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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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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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 PURPOSE AND ANALYTIC PROCESS

This report presents an analysis of the individual social factors that contributed to the community impacts from the *Exxon Valdez* oil spill and cleanup. The question that focuses this analysis is: how did social factors interact with the *Exxon Valdez* oil spill (EVOS) event to influence the type and distribution of community impacts? The emphasis is on *how* social factors functioned in the event. How did the same factor function to produce similar and different outcomes among Alaskan communities? Did some factors buffer or exacerbate community impacts? These and other questions addressed by the analysis emphasize the social and cultural processes that can link impacts with the EVOS. Our presentation of the analysis for each factor describes some of the key themes and issues and representative findings for these themes. A discussion of the issues and themes then integrates the findings about each particular social factor. In the next draft comprehensive report we will summarize and integrate all of the findings and discuss why some factors were more significant than others in contributing to community impacts. Based on this discussion we will then present an integrated analysis of these findings and their implications for natural resource managers.

The processes of completing this analysis follows common steps in qualitative methods. We first aggregate findings and descriptions about social factors from the bibliographic sources. They were then grouped according to similarities and differences. Next, these groupings were examined for issues or content regarding interactions with the EVOS or relationships to community impacts. Themes were then identified in the issues and content. These themes form the basis for developing summary discussions and explanations of the connections among social factors and community impacts.

Presentation of the analysis is guided by the practical needs of resource managers, community members, and other interested parties to understand how the EVOS influenced key social factors in exposed communities. With these practical needs in mind, the presentation has two parts. The first is a brief *definition* of each factor and its *relevance* for understanding community impacts. The second illustrates how each factor interacted with the EVOS to influence community impacts. This illustration contains summary discussions of "issues" (e.g., social conflict, reduced subsistence harvests, stress, contamination fears) related to the interaction of the EVOS and each social factor. The sources which are a basis for construction of the summary analysis are cited, including the communities addressed by the source analysis/description. References cited include those in the Annotated Bibliography and Abstracts. The result of this presentation format is a non-technical condensed summary discussion of major issues resulting from the interaction of each social factors with the EVOS.

2.0 CONTEXT FACTORS

Context factors address background information that assists in the analysis of interactions between social factors and the EVOS. They assist us by linking a wider set of relevant event and environmental characteristics with the more specific circumstances of the EVOS. To make these linkages we assume that community impacts resulted from the interaction of social factors with "environment," and "event characteristics." By "environment" we mean the biophysical adaptations and natural resource cycles of Alaskan communities. By "event characteristics" we mean the sequence and attributes of the EVOS and its aftermath as a *technological disaster*. That is, we can inform our analysis of social factors by framing the characteristics of the EVOS
in the context of similar events. These context factors emphasize the environmental stimuli and event demands to which communities reacted. By examining the relationship of specific social factors to the event and environmental contexts, we thus have a broader basis for analysis of relationships among social factors, the EVOS, and community impacts.

2.1 CONTEXT FACTOR: ENVIRONMENT

Natural resources and their annual cycles of availability influence the characteristics of rural Alaskan community life. These resources structure activities such as work and recreation. They also influence characteristics of social institutions such as family roles and economic patterns. They are also important in the ceremonies, festivals, values, and beliefs which express and give meaning to the everyday lives of rural Alaskans. The presence of "nature" and natural resources is thus multidimensional in its influence on Alaskan communities. It is not only economics, family, or cultural values that are influenced by the adaptations of these communities to their biophysical environment. Rather, the environmental context influences a complex interaction among social institutions, cultural beliefs and values, and community and individual behaviors. Any event that results in loss, damage, or contamination of the environment or its natural resources is likely to be multidimensional in its effects. Here we briefly summarize two aspects of environmental context: (1) environmental characteristics and (2) the social and cultural significance of the biophysical environmental and its natural resources.

2.1.1 Environmental Characteristics

The biophysical environment from Prince William Sound, to Kodiak Island, and on to the Alaska Peninsula is a rich and diverse ecological milieu. The literature regarding the resources of this coastal marine environment, especially post-EVOS, is detailed in its descriptions of particular resources (Rice et al. 1996). Even a causal examination of the biological literature regarding this region indicates that it has diverse, high quality resources, some of which (especially marine resources and particularly salmon and groundfish) have distinct seasonal cycles.

From Bligh Island in Prince William Sound to near the Shumagin Islands off the coast of the Alaska Peninsula, there is a highly diverse geophysical environment. In Prince William Sound, there are both wide stretches of open sandy beaches as well as deep rocky fjords. Also in Prince William Sound there are several major islands such as Montague, Latouche, Knight, Green, and Little Island which have more rocky beaches. The rocky shorelines and beaches of these and other smaller islands makes these areas ideal habitat for the seal and seal lion rookeries that are in this area. On the western side of Prince William Sound, the Kenai Peninsula juts southwest. It is separated from the Alaska Peninsula by the broad expanse of Kachemak Bay. Along the coast of the Alaska Peninsula the coast line is rugged and characterized by a mixture of small bays and many rocky and open sandy beaches. The Shelikof Straights separates the Peninsula from Kodiak Island which also has shorelines that are mixtures of deep bays, steep cliffs that abut rocky beaches, and some broad open sandy beaches.

This region can be characterized as a marine coastal environment. It has an abundance and diversity of both flora and fauna. Marine mammals (e.g., orcas, harbor seals, sea lions, sea otters, whales) exist throughout this region. Fish and other marine resources are diverse and generally abundant: there are five species of Pacific salmon, halibut, a wide variety of groundfish (e.g. Pacific Cod, black cod, pollock, sablefish), steeled, several varieties of crabs (e.g., opilio, tanner, king), shrimp and numerous other commercial and non-commercial species. Intertidal and subtidal areas are home to a diversity of invertebrates. Bird resources are numerous and diverse, including eagles, a variety of seabirds (e.g., marbled murrelets, auks, kittiwakes) and shorebirds. In fact the Copper River Delta is home to one of the greatest concentrations of shorebirds in this hemisphere. Similarly, land mammals are diverse and in some cases abundant. These resources 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. Other areas are characterized by high grasses, willows, and tundra. South of Bligh Reef, there are several major islands (e.g., Montague, Latouche, Knight) before Prince William Sound opens into the Gulf of Alaska. The coastal areas in some parts of the region (Prince William Sound, Kenai) are distinguished by deep fjords, but in other areas there are vast stretches of open beaches.

Environmental Characteristics and the Oil Spill

When oil spilled from the tanker *Exxon Valdez*, strong circulating currents in Prince William Sound spread the oil south and west from Bligh Reef, along the Kenai Peninsula, into Kachemak Bay, and then into the Shelikof Straights where it fouled shorelines along the Alaska Peninsula as well as Kodiak Island. By September of 1989, cleanup officials reported that oiling of these shorelines, bays, and beaches was extensive. By that fall, the Alaska Department of Environmental Conservation estimated the following cleaning efforts: 311 miles in Prince William Sound, 100 miles along the Kenai Peninsula, and nearly 900 miles along the Alaska Peninsula and Kodiak Island. These are conservative estimates made in the heat of the cleanup effort. Perhaps no final total will ever exist of the area oiled. However, the area exposed can be understood by placing the length of the slick in the context of other U.S. geography. This area approximates the distance from the Cape Cod coastline of Massachusetts to the southern most coast line of Virginia (State of Alaska 1989: 7).

A typical beach profile in Prince William Sound and in the other affected areas is characterized by large rocks and gravel which is over loosely compacted sediment; and, underneath these layers there is another layer of densely compacted sediment and then bedrock (State of Alaska 1989:13). The depth of the first three layers varies from beach to beach depending on the nature of the beach, the high tide lines, and the depth of the bedrock. Tides mix the cobble rock and gravel as the waters rise and fall and 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 lower 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, and the sediment layers also became contaminated. Furthermore, wave action and tides took surface oil back out to sea where incoming tides redeposited the oil, starting the cycle all over. Importantly, many of the intertidal zones are the habitat for clams, mussels, crabs, and other plants and animals used by Alaska Natives for subsistence purposes. These intertidal areas of rocky beaches were also cleaned by using hot-water high pressure hoses which attempted to root out oil which was then collected using skimmers, blotters, and other methods. In some instances, detergents and solvents were added to the hot water. The effect was to sterilize these beaches resulting in the death of most of the plant and animal life (Steiner and Byers 1990). Furthermore, the oil trapped in some of the deeper sediment layers continues to emerge, to coat rocks, and contaminate the plant and animal life along these beaches (*Exxon Valdez* Oil Spill Trustee Council 1997: 122).

Communities and Environment in the Spill Area

Native and non-Native settlements exist throughout this region. The major non-Native communities are: Valdez, Cordova, Seward, Homer, Whittier, Kenai, and Kodiak. In Prince William Sound and the Kenai the major Native villages of interest are in Seldovia, Chenega, Tatitlek, Port Graham, and English Bay. On Kodiak there are several major Native villages including Larsen Bay, Ouzinkie, Akhiok, Karluk, and Old Harbor. On the Alaska Peninsula, in the region of interest for this report, Native villages include Perryville, Chignik Lake, and Chignik Bay. These human communities, with the exception of Kenai, are located on the coast. Non-Native communities are primarily oriented to commercial fishing whereas Native communities depend on subsistence resources and some commercial fishing. The natural resources of the region, are a significant economic and cultural resource for these communities. For many people in these communities, Native and non-Native alike, this is also a “special place” because of these resources. For example,

> The first time I saw Prince William Sound, in the summer of 1980, I might as well have walked through a pass into Shangri-la. Tucked between the north coast of the Gulf of Alaska and the glacier capped Chugach Mountains, the sound was one of the few special places left in the county that seemed safely far away from the problems of the twentieth century. People had lived, hunted, and fished there for millennia, but had hardly left a mark (Steiner 1997: 112).

Further, from a Native perspective:

> The roots of our lives grow deep into the water and the land. That is who we are. We are like our brothers the bear and the deer – we live on the land, and our food is mostly from the water. Bear eat fish, deer eat seaweed, Natives eat all of the life in the water. The land and the water are our sources of life (Meganack 1989).

The characteristics of this environment provide a basis for understanding how the connections of affected communities relate to their environment. Specifically, these characteristics are essential background for understanding the meaning of spilling 11 million gallons of oil into a ecological milieu which has substantial social and cultural significance for residents of both Native and non-Native communities.

2.1.2 Social and Cultural Significance of Environment and Natural Resources

A biophysical environment is culturally constituted. What people know, their activities and interactions with their environment, and what is valued and meaningful is not random nor is it "just out there" as a fixed determinant of cultural adaptations in any natural setting. Rather, an environment becomes constructed through human interactions with it and by other social experiences as well as the transmission of community cultural traditions. Environment and natural resources are thus variables that depend on what people have been taught by their culture and how communities and individuals use and otherwise interact with these resources. This argument is developed in more detail in our discussion of the "culture" social factor, but here the point is to establish that communities construct the significance of their environment based on sociocultural processes. For our purposes here, we identify specific issues that are essential background about the social context of environment and natural resources in Alaskan communities.

Communities within the spill-affected area are dependent on the use of natural resources.

> Native and non-Native communities vary in the degree and type of dependence on natural resources. The social, economic, and cultural institutions among Native communities is dependent on the harvest and consumption on natural resources such as fish, berries, deer, and other flora and fauna. In some communities, logging and commercial fishing are essential economic activities. Among non-Native communities natural resources are the economic basis for many communities. Logging, fishing, and tourism are economic sectors that are prevalent in these communities. In varying degrees, non-Native communities are economically dependent on the harvest of natural resources or the aesthetic and other non-material value of these resources.

These resources have different meanings and values for Native and non-Native communities.

> Native communities attribute spiritual and instrumental meanings and values to natural resource use. These meanings are tightly integrated with a range of social and cultural characteristics of these communities. Among non-Native communities, natural resources have a high degree of instrumental value. However, spiritual and other

non-material values are also significant attributes of the relationship of non-Native communities to their environment. Yet, these types of values are not as tightly integrated with other aspects of social and cultural life as they are in Native communities.

Community social institutions and cycles of activity are integrated with natural resource cycles.

Among non-Native communities – especially in fishing communities – work, residence, patterns of association, and recreation, and examples of social life that are based on the cycles of availability of natural resources and especially salmon and other marine resources harvested for commercial non-commercial purposes. The activities of everyday life are integrated with the use of, and meanings attributed to, natural resource cycles. Within Native communities there are long-standing traditions of hunting, fishing, resource sharing, seasonal residence, ceremony and other sociocultural activities that tightly link these communities to natural resource cycles.

Communities have distinct preferences about resources and their use.

Native communities use a wide range of natural resources for traditional and commercial purposes. There are distinct preferences for harvesting particular types of fish, shellfish, berries, marine mammals (e.g. seals), and other wildlife (e.g., deer, bear, ducks, geese, etc.) for personal consumption. Non-Native communities have tendencies to use a narrower range of resources for personal consumption. However, non-Native communities may use a wider range of resources for commercial purposes.

Residents have multiple types of attachments to their environment.

Within Native and non-Native communities alike there are lifestyle, economic, cultural, and social attachments to the environment and natural resources. Among non-Native communities, the natural environment is often a motivating reason for residence, it offers a preferred lifestyle, and it often is the basis for individual income or a community economy. The diversity of resources, recreational activities, the spiritual value of place, and other attachments result in multiple types of attachment to place. In Native communities history, lifestyle, culture beliefs, and social institutions provide an attachment to natural resources and specific places. For Native and non-Natives alike, multiple attachments to the environment and its natural resources intertwine community, geography, flora, and fauna.

Collectively, these points indicate that both Native and non-Native communities attribute considerable social, economic, and cultural significance to their biophysical environment and natural resources. This suggests that any event which damages these resources or otherwise results in their loss or contamination will have consequences for the institutions and ways of life in these communities.

2.2 CONTEXT FACTOR: EVENT CHARACTERISTICS

The EVOS was a classic technological disaster: a human-caused accident released a substance which threatened the health, welfare, and social integrity of exposed communities. Classifying this event as a technological disaster connects it to social science knowledge about similar events. This allows framing the discussion of EVOS-social factor analysis within the context of a broader set of knowledge about significant event characteristics. However, this event also had unique attributes that add to existing knowledge about the characteristics of technological disasters and the demands they place on exposed communities. Below we describe some of the general characteristics of technological disasters and

briefly discuss the relationship of the EVOS to each one. Then we summarize the demands these characteristics place on exposed communities.

2.2.1 The *Exxon Valdez* Event: First Days

On March 23, 1989 at about 9:12 p.m., the tanker *Exxon Valdez* departed the Alyeska terminal in Valdez loaded with 53,094,510 gallons of North Slope crude oil. Winter was waning, but snow was still piled high in the streets of Valdez and there was still some ice in the ship channel. Yet, the weather was clear, the wind and the water were dead calm. Joseph Hazlewood, Captain of *Exxon Valdez* gave orders to switch to the outbound shipping lane to avoid any possible ice in the channel. After some maneuvering around ice, Hazelwood went below deck to do some paper work, leaving the ship in the command of the First Mate.

Then at approximately 12:04 a.m. the *Exxon Valdez* ran aground on Bligh Reef, just off Bligh Island in Prince William Sound. Hazlewood was called to the bridge and after some assessment of the situation he radioed the Valdez transport terminal, saying, "We've fetched up hard aground north of Goose Island off Bligh Reef . . . Evidently, we're leaking some oil and we're going to be here for awhile." He made some attempts to rock his ship off the reef. No luck. By 2:30 a.m. an oil slick from the tanker reached a half mile south. When Coast Guard officials arrived on board at 3:23 a.m. the tanks gauged that 5.8 million gallons of oil had been lost. Dawn and then daylight revealed the "big one" predicted by Cordova fishermen had indeed happened (Davidson 1990). By a little after noon, the calm seas allowed observers to see an oil slick one thousand feet wide and more than 4 miles long. More than 10.8 million gallons of oil was in the water. The oil spill response crews that were supposed to exist as part of a contingency plan were conspicuously absent from the scene. Later it would be shown that those resources did not exist (Davidson 1990).

For the next two days the weather remained calm. Ongoing efforts to transfer the remaining oil and respond to the spilled oil were underway. Exxon, Alyeska, the U.S. Coast Guard, and Alaska Department of Environmental Conservation officials discussed burning the oil, using dispersants, and booming as strategies to contain or cleanup the spilled oil. By Monday March 27, the weather had worsened causing some of the initial response efforts to be suspended. Some argue that crucial time was lost and good weather squandered by arguments and disagreements over how to respond (Davidson 1990; Keeble 1991).

In the next few days, chilling reports were filed:

> "Heavy weathered oil continues to wrap around Knight Island, Emulsified oil reported from Squire Point south to Prince of Wales Passage opposite Port San Juan. Heavy oil also reported on west side of Latouche Island" (April 1, 1989).

> "ADEC [Alaska Department of Environmental Conservation] beach surveys on Elanor Island, Ingot Island, and northern end of Knight Island show heavy contamination" (April 2, 1989).

> "Over 66,000 feet of boom deployed in Sawmill Bay. This represents 65% of total boom deployed. OSC has decided to deploy a significant amount of booming and skimmers in defensive positions to protect [salmon] hatcheries, removing capacity to fight the spill itself" (April 5, 1989).

> "Mortality rate of otters turned into rehabilitation centers is approximately 50 percent. Leading edge of oil slick 22 miles south of Nuka Bay in Gulf of Alaska . . .Oil mousse surrounds Barwell Island . . ." (April 6, 1989).
>
> "Commandant [U.S. Coast Guard] meets with representatives of Exxon, ADEC [Alaska Department of Environmental Conservation], and fishermen. Exxon presents shore clean-up execution plan . . .oil in the gulf between Cape Junken and the Chugach Islands may be driven northward and may reach shoreline in that area due to predominately southeast winds. Clean-up operations temporarily stopped due to reports of exposures to harmful vapors . . ." (April 16, 1989).
>
> "Adverse weather continues to hamper efforts to skim oil" (April 24, 1989).
>
> "Tank cleaning and repair activities on *Exxon Valdez* continue . . .Cleanup operations in the western Gulf of Alaska continue to be hindered by adverse weather . . .Various super-suction devices have been tried with limited success . . ." (April 25, 1989).
>
> Source (Alaska Oil Spill Commission Records ACE 933709-933727 from U.S. Coast Guard Pollution Reports).

Residents in Prince William Sound communities engaged in some early efforts to boom off critical habitat and to protect fish hatcheries (Davidson 1990; Keeble 1991). Others also took matters into their own hands and tried to rescue the wildlife oiled by the spill. The scenes that people observed were disheartening. For example,

> [He] anchors the *Pagan* in a small cove off Disc Island. [He] sleeps on deck and when he awakens, he sees the oil. It is thick and sludgy. Two red snapper ride belly-up on the surface . . .as the *Pagan* leaves the cove he watches a small flock of murres [sea birds] trying to lift off ahead of the hull. They flap and flounder, and beyond them, five sea otters are frantic. Oil-soaked, they are having trouble staying on top. They pop up through the oil, swimming violently, rolling, trying to scrape their thick coats clean. They sink (Simms 1989: 100).

And,

> No matter where you went it was black. A bird would fly in, it would start to struggle, and then it would go under. Kelly (Weaverling) and I went to this one beach where the oil was almost over the tops of our boots. We heard a noise. It was a loon – a big loon. All we could see was its head sticking up out of the oil. Its eyes were red and it made that eerie loon call. I grabbed him and pulled him out of the sludge. He was just covered . . .I mean, I couldn't even hold onto him. The loon was sliding out of my hands and biting me. Kelly just stood there in shock. Then he started to cry (Davidson 1990: 137).

Bald eagles, whales, seal lions, sea otters and other wildlife suffered. Cleanup was not an easy experience for those who witnessed what occurred. For example, a veterinarian from Cordova focused his efforts on rescuing otters. He observed,

> The otters I found on the beaches were all curled up. You'd see a glob of oil out their other end, by the anus . . .Some of those still alive are blind. They swim around bumping into rocks. Sometimes their central nervous system seemed to be gone: they'd

> swim right up to us and knock their heads on our boat. They were either blind or brain damaged (Davidson 1990: 149).

These types of experiences took their toll on those who witnessed them. For example,

> After a while you don't get angry. Anger is way in the back. You have moved far beyond being angry, because everything around you is dead. Before I went out I was mad. Mad at the bumbling. Then you get out there. You hope it's going to be limited, not so bad. As times goes on, the oil keeps spreading. More death. You just keep going into deeper and deeper depression. Finally, I had to get out of it for my own sanity (Davidson 1990: 153).

But it was not just oiled otters and red-eyed oil soaked loons that disheartened the residents in the affected communities. They saw coastal areas where they did commercial fishing oiled, and Natives saw beaches where they collected mussels and clams soaked with oil. Places where people picnicked and spent summers sport fishing with their family were blackened with oil. Places important to people were harmed and valued resources were contaminated. People feared for their futures. Uncertainty was pervasive about what would happen to fishing, what would happen to subsistence, what would happen to their boat payments and mortgages.

Exxon took responsibility for cleaning up the oil. A large cleanup operation was launched. Priority in hiring for cleanup work was given to local residents and especially fishermen who could not fish because the state had closed many areas to commercial fishing. However, Exxon controlled what was to be done and how it was to be done. But, the result was that large amounts of money were spent and some of these directly benefitted those who could not fish or those who lost business because of the spill. Cleanup crews often spent extended amounts of time away from home, but for some the $16.69 per hour rate plus overtime was incentive enough given the uncertainty of other options (Davidson 1990). Some crews were employed deploying booms, others in using high and low pressure beach washers to cleanup the oil. Other crews used absorbent pads to blot up oil on beaches. Among some cleanup workers there was concern about the "sincerity" of the cleanup effort by Exxon: was this a cleanup or was it a 'buy off' to help Exxon's corporate image? The cleanup was an effort that for some seemed futile, and for others it seemed immoral and an effort to pay off fishermen and other with 'blood money' (Davidson 1990; Impact Assessment, Inc. [IAI] 1990d). The cleanup itself became controversial and its privatized implementation was judged a major source of distress for many who participated (IAI 1990d).

2.2.2 The *Exxon Valdez* Event as a Technological Disaster

Social science has only recently differentiated between technological and natural disasters. This differentiation was made because the community and individual impacts of technological disasters have different characteristics than those of natural disasters (Berren, Beigel, and Ghertner 1980). These general characteristics provide a frame for assessing the specific demands on Alaskan communities resulting from the oil spill and its aftermath.

- Technological disasters are human-caused and usually involve issues of blame and responsibility for what is evaluated as a preventable event.

  The grounding of the *Exxon Valdez* was evaluated as a preventable accident by a major oil industry corporation. Blame for the accident was parsed out among Captain Joseph Hazlewood, the Exxon Corporation, the Alyeska Corporation, the U.S. Coast Guard, the Alaska Department of Environmental Conservation, and other state of Alaska oversight agencies. Initial response to the event was evaluated as inadequate, in part because resources that were identified

in mandated contingency plans for oil spill response were not available. Communities expressed concern about the absence of oversight and perceived negligence by the oil industry in protecting a resource rich environment.

C Contamination or other environmental damage results from the release of a potentially toxic substance.

This is an essential and fundamental characteristic of technological disasters. This exposure to potentially toxic substances is said to result in "dread" about the possible effects on the contaminated / damaged environment or resources as well as for the public health of nearby communities. A wide range of marine and other resources were contaminated or damaged by spilled oil. Some communities had their shorelines directly oiled. Others experienced the oiling of resources which they used for commercial or subsistence purposes. Concerns developed about the for personal and community health as well as for the future of the exposed resources.

C Publics maintain a persistent uncertainty about the environmental and health effects of exposure to potentially toxic substances.

Communities expressed concerns about the oiling of natural resources and their long-term and short-term environmental and health effects. State of Alaska agencies made initial responses to these concerns, but uncertainty persisted about health effects of exposure to hydrocarbons through use of fish and other wildlife used for subsistence purposes. Immediate damages to wildlife and other natural resources was apparent and widely publicized through all media sources. Publics raised concerns about the "ecosystem" effects of exposure to potentially toxic levels of hydrocarbons. Uncertainty persists among Native and non-Native communities about long term environmental damage related to the spilled oil.

C Media coverage informs individuals about the toxic exposure or contamination and its effects.

Most technological disasters are low probability, high consequence events. This in part accounts for why they attract extensive media attention. Three Mile Island, Love Canal, Times Beach, and the EVOS are each examples of this. Such coverage exposes individuals to selected aspect of the event and its consequences. Few people are unaware of what happened and some of its effects. In the case of the EVOS, media coverage was extensive and often dramatic in portraying the effects on wildlife, shorelines, and individuals. Some researchers argue that a "social amplification of risks" associated with such events raises public concerns about health and other impacts from technological disasters.

C There is often no clear sense of an end or low point after which life returns to normal.

Many Alaskan communities have no sense of a final resolution to the EVOS. Neither the cleanup, the litigation process, nor restoration efforts have resulted in a sense that the event is resolved. This is a function of the persistent uncertainty about environmental damages, a lengthy and contentious litigation process, and the lack of resolution for some economic damage claims. There is a trend to evaluate life in terms of before and after the oil spill, an indication that definitions of what constitutes a return to "normal" life is changed.

C The longer the duration of an event, the more prone individuals and communities are to social and psychological impacts.

Natural disasters tend to have a shorter duration than technological disasters. In the latter, duration is extended by the following circumstances: uncertainty about long term health or environmental effects, disputes over blame and responsibility, litigation, and restoration. The EVOS continues as a notable event in many Alaskan communities. Whereas some individuals have recovered economic damages, other perceive they are still owed. Some fisheries, especially herring, are not at pre-spill status, resulting in a sense of a continuing event. Litigation and restoration each contribute to the sense of a continuing event in some communities.

C Stress reactions and other psychological symptoms develop, sometimes well after the initial phases of an event, and often have a longer duration when compared to natural disasters.

Research suggests that psychological symptoms and stress reactions developed in exposed communities after the oil spill. There is some evidence that these responses were related: (1) to the trauma caused by the event itself; and, (2) to social disruption related to the EVOS. The findings about this characteristic of the EVOS are developed in later discussion of the "Social Health" social factor. Here we note that individual and community stress reactions developed immediately following the oil spill and appear to have persisted for years following the event.

C The scope of an event influences the perceived ability of individuals to respond to and overcome its effects.

The *Exxon Valdez* spilled nearly 11 million gallons of crude oil into Prince William Sound. The spilled oil fouled shorelines from Bligh Reef to Kodiak and on to the Alaska Peninsula. This event was reported as the largest event of its kind in history. Individuals who directly observed the oil slicks reported it as immense in size and potentially devastating in its effects on the environment. The combination of the reported spill of millions of gallons of oil, the reactions of direct observers to the oil slick, and extensive media coverage of damages to wildlife established this event as enormous in scope. Despite the perceived scope, individuals and groups initially organized response efforts to rescue oiled wildlife, collect oil, and protect their community shorelines.

C Community members perceive a lack of control over an event and its effects which can result in feelings of helplessness and an inability to effect resolution of the event.

Despite the perceived enormity of this event, there were efforts to respond. Perceived helplessness was not initially pervasive. However, as the privatized cleanup proceeded it all but excluded volunteer participation by groups such as the Cordova 'Mosquito Fleet' and the collection of oil by boats from Kodiak, Cordova, Seward, and elsewhere. Feelings of helplessness among community members developed, but they are related to a perceived ineffective privatized cleanup controlled by the spiller.

C Social divisiveness usually results related to different evaluations about what happened, why it happened, duration, and effects.

The social divisiveness that characterizes many technological disasters (e.g., Couch and Kroll-Smith 1991) was present in the EVOS. These conflicts were related to different evaluations about spill-related effects, participation in the cleanup, litigation, and restoration efforts. All phases of this event have resulted in conflicts in some communities. These issues are analyzed in our discussion of the "Social Organization" social factor.

C "Home" and the "sense of place" are perceived as spoiled or threatened.

Among Alaskans, it appears that beliefs and experiences with natural resources have instilled a strong sense of the ability of "nature" to recover "on her own" from even a major occurrence such as the EVOS. However, there were initial reactions that the spilled oil and perhaps efforts to clean it up, forever damaged marine resources. There is also a theme that a special place, the "pristine" environment into which the oil was spilled, has been spoiled, or at least, it is threatened with being spoiled by continued exposure to supertanker transport of crude oil.

C Community ability to develop social support and take effective action to restore social equilibrium – often termed "therapeutic community" – is compromised.

The traditional cultural belief of many American communities is that people pull together in times of disaster. Floods, earthquakes, and other such events provide ample evidence of such pulling together, the formation of a therapeutic community to provide emotional and instrumental support to recover from disaster effects. The social divisiveness that usually accompanies technological disaster often undermines the formation of a therapeutic community. Social divisiveness was one contributing factor to undermining formation of therapeutic communities, but the privatized cleanup was equally important. The absence of a therapeutic community in the immediate aftermath of the spill appears to have exacerbated some social and psychological impacts.

C There is often diminished public trust in responding agencies and organizations.

Government agencies, federal and state, were highly criticized by Alaskans immediately after the oil spill and cleanup for their failures to protect communities and natural resources. Local governments fared better than state or federal agencies in most instances, but there were notable exceptions – e.g. Kodiak, Seward, and Valdez, where federal and state agencies received praise for specific efforts during the cleanup. Post-spill and cleanup, publics perceived a need to form oversight groups to assist in the prevention of future spills. These oversight groups are a direct result of a lost of trust in some federal and state agencies to realistically assess the potential for damages from any future oil spills.

C Legal definitions and issues regarding blame, liability, and damages frame the identification about event effects and recovery.

Federal and state laws do not necessarily recognize social or community impacts as legitimate outcomes of technological disasters. Damages to natural resources often become the focus of litigation efforts. The EVOS provides a clear example that social impacts are under-recognized in these types of events. Resources are not always allocated to mitigating or addressing social impacts which can then exacerbate these effects. Where litigation issues dominate the recognition, then social impacts tend to be under-emphasized and under-addressed during critical phases of the event.

C A privatized cleanup which employs community members can both generate as well as mitigate community impacts.

Natural disasters often involve voluntary community response efforts as well as organized responses by disaster agencies (local, state, federal). Volunteer response efforts result in varying degrees of effectiveness, but community solidarity is often enhanced by their efforts

(Drabek 1986:178-182). This enhanced solidarity is said to mitigate the socio-psychological effects of disasters. Technological disasters often require specialized response efforts. Either the threats posed by the substance released requires technology for safe or effective cleanup or there are liability and other legal or regulatory issues that limit voluntary public involvement. In the EVOS there were initial voluntary response efforts, but these were discouraged in favor of a privatized cleanup organized by the spiller. This privatized cleanup employed community residents as well as workers from outside their communities. Work was controlled and directed by the Exxon Corporation through independent contractors.

The privatized cleanup discouraged development of community solidarity. It also resulted in conflicts among community members who competed for the relatively high-paying cleanup jobs. A debate developed about the sincerity and effectiveness of the privatized cleanup. Some argued that it was only a "public relations" cleanup. Others argued that it was ineffective. Still others perceived they could be effective if they were allowed more independence from the control of the contractors. Some community members declined to participate in this type of cleanup creating divisiveness regarding the nature and morality of the cleanup.

Some individuals displaced from their regular fishing industry or other work by the oil spill participated in the cleanup. Others did not. The economic benefits of participation in the cleanup were not uniformly distributed. Some experienced substantial economic gain from cleanup participation. Others were either not hired or chose not to participate. In some communities, especially small Native communities, a large segment of those eligible for work participated. This sometimes resulted in a loss of local government and medical staffing who opted for more lucrative cleanup employment. Similarly, wage workers in restaurants and other commercial establishments left their jobs for cleanup work, placing strains on the operations they left.

While the cleanup resulted in infusing cash into economies damaged by the oil spill, there were also adverse social consequences. These were primarily social disruption related to: the distribution of economic benefits, conflicts over the morality and effectiveness of the cleanup, loss of community services by individuals choosing cleanup work, changes in family roles and routines, and concerns about damages to cultural and other resources.

This list of characteristics is not exhaustive, but they address some of the major features of technological disasters which are directly applicable to our assessment of the interaction of the EVOS and key social factors. These characteristics place this event within the frame of technological disasters and point to certain types of interaction between social factors and the particular characteristics of this event.

2.2.3 Demands Resulting From the *Exxon Valdez* Event as a Technological Disaster

The characteristics of EVOS resulted in some general demands on the resources of exposed communities. The demands were for resources to address the following issues:

- Communication about what happened.
- Organizing a community response to the event.
- Interaction with agencies and corporations outside the local community.
- Damages to the environment, including wildlife and other natural resources.
- Threats to loss of personal income and community economic well-being.
- Threats to personal health and community well-being.
- Threats to the maintenance of community services.
- Social support of individuals and groups stressed by the event.

- Community conflict.
- Information about contaminated resources.
- Recovery of individual and community damages.
- Restoration of damaged resources.

These general demands were experienced, to some degree, by most communities. However, an important characteristic of the EVOS is that it was not experienced in the same way by all communities. Rather, some places were oiled more than others. Some fisheries were disrupted but others were not. Some community food supplies were contaminated but others were not. Cleanup activities varied in duration and structure. Some Alaskans never saw an oiled bird or otter whereas others witnessed truck loads of dead birds, otters, and other wildlife. Phases of the event (the initial spill, the organization and implementation of a privatized cleanup, litigation, and restoration) also affected communities differentially. Some communities experienced the spill as the most disruptive and destructive phase while for others it was the cleanup and in still others restoration is perhaps having some of the most long lasting effects. In many instances the differences in how communities experienced in the EVOS are slight, in other instances that are substantial. However, this variability of the event is important for understanding community impacts because: (1) communities had different resources for responding to common demands; and, (2) there were many variations on the demand characteristics.

3.0 SOCIAL FACTOR: CULTURE

The least systematic and comparable social factor information exists about the effects on culture of the EVOS. However, there is abundant information about some aspects of culture, specifically practices as an aspect of Native culture. The issue of subsistence is addressed in a separate section, so we include only limited reference to it in this section. Other information about cultural variables presented in the literature is limited both in breadth and depth. Yet, in several key places culture or aspects of culture are addressed that suggest that although it may not have been systematically developed in most EVOS research, it was nonetheless important in some instances. Given the potential importance, but limited information about culture, the information here is much more general than for other social factors. But, even these very general points are relevant to understand community impacts from the EVOS.

3.1 DEFINITION AND RELEVANCE

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 1984); (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 – (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).

There are two major reasons that culture is a relevant social factor for this analysis. First it calls attention to the "big C" idea that there are different cultural groups that were exposed to the EVOS. These groups may differentially interpret, assign meanings, values, assess effects, and evaluate restoration based on

cultural variables (e.g., beliefs, values, propositions, adaptations, and other ways of life). Given the history, traditions, and ways of life of different cultural groups in this region, an event such as the EVOS may be have unique outcomes for Natives and non-Natives. Second, the "little c" notion of culture focuses attention on variation among groups in their assessments of the causes, processes, outcomes, and characteristics of restoration of this particular event. Specifically, it suggests assessment of how the sub-cultures of communities, corporations, governments, and other distinct groups (e.g., fishermen) affected responses to the oil spill and its aftermath. Culture is an inescapable dimension of the EVOS, both in terms of cross-cultural and intra-cultural differences in responses and community outcomes.

3.2 CULTURAL VARIABLES AND THE EVOS

The literature about culture and the EVOS primarily discusses on the "big C" idea of differences between Native and non-Native communities (e.g., Palinkas et al. 1990, McClintock 1989, IAI 1990c, Gill and Picou 1997). This literature tends to present "cross-cultural" differences in the effects of the event, usually focusing on differences in social organization or subsistence traditions rather than developing beliefs, values, or other cognitive and expressive elements of culture. However, the Native tradition of "subsistence" is discussed in some detail in several sources as an example of the interaction of culture and the EVOS. There is little analysis of differences among organizational, community, and corporate sub-cultures (culture with a "little c"), but there is information in the literature to suggest some broad generalizations which are developed in this section. Similarly, there is also information about other typical aspects of cultural beliefs regarding natural resource orientations, and some very broad assessments of differences in values and beliefs that affected responses to and effects of the EVOS. However, in the literature these are not usually analyzed as elements of culture. We have extracted relevant points and integrated these for our analysis. In sum, culture is an under-developed variable in the literature other than where it distinguishes some very broad differences between the Native and non-Native communities.

3.2.1 Native Culture and the EVOS

The most general discussion of culture and the EVOS concerns differences in Native and non-Native traditions. Some of the earliest work examining the effects of the spill visited several Native villages (McClintock 1989). These descriptions of spill effects often emphasize subsistence activities. However, this institution is not placed within the larger context of Native culture. Nor does it otherwise note cross-cultural differences as meaningful. Most later work raises the issue of cross-cultural influences of Native culture and the EVOS. However, these works tend to focus on subsistence traditions as the essence of Native culture. In fact, cross-cultural differences focus on subsistence (e.g., ADF&G 1995), with good reason since it is, in fact, one key aspect of Native culture.

> The oil spill destroyed more than economic resources, it shook the core cultural foundation of Native life. Alaska Native subsistence culture is based on an intimate relationship with the environment. Not only does the environment have sacred qualities . . .But their survival depends of the well-being of the ecosystem and the maintenance of cultural norms of subsistence (Gill and Picou 1997: 168).

> Subsistence is a core cultural institution in Native communities. Damage to subsistence resources and to the meaningful activities that are part of this core institution disrupts meaningful connections between individual and cultural identity. The significance of this point cannot be overstated because embedded in the activities of hunting, fishing, and gathering is a way of life, a set of values, a way of seeing the world that values bears, salmon, eagles, and water as spiritual and social as well as economic resources. Threats to the resources and activities that are so fundamentally embedded

> within Native culture thus threaten that the linkages that provide continuity between individual identity, social experience, and Native culture (IAI 1990d: xii).

Perhaps the most eloquent statement about Native culture was made in a June, 1989 address to the Alaska Conference of Mayors by Walter Meganack, then Chief of Port Graham village. Chief Meganack observed,

> The Native story is different from the White man's story of oil devastation. It is different because our lives are different, what we value is different; how we see the water and the land, the plants and the animals is different. What White men do for sport and recreation and money, we do for life: for the life of our bodies, for the life of our spirits, and for the life of our ancient culture. Fishing and hunting and gathering are the rhythms of our tradition, regular daily life times, not vacation times, not employment times (Meganack 1989:1).

Chief Meganack's statement and the others cited above illustrate that Native traditions are historically and culturally distinct from non-Native communities. These differences include the meanings attributed to Native historical and traditional connections to their environment and the relationship of these connections to social behaviors (e.g., resource sharing) and institutions (e.g., kinship). However, discussion of this larger meaning of culture is limited in the current literature. Nonetheless, there are themes in the literature that describe disruptions of processes that link individual experience, social interactions, and cultural values, beliefs, and practices.

Some literature (e.g., IAI 1990c; Dyer, Gill, and Picou 1992; Fall and Field 1996; Palinkas et al. 1993; ADF&G 1995) describe disruptions of subsistence activities as affecting participation in meaningful expressions of Native ways of life. These disruptions alienate individuals from cultural processes that link individual and cultural identity. This alienation results in individual as well as social anxiety and increases in problems such as domestic violence and alcohol use (e.g., IAI 1990d, 1990c; Palinkas et al. 1993; Russell et al. 1996; Gill and Picou 1997; Dyer, Gill, and Picou 1992). Other literature argues that damage to subsistence – a core cultural institution in Native communities – "damages" Native culture (Braund & Associates and Usher 1993). Jorgensen (1995) has observed that characterizations of culture as "damaged" reify culture. However, the data presented by Braund & Associates and Usher (1993) show that the disruption of subsistence activities had important consequences for how Native's experience their culture and the connections between cultural identity and personal identity. From our perspective, Braund & Associates and Usher may be logically incorrect, but application of the concept of "alienation" to their data makes the information a valuable illustration of the disruption of essential connections between subsistence and other aspects of Native ways of life.

This same type of argument can be applied to the data about damages to archaeological sites. Bittner (1996) presents information that shows that valued archaeological and historical sites were damaged or vandalized during the EVOS cleanup. Such sites and other cultural resources are meaningful expressions of Native culture. Damage to these types of cultural resources alienates individuals from them and such alienation is itself a source of stress and disphoria.

Another theme in this literature is the notion of the resilience of Native culture (IAI 1990d; Wooley 1995). This approach argues that Native culture has endured past disasters and other damaging consequences from its interactions with non-Native cultures. The EVOS, although it may have had some short term social and economic consequences, demonstrates the ability of Native culture to endure and recover from adversity. This notion emphasizes the resiliency of cultural institutions to endure short-term impacts that do not change the fundamental adaptations of a people to their environment.

3.2.2 Differences in Corporate and Community Cultures

An under-developed point in the EVOS literature is the effects of differences in Exxon's corporate culture and the cultures of Alaskan communities. The relevance of this point is suggested by other disaster research about the effects of corporate and government organizations of the identification and acceptance of risks (e.g., Short and Clarke 1992). The essence of this argument is that organizational structure, interests, values, and orientations (i.e., organizational culture) influence the identification, assessment, and response to environmental risks.

Organizational culture can mitigate or enhance the risk experienced by populations exposed to toxic substances or other threatening technologies (Clarke 1989). Although these works focus on the notion of risk (a culturally influenced proposition), the basic argument can be generalized to situations such as the EVOS. That is, in its response to the oil spill, Exxon was guided by its own "corporate culture" that defined and responded to this event in a culturally specific manner. Exxon corporate culture is based in traditions of natural resource extraction and transport, it has values and beliefs such as profit and loss, corporate image, and legal liability; and, its relationships with other entities are formal, institutional, and often non-local. On the other hand, Alaskan communities have different historical and traditional connections to natural resources; their values and beliefs concern community well-being and preservation; and, their relationships are predominately informal and primarily local. During most phases of the EVOS, these two cultures clashed.

Some literature regarding the EVOS examines interactions between communities and the Exxon Corporation during the oil spill and cleanup (McClintock 1989; IAI 1990d, 1990b; Davidson 1990; Rodin et al. 1997). These interactions are described, but there is only minimal analysis of the consequences of interactions between these two sub-cultures. Although discussion of this cultural issue is more latent than manifest in the literature, even a casual reading suggests that the consequences of interactions between these two cultures was often mistrust, miscommunication, hostility, conflict, and litigation (IAI 1990d, 1990b; McClintock 1989; Picou, Gill and Cohen 1997).

The clearest example of the effects of these cultural differences is in the implementation of the post-spill cleanup by Exxon and its contractors. With its own organizational approach – that was set within the context of corporate responsibility, legal liability and corporate image – the structure and implementation of the cleanup often resulted in the alienation of cultural and social institutions in Alaskan communities. For example, McClintock (1989) offers several examples which describe a too bureaucratic Exxon structure that did not trust local people. Their cleanup measures sometimes displaced measures locals perceived to be more effective. This was often evaluated as satisfying Exxon's bureaucratic needs, but not community needs to protect their beaches, shorelines, and other resources (IAI 1990d, 1990c).

The value communities placed on protecting themselves became displaced by the implementation of the Exxon cleanup. Often conflicting needs arose: individuals had the choice of participating in the lucrative Exxon cleanup according to their rules or not participating at all. The alienation of the need to do something effective from the structure for action sometimes resulted in individual anxiety and community distress (IAI 1990d, 1990c; Rodin et al. 1997; Davidson 1990; McClintock 1989; Endter-Wada 1993). Some work argues that this ultimately created feelings of helplessness and had adverse effects on social support (Russell et al. 1996). Other community consequences of the privatized cleanup are discussed in more detail in the "social organization" section.

3.2.3 Beliefs, Values, and Cultural Knowledge

We summarize two examples of how cultural beliefs, values, and knowledge interacted with the EVOS. These examples discuss environment and natural resource orientations, sense of place, and perceptions of

risk and threat. Each of these stands out as an example of the interaction of community cultures with the EVOS. We emphasize, however, that these cultures are by no means uniform. In fact, we have stressed that the content of community culture is variable. Importantly, this variability contributes to accounting for different effects of the EVOS on Alaskan communities.

Environment and Natural Resource Orientations

Native and non-Natives each have significant cultural attachments to their biophysical environments and natural resources. In general, Natives have extensive cultural knowledge about the flora, fauna, and natural cycles in their environment; and, they value natural resources for aesthetic, instrumental, spiritual, and existential reasons (Jorgensen 1995; ADF&G 1995). The cultural adaptations of Native communities (e.g., community activities, significant social behaviors and institutions, and cultural ceremony) are centered around natural resource cycles (cf., Jorgensen 1990; McNabb 1993). Indeed, the individual experience with their environment becomes a pathway to reinforcement of cultural identity. There are numerous examples in the literature about Native Alaskans that express this sense of connection between the environment, individual and their culture. Here are a few notable examples:

- A Native participant in the Oiled Mayor's study from Karluk village commented: "These people out here, their environment is them. I'm talking the social environment and natural environment. And if either one's damaged, it damages the people itself, their self-esteem . . ." (IAI 1990c: 70).

- A similar sentiment, this time couched in the idiom of subsistence expresses a similar idea, "When we worry about our subsistence way of life we worry about losing our identity . . .It's . . .that spirit that makes you who you are, makes you think the way you do and act the way you do and how you perceive the world and relate to the land. Ninety-five percent of our cultural tradition now is subsistence . . .it's what we have left of our tradition (IAI 1990c: 274-275).

- Chief Meganack expresses the connection of Native life with the environment succinctly: "The roots of our lives grow deep into the water and the land. That is who we are. We are like our brothers the bear and the deer. We live on the land, and our food is mostly from the water. Bear eat fish, deer eat seaweed, Natives eat all of the life in the water. The land and the water are our sources of life. The water is sacred. The water is like a baptismal font, and its abundance is the holy communion of our lives" (Meganack 1989:3).

These types of statements express a multi-stranded connection between Native culture, individuals, and their environment. Clearly, an event such as the EVOS which kills, pollutes, and otherwise damages natural resources will affect the elements of Native culture that connect them with their environment. The discussion of subsistence in Section 4 will develop the specifics of these consequences in more detail. Here we point out that the value and significance of environment and natural resources damaged by the oil spill directly affected Native experience of the world.

Non-Natives also have significant attachments to their environment. In comparison to Natives, there is less traditional ecological knowledge, less integration of language and this knowledge, and more emphasis on instrumental than on spiritual, existential, and aesthetic values attributed to nature (Jorgensen 1995). Nonetheless, just as there is variation among Native communities in the spiritual and instrumental values attributed to nature, there is also variation in non-Native communities. The important issue here is that there are significant instrumental, spiritual, aesthetic, and existential values attributed to nature and natural resources. These values are part of the attachment of non-Natives to their environment and communities. These attachments are expressed in a large body of literature that discusses non-Native ways of life in Alaska (e.g., Lord 1997). The importance of the instrumental values of these resources is

certainly expressed in commercial fishing communities (cf., Davidson 1990; IAI 1990d; Picou and Gill 1997). However, the aesthetic and spiritual values about nature are also of cultural value in the ways of life in non-Native communities. The environment is often characterized as a nearly "pristine" example of wildness and beauty. These pristine surroundings, hunting and fishing, and the organization of life around many of nature's rhythms is part of the culture of many rural Alaskan communities that expresses their natural resource orientation.

The literature suggests that in the immediate aftermath of the spill there were many painful expressions of the effects of environmental damages from the EVOS. Newspapers, television coverage, and later collections of writings (e.g., O'Meara 1989; Frost 1990) express the anguish experienced by non-Native Alaskans. For example,

> The natural world of Prince William Sound is not just scenery; it is a vital part of our continent's living community, a community that includes all of us, a community that supplies the air we breathe and the food we eat. Any wound to that community diminishes the environment we depend on every moment of our lives, takes away from its capacity to sustain us, whether we live near the disaster or far away, in small villages or huge cities (Nelson 1990: 46-47).

These types of expressions suggest that individuals experienced an alienation from their cultural values about their environment and its resources. This alienation was experienced by individuals and groups within communities (IAI 1990c; Russell et al. 1996). The effects of alienation are a loosening of the bonds between culture and social organizations. Taken it its extreme, this results in poor adaptation of a group to a changing environment.

Perceptions of Threat and Risk

The idea of "perceived risk" and risk-related community impacts derives from work which indicates differences in public perceptions of risk and the assessments of technical risk assessors (Slovic 1987; Shrader-Frechette 1991). Government regulators and technical risk assessment experts have argued that public "misperception" of the risks associated with hazardous facilities or exposure to toxic substances were either irrational or based on public misunderstandings of fact. The "real risks" are those constructed by the technical risk assessment process (Star and Whipple 1980). However, social and behavioral science approaches have demonstrated that public perceptions of threat and risk are not necessarily influenced by education about "real risks" (Johnson and Covello 1987; IAI 1990d). Rather these "perceived risks" are based in community processes and values. These "perceived risks" are just as "real" as those presented by those versed in probabilistic risk assessment, but their logic begins with different premises, different assumptions about risk, and different signs and signals of threat. More accurately, these "perceived risks" are "community-based risk assessments" that express the values, concerns, and relationships of a community to a disaster event. Community-based risk assessment may thus focus on a different set of issues than those of probabilistic risk assessors and these concerns may result in socioeconomic impacts.

There are several specific issues in the literature about the EVOS that incorporate the idea of perceived threats and risks. The following topics address the primary issues of concern for this discussion.

- Native fears about contamination of subsistence resources.

This discussion overlaps some with our analysis of subsistence social factor analysis, however, here we emphasize the cultural influences on these contamination fears. As discussed in detail in section 7, fears about contamination of subsistence resources are among the most widely reported issues about the

community effects of the EVOS (e.g., McClintock 1989; Davidson 1990; IAI 1990c, 1990d; Picou and Gill 1997). These fears contributed to reported changes in subsistence hunting, fishing, and gathering (IAI 1990c, 1990d), decreased sharing of subsistence resources (IAI 1990c, 1990d), adverse consequences on the diet of elderly Native residents, and declines in the consumption of subsistence resources (ADF&G 1995; Jorgensen 1995).

- Perceptions of increased threat/vulnerability to environmental resources.

In non-Native communities residents used traditional ecological knowledge about their environment and its resources to assess the threat posed by the spill to natural resources. This traditional knowledge was often dismissed by Exxon and government agencies (McClintock 1989; IAI 1990d; Picou and Gill 1997; ADF&G 1995). Community assessments of threat and vulnerability to adverse environmental effects differed from that of Exxon (IAI 1990c; McClintock 1989). This contributed to suspicion and mistrust between communities and corporate and government entities involved in the cleanup. Similarly, in Native communities individuals used traditional ecological knowledge to assess threats and damages to natural resources. For example, ADF&G work in Tatitlek and Chenega suggest that Natives used specific cultural-ecological knowledge and experience to judge environmental damages:

> They keep telling us it's a bunch of stuff: Could be a hard winter. I mainly get deer. I still blame it on the spill. [There were some] meetings a couple weeks ago . . .They don't mention the spill. We argue with them. I disagree when they say the oil didn't have anything to do with it. It's the oil. The deer were eating the oiled kelp. There are fewer deer now. Deer are way down since I moved here in '83. [You] used to see them frequently. I didn't even get my limit last year. You have to walk miles and miles before you see them.

This statement directly suggests that based on traditional ecological knowledge of this study participant, deer populations were decreased by the oil spill, despite assessments by those outside their community. The following statement suggests a similar point:

> By 1993, traditional knowledge about food safety and edibility continued to inform people's decisions about subsistence uses. In addition, public health advisories had been disseminated in villages through the work of the Oil Spill Health Task Force. But doubts persisted that traditional and scientific knowledge were not enough to answer questions about what the spill had done. In the view of many of the people interviewed as part of this project, and especially in Prince William Sound and among Alaska Native people, the spill had caused fundamental changes to natural resource populations and the natural environment overall that have yet to be adequately explained. This uncertainty has had profound effects on the outlook for the future that people expressed in several communities, such as Tatitlek, Chenega Bay, and Cordova. This remains an important long-term impact of the spill (Fall 1995 in ADF&G Chapter 24).

Based on the traditional ecological knowledge and experiences of both Natives and non-Natives, residents in spill-affected communities believe the EVOS caused damages and environmental threats that were either uncertain or unacknowledged by scientific experts, Exxon, or government agencies.

- Assessments of vulnerability to similar events in the future.

In some communities exposed to the effects of the EVOS, there are perceptions of increased vulnerability to negative effects from future oil spills. In the Oiled Mayors Study household survey (IAI 1990d), 54% of participants felt that the effects of the spill would last more than five years; and more than half of all

individuals interviewed thought that another oil spill would occur in the next ten years. Those individuals exposed to the oil spill are more likely to perceive another oil spill will occur in the future than those not exposed. Ethnographic interviews for the same study also indicate a perception that the future of individuals and communities are uncertain because of the potential effects of future oil spills. Some of these interviews indicate changes in their feelings about the home and community as a safe haven from the threats and problems of modern life, including future oil spills. Work on subsistence issues in Native communities reported by ADF&G (1995) suggests that Native communities perceive vulnerability to future oil spills and additional contamination of natural resources. These assessments by Natives and non-Natives has raised overall awareness about environmental issues in general (Steiner 1997) and particular concern about oversight of oil transport through waters of Prince William Sound and the Gulf of Alaska (IAI 1990d; Clarke 1997).

- Perceptions of changes in home and sense of place.

The literature has two major themes about the sense of place and home among residents of Alaskan communities. One theme is related to non-Native communities in which home and place are perceived as "paradise found." The other theme is related to Native historical traditions which value home and place as "people of the land and water." For both Native and non-Native communities, the effects of the EVOS have been a change in pre-spill assessments of home and place (IAI 1990c; Russell et al. 1996; ADF&G 1995). Post-spill, home and place do not correspond to the same pre-spill ideals of either "paradise found" or "people of the land and water" although the findings for Native communities require some careful interpretation.

"Paradise found" is expressed in the following comment of a participant in the Oiled Mayor's Study:

> I've lived out in the bush and wilderness . . .my kids have been raised in wall tents, and dories, and deer skin rugs and fish drying . . .I've really lived in nature and in the environment . . .and so I kind of was an escapist . . .I thought the oil spill made me really sad, I had to be active for the rest of my life . . .Its like the rest of the world came to me, and said 'you can't run away any more' We have covered too much in the earth and there is no place left to hide (IAI 1990c:56).

This theme expresses Alaska communities as a "last best place" and a refuge, if not escape, from "the other world" of mainstream America. In "paradise" pollution, toxic contamination, and the threats of modern technology are not expected. In "paradise" life is authentic and close to the rhythms of salmon spawning and the calls of migrating Sandhill Cranes which signal a change of seasons more than does the calendar. However, the EVOS challenged the assumptions of a place away from the problems and threats of modern technology. A dissonance arose in seeing 11 million gallons of black oil and mousse in the midst of what people evaluated as their "pristine" place. Post-spill, there is not only a perception of home as threatened by future oil spills, but also home is now "in the world" from which many people sought to escape.

The Native theme which we characterize as "people of the land and water" is expressed in statements such as those of Chief Meganack quoted earlier in this section. Other statements quoted in ADF&G 1995 from study participants in Native villages, especially those of Chenega and Tatitlek, also suggest this same theme. In this theme, home and place have continuity with land, water, salmon, bears, and deer. The history and traditions of daily life, the profusion in language of words to describe the environment and its resources indicates the connections between people and place. But place is not narrowly defined by community boundaries, but by living in and with the land and water. Place and home cannot be escaped. Place and home are the continuity with the environment and its resources. Damage to the

environment then becomes a damage to home and to the connections with the resources that constitute place in Native culture.

Work by ADF&G suggests that in some Native villages there were changes in post-spill satisfaction with living in their community.

> Perhaps most striking of all the results of the social effects questionnaire for Cordova were responses to the question concerning whether the respondent's satisfaction with living in the community had changed since the spill. In all three years, a large percentage of respondents said they liked living in Cordova less since the spill, including 45.2% in 1991 (the most common response), 45.2% in 1992, and 52.6% in 1993 (again the most common response) . . . In two of the three years, 1992 and 1993, Cordova had the largest percentage of respondents of any study community reporting increased dissatisfaction with their community since the spill. However, it is also notable that despite the increased level of dissatisfaction with living in Cordova since the spill, a large and increasing majority in all three study years said that they would not rather live in another community (59.0% in 1991, 68.3% in 1992, and 72.8% in 1993) ….

Regarding Chenega, the ADF&G authors report:

> In 1991, half of all respondents said they liked living in the community less than before the spill, compared to 30.8% in 1993. In 1991, one third of respondents felt the main reason for liking their community less was oil contamination of the environment; . . .However, when asked if they would rather live in another community, in all years most said no. Furthermore, in the first study year, 87.5% of respondents said they expected to be living in the region when they were old, as did 76.2% in 1993 and 66.7% in 1993.
>
> In 1991/92, 46.7% of Chenega Bay SEQ respondents said they felt confident they would be able to continue to use the places they now use for hunting, fishing, and gathering. This percent declined to 33.3% in the second study year, but bounced up to 50% in 1993/94. When asked if they would continue to live in Chenega Bay if no wild foods were available, half of the respondents said no in 1991/92, as did 38.1% in 1992/93 and 27.8% in 1993/94.

About Port Graham, the findings are slightly different:

> Although there appears to be increased dissatisfaction with living in Port Graham over the three years of this study, over 80.0% of respondents liked living there either more or the same since the spill . . .Interestingly, feelings fluctuated over the three year period, while 15.6% said they liked it less in 1991/92, attitudes improved in 1992/93, but went back to liking it less in 1993/94. This seems to be a pattern in several other study communities such as Cordova, Seldovia, Kodiak, and Kenai. Relative to some other communities in the spill area, such as Cordova and Chenega Bay, Port Graham residents generally liked living where they did, and it would take something other than an oil spill to cause residents to move away. For instance, in 1991/92, 84.8% said they would live in the area when they were old, and 69.6 % said they would rather not live in another community.

We interpret these types of findings as indicating a change in the sense of place and home in Native culture. That is, the traditions of Native communities are in their connections with the land and water. If the quality of these connections changes because resources are damaged or polluted, the connections

remain, although satisfactions with them may be diminished. Post-spill, Natives experienced a changed sense of place and home that has varied in some place more than others. When traditions bind a people to natural resources, as they do in Native communities, an event such as the EVOS may diminish satisfaction with home and place. However, people are also likely to wish to remain in their home and place because they have endured previous changes and cycles in their connections to the land, water and other natural resources.

4.0 SUBSISTENCE

There are three major themes in the literature about subsistence and EVOS: (1) biological assessments of damages to and contamination of subsistence resources (e.g., Bolger, Henry, and Carrington 1996); (2) analysis of subsistence harvests, consumption, and sharing (e.g., Fall and Field 1996); and, (3) description and analysis of the effects of the EVOS on subsistence as an element of Native Alaskan culture (e.g., IAI 1990d, 1990b; Braund & Associates and Usher 1993; Palinkas et al. 1993; Dyer 1993; ADF&G 1995; Jorgensen 1995). The second and third categories overlap, but each does have a distinct theme. The focus of this section is exclusively on the second and third categories and their respective issues.

The major themes developed in this discussion describe the interaction of Native individuals, social bonds, and culturally based values and orientations with the EVOS. These can be seen as individual points that collectively convey some approximation of the experience of Native communities between 1989 and 1994. However, these individual points can also be linked by a theme of "alienation" that organizes individual, social, and cultural experiences with the EVOS. The idea of alienation is complex and debated in social science (Seeman, Seeman and Budrow 1988), but we use it here to describe the damage to or interruption of meaningful connections of individuals to the experience of their self, culture, and social group. This organizing theme makes sense when alienation is used to examine the relationship of individuals to their social bonds and culture, and the relationship of culture with social organization. That is, the data presented here suggest that the process of alienation organizes many of the disrupted relationships experienced in Native communities. Individuals were alienated from meaningful social activities such as subsistence harvesting and the sharing of subsistence resources which forms a basis for social integration in these communities (Jorgensen 1995). Individuals were also alienated from meaningful cultural values about respect for nature and the continuity between subsistence practices and a Native identity (Dyer, Gill, and Picou 1992; Jorgensen 1995; IAI 1990d). Furthermore, the social activities and practices such as harvesting resources, engaging children in subsistence as a way of life, sharing harvested resources, and consuming preferred foods were alienated from cultural values about the meaningfulness and significance of wild foods in Native ways of life (IAI 1990c, 1990d; McClintock 1989; Fall and Field 1996; Gill and Picou 1997).

Alienation of any one of these connections could be socially significant. But, when individuals perceive an alienation of themselves from their culture and social activities; and, simultaneously cultural values are alienated from the social activities, then the combined effect is potentially traumatic and disruptive. This trauma itself exists within the context of a culture which has experienced other "cultural traumas" in their dealings with non-Native societies. Indeed, the EVOS, for many Natives, becomes another assault from non-Natives on the cultural integrity of their communities.

4.1 DEFINITION AND RELEVANCE

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 1995).

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. That is, subsistence is about both traditions, values, and beliefs and activities and about social institutions linked with harvesting, processing, and distributing wild resources.

There is an abundance of literature about the importance of subsistence traditions, institutions, and practices in Native Alaskan communities (Luton 1986; Fall 1990; Jorgensen 1990). This literature describes the relationships of Native Alaskan communities to the types of natural resources that were affected by the EVOS. The significance of the affected resources for Native Alaskans and the importance of subsistence traditions, institutions, and practices suggests that this is one of the most relevant topics for understanding the community effects of the EVOS.

4.2 CONTAMINATION OF SUBSISTENCE RESOURCES

4.2.1 Subsistence Resources Were Oiled

Following the grounding of the *Exxon Valdez* on Bligh Reef, oil contaminated subsistence resources were an immediate concern for Native villagers:

> We walk our beaches. But the snails and the barnacles and the chitons are falling off the rocks. Dead. Dead water. We caught our first fish, the traditional delight of all, but it got sent to the state to be tested for oil. No first fish this year. We walk our beaches. But instead of gathering life, we gather death. Dead birds. Dead otters. Dead seaweed (Port Graham resident quoted in McClintock 1989:29).

The spilled oil was pulled south by currents from Bligh Reef through Prince William Sound down into the Kenai Peninsula and then around into Cook Inlet as well as into the Shelikof Straight between Kodiak Island and the Alaska Peninsula. In Prince William Sound the shorelines around the Native village of Chenega Bay were directly oiled and localities used for hunting and fishing by Tatitlek were also heavily oiled (ADF&G 1995). In the Kenai/Cook Inlet area Nanwalek shorelines were heavily and repeatedly oiled and areas near Port Graham were also fouled (McClintock 1989). On Kodiak, shorelines or subsistence areas were oiled in Ouzinkie, Larsen Bay, Karluk, Port Lions, and Old Harbor (IAI 1990c). Akhiok, on the southern side of Kodiak, experienced some tarballs on nearby shores, but it generally had much less oiling than other communities on Kodiak (IAI 1990c). Alaska Peninsula communities experienced some oil sheen and tar balls, but they were, in general, less exposed to oiling than other Native communities (IAI 1990c).

Residents in most Native communities directly observed oiled birds, seals, seal lions, sea otters, and other wildlife fouled by oil (McClintock 1989; IAI 1990c). Others directly observed deer or bears eating oiled seaweed or other contaminated resources (IAI 1990c, 1990d; McClintock 1989; ADF&G 1995). In some communities such as Larsen Bay, Chenega Bay, Tatitlek, and the Kenai/Cook Inlet Native communities, areas where chitons, clams, mussels, and other invertebrates were gathered were also oiled (IAI 1990c, 1990d; McClintock 1989; ADF&G 1995). In most Native villages, individuals directly observed dead or oil contaminated resources used for subsistence purposes (IAI 1990c; ADF&G 1995).

4.2.2 Traditional Knowledge Based Risk Assessments

The direct observation of dead and dying wildlife provided one basis for Natives to assess subsistence resources as potentially harmful. However, there are other issues that are suggested in the literature that can be interpreted as contributing to Native assessments of risks from contaminated resources. Specifically, statements from Natives reported in McClintock (1989), the Oiled Mayor's Study (IAI 1990d), Braund & Associates and Usher (1993), and work completed by ADF&G (e.g., Fall and Field 1996) suggests that Natives interpreted changes in their environment as indicating caution in the consumption of subsistence resources. For example, villagers describe observations about changes in the populations of sea mammals and birds, changes in the usual habitats and haunts of game and marine life, and sickly animals or wildlife with unusual characteristics (IAI 1990d; ADF&G 1995). These observations, in conjunction with other experiences with dead and dying wildlife, are the basis for a risk assessment based on traditional knowledge. This interpretation is consistent with analysis by Fall: "Direct observations of dead and injured wildlife, interpreted through traditional systems of knowledge, strongly suggested to subsistence users that resources might be unsafe for humans" (1995: Chapter XXIV:4). Furthermore, the caution among subsistence users was further reinforced when three to six years post-spill villagers continue to find oil in traditional use areas (Fall and Field 1996; ADF&G 1995).

The use of dispersants and bioremediation also contributed to Native caution about the effects of these substances on subsistence resources (IAI 1990c, 1990d; McClintock 1989). For example, an Ouzinkie resident observed:

> I feel like it's another slap in the face because . . .what's going to happen in the future . . .they're just trying . . .this stuff, the oil spill is bad enough but when you spill something on top of it, and you have no idea what the future's going to bring from it . . .I think it's crazy (IAI 1990c: 97).

Traditional risk assessments based on local knowledge and observations resulted in a sense of uncertainty about both the short and long term effects of resources exposed to the oil spill and the cleanup process. For example:

> I'm talking about a daily diet of food that we eat. And you're telling us to go back to your way of eating . . .remember Agent Orange? For the next ten years I'm going to be healthy but what happens after? After the stuff is in your system . . .(Ouzinkie Resident quoted in IAI 1990c: 94)

Reynolds quotes an Eyak Native expressing similar views:

> Deer were dying on Hawkins Island, because they were eating the seaweed. Quite a few deer died. And that affected the meat for that winter. The mussels and clams are still questionable, where the oil hit. The livers contain all the toxin. They're not safe.
>
> Roe-on-kelp doesn't taste the same now. We don't eat the food. We wonder: is it safe? The things that we're used to eating. I always wonder (Reynolds 1993: 215).

Risk assessments based on traditional knowledge indicated that both short and long term, there were reasons to be cautious about the consumption of some subsistence foods. In some instances this resulted in decreased harvest/use of wild foods. Between 1989 and 1991 contamination concerns were a major contributor to decreased subsistence harvest/use (IAI 1990d; Fall and Field 1996; Palinkas et al. 1993; ADF&G 1995; Reynolds 1993). After the cleanup phase of the EVOS (post-1990-91), explanations about reduced harvest/use focused on diminished resource availability (ADF&G 1995: Chapter VVIV). Communities most exposed to oil and its effects (Ouzinkie, Tatitlek, Chenega Bay, Larsen Bay,

Nanwalek) had more contamination concerns than other Native villages (IAI 1990d; ADF&G 1995; Fall and Field 1996).

The important issue for Natives was that, despite reassurances by scientists about the safety of traditional foods, their own traditional knowledge based risk assessments suggested that caution was prudent. This has important implications for any future events that might raise concerns about resource contamination: i.e., community based risk assessments have their own basis in experience and knowledge that will influence how scientifically based risk assessments will be interpreted (cf. Edelstein 1988).

4.2.3 Resource Use and Safety Concerns

Immediately after the spill, Natives in Prince William Sound and Cook Inlet and then in Kodiak expressed concerns about consumption of subsistence resources because of uncertainty about contamination (IAI 1990d; Rooks 1993; Endter-Wada et al. 1993; ADF&G 1995; Fall and Field 1996). One response to these was the formation of the Alaska Oil Spill Health Task Force. The health task force sampled various subsistence resources for hydrocarbon contamination in all spill-affected areas as well as in the "reference" areas of Angoon and Yakutat (Fall and Field 1996). The literature also suggests that other litigation related research regarding biological effects of the spill was observed by Native villagers (IAI 1990d; ADF&G 1995). Overall, the Alaska Oil Spill Health Task Force work concluded there was a relatively low risk from the levels of contamination measured in subsistence foods such as fish, bivalves, and shellfish (Fall and Field 1996). The results of the health task force work were presented through in-village presentations, health bulletins, ADF&G newsletters, and a food safety video (Fall and Field 1996). Native's were also advised to apply a "taste, smell, and look" test to any resources suspected of contamination.

Despite information from the Alaska Oil Spill Health Task Force, there was persistent concern about subsistence food safety among some Natives, especially in those communities hardest hit by the spill (Ouzinkie, Tatitlek, Chenega Bay, Nanwalek). These concerns appear to have persisted because of a combination of factors, including the following:

(1) Uncertainty about the validity of the Alaska Oil Spill Health Task Force testing program. In some instances uncertainty was related to skepticism about those doing the testing, e.g., "Nobody even knew the people that were testing then" (ADF&G 1995: XII: 23). In other instances, this concern appears to be related to skepticism about the sampling and testing process. For example, a Native resident of Port Lions quoted in IAI 1990c observed:

> There's no telling to what degree that shellfish is tainted. Until you get some real comprehensive results back from all the testing going on, they could go into a clam bed and take a sample here and a sample here and not get any tainted clams, but fifteen feet over here where a couple of mousse patties sat down and went and sunk into the ground a little bit, you're gonna have a section of tainted shellfish (IAI 1990c: 104).

(2) Natives were skeptical about the "see, smell, taste" recommendations of the Alaska Oil Spill Health Task Force. For example, "I don't believe smell, see, and taste tests are good enough as ways of telling whether foods are safe to eat" (ADF&G 1995: XII 23). A definitive explanation for this skepticism is not indicated in the literature, but it appears to have several origins, including: mistrust of the credibility of testing agencies; concern about Exxon's involvement in the testing program; insufficient information about testing program results information (Seitz and Miraglia 1995; Mishler, Mason et al. 1995); and, traditional risk assessments that suggested more information was required to fully understand the short and long

term effects of the spill on affected ecosystems. For example, Fall, Stanek, and Utermohle observed:

> While some plants and animals were obviously oiled and not edible, it was not clear to subsistence users if those without signs of oiling might also cause acute or chronic health problems. Abnormal behavior and conditions of wildlife also raised questions about the spill's effects for subsistence users. Consequently, they rejected the advice that sight, smell, and taste alone (the "organolepic test") was sufficient to determine food safety. People were no longer confident in their own abilities to understand and evaluate the natural environment because the spill had created such unfamiliar and unsettling conditions. As a result, people discarded resources which they suspected had been tainted, or refrained from using subsistence foods entirely (Fall, Stanek, and Utermohle 1995: Chapter 1: 21)

(3) Multiple scientific programs to assess resource contamination (e.g., ADF&G, Exxon, the Trustee Council) resulted in confusion about the "true" facts concerning the safety of subsistence foods (ADF&G 1995). Some information from these studies was not public because of litigation, further contributing to a perception of conflicts about the "true" facts of testing for resource contamination (ADF&G 1995; IAI 1990d; Jorgensen 1995).

Despite significant risk communication efforts of the Alaska Oil Spill Health Task Force, Native concerns about contaminated resources persisted. These concerns did not always result in avoidance of subsistence foods, especially among older, traditional residents of Native villages (IAI 1990d; ADF&G 1995). Indeed some residents consumed foods they believed might be contaminated because of their cultural values and preferences. For example,

> I know it's hard for you to understand, but when we can't get [subsistence foods], it's a little like a sickness. Then you get some and eat it – it's like medicine. You feel well again (Tatitlek Resident Quoted in ADF&G Chapter IXXIV: 3).

An Eyak Native observed:

> When you're used to eating those foods and you go without them, then your body just *craves* them (Reynolds 1993:215).

An elder Eyak noted:

> I think I would get sick without [Native foods]. I would. I get so hungry for them. I keep looking for some clams to satisfy the old stomach. I told my cousin I was starving for clams (Reynolds 1993: 216).

These statements indicate a cultural preference if not a cultural imperative for wild foods. These preferences motivated Natives to consume subsistence resources even though they may have fears about their contamination. Thus, post-spill recovery in the consumption of subsistence foods must be placed within this cultural (and economic) framework (Fall and Field 1996).

The overall effects of concern about food safety are not apparent in the literature. However, there are three clear themes: (1) public health programs did not provide uniform relief from concerns about health effects of consuming subsistence resources; (2) persisting food safety concerns are rooted in traditional risk assessments that suggest that the long term effects of contamination are yet to be known; and, (3)

despite contamination fears, Native residents consumed some subsistence resources. The uncertainty about such a fundamental component of daily life and Native culture affects perceptions about the future well-being of individuals and their communities (ADF&G 1995; IAI 1990d; Palinkas et al. 1993). For example, an Eyak Native observed,

> People were even scared to eat deer. And maybe we did wrong to eat deer. Maybe we'll all get cancer. What will be left in 10-20 years, of our game? No one knows. Or maybe the oil companies *do* know. But I don't know. Will my grandchildren be able to eat any of the things I eat. Or just read about it in books? (Reynolds 1993: 224).

This statement expresses profound uncertainty about the present, about the near-term future, and about the inter-generational continuity of Native ways of life as expressed in subsistence traditions. This theme illustrates clearly the issue of alienation of Native's from their culture and the social organization of subsistence practices. These types of effects are most likely to be experienced in those communities most affected by the spill such as Tatitlek, Chenega Bay, Cordova, and Ouzinkie (Fall 1995: XXI-4).

4.3 SUBSISTENCE PARTICIPATION

Subsistence participation is about the harvesting, processing, sharing, and consumption of subsistence resources. There are data indicating that pre-spill there was almost 100% subsistence participation among the 15 Native communities addressed by this analysis (Fall and Field 1996; IAI 1990d). Data for the year of the spill through 1994 exist for the majority of communities. However, as a result of sampling issues and data collection protocols, information about subsistence participation does not exist for all communities for all years (ADF&G 1995; IAI 1990c, 1990d). Among the communities studied, differences are reported that appear to be associated with the degree of oiling/contamination of subsistence resources. However, when these communities are taken as a whole, there are some high-level generalizations that can be made about subsistence participation and the EVOS.

- Overall subsistence participation decreased during the year of the oil spill and in the year immediately afterward. Decreased harvests are attributed to: contamination fears; cleanup employment; and, decreased resource availability.

- For 1990 and 1991 overall subsistence participation showed a trend of increased subsistence participation from 1989 levels, but overall subsistence participation remained below 1989 levels. By 1991, most communities (including the highly exposed communities of Chenega Bay, Tatitlek, Nanwalek, and Ouzinkie) remained below 1989 levels. However, Port Graham, Chignik Lake, and Chignik Bay were at or over the pre-spill years (Fall and Field 1996).

- Between 1991and 1994, the overall trend has been for increased subsistence participation, although in the most spill-affected communities in Prince William Sound, Cook Inlet, and Kodiak, harvests and consumption generally have not recovered to pre-1989 levels. Explanations about reduced subsistence participation have shifted toward decreased resource availability and some persisting concerns about resource contamination.

- Although the is a upward trend for subsistence participation (harvest and consumption), the composition of subsistence resources harvested and used have shifted toward fewer marine and land mammals and more towards salmon and other fish (ADF&G 1995).

- In some instances, trends towards increased usage coexist alongside persistent contamination fears. This is accounted for by a cultural imperative to consume wild foods for

health reasons and to satisfy "cravings" that express the strong preferences for subsistence foods in Native communities. That is, despite contamination fears residents in some Native communities, and especially older residents, continued to eat subsistence foods because of the cultural values and imperatives attached to wild foods (IAI 1990d; Reynolds 1993; ADF&G 1995; Fall and Field 1996). This raises other concerns about the long-term health effects of eating potentially contaminated foods.

- Where important resources are perceived to be unavailable or unsafe, Natives have had to travel further and expend more resources to harvest substitute resources. This is especially the case for Chenega Bay and Tatitlek (ADF&G 1995).

- Decreased subsistence participation resulted in concerns about Native children not participating in traditional practices that express their culture and way of life (ADF&G 1995; Palinkas et al. 1993; IAI 1990d).

- In general, subsistence participation decreased most in those communities most affected by the oil spill. Variation in the trends on subsistence participation among Native communities can be accounted for by: (1) the amount of direct oiling of community areas; and, (2) the oiling of areas used for hunting, fishing, and gathering. The most affected communities were in Prince William Sound (Tatitlek and Chenega Bay), Cook Inlet (Port Graham and Nanwalek), and Kodiak. Among the Kodiak villages, Ouzinkie, Larsen Bay and Old Harbor had the most exposure to oil and appear to be the more affected than Port Lions, Karluk and Akhiok. Akhiok, at the southern end of Kodiak Island experienced the least oiling of subsistence areas. Alaska Peninsula communities (Ivanoff Bay, Perryville, Chignik Lake, Chignik Lagoon, and Chignik Bay) were the least affected Native communities and exhibit the most stable patterns of subsistence participation (Fall and Field 1996; ADF&G 1995).

- Along with harvesting and consumption, sharing of subsistence resources decreased in the most exposed communities (IAI 1990d; Palinkas et al. 1993; ADF&G 1995). Older residents, traditionally dependent on sharing of subsistence resources, were perceived to be the most at risk because of decreased sharing (Reynolds 1993; Endter-Wada 1993; IAI 1990d).

- The EVOS-related literature mentions some changes related to subsistence hunting. In some cases, successful hunting required greater effort. In Chenega Bay (Seitz and Miraglia 1995) subsistence activity was associated with travel to new areas, since resources were considered generally less available. In Tatitlek (Seitz and Fall 1995) there were reduced harvests despite greater effort.

The overall picture that emerges from these findings is that in most Native communities exposed to the spill, subsistence participation was reduced in the first year or two after the event. After that, the trend was for increased subsistence participation, but in those communities most affected by the event, subsistence participation had not yet returned to pre-spill levels. The decrease in subsistence participation again expresses the alienation of individuals from a key aspect of their individual and cultural identity. It expresses discontinuity between Native values, beliefs, and expectations about daily life and the reality of decreased activity in this key element of Native culture and social organization. Furthermore, what replaced subsistence activities in many Native communities, i.e., cleanup work, had adverse effects on community integration. For example, work among Kodiak Natives resulted in the following observation:

> Native people missed the joy of catching, cleaning and smoking fish; they missed the going upstream, taking their families, setting their nets and helping each other to split and dry and preserve. Oil-spill work did not provide the same level of satisfaction,

family and community unity, or cooperation and sharing as did subsistence activities. Instead, it fostered competition for high-paying jobs and exacerbated petty jealousies and rivalries among villagers (Endter-Wada et al. 1993: 684).

4.4 SUBSISTENCE USE AND NATIVE CULTURE

An analysis of the literature regarding the EVOS, subsistence use, and Native culture suggests several major topic areas where there are EVOS related interactions: (1) resource sharing among family and neighbors; (2) enculturation, i.e., children participating in and learning about subsistence activities; (3) Native cultural values about subsistence resources; and, (4) culturally significant dietary changes.

4.4.1 Effects on Sharing of Subsistence Resources

In some affected communities resource sharing (giving and receiving) changed. Subsistence foods rather than store-bought foods are usually shared in Native communities and older residents are usually recipients of shared subsistence resources from other family members and neighbors (cf., Mischler 1995). The Oiled Mayor's study household survey results show that among Natives who were "highly exposed" to the EVOS, 72.4% reported decreased sharing as compared with 47.3% among those categorized as "low exposed" and 8.3% as "not exposed" (Palinkas et al. 1993: 7). The same study reported 69.6% decline in sharing resources with elders as compared with 36.5% "low exposed" and 6.3% "not exposed" and there were also similar declines in the receiving of subsistence resources (Palinkas et al. 1993:7). Ethnographic data from the same study suggest that resource sharing declined in some communities because of decreased harvests and participation in the cleanup (IAI 1990c, 1990d). ADF&G studies of sharing of subsistence resources following the EVOS show similar findings: there was decreased sharing of resources in Chenega Bay (Seitz and Miraglia 1995), Port Graham (Stanek 1995), Nanwalek (Stanek 1995), though there was little change in Chignik Lake (Hutchinson-Scorbrough 1995). Jorgensen (1995), Reynolds (1993) and Endter-Wada et al. (1993) also report important declines in the sharing of subsistence resources. For example, Reynolds quotes an Eyak Native:

> There's no seal in Tatitlek. Before the spill I'd get seal from Tatitlek and take it to my daughter-in-law in Anchorage, and she would send it to Port Graham to her mother. So see how far that seal traveled? But I can't get seal this year (Reynolds 1993: 219).

Sharing is an essential feature of the communal aspect of Native life. It is one of the traditions and practices that promotes social integration and the maintenance of social ties and bonds. Decreased sharing necessarily affects the character of social bonds and the nature of social integration in these communities, especially among those where subsistence harvesting was disrupted.

4.4.2 Effects on Children's Participation in Subsistence Activities

In some Native communities concerns were raised about the effects of disrupting children's participation in subsistence hunting, fishing, and gathering. The Oiled Mayor's Study household survey data showed a 76.5% decline in opportunities for children to learn these activities among those "highly exposed," 40.9% decline among those "low exposed"; this compares with 4.4% decline among those "not exposed" (Palinkas et al. 1993:7). Ethnographic data from this same study also observed that in some communities adults were concerned about the cultural consequences for children of the disruption of subsistence hunting, fishing, and gathering (IAI 1990c, 1990d). ADF&G work also showed a decline in children's participation in subsistence activity in Chenega Bay (Seitz and Miraglia 1995), Nanwalek (Stanek 1995), and Old Harbor (Rooks 1993b), but not in Chignik Lake (Hutchinson-Scorbrough 1995). The decreased participation of children in subsistence activities was in some cases associated with their parents' absence

due to participation in the cleanup effort. In other cases it was because of reduced opportunity to harvest subsistence resources (IAI 1990c).

In some communities of Prince William Sound, Cook Inlet, and Kodiak, the disruption of children's participation in subsistence raised concerns about the transmission of Native culture (IAI 1990d; ADF&G 1995; Palinkas et al. 1993; Braund & Associates and Usher 1993; Jorgensen 1995). The continuity of Native traditions is, in part, maintained through children's participation in subsistence activities. Furthermore, such participation also has the function of integrating children into and maintaining ties within community social networks. In the most affected communities, these types of concerns express overall distress about damage to ways of life that depend on the use of subsistence resources.

4.4.3 Effects on Native Values about Subsistence Resources

There is a continuity between the use of subsistence resources and Native values and culture. The contamination of subsistence resources and uncertainty about their long term existence raised concern and caused a sense of loss. For example, Chief Meganack's oft-quoted statement demonstrates the connection between subsistence resources and Native ways of viewing the natural world. The continuity of subsistence, Native culture, and individual identity is fundamental to a sense of individual and community well-being. Consequently, when this continuity is threatened, individuals and their families can feel alienated from their way of life and its values. For example:

> When we worry about our subsistence way of life we worry about losing our identity . . .It's . . .that spirit that makes you who you are, makes you think the way you do and act the way you do and how you perceive the world and relate to the land. Ninety-five percent of our cultural tradition now is subsistence . . .it's what we have left of our tradition (IAI 1990c: 274-275.)

Although it is often difficult to quantify or exactly measure the distress and alienation people experience when something meaningful to them is fouled and harmed, these are nonetheless damaging to an overall sense of community and individual well-being. The literature regarding technological disasters in general suggests that such a loss of well-being results in alienation and can otherwise contribute to other social and psychological problems (cf., Shkilnyk 1985).

4.4.4 Effects on Diet

Diet is a cultural variable. Food preferences, styles of preparation, and consumption can all be culturally patterned and expressed values and meaningful ways of life. As a result of the EVOS, Native communities experienced fears about food safety, perceptions of reduced populations of preferred food sources (e.g., seals and other marine mammals), and reduced opportunities to participate in subsistence activities. These resulted in some dietary changes in Native communities.

The evidence in the literature suggests that Native diets were altered by the disruption of subsistence harvests (Fall and Field 1996; Reynolds 1993; IAI 1990d; ADF&G 1995; Endter-Wada et al. 1993; Dyer, Gill, and Picou 1992). There is also evidence that the reduced availability was more of a burden for elder residents than it was for younger residents of Native villages (ADF&G 1995), and that younger residents made the transition from subsistence to purchased foods more easily than did elders (Rooks 1993: 799). An important issue here is that this potentially meant less protein in the diets of Native elders, or greater exposure to contaminated resources, because elders were less able to make substitutions for Native foods. The reluctance to eat purchased foods is related to strong cultural motivation to eat subsistence foods among more traditional members of Native communities (ADF&G 1995). This motivation is sometimes expressed as a "craving" for wild foods, as noted in an earlier quote. There is also a strong belief that

these foods confer health benefits that purchased foods do not (IAI 1990c; 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 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.

This uncertainty presents a paradox and a disconnect of traditional beliefs and the circumstances regarding the possible persisting contamination of subsistence resources. As one Eyak Native quoted by Reynolds said, "Roe on kelp doesn't taste the same now. We don't eat the food. We wonder is it safe? The things we're used to eating. I always wonder" (Reynolds 1993: 215). In communities where food is more than instrumental, indeed where food preferences connect people to their traditions and to others in their social environment, uncertainty about such a fundamental aspect of life can only be distressing. Persistent uncertainty about the safety of previously valued foods and resources fosters a further sense of disconnection between individual and family identity, values and beliefs about wild foods, and the social experiences of taking, sharing, and consuming these resources.

In more than one community, disrupted subsistence activities following the EVOS may have been associated with a dietary shift away from subsistence foods. In Ouzinkie, it was suggested (Mishler, Mason et al. 1995) that there might have been a dietary shift from subsistence foods to purchased foods, as high cash incomes from the cleanup and free groceries supplied alternatives.

4.5 SUBSISTENCE AND COMMUNITY ECONOMICS

There are three themes in the literature about subsistence, community economics, and the EVOS: (1) the lost economic value of subsistence resources; (2) increased costs to engage in subsistence practices; and, (3) effects of the EVOS were somewhat mitigated by cleanup employment in Native villages. These themes need to be placed within a broader context of the economy of Native villages in general and the particular cultural and social context of Native communities, a point that cannot be over-emphasized. Employment in many Native villages is significantly less than in non-Native villages (Jorgensen 1995; Rooks 1993). Private sector jobs are very limited as are public sector employment opportunities. Commercial fishing is an important source of cash income in many Native villages (Rooks 1993; IAI 1990d; ADF&G 1995). Cash is limited in these communities and their isolation also makes acquiring store goods expensive. Consequently, subsistence resources have an economic value in that cash does not have to be used to acquire all household foods. However, household income and participation in subsistence activities are not necessarily directly related. In fact, Rooks notes that in Old Harbor increased income is associated with increased subsistence activity (Rooks 1993b: 793). In the mixed cash-subsistence economy of Native communities, wild foods have economic value. The risk here is focusing only the economic value of these resources and not their cultural meaning. That is, westerners easily understand the economic value of wild food but may not as easily appreciate the cultural values and meanings that make wild foods more than just an *economic* value. Jorgensen emphasizes this point:

> It was learned that modern subsistence economies integrate modern technologies and sources of income required to maintain them . . .It was also learned, and confirmed in all phases of our Social Indicators research, that Native subsistence economies remain quintessentially subsistence economies in their organizations of production, including ownership, control, labor, distribution, and consumption. They are directly linked to procuring food and shelter for the maintenance of life itself. *It is the social fabric in which the subsistence economy is embedded that is crucial within and among communities* [emphasis added] (Jorgensen 1995: 151).

The issue here is that subsistence exists within the larger social and cultural fabric of communities. Subsistence resources have economic value, but they also have other values.

4.5.1 Lost Economic Value of Subsistence Resources

ADF&G (1995) and other research (Jorgensen 1995; IAI 1990d) shows that harvesting and use of subsistence resources declined in the year or so immediately after the spill. For example, Seitz and Fall note that in Tatitlek subsistence harvests declined 60% (from 482.9 pounds per person to 214.8 pounds per person) in the year following the spill (Seitz and Fall 1995: V-19). Other Native communities showed similar declines, although the villages closer to spill (Tatitlek and Chenega Bay) experienced the most serious declines (Fall and Utermohle 1995: XXIII 5-9). If subsistence resources have economic value, that is if they replace store-bought foods, then we can conclude that Native communities lost the value of these resources. Furthermore, at the same time that more cash was required, spill-related inflation increased the costs of many essential goods and services (cf. Rooks 1993). Exxon, the Kodiak Island Borough, and other entities (IAI 1990c) donated food to Native villages that, in part, offset some of the lost economic value. However, in some instances the donation of these foods were also thought to offset the disruptions caused by the loss of subsistence participation (IAI 1990c, 1990d). That is, subsistence foods were understood only for their economic value and not for their cultural value. This resulted in another dimension of alienation in these communities. For example, a Karluk resident observed:

> So people were given some frozen and canned fish from Exxon, but they didn't really eat much of that. It was considered a joke by most of us. First of all it was not the same kind of salmon that people preferentially catch for eating here, and secondly it was not cured in the culturally accepted way. Thirdly, there was not enough freezer space here . . . to store all the fish that was brought here by Exxon. So some of it spoiled . . .and some of the canned salmon that they brought out sat outside and froze and thawed and froze and thawed, making it unappealing to eat" (IAI 1990c: 68).

Although food was available, it was unused in part because it did not fulfill the cultural expectations about this type of food. The remedy for the problem was culturally off the mark. This furthers the experience of alienation from the culture and social organization in which subsistence is embedded within these communities.

4.5.2 Increased Costs For Subsistence Practices

This is a minor point in the literature. Fall and Field (1996) make reference to increased costs for Tatitlek and other residents who had to travel greater distances to harvest preferred resources that were not locally available because of the oil spill. Jorgensen also notes that although there were decreased subsistence harvests, there was still significant activity to harvest resources (Jorgensen 1995:27). The implication is that increased effort to harvest fewer resources had costs in terms of fuel and other related harvest costs. In other terms, harvest activities yielded less for the diet than in the years before the spill (Jorgensen 1995: 327).

4.5.3 Cleanup Employment Offset Losses

Native villagers had higher rates of cleanup employment than non-Natives (IAI 1990d). This resulted in increases in cash incomes, but these dollars did not necessarily stay within villages: many goods and services were purchased from sources outside villages resulting in limited economic benefit to these communities (cf. Rooks 1993: 766). The short boom in income in Native villages was important and it provided some offset for the loss of subsistence resources in the year of the spill. However, in most

Native villages, after cleanup employment ended (1990 and in some places 1991), incomes declined precipitously thereafter (Jorgensen 1995: 123).

4.6 DISCUSSION OF SUBSISTENCE AND THE EVOS

An examination of the themes in the existing literature suggests two major points that we will discuss here. One point is the alienation of individual and family experience from culturally important values, beliefs, and practices about harvesting natural resources; and, a concomitant alienation of cultural values about harvesting wild resources from social practices of sharing, visiting, and harvesting activities. The second point is the "cultural trauma" that resulted from this alienation .

4.6.1 Alienation

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 at 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 integration of the individual within the community. 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. We interpret the literature as showing that there existed a disconnection between the individual and family experience of subsistence practices and their associated cultural values and social practices.

An example of this process of alienation is illustrated in the argument presented by Braund & Associates and Usher (1993) about "damage to culture." Damage to culture is, as Jorgensen (1995) has aptly argued, logically incorrect. The specifics of the Braund et al. argument is useful if interpreted as indicating the process of the alienation of individuals and families from activities, values, and beliefs that connect them with and express their cultural traditions. For example, Braund et al. (Braund & Associates and Usher 1993:68-109) argue the following effects of subsistence disruption:

- Declines in the quality of the environment and the quality of subsistence resources.
- Uncertainty about the safety of consuming subsistence resources.
- Invalidation of traditional knowledge regarding the environment.
- Uncertainty about subsistence resources and community ways of life based on these resources.
- 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.
- Changes in personal and cultural identity.

Collectively, these changes illustrate the disconnection between individual experience, social interactions, and cultural values. The result is a type of alienation that itself predisposes individuals and their social

groups to adverse psychological impacts (Mirowski and Ross 1983; 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.

4.6.2 Cultural Trauma

The content of Native statements quoted in this section when summed with those expressed elsewhere in the literature (Reynolds 1993; IAI 1990d; Endter-Wada et al. 1993; ADF&G 1995) suggests that a process of "cultural trauma" resulted from the disruption of subsistence by the EVOS. This process of "cultural trauma" is one in which an event such as the EVOS evokes past threats to Native ways of life and cultural traditions. Statements by Natives in the literature (e.g., IAI 1990c; Braund & Associates and Usher 1993) suggest that some Natives perceive the EVOS as another instance of actions by non-Natives that will result in significant harm to their traditions. This process of "cultural trauma" is thus one that amplifies the effects of an ongoing event by evoking the threats from past events

In sum, 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 Alaska Native history, the EVOS represents a traumatic event for the culture of these communities that threatened a core element that Natives define as expressing who they are as a people. This is a process of "cultural trauma" resulting from the cumulative effects of the historical interaction of Natives and non-Natives.

5.0 SOCIAL ORGANIZATION

There are several major issues that are expressed in the literature about the interaction of community social organization and the effects of the EVOS. These issues are: community political and organizational resources; leadership; family, kinship, and other social bonds; and some limited information about demography and its interaction with the oil spill and cleanup. We develop each of the findings about these issues and then at the end of the section present a brief discussion of these findings.

5.1 DEFINITION AND RELEVANCE

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 and 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. These factors are especially relevant because they assist in understanding *how* social impacts occurred.

5.2 COMMUNITY POLITICAL AND ORGANIZATIONAL RESOURCES

5.2.1 Community Political Organization Affected Response Capability

Communities within the spill affected area have different types of political structure and different organizational resources which directly affected the social effects each experienced. Community political organization differs within the spill-affected region. For example, Seward, Homer, Kenai, Soldotna, and other Kenai Peninsula communities, as well as Kodiak Island communities, exist within a Borough. Cordova and Valdez are municipalities that do not belong to Boroughs. Native communities have Native Corporations (originally formed under the auspices of the federal Alaska Native Claims Settlement Act) and Tribal Councils and some are affiliated with regional organizational structures such as the North Pacific Rim and the Kodiak Area Native Association which provide certain services (e.g., health care) and administrative resources for their members.

The implications of these different types of political organization were apparent during the spill and its aftermath: communities that had access to a larger pool of resources were better off than those communities that could not tap into these resources (IAI 1990d; McClintock 1989). For example, boroughs provided funds for communities such as Seward, Homer, Kenai, and Kodiak that were not in their budgets but which were needed to pay for oil spill related issues (IAI 1990c, 1990d). Boroughs also offered administrative support in dealings with Exxon, the press, the state, and other entities during and after the spill (IAI 1990d). The level of demands made by extra-community agencies and entities on spill-affected communities were mitigated by the assistance of boroughs and by some other governmental resources to which particular communities had access. For example, on Kodiak, the U.S. Coast Guard provided personnel for community briefings during the early days of the spill and subsequently provided other assistance that would not have otherwise been available (IAI 1990c; Jorgensen 1995). Similarly, the Kodiak Borough and, to some extent the Kenai Peninsula Borough, also provided assistance to Native communities such as providing fax machines and otherwise assisting with communication and administrative demands. The same type of administrative and communication assistance also came from Kodiak Area Native Association and the North Pacific Rim (IAI 1990d, 1990b; Jorgensen 1995). During the early days of the spill and cleanup, the resources Boroughs provided to communities were important and mitigated some of the demands that otherwise would have added to existing burdens (Rodin et al. 1997).

Valdez and Cordova stand out for different reasons. Valdez was the administrative center for the cleanup and it also drew a major contingent of press, those seeking spill-related employment, and representatives from various agencies from the State of Alaska. This also placed a substantial burden on the resources of city government, but Exxon, the U.S. Coast Guard, the state, and other public and private entities also provided some resources to assist with the demands on the city. On the other hand, Cordova drew some attention from the press and some outsiders seeking employment, but the overall demands on Cordova

were placed on the resources of the community. Cordova has a relatively small city government with a Mayor, City Council, City Manager, Public Works Director, City Clerk, Public Safety Officer, Harbor Master, and several other administrative positions. These resources were overwhelmed during the first few months of the oil spill (IAI 1990c; Jorgensen 1995). On the other hand, Cordova did have a strong fisherman's union, the Cordova District Fishermen United, as well as the Prince William Sound Aquaculture Corporation that provided substantial communication and administrative resources for the community (Jorgensen 1995). Each of these non-governmental resources were important to responding to demands placed on this particular community during the early days of the spill.

Native villages had the fewest immediate local political resources to respond to spill demands (McClintock 1989; IAI 1990c; Jorgensen 1995). On the other hand, these resources were less than other communities and they were also overwhelmed. In some instances, essential community positions such as Village Public Safety Officer, some health aides, and other important members of Tribal Councils took employment in the cleanup. This diminished the available leadership resources in these communities (Jorgensen 1995; IAI 1990c; McClintock 1989). Native communities were also unique in that Exxon and its contractors were either confused or uninformed about the political organization of Tribal Councils and the importance of elders in Native communities. The local Native Corporation was sometimes approached as the entity with which communication and business arrangements would be made, by-passing the Tribal Council (IAI 1990d; Jorgensen 1995). This resulted in significant tensions within some communities such as Chenega Bay and Larsen Bay (IAI 1990d). While, by itself, such an oversight may seem small, for Native communities such actions had a cumulative effect in contributing to chaos from subsistence disruptions, problems in family roles and relationships related to the spill and cleanup, and stresses related to the spill and its effects (IAI 1990d; Dyer, Gill, and Picou 1992; McClintock 1989).

5.2.2 Community Leadership: Positive and Adverse Outcomes

There are some important lessons about leadership and its role and consequences in technological disasters (cf. Drabek 1986). Leaders are an important resource that not only can direct or contribute to community response efforts, but they also represent their community in these events. In the EVOS, leaders also provided an important communication link between individuals and groups within their communities and Exxon, and other agencies and concerned parties.

Leaders were drawn from three sources: (1) established government institutions such as municipalities, boroughs, and tribal councils; (2) established local organizations, often fishing related, which became active in spill-response efforts; (3) newly formed organizations that developed as a result of the oil spill; and, (4) individuals who volunteered. In most affected communities, the elected Mayors took on the role of being the public representative for their communities while City Managers and other staff were responsible for directing response efforts (IAI 1990d). In some Native communities (e.g., Larsen Bay) Village Public Safety Officers had responsibilities for directing response efforts or for acting as liaison between their communities and Exxon or other agencies (McClintock 1989; IAI 1990d). In other communities, such as Cordova and Kodiak, leaders also emerged from organizations (IAI 1990c; Endter-Wada, Hofmeister, et al. 1992, 1993). For example, in Cordova The Cordova District Fishermen United union provided important leadership and in Kodiak there were various local fishing organizations whose leaders became important resources for developing responses and representing the concerns of their members (IAI 1990c; Davidson 1990; Endter-Wada, et al. 1993). In some instances, organizations formed for spill response efforts and individuals from these organizations provided important leadership. For example, in Cordova the 'mosquito fleet' was organized by a local bookstore owner who later became a leadership resource for that community (IAI 1990c; Davidson 1990). Also, in Kodiak there were several organizations that developed either as spill response efforts or as community support organizations (IAI 1990c; Jorgensen 1995). Larger communities, and communities that were within boroughs, had the most depth in leadership resources.

Most communities needed more leadership resources than were available. Indeed, in the EVOS as in many technological and natural disaster events, leaders are among the first casualties to experience 'stress' and 'burnout.' From Valdez to Tatitlek, on to Cordova, Seward, and Kodiak, direct observations of the demands on leaders and their responses to these demands indicates that leaders experienced extraordinary burdens (IAI 1990c). This often lead to burnout and a loss of those individuals as effective leadership resources. Small communities and villages with limited leadership resources suffered the most damaging effects. A related outcome of these circumstances is the emergence of individuals into leadership positions who might not otherwise have assumed these roles (Davidson 1990). A clear example of this is from Cordova where a bookstore owner and accomplished sea kayaker assumed the role of organizing the rescue of birds and other wildlife oiled by the spill (Davidson 1990). Similarly, in Cordova, Kodiak, and other communities, individuals became leaders and spokespersons for issues important to them (IAI 1990c). In some instances, this resulted in these individuals assuming formal leadership roles in their respective communities. Longer term, this may have positive benefits by increasing the pool of individuals for leadership positions. However, the other side of this issue is that some high visibility leaders became exhausted by the demands of the event, and were no longer available as a community resource.

Post-spill, ADF&G gathered data that indicates that residents' opinions about leadership in Native communities did not substantially change as a result of the EVOS. For example, survey data for Larsen Bay (Mishler, Mason, Barnhart 1995: 21) and for other communities (e.g., Stanek 1995: 21) indicate that among a majority of residents, views about what makes a good leader were not altered by the EVOS. However, these data are about opinions of formal leadership. Within Native communities, leadership also has another dimension related to subsistence practices. Seitz and Fall (1995) note that in many Native villages some individuals have status because they are successful hunters, fishers, and gatherers (Seitz and Fall 1995: V-24). Within these types of communities, when subsistence harvesting was curtailed either because of contamination fears or perceptions of decreased resources, then the opportunity to fulfill this leadership role was diminished.

One of the more unusual incidents related to community leadership and the EVOS concerns the undermining of leadership within some communities. For example, in developing the circumstances of a lawsuit against Cordova City officials by a Council member, an affidavit from a former city manager in this law suit notes that:

> . . .while she was chairman of the Oil Spill Disaster Response Committee, [she] came to my residence, met with me privately, and asked me if I would meet privately with Exxon representatives with respect to the city's relationship with Exxon in dealing with the oil spill. [She] told me that the city of Cordova should not collect information to sue Exxon, but should simply have faith in Exxon and deal with Exxon in good faith. She told me that Exxon wanted to meet with me and deal with me rather than the Oil Spill Response Office (Endter-Wada, et al. 1993: 394).

This lawsuit was interpreted by Cordova residents as purposefully aiding Exxon by creating local conflicts: Respondents in 1991 expressed a widely held belief that her suit was a device to aid Exxon by creating conflicts within the community which would consume time, energy, and money, diverting attention of residents and officials away from their battles with the oil company (Endter-Wada, et al. 1993: 398). The Cordova resident who brought the suit denied this allegation and stated the suit was for interests related to open government; "I don't feel the lawsuit is related to the spill. Some of the issues that were discussed behind the scenes were spill-related, some were not. The divisiveness resulting from the spill would have come up in any case" (Endter-Wada, et al. 1993:399). This specific conflict among government and business leaders in Cordova illustrates the more general issue that leadership is

vulnerable during an incident such as the EVOS. Preexisting community issues, or issues arising out of an event can place leaders under scrutiny that might not otherwise occur. If conflicts develop over the actions of leaders, these can further add to divisiveness and a breakdown of social bonds that can be stressful and disruptive.

5.2.3 Community Organizational Resources Influenced Response Capability

The preparedness and organizational resources for disaster response were an important factor in community response to the oil spill. Seward, Kodiak, Cordova, and Valdez represent different aspects of this finding. In both Seward and Kodiak, organizations were formed to respond to the demands of the oil spill. In Seward, a Multi-Agency Coordinating Group (locally referred to as the "MAC Group") was formed to organize information and resources. This group was possible because there exists in Seward federal, state, borough, and local government resources. The Multi-Agency Coordinating Group also included representatives from other key local interest groups such as commercial fishermen and representatives from the Chugach Corporation (Rodin et al. 1997: IAI 1990d). This group became the focus for cleanup decision making and action in Seward and, perhaps more than in most other communities, it allowed retention of some local control over how the cleanup was implemented. An important feature of this group and its functioning was that it drew upon a wide range of local and extra-community associations and alliances to develop a strong organization that could muster a wide range of resources (IAI 1990d).

A similar organization formed in Kodiak, the Emergency Services Council. This group was activated via the implementation of Kodiak's disaster plan. Originally composed of local personnel, it subsequently incorporated representatives from other federal and state agencies. The Emergency Services Council held information meetings and coordinated early spill response activity. It was an important link with Native villages as was the Kodiak Island Borough. The Emergency Services Council served an important function by providing the community with an entity where roles and responsibilities did not have to be created and worked out: the Emergency Services Council members knew what to do. However, once oil hit Kodiak beaches and a formal cleanup began by Exxon and VECO (Exxon's contractor), the Emergency Services Council had a less prominent role. Endter-Wada et al., observed that according to local public officials, Exxon thereafter directed the cleanup effort by 'controlling the purse strings.' Cleanup expenses had to be justified to Exxon's representatives, who decided which costs the corporation would assume (Endter-Wada et al. 1992:811). These circumstances were somewhat different than Seward in that not as much control over events was retained by the Emergency Services Council as by the Seward based Multi-Agency Coordinating Group. Other organizations were also formed in Kodiak as a response to the spill. For example, several groups organized to develop a textile fabric for the cleanup resulting in some community cohesiveness (Endter-Wada et al. 1993).

In Cordova local government played an important role, but local officials were without the resources necessary to respond in the same way as Seward and Kodiak. Cordova also had resources available from state and federal agencies, but these were not mobilized and organized in the same way as they were in Seward and Kodiak. The reasons for this are not analyzed in the existing literature, but one component may be that in Cordova private entities such as The Cordova District Fishermen United union and the Chamber of Commerce and other private business groups assumed important roles in alongside the Cordova Oil Spill Response Office. Also, the major federal agency in Cordova, the U.S. Forest Service, did not have resources that were threatened in the same way that federal resources were in other areas such as Kodiak and Kenai. In the latter two communities, the National Park Service and the U.S. Fish and Wildlife Service had major interests in coordinating with other agencies for response efforts.

Post-spill there were organizations that emerged that have become resources for spill-affected communities. One important entity, the Regional Citizen's Advisory Council, is composed of individuals

from various Prince William Sound, Kodiak Island, and other communities in the spill-affected region. It provides oversight of the industry and it has sponsored several research and education projects related to disaster events and the oil industry. Another emergent entity is the Prince William Sound Science Center which is engaged in long term biophysical and oceanographic research. Some of this research is directly related to assessing the biological consequences of the oil spill, whereas other research is intended to provide information that may be of benefit to commercial fishermen and others with interests in the ecology of Prince William Sound.

5.2.4 Community Communication and Information Resources

Information about what happened on March 24, 1989 and the progress of the oil spill was the topic of concern for communities in the region during the Spring and Summer following the spill. Informational meetings were held in Cordova (Reynolds 1993), Kodiak (Endter-Wada et al. 1992), Seward (Rodin et al. 1997), Homer (IAI 1990c), Whittier (IAI 1990c), and other non-Native communities. Native communities such as Ouzinkie (IAI 1990c) also organized informational meetings to advise community residents about the nature and progress of the spill. Similarly, a series of presentations and informational meetings were organized by the ADF&G and the Alaska Oil Spill Health Task Force regarding food safety. In most non-Native communities, fact sheets, newsletters, and local radio stations became important means of communicating with residents about the oil spill and its progress. There was a significant appetite among community residents for this type of information and this need in part drove what in some communities became daily briefings (IAI 1990c). In Valdez, such meetings included a wide range of agency persons and, in the first months of the spill, Exxon and Alyeska representatives also attended these meetings (IAI 1990c). However, in Valdez these meetings often became an area for protest and the expression of public outrage rather than the dissemination of information (IAI 1990c). Yet, in most communities these meetings served important functions for rumor control, information about the event, a source for soliciting information, and as a forum where issues and concerns were aired that had no other arena.

In many communities, television and newspapers became important sources of information about the spill and its effects on communities. Television coverage was extensive as was press coverage. Much press coverage focused on impacts to fisherman while impacts to the subsistence lifestyle in Native communities was less covered by the mainstream media. The Alaska Native paper, the Tundra Times, became an important source of information regarding the oil spill and its effects on Native communities (Daley and O'Neill 1997). It has been argued that the press coverage turned Alaskans affected by the spill into 'victims' (Daley and O'Neill 1997: 246). Certainly portraying those affected by the spill as victims added to other factors that contributed to a sense of helplessness in many communities (cf. McClintock 1989; IAI 1990d; Picou and Gill 1997).

What is clear from the existing literature is that there was a strong need for information about the EVOS by community members. Most communities organized resources to address this need, although Native communities may had more problems in acquiring timely information than other communities (IAI 1990c). This may be in part because of their geographic location and in part because of the availability of only a few technological resources such as fax machines and other electronic communication that might have otherwise provided more timely information.

5.3 SOCIAL BONDS AND PATTERNS OF INTERACTION

5.3.1 The Characteristics of Social Bonds in Small Communities Affected Outcomes

Most of the communities affected by the EVOS have small populations of persons who live in relatively close physical proximity and have multiple types of social bonds with one another. The mayor or Tribal

Council member may also be the owner of a local business, an immediate neighbor, and a member of the same church congregation of any given resident. These types of multiple ties between community members are a characteristic style of social bonds in small communities (cf. Hatch 1979; Fischer 1982). These contrast to relationships among individuals who live in larger communities where ties tend to be more single interest: a neighbor is often only a neighbor, a mayor is only a mayor. This is not to say that multiple social ties do not exist, but the tendency in larger communities is for more single interest than multiple social ties (Fischer 1982). For smaller communities, multiple social ties result in demands to manage face-to-face relationships so that there is a certain harmony or equilibrium in day-to-day interactions. When there are tensions between individuals or groups, for whatever reasons, this complicates interpersonal relationships in a way that does not exist in where relationships are primarily single interest. For example, Robbins (1993:78ff) describes Valdez as a community in which there are tensions and divisions just as there are in Cordova, Kodiak, or any of the other spill impacted communities. Tensions and divisions have a kind of 'dynamic equilibrium' that people manage because of the needs to maintain face-to-face interactions or alternatively there is some insularity that segregates individuals or groups.

This structure of multiple social ties and the dynamic equilibrium of social relationships in small communities was directly affected by the EVOS. Individuals who might otherwise have made compromises to maintain face-to-face relationships argued and broke off their acquaintances (Endter-Wada, et al. 1993; IAI 1990d; Picou and Gill 1997). In communities where there was some existing insularity among residents, the event brought individuals into contact who often did not interact because of economic or occupational reasons (Endter-Wada, et al. 1993: 78ff). In other instances it resulted in a characterization of neighbors in ways that made future relationships impossible. For example, in almost every community there was an attribution of 'greed' to other community members from their response to the spill. This attribution complicated previous social bonds with those persons (cf. IAI 1990d; Russell et al. 1996; Endter-Wada, et al. 1993; Picou and Gill 1997). That is, it was more difficult to maintain a relationships with individuals whose moral character was called into question by their actions in response to the spill (cf. Russell et al. 1996).

This structural character of multiple social ties with other individuals in small communities is a characteristic of communities in the spill-affected region. It contributes to the character of small-town cohesiveness and neighbors helping neighbors that could be predicted as a characteristic of almost every community in the region. The EVOS resulted in multiple stressors on these ties, in some instances straining them and in others breaking them. A consequence was damage to community cohesiveness and an overall increase in the level of community disruption and stress as a result of the influence of the event on community social bonds. In some instances this may have contributed to the stress experienced by individuals as much as did the circumstances of the actual oil spill (cf. Palinkas et al. 1993; Russell 1992).

5.3.2 Effects of the Oil Spill and Cleanup Changed Patterns of Social Interaction

Some communities experienced changes in social interactions and other aspects of social organization as a result of the oil spill and cleanup. This was especially the case in Valdez as well as Kodiak and Cordova, although the reasons for Valdez are different than for the other communities. In Valdez, the oil spill exacerbated some existing social tensions among oil spill industry employees and other segments of the community (Rodin et al. 1997; Robbins 1993; IAI 1990c). This changed some patterns of interaction and association. To some extent, this same type of dynamic no doubt occurred in most spill-affected communities, i.e., conflicts and disruptions of community life affected the preexisting tensions and issues within the region. The processes in Cordova and Kodiak exemplify the processes within communities with more homogenous social groupings and specifically those where commercial fishing is a dominant activity.

Within communities where commercial fishing was dominant both economically and socially, usual patterns of social interaction changed. Prior to the spill, among commercial fishermen in communities such as Kodiak, Cordova, Old Harbor, and to some extent Seward and Homer there were expectations and established patterns of doing business and interacting. The competitive commercial fishing culture within such communities was an arena in which individuals knew what to do and how to compete. The best commercial fishermen, the highliners, had positions of status within these communities because of their accomplishments. The crew members, net builders, supply and repair shops, and other components of social structure in these fishing dominated communities had expectations and understandings about their place in relationship to other social categories. This structure of status relationships and social expectations was a basis for organizing a major component of social life and interaction in such communities.

The privatized cleanup disrupted the usual rules and expectations. Some fishermen who were not necessarily highliners or even among the most productive fishermen could buy new boats and equipment. Individuals who previously earned modest or meager incomes as fishermen made substantial sums of money as cleanup workers and improved their capital equipment and capabilities to compete as fishermen. For example, in Cordova a fisherman who previously had a small boat and modest success bought a larger boat with refrigerated sea water capabilities. Others fishermen judged this as a development that was unlikely to occur without an unusual event such as the cleanup. The result was that other fishermen believed they were now at a competitive disadvantage with someone who previously was not judged as a strong competitor in the Cordova fishing fleet (Russell 1990). Competing for cleanup work was also different than fishing. Indeed, the in-fighting and perceived rules for getting cleanup work were at odds with normal expectations. Expectations changed. Patterns of interaction changed. The usual social hierarchies and statuses changed. In the Kodiak region, Endter-Wada observed:

> The oil spill disrupted the existing patterns of interaction among fishermen. As one interviewee put it, there was suddenly a "new game, new rules, and new players" . . . Instead of the normal competitive fishing game, people had to complete in a new realm where they did not understand the rules. The common occupational status that many residents shared as fishermen, which cut across the divisions based on gear and size, was not longer a binding community force in the context of the oil spill and cleanup (Endter-Wada, Hofmeister, et al. 1992: 838).

This indicates the more general process that occurred in commercial fishing communities: the usual expectations and patterns of association and interaction were disrupted by how the cleanup was organized and implemented. Commercial fishing communities, because of their culture and more or less homogenous social organization, were especially vulnerable to this type of social disruption.

5.4 FAMILY AND KINSHIP

5.4.1 Family Roles and Relationships were Impacted by the Cleanup

Several major themes exist in the literature regarding family roles and relationships: (1) changes in frequency and patterns of interaction; (2) declines in the quality of family interactions; (3) changes in role behaviors; (4) problems with child care; and, (5) the vulnerability of children to psychological distress. Most of these themes suggest that the cleanup more than the spill itself resulted in disruptions to family roles and relationships.

Changes in Frequency and Patterns of Interaction

The Oiled Mayors Study (IAI 1990d, 1990e) household survey data shows that between 15-30% of households surveyed reported decreases in time spent interacting. These rates were much higher in Native communities where rates of participating in cleanup employment were also higher. In these communities the rates were between 45% and 65% decrease in time spent interacting (IAI 1990d). Analysis of the Oiled Mayors Study household survey data also showed that in comparison to those in the 'not exposed' group, individuals in 'high exposed' households were 4.7 times more likely to report declines in socializing with other household members and 4.8 times more likely to report a decline of sharing food, money, and other resources. The 'high exposed' group also was 3 times more likely to report decreased time spent together. The same work also reported 10-30% changes in family vacations, but those in the 'high exposed' group reported more vacationing (IAI 1990d). There are also data from some communities such as Akhiok and Karluk that show some families made time for special vacations as a response to the stress of the EVOS (IAI 1990c; Rooks 1993).

Declines in the Quality of Family Interactions

Dyer, Gill, and Picou (1992:118) report that 58% of a sample of Cordova residents reported changes in how their families got along. Picou and Gill (1997) using longitudinal data from the same study show a decreasing trend among Native Alaskans in Cordova for response to the same question: 1989 43%; 1990 24%; 1991 26% 1992 24% (Picou and Gill 1997: 182). The Oiled Mayors Study showed that in comparison to those 'not exposed' households in the 'high exposed' group were 5.8 time more likely to report an argument with other households members (Russell et al. 1996). Other ethnographic data from the MMS social indicator studies and the Oiled Mayors Study also suggest that conflicts decreased time available for family; and, tired parents who worked long hours on the cleanup also contributed to declines in the quality of family interactions (IAI 1990c, 1990d; Endter-Wada, Hofmeister, et al. 1992, Endter-Wada, et al. 1993, Jorgensen 1995). Some of these impacts were also differential, affecting single-parent households more than others. For example, report that half of the single parents relocated to participate in cleanup, while their children were placed in transitional care situations (Endter-Wada et al. 1993). In fact, most reported decreases in the quality of interactions are related to cleanup work. For example, an Akhiok resident observed

> I worked here last summer with VECO, and last summer all the parents were working and the kids were left by themselves . . .All the adults were tense because as soon as you start throwing . . .the money and all into it . . .that was passed on to them. It was pretty tight for awhile . . . (IAI 1990c: 62).

Additionally, the are reported increases in domestic violence in both Native and non-Native communities following the spill. These reports are both from survey data (IAI 1990d) and from interviews with women's shelters and other clinical resources (Endter-Wada et al. 1993; Reynolds 1993; IAI 1990c, 1990d).

Changes in Role Behaviors

Two issues are discussed in the literature regarding family roles. First, because of parent's cleanup employment, children or in some Native communities, elders took on responsibility for taking care of children (IAI 1990c; Endter-Wada, Hofmeister, et al. 1992, Endter-Wada 1993). In some instances, older children assumed responsibilities that were difficult to give up once parents re-assumed their former roles. Second, in some instances, especially among commercial fishermen, wives and husbands had different roles than usual. Husbands who were normally fishing were home for longer periods of time than normal when wives expected them to be working; and, wives who did not usually work took cleanup employment (IAI 1990c, 1990d; Endter-Wada, et al. 1993).

Childcare Problems

Problems with childcare were noted in Valdez, Cordova, Kodiak, most Native communities, and other communities where parents participated in cleanup work (IAI 1990d; Endter-Wada, et al. 1993; Picou and Gill 1997). In some communities, childcare facilities lost their workers to higher paying cleanup employment (Reynolds 1993; Rodin et al. 1997). While communities in some instances petitioned Exxon to assist with either deferring these costs (Reynolds 1993) or providing grants to establish childcare services (IAI 1990c), these usually met with limited success. Although the extended family networks in Native communities appear to have been more of a resource than in non-Native communities (Jorgensen 1995), it is also the case that in many Native communities many extended family members also worked on the cleanup, resulting in overall diminished resources for childcare.

Vulnerability of Children to Psychological Distress

The Oiled Mayors Study household survey included a measure of the effects of the EVOS on the behavior of children (IAI 1990d). Analysis of these data showed two themes: (1) exposure to the oil spill was associated with increases fears of being alone, children fighting with other children, arguments between parents and children, and perceptions by parents that their children were adversely affected by the event; and, (2) the children of those who worked on the cleanup showed more of these types of problems than those who did not work on the cleanup (IAI 1990d). Children were judged as vulnerable to psychological effects because of parental and community reactions to the event, family disruptions related to parental participation in the cleanup, and problems with getting adequate day care (IAI 1990d).

5.4.2 Kinship Was a Factor Affecting Patterns of Interaction and Association

Kinship is an important organizing principle for some aspects of social life in most communities. Among Alaskan Natives, kinship is a significant organizing principles for many aspects of social life (cf. Jorgensen 1990). Kinship is tightly integrated with patterns of residence, association, subsistence harvest practices, and the sharing of subsistence resources (Fall and Field 1996). The literature about the EVOS and kinship focuses primarily on Native communities, but there is some limited discussion of kinship in non-Native communities. The major theme regarding non-Native communities concerns the preference of including "family" (i.e., kinsmen) members in boat crews for cleanup work (IAI 1990c). In some communities, especially those communities where commercial fishing is a dominant industry, hired crews were sometimes replaced by relatives or other family members for cleanup work. Similarly, there was also a perception that family networks were used to hire cleanup workers (Endter-Wada, Hofmeister, et al. 1992, Endter-Wada, et al. 1993, Jorgensen 1995; IAI 1990c). While this may not be a surprising perception or behavior during a disaster event, it does highlight how kinship became one factor in shaping community response to the cleanup by replacing other types of social bonds as an organizing factor.

There are several major themes in the literature regarding kinship in Native communities and the EVOS. One theme is the disruption of visiting among Native households and kinsmen (IAI 1990d; ADF&G 1995; Jorgensen 1995). This decline in visiting behavior is usually attributed to the effects of the spill and harvesting of subsistence resources which are shared and cleanup employment which took individuals away from their communities, often for extended periods of time. A second theme concerns changes in household composition after the spill. Jorgensen observed that in Native communities,

> There was an increase in Native single-person households in 1990, which is accounted for by the fact that in order to gain cleanup employment, Natives had to relocate . . . Mixed households, remnant households, and sibling sets were more common in 1990 (53%) than in either 1988 (37%), or 1991 (33%) (Jorgensen 1995:403).

The analysis of household composition goes on to suggest different rules and expectations about kinship and household composition. These rules and expectations and some behavior change is attributed to the spill (Jorgensen 1995: 429ff), but the overall patterns that distinguish household composition persisted, although they adapted to the demands of on individuals and families resulting from the cleanup. That is, the principle of kinship which organizes household composition and results in a "communitarian" (Jorgensen 1995: 455) style of interaction responded to the spill in a fashion consistent with Native traditions. An important point in the Jorgensen analysis of differences in Native and non-Native households is that communities, families, and individuals responded to the EVOS based on existing principles of social organization and culture that define particular types of social life. Understanding these principles and how they structure life in each community is the best way to understand how the EVOS impacted Alaskan communities.

5.5 DISCUSSION

The range of findings here suggest a theme that is also present in other sections: the social circumstances in particular communities affected how the spill was experienced and its consequences for individuals, families, and overall social cohesiveness. Furthermore, the social and community resources available to respond to the event were important in determining how well communities maintained control over their own destinies during this event. Most did not. Most were overwhelmed either by the magnitude of the demands or the needs to respond to the damage to their way of life and community. Yet, differences in resources made a difference in impacts experienced. Communities that could muster their own internal resources and who received assistance from other agencies fared better than smaller communities with fewer resources. Leaders were essential for responding to the event, but most leadership resources in these small communities were at a disadvantage relative to the demands made upon them. What also stands out is that the effects on key aspects of social organization were pervasive. The effects were also cumulative so that although some effects seem relatively minor (e.g., husbands being around the household when they should have been fishing), the cumulative effect was that communities were in chaos. Key aspects of life changed. Some changes were short term, some longer, some unknown. But, so many aspects of life were affected that the sum total of the effects were to disrupt how life was lived in these communities.

McNabb (1993) makes an astute point about these types of effects. While many are related to the oil spill, many more are related to the cleanup. The cleanup was controlled by policies and organization that can be changed, that can be affected. This is one of the essential lessons to carry forward about how social organization was affected by the entire EVOS.

6.0 SOCIAL HEALTH

Disasters in general and technological disasters in particular affect how communities function as social groups (cf., Drabek 1986). This includes what can be termed the overall "social health" of a community. After defining the concept and its relevance, we examine several topics specific to the EVOS: social conflict; social disorders; mental health, community support, and recovery.

6.1 DEFINITION AND RELEVANCE: SOCIAL HEALTH

We define social health as the relationship of community resources to the demands of crises events. The application of community resources to a crises results in either adaptation or some degree of community dysfunction. When resources are insufficient or maladapted to the demands of the crisis, then the usual everyday processes of community life are disrupted.

Technological disasters are events which often disrupt the social health of affected communities (Gist and Lubin 1989). These events result in predictable consequences such as social disruption, conflict, increases in social disorders such as alcohol use and domestic problems (Drabek 1986). Often, individuals also experience stress and trauma both as a direct result of the event and often as a consequence of the social disruption they experience (Solomon 1989).

Community social support usually become means by which community and individual effects of disaster events are mitigated (Edelstein 1988). This function is usually referred to as the formation of a 'therapeutic community' (Gist and Lubin 1989). In practice this means the mobilization of family, neighbors, and formal organizations to provide the instrumental and emotional support needed to respond to the demands of a crisis. One of the important findings about technological disasters is that they often result in a compromise of the therapeutic community processes (Edelstein 1988). Indeed, because these events often result in substantial social conflict, communities are often factionalized rather than cohesive during technological disaster events (Couch and Kroll-Smith 1991).

These types of effects are especially relevant for this analysis because they are among the most usual and predictable outcome of technological disasters (Couch and Kroll-Smith 1991; Erikson 1994). At the same time they are often among the least recognized or acknowledged effects of events such as the EVOS. This is often because of litigation or unawareness on the part of agencies that are accustomed to responding to resource damages or contamination events, but not necessarily damage to human communities. Yet, within affected communities, the effects on the connections that hold them together as families, groups, and communities is unmistakable.

6.2 SOCIAL CONFLICT UNDERMINED COMMUNITY TIES

Conflict between individuals and among groups was a common outcome of the EVOS which undermined community and individual well-being (Russell et al. 1996; Picou, Gill, and Cohen 1997). Such conflict is consistent with what the literature describes about disaster-related community conflict: some are related to preexisting factions or issues (cf. Reynolds 1993) while others are particular to the disaster event (IAI 1990d). In either case, the effects are the same: conflicts threaten the ties the integrate individuals into groups and groups into a community. Conflicts existed at each stage of the EVOS: spill, cleanup, litigation, and restoration.

Most of the literature about the EVOS focuses on event-related conflicts. In some cases there may have been pre-existing issues that predisposed particular types of conflicts, but there appears to be limited data about these types of issues and their contribution to post-spill community conflicts. The major categories of conflicts described in the EVOS literature are: those about the morality of working on the Exxon sponsored cleanup; conflicts about 'gouging' Exxon; preference and unfairness in the hiring of workers and vessels for cleanup; conflicts among those supporting or opposing the oil industry; and, conflicts with Exxon regarding damages and loss. Each of these categories of conflict is briefly discussed below.

6.2.1 The Moral Acceptability of Working on the Exxon Sponsored Cleanup

In communities such as Cordova, Kodiak, and Homer individuals were in conflict over the acceptability of working on what was perceived to be an insincere cleanup (Russell et al. 1996; IAI 1990c). Fishermen and others debated the morality of participating in what was perceived as a cleanup managed for Exxon's image more than addressing problems of the spilled oil and its consequences (IAI 1990d). In Cordova, where this conflict is most well-documented, "purist" and "Exxon whores" (Reynolds 1993; IAI 1990d; Russell 1991) argued about the necessity to replace lost fishing income through cleanup employment against the immorality of participating in an insincere cleanup. The result was community conflict and

disruption (Russell et al. 1996; IAI 1990d; Reynolds 1993). The effect of this type of conflict was to segment communities and undermine cooperation (Russell et al. 1996; Reynolds 1993; IAI 1990d).

6.2.2 "Gouging" Exxon

The pricing of services or goods to Exxon, local government and individual claims against Exxon, and other community-Exxon interactions were interpreted by some as "gouging" Exxon. This resulted in judgments about the morality of this practice and undermined the social reputations of those who were perceived to be engaging in this practice. The best available data to describe this conflict is for Cordova (Reynolds 1993). One significant element of this conflict was the disruption of local government by a law suit ostensibly over the open-meetings law, but which was also interpreted by local residents as related to the equity and fairness of Cordova's spill-related claims against Exxon (Russell 1992; Reynolds 1993). This type of conflict may not have been salient on other communities, but its significance in Cordova is important for understanding how conflicts based on moral judgments resulted in undermining cooperation and cohesiveness within spill-affected communities (Russell 1992).

6.2.3 Preference and Unfairness in Hiring Vessels and Cleanup Work

Throughout the spill affected area, a theme in community conflict concerns preferences and unfairness in the hiring of cleanup workers and the allocation of contracts to vessels owners for clean-up related work (IAI 1990d; Reynolds 1993; Davidson 1990). Many of these conflicts were present in larger communities such as Cordova, Kodiak, Seward, and Homer, but less present in Native communities where the cleanup employed most who wanted to work. Some of these conflicts were perceived to result from Exxon's preferences to hire those who were "the squeaky wheels" rather than those who might be the most in need; and other conflicts were perceived to result from hiring "family and friends" in preference to those who may have a more legitimate financial need for cleanup work (IAI 1990c, 1990d; Jorgensen 1995; ADF&G 1995). The effects of this conflict are similar to those for other conflicts: formation of factions, damaged or lost friendships, and an overall contribution to the segmentation rather than cohesiveness of communities (IAI 1990d).

6.2.4 Support and Opposition to the Oil Industry

Prior to the EVOS, opposition to the oil industry existed among some fishermen in Cordova and there were some tensions in Valdez (IAI 1990c; Picou, Gill, and Cohen 1997; Robbins 1993). However, prior to 1989 organized, well-articulated opposition to oil development was generally not pervasive in the spill-affected area. After the spill, Valdez experienced some conflicts among those who work in the oil industry and those reacting to the effects of the spill (Robbins 1993; IAI 1990c). Given the salience of the industry in Valdez and the tensions generated within the particular community regarding the responsibility of the industry for the spill, this type of conflict is not surprising. Nonetheless, it was a contributing factor to the overall processes of the loosening of community bonds in this particular community.

6.2.5 Tension Exists Between Exxon and Affected Communities

Before litigation began, there were notable conflicts between Exxon and local governments, fishermen's groups, and individuals who sought damages related to the spill (Reynolds 1993). These conflicts were about diverse topics, including Exxon's operational procedures for the cleanup, payment for services rendered, delays in paying bills, and a host of other issues that generally created an atmosphere of tension between Exxon and affected communities (McClintock 1989; IAI 1990c, 1990d). These types of conflicts did not promote a spirit of cooperation in responding to a crisis that could affect the ways of life and economic conditions within affected communities. During the oil spill and cleanup phases of the

event these tensions contributed to an overall sense of tension and crisis within affected communities. Litigation became the ultimate expression of conflict between affected communities and Exxon (Hirsch 1997). However, litigation institutionalized the conflict between specific 'classes' of plaintiffs and the Exxon Corporation. The prolonged legal process that has resulted in an ongoing sense of an unresolved event (Hirsch 1997).

6.2.6 Conflicts Occurred Between Community Residents and Outsiders

Immediately following the grounding of the tanker *Exxon Valdez*, outsiders rushed to Valdez seeking employment for cleanup work. Other communities also experienced an influx of outsiders who either worked on the cleanup or were seeking an opportunity to work on the cleanup (Rooks 1993, Morrison 1993). Community residents and outsiders were often in conflict. In fact, one of the most widely reported aspects of community health is the conflict between community residents and outsiders (e.g., McClintock 1989; IAI 1990d; Palinkas et al. 1993; ADF&G 1995; Jorgensen 1993). Palinkas et al. (1993:6) reported a statistically significant association between exposure to the oil spill and conflicts with outsiders.

6.2.7 Social Conflict and Community Ties

One clear finding about technological disasters is that they usually result in community conflicts (cf., Kroll-Smith and Couch 1990). These conflicts result in the loosening the ties among community members and often there are splits into factions with opposing positions and views. The EVOS resulted in diverse types of conflicts, but within almost every community exposed to the spill, conflict was an outcome (IAI 1990d; Reynolds 1993; Endter-Wada et al. 1993). Furthermore, these conflicts pervaded a wide range of family, neighbor, working, and other community relationships (Palinkas et al. 1993). The effects were to loosen the bonds that connect individuals into groups and communities which in turn had consequences for social support. These issues are developed in more detail at the end of this section.

6.3 SOCIAL DISORDERS CONTRIBUTED TO COMMUNITY STRESS

Substance abuse, domestic violence, crime, and other social disorders often increase in response to a disaster event (Drabek 1986). Most of the information about social disorders and the EVOS is focused on the year following the spill. Three types of information are the basis for these assessments: (1) resident perceptions about substance abuse and family troubles (Palinkas et al. 1993); (2) observations of clinicians and other knowledgeable persons (IAI 1990c, 1990d); and, (3) measures of crime pre- and post-spill (IAI 1990c, 1990d).

Residents of Native and non-Native communities perceived that there was more drinking, drug use, and family fighting after the oil spill and there were more of these problems among their friends and other family members (Palinkas 1993: 9). Similarly, reports of community health representatives in Native communities and clinicians in non-Native communities reported increases in substance abuse, especially alcohol, and domestic violence following the oil spill (IAI 1990c). Importantly, many of the service providers in Native communities took employment with the cleanup which then resulted in fewer resources available to those who needed counseling services (IAI 1990c, 1990d). In some instances, stress resulting from the spill caused relapses among those with pre-existing conditions (e.g., IAI 1990c:187ff). In non-Native communities, requests for services from counseling centers increased dramatically; and, the demands for counseling services was in excess of resources (e.g., IAI 1990c:256-258; Endter-Wada et al. 1992).

Data for most non-Native communities suggest that crime and requests for public safety services increased in the year following the oil spill (IAI 1990d). For example, in Valdez for 1989 there was a 123.6% increase in arrests when compared to 1988 a 44.2% increase in person-days in jail and a 140.9%

increase in "disturbances" (IAI 1990d:64). Village Public Safety Officer reports from Native communities do not provide a consistent picture of the effects of the spill on crime in these communities (IAI 1990d). These data suggest that in the year following the spill, crime, domestic violence, and substance abuse were contributors to changes in community health that had overall negative effects.

6.4 STRESS AND MENTAL HEALTH PROBLEMS EMERGED AFTER THE EVOS

Stress and some specific psychiatric conditions such as depression and anxiety are well-reported outcomes of technological disasters (Gist and Lubin 1989). Stress is usually measured by psychological tests that assess individual responses to the measures against standardized scores. Above a certain score individuals are classified as experiencing stress. Some psychiatric conditions also have been measured, usually using psychological tests in much the same way as measures of stress. However, rather than generalized stress, the assessments of psychiatric conditions result in the identification of a "case" of a psychiatric condition according to standardized criteria. The most common psychiatric conditions assessed are depression and anxiety. Within the past ten years a condition known as Post Traumatic Stress Disorder (PTSD) has also been assessed as an outcome of disaster events. PTSD, first used to describe symptoms among Vietnam combat veterans, has been identified as an outcome of some disaster events including technological disasters (Solomon 1989). Importantly, "stress" and PTSD are different. The former is a generalized condition and the latter is a specific psychiatric condition that is usually a response to an event described as outside the range of usual human experiences (Horowitz 1990). This is a severe psychological condition that requires diagnostic criteria and as such it is much different than "stress." For our purposes here, the important point is that stress and psychiatric conditions are known outcomes of other types of technological disasters. Further, we can expect that the EVOS would result in some types of mental health issues for residents in affected communities. However, caution should be used in confusing "stress" and PTSD: they are similar but there are essential and important differences that distinguish one condition from the other.

6.4.1 Valdez Counseling Center Survey for Depression Symptoms and Stress

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 Epidemiologic 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; and
- 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 all increased as a result of the spill. Concern about the negative impact of the spill on the environment (n=5) was the second most frequently 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).

6.4.2 The Oiled Mayors Study Household Survey Findings for GAD, PTSD, and CESD

The Oiled Mayors Study used a face-to-face household survey of 594 residents in 11 affected and 2 "control" communities to assess a wide range of socioeconomic and psychological issues, including depression symptoms (CESD), generalized anxiety disorder (GAD), and PTSD (IAI 1990d). The survey, administered between March 29 and May 15 of 1990, sampled residents in 7 Native communities (Tatitlek, Chenega Bay, Akhiok, Karluk, Larsen Bay, Chignik, and English Bay) and four non-Native communities (Seward, Valdez, Cordova, and Kodiak). Petersburg and the Native community of Angoon in Southeast Alaska were selected as control communities. The Oiled Mayors Study household survey used an "exposure-outcome" design which constructed a measure of 'exposure' to the oil spill based on survey responses. The exposure score was then measured in relationship to the outcome conditions such as PTSD, CESD, and GAD. Demographic analyses also focused on Natives and non-Native responses (Palinkas et al. 1993).

The Oiled Mayors Study "exposure" measure was constructed 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 1990d)

Based on the mean of all answers, respondents were categorized into "high" "low" or "not exposed" categories. Analysis categorized 145 persons 'high,' 167 as 'low' and 281 as "not exposed." The highest mean exposure scores were in Native communities followed by Cordova, Kodiak, Seward, and Valdez. The table below shows the percentage of respondents from each community in the different exposure categories.

Percentage of Respondents
by Community and Exposure Category

	N	Mean Score	% High Exposed	% Low Exposed	% Not Exposed
English Bay	24	3.92	62.5	37.5	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
Chignik 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

High = 4-6; Low= 2-3; Not Exposed < 2
Source: Russell et al. 1996

The psychological outcome measures (PTSD, GAD, CESD) included assessments of two prevalence conditions: lifetime prevalence (have you ever had these symptoms) and post-spill prevalence (have you had these symptoms in the last year). Analysis of the exposure and outcome measures resulted in the following major findings about the measured mental health conditions.

- Pre-spill lifetime prevalence measures of the psychological conditions were roughly the same in impact and control communities (Palinkas et al. 1993).

- Exposure status was significantly associated with the post-spill prevalence of GAD, PTSD, and CESD scores.

- In comparison to those categorized as "not exposed", members of the high-exposed group were 3.6 times more likely to have GAD, 2.9 times more likely to have PTSD, 1.8 times more likely to have a CESD score greater than 16 and 2.1 times more likely to have a CESD score above 18 (Palinkas et al. 1993; Russell et al. 1996).

- Those in the "high-exposed" group were 2.1 times more likely to have GAD than those in the "low-exposed" group; members of this group were also 1.7 times more likely to have GAD as the "unexposed" group. These findings indicate that the more persons were exposed to the oil spill, the more likely they were to have GAD (Palinkas et al. 1993; IAI 1990d).

Logistic regression analyses were performed to test the effects of age, sex, ethnicity, education, 1989 household income, marital status, employment status, and exposure to the spill and cleanup on the likelihood of each psychiatric disorder. The following findings resulted from analysis of relationships between exposure and the demographic variables:

- Female sex was significantly associated with PTSD, GAD, and CESD scores.
- Age was significantly associated with PTSD and CESD.
- Ethnicity was significantly associated with GAD and CESD scores.

Multivariate models were then developed on a two-thirds (n=400) random sample of the respondents. When age, sex, and ethnicity were controlled, members of the high-exposed group were 3.7 times likely to have GAD, 2.6 times likely to have PTSD, 1.8 times likely to have a CESD score of 16 and above, and 2.1 times likely to have a CESD score of 18 and above as were members of the unexposed group. Members of the high-exposed group were also 2 (95% CI = 1.04-3.64) times as likely to have GAD as members of the low-exposed group who, in turn, were 1.9 (1.01-3.60) times as likely to have GAD as members of the unexposed group; the dose-response relationship found in the univariate analysis thus persisted when age, sex and ethnicity were controlled. Female sex was significantly associated with the likelihood of GAD, PTSD, and a CESD score of 18 and above. Young (18-24 years old) age and Native ethnicity were significantly associated with the likelihood of CESD scores of 16 and above.

Previous studies have found that co-morbid (the presence of more than one disorder in an individual) conditions are more likely to occur after a disaster than single psychiatric disorders. For instance, Shore, Tatum and Vollmer (1986) found the presence of a Mount St. Helen's Syndrome which consisted of symptoms of depression, anxiety, and post-traumatic stress disorder in victims of the Mt. St. Helen's disaster. The Oiled Mayors Study findings produced similar results: in comparison to those in the "not exposed" group, respondents in the high-exposed group were twice as likely to have at least one of the three mental health conditions, 2.4 times more likely to have more than one of the three mental health conditions, and 3.9 times more likely to have all three psychiatric conditions.

The overall findings of the Oiled Mayors Study indicate a significant relationship between exposure to the oil spill and cleanup and adverse mental health. In general, a dose-response relationship was found to exist between exposure and mental health: the more a community/individual was exposed to the oil spill and cleanup the more likely they were to have adverse effects on their mental health (Russell et al. 1996; Palinkas et al. 1993; IAI 1990d). Natives had more adverse mental health outcomes than non-Natives (Palinkas et al. 1993b).

6.4.3 University of Southern Alabama Survey Findings about Stress in Cordova and Valdez

The University of Southern Alabama (Picou and Gill 1996) conducted a longitudinal study of residents in Cordova, Valdez, and Petersburg to measure stress and other sociological variables. The study collected data at different points in time between August of 1989 and 1992. A two panel study design was used. The first panel was composed of data collected in Cordova (impact community) and Petersburg (control community) during August of 1989 and December of 1990. A second panel was constructed by adding spouses of the original sample and random selection of other community residents. A combination of face-to-face, telephone, and mail survey data collection methods were used during 1989, 1990, 1991, and 1992 (Picou and Gill 1997). A total of 228 persons from Cordova, 119 from Valdez and 102 from Petersburg completed survey responses. The survey included a sub-scale of the 'Impact of Events Scale' (Horowitz 1990) that taps two (intrusiveness and avoidance) of the four diagnostic elements of PTSD.

Analysis emphasized demographic and occupational (fishermen) characteristics of respondents with the stress measure being the dependent variable.

Analysis of the University of Southern Alabama data emphasized differences between impact communities (Cordova and Valdez) and reference or control communities (Petersburg and Angoon) and the differences between Cordova and Valdez. The University of Southern Alabama analysis of the later topic explained differences between Cordova and Valdez as accounted for by the former being a renewable resource community that is structured around commercial fishing (Picou and Gill 1997) whereas Valdez has a more diverse economy. The following are the major findings about the stress measure:

- Residents of Valdez and Cordova had higher measures of stress than those in Petersburg.
- Residents of Cordova had higher measures of stress than residents of Valdez in 1991 and 1992, but the difference was only statistically significant in 1991.
- Fishermen in Cordova had higher measures of stress than fishermen in Petersburg.
- Fishermen had higher levels of stress measures than other occupational groups and fishermen households had similarly higher stress measures than other types of households.
- There were no statistically significant correlation between the measure of stress and age, education, ethnicity, and families that had dependent children.
- Mean measures of stress have decreased between 1989 and 1992, but commercial fishermen have experienced less decline (Picou and Gill 1997).

The University of Southern Alabama analysis argues that Cordova as a renewable resource community and particularly fishermen and their households experienced higher stress measures than residents of Valdez and the control community Petersburg.

6.4.4 Discussion of Mental Health Findings

There are important and significant differences and similarities in the findings from these three primary sources of data about mental health and the EVOS. A significant similarity is that each data set shows that there were high levels of stress and mental health conditions in communities of the area of interest for this study. That is , there is consistency in finding post-spill stress and other mental health conditions in each of the three studies. Comparisons with "control" communities strengthen the positive findings. However, the post-hoc research designs used by each study cannot completely "prove" that the measures of stress and mental health conditions are directly related to the EVOS. Yet, the consistency of findings among these studies supports an assertion that would be less satisfying than any interpretation of only one or two studies.

Some of the important differences in these studies and their findings about mental health conditions are as follows:

- Donald et al. (1990) and Picou and Gill (1997) used measures of "stress that have been used in other studies of disaster events. These are not the same as measures of the mental health diagnosis PTSD that was used by the Oiled Mayors Study. Stress and PTSD are clinically different and this difference is important. Nonetheless, if stress and PTSD are lumped into a

single category, then there is a strong argument that there is a relationship between the EVOS and these lumped outcomes."

- Neither Donald et al. (1990) nor Picou and Gill (1997) found a statistically significant correlation between stress measures and demographic variables. However, the Oiled Mayors Study found a correlation between mental health conditions and some demographic variables, specifically gender, ethnicity, and age. The Oiled Mayors Study findings are consistent with other studies of technological and natural disasters (Green 1982; Gist and Lubin 1989; Baum, Fleming, and Singer 1983). The differences between the Oiled Mayors Study and the other two studies may be accounted for by the larger number of communities and hence more diverse populations than were sampled by the other studies in Valdez and Cordova.

- Donald et al. did not find any statistically significant correlation between occupation and measures of stress (1990:18). However, the University of Southern Alabama study found correlation between commercial fishing occupations and stress (Picou and Gill 1997). These differences may be accounted for by differences in sample size between the two studies and the longitudinal methods of the University of Southern Alabama study.

- Donald et al. (1990) and the University of Southern Alabama researchers (Picou and Gill 1997) interpreted their data based on the location of communities in relationship to the spill and, for the University of Southern Alabama team, the idea of the renewable resource community. The Oiled Mayors Study team based their analyses and interpretation on a measure of exposure and its relationship to mental health conditions. In effect, an examination of the exposure data in relationship to community geography suggest that we can lump the data for the narrow purpose of assessing mental health conditions. But, the analyses of the reasons for the post-spill adverse mental health conditions in these communities needs further elaboration. We will address this in the synthesis of information from this study in the next report.

6.5 COMMUNITY SUPPORT WAS UNDERMINED

Social or community support is an essential part of the mitigation of impacts and the process of recovery in disaster events (Drabek 1986). If social support is undermined, then it can have overall adverse effects on the social health of a community and specific effects on individuals and families. If individuals and families experience stress or other mental health conditions and social support is unavailable or diminished, then these conditions can worsen. Consequently, the issue of social support is an essential consideration for assessment of impacts as well as recovery from technological disasters.

The literature consists of a number of overlapping and sometimes conflicting findings about the issue of community and family support. Below we organize the findings by source for convenience, reporting mostly the novel findings of each study. The discussion section then synthesizes the findings from all sources reviewed adding relevant materials from other sources with relevant but less developed information regarding family and community support.

6.5.1 Oiled Mayors Study Findings about Family and Community Support

The Oiled Mayors Study household survey and information from interviews in 22 communities provide a range of information about the effects of the EVOS on community support. The Oiled Mayors Study household survey has a "family support" measure as well as assessments of changes in other social relationships (IAI 1990d: 38-45).

- There is a significant association between exposure status and a decline in social relationships (Palinkas et al. 1993b: 5).

- This is a significant association between decreased visiting among family and friends and exposure status (Palinkas et al. 1993: 6). Between 20-40% of households surveyed reported decreases in visits with friends and 15-30% reported decreased in family interactions (Russell et al. 1996: 874). In Native communities, 70% reported decreases in family visitation; and, those who worked on the cleanup reported less time spent with family and friends than those who did not (Russell et al. 1996: 874).

- Participation in community activities that traditionally reinforce social bonds decreased among those who worked on the cleanup; those who worked on the cleanup reported less participation than those who did not work on the cleanup (Russell et al. 1996: 874-875).

- Perceived family support appears to buffer the effects of depressive symptoms in non-Native communities, but not in Native communities (Palinkas et al. 1992: 293).

- Ethnographic data from the Oiled Mayors Study also suggests that social bonds in Native and non-Native communities were loosened as a result of the spill. For example, Native study participants quoted in Russell et al. (1996: 876) said: "It has drifted people apart. [It is] not the same as it was before. We used to help each other . . . " Further:

> [Before] the village used to be a whole family. Before. These people were one big family . . . but during the oil spill I noticed the village, that it's pulling away again, people started going into their own shells, and just pulling away. It was like people were mad at each other, they put a lot of stress on the workers . . .

- Other ethnographic data suggest that social bonds were loosened and overall participation in traditional community activities suffered during the EVOS (IAI 1990c, 1990d).

- Developing community cohesiveness and support was undercut by a privatized cleanup that was controlled from outside local communities (Russell et al. 1996; IAI 1990d).

- Social disruption contributed to distress experienced by individuals and communities and this disruption inhibited community cohesiveness and social support (Russell et al. 1996).

6.5.2 University of Southern Alabama Findings About Perceived Social Support

- In 1989, 58% of 31 respondents reported a decline in family relationships, but in 1990 this decreased to about 25% of respondents (Dyer, Gill, and Picou 1992: 118).

- Among Alaskan Natives perceptions of adverse changes in family relations was 43% (unreported N) in 1989, 24% in 1990, 26% in 1991, and 24% in 1992.

- Gill and Picou interpret Oiled Mayors Study results and ADF&G results as indicating that within Native communities family relationships were adversely affected by the oil spill and cleanup (1997: 174-175).

- Residents in Cordova experienced "significant social disruption in personal, family, and work settings" (Picou, Gill, Dyer and Curry 1992: 15). In comparison to Petersburg (study control community), Cordova residents experienced more social disruption after 18 months.
- 18 months post-spill, an association existed between social disruption and psychological stress (Picou, Gill, Dyer and Curry 1992:17). This associations was most prevalent among commercial fishermen.

6.5.3 MMS Social Indicators

In Kodiak area communities, Exxon's implementation of the cleanup process created community divisiveness and loosened social bonds (Endter-Wada et al. 1993:682ff).

Exxon's actions in the cleanup fostered a sense of helplessness among community residents by undermining values about fairness and equity, local knowledge, and the sincerity of the cleanup (Endter-Wada et al. 1993: 682 ff.)

- Resources usually available to respond to stress and mental health conditions could not meet the service demands placed on them by the oil spill (Endter-Wada et al. 1993).

- Communities, especially Native communities on Kodiak, lost control. For example, a Karluk resident quoted by Rooks (1993a: 764) observed: "So many people were telling us what to do and what not to do, who to let in the village and who not to let in the village. It was very confusing . . ."

- In Old Harbor tensions within families increased as a result of the disruption of usual routines and waiting for cleanup employment (Rooks and Ender-Wada et al. 1993: 800)

- In Chignik school children and families were strained by the EVOS (Rooks 1993c: 843).

- Chignik residents, especially commercial fishermen, formed alliances in response to outsiders, especially Exxon (Rooks 1993c: 843).

- In Valdez the spill exacerbated existing social tensions and conflicts related to class, employment, and length of residence (Robbins: 1993:77 ff.). Post spill, divisiveness persisted, e.g., "I saw a well develop between me and my friends at Alyeska because of the spill. We are friends again but it is not the same, the old hurt can't heal" (Robbins 1993: 97).

- In Valdez, many social tensions related to the spill were unexpressed, e.g., "We live in an oil town and there was nothing little people could do about this. So the anger and disappointment was turned inward and added to the tensions in town and the problems one gets from stress" (Robbins 1993: 102).

- The EVOS undermined confidence in judgment about the character of friends and neighbors. For example, " . . . the spill created a sense of distrust, of doubt about people's motives and of betrayal by friends and enemies alike, and that: 'Will be an undercurrent in Valdez for years to come . . ." (Robbins 1993: 103). This often resulted in a loss of cooperation and loosened social bonds (Robbins 1993: 110).

- Conflicts over spill-related employment were less in Valdez than in Cordova or other affected communities (Robbins 1993: 93).

- An influx of outsiders (government, military, Exxon, Alyeska, reporters, onlookers, and others) was a major source of social disruption in Valdez (Robbins 1993: 100) contributing to a loosening of community bonds.

- Social bonds were loosened in Cordova because of conflicts over spill-related employment, the actions of community members vis-à-vis Exxon, and a law suit brought against the city by a local resident/council member concerning the city's lawsuit against Exxon (Reynolds 1993: 226ff).

- Local efforts to respond to the spill in Cordova were undermined by the privatized cleanup which disbanded volunteer efforts to rescue injured wildlife and cleanup spilled oil (Reynolds 1993: 233 ff.).

- The Cordova District Fishermen United union is a major social institution in Cordova that acted as an important organizational and community support institution during the oil spill (Reynolds 1993: 233).

- Divisiveness in social relations is expressed in the formation of the Cordova Business Owners Association which was a reaction to dissatisfaction with the Chamber of Commerce's perceived support of Exxon (Reynolds 1993: 338-340).

- In many communities, employers felt betrayed by employees who took more lucrative cleanup employment (e.g., Reynolds 1993; Endter-Wada 1993; Robbins 1993).

6.5.4 Discussion of Community and Family Support Findings

Social bonds were loosened in Native and non-Native communities. These loosened bonds resulted from (1) conflicts regarding spill and cleanup related issues; (2) participation in cleanup activities; (3) influx of outsiders into some communities; (4) decreased participation in collective community activities; and, (5) divisiveness related to evaluations of the actions of friends, neighbors, and other community members. The loosening of social bonds in combination with reduced availability of institutional support from mental health clinics and providers resulted in overall diminished resources for coping with the stress and strains associated with the spill. Furthermore, Exxon's actions in dealing with affected communities at best contributed to a sense of helplessness and at worst undermined the nascent therapeutic community in many of the spill-affected communities. Native communities had the fewest institutional resources and perhaps the most sociocultural resources for social support. However, family and extended kinship bonds within these communities were also affected by participation in the cleanup, reduced sharing of subsistence resources, and decreased visiting among family members after the spill.

There are conflicting findings about the effect of social support on buffering the mental health effects of the spill. Donald et al. (1990) report no statistical correlation between social support and a measure of stress, but the trend in the data show that, at least for Valdez, persons with a high perceived social support score tended to score lower on the stress measure (Donald et al. 1990: 20). Palinkas et al. (1992) report that exposure correlated with increased conflicts in Native and non-Native communities; and, in non-Native communities there was also correlation between exposure and a decline in family support, but in Native communities there was no such correlation. Similarly, family support appears to buffer the effects of depressive symptoms in non-Native communities but not in Native communities (Palinkas et al. 1992: 293). Family and social support may be different constructs in Native and non-Native communities.

The co-occurrence of community conflict, psychological distress, decreased institutional resources, and processes that undermined formation and persistence of a therapeutic, supportive community had adverse effects. Communities did not have the resources to cope with the array of social, psychological, institutional, and other practical problems that confronted them during and after the spill. Community processes that would normally buffer the effects of stressful events were undermined.

6.6 RECOVERY AND PREVENTION

Almost no data exists about recovery from the effects of the oil spill, cleanup, and related social disruption on Alaskan communities. However, the literature does suggest some issues about recovery that are worthy of mention. Also, the spill resulted in a range of recommendation about preventing community impacts from future events. We briefly review two major sources of recommendations about mitigation of social and psychological impacts from future events.

6.6.1 Impacts Need to be Acknowledged for Recovery to Occur

Recovery depends on identification and acknowledging that a problem exists. However, the issue of social and psychological effects related to this event were slow to be acknowledged as legitimate by the spiller (IAI 1990d; Picou and Gill 1997). Concerns about liability and litigation may have been a factor in this refusal. However, the picture that emerges from the literature is that there was simply an overall reluctance to recognize that social and psychological impacts were a legitimate outcome of this event. The notion seemed to exist that if spill employment or other monetary losses could be mitigated, then the other problems would be lessened. In fact, the 'spill' of money into communities often resulted in increased conflict and social disruption. This further added to some of the community health problems discussed above.

6.6.2 Recovery Through Education

The Regional Citizen's Advisory Council has sponsored projects aimed at informing publics, particularly in Cordova, about chronic stress and the characteristics of technological disasters (Picou 1996). There are also a series of leaflets (Sound Alternatives 1996a) and taped radio programs (Sound Alternatives 1996b) regarding stress, recovery, technological disasters and other topics aimed at informing publics about the psychological and community effects of these types of events.

6.6.3 Recovery is Unknown

The literature about social health issues provides a wide range of information about how communities were impacted and why some of these impacts happened. Yet, almost nothing exists in the literature about the processes of recovery in the affected communities. The longitudinal data in Picou and Gill (1997) reports a declining level of stress in Cordova between 1989 and 1992, and there are declines in reported psychological stress in Kodiak (Endter-Wada et al. 1993), but the process of recovery is not a salient topic in the existing literature.

6.6.4 Prevention

In the days immediately following the spill there was some recognition by the State of Alaska that social and psychological impacts were issues that needed attention. A disaster psychologist, Richard Gist, was contacted by the Alaska Department of Health and Social Services and the Alaska Division of Emergency Services in April of 1989 to consult about the psychological and community impacts of the event (Gist 1989). Gist spent ten days, from April 6 until April 15, observing and consulting with local mental health

staff in Cordova, Valdez, and Seward (Gist 1989). This resulted in a set of policy recommendations that were focused primarily at a State level. These recommendations included:

- develop the capacity for an Integrated Emergency management system;
- develop the capacity for community impact assessment as part of an integrated Emergency Management System;
- ensure, through state and local coordination, that local level disaster plans exist and address psychosocial issues;
- develop training programs to address the community context of psychological problems related to disaster events;
- develop a state plan for public information and dissemination about disaster events and their effects;
- develop a triage program with centralized support for decentralized services;
- develop a critical incident debriefing process for those exposed to the disaster event, especially those working on disaster response; and
- develop culturally specific interventions (Gist 1989: no page numbers).

The emphasis of Gist's concise report and recommendations is on preparation for the next event and some of the processes that might have mitigated the effects of the EVOS. However, it also highlights the importance of building on existing knowledge about disaster events and acknowledging that social and psychological impacts occur in these types of events.

The Oiled Mayors Study (IAI 1990a) also resulted in a recommendations relevant to preventing and mitigating community impacts. Among these recommendations are:

- There should be a full understanding of the risk factors that expose these Alaskan communities to future disaster events.

- Community infrastructures and organizational resources need to be buttressed and supported in disaster events to prevent overwhelming resources that are needed to respond to the event and to support community members.

- Disaster plans and organizational structures within communities are essential to effective response.

- Communities need to have improved access to resources which can assist with disaster response.

- Communication processes need to exist to effectively inform community members about the course and process of the disaster and its community effects.

- Programs should be in place to respond to the community conflict that inevitably results from such events.

- Resources need to exist to supplement local resources for response to the psychological and social problems that accompany disaster events.

- Psychosocial impacts need to be acknowledged by natural resource agencies if harm to communities is to be prevented.

7.0 ECONOMIC CHARACTERISTICS

The literature about the EVOS suggests there are several major issues to consider about the interaction of local economies with the EVOS: (1) variable structure of fishing economies among spill-affected communities; (2) public and private losses and gains related to the oil spill and cleanup; and, (3) litigation. We discuss here an overview of the issues related to the findings about each of these topic areas.

7.1 DEFINITION AND RELEVANCE

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. Damage to 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 which resulted in a "money spill" into many affected communities. The economic effects of the spill are therefore highly relevant to any examination of how the spill interacted with the social institutions of rural Alaskan communities.

7.2 THE STRUCTURE OF ECONOMIC DIVERSITY

The structure of local economies is variable and this variability affected how communities were impacted by the oil spill and cleanup. Within non-Native communities, Valdez, Seward, Homer, and Kenai have economies with multiple sectors. Commercial fishing is one of these sectors, but it is not the dominant sector. On the other hand, Kodiak and Cordova have economies dominated by commercial fishing. However, there are important differences between these two communities. Kodiak's fishing economy has multiple components such as groundfish, salmon, crab, and herring. While there is some diversity in Cordova's economy, it is primarily focused on salmon fishing, especially the Copper River Flats salmon fishery. Within Native communities, subsistence foods are an important contribution to family and communities economies. Commercial fishing usually provides a major source of cash income within these communities. Importantly, subsistence and cash features of the economies of Native communities interact. These types of factors influenced the amount of economic damage caused by the spill as well as how cleanup monies affected local economies.

7.2.1 Economic Diversity in Non-Native Communities

The EVOS interacted with the economic structures of these communities in different ways. In the non-Native economically diverse communities, there were adverse economic impacts from fisheries closures as well as from inflation of goods and services that were being used for oil spill response (IAI 1990c, 1990d). But, these economies had some buffer because of their diversity. Adverse commercial fishing impacts did not bring these economies to their knees. Furthermore, they also had a range of services to offer for oil spill response, thereby drawing cleanup money. Kodiak is similar to these communities, but fishery closures threatened to adversely affect the entire Kodiak economy, yet not in the same way as in Cordova. In Kodiak, fishermen had some limited options to pursue other fisheries that Cordova fishermen did not have. This was partly related to the oiling of Cordova fishing grounds and hatchery waters and partly a function of the diversity of Kodiak's commercial fishing operation. That is, both Cordova and Kodiak are dependent on commercial fishing, but there are more sectors (vessel types, processors, species harvested and processed) within the Kodiak industry than in Cordova.

An important point about economic structure that can be derived from the literature is that economy diversity buffered communities, even commercial fishing communities, from adverse impacts. Cordova is the worst case example and Valdez is perhaps the best case example, both because of the economic

benefits derived from being the center of the oil spill response effort; and because of a diverse economy in which commercial fishing was an important but not dominant factor (cf. Endter-Wada, et al. 1993).

7.2.2 The Structure of Subsistence and Cash Economies in Native Communities

There is a straightforward point to make in contrasting the economic structures of Native and non-Native communities: subsistence plays an important economic role in providing food for families which is supplemented by cash resources from commercial fishing and other sources of employment. These communities have significantly less economic diversity than non-Native communities and the EVOS impacted resources that were central to both the cash and subsistence aspects of Native economies. Not surprisingly, residents of Native communities were motivated to seek and were employed on the cleanup in greater proportions than residents in non-Native communities (Endter-Wada, et al. 1993).

7.3 PRIVATE SECTOR ECONOMIC LOSSES AND GAINS

There are several major sources of public information about economic losses and gains related to the EVOS. There are also other data that were prepared for litigation purposes, but these sources are not public. The three major public sources of economic data are:

- The Oiled Mayors Study analyzed 1,341 responses from a mail survey of more than 6,000 businesses to ascertain losses, gains, and changes in business plans (IAI 1990a). This study also examined fiscal impacts to local governments (IAI 1990d).

- Endter-Wada, et al. used a panel study to ascertain the effects of the spill on community and household economies (Endter-Wada, et al. 1993).

- Cohen (1997) presents an analysis of the effects of the EVOS on commercial fishing and the regional economy of Prince William Sound.

7.3.1 Findings about Economic Losses and Gains

Businesses both prospered and floundered because of the EVOS. Prosperity was directly related to providing goods, services, or labor for the cleanup. Floundering was usually a direct result of the effect of the spill on local fishing economies and the businesses that provide goods and services to crews, boats, and processors. Businesses that did not participate in the cleanup tended to loose more and gain less than those businesses that did participate in the cleanup (IAI 1990a). The following are some of the major findings about business gains and losses and their relationship to the cleanup.

- Overall business losses exceeded gains: Total region-wide losses arising from the oil spill and cleanup are over $336 million. These losses are partially offset by spill-induced gains of $105 million. Region-wide losses of $293 million in business profits accounted for the overwhelming majority of total region-wide losses (IAI 1990a:7-1).

- Business losses and gains were not evenly distributed. Commercial fishermen and seafood processors suffered the most losses. Other basic sector industries and support industries suffered fewer losses (IAI 1990a: 7-12). Overall, respondents in Valdez, Seward, and Soldotna had the least losses while those in Cordova experienced the most (IAI 1990a: 7-1).

- Using earnings as a proxy for regional economic activity, Cohen suggests that losses were variable between 1989 and 1990. For 1989 the 1-4 quarter differences between with and

without impact estimates are 9%, 46%, 65%, and 13%, respectively. Similar numbers for the 1990 quarters are, respectively: 17%, 20%, 14%, and 13% (Cohen 1997: 140).

- Losses were distributed, but commercial fishing experienced the most losses (Cohen 1997: 142ff).

- Using a with/without EVOS analysis framework, Cohen argues that between 1989 and 1990, ex-vessel prices for most salmon shellfish and herring harvests declined. Herring sac row suffered the most severe decline (Cohen 1997: 151). Using the same framework, ex-vessel revenues for most species other than halibut and sablefish declined. The overall decrease for ex-vessel revenues for 1989 is calculated at 27% while for 1990 the value was 12% (Cohen 1997: 151). Other research using different economic modeling suggest that there were no post-spill declines in salmon prices related to the oil spill (Owen et al. 1995).

- The issue of post-spill declines in fish prices is contentious and potentially related to a number of exogenous factors other than the oil spill (Jorgensen 1995; Cohen 1997).

- Cohen (1993) analyzed time series data for non-Native communities and concludes that the over-all economic benefits of the spill were positive.

- Economic losses were most felt by the following groups: (1) construction/remodeling firms; (2) river guiding and sport fishing operations; (3) suppliers of boating and fishing equipment and services; (4) small-scale commercial fishermen; (5) fast-food businesses; (6) tourism businesses; and, (7) real estate brokers (Jorgensen 1995: 43-44).

- Commercial fishing households lost the most from the spill and were compensated the least for their losses (Jorgensen 1995: 112).

- Within Native communities, costs for some essentials such as fuel placed additional burdens on those who had to travel to distant areas for subsistence foods that were locally available prior to the spill (IAI 1990d; ADF&G 1995).

7.3.2 Economic Aspects of the Cleanup

- The cleanup resulted in an expenditure of an estimated $1.2 billion during 1989 (Wohlforth 1989). By mid-1991 Exxon estimated that over $2 billion was spent on the cleanup (Jorgensen 1995: 41).

- Some of the spills immediate economic impacts were mitigated by a privatized cleanup that employed many person in affected communities; and cleanup contractors made some efforts to purchase goods and services in these same communities (IAI 1990d; Endter-Wada, et al. 1993).

- The Oiled Mayors Study business survey reported the 38% of businesses surveyed participated in the cleanup. The highest percentage was in Valdez (62%) and the lowest in Soldotna (15%). Commercial fishermen had the highest rate of participation in the cleanup of all businesses surveyed (IAI 1990a: 4-1). However, larger boats were more often participants in the cleanup than smaller vessels, illustrating the distribution of effects of cleanup participation (Jorgensen 1995: 48-49).

- Boats in Native communities were often chartered at lower rates than boats in non-Native communities (Jorgensen 1995: 50).

- Crew members on fishing vessels participating in the cleanup were often displaced by family and close friends. This resulted in further effects on the distribution of cleanup related employment (IAI 1990d; Jorgensen 1995: 50-51).

- Respondents that did not participate in the cleanup reported income decreases (36%) were more than income increases (20%) whereas those that did participate in the cleanup reported more income increases (46%) than decreases (30%) (IAI 1990a: 5-2).

- Residents in Native communities participated in the cleanup in higher proportions than residents in non-Native communities (Endter-Wada, et al. 1993).

- The economic effects of cleanup moneys were mitigated by several factors: some individuals employed on the cleanup were from outside local communities and their incomes did not benefit local communities; cleanup income was spent outside communities for many consumer goods; and, other losses offset the gains from cleanup remuneration (Cohen 1997).

- Businesses lost wage workers to the cleanup which paid higher wages. This placed these businesses in difficult operational circumstances, some of which led to losses. Labor shortages were common in most spill-affected communities (IAI 1990d; Endter-Wada, et al. 1993; Cohen 1997).

- Jobs were created by the cleanup, but these usually did not outnumber the jobs lost (Jorgensen 1995: 44). Also, Jorgensen observed, "Between 1989 and 1992, significantly more jobs were lost in the private sector throughout the spill area than in the public sector. Inasmuch as the spill accounted for 45% of Alaska's job growth in 1989. . .the loss of jobs after 1990 when cleanup activities attenuated appears to be a direct consequence of the loss of cleanup employment" (Jorgensen 1995: 84).

- The economic effects of the cleanup should be considered within a "boom-bust" framework (Jorgensen 1995). The boom resulted in not only an infusion of cash into local economics, but it also caused an increase in prices for commodities, rents, and services (Endter-Wada, et al. 1993: 4).

- "Natives in comparison with non-Natives, were less often compensated for their losses, more frequently lost jobs because of the spill, and spill-related employment was more frequently away from their home villages" (Jorgensen 1995:112).

7.4 PUBLIC SECTOR FISCAL IMPACTS

Much of the research that quantified public sector fiscal impacts is not in the public domain because of litigation issues. However, there is limited qualitative information about some of the issues regarding fiscal impacts to affected communities. Most of these qualitative data concern the categories of revenues and expenditures related to the spill and the nature of reimbursements between Exxon and municipalities. The following bullets summarize key issues about public sector impacts from the publicly available data.

- Municipal revenues were impacted. Sales taxes increased in some communities because of cleanup related expenditures (Jorgensen 1995; IAI 1990b). Raw fish taxes decreased in most communities except Valdez (IAI 1990d:97). Harbor revenues may have been offset by costs

associated with Harbor operations. Transient occupancy taxes decreased because of changes in residency types (IAI 1990d: 97). Overall, there is no clear picture of the total effects on local government revenues from the oil spill and cleanup in the existing public literature.

- Municipal expenditures increased during the cleanup period. These increased expenditures were associated with: deferred maintenance, administrative costs in excess of the 10% allowed by Exxon, opportunity costs for projects/grants not pursued, increased audit fees, increased insurance costs, changes in bond ratings, attorneys fees, and the costs on cash reserves of budget depletion/disruptions (IAI 1990d: 100ff). Furthermore, within most communities affected by the spill, there were increased demands for services that strained the resources of municipal governments and sometimes resulted in increased costs (IAI 1990b; Jorgensen 1995).

- Exxon compensated some of the costs to local government for cleanup related expenditures (IAI 1990d: 73ff.). However, Exxon established the rules for what expenditures would and would not be reimbursed. Expenditures for costs related to social services or mental health could not be included in billings. Other costs were also not included in billings because of Exxon rules. The use of billings to Exxon as a measure of event costs to local government is imprecise (IAI 1990d: 94-95). The costs incurred by selected communities for the time period between March 24, 1989 and the Spring of 1990 reported by the Oiled Mayors Study were as follows:

Spill-Related Expenditures for Selected Communities	
Jurisdiction	**Reported Spill-Related Expenditures**
Cordova	$951,000
Valdez	$1,395,000
Kenai Borough	$1,180,000
Homer	$363,000
Seward	$292,000
Kodiak Borough	$1,781,000
City of Kodiak	$125,000
Whittier	$268,300
Seldovia	$154,200
Ouzinkie	$3,400
Port Lions	$160,500
Larsen Bay	$13,000
Old Harbor	$44,700
Chignik	$9,700

Exxon is reported to have reimbursed most expenditures, but again these are only the expenditures for which billings were allowed. A clear picture of differences between expenditures and revenues related to the oil spill and cleanup is unclear. However, what is clear from an examination of the literature is that most municipalities did not have the fiscal resources to respond immediately to the oil spill unless they had substantial reserves (IAI 1990b). This placed many communities in the position of having to rely on Exxon and its rules and procedures to assist with expenditures related to the cleanup.

7.5 LITIGATION AND ECONOMIC ISSUES

Municipalities and individuals perceived that litigation was a primary means to recoup losses related to the EVOS. Although both individuals and municipalities submitted claims to Exxon for damages incurred, this process proved unsatisfactory for many individuals, businesses, and local governments (Endter-Wada, et al. 1993; IAI 1990d). Litigation resulted. Civil litigation was focused by maritime law and the Robbins-Dry Dock case law (Hirsch 1997) which allows for direct damages from the oil spilled.

For many residents of the spill affected area, this type of litigation appears not to address their needs or losses. Civil litigation between Exxon and the Federal and State governments resulted in a $900 million assessment which is to be paid over ten years (Hirsch 1997). Additionally, about $300 million was awarded for compensatory damages to be paid to commercial fishermen, Natives, and land owners. The most controversial aspect of the judgments against Exxon has been the $5 million punitive damages award which is currently under appeal. This and other appeals may not be resolved for years (Hirsch 1997). This keeps alive ongoing uncertainty about the final economic effects of the oil spill and cleanup. Ultimately, until the ongoing litigation is resolved, the issue of the effects of litigation on local economies is also uncertain.

7.6 DISCUSSION: COMMUNITY ECONOMICS AND THE EVOS

Litigation has clearly inhibited a complete analysis of the economic effects of the oil spill because of data and reports that have been protected by the courts. However, there are some qualitative issues that emerge from the literature that seem noteworthy:

- The cleanup resulted in an infusion of cash into local communities, but the nature of local economies and the character of the cleanup meant that there were limited overall benefits to local economies.

- Monies gained from the cleanup by local residents did not mitigate the other social effects of the spill and cleanup. That is, there was a tendency to view the whole event in economic gain and loss terms. This obscured recognition of some of the other significant social, psychological, and cultural problems related to the spill and cleanup.

- Cleanup monies were unevenly distributed within and among spill affected communities. The economic benefits in some instances resulted in other social conflicts that had adverse consequences for communities.

- All the economic issues related to the spill are not resolved, most because of the litigation process.

- Commercial fishermen and especially small scale fishermen were hardest hit by the spill.

- Diversity in local economies and fisheries buffered the economic effects of the spill.

If there is one over-riding issue that stands out from examination of the literature about economic issues, it is the distribution of economic impacts. The distribution of impacts was in part a function of the structure of local economics which either exacerbated or mitigated the economic impacts of the EVOS. Furthermore, within communities there were also differences in economic losses and gains. Not everyone benefitted from the cleanup. Not everyone was damaged by the oil spill and its effects. The economic effects of the EVOS, much like the other social effects, are a mosaic that requires attention to the diversity of communities and the distribution of effects in order to understand the complexity of what happened. There is little data currently available to understand the overall distribution of these economic effects and their consequences for local economies.

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Final Social Factors

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1.0 THE *EXXON VALDEZ* OIL SPILL EVENT AND SOCIAL FACTORS

Social factors are the focus for our analysis of the community impacts of the *Exxon Valdez* oil spill, cleanup, and litigation. In this document we present a discussion of the derivation of social factors, how these factors will be used, a summary of types of community impacts, and a revised list of social factors and their components. For our purposes here, social factors are major categories of sociocultural variables such as social organization, culture, or subsistence. Each social factor has components such as political organization for social organization, beliefs and values for culture, and harvest activities for subsistence. Social factors will organize our analysis of the relationship between the *Exxon Valdez* oil spill (EVOS) event and its community impacts. Individual components of particular social factors will assist in describing how any one category contributed to different effects across the impacted communities.

1.1 SOURCES FOR THE DERIVATION OF SOCIAL FACTORS

We define "social factors" as a structure (social, cultural, or economic) or process (social or cultural) within communities that organizes and makes meaningful individual and group experience. For example, "social structure" is a social factor comprised of specific social institutions, their connections, and processes. We have identified social factors by the examination of the literature regarding the oil spill and the literature about technological disasters in general. The literature about the oil spill and its aftermath describes an array of social, economic, psychological, cultural, and physical impacts (e.g., Impact Assessment, Inc. [IAI] 1990d; Picou, Gill and Cohen 1997). In the factor by factor analysis, we will present a thorough summary of these impacts. Our listing of social factors has also been informed by, and examination of, the literature about other "technological disasters." This literature places the EVOS event within a wider frame of social problems and phenomenon (e.g., Kroll-Smith and Couch 1990; Edelstein 1988; Dunlap, Kraft, and Rosa 1993; Couch and Kroll-Smith 1991). We use this literature to generate concepts that apply to similar events, but which may not be fully described or analyzed in literature about the EVOS event itself. For example, perceived risk (Slovic 1987) and the social amplification of risk (Kasperson et al. 1988) are sub-topics within this literature that we found useful to describe social and cultural factors for the EVOS.

The Annotated Bibliography and Abstracts represents the range of literature about the EVOS event we have used as a major source of information for our derivation of social factors. As this bibliography demonstrates, the literature about the event itself is highly varied in the scope, methods, communities, and issued examined. Some work (e.g., Picou 1992) focuses on one or two communities and a subset of the full-range of impacts associated with the event. Other work includes a number and diversity of impacted communities and examines a range of psychological, social, economic, and municipal effects (e.g., IAI 1990d). Some research is broad in its geographic range and diversity of communities examined and also rich in descriptions of event effects and local context, but is limited in its analysis of "why" these effects occurred (e.g., Minerals Management Service Technical Report 160). Other information from popular literature and news sources tends to be descriptive of effects, but often without the contextual factors or analysis that would aid in the specification of social factors. Consequently, our task has been to sift through these diverse sources to derive social factors that cover the full range of circumstances related to the event. Not all social factors apply to all communities. Indeed, examination of the literature suggests that community effects are related to the configuration of components of particular social factors and to the interactions among factors in diverse communities. Consequently, we have cast a broad net to identify social factors that apply to the widest set of circumstances, and we also identify components of these factors to assist in accounting for the diversity of impacts among communities from Prince William Sound to Kodiak and the Alaska Peninsula.

Another consideration is the phases of the event covered by most of the systematic research about the EVOS event (e.g., IAI 1990; Russell et al. 1996; Picou, Gill, and Cohen 1997). Most of the work addresses effects related to the spill and cleanup during the first two or, at most, three years following the spill. Effects related to restoration and litigation are minimally addressed by research that extended much beyond two or three years after the spill. This leaves out a considerable number of events related to restoration and litigation that have received media coverage, but media coverage is not systematic enough for the analysis we would like to see performed for these crucial phases of the EVOS event. Consequently, the social factors we derive from the literature may not cover the full-range of applicable circumstances, especially those concerning restoration and litigation.

A second major source for our derivation of social factors is the literature about other types of technological disasters. In recent years, this area of scientific research has increased in the kinds of events examined and in the sorts of issues considered and the way that the technological aspects of these disasters make them different, in course and social consequences, than natural disasters (e.g., Drabek 1986). The examination of chemical spills, siting of hazardous facilities, mine fires and other similar human-made circumstances has bought attention to the social impacts that follow technological disasters as well as to the role of social factors in influencing event outcomes. This literature indicates several important types of sociocultural features and effects of technological disasters that are a backdrop for our identification of social factors. Among these features are: (1) discourse about event characteristics, as well as blame and responsibility for the event occurrence, leading to a lack of public consensus on answers to these questions ; (2) pollution fears and concerns about health effects from the event; (3) perceptions of a polluted and changed physical environment; (4) assessments of "home" as a changed and damaged place; (5) emergence of social groups that take activist positions about environmental issues; (6) social conflict and divisiveness; (7) damaged community bonds and social processes; (8) loss of trust in governmental and corporate institutions; (9) family and individual stress responses; (10) changes in community participation; and, (11) changes in local political and community leadership. In technological disasters it is not uncommon for community divisions and distrust to develop over alliance with the entity blamed for the disaster, and for disagreements to emerge about solutions. The consequent damage to community bonds often spawns the chaotic effects that seem to characterize technological disasters (cf. Erikson 1994). Since less is known, or widely known, about the long term health effects associated with exposures in technological disasters, enduring health fears and uncertainty about contamination and exposure are not uncommon. Further, in technological disasters, cultural, social, and psychological factors often interact and have compounding effects, subverting the traditional 'therapeutic community' that may develop following natural disasters. Thus the community's perception of disaster as technological in origin may, itself, be a critical social factor configuring and amplifying social effects.

For our purposes, the literature about technological disasters places the EVOS event within a context of similar events. It allows us to use these other events to examine issues that may not necessary be examined by specific pieces of literature about the event, but when the total range of data available are assembled we can suggest social factors derived from analysis of similar events.

1.2 THE USE OF SOCIAL FACTORS FOR ASSESSING COMMUNITY IMPACTS

The identification of social factors is in part informed by how they will be used in the factor-by-factor analysis. Here we wish to describe briefly (1) an approach for analysis of the relationships between event context, social factors, and community impacts and (2) how the factor-by-factor analysis will be implemented.

1.2.1 An Analytic Approach for the Use of Social Factors

Our analytic approach to the analysis of the role of social factors in effecting community impacts is to assess the relationship between community impacts, social factors, and "event context" (characteristics of the event and biophysical characteristics of community environment). Our approach has the working assumption that social factors mediated between the event context and community impacts. That is, the EVOS event outcomes are a consequence of how specific context characteristics interact with the structures and processes of particular communities. In these interactions, the configuration of social factors, in particular, communities, may have produced different effects through exposure to the same event characteristics. For example, subsistence resources used by both Natives and non-Natives were damaged. These damages had similar functional effects, depriving individuals and families of subsistence food resources. However, the cultural meanings of subsistence resources (for example, research in some Native Alaskan communities has noted that the traditional exchange and sharing of wild foods hunted, fished, or gathered by individuals and families is an important link in the maintenance of community bonds and the fulfillment of social responsibilities) differs in Native and non-Native communities and thereby resulted in different effects. We will thus use social factors as a way to analyze how variable community effects were produced from exposure to the characteristics of the EVOS event.

1.2.2 Implementation of the Factor-by-Factor Analysis

Social impacts of the EVOS event were not uniform, and differed in severity, kind, and duration from one community to another. Our description of the application of each factor emphasizes how data will be aggregated from the literature to analyze how these factors mediated different outcomes from the oil spill, cleanup, and litigation. This analysis has two parts. The first considers each individual social factor and its relevant components, assessing how each mediated exposure to the oil spill and community impacts. The second considers the interactions among social factors and their components as they mediate community impacts.

The purpose of the factor-by-factor analysis is to provide resource managers and community members with an understanding of how particular social variables contributed to community impacts associated with the *Exxon Valdez* oil spill, cleanup, and litigation. For example, interested parties will be able to read an analysis of social structure and its components to understand how these contributed to the overall patterning and distribution of community impacts This analysis will be completed by aggregating and synthesizing the literature cited in the bibliography. Codes will be assigned to the literature examined for the presence of a social factor and its components. We will then aggregate the relevant information and analyze how each social factor contributed to community impacts.

This analysis will first categorize the aggregated information for each factor and then examine the themes and issues regarding the relationship between oil spill events, environmental context, and community impacts. Each source used in the analysis will be indexed so that the basis is clear for the interpretations and conclusions in the social factor analysis. Additionally, this factor-by-factor analysis will assess the relative priority of social factors affecting community impacts. This priority analysis will consider intensity of impacts, effects on population sub-groups (Natives, fishermen, cleanup workers), and the range of communities impacted.

Individual social factors interact with each other (e.g., culture and social organization), in most contexts to influence or determine the meanings and processes of social life. The factor by analysis will also consider interactions among each factor and its components identified for this study. Based on our review of the literature so far and our review of the literature regarding technological disasters, we expect that this analysis will illustrate how interactions among social factors contribute to outcomes that are not accounted for by any single social factor. Additionally, we expect the patterning of relationships among factors will also account for variation among communities in the impacts experienced when the

"exposure" and context conditions seem similar. Our focus will be to connect the interactions among social factors with outcomes related to phases and conditions of the EVOS event.

1.3 SOCIAL FACTORS AND TECHNOLOGICAL DISASTERS

It was apparent to those who lived in the communities in the path of the spill that the threat to their environment was also a threat to their way of life, to their expectations about a future, and the connection of that future with their past. None of the rhetoric about the volume of oil spilled, or the number of otter and bird deaths, could overshadow the difficulties of the people of Prince William Sound, Kodiak Island and the Gulf of Alaska who experienced the *Exxon Valdez* oil spill as a calamity thrust upon their lives and future. In terms of sociocultural effects, the cleanup effort and litigation phase are as important as the primary spill event itself. As time has passed and more research has emerged, the EVOS event has become an exemplar of a type of disaster in which individuals, families, and entire communities experience not only the relatively short-term immediate physical effects of the disaster itself, but also more long-term social and psychological distress generated by the ambiguous nature of the disaster event and the variety of responses to it. This "new species of trouble" as Kai Erikson labels it creates uncertainty, dread, and a changed relationship of individuals and communities with their environment. As Erikson observes,

> . . . when the dread is lasting and pronounced, the spectacle of a failed technology can become the spectacle of a failed environment as well. This is an outlook born of the sense that poisons are now lodged in the tissues of the body, that the surrounding country-side is contaminated as well, that the whole natural envelope in which people live out their lives has become defiled and unreliable (Erikson: 1991: 24).

Yet, in this new species of trouble – the technological disaster – it is not only the environment, the natural envelope of human experience, that has become unreliable, but also many of the social institutions and processes upon which communities rely for social cohesiveness and support. Indeed, a reading of the technological disaster literature suggests that a defining characteristic of these events is damage to community, to individuals, to ways of life, and to the worldviews that attribute meaning to human experience (Shilnyk 1985). This loss of, or damage to, the sense of community, the loss of trust in government and corporate institutions, and the disruption of 'lifescapes' in technological disasters have consequences that social scientists have described (Edelstein 1988). Again, Erikson in commenting on the mercury poisoning of waters used by an Ojibwa community has a meaningful observation about damage to community institutions and processes:

> When survivors suffer from loss of community as well as from individual shock, it is not just a question of getting them back on their feet but of seeing to it that there is some kind of communal ground, as it were, for them to stand on once they are upright. We can dress their physical wounds, provide food and shelter and clothing, console them for their losses, ease their grief, find ways to calm their anxieties. But until we restore the communal surroundings that was so vital to their sense of health and security, they will remain like refugees in their own land, damaged in spirit long after they have been put together again in body, and feeling a long way from home (Erikson 1985:xvii in Shilnyk 1985).

The trauma suffered by individuals from such events becomes compounded when the processes of community are also damaged. Traditional support systems become less efficient or unavailable and other community resources that protect communities from being overwhelmed by disasters are undermined. Individuals and communities become at risk for compounded social and psychological effects that seem unpredictable. Indeed, it is this compounding of individual and community effects that often leads to the

sense of chaos that pervades these events, that contributes to unexpected outcomes and disruption in community life. Yet, in the case of the EVOS event, patterns were seen in its community impacts. What may have been unexpected at the community level can, in retrospect, be understood from an analytic perspective, and this is where social factors analysis can assist in facilitating understanding of events and processes associated with the EVOS event.

1.4 THE *EXXON VALDEZ* AS A TECHNOLOGICAL DISASTER

In a number of communities, the oil spilled from the wrecked *Exxon Valdez* altered the lives of many Alaskans just as surely it as blackened beaches and damaged wild resources. The spill and subsequent related events generated social impacts at all levels within the social structure or organization. In additional to having an influence on individuals, the spill and associated events altered community activities, and the relationships between individuals and groups in communities. For example, because of the oil spill and cleanup, fishermen did not fish and Native Alaskan subsistence hunters did not hunt, influencing all of the relationships that intertwine with these activities. Others experienced their lives as forever changed for a variety of reasons. Some businesses lost money while others gained large profits, creating 'spillionaires' out of, for example, former plumbers, fishermen, and refrigerator repairmen who went to work on the cleanup effort. Friends and neighbors sometimes argued over differences about the spill, and especially the 'morality' of working for Exxon (who paid for and ultimately organized the cleanup effort), creating (or exacerbating) social divisions between neighbors and former friends. Others argued over inequities in opportunities, and money lost and gained in the cleanup effort. On the family level, parents and children argued over the same issues. On the individual level, some persons experienced depression, anxiety, post-traumatic stress disorder, and other types of clinical disorders while others were angry, fearful, and, in their words, "stressed." People in both Native and non-Native communities were concerned about the toxic effects of the spilled oil.

For communities in the path of the oil spill, as well as for some near the path that experienced damage to their resource base, such individual and social tensions were among the pervasive consequences of the EVOS event. Yet, in the early days of the spill, the focus of attention by the media, the spiller, and various governmental entities was on natural resources damages. Indeed, to the world at large, the spill has become known solely as an 'environmental disaster.' Most Exxon Valdez Trustee Council studies (whether damage assessment or aimed at restoration) focus on the oil spill event itself as the cause for effects upon biological (natural) resources. Although both cleanup efforts and litigation phases had the potential to effect biological/ecological resources, Exxon Valdez Trustee Council studies and projects more-or-less ignore such potential effects (archaeological studies did assess the effect of cleanup efforts on cultural resources). No Exxon Valdez Trustee Council study focuses on the litigation phase, and effects on the human population of Prince William Sound have more generally not been examined.

It is also important to recognize that there have been other types of social impacts in communities that may or may not have experienced the acute social disruption found in some spill area communities. An example of this are the continuing social impacts that are being generated by the 'restoration' process, whereby land status is changing, altering relationships between communities, and groups within communities, and the local resource base. Not all social impacts have been seen as negative by any means, nor have 'new' social impacts stopped occurring nearly a decade after the spill.

What is essential about the EVOS event as a technological disaster is its effects on human communities. Natural resource damages were, and are, significant, but communities also have economic, social, cultural, and spiritual relationships with those resources. As we have noted earlier, the literature about technological disasters suggests that social characteristics and processes of particular communities effects how impacts are experienced. We wish to emphasize here that our analysis of the relationship of

exposure to the EVOS event and community impacts will emphasize how social factors and their components contributed to the patterning and distribution of impacts experienced.

1.5 THE DISTRIBUTION OF COMMUNITY IMPACTS AND SOCIAL FACTORS

The EVOS event altered social processes and relationships in Alaskan communities, but how these changed varied from community to community. Indeed, there was a continuum of experience where some communities experienced the spill as 'socially corrosive' while in others the effects were perceived as short term and only minimally disruptive. Despite the environmental and social damages of the EVOS event, there are perceptions that there were positive community outcomes including infrastructure development, habitat protection, acquisition of new lands for habitat protection, increased environmental awareness, and renewed interest in participation in community leadership. An understanding of the variation in the patterning of impacts and in the role of social factors in contributing to these patterns and their variations is essential to our analysis.

In some communities the EVOS event was extremely divisive. The 'social turbulence' (the disruption of community functions and relationships) that accompanied the event was in some cases related to the issues of blame and responsibility. A discourse developed among community members and groups about what was right and wrong, what was moral and what was reprehensible. This type of discourse was especially present during the cleanup and litigation phases. As an example, one theme that was prevalent during the cleanup in Kodiak, Cordova, and Homer concerned the 'morality' of accepting what was sometimes termed 'Exxon blood money.' A community dialog develop among those who became labeled 'purists' and those who were labeled as 'realists.' The purists argued that accepting any money from Exxon was immoral because the intent of Exxon offering high paying jobs was to 'pay off' local residents and to keep them quiet. From the point of view of the 'purists,' those who took such money were accepting money for unacceptable behaviors, and the label 'Exxon whores' came into use. On the other hand, the 'realists' perceived their livelihood and economic future as threatened. Mortgages and boat payments had to be paid and food put on the table. It was necessary to take Exxon's money to survive, even if the cleanup effort did not appear to be a sincere or an effective undertaking. The realists and purists often engaged in acrimonious public debates about the morality of their respective positions. A consequence of these debates was divisiveness that loosened the bonds among individuals and diminished the overall sense of community.

Although diverse communities experienced a social impact such as "community disruption" the processes that generated such disruption varied. In some communities disruption was the result of moral discourse about the cleanup while in others it was the bleeding off of leadership to work on the cleanup, or the interruption of usual patterns of social interaction. An important analytic task of this project is to clarify the reasons for these chaotic circumstances and their distribution among Alaskan communities (as well as show how what was socially chaotic on the ground was part of a pattern when viewed from a larger or more distant perspective). To accomplish this analysis we will analyze particular social factors and the patterns of relationships among social factors.

2.0 SOCIAL FACTOR CATEGORIES

Social factors, the structures and processes with a specific configuration that construct a particular community, are the organizing concept for the factor-by-factor analysis and the basis for subsequent recommendations to natural resource managers. In this section we list specific social factors and their component parts that we expect to use in the factor-by-factor analysis. However, we also expect that this is a working list that will be revised as we examine the literature in more detail and discover new, or delete those, factors or components that do not contribute to understanding community impacts and their distribution. We also identify here two "context factors" – biophysical adaptation and event

characteristics – which are essential to understanding how social factors mediated community impacts. We first describe each of the two context factors and then list the social factors to be used in the factor-by-factor analysis.

2.1 CONTEXT FACTORS

"Context factors" are different from "social factors." Context factors address characteristics and processes of an environment which are external to community sociocultural characteristics. Social factors emphasize the internal configuration of sociocultural structures and processes in a community whereas context factors emphasize a set of "external" environmental conditions and events to which communities adapt. Context factors, like social factors, exhibit variability. For example, the availability of fish resources is a common context factor for coastal Alaskan communities, but the distribution and availability of specific resources to particular communities is variable. Similarly, the duration of the oil spill as an event was roughly the same for all communities, but the oiling of community beaches and property exhibited much more variability. Our analysis of the context factors will focus on defining the components which characterize the EVOS event and the biophysical adaptations of communities that are essential to understanding community impacts.

2.1.1 Biophysical Environment and Natural Resource Cycles

Natural resources and their annual cycles of availability are critically important for Alaskan rural communities. Indeed, the presence and availability of natural resources set conditions to which communities adapt, and these adaptations, in part, structure community life. Economic institutions and processes, cycles of harvest activities, community festivals and celebrations, values about important resources, and the organization of individual and community time and activity are examples of how adaptations to natural resource cycles and their biophysical context structure life in Alaskan communities. The most obvious use patterns are encompassed by such terms as "subsistence," "logging,""commercial fishing," and "tourism." Each of these represents a community adaptation to the presence and use of particular natural resources and their cycles. Any event that disrupts a particular environmental context and its natural resources is likely to result in impacts to communities that depend on those resources. Consequently, an understanding of the biophysical context and adaptations of Alaskan communities is a key factor for assessing community impacts of the EVOS event.

Components of Biophysical Context

Patterns of Resource Use

- availability and diversity of resources used
- activities associated with resource availability
- patterns and cycles of resource use
- community dependency on resources used
- preferences and alternatives in resource use

Social and Cultural Significance of Resources Used

- institutional significance
- economic importance of resources to community
- lifestyle significance of resources used

2.1.2 Event Characteristics

The EVOS was not a single event that was experienced in the same way by all individuals and communities. Rather, some places were oiled more than others, some fisheries were disrupted and others were not, some community's food supplies were threatened and others were not, cleanup activities varied

in duration and structure, and some never saw an oiled bird or otter whereas others witnessed truck loads of dead birds, otters, and other wildlife. The event also has phases (the initial spill, the organization and implementation of a privatized cleanup, litigation, and restoration) that have affected communities and individuals differentially. Some communities experienced the spill as the most disruptive and destructive phase of the event while for others it was the cleanup, and in still others, restoration is perhaps having some of the most long lasting effects. An assessment of event characteristics sets the conditions for response by the natural and social environments of Prince William Sound and the Gulf of Alaska.

Component Factors:

Oil Spill Event Characteristics

- timing of event occurrence
- threats to resources and human health
- duration of the event
- event phases
- natural and community resources damaged
- uncertainty about effects and outcomes
- blame and responsibility

Conditions of Exposure

- physically oiled
- fishing grounds oiled
- lifestyle and social disruption
- media exposure
- cleanup participation
- social exposure, i.e. experiencing the event through others in the community

Characteristics of the Cleanup

- structure and organization of a privatized cleanup
- local control and privatization
- economic benefits and losses
- effectiveness
- duration

This listing of variables for describing event characteristics will require fine-tunning as we sift through the literature to extract those features which can effectively and economically capture the conditions to which Alaskan rural communities had to adapt. However, the major sub-categories of event characteristics, conditions of exposure, and cleanup characteristics offer a framework that should allow us to effectively describe how this event interacted with the sociocultural characteristics of Alaskan rural communities in the spill-effected region.

2.2 SOCIAL ORGANIZATION

“Social organization” as a concept, describes the configuration of community social elements 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, and voluntary organizations. The following components of social factors will be used in the factor-by-factor analysis.

Demographic characteristics: Some of the most common correlates of differential sociocultural effects are demographic social factors. Demographic social factors combine biological properties of human populations with some social constructions – age, sex, ethnicity, absolute population size, residency, and immigration/emigration.

Component Factors

Population

- size
- permanent versus seasonal residency
- sex/gender
- age
- immigration/emigration

Ethnicity of community

- Native
- Non-Native
- plural

Political structure: the formal political organization of communities affects the types of resources communities have available to respond to events such as the EVOS event and their ability to access and/or mobilize non-local resources. Typically, Alaskan rural communities range from minimal formal political structure (no incorporated civil structure, no tribal organization) to complex organizational structures (city/village civil council, traditional/tribal council, IRA [Indian Reorganization Act] council, formal representation in borough assembly, other local representational groups). Some unincorporated Alaskan communities with no formal government may still operate under a cooperative home owners association or through a voluntary organization such as a local sportsmen's club or service organization. An additional aspect of a community's political structure is the degree of communication and the ease of coordination between political/governmental entities, since it may affect their ability to mobilize resources quickly.

Component Factors

- incorporated municipality (village/city)
- unincorporated community
- part of organized borough/outside of organized borough
- tribal council (traditional/Indian Reorganization Act)
- quasi-governmental entities (Native [Alaska Native Claims Settlement Act] corporations, home owners associations, local voluntary organizations that operate as a coordinating body)
- site for county, state, federal offices

Leadership: the breadth and depth of leadership resources influences the ability of a community to organize and implement a response to an event such as the oil spill. Some leadership resources are individuals who step forward and take responsibility during a crisis. Other resources exist in the formal institutions of a community such as the role of mayor or the chairman of a tribal council. Still other resources are organization, such as a fisherman's union or chamber of commerce. Our consideration of

leadership will include the range of individual and institutional resources that emerged during the EVOS event and influenced the nature of community impacts.

Component Factors

- presence and availability of institutional leadership resources
- presence and availability of community-based resources
- emergence of individual leaders
- leadership burn-out
- post-event presence and availability of leadership resources

Multiplex social ties: where social ties overlap (i.e. are multiplex) rather than single interest, then the potential for certain types of effects increases. Multiplex social ties more commonly characterize smaller, more rural, communities and are especially prevalent in rural Alaskan communities, including Native communities. Populations tend to be small, limiting the "bodies" available to fill the social roles required for a functioning community. The smaller the available pool of people, the more likely it is that each will serve in several roles (wear more than one hat) and the more multiplex social interactions there will be. These types of ties are important for the social factor analysis because they dominate the character of face-to-face relationships in community life, an essential factor for assessing community impacts of the EVOS event.

Component Factors

- role of multiplex social ties in community leadership
- multiplex social ties community-wide
- role of multiplex ties in affecting community conflict and cooperation

Kinship: this is a major documented organizing principle of social life in Native communities, and is important in non-Native communities as well (although usually more on an individual rather than an institutional basis). Although not as well documented, kinship (and quasi-kinship) networks certainly affected the patterns of response to the spill event in other rural Alaskan communities as well. "Kinship" could be included as a social factor under any of the previous headings, as it is fundamentally based upon demographic information (biological relationships of individuals), it often creates multiplex ties between people and families, and is commonly a central factor in community political structure and leadership. Kinship is also often a central mechanism for the distribution of resources and information within (and between) communities.

"Kinship" as a concept is seldom absolute in any social context – in any behavioral context it is often fuzzy and ranges on a continuum from 100 percent connected to a very distant cousin indeed. People are quite inventive with kinship relations, and different researchers have examined kinship as a social factor in different ways. The expectations and obligations entailed in kinship relationships can affect the social consequences associated with a disaster: For example, research in Native communities has indicated that the EVOS event made it difficult for people to fulfill their obligations to share subsistence resources with elderly kin, and disrupted these systems of kin support. And research on technological threats and disasters indicates that the presence of certain kinship ties, such as being a parent with young children, increases a person's perception that the event is serious and threatening.

Component Factors

- kinship-based community institutions/organizations – formal/informal
- kinship-based sharing
- kinship-based economic activity
- role of kinship in buffering event related effects

Community cohesiveness: the social solidarity within communities, the degree of "close-knit" patterns of association and interaction, is a factor that affects the availability of social support and the overall ability of communities to respond to disaster events.

Component Factors

- existing divisiveness
- history of prior actions of community support in crises
- institutional/organizational focus for community support
- patterns of association and interaction that provide a basis for community action in crises

Organizational resources (other than formal political structures): formal and informal organizational resources are often mobilized in disaster events to coordinate responses, communicate about ongoing events, and to provide resources to the community in the process of recovery. These can be organizations formally charged with disaster response-like activities (Search and Rescue, Fire Department, Emergency Response Team) or those with no apparent link to such activities (Lions Club, Chamber of Commerce). This is an important social factor that applies to all of the communities affected by the EVOS event.

Component Factors

- community institutional/organizational inventory
- past disaster event experience
- explicit existing emergency response plans
- participation in Exxon Valdez Trustee Council process
- participation in regional organizations (Regional Citizen's Advisory Council, etc.)

Extra-community resources: the ability to extend within-community resources by drawing on linkages with other communities and other private and political entities can expand the infrastructure, expertise, and material resources brought to bear in a disaster. Few communities have the resources on hand to manage major disasters, and therefore, the access to additional resources, often achieved through persons or organizations with wider connections, can moderate impacts.

Component Factors

- community provides local headquarters for national or state businesses/government offices
- access to extra-community resources through community members
- community is a place of interest/value to those outside the community

Information/communication resources: the ability of communities to discover what is happening in a disaster, to communicate that to its citizens in a manner considered reliable and trustworthy, and then to provide communication channels to its citizens and other affected parties is a social factor that influences the effects experienced in these types of events. The timeliness with which information is gathered and disseminated can affect a community's ability to respond to and prevent some of the damaging

consequences of a disaster. This is certainly related to organizational resources available to facilitate information gathering and communication.

Component Factors:

- existence of local media (radio, television, newspaper, other)
- existence of local infrastructure (roads, boardwalks, sidewalks, piers, airstrips) and physical continuity of the community
- existence of local regular meeting groups (church, governing bodies, discussion groups)
- local membership in regional, state, and national voluntary organizations
- actions to disseminate information about EVOS event issues

Legal resources: technological disaster events often involve the issues of blame, responsibility, and legal action. Access to legal resources by communities and individuals within communities can affect the overall impacts experienced. The availability of other kinds of expertise can also serve to moderate impacts, though the kinds of expertise needed may be particular to the disaster. Those capable of providing expertise may be involved in direct work on the disaster. In the EVOS event case, municipal work, health and mental health expertise, child care provision, accounting, and prior experience in managing large operations and responding to disasters were skills sought.

Component Factors:

- local legal expertise
- prior local legal experience
- locally perceived interests
- unity of locally perceived interests
- locally perceived conflicts of interest
- local financial resources to provide for legal representation

Emergent organizations: these types of groups characterize responses to technological disasters in general and they were salient within communities exposed to the EVOS event. These groups can act to foment social conflict and also to provide social support to members of impacted communities. Most of the literature on technological disasters mentions the formation of citizen organizations designed to provide information on the course of the disaster and propose solutions, and to hold accountable those considered responsible. Often, the formation of emergent organizations occurs when public/governmental action or the provision of information is considered inadequate or untrustworthy. There are also instances, such as that described in Seward, Alaska (IAI 1990 [Final Report]), in which organizations arise after an event to coordinate response to the disaster, and they act to increase the effectiveness of existing organizational structures.

Component Factors

- volunteer or government organizations formed to respond to the event
- stated functions of emergent organizations, including advocacy (such as social, environmental, and oil industry advocacy), litigation, information dissemination, oversight, resource collection and distribution, cleanup activities, and provision of organizational structure and coordination
- activism of emergent organizations, including high, medium, and low levels of activism
- post-event persistence of organizations and their community role

Litigation participation: this factor can act to increase social tensions and divisiveness as well as to promote social solidarity among some individuals within communities.

Component Factors

- individual or group lawsuit
- target of lawsuit (such as federal government, Exxon Corporation, other community members)
- duration of lawsuit

Oil industry participation: this factor applies specifically to Valdez and to communities on the Kenai peninsula. Social divisiveness and community cohesiveness were each affected by the presence of the oil industry in affected communities.

Component Factors

- oil industry employees among community members
- community is a site for oil company businesses, but most oil business employees are non-residents of the community
- oil businesses and employees reside in the community
- presence of other well-developed economic and community sectors

2.3 ECONOMIC CHARACTERISTICS

The economic institutions and processes of Alaskan coastal communities are highly dependent on the natural resources damaged by the oil spill. Furthermore, the privatization of the cleanup also resulted in effects on local economies that in part mitigated some of economic effects of resource damages, but also had other consequences for impacted communities. Consequently, it is essential to consider the economic characteristics and processes of these communities in our factor-by-factor analysis. The specific components we will include in this analysis are enumerated below.

Component Factors

- natural resource dependency: the more communities are dependent on natural resources for their economic structure, the more likely they are to have economic effects related to the EVOS event.
- economic sectors and economic diversification: the less economically diverse a community is, the more likely that it would be affected/disrupted by spill event activities (spill itself, cleanup, and/or litigation). This is a corollary to the above factor, but its importance is that it points to the differences in effects related to the degree of economic diversity among communities effected by the EVOS event.
- fishing sector diversity: communities such as Cordova, with less diversity in the fishing industry than communities such as Kodiak, were affected more by the EVOS event. Each of these communities is dependent on fishing, but there are more sectors (vessel types, processors, species harvested and processed) within the Kodiak industry than in Cordova. This is a factor that applies across the impacted communities.
- subsistence participation: within Alaskan rural communities subsistence is an important economic as well as a cultural factor. For this reason, even though it is an important component of rural Alaskan economies, it is treated separately below.

- cleanup participation: the cleanup provided a source of income to affected communities that had far reaching economic and social effects.
- Exxon Valdez Trustee Council project participation (as paid employee or consultant)
- employment/unemployment: Pre-event unemployment levels may have some relation to rates of cleanup participation and subsequent effects. Cleanup participation may have fostered or exacerbated labor supply problems for more "stable" community economic sectors. Length of employment (during any year) may be useful as a measure of seasonality of wage or other employment.
- sources and distribution of income and mean income per capita are social factors that may well differentiate communities experiencing different effects from the EVOS event.
- restoration fund investments in local resources (land/habitat purchase/easement, infrastructure development)

2.4 CULTURE

Culture is the system of beliefs, values, and worldviews that communities use to interpret and assign meaning to objects, events, relationships, and social conditions. Culture and its elements such as beliefs and values and cultural knowledge are not uniformly distributed within a society. When a novel event occurs individuals or groups may differentially interpret, assign meanings, and value what occurs as a consequence of that event. The extent of cultural homogeneity and heterogeneity can have consequences for how an event is understood within a community and for the impacts experienced. Furthermore, an "organizational culture" or "governmental culture" may perceive an event according to values, beliefs, and knowledge that are significantly different than those of a "community culture." Such differences can be significantly magnified when there are non-Western cultures involved such as occurred with Native cultures in the EVOS event. Culture is thus an essential factor to consider for evaluating the impacts of the EVOS event because it frames how the event is understood, evaluated, and how impacted were themselves defined and experienced.

Cultural values and beliefs: communities assign importance to, and priorities among, ways of living, beliefs, and objects that we can term "cultural values." Values are embedded within larger cultural meaning systems that allow us to interpret, for example, why the oiling of an archaeological site has a different impact on Native than non-Native communities.

Component Factors

- homogeneity/heterogeneity of values among event participants
  - differences in "organizational" and "community" values
  - values and meaning about the significance and use of natural resources
  - valuations of damaged natural and community resources

Risk perception: individuals and groups assess the type and degree of risk associated with exposure to an event and its effects on their lives. This is an important cultural factor for consideration of the overall effects of the EVOS event. Here risk perception includes the idea of what constitutes acceptable risk, signs and signals of threat, and the degree and kinds of threat posed by an event. Risk perceptions can vary between communities, between community sectors and individuals, and between communities and external organizations and groups. These perceptions may be partly influenced by conditions such as the presence of vulnerable individuals in a family or community, or the economic base of the community or

sector. Such perceptions of risk and threat are central to technological disasters in general and they have specific applicability to the EVOS event where individuals and sometimes entire communities perceived the risks and threats posed by the spill very different than the spiller and government institutions.

Component Factors

- signs and signals of threat
- assessment of risk types (e.g., economic, health risk, community's future)
- assessment of potential damages (e.g., degree, long/short term)
- assessments of recovery potential
- perceptions of damaged "home"

Natural resource orientation: within and across communities and between communities and the spiller, there were diverse orientations to the value and use of natural resources. The classic difference is among those who value natural resources for their economic importance and those who value such resources for their lifestyle or spiritual significance. These are not always necessarily in conflict, but these differences in how people think about natural resources plays a part in the assessments of damages and the meaning of "recovery."

Component Factors

- kind of natural resource orientation, including enjoyment, sense of responsibility for the environment, use for hunting and fishing, other sports
- frequency and traditional nature of use/enjoyment of natural resources and settings
- environmental/oil orientation: the orientation to environmental activism and especially to oil industry issues is a factor that affected how some communities responded and their participation in litigation and other actions during and after the spill

Sense of place and community: these concepts integrate the values, orientations, and activities of people who live in a "place" such as a "village" or "town." Sense of place extends an understanding of a "village" from a sociopolitical entity in a particular geographical place to one which addresses how activity, values, and space integrate to something larger. This "sense of place and community" is about the meanings people attribute to their homes and its environment; and it is about what is preferred, desired, and expected in how a home and its surrounding landscapes should look and be used. This is a corollary of values and natural resource orientations that integrates and extends both of those concepts for our analysis of which aspects of culture affected how communities were impacted by the EVOS event.

Component Factors

- ancestral associations with community and locale
- historical/religious interest in locale
- value of community as "home"
- existence of "special" places
- integration of lifestyle and place
- attachment to place

2.5 SOCIAL HEALTH

The ability of a community to respond to a crisis and maintain its "social equilibrium" is a working definition of social health. When communities cannot respond to crises there may be indicators such as

increased crime and other psychosocial conditions (e.g., substance and alcohol abuse) and the breakdown of social support. Some of these social health factors can compound or extend the impacts from other factors, and can be analyzed both as social indicators and as factors that contribute to the long-term health of a community.

Component Factors

- social support resources: these resources can be formal (i.e., clinics, hospitals, counseling services) or informal (voluntary associations, friendship networks) and affect the ability of communities to respond to crises.
- substance and alcohol use: these are common indicators of the social health of communities. While these are most obviously social effects, it is also possible that increased reliance on these substances in times of stress or economic boom may have been a factor contributing to other social effects such as crime and domestic violence.
- domestic violence/disturbance: these social factors may increase in response to disaster events; they may compound other social effects (such as the strain on health services) and may extend the duration of particular impacts (especially those related to social health) through their influences on the lives of children.
- crime: increases or decreases in crime can be an indicator of changes in the social health of communities and can itself be a source of additional impacts .
- mental health: as with crime, this can also be an indicator of the overall social health of a community, and may also be a social factor itself.

2.6 SUBSISTENCE

"Subsistence" encompasses far more than the individual behavioral patterns of harvesting, processing, distributing, and consuming/using natural resources for personal subsistence. Rather, these activities constitute a community (and more loosely regional) pattern of activities potentially interconnecting every household in any given community, and a significant number between communities. Shared kinship relationships within a land-oriented way of life are the most common idioms and ideology of subsistence. Individual and community social factors related to subsistence are listed below.

Component Factors

- number and percentage of community households using subsistence resources
- number and percentage of community households harvesting subsistence resources
- number and percentage of community households sharing subsistence resources
- number of different subsistence resources used, harvested, and shared
- frequency of use of subsistence resources
- per capita subsistence harvest
- access (method) to subsistence resources
- integration of subsistence with commercial activities (especially fishing)

Access to Resources

- restrictions on access to subsistence resources, for reasons of human health or the health of the species
- availability of subsistence resources: perceived increase or decrease in the availability of subsistence resources

Subsistence Hunting

- frequency of subsistence hunting
- number of species/kinds of resources hunted
- success of hunting: perceived increase or decrease in the success of subsistence hunting
- anticipation of future reliance on hunting
- distance covered, time and effort expended to hunt (relates to perceived species availability)

Resource Use

- sharing and maintaining social ties
- primary food source, secondary food source
- enculturation about community values, cultural history, knowledge of local geography, social roles, hunting methods, methods of subsistence food preparation, values and beliefs about the natural environment

Subsistence social factors combine with other, more general social factors, to produce greater or lesser effects upon individual and community subsistence activities. Examples of such "other social factors" are proximity to the spill event, demographic and ethnic characteristics of the community, and economic characteristics.

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

Final Report, Volume IV:
Introduction to the
Final Annotated Bibliography and Abstracts

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1.0 INTRODUCTION

The central focus of this Annotated Bibliography and Abstracts is to identify, examine, assign keywords, annotate, and selectively abstract the major sources regarding the oil spill, cleanup, and litigation for 1989 to date. By design, this work has focused on those sources that indicate the effects on the human environment in the spill affected area. Per our study plan, and discussions with MMS, we have defined the spill affected area as including the following communities:

Kodiak Island	Alaska Peninsula	Kenai Peninsula	Prince Wm. Sound
Kodiak	Chignik Bay	Kenai	ValdezAkhiok Chignik Lagoon
	Soldotna	Cordova	
Karluk	Chignik Lake	Seward	Whittier
Larsen Bay	Perryville	Homer	Chenega Bay
Old Harbor		Seldovia	Tatitlek
Ouzinkie		Port Graham	
Port Lions		Nanwalek	

In the development of this Annotated Bibliography and Abstracts, work proceeded through several stages. The stages of this process included:

- Development of a uniform bibliographic format
- Development of key words
- Development a data base structure and specification of reporting requirements
- Collecting, examining, coding, annotating, and selectively abstracting sources

This document is organized around a discussion of these stages in turn, with the final point illustrated by the annotated bibliography and abstracts themselves.

2.0 UNIFORM BIBLIOGRAPHIC FORMAT

In order to accomplish the end goals of this project, it is necessary to have a uniform bibliographic format that accommodates books, articles, and unpublished sources. The most important criterion for this format is that it allows any reader the ability to locate a source in a library, bookstore, or through computerized searches of Internet and other electronic sources. We have generally followed the bibliographic formats for sources as specified in the *Chicago Manual of Style* (CMS). For books, articles, and unpublished sources we have used an author and date format. Variations in source types have generally been recorded according to the formats specified in the CMS, although there may some instances where we have deviated from those formats. Further, it is important to note that there is not a 'single' CMS style for most types of entries but, rather, a range of options. For this project, we have made selections within these options, which are presented a following section. We would emphasize we are now at an early stage in the study process, and the choices we have made represent our best estimate of what will be the most useful for this project, i.e., there is no single 'right way' to fashion entries.

The format for specific components of the bibliography for books, articles, and unpublished entries is described in detail in Chapter 16 of the CMS. We have generally used this format, following what the CMS describes as a "type B" (University of Chicago Press: 439ff.) format which is generally followed by those in the natural and social sciences. This format (including our choices among the optional styles) has the following distinguishing characteristics: (1) the authors full names rather than initials are used; (2) the date of publication comes after the authors name(s); (3) a "down style" or small caps are used for all words in a title except the first word and proper nouns, and the same convention is used with journal and

popular article titles, while journal source titles (such as Business Week, and Ecology Law Review) are capitalized; (4) no quotation marks are used around article titles; (5) quotation marks are used around book titles when the chapters are abstracted; (6) abbreviations for journal names may be used; and (7) periods are used after each main segment of an entry.

2.1 BIBLIOGRAPHIC FORMAT EXAMPLES

Following are several examples of the bibliographic format that we propose for the final bibliography.

Books

Davidson, Art. 1990. In the wake of the *Exxon Valdez*: the devastating impact of the Alaska oil spill. San Francisco: Sierra Club Books.

Spencer, Page. 1990. White silk and black tar: a journal of the Alaska oil spill. Minneapolis: Bergamot Press.

Chapters in Books

Fall, James and L.J. Field. 1996. Subsistence uses of fish and wildlife before and after the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 819-836. Bethesda, MD: American Fisheries Society.

Hirsch, William B. 1997. Justice delayed: seven years later and no end in sight. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 271-303. Dubuque, IA: Kendall/Hunt Publishing Co.

Popular Articles

Drew, Lisa. 1990. Truth and consequences along oiled shores. National Wildlife 28(4):34 (9 pages).

Hodgson, Bryan. 1989. Alaska's big spill: can the wilderness heal? National Geographic 177(1):5-43.

Academic Articles

Dyer, Christopher L. 1993. Tradition loss as secondary disaster: long-term cultural impacts of the *Exxon Valdez* oil spill. Sociological Spectrum, 13(1):65-88.

Palinkas, Lawrence A., John S. Petterson, John C. Russell, and Michael A. Downs. 1993. Community patterns of psychiatric disorders after the *Exxon Valdez* oil spill. American Journal of Psychiatry, 150(10):1517 (7 pages).

Reports

Donald, Robert, Richard Cook, Rose Fong Bixby, Robert Benda, and Aron Wolf. 1990. The stress related impacts of the Valdez oil spill on the residents of Cordova and Valdez: a comparative study conducted by the Valdez counseling center. Valdez: Valdez Counseling Center.

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A Note on Newspaper Articles and Sources

There are a vast number of newspaper articles on the EVOS, and a variety of research resources that index and, in only a few cases store, these newspaper articles. It is beyond the scope of this project to annotate and abstract all these articles, and it would be difficult to determine the most significant or representative newspaper articles for inclusion. Most of Anchorage Daily News (ADN) coverage for the early period deals with the details of the spill, its chronology, the cleanup effort and its logistics. The ADN coverage (at least at this stage) does not seem to have much of a concern with the potential socioeconomic effects of the EVOS -- although their articles tend to be longer than those of the contemporary Anchorage Times (AT) coverage. For this CD-ROM, a limited number of newspaper stories or accounts have been annotated, primarily from the early period of the EVOS from the Anchorage papers. In addition, a database containing headlines from national newspapers was searched. This database contains over 1,020 references to the *Exxon Valdez* oil spill, from 1989 to 1997. Newspaper titles from 1995 through 1997 have been included here, and keywords provided. The rationale for focusing upon this time period is that articles and books about these years have yet to be published; focusing on this time-frame offers more recent information, especially on the litigation period, than is accessible through a review of other source types. The articles are listed chronologically rather than by author, since newspapers have different practices with respect to by-lines and the identification of authorship. Keywords have been attached to these references.

A limited number of organizations maintain newspaper archives related to the EVOS. Those of most potential importance are the Anchorage Daily News (Alaska's largest newspaper), the Alaska Resource Library and Information Service (ARLIS -- the collective library for federal agencies in Anchorage), and the Z.J. Loussac Public Library (in Anchorage). Each of these is "annotated" as a source in Volume V, the Final Annotated Bibliography and Abstracts. In sum, Volume V, the Annotated Bibliography and Abstracts, presents limited article annotations from the two major Alaskan newspapers during March and April of 1989, and limited annotations from national newspapers for the time period 1994 to 1997, along with brief annotations of the major Alaskan newspaper archives.

2.2 ANNOTATION/ABSTRACT EXAMPLES

In terms of format, in the bibliography a space and the word ‘NOTATION’ (in all caps) has been inserted between the citation and the annotations and abstracts, and the word ‘SOURCE’ precedes each source listing. In general, an abstract will override an annotation: there will not be both an annotation and an abstract for a single source. For our purposes, an annotation is one or two sentences that indicate the content of a source. An abstract is several sentences to a paragraph long that describes the major findings and issues in the source relevant to the purpose of this study. A two-column format and other layout features have been avoided in order to accommodate the formatting requirements of AskSam, the program that will allow searches of the bibliography on CD-ROM. The general format for recording information is indicated below.

Citation: Authors(s) date. Title. Volume. Series. City of publication: Publisher.

Annotation/Abstract

The following is an example of a more developed annotation/abstract as it appears in the draft final bibliography. (Please note that it does not contain keyword codes or social factor codes, which are discussed in a subsequent section.)

> SOURCE[Fall, James and L.J. Field. 1996. Subsistence uses of fish and wildlife before and after the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 819-836. Bethesda, MD: American Fisheries Society.]
>
> NOTATION[In the year following the oil spill, the 2200 residents of 15 native Alaskan communities reduced their harvest of subsistence resources as well as the variety of resources harvested. In 10 villages harvests decreased by about 77% because of fears about oil contamination. In response to community concerns, the Oil Spill Health Task Force initiated a study of subsistence foods (finfish, invertebrates, and marine mammals) for aromatic contaminants. Findings indicated invertebrates were the most susceptible to contamination. Efforts to communicate findings to Native communities met with mixed results. Two and three years after the spill, contamination fears persisted, although subsistence harvests increased.]

The following provides an example of a brief annotation:

> SOURCE[Drew, Lisa. 1990. Truth and consequences along oiled shores. National Wildlife, 28(4):34 (9 pages).]
>
> NOTATION[This popular article represents an overview of local efforts to respond to the oil spill by Alaskans, including some inventions to aid in cleanup, and the formation of organizations.]

3.0 DEVELOPMENT OF KEY WORDS

Key words are intended to reflect the topics of entries in the bibliographic data base and thereby aid data base searches by specific topics or concepts. That is, a "key word" should reflect the topical content of a source that is relevant to the purpose of this study: determining the social effects of the *Exxon Valdez* oil spill, cleanup, and litigation.

3.1 BACKGROUND

Our draft work plan called for assessing either a free-form or structured approach to assignment of keywords. The latter type is structured to specify four to five predefined *key word fields* with entries (single or multiple) for each major category. This allows reasonably fine-grained key words while maintaining mutually exclusive categories for searching the bibliographic sources. Below is the structure we used as a starting point for developing the pre-defined fields and the particular listings for each.

Predefined Field - Definition and Example Key Words

Source Type Identifying the source type will aid in searching the bibliography by specific source types. Although not a key word in terms of content, this will help users to effectively search the bibliography. For example, source codes might include: newspaper, magazine, scientific publication, book, legal deposition, etc. We may also include a code indicating the affiliation of the information and/or author -- oil and gas industry, fishing industry, environmental group, local (spill area) official,

local (spill area) resident, journalist or reporter, academic, federal, Oil Spill Trustee Council, etc.

Geography/location Geography was among the important factors that affected community responses to the *Exxon Valdez* oil spill event (EVOS). Relationship of a community to the spilled oil or to available resources affected responses. Consequently, a key word field that designates the overall region and the specific municipality/community should be included as key words. For example, municipalities would describe specific communities (e.g., Cordova, Tatitlek, Perryville, etc.) and the region of each community (e.g., North Gulf Coast, Prince William Sound, etc.) Again, this will aid in searching the bibliography by region (e.g., all communities within Prince William Sound) or by a specific locality.

Social or Cultural Identifiers Sources that discuss social effects of the *Exxon Valdez* event often address specific populations or social/cultural groups. Consequently, key words that identify which groups/populations are discussed can be useful for data base searches and analysis. We expect to develop a list that addresses cultural populations, specifically Natives (Koniag, Aleut, etc.) and non-Natives as well as other social groupings that are discussed in the professional and popular literature (e.g., cleanup workers, fishermen, merchants, non-residents). These types of key words can be combined with geography codes for very specific searches of the bibliography.

Event Phase The scientific as well as some of the popular literature discusses the relationship between social effects and the phase of the *Exxon Valdez* event (e.g., IAI 1991). Some of this literature also focused on particular phases of the event such as the cleanup or the social effects that occurred immediately after the spill. It will be useful for searches and as well as for analysis to include an "event phase" key word such as: pre-spill, post-spill, spill, cleanup, litigation. We will develop specific definitions of the phases to ensure coding consistency.

Event Effects The effects of the EVOS were at the individual, family, and community levels of social organization. There were also important cultural effects for both Natives and non-Natives. The diversity of effects needs to be addressed by effect sub-categories. The following sub-categories are ones that should address the range of event effects. As we review a sample of sources, we will develop key words within these sub-categories for application to all sources.

social (disruption, family, etc.)
cultural (risk perceptions, etc.)
economic (reallocation, loss, etc.)
psychological (PTSD, Depression, anxiety, etc.)
municipal (fiscal, operational, etc.)
litigation (compensation, conflict, etc.)
Other

Subsistence Subsistence identifies a cultural complex, especially within Native communities, that was susceptible to effects from different phases of the EVOS. Subsistence activities (hunting, fishing, gathering) and their cultural context (sharing, role-relationships, enculturation) will be represented in the key words for this sub-category.

The other approach we evaluated was to develop a master key word list containing mutually exclusive terms for identifying source content, with no prior categorization.

3.2 CHOICE OF A KEYWORD APPROACH

After assessing the merits of either a free-form or structured approach to assignment of keywords, we settled on a combination of those approaches that should result in the most consistent assignment of keywords. We first selected a few articles and used a freeform approach to extract keywords. We then used the structured approach wherein we pre-defined categories and in some cases category content (e.g., "event phase" with content of: pre-spill, spill, cleanup, restoration, litigation). In other instances, we decided to allow the keywords to emerge from examination of the sources. This approach is essentially "coding" the content of the source. After assessing both approaches, we decided that using the pre-defined content approach has the advantage of keeping a common frame among the research team for examining sources, but it did not necessarily allow for identifying what might be unique keywords for a source. Consequently, we added to the pre-defined categories "Effects-Other" and a "Residual" category that allows for assigning unique keywords. The result is that we can code consistently across the predefined fields and accommodate unique items that may not fit within our predefined fields. This will ultimately give end users the capability to search the data base with a wide range of keywords that can be selected from the predefined and free-form fields.

As we have proceeded with different research staff assigning keywords within the pre-defined categories, we have encountered two issues. One, there is variation in how we code the same concept, for example "contaminated seafood" and "seafood contamination." These variation issues are easily identified when we run "field content" reports in AskSam, and can be resolved. by determining a standard gloss for the keyword and then using AskSam or WordPerfect "search and replace" functions to make all entries consistent. The Second issue is that we continue to add content to pre-defined categories as we continue reviewing sources. That is, this is an iterative process of examining sources, discovering the most appropriate key words, adding them to the list, checking the list for consistency, modifying the list as necessary, and then ensuring consistency of all entries in the source entries. We expect that this will continue until all sources are reviewed and even through examination of the sources for social factors. Fortunately, the capabilities of AskSam makes for a relatively uncomplicated process of revising the field contents and replacing the keywords with revised entries.

Ultimately, we feel that the process of using a combination of pre-defined and free-form keywords will allow end users extensive search capabilities. The coding approach ensures that users will have extensive search capabilities while using the free-form approach ensures that we retain all of the unique keywords that reflect content and key concepts within a source. This approach is more time consuming to implement, but our assessment that it will result in more refined search capabilities for the CD-ROM.

One of the larger issues to sort out following this decision was whether or not to attempt to code all categories or only those categories which apply in a particular source. Our decision was to only code relevant categories (that is, we do not have "does not apply" code that holds a place in the database). What resulted from this decision was coding that was done by numbering the keyword categories followed by the keyword itself. Immediately below we present our working keyword listing; using this

listing then, typical entries could include: ‘K1-Academic Book’ (for source type); ‘K2- Prince William Sound’ (for geography), and so on.

3.3 KEYWORD LISTING

The following listing represents the base keywords that we have used in preparing this bibliography. A full listing of keywords, by field, is presented in Section 6.0 of this report.

(K1) Keyword Source Type[What type of source?

Academic Book, Academic Book Chapter, Academic Journal, Popular Book, Popular Magazine, Newspaper, Report, Litigation Document, Unpublished Document, Project Description

(K2) Keyword Geography[What is the geographical region and community addressed by the source?

Prince William Sound, Kenai Peninsula, Alaska Peninsula, Kodiak Island, Southeast Alaska, Alaska-State (for sources that address more statewide issues than locale specific issues) Communities to include as keywords: Akhiok, Chenega Bay, Chignik Lake, Chignik Lagoon, Chignik Bay, Cordova, English Bay , Homer , Karluk, Kenai, Kodiak , Larsen Bay, Old Harbor, Ouzinkie, Perryville, Port Lions, Port Graham, Seldovia, Seward, Soldotna, Tatitlek, Valdez, Whittier, Lower Cook Inlet

(K3) Keyword Event Phase[What portion of the *Exxon Valdez* event is addressed by the source?

pre-spill phase (pre March 24, 1989)
spill phase (March 24-1997 April-1, 1989)
Cleanup Phase (April 1, 1989-July 1992)
Restoration
Litigation Phase (March 24, 1997-Present)

(K4) Keyword Social or Cultural Identifier[What are the sociocultural identifiers of the communities or groups addressed by the source?

Fishermen, Deckhands, Merchants, Outsiders/Non-Residents, Cleanup Workers, Natives, Local Government, U.S. Coast Guard, State Government, Subsistence Resource Users

(K5) Keyword Social Effects[What are the community/social effects addressed by the source?

community stability, social disruption, conflict, community leadership, local resources, crime rates, emergent groups, kinship, subsistence-based community, natural resource community, Multi-Agency Coordinating Group, response organization, demographic characteristics, alienation;

(K6) Keyword Cultural Effects[What are the cultural effects of the event? (note that there are a number of “cultural” effects that should be addressed by the subsistence keywords.)

perceived risk, sense of place, sense of community, lifestyle, ethics, pathology, dislocation, disruption, traditional knowledge

(K7) Keyword Family Effects[What are the family effects that have appeared in various sources?

Role relationships, stress, roles, children, sharing, domestic violence, health

(K8) Keyword Economic Effects[What are the economic effects addressed by the source?

economic boom, economic loss, economic diversification, money spill;

(K9) Keyword Psychological Effects[What psychological effects are addressed by the source?

chronic stress, PTSD, Depression, Anxiety, substance abuse, CESD, General Anxiety Disorder Scale, therapeutic community, Impact of Events Scale, stressor, mental health

(K10) Keyword Municipal Effects[What are the effects on municipal/local governments of the *Exxon Valdez* event?

increased service demands, fiscal loss, operational disruption, mayor, city council, oiled mayors,

(K11) Keyword Litigation Effects[What are the effects of litigation on communities addressed by the source?

court settlement, class action, damages, Robbins Dry Dock decision, punitive damages, plaintiffs, defendants, common property resource, maritime law.

(K12) Keyword Other Effects[

(K13) Keyword Subsistence Activities[What subsistence activities and harvest levels are addressed by the source?

hunting, fishing, gathering, clamming, decreased harvest, contamination fears, contaminated resources,

(K14) Keyword Subsistence Cultural[What cultural characteristics of subsistence are addressed by the source?

enculturation, sharing, symbolic expression of culture,

(K15) Keyword Remainder[

Alaska Native Claims Settlement Act (ANCSA), archeology, community involvement, community participation

3.4 APPLICATION OF KEYWORD CODING TO ANNOTATIONS/ABSTRACTS

Key words and social factors codes are found on separate lines following the annotation - abstract of a source. Building upon the format for citation and annotation/abstract entry (as illustrated in Section 2.2), the general format for recording information is indicated below.

Citation: Authors(s) date. Title. Volume. Series. City of publication: Publisher.

Annotation/Abstract

Keyword1 Keyword2 Keyword3 Keyword4 Keywordn

Social Factors Codes

At this stage of the research process, work is in progress within each of the first three entry areas (citation, annotation/abstract, keywords). In the next stage of the process, social factors codes will be developed and added to the entries following the key words.

3.5 EXAMPLES OF KEYWORD CODING

The following example abstract with key word coding continues the example of the Fall and Field article used as an example of annotation/abstracting in Section 2.2. This example represents the essential issues about "coding" versus a "keyword only" approach. We are essentially coding content in predefined categories plus we are also designating other essential keywords that do not fit within the predefined field format. We would emphasize this point in that it is 'above and beyond the call' of what was requested and previously discussed. However, after working with the materials, it is apparent this will make for a much better product in the end, particularly with respect to searches, and it is our belief that MMS will immediately recognize the advantages of codes plus other keywords rather than only keywords. This became apparent to our team when we considered that focusing on "mutually exclusive keywords" alone means essentially going to a coded approach since different sources may use different words or phrases to refer to the same thing. For instance, one source may refer to seafood contamination while another refers to contaminated seafood.

SOURCE[Fall, James and L.J. Field. 1996. Subsistence uses of fish and wildlife before and after the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 819-836. Bethesda, MD: American Fisheries Society.]

NOTATION[In the year following the oil spill, the 2200 residents of 15 native Alaskan communities reduced their harvest of subsistence resources as well as the variety of resources harvested. In 10 villages harvests decreased by about 77% because of fears about oil contamination. In response to community concerns, the Oil Spill Health Task Force initiated a study of subsistence foods (finfish, invertebrates, and marine mammals) for aromatic contaminants. Findings indicated invertebrates were the most susceptible to contamination. Efforts to communicate findings to Native communities met with mixed results. Two and three years after the spill, contamination fears persisted, although subsistence harvests increased.]

KEYWORDS: SOURCE_TYPE[Academic Book Chapter] GEOGRAPHY[Larsen Bay, Old Harbor, Ouzinkie, Perryville, Port Lions, Port Graham, Kodiak, Chenega Bay, Tatitlek, Nanwalek, Karluk, Lake, Port Graham, Ivanof Bay, Akhiok, Chignik Lagoon, Kodiak Island, Prince William Sound, Alaska Peninsula] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Native Alaskans, Aleut] SOCIAL_EFFECTS[subsistence-based communities] CULTURAL_EFFECTS[risk communication] OTHER_EFFECTS[health risks] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, clamming, decreased harvest, contamination fears, contaminated resources] SUBSISTENCE_CULTURAL[enculturation, sharing, symbolic expression of culture] REMAINDER[Alaska Department of Fish and Game, Oil Spill Health Task Force, aromatic contaminants].

Another example may be seen in the following:

SOURCE[Russell, John C., Michael A. Downs, John S. Petterson, and Lawrence A. Palinkas. 1996. Psychological and social impacts of the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 867-878. Bethesda, MD: American Fisheries Society.]

NOTATION[This article uses quantitative and qualitative interview data from the Oiled Mayors study of 22 communities of Prince William Sound, the GOA, Kenai Peninsula, and The Alaska Peninsula to describe psychological and social impacts. Survey data are analyzed to describe the relationship between exposure measures and selected outcome measures including: family and child relations, social disruption, subsistence activities, depression, anxiety, post-traumatic stress disorder, substance abuse, and domestic violence. Analysis of the survey data indicates correlations between exposure to the oil spill and increased outcome measures. The interview data describe the social and community context of the psychological impacts, particular the relationship between the non-therapeutic community and social/psychological distress.]

KEYWORDS: SOURCE_TYPE[Academic Book Chapter] GEOGRAPHY[Kodiak Island, Prince William Sound, Kenai Peninsula, Native Communities] EVENT_PHASE[spill, cleanup, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Natives, Koniag, Aleuts] SOCIAL_EFFECTS[community disruption, social bonds, social conflicts] CULTURAL_EFFECTS[sense of place, sense of community, moral discourse] FAMILY_EFFECTS[family relationships, child behavior, domestic violence] PSYCHOLOGICAL_EFFECTS[anxiety, depression, post-traumatic stress disorder, stress, substance abuse] SUBSISTENCE_ACTIVITIES[decreased subsistence activity, sharing, decreased use of subsistence foods] SUBSISTENCE_CULTURAL[sharing, enculturation, culture] REMAINDER[exposure index, Oiled Mayor's Study]

4.0 DEVELOPMENT OF DATA BASE STRUCTURE AND REPORTING REQUIREMENTS

We expended considerable effort on evaluating available software products and realistically assessing their actual capabilities which can be used for the purposes of this project. Following discussions with the manufacturer, MMS, and others in the field, we made the decision to obtain the Professional version of the AskSam Electronic Publisher to enhance the search and reporting capabilities of the CD-ROM that will be one of the end products of this research effort. This version of AskSam allows for full indexing of files which will make searches faster and more efficient for end-users.

5.0 FINAL ANNOTATED BIBLIOGRAPHIC LISTING

We have examined a range of library and on-line sources for information about the social effects on communities of the oil spill, cleanup, and litigation. We have compiled a working bibliography of journal articles, and academic books, articles in popular magazines, and reports from U.S. Government, State of Alaska, and private sources. We have also examined newspapers and subsistence sources, Trustee studies and biological summaries. Our examination of the litigation specific material has shown that there may be considerably less material in the public domain at this point than would be desirable. That is, there are works that mention the impact of litigation on the communities, but a large body of documents produced specifically for the litigation process itself (e.g., some expert reports on social and psychological impacts to communities) are still bound by legal confidentiality restrictions, and are likely to remain so at least through the appeals process, which, according to one attorney centrally involved with the case, may be another two years or so. There are some materials on damages to fishermen that are in the public domain, but much of those materials focus on the resources themselves; State court related materials focus primarily on resource and land damages and do not have a focus on social impacts.

The full annotated bibliographic listing is included on this CD-ROM as a separate document (Volume V). In this way, the file structure of this CD-ROM differs from the volumes submitted to MMS in hardcopy. In the hardcopy version, Volume IV of the Final Report (*Exxon Valdez* Oil Spill, Cleanup, and Litigation: A Collection of Social-Impacts Information and Analysis, Volume IV) contained both the introduction to the final annotated bibliography and abstracts, and the final annotated bibliography and abstracts themselves. For this CD-ROM based version, the bibliography and abstracts portion was broken out into its own volume to facilitate electronic search functions.

6.0 FULL KEY WORD LISTING

The following listing represents the printout of key words as they appear in the bibliographic annotations.

contents of field SOURCE_TYPE
==========
academic article
academic book
academic book chapter
academic conference news bulletin
academic editorial
academic letter
academic paper
academic report
book of conference papers
book, personal journal
community outreach documents
Congressional Hearing
doctoral thesis
EVTC Project Annual Report
government report
journalistic book
master's thesis
museum exhibition book
news magazine article
newspaper article
newspaper editorial
pamphlet
popular article
popular book
progress report
project description
public outreach document
public outreach radio/audio tape
report
report chapter
report volume
Senate Hearing
taped radio program
technical article

contents of field GEOGRAPHY

==========

13 Alaska communities
Afognak Island
Akhiok
Alaska
Alaska Native Communities
Alaska Peninsula
Alaskan coastal villages
Alaskan Peninsula
Aleutian Chain
Aleutian Islands
Aleutian-Pribilof Islands
Aleutian Range
Alitak
Anchorage
Anchorage Bay
ANSCA communities
Anton
Anuktuvak Pass
ANWR
Arctic Circle
Arctic National Wildlife Refuge
Arctic region
Arey Lagoon
Barron Island
Barrow
Barter Island
Bearing Sea
Beaufort
Beaufort Sea
Beaufort Sea coast
Bethel
Bligh Reef
Block Island
Bolsa Chica wetlands
Borough
Bristol
Bristol Bay
Brooks
Busby Island
California
Calista
Canada
Cape Chiniak
Cape Thompson
Chalkyitsk
Chenaga Bay
Chenaga
Chignik
Chignik Bay
Chignik Lagoon

Chignik Lake
Chignik River
Chugach
Chugach Mountains
Chugach National Forest
Chukchi Sea
City
coastal village
Columbia Glacier
Colville River
Communities
Cook
Cook Inlet
Copper River Delta
Cordova
Corwin Lagoon
Culross
DeLong Mountains
Dillingham
Eastern and Northern Districts
English Bay
Evans Island
Eyak
Fairbanks
Florida
Fort Abercrombie State Park
Gambell
Glacier Bay
Graham
Green Island
Gulf of Alaska
Harrington Point
Herring Bay
Homer
Iliamna Lake
Ivanoff Bay
James Lagoon
Juneau
Kachemak Bay
Kaktovik
Kaktovik Lagoon
Karluk
Karluk Lagoon
Karluk River
Katmai
Katmai Coast
Katmai National Park and
Kayak Island
Kenai
Kenai Fjords National Park
Kenai Peninsula

Kenai Peninsula Borough
King Salmon
Kivalina
Kivalina Lagoon
Kizhuyak
Kizhuyak Bay
Knight Island
Kodiak
Kodiak Archipelago
Kodiak Archipelago Uyak Bay
Kodiak City
Kodiak Island
Kodiak Island Borough
Kotzebue
Kotzebue Sound
Kukak Bay
Larsen
Larsen Bay
Latouche Island
Lower Cook Inlet
Marmot Bay
Mars Cove
McCarty Fjord
Monashka Bay
Montague District
Montague Island
Mulgrave Hills
Naked Island
Naknek
NANA
Nanwalek
National Wildlife Refuge
Native villages
Nechelik Channel
New Stuyahok
New York
Noatak
Nondalton
North Gulf Coast
North Naknek
North Pacific Rim
North Slope
North Slope Borough
Northwest Arctic
Northwest Arctic Borough
Norton Sound
Nuiqsut
Nushagak Bay
Nushagak River
Old Harbor
Olga Bay

Ouzinke
Perryville
Petersburg
Point Hope
Port Angeles Washington
Port Graham
Port Heiden
Port Hobron
Port Lions
Port of Valdez
Port Valdez
Prince William Sound
Prudhoe Bay
Quartz Bay
Red Dog Mine
south Naknek
Saints Bay
Sand Point
Santa Barbara CA
Seldovia
Settlers Cove
Seward
Shelikof Strait
Sitcalidak Island
Sitkalidak Strait
Soldotna
Southcentral Alaska
Southeast Alaska
Southern Kenai Peninsula
Southwestern District
spill area
Spruce Island
State of Alaska
Tatitlek
three communities
Togiak
Tongass National Forest
Tugidak Island
Tyonek
U.S. states
Unalakleet
United States
upper Cook Inlet
Upper Alaska Peninsula
U.S. Congress
Valdez
Valdez Narrows
Vancouver Island
Wainwright
Washington State
West Cook Inlet

Whittier
Windy Bay
Women's Bay
Wulik River

contents of field EVENT_PHASE
==========
1964 earthquake
1976 construction
cleanup
general
litigation
post-spill
pre-spill
restoration
spill

contents of field SOCIAL_OR_CULTURAL_IDENTIFIER
==========
Admiral Paul Yost
adults
Advanced Environmental Technology
Alaska Area Native Health Service
Alaska Board of Marine Pilots
Alaska Department of Environmental Conservation
Alaska Department of Fish and Game
Alaska Department of Labor
Alaska Department of Natural Resources
Alaska Institute of Marine Science
Alaska Legislature
Alaska Oil spill
Alaska Oil Spill Commission
Alaska Regional Response Team
Alaska State
Alaska State government
Alaska Volunteer Independent Cleanup Effort
Alaska's Attorney General
Alaskan Native
Alaskan Natives
Alaskan officials
Alaskans
Aleut
Alutiiq
Alyeska
Alyeska president Hermiller
American Institute of Marine Shipping
American Institute of Merchant Shipping
Anchorage Daily News
ANCSA communities
AP wire service
Aquaculture Corporation

Arco
Arco Anchorage
Athapaskan Indians
author
author Jeff Wheelwright
authorities
bankers
boat owners
Bohannon
bond market
Bristol Bay Native Corporation
British Petroleum
bureaucrats
Bush Administration
business owners
business sector
cannery workers
Captain Dave Spade
Captain Hazlewood
Captain Ken Thompson
Captain Larrabee
Center for Marine Conservation
Chenega Corporation
Chevron
children
Chugach Alaska Corporation
Chugach Native Corporation
cleanup workers
clinics
Coast Guard Spill Coordinator
Coast Indians
commercial fishermen
Congress
consumers
Cordova District Fishermen United
Cordova mayor
corporations
court
Court of Appeals
courts
deckhands
Deckhands Association
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Fish and Wildlife
Department of Health and Human Services
Department of Justice
Department of Labor
Department of the Interior

Department of Transportation
Division of Environmental Health
Doris Lopez
Earth First!
ecologist
economists
editors
educators
elderly
elders
Emergency Services Council
English Bay Corporation
environmental groups
Environmental Defense Fund
Environmental Protection Agency
environmentalists
Equitas
Euro Americans
Exxon Corporation
Exxon crew
Eyak Native Corporation
family
Far West Inc. Village Corporation
federal government
federal workers
Federal Aviation Administration
fish hatcheries
fish processors
fisheries
fisheries workers
fishermen
fishing industry
fishing permit holders
fishing sectors
Food and Drug Administration
Friends of the Earth
General Accounting Office
government
government workers
Governor Steve Cowper
guides
hatchery workers
Homer Area Recovery Coalition
Homer Area Recovery Commission
hospitals
households
Housing Authority
human subjects
hunters
independent contractors
individual

insurers
interest groups
International Bird Rescue and Research Center
interviewees
Inuit
Inupiat
Inupiat Eskimo
investors
Japanese
Joint Federal-State Land Use Planing Commission for Alaska
Joseph Jorgensen
journalistic sources
journalists
judge
Judge H. Russell Holland
jury
Kaktovik City Council
key informants
Kodiak Area Native Association
Kodiak Island Borough
L.G. Rawl CEO of Exxon
L.R. Raymond President of Exxon
Laborers International Union
landowners
Larsen Bay Tribal Council
lawyers
leaders
legislators
Lieutenant Governor of Alaska
litigants
Lloyd's of London
local government
long term residents
longshoremen
Los Angeles Times
Manual Lujan Secretary of the Interior
media
men
merchants
Minerals Management Service
mosquito fleet
Mount Sinai School of Medicine
Multi-Agency Coordinating Group
municipal workers
municipalities
Murkowski
National Academy of Sciences
National Audubon Society
National Marine Fisheries Service
National Marine Mammal Laboratory
National Marine Manufactures

National Oceanographic and Atmospheric Administration
National Park Service
National Research Council
National Resources Defense Council
National Response Center
National Response Team
National Science Foundation
National Toxicology Program of the NIEHS
National Transportation Safety Board
National Wildlife Federation
Native Association
Native Corporations
Native to Native Assistance Program
Natural Resources Defense Council
New York Times
Nixon Administration
non-Natives
Northwest Alaska Native Association
Nuiqsut City Council
Occupational Safety and Health Administration
Office of Management and Budget
oil companies
oil consumers
oil industry
oil industry employees
oil tankers
Oil Reform Alliance
Oil Spill Health Task Force
Oil Spill Trustee Council
Oiled Mayors
On Scene Coordinators
Ouzinkie Native Corporation
Pacific Area Coast Guard Strike Team
parents
Pilots Association
police
Port Graham Corporation
Port Pilots Association
President Bush
Prince William Sound Aquaculture Association
Prince William Sound Conservation Alliance
Protestant
public
public pension funds
Public Advisory Group
Public Broadcasting System
recreational resource users
Regional Citizen's Advisory Council
Regional Response Team
regulators
Rep. Bentley

Rep. Brennan
Rep. Carper
Rep. Clement
Rep. Coble
Rep. Curtis
Rep. Davis
Rep. Hughes
Rep. Inhofe
Rep. Jones
Rep. Laughlin
Rep. Lent
Rep. Lowey
Rep. Manton
Rep. Miller
Rep. Moore
Rep. Pickett
Rep. Schneider
Rep. Shumway
Rep. Tauzin
Rep. Weldon
Rep. Young
researchers
residents
resource users
rural residents
Russian
Russian Orthodox
Salmon Market Information Service
Samuel Skinner Department of the Interior
Scandinavian
scientists
seafood processors
Secretary of Commerce
Secretary of Labor
Secretary of Transportation
Senate
Senate Energy and Commerce Committee
Senator Adams
Senator Breaux
Senator Bryan
Senator Burns
Senator Gore
Senator Gorton
Senator Hollings
Senator Inoye
Senator Kerry
Senator Lott
Senator Packwood
Senator Pressler
Senator Stevens
service workers

Seward Life Action Council
Sierra Club
Sierra Club Legal Defense Fund
social scientists
Southeast Coast Indians
Southwest Pilots Association
Spiro Agnew
sportsmen
state government
state workers
State Legislature
State of Alaska
State Pilot Association
stockholders
subsistence resource users
Swedish Environmental Research Institute
tanker crew
tourists
Trans Alaskan Pipeline Liability Fund
tribal council
Trustee Council
Trustees for Alaska
U.S. citizens
U.S. Coast Guard
U.S. District Court
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. Navy
U.S. National Institute of Environmental Health Sciences
Under Secretary of Commerce for Oceans and Atmosphere
underwriters
unemployed
Unification Church
University of Alaska
University of Alaska Department of Forestry
University of California at San Diego
University of Washington College of Fisheries
Valdez Counseling Center
VECO
Village Council
volunteers
Walter Mondale
Washington College of Fisheries
Washington Post
Washington State fishermen
Wilderness Society
Wildlife Federation of Alaska
William E. Evans Undersecretary of Commerce for Oceans and Atmosphere
William Reilly
wire services

women
women’s shelter
world community

contents of field SOCIAL_EFFECTS
==========
absence of local services
alienation
breakdown of organizational planning
community disruption
community obligations
community resources
community stability
cooperative work
corrosive community
crime
crime rates
demographic change
demographic characteristics
disruption of Native communities
distrust
emergent groups
emigration
ethnic pride
Exxon’s media response
factionalism
friendships
household size
immigration
increased competition
increased insularity
information sources
inter-generational discord
kinship
leadership
media coverage
natural resource community
political activity
political decisions
political power
population increase
racism
reduced crime
regulatory oversight
renewable resource community
response organizations
sharing
sociability
social cohesion
social conflict
social disruption

social organization
social organization of tankerships
social pathology
social support
social tension
subsistence-based community
support of the elderly
therapeutic community
vandalism
voting

contents of field CULTURAL_EFFECTS
==========
archaeological resources
belief and cognition
belief in efficacy of spill cleanup
beliefs about technology
civic pride
cultural and social constructions of nature
cultural identity
cultural persistence
cultural values
culture loss
customs
distrust
enculturation
ethics
festivals
future risk
lifestyle
moral discourse
political attitudes
religion
rhetoric of risk
risk communication
risk perception
sense of community
sense of place
stewardship of the environment
subsistence traditions
technological risk
traditional culture
traditional knowledge
tranquility
trust in development

contents of field FAMILY_EFFECTS
==========
adult absence
behavioral problems
child abuse

child neglect
childcare
children
divorce
domestic stress
domestic violence
enculturation
family disruption
family outreach
family relationships
family routines
family support
generational tension
household composition
household organization
inheritance
kinship
obligations
parent absence
parent-child conflicts
role relationships
separation anxiety
sharing
sharing with elderly
stress
unsupervised children
women's shelters

contents of field ECONOMIC_EFFECTS
==========
Alaskan fisheries
Alyeska losses
banking industry
bankruptcy
basic economic activities
bond market
business losses
cash economy
claims process
cleanup contracts
cleanup employment
cleanup money
commercial fisheries
commercial fisheries losses
commercial fishermen
commercial fishing
commercial vs. traditional economy
compensation for damages
cost of living
debt service
decreased harvests

direct damages
distribution of cleanup money
economic diversification
economic gain
economic loss
economic sectors
employment
employment outside community
ex-vessel prices
ex-vessel value
exchange rate
Exxon costs
Exxon losses
federal costs
financial recovery
financial strain
fiscal gain
fiscal impacts
fiscal loss
fish hatchery industry
fish tax
fishery dependence
fishing industry
fishing industry sectors
fishing sector vs oil sector
foreclosures
fuel prices
government employment
government payments
harvest types
harvest volume
housing shortages
increased wealth
indirect damages
inflation
insurance rates
international market
Japanese yen
labor shortage
loans
lost passive use
low income
money spill
nonbasic economic activities
oil industry costs
per capita income
price impacts
property loss
public expenditures
reduced harvest
regional economic impacts

regional economy
resource loss
revenue impacts
revenue loss
service sector
shareholder losses
spending patterns
spillionaires
stock market
subsistence economy
taxation
temporary employment
tourism industry
traditional vs. commercial economy
unemployment
use of funds
value of subsistence losses
village economy
wage expectations
wage labor
work disruption
workmen's compensation

contents of field PSYCHOLOGICAL_EFFECTS
==========
alcohol abuse
alcoholism
alienation
anger
anxiety
behavioral problems
child abuse
chronic psychological stress
coping mechanisms
corrosive community
counselors
crime
cultural identity
dazed
depression
depressive symptoms
despair
destructive behavior
dislocation
disruption
divorce
domestic violence
emotional expression
emotional problems
emotional response
fear

fear for future
fear for town
frustration
futility
generalized anxiety disorder
grief
impact of events scale
inter-personal conflict
isolation
loss of control
loss of innocence
mental health
mental health services
mental health services
mistrust
post-traumatic stress disorder
psychological outreach
PTSD
self- concept
self-image
self worth
sense of betrayal
sense of health
sense of the future
separation anxiety
shock
social disruption
social support
stress
substance abuse
suicide
therapeutic community
uncertainty
victim stress
violence
worry

contents of field MUNICIPAL_EFFECTS
==========
arrests
chaotic claims process
city council
civic posts unfilled
crime
decreased household size
delayed work
emigration
employment
expenditures
fiscal impacts
fiscal losses

government overwhelmed
government services
grants missed
increased workloads
influx of outsiders
infrastructure
infrastructure as a variable
infrastructure demands
lost revenue
lost tax revenue
lost time
mayor
media
mitigation
municipal actions
municipal and State costs
municipal costs
Oiled Mayors
operational disruption
organizations
overcrowding
police overwhelmed
population
population decline
population turnover
preparedness plans revised
public expenditures
rumor control
service demands
service providers take cleanup employment
service sector
subsistence community
tourist sites shift
traffic
Village Council as VECO Coordinators

contents of field LITIGATION_EFFECTS
==========
$5 billion award
adequacy of settlement
Akau v. Olohana
Alaska National Interest Land Commission Act
Alaska Native Claims Settlement Act
appeal
assessment studies
award
CERCLA
claims
class action
Clean Water Act
cleanup

compensation
compensatory damages
contingent valuation
court settlement
Court of Appeals
damage awards
damage claims disallowed
damages
defendants
direct costs
failure of plaintiffs
federal common law
Federal District Court
Federal Water Pollution Control Act
first lawsuits filed
In re Steuart Transportation
In re the *Exxon Valdez*
indirect costs
insurance award
insurance claim
judgement
judicial criticism
judicial decision
jury
lawsuit
lawyers
liability
litigation
litigation and scientific research
litigation as a stressor
litigation as deterrent
litigation as secondary disaster
litigation research
litigation restricts information
lost passive use
Maine v. M/V Tamanol
Marine Mammal Protection Act
maritime law
Maryland v. Amerada Hess Corporation
Migratory Bird Act
Native claims
Native lawsuits
negligence
new trial
Oil Pollution Act
order
Order No. 190 Id at 10. dicta
overturn law
partial settlement
payments
plaintiffs

public trust resources
Public Trust Doctrine
punitive damages
recovery
Recovery Act
request new trial
Resource Conservation and Recovery Act
Rivers and Harbors Act
Robbins Dry Dock
Robins Dry Dock and Repair Co. v. Flint
Save Sand Key Inc. v. U.S. Steel Corp.
secret agreement
settlement
settlement expenditures
Sierra Club v. Exxon Corp.
Sierra Club v. Morton
spending of compensation
State of La ex rel. Onste v. M/W Test bank
sympathy for Exxon
tax deductibility of corporate litigation
Trans-Alaska Pipeline Liability Fund
trial process
Trustees for Alaska v. State
Union Oil Co v. Oppen
verdict
verdict upheld
voided
Water Pollution Control Act
win lawsuit

contents of field OTHER_EFFECTS
==========
cancer risk
decline in perception of health
hazardous materials
health
health concerns
health effects
health of cleanup workers
health risks
increased diagnosis of medical problems
increased regulation
legislative change
liability standards
odor of oil
risk assessment
seafood safety policy
tourism

contents of field SUBSISTENCE_ACTIVITIES
==========

amounts consumed
bidarkies
birds
bottomfish
change from subsistence foods to purchased foods
children's participation
chitons
clamming
clams
competition with sportsmen
contaminated resources
contamination assessment
contamination fears
contribution to diet
decreased harvest
decreased subsistence activity
decreased use of subsistence foods
deer
dependence on subsistence
favored locales
fin-fish
fish
fish contamination
fishing
fishing methods
food storage
gathering
gear types
halibut
harbor seals
harvest amounts
harvest disruption
harvest methods
herring
high subsistence levels
hunting
increased effort
increased harvest
increased reliance on subsistence
increased resource availability
land mammals
marine invertebrates
marine mammals
medicinal plants
mussels
no decrease after EVOS
no sustained recovery in harvests
octopus
participation in harvests
participation in processing
plants

preservation methods
processing methods
quantities
resource availability
restoration of subsistence
salmon
sea ducks
sea lions
seafood contamination
seals
sharing
shellfish
shift from mammals to fish
species
subsistence activity
subsistence concerns
subsistence consumption
subsistence foods
subsistence methods
subsistence resources
subsistence unaffected
travel to new areas
vegetation
wild game
wild plants

contents of field SUBSISTENCE_CULTURAL
==========
absence of impact on culture
beliefs
change in attitudes towards subsistence foods
cognition
community ties
cooperation
cultural identity
cultural meaning of resources
cultural meaning of subsistence
culture
culture conflict
dependence on subsistence
economics
elders
enculturation
family and community responsibility
family ties
festivals
harvest methods
health beliefs
identity
knowledge
knowledge of species

lifestyle
meaning systems
medicinal plants
preservation methods
pride
religion
resource preferences
self reliance
sharing
significance of habitats
social patterning of subsistence
social structure
society
stewardship of the environment
subsistence culture
subsistence roles
subsistence traditions
symbolic expression of culture
symbolic value of locales
symbolic value of species
threat to subsistence culture
tradition loss
traditional harvest techniques
traditional knowledge
traditional locales
traditions
uncertainty about future
values

contents of field REMAINDER
==========
Alaska Native Claims Settlement Act
Alaska Pipeline
Alaskans
ANCSA
ANWR
Archaeological Resources Protection Act
archaeology
archaeology of spill area
aromatic compounds
aromatic contaminants
behavior
Bristol Bay
business ethics
causes of spill
CERCLA
CERES
cleanup-related damages
Congressional debate
contingency plans
contingency plans and preparation

corporate
corporate behavior
corporate credibility
coverage of Alaskans
coverage of wildlife
cultural resources
disaster planning
double hull tankers
ecological impacts
economic research methods
environmental concerns
environmentalist's response
essays
exposure index
federal oil policy
finance
financing of award
future oil exploration
health policies
health risks
historic sites
impacts of cleanup
incentives to pollute
increased environmental scrutiny
increased scrutiny of oil companies
insurance
insurance claim
inter-agency coordination
inter-agency relations hinders response
interview summaries
inventions
lack of use of volunteers
legislation
legislative change
legislative hearings
legislative oversight
liability laws
life of pilots
litigation constrains research
longitudinal study
media coverage
media sources
national energy policy
National Historic Preservation Act
National Interest
natural disaster
offshore drilling
oil company advertizing
oil spill
oil transport system
Oiled Mayor's Study

Outer Continental Shelf Lands Act
personal reactions
poetry
political economy
press releases
public land
public relations
recovered species
recovering species
recreation
regulation
regulatory change
reimbursement process
research methods
restriction of scientific information
rhetoric
risk
risk assessment
risk estimates
science
social problem theory
Sound Ecosystem Project
species not recovered
species recovery unknown
spill response
supertanker
survey
systemic power theory
talking circle
tax code change
technological disaster
tourism
trans-Alaska pipeline
vulnerability of traditional communities
who paid costs of spill

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

Final Report, Volume V:
Final Annotated Bibliography and Abstracts

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BOOKS

CITATION[Abordaif, Faisal Hamzah. 1994. The development of an oil spill contingency planning evaluation model. Doctoral Thesis, George Washington University, 1994. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* oil spill is used as a case study, in an analysis which proposes a way of evaluating disaster contingency plans. The researcher finds that formal contingency plans are often abandoned in an actual disaster, and identifies the important factors that lead to divergence from the original contingency plan. A model for evaluating contingency plans is proposed.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska] EVENT_PHASE[spill] REMAINER[contingency plans]

CITATION[University of Alaska, Alaska Sea Grant College Program. 1995. Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, March 23-25, 1994, Anchorage, Alaska. Alaska Sea Grant College Program report 95-02. Fairbanks, AK: University of Alaska, Fairbanks.]
ABSTRACT/ANNOTATION[This volume contains a number of papers and discussion sessions organized according to the topics of prevention, response and oversight. The section on oil spill response includes wildlife protection strategies and contingency planning, the protection of archaeological sites and cultural resources, an article on National Park Service lands, and a paper on the recreation and tourism industries. The paper on the Park Service, by Rick Kurtz observes that three parks were affected by the spill, the Kenai Fjords National Park, Katmai National Park and Preserve, and Aniakchak National Monument and Preserve. The paper indicates that the different mandates and organizational cultures of agencies made it somewhat harder to work cooperatively in spill response. Further, the Park Service had been less interested in potential threats that originated outside its purview, as for example in the oceans, associated with Coast Guard oversight. A paper by Nancy Lethcoe discusses the damage to and protection of resources associated with recreation and eco-tourism. The author differentiates between urban tourism, nature tourism and eco-tourism. Urban tourism (restaurants, gift shops) relies very little on the condition of natural resources. Nature tourism is characterized brief, multi-person visits (cruise ships, and bus tours), while eco-tourism involves more intensive use of the environment (sailing, kayaking, hiking sportsfishing, observing wildlife), and was most affected by the spill. The Alaska Wilderness Recreation and Tourism Association's database for 1993, indicates that around 150 eco-tourism businesses operate in Prince William Sound, and some beach areas generate hundreds of thousands of dollars. 'Lessons learned' from the spill included the following: 1) Unbalanced media coverage has a negative economic impact on nature and eco-tourism. 2) Since mapping of oil is done by air, lightly oil beaches important to tourism and recreation may not be mapped as oiled, and therefore not cleaned. 3) Agencies responsible for tourism did not have lists of tourist sites, contributing to a failure to protect some areas from oiling, while areas with the greatest public interest and advocacy received most care. 4) Cleanup workers and scientists spread damage to unaffected areas and were sometimes unfamiliar with laws regarding wildlife. 5) The tourism industry was denied legal recovery for damages. Estimations of lost value in the tourist industry should take into account that eco-tourism involves a few visitors who are willing to spend a lot of money, in contrast to the common

models of tourism. Among the planning recommendations, the author includes provisions for evacuation and notification.]
KEYWORDS: SOURCE_TYPE[book of conference papers] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, spill, post-spill, restoration] ECONOMIC_EFFECTS[economic loss] LITIGATION_EFFECTS[damage claims disallowed] OTHER_EFFECTS[tourism] REMAINDER[tourism, recreation, inter-agency relations hinders response, cultural resources, archaeology]

CITATION[Button, Gregory Vedder. 1993. Social conflict and the formation of emergent groups in a technological disaster: The *Exxon Valdez* oil spill and the response of residents in the area of Homer, Alaska. Doctoral Thesis, Brandeis University, 1993. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[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.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Homer, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFER[residents, authorities, cleanup workers] SOCIAL_EFFECTS[social cohesion, social conflict, emergent groups, social organization] CULTURAL_EFFECTS[sense of community, sense of place] PSYCHOLOGICAL_EFFECTS[loss of control, uncertainty] MUNICIPAL_EFFECTS[infrastructure, organizations]

CITATION[Cohen, Maurie J. 1993. Economic aspects of technological accidents: an evaluation of the *Exxon Valdez* oil spill on southcentral Alaska (*Exxon Valdez*). Doctoral Thesis, University of Pennsylvania, 1993. Ann Arbor, MI: University Microfilms, International.]
ABSTRACT/ANNOTATION[Prior research, according to the author, has argued that natural disasters often generate short-term economic benefits. This study investigates whether the idea of short-term economic gain applies to technological disasters by looking at the EVOS case. The study finds that there were substantial short term economic benefits to the community as a whole, though the short term economic gains from the accident were not evenly distributed across the communities in the region of the spill. Further, the short-term gain associated with the oil spill obscured a decline in the profitability of commercial fishing and intensified the decline of international market conditions for Alaskan fishery products. While acknowledging that impact analyses of complex systems are difficult to achieve, the analysis indicates that the

ex-vessel revenue impacts in 1990 from the EVOS were between $11.2 million and $44.9 million.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[southcentral Alaska] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, fishing industry] ECONOMIC_EFFECTS[economic gain, economic loss, ex-vessel value, international market, revenue impacts]
CITATION[Davidson, Art. 1990. In the wake of the *Exxon Valdez*: the devastating impact of the Alaska oil spill. San Francisco, CA: Sierra Club Books.]
ABSTRACT/ANNOTATION[The book includes a discussion of the spill and the events leading up to the spill, a section on response to the spill, and a final section on the aftermath of the *Exxon Valdez* event. In the first few days after the *Exxon Valdez* ran aground, representatives of local communities, Exxon, and state and local government met in public and private meetings to confer about the actions to take. After worsening weather began to spread the oil, local communities and organized Exxon response teams began efforts to contain and cleanup the oil. Organized response efforts promised more than they delivered, and birds, marine mammals, other sea life, and shorelines were damaged by the spreading oil. In the wake of the spill, communities throughout the region were affected by the spilling oil, the influx of outsiders, the potential threat to important natural resources, and the nature of the cleanup effort. In Native villages such as Tatitlek and Chenega Bay, concerns developed about contaminated resources used for subsistence purposes. Natives also perceived the effects of the spill through their own cultural views about nature. The effects of the spill have important implications for how oil is developed and shipped in the future.]
KEYWORDS: SOURCE_TYPE[popular book] GEOGRAPHY[Prince William Sound, Kodiak Island, Kenai Peninsula, Valdez, Cordova, Kodiak, Homer, Seward, Tatitlek, Larsen Bay, Ouzinkie, Kenai, Native villages] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, fishermen, VECO, U.S. Coast Guard, residents, cleanup workers, mosquito fleet, Exxon Corporation, National Park Service, Minerals Management Service, U.S. Fish and Wildlife Service, Alaska Department of Environmental Conservation, Multi-Agency Coordinating Group] SOCIAL_EFFECTS[social disruption, social conflict, emergent groups] CULTURAL_EFFECTS[sense of place, sense of community] ECONOMIC_EFFECTS[money spill, cleanup contracts, economic loss] PHYCHOLOGICAL_EFFECTS[stress, frustration, despair, emotional problems] MUNICIPAL_EFFECTS[influx of outsiders, population] SUBSISTENCE_ACTIVITIES[hunting, fishing, clamming, gathering, contaminated resources, contamination fears]

CITATION[Dennard, Floyd H. 1997. Long-term community impacts of a technological disaster: The Valdez oil spill (Alaska). Master's Thesis, University of South Alabama, 1997. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis argues that the impacts of technological accidents result not only from the event itself. Litigation following the event, and involvement in this litigation produce additional negative impacts, and these are discussed as secondary disasters that prolong the social impact of technological disasters such as the *Exxon Valdez* spill.]
KEYWORDS: SOURCE_TYPE[master's thesis] GEOGRAPHY[Cordova, Alaska] EVENT_PHASE[spill, post-spill, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[residents, litigants] LITIGATION_EFFECTS[litigation as secondary disaster]

CITATION[Dyer, Samuel C. Jr. 1991. Issue phases in attention cycles: a study of the *Exxon Valdez* disaster. Doctoral thesis, The University of Tennessee, 1991. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis set out to consider change in the way the media characterized the *Exxon Valdez* event over time. Two wire services are included in the study, which includes the year before and the year after the oil spill. Statistical analysis of data from content analysis of two wire services found that Exxon Corporation sources did not dominate AP Wire coverage at any point in the development of the story, and that Exxon's stance was generally reactive to statements from other sources.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[media, wire services, AP wire service, Exxon Corporation, journalists, journalistic sources] SOCIAL_EFFECTS[media coverage, Exxon's media response]

CITATION[Erickson, Kai. 1994. A new species of trouble: explorations in disasters, trauma, and community. New York, NY: W.W. Norton.]
ABSTRACT/ANNOTATION[This work, a collection of essays on a number of discreet events, focuses on the psycho-social impacts of modern technological disasters. It is proposed that these events, which are often associated with ill-understood technologies, have some special characteristics. These characteristics are that involve some human agency, they often involve toxic contamination, and their consequences may be both acute and chronic, with uncertainty about the nature, extent, and duration of the danger contributing to the trauma experienced. The first section includes articles on mercury poisoning in an Ojibwa community, a sense of betrayal following financial misdealings in a Haitian community, petroleum pollution in a Colorado community, Three Mile Island, and homelessness in America, and the second section reflects on Hiroshima and the proposed high level nuclear waste repository in Nevada.]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[United States] EVENT_PHASE[general] SOCIAL_OR_CULTURAL_IDENTIFIER[public, world community, Japanese] SOCIAL_EFFECTS[alienation] CULTURAL_EFFECTS[risk perception, sense of place]

CITATION[Frost, Helen and John Haines eds. 1990. Season of dead water. Portland, OR: Breitenbush Books.]
ABSTRACT/ANNOTATION[A compilation of poetry and short essays that express individual and community reactions to the oil spill and cleanup.]
KEYWORDS: SOURCE_TYPE[popular book] EVENT_PHASE[spill, cleanup] REMAINDER[poetry, essays, personal reactions]

CITATION[Gartner, Carrie Nell. 1990. The *Exxon Valdez* oil spill: a case study in institutional apologia. Masters thesis, California State University, Fullerton, 1990. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis argues that defensive statements by institutions, as well as individuals, can be analyzed as examples of apologia. It introduces a set of criteria for analyzing individual and institutional apologia, and concludes that Exxon's apology following the oil spill was unsuccessful, and suggests reasons.]

KEYWORDS: SOURCE_TYPE[master's thesis] GEOGRAPHY[Valdez, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon Corporation] REMAINDER[corporate behavior, corporate credibility]

CITATION[Jorgensen, Joseph G. 1990. Oil age Eskimos. Berkeley: University of California Press.]
ABSTRACT/ANNOTATION[Most of the research for this book was completed before the *Exxon Valdez* oil spill, and it covers the period from 1981 to 1989. However, the book briefly discusses the implications of the spill for Alaskan Native communities. A number of researchers were involved in collecting the data analyzed in this work. The book is about the culture and the cultural ecology of three Alaskan Native communities, Unalakleet, Gambell, Wainwright, which are in the regions of the Bering Sea and the Chukchi Sea and are therefore beyond the geographic area of the spill. The book considers the factors that have shaped the communities, including the impact of the Alaska Native Claims Settlement Act (ANCSA) on Native communities and culture. The book contains detailed ethnographic material concerning subsistence uses of the environment, Native beliefs and attitudes about the environment, the economy and the subsistence economy in these communities, and the community social organization, kinship, and ideology. Native concerns about oil development of the Outer Continental Shelf are presented.]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[Unalakleet, Gambell, Wainwright, Alaska, Beaufort Sea, Bearing Sea, Chukchi Sea, Norton Sound] EVENT_PHASE[pre-spill, spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Natives, men, women, children, elderly, family, Minerals Management Service] REMAINDER[Alaska Native Claims Settlement Act]

CITATION[Keeble, John. 1991. Out of the channel: the *Exxon Valdez* oil spill in Prince William Sound. New York, NY : Harper Collins.]
ABSTRACT/ANNOTATION[This is a journalistic style book by an author first sent to Valdez, Alaska to cover the EVOS story for the Village Voice, and it includes reflections by many people associated with, and affected by, the spill and cleanup. The work considers a broad range of topics, such as the political, economic, and regulatory context of the spill, the 'normal' practices of oil transportation in Valdez, the corporate, governmental, and organizational entities and processes involved in responding to the spill, media coverage of the EVOS, and the environmental and social impacts of the spill and cleanup. It also considers the role of science in spill studies and provision of information to the public.]
KEYWORDS: SOURCE_TYPE[journalistic book] GEOGRAPHY[Bligh Reef, Block Island, Cordova, Cook Inlet, Kodiak Island, Knight Island, Seward, Seldovia, Valdez, Tatitlek, Tongass National Forest, Valdez Narrows, Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Chugach Native Corporation, British Petroleum, Alyeska, Exxon, VECO, U.S. Coast Guard, Earth First!, Alaska Department of Environmental Conservation, Environmental Protection Agency, Alaska Department of Fish and Game, Department of Fish and Wildlife, Homer Area Recovery Coalition, Department of the Interior, International Bird Rescue and Research Center, National Oceanic and Atmospheric Administration, National Transportation Safety Board, Native to Native Assistance Program, scientists, fishermen, Alaskan Natives] SOCIAL_EFFECTS[social conflict] ECONOMIC_EFFECTS[economic gain, economic loss] PSYCHOLOGICAL_EFFECTS[

stress] SUBSISTENCE_ACTIVITIES[decreased harvest] REMAINDER[restriction of scientific information].

CITATION[Lethcoe, Nancy R. and L. Nurnberger. 1989. Prince William Sound environmental reader. Valdez, Alaska: Prince William Sound Conservation Alliance.]
ABSTRACT/ANNOTATION[This book contains a selection of papers related to Prince William Sound and the *Exxon Valdez* oil spill. The first half of the volume contains a chronology of the first 72 hours of the spill event, a descriptive overview of Prince William Sound from a naturalist's point of view (with a preliminary indication of possible effects of the spill), and a selection of materials about oil dispersants, guidelines as to their general use and effectiveness, and their use on the *Exxon Valdez* oil spill. The second half of the volume contains sections describing the cleanup plan and its implementation, the mechanisms to establish priorities fro restoration efforts, and responses to
the restoration plan as it had occurred up to that point. A list of scientific studies which had been started that were associated with the spill was also included, as was a short description of the role of state and federal agencies in the response effort, and a transcript of the testimony of Fredericka Ott before the House Interior Committee (May 7, 1989).]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_EFFECTS[local resources, Multi-Agency Coordination Group, response organization] CULTURAL_EFFECTS[perceived risk, sense of place, lifestyle, dislocation]

CITATION[Lord, Nancy. 1992. Darkened waters : a review of the history, science, and technology associated with the *Exxon Valdez* oil spill and cleanup. Homer, AK: Homer Society of Natural History/Pratt Museum.]
ABSTRACT/ANNOTATION[This book was published to accompany an exhibition on the *Exxon Valdez* oil spill.]
KEYWORDS: SOURCE_TYPE[museum exhibition book] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup]
CITATION[McGill, Anthony D. 1994. Corporate public discourse: Exxon's March 24, 1989 accounts following the Valdez oil spill. Doctoral thesis, Wayne State University, 1994. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[Public relations releases from Exxon Corporation were analyzed in terms of the style of apology used, and the researcher found that concession was much more common than denial in Exxon press releases, and that Exxon's stance was generally reactive rather than taking the initiative.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] REMAINDER[public relations, press releases]

CITATION[McNally, Timothy S. 1997. Technological disaster and chronic psychological stress: an evaluation of the conservation of resources stress model. Master's Thesis, 1997, University of South Alabama. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[Surveys sent to members of a commercial fisherman's organization in Cordova are used to analyze the relationship between fishing losses, disruptions

in social support and social self-concept and the 125 respondents' psychological symptomotology, Data consisted of self-reporting by respondents.]
KEYWORDS: SOURCE_TYPE[master's thesis] GEOGRAPHY[Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Cordova District Fishermen United] SOCIAL_EFFECTS[social support] ECONOMIC_EFFECTS[economic loss, resource loss] PSYCHOLOGICAL_EFFECTS[self-concept, social support, anxiety, depression, post-traumatic stress disorder]

CITATION[Miller, Demond S. 1996. Psychological depression and economic loss among commercial fishermen during the aftermath of the *Exxon Valdez* oil spill. Master's thesis, Mississippi State University, 1996. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[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.]
KEYWORDS: SOURCE_TYPE[master's thesis] GEOGRAPHY[Cordova, Alaska] EVENT_PHASE[cleanup, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Cordova District Fishermen United] ECONOMIC_EFFECTS[economic loss, property loss] PSYCHOLOGICAL_EFFECTS[depression, anxiety] LITIGATION_EFFECTS[litigation as a stressor]

CITATION[Miller, Demond S. 1997. A construction of competing disaster narratives: media coverage of the distribution of risk following a technological disaster. Doctoral thesis, Mississippi State University, 1997. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[This thesis examines news coverage from different types of media in the aftermath of the *Exxon Valdez* oil spill. Network news, local print media, and local video interviews and town meetings provided data for qualitative analysis. It finds a variety of themes present in the media coverage, with themes representing different social groups and risk groups, and different phases of the event. Additionally, it discusses the therapeutic and corrosive impacts on the community due to the competing perspectives present in the community.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska, Southcentral Alaska, US] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[media, public, Exxon, U.S. Coast Guard] SOCIAL_EFFECTS[media coverage, corrosive community, therapeutic community]

CITATION[Mobley, Charles, M. B. Workman, and K.M. Workman. 1990. The 1989 *Exxon Valdez* cultural resource program. Anchorage, AK: Exxon Shipping Co.: Exxon Co., USA.]
ABSTRACT/ANNOTATION[In this volume, archeologists discuss the history, historic sites and antiquities in the region of the *Exxon Valdez* oil spill.]
KEYWORDS: SOURCE_TYPE[book] REMAINDER[historic sites, archaeology]

CITATION[Moore, William Henry J. 1993. Management of human and organizational error in operations of marine systems. Doctoral thesis, University of California, Berkeley, 1993. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The dissertation offers a quantitative modeling methodology to evaluate the impacts of human organizational errors in the operation of oil tankers and offshore

oil platforms. The author indicates that more than 80% of high consequence marine accidents are attributable to a compounding of human and organizational errors. The *Exxon Valdez* grounding and the Occidental Piper Alpha platform explosion are used as case studies.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[tanker crew, Exxon] REMAINDER[causes of spill]

CITATION[Nalder, Eric. 1994. Tankers full of trouble: the perilous journey of Alaskan crude. New York, NY: Grove Press.]
ABSTRACT/ANNOTATION[Written by a journalist with the *Seattle Times*, this book provides information about oil tankers, tanker personnel, and the tanker industry, woven into an account of the author's trip aboard the tanker-ship *Arco Anchorage*. Changes introduced in the tanker industry following the *Exxon Valdez* oil spill, and regulatory change are among the topics. Examples are given of the trade-offs made between safety and economic gain, such as the issue of double-hulled tankers.]
KEYWORDS: SOURCE_TYPE[book] GEOGRAPHY[Prince William Sound, Port Angeles Washington, Valdez, Vancouver Island] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, American Institute of Merchant Shipping, Alaska Oil Spill Commission, Arco Anchorage, U.S. Coast Guard, tanker crew] SOCIAL_EFFECTS[social organization of tankerships] LITIGATION_EFFECTS[litigation and scientific research] REMAINDER[regulatory change]

CITATION[O'Donoghue, Brian. 1989. Black tides: the Alaska oil spill. Anchorage, Alaska: Alaska Natural History Association.]
ABSTRACT/ANNOTATION[This short illustrated book provides a chronology of spill events and of the preliminary cleanup effort. It also reports the local perspective of damages from the spill, as well as of the overall management of the spill response and cleanup efforts.]
KEYWORDS: SOURCE_TYPE[popular book] GEOGRAPHY[Prince William Sound, Valdez, Chenega] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, cleanup workers, Alaskan Natives, local government] SOCIAL_EFFECTS[community stability, social disruption, social conflict, leadership, local resources, Multi-Agency Coordinating Group, response organization] CULTURAL_EFFECTS[sense of place, lifestyle, dislocation, disruption] ECONOMIC_EFFECTS[economic boom, economic loss, money spill] MUNICIPAL_EFFECTS[increased service demands] SUBSISTENCE_ACTIVITIES[clamming, contamination fears, contaminated resources]

CITATION[O'Meara, Jan. 1989. Cries from the heart: Alaskans respond to the *Exxon* Valdez oil spill. Homer, Alaska: Wizard Works.]
ABSTRACT/ANNOTATION[This work is a collection of short pieces (essays, poems, drawings) conveying some individual Alaskans' experiences of and reactions to the *Exxon Valdez* oil spill. The great variation in the nature of the material makes generalization difficult, but the overall tone is one of loss and how personal relationships with/perceptions of Prince William Sound have changed. Most of the contributors are non-Native, but Walter Meganack, Sr. of Port Graham contributes a powerful summary of how his community was affected.]
KEYWORDS: SOURCE_TYPE[popular book] GEOGRAPHY[Prince William Sound, Port Graham] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[

fishermen, cleanup workers, Alaskan Natives, local government, subsistence resource users] SOCIAL_EFFECTS[local resources, response organization, alienation] CULTURAL_EFFECTS[perceived risk, sense of place, sense of community, lifestyle, ethics, dislocation, disruption]

CITATION[Owen, Bruce, M. et al. 1995. The economics of a disaster: the *Exxon Valdez* oil spill. Westport, CT: Quorum Books.]
ABSTRACT/ANNOTATION[Written by economists who are interested in the question of legal liability following a disaster, this volume proposes an economic model for calculating economic losses that might be recoverable in a lawsuit. Therefore, they are interested in 'economic loss' according to a specific legal definition. They develop and test their model in relation to the *Exxon Valdez* oil spill, and a possible decline in salmon prices. They examined the price effects from the spill on salmon prices, and while there was a decline of prices in 1989, they found an absence of change caused by the EVOS.]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[Alaska] EVENT_PHASE[pre spill, spill, cleanup] ECONOMIC_EFFECTS[Alaskan fisheries, price impacts]

CITATION[Picou, J. S. , D.A. Gill, and M.J. Cohen eds. 1997. The *Exxon Valdez* disaster; readings on a modern social problem. Dubuque, IA: Kendall/Hunt Publishing Co. *(NOTE: individual chapters of this volume are already annotated).*]

CITATION[Rice, S.D. and R.B. Spies, D.A. Wolfe, and B.A. Wright eds. 1996 Proceedings of the *Exxon Valdez* oil spill symposium. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[This edited volume focuses primarily on biological aspects of the *Exxon Valdez* event, but there are several chapters that address social and cultural issues, including subsistence. There is a single chapter discussing cultural resource issues which argues that these resources were damaged primarily by vandalism during the cleanup period of the EVOS. There are four chapters that directly address social issues including subsistence uses during and after the spill and their sociocultural consequences and biologically oriented discussions of the presence of contaminants in subsistence resources. Two chapters describe and analyze social and psychological impacts related to the oil spill and cleanup. One chapter focuses on the relationship between psychological distress and community disruption during and following the oil spill. The other chapter describes "chronic psychological" stress among commercial fishermen and the community context of the stress experienced by this occupational group.]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[Prince William Sound, Gulf of Alaska, Kenai Peninsula, Alaska Peninsula, Cordova, Petersburg, Native villages] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, residents, Alaskan Natives] SOCIAL_EFFECTS[social disruption, community resources, subsistence-based community] CULTURAL_EFFECTS[sense of community, risk perception] PSYCHOLOGICAL_EFFECTS[PTSD, depression, anxiety, chronic psychological stress] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, clamming, decreased harvest, contamination fears, contaminated resources] CULTURAL_SUBSISTENCE[enculturation, sharing, symbolic expression of culture]

CITATION[Ross, Wallace Alan. 1993. The rhetoric of identification in business discourse. Doctoral thesis, University of Illinois at Chicago, 1993. Ann Arbor, MI: University Microfilms, International.]
ABSTRACT/ANNOTATION[Theories concerning public rhetoric are the concern of this thesis. The concept of rhetorical identification is examined for relevance using the example of the *Exxon Valdez* oil spill. The public relations releases of Exxon, and the rhetoric that appeared in newspapers relaying information about the spill, are examined in order to understand the process of persuasion.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska, US] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, public, journalists, interviewees] REMAINDER[rhetoric, public relations, corporate behavior]

CITATION[Sadowitz, March. 1992. Corporate tax policy: a factor in environmental decision making. Master's thesis, State University of New York at Albany, 1992. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis considers how corporate tax laws can affect the actual cost of corporate payments for environmental incidents, cleanup, and non-compliance with environmental law in incidents such as the *Exxon Valdez* oil spill. The ability of corporations to legally deduct for non-conformance penalties, for legal fees arising from environmental lawsuits, and for environmental fines and penalties are analyzed as perverse environmental tax incentives. It argues that the laws permitting deductibility of cleanup costs should be clarified but not eliminated. Congressional and state proposals for changing environmental corporate tax laws are outlined.]
KEYWORDS: SOURCE_TYPE[master's thesis] GEOGRAPHY[Alaska, US Congress] EVENT_PHASE[cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[corporations, taxpayers, Congress, courts, IRS] LITIGATION_EFFECTS[tax deductibility of corporate litigation] REMAINDER[legislative change, tax code change, incentives to pollute, corporate behavior]

CITATION[Sims, Grant. 1994. Leaving Alaska. New York, NY: Atlantic Monthly Press.]
ABSTRACT/ANNOTATION[The author, who was a faculty member at the University of Alaska, reflects on his stay in Alaska and his decision to leave. The book contains descriptions of places and associates in Alaska, the State's attractions, and his reasons for leaving. The author covered the EVOS as a journalist for Outside magazine.]
KEYWORDS: SOURCE_TYPE[book] GEOGRAPHY[Alaska, Beaufort, Arctic National Wildlife Refuge, Kaktovik, Brooks Range, Anaktuvuk Pass, Cordova, Kodiak Archipelago, Fairbanks, Valdez, Chugach Mountains] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Eyak Native Corporation, Inupiat Eskimo, Exxon, National Oceanographic and Atmospheric Administration, Arco, Alaska Department of Natural Resources, Alaska Department of Environmental Conservation] SOCIAL_EFFECTS[population increase, social disruption] PSYCHOLOGICAL_EFFECTS[alcoholism, domestic violence]

CITATION[Smith, Conrad. 1992. Media and apocalypse: news coverage of the Yellowstone forest fires, *Exxon Valdez* oil spill, and Loma Prieta earthquake. Westport, CT. London: Greenwood Pub. Group.]
ABSTRACT/ANNOTATION[Written by an former journalist and current academic, this volume is an examination and critique of the way journalist report unusual major events. One

chapter is devoted to media coverage of the *Exxon Valdez* spill, and other chapters examine reporting of the Yellowstone fires and the Loma Prieta earthquake, while the conclusion suggests general problems with coverage and possible solutions. The author found that most journalists covering the *Exxon Valdez* oil spill were unfamiliar with Alaska or with the process of oil transportation, they relied on readily available official sources (from the oil company, the Alaska Department of Environmental Conservation, the Coast Guard, the Bush administration and environmental groups, but very rarely independent scientific sources), and they tended to produce stories with a limited and uniform perspective. In general, television images define the story for the other media, and few journalists wander from story others are telling. Superficial aspects of a story, including conflict and drama, are the elements that draw most attention. News coverage of the *Exxon Valdez* spill (EVOS) focused on a small number of culturally resonant themes, and these few themes were repeated many times. Themes in early news stories were 1) the ineffectiveness of Exxon's clean-up efforts; 2) the anger of local residents, and; 3) alcohol consumption by the captain as a possible cause of the accident. Minor themes were the possible protection offered by double hulled ships and whether the spill contingency plan was capable of handling a disaster of this size. Later themes were the continuing spread of the oil, the damage to the fishing industry, beaches, wildlife and the cost of wildlife rescue, criticisms of Exxon's cleanup, the impact on oil prices, and the possible effect of the disaster on plans to drill for oil in the Alaska National Wildlife Refuge. Themes ignored by most, but explored in award-winning journalism, were contextual factors such as the declining regulatory controls and expenditures and declining safety standards in the period between the inception of the pipeline and the *Exxon Valdez* spill. The imperative to provide appealing video images meant that wildlife less affected by the spill, particularly sea otters, appeared more often than did birds, which died at higher rates.]
KEYWORDS: SOURCE_TYPE[academic book] GEOGRAPHY[Alaska, U.S.] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[journalists, editors, media, Alaska Department of Environmental Conservation, U.S. Coast Guard, Bush Administration, scientists, Alaskan Natives, Exxon] SOCIAL_EFFECTS[media coverage] CULTURAL_EFFECTS[risk communication] ECONOMIC_EFFECTS[price impacts] SUBSISTENCE_ACTIVITIES[subsistence activity] REMAINDER[media coverage, media sources, coverage of wildlife, coverage of Alaskans]

CITATION[Sparling, M. Beverly. 1993. Factors influencing environmental investment from social issues to government mandates: a historical perspective. Doctoral Thesis, Rensselaer Polytechnic Institute, 1993. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis concerns finance and investment, and the influence of environmental activism on corporations. It analyzes a trend in the arena of environmental activism to seek corporate influence through the use of proxy resolutions. Public pension funds represent an important source of activism. The thesis also examines three incidents involving corporations, the *Exxon Valdez* oil spill, the Union Carbide gas leak in Bhopal, India, and the tainting of Tylenol capsules. The influence of activism on corporate policy, and the affects of negative events on stock prices, and the potential for investors to take advantage of unexpected negative incidents are the topics examined.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[investors, corporations, environmental groups, public pension funds] REMAINDER[finance]

CITATION[Spencer, Page. 1990. White silk and black tar: a journal of the Alaska oil spill. Minneapolis, MN: Bergamot Press.]
ABSTRACT/ANNOTATION[This book is a personal journal by an ecologist and Alaskan resident employed by the National Park Service. It reflects her professional observations and the physical and emotional stress she experienced in response to the spill and its impact on the ecology of southcentral Alaska.]
KEYWORDS: SOURCE_TYPE[book, personal journal] GEOGRAPHY[Kenai Fjords National Park, McCarty Fjord, James Lagoon, Quartz Bay, James Lagoon, Harrington Point, Montague Island, Knight Island, Glacier Bay] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[National Park Service, ecologist, Exxon] PSYCHOLOGICAL_EFFECTS[stress]

CITATION[Walden, W. Darrell. 1993. An empirical investigation of environmental disclosures analyzing reactions to public policy and regulatory effects. Doctoral Thesis, Virginia Commonwealth University. Ann Arbor, MI: University Microfilms International.]
ABSTRACT/ANNOTATION[The thesis examines changes in the environmental disclosure policies of corporations, as reflected in annual reports, subsequent to the *Exxon Valdez* oil spill. Content analysis was conducted on annual reports from 53 companies between 1988 and 1990. The thesis found changes in the years 1988 to 1989, and from 1989 to 1990, and that company size and industry membership made a difference in the degree of change in disclosures. Theoretical implications are discussed.]
KEYWORDS: SOURCE_TYPE[doctoral thesis] GEOGRAPHY[Alaska, U.S.] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[corporations] REMAINDER[corporate behavior]

CITATION[Wells, Peter G., James N. Butler, and Jane Staveley Hughes, (eds.). 1995. *Exxon Valdez* oil spill: fate and effects in Alaskan waters. Philadelphia, PA: ASTM, Series title: ASTM special technical publication; 1219.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* oil spill in Prince William Sound prompted many studies on the fate, transport, and effects of the oil on biota in Alaskan waters, as well as on archaeological sites. This book consists of 25 research papers presented at an ASTM symposium in April 1993. There were five main sessions: “Chemistry and Fate of the Spill” (six papers), “Shoreline Impact of the Spill” (six papers), “Impact Assessment for Fish and Fisheries” (four papers), “Impact Assessment for Wildlife” (eight papers), and Impacts on Archaeological Sites” (one paper). An introductory paper summarizes the topics and the highlights of these papers.]
KEYWORDS: SOURCE_TYPE[book] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, cleanup, restoration] OTHER_EFFECTS[ecological recovery] REMAINDER[archaeology]

CITATION[Wheelright, Jeff. 1994. Degrees of disaster: Prince William Sound, how nature reels and rebounds. New York, NY: Simon and Schuster.]
ABSTRACT/ANNOTATION[The ecological impacts of the *Exxon Valdez* oil spill, and the impacts of remediation efforts in Prince William Sound are explored in a journalistic-style work by a science writer. Interviews with scientists, politicians, lawyers, Alaskans, volunteer workers

and agencies, media accounts and the author's observations of the area provide the data. The author argues that naturally occurring processes did a better job of clean-up than did human efforts, and that the response to the spill on the part of volunteers, clean-up crews, etcetera, caused additional damage to the Sound. He argues that remediation efforts were driven by legal, political, and media influences rather than by scientific knowledge. He proposes that the greatest wildlife impacts were suffered by the otters, and that human impacts were most pronounced in Alaskan Native communities, because their subsistence activities, and the social life surrounding subsistence, were seriously disrupted. Human impacts are not discussed at length, with the exception of the grief suffered by volunteers treating wildlife, but there is specific discussion of the way petroleum degrades in the environment, and acute and chronic biological effects of contaminants on wildlife species and the food chain. The environmental and social changes preceding the spill are also described, to suggest that this disaster occurred within a context of ongoing change.]
KEYWORDS: SOURCE_TYPE[book] GEOGRAPHY[Prince William Sound] EVENT_PHASE[1964 earthquake, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaskans, scientists, media, federal government, state government, volunteers] PSYCHOLOGICAL_EFFECTS[grief] MUNICIPAL_EFFECTS[influx of outsiders] SUBSISTENCE_ACTIVITIES[subsistence activity] REMAINDER[impacts of cleanup]

CITATION[Wilson, Alexander. 1992. The culture of nature : North American landscape from Disney to the *Exxon Valdez*. Cambridge, MA : Blackwell, 1992.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* has only a brief mention in this academic book, which is a general overview of the ways modern North American culture conceives of nature. With chapters on tourism, nature education, landscape design, nature movies and television, theme parks, the modern relations of city and country such as industrial agriculture and indoor urban malls with nature areas, nature parks and zoos, and some of the large scale energy-use technologies of the twentieth century, this work provides an introduction to a topic that has become of growing academic interest in recent years. With respect to the *Exxon Valdez* spill, the author declines to call it an accident, because he argues that accidents of varying scale and the careless, accretive, disposal of small amounts of oil are commonplace in modern society's use of petroleum.]
KEYWORDS: SOURCE_TYPE[academic book] CULTURAL_EFFECTS[cultural and social constructions of nature]

CHAPTERS IN BOOKS

CITATION[Bittner, Judith E. 1996. Cultural resources and the *Exxon Valdez* oil spill: an overview. In Proceedings of the *Exxon Valdez* oil spill symposium, eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 814-818. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[Archaeological resources were damaged during the cleanup more than during the spill. Vandalism and the cleanup process were the major causes of damages to archaeological resources. Lessons from the damaged caused by cleanup activities can be applied to preventing damages to any future events similar to the *Exxon Valdez* event.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Native villages, Prince William Sound, Kodiak Island, Alaska Peninsula] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Exxon, U.S. Coast Guard]

SOCIAL_EFFECTS[vandalism] REMAINDER[Archaeological Resources Protection Act, National Historic Preservation Act, impacts of cleanup]
CITATION[Bolger, M., S.A. Henry, C.D. Carrington. 1996. Hazard and risk assessment of crude oil contaminants in subsistence seafood samples from Prince William Sound. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 837-843. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[The Oil Spill Health Task Force requested a study of the potential health risks of the consumption of fin-fish and shellfish by subsistence users. Studies indicate that long term risks for cancer from consuming fin-fish and shell fish are so low that they cannot be calculated.] KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Kodiak Island, State of Alaska, Windy Bay] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, U.S. Coast Guard] OTHER_EFFECTS[risk assessment, health effects, cancer risk] SUBSISTENCE_ACTIVITIES[seafood contamination, subsistence consumption, shellfish, fin-fish, contamination fears]

CITATION[Brown, D.A. and nine coauthors. 1996. Survey of Alaskan subsistence invertebrate seafoods collected in 1989-1991 to determine exposure to oil spill from the *Exxon Valdez*. In Proceedings of the *Exxon Valdez* oil spill symposium, eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 844-855. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[Alaska Natives had fears about contamination of subsistence resources from the *Exxon Valdez* oil spill. A study was initiated to examine contamination of subsistence resources from 80 different locations. The results found various levels of contamination of molluscs and other shell fish. A small number of samples were classified as "moderately" or "highly" contaminated by aromatic compounds.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Kodiak Island, Alaska Peninsula, Tatitlek, Windy Bay, Chignik, Old Harbor, Chenega Bay] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaska Department of Fish and Game] SUBSISTENCE_ACTIVITIES[seafood contamination, subsistence foods, shellfish, chitons, mussels, clams, contamination fears] REMAINDER[aromatic contaminants]

CITATION[Clarke, Lee. 1997. Supertanker politics and the rhetorics of risk: the wreck of the *Exxon Valdez*. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 55-65. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[Sociopolitical choices concerning Alaskan and Canadian economy and politics regarding pipelines and supertankers are important background for understanding the *Exxon Valdez* oil spill. Different "rhetorics of risk" by government, private citizens, and industry have structured pre and post-spill choices and debates about oil transport in general and the *Exxon Valdez* spill in particular. Some of this debate has equated oil production with the "National Interest" but this needs careful analysis and consideration within the context of risk debates.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska State] SOCIAL_EFFECTS[social conflict] CULTURAL_EFFECTS[rhetoric of risk] REMAINDER[national energy policy, supertanker, Alaska Pipeline, risk, political economy, National Interest]

CITATION[Clarke, Lee. 1992. The wreck of the *Exxon Valdez*. In "Controversy: politics of technical decisions" (third edition), D. Nelkin (ed.), 80-96. Newbury Park, CA: Sage.]
ABSTRACT/ANNOTATION[This is an article in an edited volume that considers some of the controversies surrounding technology and society. The article is part of a literature on risk perception and 'risk objects', and how accidents occur in complex systems. Considering the *Exxon Valdez* oil spill, the article argues that priorities were implicitly set between economic and environmental trade-offs or values, and technology and regulatory framework implemented those priorities: it argues that while blame for the accident was directed at the captain and the issue of alcoholism, an accident of this size was likely. The decision to place the pipeline in Alaska rather than through Canada (which has less seismic activity), the reliance on huge tankers which are harder to steer but cheaper to operate, the period of de-regulation of oil tanker transport during the Reagan administration and lower funding for surveillance during the Bush administration, and so forth, are examined as the real causes of the spill. The personalization of the issue (in the form of the captain) and the moralization of the event (in relation to alcohol use) are characterized as deflecting public attention from the public decisions that were made.]
KEYWORDS: SOURCE_TYPE[academic book chapter] SOCIAL_EFFECTS[political decisions, regulatory oversight] CULTURAL_EFFECTS[risk perception, technological risk]

CITATION[Cohen, M. J. 1997. Economic impacts of the *Exxon Valdez* oil spill. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 133-160. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The regional economy of Southeastern Alaska was differentially affected by the *Exxon Valdez* oil spill. The overall and specific economic effects are estimated using a "with" and 'without" event analytic framework. This framework shows that specific sectors within the commercial fishery generally showed adverse economic impacts. However, oil spill employment and other economic consequences of the spill showed short term economic gains for other sectors of the economy.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Southeast Alaska, Cordova, Kodiak Island, Kenai Peninsula, Southeast Alaska] ECONOMIC_EFFECTS[regional economy, regional economic impacts, commercial fishing, price impacts, economic diversification, basic economic activities, nonbasic economic activities]

CITATION[*Exxon Valdez* Oil Spill Trustee Council. 1997. Recovery of injured resources and services: 1996 update. In The *Exxon Valdez* disaster: readings on a modern social problem, eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 121-128. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The Oil Spill Trustee Council has been responsible for initiating efforts to restore biological, archaeological, and subsistence resources affected by the *Exxon Valdez* event. Biological resources have been assessed to have varied success in recovery. Archaeological resources damaged during the spill are being restored by the Alutiiq Archaeological Repository. Twenty communities whose subsistence resources were affected by the spill have been studied by Alaska Department of Fish and Game. Other studies of clams and intertidal resources have also been examined.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Kodiak Island, Prince William Sound] EVENT_PHASE[cleanup, restoration]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alutiiq, Alaskan Natives, Oil Spill Trustee Council,

Alaska Department of Fish and Game] CULTURAL_EFFECTS[archaeological resources] SUBSISTENCE_ACTIVITIES[subsistence resources] REMAINDER[Sound Ecosystem Project]

CITATION[Fall, James and L.J. Field. 1996. Subsistence uses of fish and wildlife before and after the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 819-836. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[In the year following the oil spill, the 2200 residents of 15 native Alaskan communities reduced their harvest of subsistence resources as well as the variety of resources harvested. In 10 villages harvests decreased by about 77% because of fears about oil contamination. In response to community concerns, the Oil Spill Health Task Force initiated a study of subsistence foods (fin-fish, invertebrates, and marine mammals) for aromatic contaminants. Findings indicated invertebrates were the most susceptible to contamination. Efforts to communicate findings to Native communities met with mixed results. Two and three years after the spill, contamination fears persisted, although subsistence harvests increased.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Larsen Bay, Old Harbor, Ouzinkie, Perryville, Port Lions, Port Graham, Kodiak, Chenega Bay, Tatitlek, Nanwalek, Karluk, Lake, Port Graham, Ivanoff Bay, Akhiok, Chignik Lagoon, Kodiak Island, Prince William Sound, Alaska Peninsula] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Aleut, Alaska Department of Fish and Game, Oil Spill Health Task Force] SOCIAL_EFFECTS[subsistence-based community] CULTURAL_EFFECTS[risk communication, risk perception] OTHER_EFFECTS[health risks] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, clamming, decreased harvest, contamination fears, contaminated resources] CULTURAL_SUBSISTENCE[enculturation, sharing, symbolic expression of culture] REMAINDER[aromatic contaminants]

CITATION[Gill, Duane A. and Steven Picou. 1997. The day the water died: cultural impacts of the *Exxon Valdez* oil spill. In The *Exxon Valdez* disaster: readings on a modern social problem, eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 167-187. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The subsistence lifestyle of Native Alaskans predisposed them to effects of the *Exxon Valdez* oil spill and cleanup. The direct effects of the oil spill included: emotion distress and disruption, threats to subsistence activity and consumption because of contamination of fears, and disruption of harvesting because of cleanup participation. The cleanup also directly affected the cultural complex that is subsistence in Native Alaskan communities. These effects included: influx of outsiders into Native communities, destruction of historical/archaeological sites, racism, disrupted family activities, psychological stress, and substance abuse. The effects of the spill and cleanup have been ongoing to the time of publication of the article, including decreased consumption and decreased harvesting. The cultural activities associated with subsistence have also suffered. Litigation has not addressed the cultural impacts associated with the spill and cleanup because of the focus on non-economic damages.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska Native Communities, Tatitlek, Chenega Bay, Larsen Bay, Port Graham, Akhiok, Karluk, Ouzinkie, Old Harbor, Nanwalek] EVENT_PHASE[spill, cleanup, restoration]

SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Chugach Natives]
SOCIAL_EFFECTS[social disruption, population increase, therapeutic community, racism]
FAMILY_EFFECTS[family disruption, kinship, role relationships] ECONOMIC_EFFECTS[subsistence economy, value of subsistence losses, money spill]
PSYCHOLOGICAL_EFFECTS[PTSD, chronic psychological stress, post-traumatic stress disorder, anxiety, depression] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, decreased harvest, harvest disruption, contamination fears, contaminated resources]
CULTURAL_SUBSISTENCE[sharing, elders, enculturation] REMAINDER[ANCSA, Alaska Native Claims Settlement Act, Oiled Mayors Study]

CITATION[Gramling, Robert and William R. Freudenburg. 1997. The *Exxon Valdez* oil spill in the context of U.S. petroleum politics. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 71-87. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The sociopolitical context of oil in America and in Alaska is essential to understand the occurrence of the *Exxon Valdez* oil spill. This context is influenced by "stratified power" among federal and state governments and the interests of capitalists, the military, and the American public at large.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska State, Prince William Sound] EVENT_PHASE[pre-spill, spill, cleanup] REMAINDER[systemic power theory, federal oil policy, Outer Continental Shelf Lands Act, ANCSA, trans-Alaska Pipeline]

CITATION[Hirsch, William B. 1997. Justice delayed: seven years later and no end in sight. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 271-303. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[Federal Maritime Law structured the plaintiffs and the types of damages that could be brought against the Exxon corporation. The application of Maritime Law resulted in most of the litigation taking place in Federal courts where Judge Holland was more sympathetic to Exxon's position. Judge Holland applied the *Robbins-Dry Dock* decision which effectively limited the liability of plaintiffs to those who were physically touched by oil. The application of Maritime law also preempted other claims in state courts. Exxon's well funded legal efforts also resulted in creating a mandatory punitive damages class which worked to the advantage of the defendant. The procedures of the trial and appeal have prolonged the overall resolution of the case against Exxon.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Kodiak Island, Kenai Peninsula] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Exxon Corporation, Judge H. Russell Holland] LITIGATION_EFFECTS[class action, Robbins Dry Dock, settlement, punitive damages, trial process]

CITATION[Hom, Tom and five coauthors. 1996. Assessment of exposure of subsistence fish to aromatic compounds after the *Exxon Valdez* oil spill. In Proceedings of the *Exxon Valdez* oil spill symposium, eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 856-866. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[This study reports on the presence of aromatic compounds in the fish resources of Prince William Sound.]

KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Kodiak Island, Kenai Peninsula] SUBSISTENCE_ACTIVITIES[seafood contamination, fish contamination, contaminated resources] REMAINDER[aromatic compounds]

CITATION[Keeble, John. 1997. The imaginary journey of captain Joseph Hazelwood. In The *Exxon Valdez* disaster: readings on a modern social problem, eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 23-34. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The actions on March 24, 1989 of Captain Joseph Hazelwood of the *Exxon Valdez* must be placed within the context of shipping company pressures to increase effectiveness and reduce crew size. Interpretations of Hazelwood's actions should consider the effects of these pressures on how he acted before and after the spill.]
KEYWORDS: SOURCE_TYPE[academic book chapter] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Captain Hazlewood, oil industry, U.S. Coast Guard] REMAINDER[double hull tankers, contingency plans]

CITATION[Lord, Nancy. 1997. Oil in the sea: initial biological impacts of the *Exxon Valdez* oil spill. In The *Exxon Valdez* disaster: readings on a modern social problem, eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 95-105. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[Oil in a natural ecosystem has widespread effects because of its effects on a broad range of biological processes. Birds, marine mammals, fish and especially salmon were affected by the *Exxon Valdez* spill. Longer term effects of the spill are yet unknown.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska State] REMAINDER[ecological impacts]

CITATION[National Response Team. 1997. The *Exxon Valdez* oil spill and response preparedness: a report to the President. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 39-50. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[In the month following the spill certain response actions and the overall state of preparedness was affected by pre-existing plans of federal, state, and private entities. The overall adequacy of contingency planning for Alaska ports and elsewhere is called into question by the events in the month following the *Exxon Valdez* spill.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska State, Port of Valdez] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Regional Response Team, Alyeska, U.S. Coast Guard] REMAINDER[contingency plans]

CITATION[Picou, J.S. and D.A. Gill. 1996. The *Exxon Valdez* oil spill and chronic psychological stress. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 879-893. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* event produced patterns of chronic stress that are directly related to natural resources damages by the spill. Cordova and Valdez residents measured higher on the impact of events scale, a measure of psychological stress, than did residents of a control community, Petersburg, in Southeast Alaska. Residents of Cordova, a resource dependent community, measured higher than residents of Valdez, a more economically

diversified community. Commercial fishermen measured higher than other occupational groups. The study indicates that residents of resource dependent communities exposed to the effects of the *Exxon Valdez* event are consistent with other findings about stress in technological disasters.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Southeast Alaska, Cordova, Valdez, Petersburg] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen] SOCIAL_EFFECTS[natural resource community] PSYCHOLOGICAL_EFFECTS[chronic psychological stress, stress, impact of events scale] REMAINDER[survey, longitudinal study]

CITATION[Picou, J.S., D.A. Gill, and M.J. Cohen. 1997. The *Exxon Valdez* oil spill as a technological disaster: conceptualizing a social problem. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 3-17. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* oil spill can be conceptualized within the theoretical framework of a social problem similar to other technological disasters such as Love Canal and Three Mile Island.]
KEYWORDS: SOURCE_TYPE[academic book chapter]
SOCIAL_OR_CULTURAL_IDENTIFIER[Regional Citizen's Advisory Council]
SOCIAL_EFFECTS[therapeutic community, emergent groups] CULTURAL_EFFECTS[risk perception, technological risk] REMAINDER[natural disaster, technological disaster, social problem theory]
CITATION[Picou, J.S. and D.A. Gill. 1997. Commercial fishers and stress: psychological impacts of the *Exxon Valdez* oil spill. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 211-232. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[A new paradigm in disaster research indicates that technological disasters produce different types of social and psychological effects that may require longitudinal study to fully appreciate. This discussion examines the psychological impacts on commercial fishermen from the EVOS to examine the hypothesis that threats, actual or perceived, to natural resources upon which fishermen depend constitute a stressor sufficient to cause psychological impacts. A mail survey was sent to residents of Valdez (63), Cordova (163), and Petersburg (59, a "control" community) to measure stress using the Impacts of Events Scale. Levels of stress were reported to be higher in Valdez and Cordova than in Petersburg and higher among fishermen than non-fishermen.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Southeast Alaska, Cordova, Valdez, Petersburg] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen] SOCIAL_EFFECTS[natural resource community] PSYCHOLOGICAL_EFFECTS[chronic psychological stress, stress, impact of events scale] REMAINDER[survey, longitudinal study]

CITATION[Picou, J.S. and D.A. Gill and M.J. Cohen. 1997. Technological disasters and social policy: lessons from the *Exxon Valdez* oil spill. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 309-315. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[As an example of technological disasters, the *Exxon Valdez* event shows the complexity of the interactions among governments, private industry, and

individual citizens and their communities. It also raises issues of how responsible parties should prepare for and respond to such events. The Coalition for Environmentally Responsible Communities (CERES) has suggested 10 principles as a code of conduct for action in the wake of the *Exxon Valdez* event. However, local communities have also assumed new responsibility to prepare for future events and provide oversight to the transport of oil nearby to their communities.]
KEYWORDS: SOURCE_TYPE[academic book chapter]
SOCIAL_OR_CULTURAL_IDENTIFIER[Regional Citizen's Advisory Council]
REMAINDER[CERCLA, CERES, technological disaster]

CITATION[Piper, Ernest. 1997. The *Exxon Valdez* oil spill government settlement and restoration activities. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 255-256. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[The State of Alaska and the Federal Government each had interests, in some instances potentially conflicting, in legal proceedings against Exxon. Initial legal negotiations for a plea agreement between Exxon and the Federal Government were not necessarily in the State's best interests. Subsequently, this agreement dissolved, resulting in the State and Federal governments working to establish a settlement for publicly owned natural resources. Eventually, the terms of the settlement called for Exxon to pay 150 million dollars in criminal penalties and 900 million dollars in civil penalties. There was some public opposition to the settlement, in part because scientific studies about spill effects were not publicly available. A Trustee Council composed of state and federal officials was established to oversee the administration of restoration work that would be funded by funds from the Exxon settlement.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Alaska State]
EVENT_PHASE[spill, cleanup, restoration, litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Oil Spill Trustee Council, Exxon Corporation, Public Advisory Group] LITIGATION_EFFECTS[court settlement, maritime law, Clean Water Act, negligence, Rivers and Harbors Act, Migratory Bird Act]

CITATION[Rodin, Mari, Michael A. Downs, John S. Petterson, John C. Russell. 1997. Community impacts of the *Exxon Valdez* oil spill. In "The *Exxon Valdez* disaster: readings on a modern social problem," eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 193-205. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[Twenty two communities from Prince William Sound to Kodiak and the Alaska Peninsula were studied to determine the social, psychological, and economic effects of the *Exxon Valdez* oil spill and cleanup. Native and non-Native communities differed in their responses to the spill based on the availability of leadership and other community resources. Communities experienced increased demands on social services, an influx of outsiders, and other social disruptions. The nature of the cleanup by Exxon and VECO resulted in differential effects in communities depending on pre-event resources and disaster plans. Seward and Kodiak appeared to fare better than other communities because they had effective response organizations, access to external resources, and pre-existing disaster plans that were suited to this event.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Prince William Sound, Kenai Peninsula, Alaska Peninsula, Kodiak Island, Seward, Kodiak, Larsen Bay, Port

Lions, Tatitlek, Native Communities, North Pacific Rim] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon Corporation, Seward Life Action Council, deckhands association, VECO, Multi-Agency Coordinating Group, Oiled Mayors] SOCIAL_EFFECTS[social disruption, kinship, alienation, emergent groups] FAMILY_EFFECTS[unsupervised children, children] MUNICIPAL_EFFECTS[service demands, government services] REMAINDER[Oiled Mayor's Study]

CITATION[Russell, John C., Michael A. Downs, John S. Petterson, and Lawrence A. Palinkas. 1996. Psychological and social impacts of the *Exxon Valdez* oil spill. In "Proceedings of the *Exxon Valdez* oil spill symposium," eds. S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, 867-878. Bethesda, MD: American Fisheries Society.]
ABSTRACT/ANNOTATION[This article uses quantitative and qualitative interview data from the Oiled Mayors study of 22 communities of Prince William Sound, the GOA, Kenai Peninsula, and The Alaska Peninsula to describe psychological and social impacts. Survey data are analyzed to describe the relationship between exposure measures and selected outcome measures including: family and child relations, social disruption, subsistence activities, depression, anxiety, post-traumatic stress disorder, substance abuse, and domestic violence. Analysis of the survey data indicates correlations between exposure to the oil spill and increased outcome measures. The interview data describe the social and community context of the psychological impacts, particular the relationship between the non-therapeutic community and social/psychological distress.]
KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[Kodiak Island, Prince William Sound, Kenai Peninsula, Native Communities] EVENT_PHASE[spill, cleanup, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Aleuts] SOCIAL_EFFECTS[social disruption, social cohesion, social conflict] CULTURAL_EFFECTS[sense of place, sense of community, moral discourse] FAMILY_EFFECTS[family relationships, children, domestic violence] PSYCHOLOGICAL_EFFECTS[anxiety, depression, post-traumatic stress disorder, stress, substance abuse, therapeutic community] SUBSISTENCE_ACTIVITIES[decreased subsistence activity, sharing, decreased use of subsistence foods] CULTURAL_SUBSISTENCE[sharing, enculturation, meaning systems] REMAINDER[exposure index, Oiled Mayor's Study]
CITATION[Steiner, Rick. 1997. Probing an oil stained legacy. In The *Exxon Valdez* disaster: readings on a modern social problem, eds. J.S. Picou, D.A. Gill, and M.J. Cohen, 111-114. Dubuque, IA: Kendall/Hunt Publishing Co.]
ABSTRACT/ANNOTATION[Since the oil spill there is a "new silence" in Prince William Sound that indicates the biological damage caused by the oil spill and its aftermath. Restoration has had mixed results, but there have been some notable improvements in the oil transport system. The ongoing American demand for oil continues to put places such as Prince William Sound at risk.] KEYWORDS: SOURCE_TYPE[academic book chapter] GEOGRAPHY[State of Alaska] EVENT_PHASE[spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Regional Citizens Advisory Council] REMAINDER[oil transport system]

POPULAR ARTICLES

CITATION[Alaska's Wildlife. 1993. Map of *Exxon Valdez*, Alaska, oil-spill's effect on people. Alaska's Wildlife. Formerly Alaska Fish and Game 25(1):26.]
ABSTRACT/ANNOTATION[This special issue is devoted to the biological effects of the *Exxon Valdez* oil spill. Included is a discussion of subsistence, terrestrial mammals, birds, marine mammals, habitat, shellfish, and fish. There is also a map of the oil spill's effect on people. The section on subsistence, by James Fall of the Alaska Department of Fish and Game, presents information on the level of subsistence use in Native communities, and the contamination of wildlife.]
KEYWORDS: SOURCE_TYPE[article] GEOGRAPHY[Alaska, Alaska Peninsula, Tugidak Island, Kodiak Island, Afognak Island, Katmai Coast, English Bay, Cook Inlet, Kenai, Anchorage, Kenai Peninsula, Kenai Fjords National Park, Chenega Bay, Knight Island, Herring Bay, Naked Island, Prince William Sound, Bligh Reef, Valdez, Tatitlek, Cordova, Copper River Delta, Kayak Island] EVENT_PHASE[spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaskans, fishermen, hunters, Exxon, Alaska Department of Fish and Game] ECONOMIC_EFFECTS[economic loss]
SUBSISTENCE_ACTIVITIES[contaminated resources]

CITATION[Chatterjee, Pratap. 1992. Squabble over how to spend Exxon's Valdez compensation. New Scientist 134(1816):10.]
ABSTRACT/ANNOTATION[This popular article in a science magazine indicates that environmentalists and scientists disagree about how more than $1 billion from Exxon should be spent. The scientists want more research into the long term effects of the spill, while environmentalists propose to buy a nearby forest to save it from logging.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska, Prince William Sound, Kenai Peninsula, Kodiak Island] EVENT_PHASE[restoration, litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, University of Alaska Department of Forestry, Prince William Sound Conservation Alliance, National Park Service]
ECONOMIC_EFFECTS[use of funds] LITIGATION_EFFECTS[compensation, spending of compensation]

CITATION[Davidson, Art. 1990. Valdez reflections. Sierra 75(3):42 (10 pages).]
ABSTRACT/ANNOTATION[This popular article presents reflections on the *Exxon Valdez* oil spill and cleanup a year after the spill. It notes that lingering impacts on beaches and wildlife, but anticipates that wildlife will recover. Social impacts are also mentioned, including a sense of vulnerability in those living near tanker operations. Native Alaskans depend on the sea for subsistence, and hunting and fishing are an important part of their cultural identity. Part of the article is concerned with assigning responsibility for the spill, and suggests that Exxon and other entities, such as the Coast Guard and the State of Alaska, share this role while Exxon bears ultimate responsibility. The response by Exxon was more rapid than the State of Alaska or the federal government. It concludes that current technology is inadequate to deal with a spill, especially one of this size, and that the oil companies and the Department of the Interior were not sufficiently forthright with the public and the Congress about the difficulty of recovering spilled oil.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prince William Sound, Kodiak, Katmai] EVENT_PHASE[pre-spill, spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaskans, U.S. Coast Guard,

Exxon, oil companies, Congress, Alaska State, Department of the Interior, Minerals Management Service, Alaska Legislature, Alaska Department of Environmental Conservation] SUBSISTENCE_ACTIVITIES[contaminated resources] CULTURAL_SUBSISTENCE[cultural identity]

CITATION[Dayton, Leigh. 1989. *Exxon Valdez's* human toll is still unknown. New Scientist 123(1677):23.]
ABSTRACT/ANNOTATION[This article in a popular science magazine reports that the human health risks from the *Exxon Valdez* spill are unknown. Lack of advance planning by officials and scientists are faulted, and it is noted that no plans were in place for a study of health risks in advance of the spill. In consequence, data was lost. Studies of the weathering and toxicity of oil are beginning to be reported, but the results are inconsistent.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prudhoe Bay, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Swedish Environmental Research Institute, Alaska Department of Environmental Conservation, U.S. National Institute of Environmental Health Sciences, Exxon, Alaska State, Alaska Department of Labor, National Toxicology Program of the NIEHS, Mount Sinai School of Medicine] REMAINDER[health risks]

CITATION[Drew, Lisa. 1990. Truth and consequences along oiled shores. National Wildlife 28(4):34 (9 pages).]
ABSTRACT/ANNOTATION[This popular article represents an overview of local efforts to respond to the oil spill by Alaskans, including some inventions to aid in cleanup, and the formation of organizations.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prince William Sound, Valdez, Homer, Bligh Reef, Cordova, Mars Cove, Kenai Peninsula] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Exxon, Oil Reform Alliance, Alaska Oil Spill Commission, fishermen, U.S. Coast Guard, Homer Area Recovery Commission, Alaskan Natives] SOCIAL_EFFECTS[crime, emergent groups, disruption of Native communities, subsistence-based community] ECONOMIC_EFFECTS[spillionaires] PSYCHOLOGICAL_EFFECTS[substance abuse, mental health services] SUBSISTENCE_ACTIVITIES[contamination fears, food storage]

CITATION[Graham, Frank, Jr., Leslie Ware, and Jon R. Luoma. 1989. Oilspeak, common sense, and soft science: the industry's high-powered blend of politics, public relations, and plenty of dollars obscures our knowledge of oil's environmental effects. Audubon 91(5):102 (10 pages).]
ABSTRACT/ANNOTATION[This article in a popular journal mentions the public relations efforts by oil companies, but argues that they failed to prepare and had insufficient scientific knowledge to deal with the *Exxon Valdez* spill (EVOS), especially given the special problems presented by Arctic oil spills. Previous oil spills are detailed, including Amoco Cadiz, Torrey Canyon, and Atlantic Express. Also mentioned are the effects of the spill on the environment, wildlife and the food chain.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prince William Sound, Kenai Fjords National Park] EVENT_PHASE[spill, cleanup, restoration]

SOCIAL_OR_CULTURAL_IDENTIFIER[Congress, Exxon, oil companies, National Oceanographic and Atmospheric Administration]
CITATION[Hodgson, Bryan. 1989. Alaska's big spill: can the wilderness heal? National Geographic 177(1):5-43.]
ABSTRACT/ANNOTATION[This popular article offers the author's observations of the oil spill (EVOS) and cleanup on the eighth day and five months later. The fears of locals over recovery, the extent of recovery, and questions about the duration and efficacy of the cleanup are mentioned. The article includes a detailed map of the region, and the spread of the oil. There are also sections on the technologies used for cleanup, the impact on wildlife, degradation of oil in the environment, and public entities involved in response to the spill.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Columbia Glacier, Chugach National Forest, Katmai National Park and Preserve, Prince William Sound, Evans Island, Kodiak, Alaska Peninsula, Knight Island, Herring Bay, Tugidak Island, Kenai Peninsula, Barron Island, Cape Chiniak, Sand Point, Busby Island, Green Island] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, National Oceanographic and Atmospheric Association, scientists, fishermen, U.S. Coast Guard, Alaska Department Of Fish and Game, Alaska Institute of Marine Science, Governor Steve Cowper, Division of Environmental Health, National Park Service, University of California at San Diego, Department of the Interior, National Transportation Safety Board, Pacific Area Coast Guard Strike Team, Cordova District Fishermen United, Alyeska, National Science Foundation, Environmental Protection Agency] SOCIAL_EFFECTS[emergent groups] REMAINDER[inventions]

CITATION[Matsen, Brad. 1996. The once and future spill: in the wake of 1989's *Exxon Valdez* oil spill disaster, has anything really changed? Audubon 96(4):116 (Column).]
ABSTRACT/ANNOTATION[This article in a popular magazine argues that while litigation has proceeded, little has changed to prevent a future occurrence of a similar disaster. The author argues that oil companies find loopholes in existing regulations and delay updating their technology, and regulations, for example those requiring double hulled tankers, are so vague they make enforcement difficult, and there has been no change in energy consumption practices or policies.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[oil consumers, author, oil companies, oil tankers, regulators, legislators] LITIGATION_EFFECTS[litigation as deterrent]

CITATION[Munk, Nina. 1994. We're partying hearty! Forbes 154(10):84 (5 pages).]
ABSTRACT/ANNOTATION[In this article in a popular magazine, the author argues that lawsuits have turned the oil spill into an economic bonanza for the state of Alaska, law firms, and 15,000 plaintiffs, while Exxon shareholders have lost value of their stock. The fisheries and coastline have recovered, and the author cites a book by Wheelright to the effect that some of the damage was done by the cleanup rather than the spill. This case is discussed as an example of deep pockets litigation, and examples are given of the kinds of calculations that are made to figure economic losses suffered by the plaintiffs, and the damages and punitive damages Exxon should pay. The article specifies the amounts Exxon and Alyeska have been ordered to pay to various parties and entities, and suggests that many of the claims were of questionable nature, and indicates the normal volatility of harvests and prices in the salmon fishery.]

KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska, Prince William Sound, Canada, Cordova] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[federal government, Alaska's Attorney General, fishermen, fish processors, litigants, Exxon, Alyeska, Alaska State government, Native Alaskans, Native Corporations, Kodiak Island Borough, landowners, cannery workers, municipalities, business owners, fish hatcheries, author Jeff Wheelwright, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, Salmon Market Information Service, media] ECONOMIC_EFFECTS[economic gain, shareholder losses, Exxon losses, Alyeska losses] LITIGATION_EFFECTS[punitive damages, compensatory damages, cleanup, assessment studies, plaintiffs, defendants]

CITATION[Pain, Stephanie. 1989. Alaska has its fill of oil. New Scientist 123(1677):34 (7 pages).]
ABSTRACT/ANNOTATION[This article in a popular science magazine indicates the various scientific and technical efforts associated with cleanup of the oil spill. A computer program tracks movement of the oil and the boats, and tells Exxon how to proceed with cleanup. However some of the cleanup efforts are low-technology. The article describes the geography of the spill's spread, affected fish and wildlife, the varied approaches to cleaning beaches of oil, and describes scientists' attitudes as angry, frustrated, challenged and intrigued.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Valdez, Prince William Sound, Prudhoe Bay, Alaska, Bristol Bay, Arctic National Wildlife Refuge, Bligh Reef] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Alyeska, U.S. Coast Guard, Department of Environmental Conservation, National Oceanographic and Atmospheric Administration, University of Washington College of Fisheries, U.S. Fish and Wildlife Service, National Marine Mammal Laboratory, University of Alaska, Environmental Protection Agency]

CITATION[Raloff, Janet. 1993. Native Alaskans eschew this oily diet. Science News 143(7):110.]
ABSTRACT/ANNOTATION[This brief article in a popular science magazine considers the impact of the oil spill on the Native Alaskan diet. The Native Alaskan diet at the time of the spill included consumption of between 200 to 500 pounds of subsistence foods per person annually in villages considered in a particular study, which included mostly Alutiiq Natives. This compares to an average purchase of 220 pounds of meat, fish and poultry annually for an average American family. After the spill, there was a steep drop in subsistence harvests in the ten villages most affected. Fear of food contamination was the main reason given for avoidance in a survey of 403 homes. Subsistence includes a combination of marine mammals, fish, shellfish, birds, land mammals, and wild plants. The decrease in subsistence activities is seen to threaten Natives' nutrition, local economy, and the cultural fabric of Native Alaskan society.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Oil Spill Health Task Force, Exxon, National Oceanographic and Atmospheric Administration, Alaska Department of Fish and Game, Native Alaskans, Alutiiq] SUBSISTENCE_ACTIVITIES[marine mammals, fish, shellfish, birds, land mammals, wild plants, amounts consumed, contamination fears, decreased harvest] CULTURAL_SUBSISTENCE[culture, society]

CITATION[Shao, Maria. 1990. Everybody cleaned up: that's the problem. Business Week, n3173:24D (2 pages, column).]
ABSTRACT/ANNOTATION[This news-magazine article, a 'letter from Valdez' by the correspondent, presents a number of observations about impacts of the oil spill. As the base of a $2 billion cleanup operation, Valdez had many 'spillionaires,' from boat rentals, gasoline sales, etc. There were also losses, to civic pride, sense of tranquility, as the area was besieged by oil company workers, government bureaucrats, job seekers, and "destitute toughs." The population rose from 3,200 to 10,000, and remained larger, at 4,100, a 28% increase. Some of the increase was due to the permanent siting of spill response crews by Alyeska. Crime increased, and the arrest rate was 60% higher than pre-spill, while tourism declined 20% in 1989. Counseling centers were diagnosing post traumatic stress, and there was a ten-fold rise in cases at women's shelters.]
KEYWORDS: SOURCE_TYPE[newsmagazine article] GEOGRAPHY[Valdez] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, boat owners, Alyeska, cleanup workers, bureaucrats, residents] SOCIAL_EFFECTS[population increase, crime] CULTURAL_EFFECTS[sense of place, sense of community, civic pride, tranquility] FAMILY_EFFECTS[women's shelters] ECONOMIC_EFFECTS[spillionaires, economic loss] PSYCHOLOGICAL_EFFECTS[post-traumatic stress disorder, PTSD] MUNICIPAL_EFFECTS[traffic, crime, arrests, mayor]

CITATION[Shao, Maria. 1990. Caught in the wake of the *Exxon Valdez*. Business Week, n3172:74 (3 pages).]
ABSTRACT/ANNOTATION[This newsmagazine article discusses some of the regulatory and technological problems facing the Alyeska Pipeline Consortium in the period after the oil-spill and cleanup. The Consortium, which includes Atlantic Richfield, Exxon, Amerada Hess, Mobile, Phillips, and Unocal is facing increased regulatory distrust because of the view that their response to the spill was delayed, and because of their dispute with the Alaska Department of Environmental Conservation concerning regulations on dumping untreated ballast water from the oil tankers. The pipeline's earnings decreased 11% from the year before and are expected to decrease 4% in the current year (1990). A new Alyeska president has offered to make some consortium records available to a citizen's environmental oversight organization, and to provide funding to the organization. Alyeska's major problem is that corrosion is wearing away the 48" diameter pipes, and the company has found 827 anomalies which are mostly due to failure of the pipes' epoxy coating. An eight and a half mile section of pipe that runs through the Atigun tundra is badly affected by corrosion. (Also includes related article on Alaska's dependency on oil production).]
KEYWORDS: SOURCE_TYPE[newsmagazine article] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Alyeska president Hermiller, Alaska Department of Environmental Conservation] SOCIAL_EFFECTS[distrust, regulatory oversight] CULTURAL_EFFECTS[distrust, ethics, future risk] ECONOMIC_EFFECTS[Alyeska losses]

CITATION[Wohlforth, Charles P. 1989. Black gold: the second Alaska oil boom. New Republic 201(12-13):20 (2 pages).]
ABSTRACT/ANNOTATION[A brief overview of effects of the cleanup effort on Valdez, Alaska is provided in this popular article. The cleanup effort's effect on the economy is

compared to the economic boom during construction of the trans-Alaska pipeline. It notes that the Alaska unemployment rate, which was among the highest in the nation, fell in the two months after the spill to the lowest it had been since the 1976 pipeline construction. At the time of the spill, cuts had been made in State government, and the collapse of real estate prices had put most State banks out of business, but that the cleanup had infused an anticipated $1.2 billion into the economy. Among other impacts, it mentions increased traffic and crime, increased population, discord among co-workers about the division of financial awards, Native Alaskans concerns about the contamination of subsistence food, and the disruption of traditional society as Native Alaskans adults left the village to take part in cleanup. It mentions that the main contractor for the cleanup, Veco Inc. was guaranteed a percentage of the profit on everything spent on cleanup, and concludes that many Alaskans will look back on the cleanup with nostalgia.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Valdez, Alaska] EVENT_PHASE[1976 construction, pre-spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaskans, unemployed, fishermen, VECO, Exxon, police, Alaska State Government, bankers] SOCIAL_EFFECTS[crime, social conflict, social disruption, population increase] CULTURAL_EFFECTS[cultural persistence] FAMILY_EFFECTS[adult absence] ECONOMIC_EFFECTS[economic gain, economic loss, unemployment, distribution of cleanup money, banking industry, fishing industry] MUNICIPAL_EFFECTS[police overwhelmed, traffic] SUBSISTENCE_ACTIVITIES[contamination fears]

ACADEMIC ARTICLES

CITATION[Barinaga, Marcia. 1989. Alaskan oil spill: health risks uncovered. Science, 245(4917):463.]
ABSTRACT/ANNOTATION[This brief article in a popular and academic magazine indicates that while there has been much attention to the impacts of the oil spill on wildlife, much less attention has focused on the impact on human health, according to toxicologists and health officials at a scientific conference. Health risks to cleanup workers from fumes and contact with oil are mentioned. Further, Native subsistence fishermen generally rely on seafood for 80% of the protein in their diets, and if they continue to eat seafood it is projected they may face an increased risk of stomach cancer. The article also notes that some scientists find a discrepancy between policies adopted to ensure the safety of commercial Alaskan seafood and policies directed at Native Alaskans and their use of subsistence foods.]
KEYWORDS: SOURCE_TYPE[academic conference news bulletin] GEOGRAPHY[Prince William Sound, Alaska] EVENT_PHASE[spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Laborers International Union, Occupational Safety and Health Administration, Food and Drug Administration, Alaska Area Native Health Service, University of Alaska, National Oceanographic and Atmospheric Administration, Congress] OTHER_EFFECTS[health of cleanup workers, seafood safety policy] REMAINDER[health risks, health policies]

CITATION[Bowen, Michael and F. Clark Power. 1993. The moral manager: communicative ethics and the *Exxon Valdez* disaster. Business Ethics Quarterly, 3(2): 97-115.]

ABSTRACT/ANNOTATION[This journal article considers the business ethics surrounding the decisions made in the period leading to and following the *Exxon Valdez* oil spill. The information that managers had to make decisions, and the uncertainty of circumstances in which they were operating should be taken into account.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, spill, cleanup] REMAINDER[business ethics]

CITATION[Carson, Richard T., R.C. Mitchell, M. Hanemann, R. J. Kipp, et al. 1995. Contingent valuation and lost passive use: damages from the *Exxon Valdez*. Discussion Paper 95-02. San Diego, CA: Department of Economics, University of California, San Diego.]
ABSTRACT/ANNOTATION[This academic paper considers the validity of the 'contingent valuation' approach in the estimation of the passive use value of natural resources. Contingent valuation is a survey method for determining the economic value people assign to the availability of a resource when there is no clear market for determining the economic value. It provides people with a scenario and then asks about their willingness to pay for changes (for example resource protection) or their willingness to accept compensation for degradations in the resource. This paper reports on a project that attempted to design the best possible contingent valuation survey of the lost passive use of natural resources, taking into account and addressing criticisms that had been leveled against the methodology. The project was conducted for the State of Alaska in preparation for *Exxon Valdez* oil spill litigation. The paper reports in depth on the study design and implementation, and briefly outlines its findings. Three different methods for figuring the mean willingness-to pay are used to yield three different numbers, which represent the survey's willingness-to-pay estimate multiplied by the number of English speaking households in the U.S. These numbers are $2.75 billion (using the parametric point estimate of the median), and $4.87 billion (using a conservative estimate of the mean consistent with the density estimates of the nonparametric Turnbull estimator), and $8.83 billion (using the parimetric Weibull estimate of the mean), and are designed to represent the public's willingness to pay to prevent another *Exxon Valdez* oil spill, given the scenario posed to them.]
KEYWORDS: SOURCE_TYPE[academic paper] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, State of Alaska, economists, public] ECONOMIC_EFFECTS[lost passive use] LITIGATION_EFFECTS[litigation research, contingent valuation, lost passive use] REMAINDER[research methods]

CITATION[Cohen, Maurie J. 1993. Economic impact of an environmental accident: a time-series analysis of the *Exxon Valdez* oil spill in south-central Alaska. Sociological Spectrum, 13(1):35-63.]
ABSTRACT/ANNOTATION[This is an academic article on economic impacts of the *Exxon Valdez* oil spill. The article concludes that the overall impact of the event was economically beneficial, and compensated for a sharp reduction in the profitability of commercial fishing, though the benefits were not evenly distributed in all areas of Southcentral Alaska. The author notes that Native communities were not included in his analysis. The area of Petersburg was used as a control in the analysis.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Southcentral Alaska, Cordova, Valdez, Kenai, Petersburg] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[non-Natives, fisheries, consumers]

ECONOMIC_EFFECTS[economic gain, commercial fisheries losses, regional economic impacts]

CITATION[Cohen, Maurie J. 1995. Technological accidents and natural resource damage assessment: an evaluation of the *Exxon Valdez* oil spill. Land Economics, 71:35:63.]
ABSTRACT/ANNOTATION[This academic article presents an economic analysis of the effect of the oil spill on the fisheries of Southcentral Alaska. The author observes that fisheries provide the economic foundation for many small communities. According to the economic model used, the upper limit of the cost to the fisheries was $108 million in the first year, approximately 27% of ex-vessel value, and second year effects may have been as high as $47 million. The author states that it is unlikely that actual costs to the fisheries were this high. At the same time, there was an economic boom, and wages remitted in Valdez increased 300% over the previous year. Southcentral Alaska has three regulatory areas, Prince William Sound, Lower Cook Inlet, and Kodiak Island, and each has many fisheries, as defined by locality, species, and gear group. The five species of Pacific salmon are the most valuable fish product, representing 40% of production and 66% of ex-vessel value. The spill had different impacts on different salmon species. The economic model depends on estimating harvest volumes and ex-vessel prices for the region's fisheries that would have occurred in the absence of the accident, and the author mentions other economic and ecological factors that might have affected the fisheries.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Southcentral Alaska, Prince William Sound, Lower Cook Inlet, Kodiak Island] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fisheries, Exxon] SOCIAL_EFFECTS[natural resource community] ECONOMIC_EFFECTS[economic gain, economic loss, ex-vessel prices, harvest volume, Japanese yen, exchange rate]

CITATION[Daley, Patrick. 1991. Sad is too mild a word: press coverage of the *Exxon Valdez* oil spill. Journal of Communication, 41(4):42-57.]
ABSTRACT/ANNOTATION[News coverage of the *Exxon Valdez* event is analyzed by examining the thematic narratives in three news papers: The Anchorage Daily News (ADN), the Boston Globe (BG), and the Tundra Times (TT). The analysis argues that the political and economic concerns of dominant American society are emphasized in the ADN and BG, but subsistence concerns of Alaskan Natives are generally under-reported. Narrative themes in the ADN and BG express a disaster theme that portrays the public as victims, a "naturalization" of the event, and the paradoxical dependence of Alaskans on oil that has now resulted in disaster. Although there is a minor environmental theme, the preponderance of coverage reinforces the political and economic interests of the oil industry. In contrast, coverage of the TT emphasized subsistence issues, but it also indicates Native Alaskan's perceived Exxon's cleanup effort as more public relations rather than actual cleanup.]
KEYWORDS: SOURCE_TYPE[academic article] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, residents, public, oil industry] SUBSISTENCE_ACTIVITIES[subsistence concerns] REMAINDER[media coverage]

CITATION[Dyer, Christopher L. 1993. Tradition loss as secondary disaster: long-term cultural impacts of the *Exxon Valdez* oil spill. Sociological Spectrum, 13(1):65-88.]
ABSTRACT/ANNOTATION[This academic article looks at social and cultural impacts of the *Exxon Valdez* oil spill on Native Alaskan communities. The author argues that the cultural

impacts from the spill can evolve into a loss of traditions in Native communities, and emphasizes the importance of studying cultural effects. Observed changes include a decline in sharing and social support networks, a decline in subsistence activities, and disruption of the communal controls of natural resources. The author proposes that culture and tradition loss can be the outcomes of technological disasters, and that understanding cultural impacts is important given the expansion of First World technology into Third World settings. The researcher found that Native Alaskan communities are economically oriented toward utilizing sustainable resources, sharing subsistence resources, and communal protection and enhancement of local resources, and that these are symbolized in festivals, religion, and family and community obligations. The loss of subsistence resources caused breakdowns in cultural patterns of resource use and cooperative work and the sense of stewardship of the environment, and led to increased domestic violence, alcoholism, social dysfunction, drug abuse and child abuse.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Cordova, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] SOCIAL_EFFECTS[social support, subsistence-based community, sharing, community obligations, cooperative work] CULTURAL_EFFECTS[culture loss, cultural persistence, festivals, sense of community, sense of place, stewardship of the environment, religion, subsistence traditions] FAMILY_EFFECTS[domestic violence, child abuse, stress, role relationships] ECONOMIC_EFFECTS[commercial vs. traditional economy] PSYCHOLOGICAL_EFFECTS[substance abuse, child abuse] CULTURAL_SUBSISTENCE[culture, religion, festivals, tradition loss, stewardship of the environment.]

CITATION[Dyer, Christopher L., Duane A. Gill and J. Stephen Picou. 1992. Social disruption and the Valdez oil spill: Alaska Natives in a natural resource community. Sociological Spectrum, 12(2):105-126.]
ABSTRACT/ANNOTATION[This academic article presents a conceptual model for understanding the cultural impacts of the oil spill on Native Alaskan communities, and also presents results of a community survey conducted in 1989 and again in 1990. A natural resource community, according to this model, is a population living in a bounded area whose primary cultural existence is based on the utilization of renewable natural resources. In Cordova, commercial fisheries include salmon, herring, razor clams, halibut, crab, shrimp, rockfish, and sablefish, and subsistence involves harvest of berries, marine invertebrates, vegetation, and wild game. The article cites another report (Stratton 1989) that in a 1985 survey, 402.7 pounds of resources per household were harvested, and salmon constituted a large portion of the overall harvest. The survey found that in 1989, 58% of respondents reported disruptive changes in family relationships, many linked to the breakdown of normal family routines associated with commercial fishing and subsistence, while in 1990, only 25% reported family disruption. In 1989, 52% of respondents indicated a change in future plans, but by 1990 that number had decreased to one third. In contrast, work-related disruption increased over time, from 25% in 1989 to 50% in 1990. The increase in work-related disruption may be because some people left usual work for cleanup employment and did not return to their normal jobs the next season. The proportion of respondents who perceived change in the Cordova community increased from 3% to 75%.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Cordova, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] SOCIAL_EFFECTS[natural resource community, sharing, alienation, kinship]

CULTURAL_EFFECTS[subsistence traditions, traditional knowledge] FAMILY_EFFECTS[family relationships, family routines] ECONOMIC_EFFECTS[cleanup employment] PSYCHOLOGICAL_EFFECTS[sense of the future, alienation, stress] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, clamming, salmon, marine invertebrates, vegetation, wild game] CULTURAL_SUBSISTENCE[culture]

CITATION[Dyer, Samuel Coad, Jr., M. Mark Miller, and Jeff Bonne. 1991. Wire service coverage of the *Exxon Valdez* crisis. Public Relations Review, 17(1):27-36.]
ABSTRACT/ANNOTATION[In this academic article, stories in two media wire services are analyzed a year before the oil spill and a year after the spill, with an interest in organizational planning for crisis communications. They included 51 press releases from Business Wire and newscopy from 2091 pieces from the Associated Press. The content analysis identified terms associated with legal, environmental, and economic issues, and these were coded for frequency using a computer content analysis system, and analyzed with log-linear analysis.]
KEYWORDS: SOURCE_TYPE[academic article] REMAINDER[media coverage]

CITATION[Goldberg, Victor P. 1994. Recovery of economic loss following the *Exxon Valdez* oil spill. Journal of Legal Studies, 23:1-39.]
ABSTRACT/ANNOTATION[This academic article provides a discussion of the legal issues and arguments surrounding legal liability for damages suffered from the *Exxon Valdez* oil spill. It considers who should be able to sue for damages, and specifically outlines decisions in Robins v. Dry Dock and subsequent decisions. The author proposes that, as in the Amoco Cadiz case, the government should act as the surrogate owner of the lost access to a public resource, rather than lawsuits being pursued by individuals and groups. The government would provide relief to injured parties and sue the company for recovery of funds distributed. It suggests that the law's protections of some parties (fishermen) and not others should be seen as a political decision to provide relief.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, fishermen, litigants, federal government] LITIGATION_EFFECTS[Robins Dry Dock and Repair Co. v. Flint, Union Oil Co v. Oppen, State of La ex rel. Guste v. M/V Testbank]

CITATION[Gramling, Robert. 1992. Oil spills and policy: the *Exxon Valdez* and US petroleum energy policy. American Sociological Association.]
ABSTRACT/ANNOTATION[This is a virtually identical version of the article published in Industrial Crisis Quarterly.]

CITATION[Gramling, Robert and William R. Freudenburg. 1992. The *Exxon Valdez* oil spill in the context of US petroleum politics. Industrial Crisis Quarterly, 6(3):175-196.]
ABSTRACT/ANNOTATION[The article argues that the causal elements involved in the *Exxon Valdez* oil spill were included actions of governmental institutions as well as actions of the tanker crew and Exxon corporation. They suggest that there is in some sense a profit motive for government agencies in promoting oil extraction, and that there is a governmental interest in encouraging domestic rather than international oil extraction and use. Additionally safeguards placed on the pipeline development eroded once public attention was no longer focused on the issue.]

KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska, Valdez] EVENT_PHASE[pre-spill, spill] REMAINDER[causes of spill]

CITATION[Harrald, John R., R. Cohen, W.A. Wallace. 1992. "We were always re-organizing...": some crisis management implications of the *Exxon Valdez* oil spill. Industrial Crisis Quarterly, 6(3):197-217.]
ABSTRACT/ANNOTATION[The article takes as its starting point the organizational confusion that occurred after the *Exxon Valdez* oil spill among those charged with response. The article outlines the organizational structure that was supposed to come into play in the event of an oil spill, and describes the way these contingency plans quickly fell apart and were replaced by other organizational structures after the spill. The contrast between contingency plans and actual response patterns and organization is outlined. The important and problematic role of emergent organizations in the *Exxon Valdez* response are discussed. Recommendations are made for improving the ability to prepare for disaster response.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[U.S. Coast Guard, Exxon, Alaskan State Government, interest groups, emergent groups, federal government] SOCIAL_EFFECTS[emergent groups, response organizations, breakdown of organizational planning] REMAINDER[disaster planning]

CITATION[Holland, H. Russel. 1996. Letter. American Indian Culture and Research Journal. 20(3): 167-170.]
ABSTRACT/ANNOTATION[In this letter, Federal District Judge Holland replies to Professor Joseph Jorgensen's article, "Ethnicity, Not Culture? Obfuscating Social Science in the *Exxon Valdez* Oil Spill." Holland indicates that the decision against Native Alaskans' claims for damages was not based on social science, but rather the legal framework that defines who is eligible to seek damages. The Native claims were not granted under maritime public nuisance laws because they did not show that they suffered damages "different in kind" from the general public, since all Alaskans have the right to lead subsistence lifestyles. Claims for private nuisance were rejected because the Native Alaskans did not have a "possessory interest" in the land oiled by the spill. Further, the court decision held that even if Native Alaskans could prove their claim for nuisance, it would not be relevant, since nuisance claims under federal common law and maritime law are, in the judgement of this court, preempted by the Federal Water Pollution Control Act. The letter also disputes Jorgensen's discussion of attorneys' fees and Native versus non-Native damage awards.]
KEYWORDS: SOURCE_TYPE[academic letter] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Judge H. Russell Holland, Joseph Jorgensen, Alaskan Natives, social scientists, lawyers, courts, Exxon, State of Alaska, Native Corporations, Bohannon] LITIGATION_EFFECTS[In re the *Exxon Valdez*, federal common law, maritime law, Federal Water Pollution Control Act, Trans-Alaska Pipeline Liability Fund, Order No. 190 Id. at 10. dicta, Federal District Court]

CITATION[Jones, Jonathon D., Christopher Jones and Fred Phillips. 1994. Estimating the costs of the *Exxon Valdez* oil spill. Research in Law and Economics, 16:109-149.]
ABSTRACT/ANNOTATION[In this academic article, the author uses the *Exxon Valdez* case to examine whether the costs associated with large spills provide private incentives to oil

companies to invest in spill prevention and abatement. A stock market event analysis is used to estimate losses to Exxon stockholders from the EVOS and estimate the spill's negative external effects on the oil industry. The study found large and significant losses for Exxon, while costs to the oil companies were economically large but statistically insignificant. Further, liability laws provide firms with private incentives to invest in safeguards, but companies may underestimate the costs of a spill. The *Exxon Valdez* spill is estimated to have cost a loss in stockholder wealth of between $4.7 billion and $11.3 billion. Costs to stockholders in other oil companies after the spill, and costs resulting from factors such as increased regulation, may total as much as $9.8 billion. The study uses a broad reading of costs, and these include direct costs such as cleanup, legal fees and insurance, indirect costs such as financial liability, and repercussion or reputation costs, such as regulatory change, legislative change, and stockholder and consumer factors. The article includes a time line of events and news regarding the spill, the company and the industry, along with fluctuations in stock prices. The authors concludes that the stock market response to the Valdez spill was atypically large. This event may have brought a reassessment of expectations regarding spill frequency, and initiated changes in environmental attitudes and policies that are not likely to be duplicated in future spills.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska, Prince William Sound, Santa Barbara CA, Florida] EVENT_PHASE[spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Alyeska, oil industry, stockholders, bond market, regulators, legislators] ECONOMIC_EFFECTS[stock market, bond market, insurance rates, Exxon costs, oil industry costs] LITIGATION_EFFECTS[liability, damages] REMAINDER[legislation, regulation]

CITATION[Jorgensen, Joseph G. 1995. Ethnicity, not culture? Obfuscating social science in the *Exxon Valdez* oil spill case. American Indian Culture and Research Journal, 19(4):1-124.]
ABSTRACT/ANNOTATION[The author of this academic article argues that social science was mis-used in a lawsuit by Native Alaskans against Exxon over the oil spill. Social scientist who testified for the Natives argued that culture-loss had occurred as a result of the spill, but the author indicates that the testimony should have instead focused on Natives' responses to the consequences of the EVOS. The article criticizes the approaches of social scientists cited by the plaintiffs and those for the respondent. In the context of a broader discussion of Native culture, it argues that Native plaintiffs were ill served by social scientists who made claims on the basis of cultural impacts, and that social scientists for the plaintiffs muddied the waters. It concludes that bad social science was associated with severe results for Native Alaskans.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, social scientists, Exxon] CULTURAL_EFFECTS[culture loss, rhetoric of risk] LITIGATION_EFFECTS[failure of plaintiffs]

CITATION[Jorgensen, Joseph G. 1996. 'Ethnicity, not culture?...' A reply. Response to article by H. Russell Holland. American Indian Culture and Research Journal, 20(3):171 (5 pages).]
ABSTRACT/ANNOTATION[The author disputes the concepts of culture and tradition proposed by Holland in an academic response to another article in the same journal. The author argues that the generalizations made about culture and tradition lack evidential support.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, social scientists, Judge

H. Russell Holland, Exxon, lawyers] CULTURAL_EFFECTS[culture loss, rhetoric of risk] LITIGATION_EFFECTS[failure of plaintiffs]

CITATION[Moore, W.W. 1994. The grounding of the *Exxon Valdez* -- an examination of the human and organizational factors. Marine Technology and News, 31(1):41-51.]
ABSTRACT/ANNOTATION[This academic article notes that in high consequence, low probability technological disasters, human and organizational factors are often causative. The author observes that the complexity and limitations of the technology are often not well understood by the operators. The specific human and organizational factors that can lead to technological disasters are proposed.]
KEYWORDS: SOURCE_TYPE[technical article] GEOGRAPHY[Bligh Reef, Prince William Sound] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaska Board of Marine Pilots, State Pilot Association, Southwest Pilots Association, tanker crew, Exxon, U.S. Coast Guard.]

CITATION[Palinkas, Lawrence A., John S. Petterson, John C Russell, and Michael A. Downs. 1993. Community patterns of psychiatric disorders after the *Exxon Valdez* oil spill. American Journal of Psychiatry, 150(10):1517 (7 pages).]
ABSTRACT/ANNOTATION[This academic article presents a study on psychological impacts of the *Exxon Valdez* oil spill carried out one year after the spill. Symptoms of generalized anxiety disorder and post traumatic stress disorder were assessed using the National Institute of Mental Health Diagnostic Interview Schedule, and depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D). Research employed a community survey of 599 men and women in thirteen Alaska communities. The one-year prevalence of symptoms in communities with all degrees of exposure was 20.2% for generalized anxiety disorder and 9.4% for post traumatic stress. The prevalence of respondents with CES-D Scale scores above 16 and 18 was 16.6% and 14.2% respectively. Those who had a high exposure to the spill and cleanup were 3.6 times likelier to have generalized anxiety disorder, 2.9 times likelier to have post traumatic stress, they were 1.8 times as likely to have a CES-D Scale score of 16 and above and 2.1 times as likely to have a score of 18 and above. Women more often suffered these conditions, and Native Alaskans were more likely to suffer depressive symptoms. Implications for mental health and primary care are discussed.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[13 Alaska communities] EVENT_PHASE[cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, women, Alaskans] PSYCHOLOGICAL_EFFECTS[post-traumatic stress disorder, PTSD, generalized anxiety disorder, depression]

CITATION[Palinkas, Lawrence A., Michael A. Downs, John S. Petterson, and John C. Russell. 1993. Social, cultural, and psychological impacts of the *Exxon Valdez* oil spill. Human Organization, 52(1):1 (13 pages).]
ABSTRACT/ANNOTATION[This academic article considers the psychological and sociocultural impacts of the *Exxon Valdez* spill, and reports the results of a population-based study of 594 men and women living in 13 Alaska communities a year after the spill. The study found a dose-response relationship between exposure to the spill and cleanup activities and declines in traditional social relations with coworkers, friends, neighbors, and family, as well as a decline in activities associated with subsistence production and distribution, along with a

perceived increase in problems connected to substance abuse and domestic violence, and a decline in perceived health status along with an increase in diagnosed medical conditions. Further, the study found post traumatic stress, generalized anxiety disorder, and depression. Those most at risk for the psychiatric disorders were Alaskan Natives, women, and those 18-44 years old.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alaskans, women, adults] SOCIAL_EFFECTS[social disruption, demographic characteristics, kinship, friendships, crime] FAMILY_EFFECTS[family relationships, domestic violence] PSYCHOLOGICAL_EFFECTS[post-traumatic stress disorder, PTSD, generalized anxiety disorder, depression, substance abuse, sense of health] OTHER_EFFECTS[increased diagnosis of medical problems, decline in perception of health] SUBSISTENCE_ACTIVITIES[decreased harvest, sharing] CULTURAL_SUBSISTENCE[sharing]

CITATION[Palinkas Lawrence A., John C. Russell, Michael A. Downs, and John S. Petterson. 1992. Ethnic differences in stress, coping, and depressive symptoms after the *Exxon Valdez* oil spill. Journal of Nervous and Mental Disease, 180(5):287-295.]
ABSTRACT/ANNOTATION[This academic article reports research on depressive symptoms in a sample of 188 Alaskan Natives and 371 Euro American residents of three Alaska communities. Equal proportions of Natives and Euro Americans lived in affected and control communities. The study found ethnic differences in the association between depressive symptoms and exposure to the spill and cleanup. Symptoms were measured with the Center for Epidemiological Studies Depression Scale. Natives had a significantly higher mean Exposure Index score than did Euro Americans, and were more likely to report that they had worked on the cleanup, and suffered from the damage to commercial fishing and subsistence activities. For Natives, depression was related to participation in cleanup and other oil contact, while among Euro Americans depression was related to damage to commercial resources, their use or residence in areas affected by the spill. Family support provided a better buffer for Euro Americans than for Natives. The two ethnic groups were different in the degree and kind of exposure they reported, in their evaluation of the events as stressful, and the level of depression measured in the two groups. The cultural significance of the spill, and the threat to Native culture and personal identity associated with culture were factors. There was no difference between Natives living in different areas, and no significant difference among Native groups including Aleuts, Athapaskan Indians, Southeast Coast Indians, and other groups.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska, three communities] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Euro Americans, Aleuts, Athapaskan Indians, Southeast Coast Indians] FAMILY_EFFECTS[family support] ECONOMIC_EFFECTS[commercial fishermen] PSYCHOLOGICAL_EFFECTS[depressive symptoms, coping mechanisms] SUBSISTENCE_ACTIVITIES[contaminated resources] CULTURAL_SUBSISTENCE[culture, identity]

CITATION[Picou, J. Steven, D.A. Gill, C.L. Dyer, E.W. Curry. 1992. Disruption and stress in an Alaskan fishing community: initial and continuing impacts of the *Exxon Valdez* oil spill. Industrial Crisis Quarterly, 6(3):235-257.]

ABSTRACT/ANNOTATION[The article argues that communities dependent on the use of renewable natural resources are more vulnerable to the impacts of disasters that contaminate those resources. It compares the city of Cordova, Alaska with an Alaskan community unaffected by the spill, and finds long term impacts such as social disruption and stress in Cordova.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Cordova, Petersburg] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, Alaskan Natives] SOCIAL_EFFECTS[social conflict] CULTURAL_EFFECTS[sense of community] FAMILY_EFFECTS[family relationships] ECONOMIC_EFFECTS[economic loss, work disruption] SUBSISTENCE_ACTIVITIES[contamination fears] CULTURAL_SUBSISTENCE[sharing]

CITATION[Quarm, Darrin J. 1992. Right to subsist: the Alaska Natives' campaign to recover damages caused by the *Exxon Valdez* spill. The Georgetown International Environmental Law Review, 5: 177-213.]
ABSTRACT/ANNOTATION[This academic article examines the legal issues involved in lawsuits brought by Native Alaskan corporations against Exxon. This article reviews the actions taken by Native Corporations against Exxon, and discusses key players, the legal strategies employed by key players, and evaluates those strategies and their results. The author mentions that damage to the wildlife of Prince William Sound damaged the Natives' subsistence activities and the subsistence lifestyle, including social and cultural traditions, economics, sense of pride and cultural identity, self reliance, cooperation and family and community responsibility. The bulk of the article presents the legal context and legal arguments made by concerned parties.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska, Prince William Sound] EVENT_PHASE[spill, cleanup, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, federal government, Alaska State, Native Corporations, litigants, Chenega Corporation, Port Graham Corporation, English Bay Corporation, Alyeska, environmental groups, Department of the Interior, U.S. District Court, Department of Justice, Sierra Club Legal Defense Fund, National Resources Defense Council, Trustees for Alaska, National Audubon Society, Environmental Defense Fund, National Wildlife Federation, Wilderness Society] PSYCHOLOGICAL_EFFECTS[post-traumatic stress disorder] LITIGATION_EFFECTS[Alaska Native Claims Settlement Act, Alaska National Interest Land Conservation Act, Marine Mammal Protection Act, Oil Pollution Act] SUBSISTENCE_ACTIVITIES[subsistence activity] CULTURAL_SUBSISTENCE[lifestyle, traditions, economics, pride, identity, self reliance, cooperation, family and community responsibility]

CITATION[Rodin, Mari, M. Downs, J. Petterson, J. Russell. 1992. Community impacts resulting from the *Exxon Valdez* oil spill. Industrial Crisis Quarterly, 6(3):219-234.]
ABSTRACT/ANNOTATION[This academic article considers the social effects associated with the *Exxon Valdez* oil spill and by the cleanup efforts. Three factors influencing impacts were the environmental damage caused by the accident, the influx of large sums of money into the community, and the manner in which cleanup entities operated. The article suggests that management strategies used during the cleanup undermined community social structures in Native communities. It also finds and that a community's technical and administrative resources were important variables in it's ability to find additional resources and help.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska, Kodiak, Seward, Valdez, Old Harbor, Ouzinkie, Tatitlek, Larsen Bay, Kenai Peninsula Borough]

EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[cleanup workers, Exxon, Alaskan Natives, Deckhands Association, VECO, commercial fishermen, Seward Life Action Council, Alaska Department of Environmental Conservation] SOCIAL_EFFECTS[emergent groups, social organization, social conflict] CULTURAL_EFFECTS[sense of place, Native culture, cultural persistence] FAMILY_EFFECTS[domestic violence, unsupervised children] PSYCHOLOGICAL_EFFECTS[substance abuse, domestic violence, crime, mental health services] MUNICIPAL_EFFECTS[fiscal impacts, delayed work] SUBSISTENCE_ACTIVITIES[contaminated resources] CULTURAL_SUBSISTENCE[social structure] REMAINDER[vulnerability of traditional communities]

CITATION[Shaw, D. and H. Bader. 1996. Environmental science in a legal context: the *Exxon Valdez* experience. Ambio, Nov. 25(7):430-434.]
ABSTRACT/ANNOTATION[This academic article examines the existing legal framework of governmentally supported scientific research on incidents such as the *Exxon Valdez* oil spill. It notes that the government gathered data on the environmental consequences of the incident, most as part of a legally mandated process that limits the information gathering to specific studies designed to help determine injury and biological restoration. With respect to the *Exxon Valdez* case, the article observes that the damage assessment process was not designed to study effects of the incident in any broad sense. The constraints on data collection limited the ability of state and federal government to demonstrate natural resource injury, and the delays associated with defining the scope of damage assessment meant that research opportunities were lost. It argues for changing the reliance on ecological baseline data, and proposes that a different legal context, one of mitigation rather than restoration, would have advantages.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[State of Alaska, US, Prince William Sound, Aleutian Islands] EVENT_PHASE[spill, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Department of the Interior, National Park Service, Exxon, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, Alaska Legislature] LITIGATION_EFFECTS[CERCLA, Oil Pollution Act, Public Trust Doctrine, Maryland v. Amerada Hess Corporation, Maine v. M/V Tamanol, In re Steuart Transportation Corporation, Clean Water Act, Marine Mammal Protection Act, public trust resources]

CITATION[Smith, Conrad. 1993. News sources and power elites in news coverage of the *Exxon Valdez* oil spill. Journalism Quarterly, 70(2):393-403.]
ABSTRACT/ANNOTATION[In this academic article, the author analyzed sources named in six months of coverage of the *Exxon Valdez* spill by the New York Times, the Los Angeles Times, the Washington Post, and the Anchorage Daily News. The interest was in the relative success of elite and non-elite sources in access to media, and how the three major elites identified and framed the story. The study looked at 483 stories written by 116 different journalists, and identified 1,439 sources including government, oil industry, scientists, fishermen, environmentalists, affected business, individuals, animal rescue, oil experts, legal experts and media observers. The study concludes that sources named by more than one news organization were part of powerful institutional elites, i.e. organized economic or political groups with a vested interest in how the spill was reported. It further concludes that sources from the three elites had different perspectives and were not equally satisfied with the way the story was reported, though satisfaction was not related to media access.]

KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[New York Times, Los Angeles Times, Washington Post, Anchorage Daily News, journalists, oil industry, scientists, fishermen, environmental groups, businesses, public, media] REMAINDER[media coverage]

CITATION[Special report (on the 1989 *Exxon Valdez* oil spill, Prince William Sound, Alaska). In The Amicus Journal. Vol. 11, no. 3 (summer 1989). *(NOTE: this 'special report' essentially consists of five separate articles within this volume; these are each annotated below)*]

CITATION[Borrelli, Peter. 1989. Troubled waters. (p.10-20) The Amicus Journal. Vol. 11, no. 3 (summer 1989)]
ABSTRACT/ANNOTATION[This article provides a description of the locales, landmarks, and entities involved in response to the *Exxon Valdez* oil spill.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prince William Sound, Cordova, Eastern and Northern Districts, Chugach Mountains, Valdez, Columbia Glacier, Kenai Peninsula, Kodiak Island, Southwestern District, Montague District, Perry, Culross, Naked Islands, Arctic National Wildlife Refuge, Bristol Bay, Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Cordova District Fishermen United, Aquaculture Corporation, National Marine Fisheries Service, scientists, Alaska Department of Fish and Game, U.S. Forest Service, Exxon, National Oceanographic and Atmospheric Administration, Governor Steve Cowper] LITIGATION_EFFECTS[CERCLA.]

CITATION[Schmidt, Susan. 1989. The oil doctors. (p.21-23) The Amicus Journal. Vol. 11, no. 3 (summer 1989)]
ABSTRACT/ANNOTATION[This article discusses government scientific response, especially response by NOAA, to the oil spill. It mentions that NOAA is one of fifteen government agencies that deal with oil spills.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska] EVENT_PHASE[cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, scientists, National Oceanographic and Atmospheric Administration, National Response Center, U.S. Coast Guard, Environmental Protection Agency]

CITATION[Seligman, Dan. 1989. The accident that wanted to happen. (p.21-23) The Amicus Journal. Vol. 11, no. 3 (summer 1989)]
ABSTRACT/ANNOTATION[The subtitle of this article is "how big oil, Congress, and the Nixon Administration scuttled NEPA and a Canadian pipeline alternative in favor of the trans-Alaska pipeline," and it discusses the context in which the decision was made to site the pipeline in Alaska, including the energy shortage, and political and legal battles over siting.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Alaska, Canada] EVENT_PHASE[pre-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Congress, Senate, Nixon Administration, U.S. Coast Guard, Department of the Interior, Wilderness Society, Environmental Defense Fund, Friends of the Earth, National Resources Defense Council, Exxon, oil companies]

CITATION[Hall, Vicki. 1989. Dear Mom. (p. 28-29). The Amicus Journal. Vol. 11, no. 3 (summer 1989)]

ABSTRACT/ANNOTATION[This is a personal account written by a woman in Cordova who works as a longshoreman. Her observations of the spill and her emotional response and concerns about the future of the area are described, and dated April 25, 1989.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Cordova, Aleutian Chain, Kodiak] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[longshoremen, Exxon]

CITATION[Price, Jess. 1989. Snake oil. (p.30) The Amicus Journal. Vol. 11, no. 3 (summer 1989)]
ABSTRACT/ANNOTATION[The author interviews Dept. of the Interior Secretary Manuel Lujan about the future plans for the Wildlife Refuge, lease sales, and regulatory items such as inspections and response teams, in the wake of the *Exxon Valdez* spill.]
KEYWORDS: SOURCE_TYPE[popular article] GEOGRAPHY[Prince William Sound, Arctic National Wildlife Refuge] EVENT_PHASE[cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Bush Administration, Department of the Interior, Manual Lujan Secretary of the Interior, Environmental Protection Agency, Department of Commerce, Office of Management and Budget, National Academy of Sciences, U.S. Coast Guard.]
CITATION[Tierney, Kathleen J. and E.L. Quarantelli. 1992. Social aspects of the *Exxon Valdez* oil spill. Industrial Crisis Quarterly, 6(3):167-173.]
ABSTRACT/ANNOTATION[This introductory editorial precedes a series of articles on the *Exxon Valdez* oil spill in a special issue of the journal. Following a brief summary of the articles contributing to the special issue, the authors argue that scientific research and reporting were constrained following the spill by gag orders associated with lawsuits, and by efforts to subpoena data collected under promises, and "Human Subjects/IRB" requirements, of confidentiality. It concludes that the power of science in our society is very fragile compared to the power of the state and the corporation.]
KEYWORDS: SOURCE_TYPE[academic editorial] GEOGRAPHY[Alaska]
SOCIAL_OR_CULTURAL_IDENTIFIER[scientists, corporations, government, human subjects] LITIGATION_EFFECTS[litigation and scientific research]

CITATION[Tolbert, Miles. 1990. The public as plaintiffs: public nuisance and federal citizen suits in the *Exxon Valdez* litigation. Harvard Environmental Law Review, 14(2):511-527.]
ABSTRACT/ANNOTATION[The author of this academic article suggests that novel legal approaches have emerged in response to the *Exxon Valdez* spill, and that these approaches might change the nature of future environmental litigation. The article compares two lawsuits brought by environmental groups against Exxon, suits that used two different legal strategies. One suit used common law public nuisance doctrine, while the other used modern environmental statutes. The efficacy and limitations of the two approaches are discussed.]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[environmental groups, Alyeska, Exxon, U.S. District Court, National Wildlife Federation, Wildlife Federation of Alaska, Natural Resources Defense Council, Environmental Protection Agency] LITIGATION_EFFECTS[Federal Water Pollution Control Act, Resource Conservation and Recovery Act, CERCLA, Sierra Club v. Morton, Save Sand Key Inc. v. US Steel Corp., Akau v. Olohana, Trustees for Alaska v. State, Sierra Club v. Exxon Corp, Clean Water Act]

CITATION[Wooley, Christopher B. 1995. Alutiiq cultures before and after the *Exxon Valdez* oil spill. American Indian Culture and Research Journal, 19(4):125 (29 pages).]
ABSTRACT/ANNOTATION[The author of this academic article disputes the view proposed by other research that the spill and disruption of subsistence activities led to a loss of culture among Alaskan Natives. Instead, the author argues that the spill provided an impetus for the Alutiiq people to become more aware of their cultural identity and political power, and gain increased sense of self-worth. More generally, it argues that culture is never static and that change is ongoing. It criticizes surveys and baseline studies that attempt to define a culture at a given time in order to quantify culture change. It proposes that major events are often treated the cause of change that is actually ongoing, and argues that the spill could be treated as the scapegoat for the many changes in Alutiiq culture in the twentieth century]
KEYWORDS: SOURCE_TYPE[academic article] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alutiiq] SOCIAL_EFFECTS[political power, ethnic pride] CULTURAL_EFFECTS[cultural persistence, cultural identity] ECONOMIC_EFFECTS[wage labor] PSYCHOLOGICAL_EFFECTS[self-worth, cultural identity] SUBSISTENCE_ACTIVITIES[subsistence activity] CULTURAL_SUBSISTENCE[absence of impact on culture]

REPORTS

CITATION[Agler, B.A., P.E. Seiser, S.J. Kendall, and D.B. Irons. 1994. Marine bird and sea otter population abundance of Prince William Sound, Alaska: trends following the T/V *Exxon Valdez* oil spill, 1989-93. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93045). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194873).]

CITATION[Agler, B.A., S.J. Kendall. P.E. Seiser, and D.B. Irons. 1995. Marine bird and sea otter abundance of Prince William Sound, Alaska: trends following the T/V *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 94159). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194881).]

CITATION[Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160.]
ABSTRACT/ANNOTATION[This report is based on research in twenty-one communities in four Alaska locales, conducted during 1992, 1993, and 1994. The research was directed at understanding the sociocultural impacts of resource development in Alaska's Outer Continental Shelf, and especially the impacts on subsistence use of wildlife and fish. The *Exxon Valdez* spill is one topic addressed in this broader study of oil development. Two interview instruments were employed, a "harvest survey questionnaire" and a "social effects questionnaire." Separate chapters provide results of research in each community, and clear differences emerge among the communities, based on ethnic composition, economic base, proximity to the spill and damage to the environment. In an earlier study, the researchers found that the spill had an important impact on subsistence activities and related sociocultural systems, and that the degree of social and subsistence impacts followed the geography of the spill and the persistence of environmental

damage. The most environmentally affected areas were also the most affected in terms of subsistence and social impacts. This pattern of impacts continued during the present study. In some communities, impacts included decreased sharing of wild foods, less participation of children in subsistence activities, less satisfaction with living in the community, a belief that there is less subsistence activity, and that the populations of fish and wildlife that provide subsistence base had declined. There were also fears of food contamination, and doubts about the health of the environment. These perceived declines in wildlife populations and vitality of the environment are viewed as unexplained, and constitute a source of lingering uncertainty about the future. The prolonged litigation over Native claims, and the judicial decisions made with respect to the legitimacy of Native claims, constitute another social impact. *(NOTE -- individual volumes/chapters of this work are separately annotated given the rich nature of their content)*]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Chenega Bay, Cordova, Tatitlek, Valdez, Prince William Sound, Kenai, Nanwalek, Port Graham, Seldovia, Cook Inlet, Akhoik, Karluk, Kodiak, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, Kodiak Island Borough, Chignik Bay, Chignik Lake, Alaska Peninsula, Arctic region, Kotzebue, Kaktovik, Kivalina, Nuiquist] EVENT_PHASE[spill, cleanup, restoration, litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, fishermen, hunters, sportsmen, subsistence resource users] SOCIAL_EFFECTS[subsistence-based community]
CULTURAL_EFFECTS[sense of place, sense of community, risk perception]
FAMILY_EFFECTS[children, sharing, domestic violence, role relationships]
ECONOMIC_EFFECTS[economic gain, economic loss] PSYCHOLOGICAL_EFFECTS[substance abuse, fear about future] LITIGATION_EFFECTS[Native lawsuits]
SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, decreased harvest, contamination fears, deer, harbor seals, sea lions, sea ducks, clams, seals, salmon, halibut, clams, bidarkies, octopus] CULTURAL_SUBSISTENCE[sharing, enculturation, uncertainty about future]

CITATION[Jody and James A. Fall. 1995. Cordova. *In* Volume II: Prince William Sound. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160.]
ABSTRACT/ANNOTATION[Commercial and subsistence harvests in Cordova declined over the three years of the study. In 1993 approximately 20% of households blamed the *Exxon Valdez* spill for the reduced subsistence, while a larger proportion of Natives in Prince William Sound and Cook Inlet held this view. There was general opposition to continued resource development, and the majority said they liked living in Cordova less than before, because of financial troubles, stress, and uncertainty about the future.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Cordova, Prince William Sound, Cook Inlet] EVENT_PHASE[spill, cleanup, restoration, litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] ECONOMIC_EFFECTS[reduced harvest] PSYCHOLOGICAL_EFFECTS[stress, fear about future]
SUBSISTENCE_ACTIVITIES[decreased harvest]

CITATION[Miraglia, Rita A. and Lisa Tomrdle. 1995. Valdez.. *In* Volume II: Prince William Sound. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160.]
ABSTRACT/ANNOTATION[The authors observe that there are socio-demographic differences between Valdez and some of the other communities studied, since it is an urban community, a portion of the economy is based in the oil industry, there is relatively little subsistence use of resources while recreational hunting and fishing are more common, and the community is predominately non-Native. Further, the *Exxon Valdez* spill did not contaminate the Port of Valdez. Valdez residents were more likely to compare the *Exxon Valdez* spill to the pipeline construction of the 1970's, while other Prince William Sound communities more often compared the spill to the 1964 earthquake, and the theme was economic boom rather than disaster. In contrast to other communities, most Valdez respondents did not report that there were fewer subsistence resources. A few interviewees thought clams were unsafe for children, and associated this unsafety to oil pollution and contamination, but long-time residents often cited chronic pollution from the pipeline terminal rather than the *Exxon Valdez* spill. Respondents in Valdez reported less social impact from the spill than did respondents in other communities.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Valdez] EVENT_PHASE[pre-spill, spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[sportsmen, non-Natives, residents] ECONOMIC_EFFECTS[economic gain]

CITATION[Seitz, Jody and Rita Miralgia. 1995. Chenega Bay. *In* Volume II: Prince William Sound. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160.]
ABSTRACT/ANNOTATION[While there was an increase in harvests in the years 1991-1993 over levels in 1989-1991, some effects of the spill continued into 1994. Harvests of land mammals, birds, and marine mammals were below expectations, and there was a shift to harvesting of fish. Since there were fewer local resources, and there were continued contamination fears about local resources, subsistence activity was associated with travel to new areas. Respondents asserted that resource use was below levels prior to the spill, and the majority said that deer, harbor seals, sea lions, sea ducks, and clams had declined in numbers. The authors report that contamination fears persisted in Chenega Bay more than in any other community studied. Respondents also indicated that they did not feel well enough informed, and they said there was less sharing of resources, and a third of respondents believed that the spill had affected children's participation in subsistence. In the first year of the study, half the respondents reported they liked living in Chenega Bay less since the spill.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Chenga Bay] EVENT_PHASE[pre-spill, spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, resource users] SOCIAL_EFFECTS[subsistence-based community, sharing, cooperative work, information sources] CULTURAL_EFFECTS[sense of community, sense of place, risk communication] FAMILY_EFFECTS[role relationships, enculturation] SUBSISTENCE_ACTIVITIES[

decreased harvest, deer, harbor seals, sea lions, sea ducks, clams, contamination fears , travel to new areas, increased effort, shift from mammals to fish.]

CITATION[Seitz, Jody, and James A. Fall. 1995. Tatitlek. *In* Volume II: Prince William Sound. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[The authors write that Tatitlek is one of the communities that continues to be most affected by the spill, as evidenced in reduced harvests despite the greater effort put into subsistence activity. The report notes the cultural values which give responsibility to those who take part in subsistence activities for providing for dependents, and an ethic that they must not return without something to share. The failure of the herring run in 1993 and 1994 and a herring virus made a prized food unavailable and had added cultural significance, since it is associated with spring and the renewal of life, and is seen as a sign of environmental health and the persistence of Alutiiq subsistence culture. Five households had left the small community of Tatitlek by 1994, and three of them were considered important harvesters. There were additional expenditures of time and labor as people traveled farther to harvest.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Tatitlek] EVENT_PHASE[pre-spill, spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alutiiq] SOCIAL_EFFECTS[sharing, emigration, subsistence-based community] CULTURAL_EFFECTS[traditional knowledge, cultural persistence, risk perception] SUBSISTENCE_ACTIVITIES[herring, decreased harvest]

CITATION[Tomrdle, Lisa, Lisa Hutchinson-Scarbrough, and Ronald T. Stanek. 1995. Kenai. *In* Volume III: Lower Cook Inlet. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[The *Exxon Valdez* spill had little or no direct impact on Kenai, according to respondents interviewed for this report. The oil and gas industry are important parts of the Kenai economy, while the subsistence use of resources is not common. Wildlife and fishery resources are part of the area's commercial fishing, and recreational hunting and fishing are part of the tourism industry. According to one interview with a counselor, the presence of sudden wealth from the cleanup may have contributed to social problems such as divorce, violence, and substance abuse. Most respondents were unaffected by the spill and were unaware of impacts from the spill, and they favored continued oil development. Only a small portion of respondents worked in fisheries or as fishermen, or were Alaskan Native, and respondents in these categories identified themselves as being more affected by the spill, and they noted economic impacts. Some residents expressed sympathy for Exxon in the ongoing litigation.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kenai] EVENT_PHASE[spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[oil industry employees, fishermen, fisheries workers, tourists, Alaskan Natives] FAMILY_EFFECTS[divorce] ECONOMIC_EFFECTS[economic gain, commercial fisheries, tourism industry] PSYCHOLOGICAL_EFFECTS[divorce, violence, substance abuse] LITIGATION_EFFECTS[sympathy for Exxon]

CITATION[Stanek, Ronald T, Lisa Tomrdle, and James A. Fall. 1995. Seldovia. *In* Volume III: Lower Cook Inlet. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[Social impacts differed in Seldovia and the other two Kenai Peninsula communities included in the Technical Report 160 study series, despite the fact that the three communities have a similar history. In comparison to the other two Kenai Peninsula communities, relatively few households in Seldovia mentioned lowered harvest levels, reduced sharing of resources, or less participation in subsistence activities by children. And comparatively few mentioned decreased populations of subsistence resources or fears of food contamination. The researchers suggest that this difference may be associated with the lesser degree of oiling in the area of Seldovia and the lesser degree of observed decline in subsistence resources. Yet around half of the residents believed oil development in the outer continental shelf would result in damage to the fish and wildlife. A population of near 500 includes about a third Alaskan Natives. Commercial fishing provided the economic base for many years, but this industry declined sharply during several years prior to the spill. Tourism has provided some diversification, and the permanent location of a spill response team in Seldovia after the spill increased the oil and gas sector of the community and economy. Seldovia is an incorporated community, but is not connected by roads to other parts of the State. There was a high degree of reliance on wild resources for subsistence, and wild resource harvesting included most Seldovia residents. Harvested resources included berries and plants for food and medicinal purposes, fish, marine invertebrates, land and sea mammals for food.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Seldovia, Nanwalek, Port Graham, Kenai Peninsula] EVENT_PHASE[pre-spill, spill, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Natives, commercial fishermen, children] SOCIAL_EFFECTS[subsistence-based community, sharing] CULTURAL_EFFECTS[sense of place, sense of community] FAMILY_EFFECTS[enculturation] ECONOMIC_EFFECTS[commercial fisheries, tourism industry, subsistence economy, economic gain, economic loss] SUBSISTENCE_ACTIVITIES[increased harvest, resource availability]

CITATION[Stanek, Ronald T. 1995. Port Graham. *In* Volume III: Lower Cook Inlet. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[Port Graham has a population of around 160, with about 85% of the residents Native Alaskan. Like Seldovia, another Kenai Peninsula community, Port Graham did not have roads connecting it to the rest of the State, but was accessible by boat and small airplane. The commercial fishing industry was the major economic sector in Port Graham prior to the oil spill, but after the spill the local cannery closed and salmon runs declined, leading to a significant decrease in the importance of the commercial fishing industry. The economy diversified somewhat after the spill, with work in small construction projects, logging, a salmon hatchery and more, but many young job seekers had to leave Port Graham to find employment.

Commercial fishing continued to be the largest source of employment, and to represent the major source of household earned income. The chapter indicates the kinds and quantities of resources harvested for subsistence use, sharing, medicinal purposes, and the amounts and kinds of fish taken from commercial activities for home use. Community members were asked to assess the amounts of wild resources they had used in 1991/92 in comparison to 1990, and in comparison to the year prior to the spill. For marine resources, around half of the respondents indicated that they used less in 1991/92 than before the spill, a moderate number indicated that they used the same amount, and the fewest respondents said that they used more marine resources than before the spill. In contrast, more respondents indicated that they used the same amounts of land based resources such as birds, plants, and land mammals in 1991/92 and before the spill. Reported resource use levels were more similar in 1990 and 1991/92, than when comparing either year to the year prior to the spill. The composition of the wild resource harvest was relatively consistent during the six year period of study, despite the oil spill. This consistency is attributed to established harvest practices, cultural preferences, access and affinity to traditional harvest areas, and abundant resources, and to the fact that the oiling of Port Graham did not have as severe an impact on harvests as some other areas. Respondents expressed some concern about food safety after the spill, and thought there were fewer resources available, and less sharing. They also liked their communities less.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kenai Peninsula, Port Graham, Nanwalek, Seldovia, Cordova, Chenega Bay, Kodiak] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Russian] SOCIAL_EFFECTS[subsistence-based community, sharing, emigration] CULTURAL_EFFECTS[sense of place, sense of community] ECONOMIC_EFFECTS[economic loss, commercial fishing, economic diversification, unemployment, subsistence economy] SUBSISTENCE_ACTIVITIES[fishing, hunting, gathering, resource availability, medicinal plants, preservation methods] CULTURAL_SUBSISTENCE[medicinal plants, traditional locales, resource preferences]

CITATION[Stanek, Ronald T. 1995. Nanwalek. *In* Volume III: Lower Cook Inlet. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[At the time of this study, Nanwalek had a population of around 162, approximately 90% Native Alaskan. Residents were more isolated than the other two Kenai Peninsula communities, and placed greater importance on maintaining their customs and traditions. There were few economic opportunities, but subsistence and traditional culture were attractions for residents. The economy has moved almost completely away from commercial fishing (due to low escapements and the closing of a cannery in Port Graham) to reliance on temporary jobs in construction, with additional sectors in logging, services, and local government. Half of the respondents considered their financial situation the same as before the spill, and a third judged it to be worse despite revenue from the cleanup. Resource harvest levels dropped by half in 1989, the year of the spill, over levels in 1987, and the types of items harvested also decreased by half. Harvest amounts and kinds recovered in 1990-92. More marine than non-marine resources were discarded due to abnormal appearance and fear of contamination. Confidence in the safety of resources increased in the years after the spill, while

employment opportunities decreased. Residents observed decreases in seal and sea lions, and helped to clean heavily oiled beaches. Participation in subsistence activities by children was significantly affected by the oil spill, this impact was more widespread in Nanwalek than in some other communities. The researcher observes that many Nanwalek adults took cleanup jobs that kept them from the community for long periods and meant that Nanwalek children did not work with their parents to obtain subsistence resources. The reported sharing of subsistence resources also declined after the spill, but in the third year after the spill sharing levels increased.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Nanwalek, Kenai Peninsula, Port Graham, Seldovia, Kachemak Bay, Cook Inlet] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, children] SOCIAL_EFFECTS[subsistence-based community, sharing] CULTURAL_EFFECTS[sense of place, traditional knowledge, customs, enculturation] FAMILY_EFFECTS[parent absence] ECONOMIC_EFFECTS[economic decline, cleanup employment, subsistence economy, village economy, economic diversification, temporary employment] SUBSISTENCE_ACTIVITIES[resource availability, harvest amounts, species, increased reliance on subsistence] CULTURAL_SUBSISTENCE[sharing, enculturation]

CITATION[Mishler, Craig, Rachel Mason, and Jeffrey Barnhart. 1995. Kodiak. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 160]
ABSTRACT/ANNOTATION[The history of Kodiak City is briefly reviewed, and it is described as part rural and part urban, with a city population of over 6,000, with 14.2% Native Alaskan. The wider area of Kodiak included in this study had a population of around 10,000. Over 25% of the residents were newcomers, and had arrived in Kodiak after the *Exxon Valdez* oil spill. Around 8% of the residents were employed by the Federal government, and many were part of a nearby Coast Guard base. Commercial fishing is the major economic sector, and Kodiak was the number one seafood port in 1981 and 1988. Commercial fisheries also contributes to subsistence use, and fishermen use or share part of their commercial catch. The cost of living in Kodiak was relatively high in the early 1990's, and was higher according to some measures than Anchorage or Seattle. Kodiak residents harvested and used a large number of subsistence resources. The report does not distinguish between sports harvest and subsistence harvest by Native Alaskans. The researchers note that in 1991, 98% of households used , and 93% harvested at least one wild resource, with 80% giving a harvested resource and 93% receiving a harvested resource. Fishing, the harvest and processing of plants and berries, and hunting for food were the main activities, with 88 resources harvested, and sharing extending to 15 Alaskan communities, while Kodiak residents received wild goods from 25 communities. Per capita harvest included 96.6 pounds of fish, 25 pounds of land mammals12 pounds of marine invertebrates and 5 pounds of wild plants and berries. Harvests in later study years were similarly high. The specific species, means of harvest, and preservation methods are discussed, as are geographic/ethnic differences in harvested resources. In general, Kodiak residents were not concerned about the effect of the *Exxon Valdez* oil spill on the safety of harvested resources, in part because increasing numbers of residents had not been in Kodiak at the time of the spill. It is suggested that the population has become increasingly transient and mobile. Of those surveyed, around 30% thought that clams were unsafe for children to eat, with 50% concerned

about shellfish poisoning, and 20% mentioning oil contamination. Reported sharing of resources had not apparently decreased in 1990 and 1991 from the levels of sharing before the spill.] KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kodiak Island, Kodiak City, Women's Bay, Chiniak Bay, Gulf of Alaska] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Native, fishermen, U.S. Coast Guard, sportsmen, children] SOCIAL_EFFECTS[sharing, subsistence-based community, immigration, demographic change, emigration] CULTURAL_EFFECTS[risk perception, risk communication] ECONOMIC_EFFECTS[commercial fisheries, harvest types, government employment, service sector, cost of living, per capita income] SUBSISTENCE_ACTIVITIES[hunting, fishing, plants, gear types, species, quantities, contamination fears, resource availability] CULTURAL_SUBSISTENCE[sharing] CITATION[Mishler, Craig. 1995. Old Harbor. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS] ABSTRACT/ANNOTATION[Old Harbor is located at the southeast end of Kodiak Island, at the narrows of Sitkalidak Strait. The population is above 200, and half the residents are of mixed Alutiiq and Scandinavian ancestry, with almost all the residents members of the Russian Orthodox Church. Those of Alutiiq-Scandinavian heritage are often involved in commercial fishing. Commercial fishing generally occupies its participants for six months out of the year, and while commercial fishing is the most common employment sector, with government employment second, slightly more personal income in Old Harbor derives from government work, which pays more, than from commercial fishing. Old Harbor includes a small boat harbor and a large dock, a clinic, an elementary and high school, and a new airport completed in 1993. The use of subsistence resources was particularly high in Old Harbor, and these resources contributed a significant proportion of foods consumed. All households used at least one wild resource, and all harvested at least one. Eighty-four different kinds of resources were harvested, and in addition an uncounted variety of wild plants were harvested. Levels of sharing were also high, and 95% gave away and 97% received at least one resource. Sharing with other communities involved seven recipient communities and gifts from twelve communities. Subsistence harvests contributed an important part to Old Harbor's economic health, and the harvest level was the third highest per capita among the study communities in 1991. Thirty-eight percent of households estimated that wild fish, meat, and poultry constituted between a quarter and a half of their yearly use. Around 60% of salmon were caught with subsistence gear. The amounts, species, harvest and preparation methods are discussed, as is the medicinal use of plants. About half of the residents surveyed thought their use of wild resources had declined since the *Exxon Valdez* oil spill, with the largest perceived decline in use of salmon, marine mammals and shellfish. The amounts of subsistence harvests declined considerably in the year following the oil spill, and by 1991/92 had begun to approach, but still did not equal, harvest levels before the spill. Concerns about eating subsistence foods were common in Alaskan communities after the spill, but by 1991/92 concerns were lower than in Prince William Sound and lower Cook Inlet. Only 19% of those surveyed said that the spill had negatively affected children's participation in subsistence activities, and over 90% liked living in their community just the same as before the spill. The researchers note that sharing is almost exclusively associated with subsistence foods rather than purchased foods, and that the cultural ethic of sharing and the support of the elderly through sharing would probably change with a change in diet.]

KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Old Harbor, Prince William Sound, Cook Inlet, Kodiak Island, Three Saints Bay, Sitkalidak Strait, Anchorage, Kodiak City, Akhiok, Fairbanks, Gambell, Karluk, North Naknek, Barrow, Bethel, Chalkyitsk, Kenai, Port Lions, south Naknek, Afognak, Alitak, Port Hobron] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alutiiq, Scandinavian, Alaskan Natives, Russian, commercial fishermen, children, elderly] SOCIAL_EFFECTS[subsistence-based community, sharing] CULTURAL_EFFECTS[sense of place, religion, sharing, cultural values] FAMILY_EFFECTS[children, enculturation, obligations, sharing with elderly] ECONOMIC_EFFECTS[commercial fishermen, government employment, government payments] MUNICIPAL_EFFECTS[infrastructure] SUBSISTENCE_ACTIVITIES[hunting, fishing, gear types, resource availability, harvest amounts, species, food preservation techniques, contamination fears] CULTURAL_SUBSISTENCE[sharing, enculturation, harvest methods, preservation methods, medicinal plants]

CITATION[Mishler, Craig, Rachel Mason, and Vicki Vanek. 1995. Ouzinkie. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[This is a community of over 200 residents on Spruce Island, near Kodiak Island. Around 87% of the residents are Alaskan Native, and employment was in commercial fishing, the school board, the village Native Corporation, longshoreman, and Native corporation provided the local income. Harvest levels and techniques, gear types, the species harvested, and medicinal uses of plants are presented. Residents have favorite subsistence hunting and fishing areas, and the researchers observe that some harvest areas and species have a highly symbolic value to the community. There was a dramatic decline in harvest levels after the oil spill, and levels did not return to pre-spill levels in subsequent years. It is speculated that subsistence harvests were permanently transformed after the spill, reflecting both reduced populations of animals and a dietary shift from subsistence foods to purchased foods. The change in tastes to purchased foodstuffs was influenced by the high cash incomes associated with cleanup work, and by large amounts of free groceries given to cleanup workers by Exxon and VECO. There were also perceived declines in resource availability. In the first year of this survey, the highest proportion (47%) of residents said they got 26-50 percent of their protein from wild foods, while in the third year the same proportion of residents said they got 1-25 percent of their protein from wild foods. A majority believed that the oil spill had not affected children's participation in subsistence activities. 96% of household share subsistence goods. Levels of political activity had not changed in the community, and residents liked living there as much as before the spill. Community members described the attractions of living in Ouzinkie, and said that if another oil spill were to prevent subsistence activity for six months, it would be a calamity.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Ouzinkie, Spruce Island, Kodiak Island, Kodiak Archipelago, Anton Larson Bay, Monashka Bay, Fort Abercrombie State Park, Marmot Bay, Afognak Island] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Ouzinkie Native Corporation, Russian, commercial fishermen, longshoremen, children, elderly, Unification Church] SOCIAL_EFFECTS[subsistence-based community, sharing, political activity, voting, leadership] CULTURAL_EFFECTS[sense of place, sense of community, cultural values,

sharing] ECONOMIC_EFFECTS[commercial fisheries, cleanup money, traditional vs. commercial economy, cash economy] MUNICIPAL_EFFECTS[infrastructure] SUBSISTENCE_ACTIVITIES[resource availability, contamination fears, species, subsistence methods, preservation methods, medicinal plants, favored locales, decreased harvest, change from subsistence foods to purchased foods] CULTURAL_SUBSISTENCE[sharing, enculturation, symbolic value of locales, symbolic value of species, change in attitudes towards subsistence foods]

CITATION[Mishler, Craig, Rachel Mason, and Jeffrey Barnhart. 1995. Larsen Bay. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS] ABSTRACT/ANNOTATION[Larsen Bay, on the west side of Kodiak Island, is inaccessible by road, and can be reached by air or water travel. It has a relatively young population of around 150 residents, and just over 80% are Alaskan Native. Commercial fishing provides most of the local income, and in 1993 included 6 purse seine permits, 3 beach seine permits, and 10 set gillnet permits. A local cannery purchases from residents but its employees are from outside the community. Income from government jobs, especially education, is the second highest source of income. The cash economy was stable over the three years of the study, the population decreased slightly, and those who remained had higher cash incomes. The amount of money spent by households on purchased foods was among the highest of the villages studied. 69% of the community took part in subsistence harvests in the first year, they shared resources with residents of 14 other Alaskan communities, and the per capita harvest was 295 pounds of food. which increased to 353 pounds in 1992/93, and 451 pounds in 1993/94. Trends in prior years had shifted, and in 1982/83 the harvest was 403 pounds, in 1986 it as 209 pounds, and in 1989 it was 212 pounds. 52% of the harvest was fish in the first year, and fish were 70% of the weight during the second study year, and 64% the third year. The chapter also notes processing techniques and the species harvested. Participation in subsistence activities was high, with over 90% of households harvesting, and all households using subsistence resources. Larsen Bay has become a popular site for sports hunters and fishermen from outside the community, and local subsistence users and hunters increasingly mentioned the depletion of resources by these outside sportsmen. Few of those surveyed expressed fears about seafood contamination. About half the household heads surveyed said that if subsistence resources became unavailable they would no longer live in Larsen Bay. Most of those surveyed in the first study year said they were sufficiently informed about the safety of eating subsistence foods after the oil spill. However, over the course of the three year study, the percentage of those who said they were uninformed remained constant, while the percentage of those who felt they had been informed declined.] KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Larsen Bay, Kodiak Island, Kodiak Archipelago Uyak Bay, Karluk, Kodiak City, Anchorage, Kenai] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Larsen Bay Tribal Council, Alaska Department of Fish and Game, Kodiak Area Native Association, commercial fishermen, sportsmen, hunters, fish processors, Alaskan Natives, elders, children, households] SOCIAL_EFFECTS[subsistence-based community, community obligations, sharing, support of the elderly, household size] CULTURAL_EFFECTS[risk communication] ECONOMIC_EFFECTS[commercial fisheries, fish processing, tourism industry] MUNICIPAL_EFFECTS[population decline, decreased household size, infrastructure,

subsistence community] SUBSISTENCE_ACTIVITIES[harvest amounts, species, participation in harvests, participation in processing, processing methods, medicinal plants, fishing methods, sharing, competition with sportsmen] CULTURAL_SUBSISTENCE[sharing, enculturation, sense of place]

CITATION[Mason, Rachel, and James A. Fall. 1995. Karluk. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[Karluk is a located on the west side of Kodiak Island, along the Shelikof Strait and at the mouth of the Karluk River. In the late 1800's, it had a population of hundreds, but in the 1990's it was 71 or less. It was a relatively young population, with an average age of 22.7 years, it was 95% Alaskan Native, and had a fairly long average residency in the community, 28 years. The population decline is attributed to a variety of factors, including an enduring family feud, and additional tensions that emerged after the *Exxon Valdez* oil spill. Employment in Karluk was scarce, and the per capita income of $6,924 was one of the lowest of the communities included in the study. The major source of income was service jobs, and a major sector of that business was providing guides for sports hunting and fishing. Income from employment at the local school was the other major source of income. In contrast to other communities, commercial fishing did not provide much income, and consisted of only an average of $90 per capita. Commercial fishing is less important in Karluk because it does not have a small boat harbor, and only one person owned a limited entry salmon fishing permit. Some young men in the village worked as crew on Kodiak or Larsen Bay fishing boats. Food expenditures in Karluk were higher than in the other communities surveyed in 1991/92, and the average expense was over eight hundred dollars per household. Over a third (38.5%) of those surveyed said their financial situation was about the same as before the EVOS, and the same proportion said their situation was worse than before the spill. The researchers note that the stressed condition of the economy were visible in the high unemployment rate, high food costs, decreasing population, and low per capita income. Subsistence uses of resources were high, and virtually all residents had used and harvested at least one wild resource. On average, Karluk households harvest a smaller range of resources than do other Kodiak communities, and Karluk's subsistence harvests concentrate on the major local resource, salmon. They shared resources within the community and with other communities. In 1991/92, 46%, estimated that between 26-50% of their protein came from wild resources. There was a substantial drop in subsistence harvests for the year following the *Exxon Valdez* oil spill. The pre-spill average was 618 pounds per capita, and that dropped to 255 pounds in 1989. Most of those surveyed identified the oil spill as the reason for the lower harvest, specifically cleanup work that interfered with harvesting, and contamination fears. The spill had social impacts, including unfilled jobs in tribal government, and animosities over cleanup hiring, wages, and income. Subsistence harvest recovered in 1990/91, to 401 pounds per capita, but in 1991/92 they had again dropped, to 269 pounds per capita, a pattern that contrasts with some other spill area communities such as Ouzinkie, Nanwalek, Port Graham, and Chenega Bay. Yet most villagers considered their subsistence uses the same or higher than before, few feared food contamination, most thought they had been well enough informed about food safety, and only 15% in 1991 indicated less sharing. Only 15% believed the spill had affected children's participation in subsistence activities, lower than the proportion of respondents in Prince William Sound, lower Cook Inlet,

and Ouzinkie. Karluk is a site for sports hunting and fishing, and sportsmen from all over the world visit and take resources for use, trophies, or catch and release. These activities compete with available subsistence harvests.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Karluk, Shelikof Strait, Kodiak Island, Karluk River, Larsen Bay, Ouzinkie, Nanwalek, Port Graham, Chenega Bay, Prince William Sound, lower Cook Inlet] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, tribal council, guides, sportsmen, children, educators] SOCIAL_EFFECTS[emigration, social conflict, subsistence-based community, sharing] CULTURAL_EFFECTS[sense of place, sharing] FAMILY_EFFECTS[children, enculturation] ECONOMIC_EFFECTS[financial strain, low income, cost of living, unemployment, tourism industry, employment outside community, government employment] MUNICIPAL_EFFECTS[civic posts unfilled, subsistence community] SUBSISTENCE_ACTIVITIES[decreased harvest, participation in harvest, species, techniques, contamination fears, sharing, competition with sportsmen, harvest amounts, no sustained recovery in harvests, children's participation, contribution to diet, medicinal plants] CULTURAL_SUBSISTENCE[sharing, enculturation, medicinal plants]

CITATION[Mishler, Craig. 1995. Akhiok. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[This isolated community is located on Alitak Bay at the south end of Kodiak Island. The population is small, with between 56 and 80 residents, and most of the increase occurred after the *Exxon Valdez* oil spill. At the time of the survey, 85% of the village was Alaskan Native, and it was a relatively young population, with 42% of the population under 14, and 7% over age 54. Akhiok and Karluk had the lowest per capita incomes in the Kodiak area. There was no local grocery store in Akhiok, and villagers traveled to the cannery at Wards Cove at Atilak to buy supplies. Travel to other communities is by air, and is expensive. This increases the cost of living in Akhiok. Harvest of wild foods was especially important given the low incomes, and participation in subsistence was high. All households harvested at least two resources, and used at least eight resources. There were high levels of sharing, with 83% of households giving, and 96% of households receiving, wild resources. The average per capita harvest in 1992/93 was 322 pounds. The harvest and preservation techniques, and the species harvested, are discussed. The researchers note that since 1983 the estimated pounds of subsistence harvest have been variable, and have not shown a particular trend. Akhiok is heavily dependent on subsistence foods to maintain the economy, because of the low income, and the added costs of purchased supplies. The *Exxon Valdez* oil spill did not appear to have a negative impact on subsistence activity in Akhiok. However, participation in clean-up activities added significantly to the earned income in 1989, and household income was more than double in 1989 the levels in 1992/93, though this partly relates to a larger household size in 1989 and more nuclear households in 1992/93.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Akhiok, Karluk, Kodiak Island, Alitak, Moser Bay, Olga Bay, Wards Cove] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alutiiq, Russian Orthodox] SOCIAL_EFFECTS[subsistence-based community, absence of local services, sharing] CULTURAL_EFFECTS[sharing, religion] ECONOMIC_EFFECTS[unemployment,

low income, government employment, cleanup money, subsistence economy, cost of living] MUNICIPAL_EFFECTS[infrastructure, subsistence community] SUBSISTENCE_ACTIVITIES[dependence on subsistence, harvest amounts, harvest methods, species, no decrease after EVOS, sharing] CULTURAL_SUBSISTENCE[sharing, dependence on subsistence]

CITATION[Fall, James A., and Craig Mishler. 1995. Port Lions. *In* Volume IV: Kodiak Island. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[This community was founded in 1965 by villagers who left Afognak, which used to be an Alutiiq village on Afognak Island. Residents left Afognak after years in which their subsistence activities were restricted or forbidden by a federal mandate creating a Fish Culture Reserve. In 1993/94, Port Lions had a population of around 236, and 66% of the residents were Alaskan Native. Port Lions is located on the north side of Kodiak Island, at Settlers Cove in Kizhuyak Bay, near the mouth of the Kizhuyak River. But many of the traditional fishing areas are near Afognak. The village included a Russian Orthodox and a Protestant Church, and lodges for hunters and fishermen, but the only grocery store had closed. Most households have cars or trucks, and Port Lions has a large boat harbor and houses a fairly large fishing fleet for commercial and subsistence fishing. The road system spans ten miles, and links the air strip and the ferry dock. The per capita income in Port Lions was higher than that in any of the other Kodiak Island villages in the years studied. Major sources of income and employment came from commercial fishing, government employment, and the transportation, communications and utilities sector. In 1989, the year of the EVOS, subsistence harvests declined 52% in comparison to averages of pre-spill years. The majority of households blamed the spill for the decrease, citing contamination fears and the involvement of residents in cleanup rather than subsistence. In 1993/94 subsistence harvest had recovered to pre-spill levels, and 92% of residents harvested at least one resource, and all households used, harvested, and shared resources.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Port Lions, Kodiak Island, Settlers Cove, Kizhuyak Bay, Kizhuyak River, Afognak] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Native, federal government, Alutiiq, Secretary of Commerce, Secretary of Labor, Russian Orthodox, Protestant, sportsmen, commercial fishermen] SOCIAL_EFFECTS[subsistence-based community, sharing] ECONOMIC_EFFECTS[per capita income, decreased harvests, cleanup employment] MUNICIPAL_EFFECTS[infrastructure] SUBSISTENCE_ACTIVITIES[decreased harvest, species, harvest methods, contamination fears, participation in harvests] CULTURAL_SUBSISTENCE[traditional locales, traditional harvest techniques]

CITATION[Hutchinson-Scarbrough, Lisa. 1995. Chignik Bay. *In* Volume V: Alaska Peninsula and Arctic. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[This community of between 130 and 190 residents is located at the southern end of Chignik Bay, at the head of Anchorage Bay. In 1992, it was estimated that 52% of the residents were Alaskan Native. Commercial fishing, including both fishing and fish

processing, is the major economic sector in terms of income and employment. There was also employment in local government, the school, health clinic, and stores. Chignik Bay is an incorporated city, with a mayor, city council and administrator, and Far West Inc. village corporation represents the Native population, and the Bristol Bay Native Corporation was also important in the community. The infrastructure is fairly developed, and includes a school, gymnasium, post office, firehouse, airstrip, two stores, health clinic, radio station, two churches and two seafood processing plants. 40% of those surveyed said their financial situation was better in 1991/92 than during the year before the *Exxon Valdez* oil spill, and a third said it was worse. Subsistence contributes an important part to the diet. 83% of the residents attempted to harvest resources, and subsistence resources were used by all households. Sharing was common, and 97% received, and 63% gave away wild resources. Per capita subsistence harvest increased from 1984 to 1989, from 188 pounds to 209 pounds, and then increased in 1991/92 to 357 pounds. Subsistence techniques, gear types, amounts, and preservation methods are discussed. The researcher mentions that communities close to the spill had a greater decrease in wild resource sharing than did the Chignik area communities. Commercial fishermen, fish processors, businesses and the municipality suffered a loss of income and were uncertain about the long-term damage to resources, and were concerned about the safety of eating subsistence foods, but also felt a need to harvest more subsistence foods to make up for lost income. There were social impacts due mostly to lost income, including increased conflicts between people, more stress and alcohol use, and clinical depression. During 1989, the spill caused confusion, disruption, stress, and anger. Fears about the safety of subsistence foods, about how to manage without them, and about lost income were the major concerns. Only a few Chignik Bay residents worked on oil spill cleanup or test fishing. By 1992 most residents felt the community was back to normal, but believed they had not necessarily recovered the losses they suffered in 1989. While 83% of those surveyed said they liked living there as much as before the EVOS, some of the 12% who liked living there less mentioned decreased resource availability and community conflict, and that community differences had been brought to the fore. About half the respondents thought they were provided with enough information about the safety of subsistence foods.]

KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Chignik Bay, Chignik Lake, King Salmon, Anchorage Bay, Aleutian Range, Alaska Peninsula] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Russian, Alaskan Natives, Exxon, VECO, Far West Inc. Village Corporation, Bristol Bay Native Corporation, elders, children, leaders, fishermen] SOCIAL_EFFECTS[subsistence-based community, social conflict, leadership, sharing] CULTURAL_EFFECTS[sense of place, sense of community] FAMILY_EFFECTS[parent-child conflicts, parent absence] ECONOMIC_EFFECTS[economic loss, fiscal loss, financial recovery, economic sectors] PSYCHOLOGICAL_EFFECTS[stress, alcohol abuse, inter-personal conflict, fear, worry, anger] SUBSISTENCE_ACTIVITIES[harvest amounts, harvest methods, species, preservation methods, decreased harvest, sharing, dependence on subsistence] CULTURAL_SUBSISTENCE[sharing, enculturation, health beliefs]

CITATION[Hutchinson-Scarbrough, Lisa. 1995. Chignik Lake. *In* Volume V: Alaska Peninsula and Arctic. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]

ABSTRACT/ANNOTATION[This Alaska Peninsula community is located near the mouth of Chignik Lake, on a pass that leads through the Aleutian Range from Bristol Bay to the Pacific Ocean. The population numbers around 130, and 92% are Alaskan Native. The village is part of the Lake and Peninsula Borough, and is governed by a village council, which employs an administrator and a clerk. Chignik River, Limited is the village's Native Corporation. The village includes a post office, Russian Orthodox Church, health clinic and school district, and airstrip. Commercial fishing is the major source of income and employment, the school system is second, and the health corporation and the local village corporation are also employers. Subsistence foods supplement the diet and a third of households surveyed estimated that 26 to 50% of their meat, fish and poultry were from subsistence foods. 79% of residents harvested and 64% processed wild foods; on average, households used 24 kinds of resources, which was the greatest 'use' variety of the communities included in the study. Sharing was common, and 96% of households received resources and 92% gave resources, and there was sharing with at least 18 other Alaskan communities. Harvest amounts, techniques, gear types and species are discussed, as are preservation methods. The study finds that the spill had a greater impact financially and emotionally on villagers than through the loss of subsistence harvests. Economic difficulties were worse in Chignik Lake than in Chignik Lagoon or Chignik Bay, because the average income is lower, and Chignik Lake residents did not have the savings to cover the year of lost income. Some fishing permit holders had to foreclose on loans and sell their fishing permits and their boats. Since they planned to pass these permits and boats to their children, their losses had wider implications. The average Exxon damage claims provided $4,018.18 per household in 1989, none in 1990, and only one resident worked on spill clean-up. Few survey respondents thought that children participated less in harvests, while in communities closer to the spill such as Tatitlek and Nanwalek, over 50% of respondents noted this change. There was also little change in Chignik Lake with respect to sharing of resources, in comparison to communities nearer the spill. A portion, but not a majority, of residents thought there were less salmon and ducks in 1991 than in 1988. About 60% of those surveyed thought they had been adequately informed about the safety of subsistence foods. The researcher notes that residents suspect that the effects of the spill are just beginning to become apparent, with tar balls washing onto the beaches, lower levels of salmon, clams, and eider ducks, and observations of diseased fish and empty clam shells. However for other villagers, their lives and subsistence activities have returned to normal.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Chignik Lake, Alaska Peninsula, King Salmon, Aleutian Range, Bristol Bay, Port Heiden, Tatitlek, Nanwalek, Chignik Bay, Chignik Lagoon, Chignik River, Anchorage Bay] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, elders, leaders, children, Exxon, commercial fishermen, boat owners, fishing permit holders, parents] SOCIAL_EFFECTS[subsistence-based community, sharing] CULTURAL_EFFECTS[sharing, sense of place] FAMILY_EFFECTS[inheritance, enculturation] ECONOMIC_EFFECTS[economic loss, foreclosures] MUNICIPAL_EFFECTS[infrastructure] SUBSISTENCE_ACTIVITIES[harvest amounts, harvest methods, species, preservation methods, resource availability, dependence on subsistence, sharing, children's participation] CULTURAL_SUBSISTENCE[enculturation, sharing]

CITATION[Magdanz, James, Susan Georgette, and Jimmie Evak. 1995. Kotzebue. *In* Volume V: Alaska Peninsula and Arctic. Alaska Department of Fish and Game, Division of Subsistence.

1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS] ABSTRACT/ANNOTATION[This community is far from the site of the spill, and experienced no direct impacts, though cleanup provided a small number of jobs for businesses associated with the Native Corporation NANA. The town is located 26 miles north of the Arctic Circle on Kotzebue Sound in northwest Alaska. It is 600 miles north and west of Valdez, and is not connected to the rest of Alaska by road or rail; access to Kotzebue is by boat, snow machine, dog team and air. It has a population of around 3,000, and between 75 and 85% are Alaskan Native. Kotzebue provides a regional center of government and services for dispersed communities in the area. The primary sources of employment and income are from government, services, commercial fishing and retail trade. It has a relatively high rate of employment and income, with an estimated per capita income in 1991 of $12,686. Subsistence activities provided a major portion of the diet in Kotzebue, up to 25% of protein for a third of the population, and between 26 and 50% for a quarter of the population. Harvest amounts, species, fishing permit structure, and preservation techniques are discussed. Activities included gathering wild plants (for food and medicinal uses), fishing, hunting, and trapping. Harvests and sharing were not substantially different in the years before and after the spill. Sharing took place within Kotzebue, with 35 Alaskan communities, and places outside the State. In 1986 the per capita harvest was 398 pounds per capita, and was even higher, 518 pounds per capita, among Native residents of Kotzebue. There are two Native Corporations, the Northwest Alaska Native Association and the Kikiktagruk Inupiat Corporation, and the NANA has a fairly strong political role locally. According to survey respondents, political participation and ideas about leadership were not changed after the spill.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kotzebue, Arctic Circle, Valdez, Kotzebue Sound, Northwest Arctic Borough, Red Dog Mine] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[government workers, Alaskan Natives, Inuit, Inupiat, Northwest Alaska Native Association] ECONOMIC_EFFECTS[cleanup employment] SUBSISTENCE_ACTIVITIES[subsistence unaffected]

CITATION[Magdanz, James, Susan Georgette, and Ronald T. Stanek. 1995. Kivalina. *In* Volume V: Alaska Peninsula and Arctic. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS] ABSTRACT/ANNOTATION[No impacts of the spill are indicated in this community far from the spill site. However knowledge about the *Exxon Valdez* spill may have affected local opinions, and villagers expressed serious doubts that either a large or a small spill could be contained. The development of the Red Dog mine was associated with an incident of water contamination with serious local impacts; in another experience with development, a local road was said to have decreased the availability of caribou. This small Inuit community is located around 80 miles above the Arctic Circle, northwest of Kotzebue, and near Cape Thompson. About 95% of the population is Alaskan Native. There is no centralized water and sewer system, except for at the school and clinic, and access to the village was by air, by boat when there was open water, and by snow machine and dog team in the winter. The per capita income in 1992 was around $7,000, with earned income from government, mining, trade, and service, and a fairly small contribution from commercial fishing. There was considerable reliance on subsistence, and an average harvest of 761 pounds per capita, with the majority coming from

marine mammals, big game, and fish. The overall harvest level remained stable over the decade of the mid 1980's to mid 1990's, but there were variations in levels of particular resources. Wild food consumption was higher in Kivalina than in any of the other study communities. There was confidence in the safety of wild foods, and most respondents thought that sharing practices had not changed. Harvest amounts, species, and preservation techniques are mentioned. There was the view that greater development of offshore oil and gas would have a negative impact on the availability of subsistence resources.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kivalina, Arctic Circle, Kotzebue, Chukchi Sea, Noatak, Corwin Lagoon, Kivalina Lagoon, Wulik River, DeLong Mountains, Mulgrave Hills, Point Hope, Red Dog Mine, Cape Thompson, Northwest Arctic Borough, Noatak Valley] EVENT_PHASE[pre-spill, spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Inuit, Inupiat, Northwest Alaska Native Association, Joint Federal-State Land Use Planing Commission for Alaska]
CULTURAL_EFFECTS[political attitudes, beliefs about technology, trust in development, belief in efficacy of spill cleanup] SUBSISTENCE_ACTIVITIES[high subsistence levels]

CITATION[Pedersen, Sverre. 1995. Kaktovik. *In* Volume V: Alaska Peninsula and Arctic. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[The social effects portion of the survey was not carried out in this community, and thus there is no information on social impacts of the *Exxon Valdez* spill. This is a small community on Barter Island, about 120 miles east of Prudhoe Bay and near the Arctic National Wildlife Refuge. About 85% of the population of near 200 is Alaskan Native. Subsistence provides a major portion of dietary protein, and in 1992 the subsistence harvest was 886 pounds of edible weight per capita. Most of this came from the higher than average whale harvest that year.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kaktovik, Barter Island, Beaufort Sea coast, Prudhoe Bay, Arctic National Wildlife Refuge, Arey Lagoon, Kaktovik Lagoon, North Slope Borough, Barrow] EVENT_PHASE[pre-spill, post-spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Kaktovik City Council]
SUBSISTENCE_ACTIVITIES[harvest amounts, species]
CITATION[Pedersen, Sverre. 1995. Nuiqsut. Alaska Department of Fish and Game, Division of Subsistence. 1995. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Prepared for Minerals Management Service, Alaska OCS]
ABSTRACT/ANNOTATION[Impacts of the *Exxon Valdez* oil spill are not discussed. Nuiqsut is located about 150 miles southeast of Barrow. It is incorporated as a second class city, and it is part of the North Slope Borough. Access to Nuiqsut is by air. The population is around 350, and 89% are Alaskan Native. The population depends on subsistence foods because purchased foods are expensive and sometimes unavailable. Subsistence foods are considered healthier, and are preferred as part of local tradition. Subsistence provides most of the protein in the diet. In 1993, the harvest was 742 pounds per capita, and consisted primarily of fish, mammals, and marine mammals. Sharing of resources was common, with 91% of households giving, and 98% or households receiving at least one resource. Income earned through employment provides for housing, heat and other living expenses. Income sources are local government and education, finance, insurance real estate and construction, services, trade, and so forth.]

KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Nuiqsut, Nechelik Channel, Colville River, Barrow, Prudhoe Bay, Arctic Ocean, Kaktovik, North Slope Borough] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Inupiat, Nuiqsut City Council] SUBSISTENCE_ACTIVITIES[harvest amounts, species]

CITATION[Andres, B.A. 1995. The effects of the *Exxon Valdez* oil spill on black oystercatchers breeding in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 12, Restoration Study Number 17). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-204292).]

CITATION[Babcock, M.B. and J.W. Short. 1996. Prespill and postspill concentrations of hydrocarbons in sediments and mussels in intertidal sites within Prince William sound and the Gulf of Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Coastal Habitat Study Number 1B). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194824).]

CITATION[Babcock, M.M., P.M. Harris, S.D. Rice, R. J. Bruyere, and D.R. Munson. 1995. Recovery monitoring and restoration of oiled mussel beds in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 93036). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Babcock, M.M., S.D. Rice, and P.M. Harris. 1995. Recovery monitoring and restoration of oiled mussel beds in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 93036). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Babcock, M.M., S.D. Rice, P.M. Harris, and C.C. Brodersen. 1996. Recovery monitoring and restoration of intertidal oiled mussel beds in Prince William Sound impacted by the *Exxon Valdez* oil spill: 1991 and 1992. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Annual Report (Restoration Study Number 103-1). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Ballachey, Brenda. 1995. Biomarkers of damage to sea otters in Prince William Sound, Alaska following potential exposure to oil spilled from the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-1). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Bittner, Judith E. and Douglas R. Reger. 1995. 1994 EVOS report. Anchorage, Alaska: Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Office of History and Archaeology.]
ABSTRACT/ANNOTATION[The Spill Area Site Protection and Collection Plan was an additional aspect of archaeological site protection identified by requests from a number of concerned communities and organizations. As part of this, there was a need to determine the need for repositories for collections, and to assess existing facilities. Local museums in the Prince William Sound and Homer areas were visited for this purpose -- to describe existing

museums and assess their suitability for housing archaeological collections generated from *Exxon Valdez* oil spill related activities. Individuals in local communities, Native corporations, and governmental agencies were interviewed to determine what kinds of site protections programs existed in the spill area. At the same time, those groups were polled to determine what facility and program needs were perceived on the local as well as the regional level. Recommendations were: 1) a regional repository should be supported, 2) small local storage and display facilities should be supported, 3) site monitoring should continue and a stewardship program should be encouraged, and 4) public education in support of archaeological site protection should be supported for long term site protection.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Cordova, Valdez, Seward, Homer, Kodiak, Eyak, Tatitlek, Chenega, Port Graham, Nanwalek, English Bay, Karluk] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, local government, state government] SOCIAL_EFFECTS[local resources] REMAINDER[archeology]

CITATION[Bodkin, J.L. and M.S. Udevitz. 1996. 1993 Trial aerial survey of sea otters in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93043-2). Anchorage, AK: National Biological Service.]

CITATION[Bodkin, J.L. and M.S. Udevitz. 1995. An intersection model for estimating sea otter mortality from the *Exxon Valdez* oil spill along the Kenai Peninsula, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-5). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194980).]

CITATION[Bodkin, J.K., D.M. Mulcahy, C.J. Lensink. 1996. Age-specific reproduction in female sea otters (Enhydra Lutris) from Southcentral Alaska: analysis of reproductive tracts. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-4). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Bowman, T.D., P.F. Schempf, and J.A. Bernatowicz. 1993. Effects of the *Exxon Valdez* oil spill on bald eagles. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 4). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-204250).]

CITATION[Braddock, J.F., B.T. Rasley, T.R. Yeager, J.E. Lindstrom, and E.J. Brown. 1992. Hydrocarbon mineralization potentials and microbial populations in marine sediments following the *Exxon Valdez* Oil Spill. *Exxon Valdez* State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 1B). Fairbanks, AK: University of Alaska Fairbanks (NTIS No. PB96-194626).]

CITATION[Braddock, J.F. and Z. Richter. 1995. Microbiology of subtidal sediments: monitoring microbial populations. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93047-2). Fairbanks, AK: University of Alaska Fairbanks (NTIS No. PB96-194816).]

CITATION[Braund, Stephen & Associates and Peter Usher. 1993. The effects of the *Exxon Valdez* oil spill on Alutiiq culture and people. Anchorage. Stephen R. Braund & Associates.]
ABSTRACT/ANNOTATION[This report was prepared in support of Native litigation against Exxon. Braund et al. conducted field research and synthesized other primary data to describe the effects of the EVOS on Native communities. The report presents a brief overview of the history of Alutiiq peoples in Alaska, including an argument that subsistence is an essential element of Alutiiq culture in several ways. Subsistence describes the relationship of food and place, the relationship of humans to nature and resources, the transfer of knowledge between generation, and the expression of cultural autonomy. As part of Alutiiq culture, subsistence has both economic, social, and psychological importance. The report next provides a brief overview of the EVOS as a technological disaster, then discusses the impacts to Native culture and communities. The authors present a discussion that identifies the following impacts: decline in the quality of environment and resource quality and quantity; increased uncertainty about subsistence; uncertainty about the safety of subsistence resources; invalidation of traditional environmental knowledge; and, uncertainty about the future. The report summarizes studies of subsistence and concludes the following specific impacts to subsistence: decline in culturally significant elements of the subsistence system; decline in subsistence participation; decline in cooperative hunting, fishing, and gathering; decline in sharing; decline in satisfaction in eating Alutiiq foods; decline in integrity of place; and, decline in autonomy. The authors then argue that damage to the core elements of Native communities – the natural resource base or kinship system – "damages the culture and the people."]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Native villages] EVENT_PHASE[spill, post-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alutiiq] CULTURAL_EFFECTS[culture loss, enculturation, subsistence traditions, traditional knowledge, cultural identity] SUBSISTENCE_ACTIVITIES[decreased subsistence activity, decreased harvest] CULTURAL_SUBSISTENCE[change in attitudes towards subsistence foods, cultural meaning of subsistence, stewardship of the environment, traditional knowledge, uncertainty about future, sharing, self-reliance, cooperation]

CITATION[Brelsford, Taylor, Ann Fienup-Riordan, Joseph Jorgensen, Steven McNabb, Patricia Petrivelli, Lynn Robbins, and Michael Galginaitis. 1992. Social indicators of Alaskan coastal villages: I key informant summaries; volume 1, schedule A regions. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 151, OCS Study MMS 92-0031. New Haven, Connecticut: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This volume one of a two-volume set of key informant summaries from the social indicators studies of seven different regions of Alaska. The Schedule A regions, covered in this volume, include the North Slope region, the NANA region, the Calista region, and the Aleutian-Pribilof Islands region. This volume does not cover communities in the *Exxon Valdez* spill region, but it does provide an introduction to the study that is not recapitulated in Volume 2 (that does cover *Exxon Valdez* spill area communities, and specific spill impacts).]
KEYWORDS: SOURCE_TYPE[report volume] GEOGRAPHY[North Slope, NANA, Calista, Aleutian-Pribilof Islands] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[key informants, interviewees] REMAINDER[interview summaries]

CITATION[Brown-Schwallenburg, Patty, Jeff Hetrick, and David Daisy. 1996. Nanwalek/Port Graham/Tatitlek subsistence clam restoration. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95131). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division.]
ABSTRACT/ANNOTATION[Clams were once a major subsistence resource in the Native communities of Nanwalek and Port Graham in lower Cook Inlet and Tatitlek in Prince William Sound. The use of clams as a subsistence food source has been greatly reduced as a result of a lack of confidence by villagers in the safety of shellfish after the *Exxon Valdez* oil spill. In addition, local clam populations have been on the decline in recent years as a result of sea otter predation and changing currents and beach patterns. The 1995 objectives of this study were to identify clam species to use in restoration efforts, identify and clear clam brood stock for hatchery use, demonstrate hatchery and nursery capabilities to produce clam seed for 1996, and to identify and survey restoration sites near the project villages.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Kenai Peninsula, lower Cook Inlet, Nanwalek, English Bay, Port Graham, Tatitlek] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] SOCIAL_EFFECTS[subsistence-based community] ECONOMIC_EFFECTS[economic diversification] SUBSISTENCE_ACTIVITIES[clamming, decreased harvest, contamination fears, contaminated resources, restoration of subsistence]

CITATION[Byrd, G.V., E.P. Bailey, and W.H. Stahl. 1995. Introduced predator removal from islands. *Exxon Valdez* Oil Spill restoration Project Final Report (Restoration Project 95041). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Carls, M.G., S.D. Rice, and R.E. Thomas. 1995. The impact of exposure of adult pre-spawn herring (Clupea harengus pallasi) on subsequent progeny. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94166). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Chugach Regional Resource Commission. 1995. Community involvement/traditional ecological knowledge project. *Exxon Valdez* Oil Spill Trustee Council detailed project description (restoration project 96052). Anchorage, AK: Chugach Regional Resource Commission.]
ABSTRACT/ANNOTATION[Project 96052 would continue and expand on the original concept of increasing community involvement in the restoration process begun under 95052. The project originated in 1995 and is scheduled to run through 2002, with an annual budget of $250,000. The project has two major components: community involvement and traditional ecological knowledge. Under the community involvement component a spill area-wide coordinator will be hired through a contract with Chugach Regional Resources Commission to serve as a liaison between the communities and the existing network of scientists, agency personnel, restoration office personnel, and the Trustee Council. Through direct communications with a network of local facilitators the spill area-wide coordinator will actively involve local residents in the restoration program, particularly on-going scientific studies. The second project component, Traditional Ecological Knowledge (TEK), will consist of a pilot effort with the potential to integrate western science and local TEK to further the Trustee Council's restoration program. No annual or final reports have been issued for this project.]
KEYWORDS: SOURCE_TYPE[project description] GEOGRAPHY[Prince William Sound, Kenai Peninsula, lower Cook Inlet, Chenega, Tatitlek, Port Graham, Nanwalek, English Bay, Eyak, Seward, Valdez] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] SOCIAL_EFFECTS[community stability, social disruption, subsistence-based community] CULTURAL_EFFECTS[traditional knowledge] CULTURAL_SUBSISTENCE[symbolic expression of culture]

CITATION[Cohn, Ruth E. and William A. Wallace. 1992. The role of emotion in organizational response to a disaster: an ethnographic analysis of videotapes of the *Exxon Valdez* accident. Boulder, CO: Natural Hazards Research and Applications Information Center, Institute of Behavioral Science, University of Colorado. Working paper #74.]
ABSTRACT/ANNOTATION[The report discusses four videotapes which were produced in the six months following the *Exxon Valdez* oil spill. The four tapes were produced by four different organizations, Exxon corporation, the U.S. Coast Guard, the Cordova District Fishermen United, and the Public Broadcasting System's NOVA. The report compares the emotional quality of the interviews and the emotional persuasion of the visual imagery presented in these four tapes.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska, Cordova] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, U.S. Coast Guard, Cordova District Fishermen United, fishermen, residents, Public Broadcasting System] PSYCHOLOGICAL_EFFECTS[emotional expression]

CITATION[Cooney, R.T. 1995. Sea90: Sound ecosystem assessment (SEA) - and integrated science plan for the restoration of injured species in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94320). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Section.]

CITATION[Corbett, D.G. and D. Reger. 1994. Development of Alaska heritage stewardship program for protection of cultural resources at increased risk due to the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report

(Restoration Study Number 104A). Homer, AK: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge (NTIS No. PB96-204284).]

CITATION[Craig, A.K., B.G. Bue, and T.M. Willette. 1996. Injury to pink salmon embryos in Prince William Sound - field monitoring. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95165). Cordova, AK: Alaska Department of Fish and Game, Genetics Laboratory.]

CITATION[Craig, A.K., B.G. Bue, and S. Sharr. 1995. Feasibility of wildstock tetracycline otolith marking in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94320C). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Dahlheim, M.E. and O. Von Ziegesar. 1993. Effects of the *Exxon Valdez* oil spill on the abundance and distribution of humpback whales (Megapteranovaeangliae) in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 1). Seattle, WA: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194634).]

CITATION[Dahlheim, M.E. and C.O. Matkin. 1994. Assessment of injuries and recovery monitoring of Prince William Sound killer whales using photo-identification techniques. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93042/94092). Seattle, WA: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194667).]

CITATION[Dahlheim, M.E. and C.O. Matkin. 1993. Assessment of injuries to killer whales in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine mammal Study Number 2). Seattle, WA: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194642).]

CITATION[Day, R.H. and D.A. Nigro. 1996. Status and ecology of Kittlitz's murrelet in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 96142). Fairbanks, AK: ABR, Inc.]

CITATION[DeGange, A.R., D.C. Douglas, D.H. Monson, and C.M. Robbins. 1995. Surveys of sea otters in the Gulf of Alaska in response to the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-7). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-1195003).]

CITATION[Dekin, Albert A. Jr. et al. 1993. *Exxon Valdez* oil spill archaeological damage assessment. Produced and edited by Leslie Green. Anchorage, AK: Preston, Thorgrimson, Shidler, Gates, and Ellis.]

CITATION[DeVelice, R.L., C. Hubbard, M. Potkin, T. Boucher, and D. Davidson. 1995. Characterization of upland habitat of the marbled murrelet in the *Exxon Valdez* oil spill area. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93051B). Anchorage, AK: USDA Forest Service, Chugach National Forest (NTIS No. PB96-194931).]

CITATION[DiCostanzo, C. and B.P. Simonson. 1993. Database management. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 30). Juneau, AK: Alaska Department of Fish and Game, Division of Commercial Fisheries.]

CITATION[Donald, R., R. Cook, R. Bixby, R. Benda, and A. Wolf. 1990. The stress related impact of the Valdez oil spill on the residents of Cordova and Valdez, Alaska. Valdez, AK: Valdez Counseling Center.]
ABSTRACT/ANNOTATION[The Valdez Counseling Center conducted a 3 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 Epidemiologic 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. The Valdez Counseling Center survey produced the following major findings: residents of Cordova and Valdez experienced 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; and, no relationships were found between emotional distress and occupation, age, gender, and other demographic variables. Among Valdez respondents, stressors were most related to the impact of the influx of outsiders into the community. Among Cordova residents the stressors were related to social disruption and concern about the future of commercial fishing.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Valdez, Cordova] EVENT_PHASE[post-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[residents, Valdez Counseling Center] SOCIAL_EFFECTS[demographic characteristics, community disruption, social support, population increase] ECONOMIC_EFFECTS[commercial fishing] PSYCHOLOGICAL_EFFECTS[stress, social support, depressive symptoms] MUNICIPAL_EFFECTS[influx of outsiders]

CITATION[Doroff, A.M., and A.R. DeGange. 1995. Experiments to determine drift patterns and rates of recovery of sea otter carcasses following the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-9). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194972).]

CITATION[Dragoo, D.E., G.V. Byrd, D.G. Roseneau, D.A. Dewhurst, J.A. Cooper, and J.H. McCarthy. 1995. Population levels and reproductive performance of murres based on observations at breeding colonies four years after the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study Number 11). Homer, AK: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge (NTIS No. PB96-204268).]

CITATION[Duffy, D.C. 1996. APEX: Alaska predator ecosystem experiment. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95163). Anchorage, AK: Alaska Natural Heritage Program, University of Alaska.]

CITATION[Edmundson, J.A., G.B. Kyle, and S.R. Carlson. 1995. Restoration of Coghill Lakes sockeye salmon: 1994 annual report on nutrient enrichment restoration. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94259). Soldotna, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Endter-Wada, Joanna, John Hofmeister, Rachel Mason, Steven McNabb, Eric Morrison, et al. 1993. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 1 (Cordova, Tatitlek, Valdez). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This volume considers socioeconomic variables and social impacts of the *Exxon Valdez* spill on three of the communities in the area affected by the spill. The volume contains chapters on Valdez, Cordova, and Tatitlek, and they are organized differently. The chapter on Valdez includes an historical and descriptive overview of the community, a section on the economy with subsections on commercial fishing, fish processing, tourism, transport, the public sector, small businesses, and housing, and a section on the sociology of the spill and its effects. The Cordova chapter contains an historical and socio-economic overview, a section on Alaskan Natives in Cordova in terms of culture, social-political organization and economy, a section on the impacts of the spill on the fishing sector of the economy, another section on the non-fishing private sector impacts of the spill (entries include housing, labor, conflicts within the business community, and entries for various service providers), a section on impacts on city government and a summary section. The chapter on Tatitlek includes a background and a section on the effects of the spill through 1991, including the economy, attribution of blame for the spill, human intervention, subsistence, an leadership. An introduction provides an summary discussion of research findings for 'schedule C' communities, in terms of general socioeconomic differences among them, and the impact of the spill. It notes that in much of rural Alaska, the presence of commercial fishing and fisheries businesses are associated with high incomes and available jobs, and they provide much of the private sector activity in rural Alaska. It also notes that the communities with a high proportion of oil industry employment are sociologically distinct from other communities in the sample. The report also makes a distinction between 'hub' communities and 'periphery' communities. The hub communities are larger and more economically diverse, and they have a larger public sector. In terms of spill impacts, the report concludes that a community's proximity to the spill is not sufficient to explain residents' perceived exposure to the spill, the spill's impact on resources, or risks. Instead, small communities (such as Tatitlek, Chignik), those close to visible effects of the spill (Valdez, Cordova, Tatitlek) and communities where fishing is the dominant economic sector (Cordova) are likelier to perceive decreases in fish resources, and the perceptions are strongest in communities where these factors of size, visibility, and fishing economy overlap. It concludes that despite some economic benefits provided by cleanup work, small communities with undiversified resource-export economies are especially vulnerable to the spill's impacts. While they may benefit from cleanup funds, in order to gain benefits residents of these

communities more often have to make adjustments, such as moving, than do those in larger communities. Those nearer the spill were more likely to blame the State for the spill, while those in more distant communities more often blamed Exxon and the ship's captain. Demographic variables are associated with differences in perceptions and impacts. Decreased fish resources are likelier to be noticed by younger respondents, who also expressed more pessimism about oil development. Native Alaskans faced certain disproportionate economic impacts: they more often had to move in order to secure work in the cleanup, their work tenure was less secure, they more often faced property loss, and they expressed more doubt about the benefits of oil development. Those in less secure circumstances faced greater disruption in order to benefit from cleanup work: Half of the single parents in the sample relocated for cleanup work, and the children were placed in various transitional-care situations. Those with less employment history had more trouble gaining employment. Overall, the report concludes that the existing social and political patterns, of underdevelopment in rural areas, dominance of urban centers, lesser economic access for Native Alaskans, were mirrored in differential impacts of the spill.]
KEYWORDS: SOURCE_TYPE[report volume] GEOGRAPHY[Valdez, Cordova, Tatitlek, Chignik, Kodiak City, Tyonek, Seldovia, Kenai, Karluk, Old Harbor] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, children, families, fishermen] SOCIAL_EFFECTS[emigration, immigration] FAMILY_EFFECTS[parent absence, childcare] ECONOMIC_EFFECTS[economic diversification, economic gain, economic loss, property loss] MUNICIPAL_EFFECTS[operational disruption]

CITATION[Robbins, Ed. 1993. Valdez. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 1 (Cordova, Tatitlek, Valdez). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This chapter observes that after the spill there was increased social division and tension between oil industry employees and those employed elsewhere, and between those who benefitted from the spill and those who did not, though the tensions were not as high as elsewhere in the Prince William Sound area. To some extent residents have become less community oriented and more insular, because of the social tensions and overcrowding during the cleanup efforts. In the post cleanup period, the housing market continued to be competitive because housing had not become more available, and there was a lasting turnover in the population with some residents leaving and others arriving. While social changes were viewed as largely negative, economic changes were perceived as positive.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Valdez] EVENT_PHASE[pre spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, oil industry employees, residents] SOCIAL_EFFECTS[increased insularity, alienation, social conflict, emigration, immigration] ECONOMIC_EFFECTS[economic gain] MUNICIPAL_EFFECTS[population turnover, overcrowding]

CITATION[Reynolds, Stephanie. 1993. Effects of the 1989 *Exxon Valdez* oil spill on Cordova, Alaska. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 1 (Cordova, Tatitlek, Valdez). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]

ABSTRACT/ANNOTATION[There were conflicts over the operation of Exxon during the cleanup, including a lawsuit among city council members. The city of Cordova was constrained to provide services and facilities for the cleanup, without receiving full reimbursement for expenditures and labor. Private sector economic impacts were uneven, and businesses not participating in cleanup faced more damage. Economic impacts included lost credit lines, bankruptcies, foreclosures, business closures, and lost business. There was criticism over a chaotic and changing claims process, and that there was no oversight of Exxon's practices. There was conflict in the business sector between VECO and local business, and concern over the long-term impact of the spill on fishing. There was confusion over Exxon's use of fishermen as independent contractors in the spill, and the contractors' acceptance of legal liability for cleanup efforts. There was some stigma attached to work for Exxon, and resentments over Exxon's accounting practices. Cleanup workers were untrained to deal with the hazardous materials of the spill and cleanup, and there were adverse health affects for workers. Residents expressed the view that the cleanup may have caused additional environmental harm. Claims for damages to fishermen and hatcheries are discussed. Impacts to Native Alaskans in Cordova included higher prices, shortages of rental space, disrupted government operations, the lost use of subsistence resources, fear of resource contamination, along with concerns about the environment and their subsistence traditions. Exxon disallowed traditions of inter-village exchange of subsistence resources in assessing damages.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Cordova] EVENT_PHASE[pre spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, municipal workers, city council members, local government, Exxon, VECO, cleanup workers, commercial fishermen, independent contractors] SOCIAL_EFFECTS[social conflict, leadership] ECONOMIC_EFFECTS[economic loss, bankruptcy, foreclosures, business losses, fiscal losses, claims process, inflation, housing shortages] PSYCHOLOGICAL_EFFECTS[anger, fear, social disruption] MUNICIPAL_EFFECTS[increased workloads, delayed work, service demands, chaotic claims process, fiscal impacts] OTHER_EFFECTS[hazardous materials, health] SUBSISTENCE_ACTIVITIES[contamination fears] CULTURAL_SUBSISTENCE[culture conflict]

CITATION[Morrison, Eric. 1993. Tatitlek. With a preface by Steven McNabb. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 1 (Cordova, Tatitlek, Valdez). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This chapter provides background on this Alutiiq community and the early effects of the spill. However, this is only a brief chapter because the research was curtailed due to ongoing litigation. The author observes that money made during the cleanup was often spent on luxury items rather than savings. The influx of people, including reporters, researchers, and cleanup workers was a source of anger in the community. Subsistence resources, especially bottom fish and shellfish, were seen as affected. A decline in subsistence harvests is noted.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Tatitlek] EVENT_PHASE[pre-spill, spill, cleanup, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Alutiiq, cleanup workers, journalists, scientists] ECONOMIC_EFFECTS[economic gain, economic loss, spending patterns] LITIGATION_EFFECTS[litigation and scientific research]

SUBSISTENCE_ACTIVITIES[contamination fears, resource availability, shellfish, bottomfish] REMAINDER[litigation constrains research]

CITATION[Endter-Wada, Joanna, John Hofmeister, Rachel Mason, Steven McNabb, Eric Morrison, et al. 1993. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]

CITATION[Robbins, Lynn A. 1993. Kenai. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This chapter contains sections the historical context of Kenai, and the impacts of the spill on the municipality, businesses and households, commercial fishermen and fish processors, and community relations. The community includes fishing sectors and oil sectors, and there is general amity between these groups, though there was some resentment between drift-net and set-net fishermen, because the set-net fishermen were able to continue to work on the inlet's shores, and brought in large catches of salmon. There was also some bitterness between drift net fishermen and people who worked in spill cleanup. Alaskan media was affected when the oil company consortium VECO bought one of the two major State newspapers, The Anchorage Times, and sold it in 1992 to The Anchorage Daily News. Crimes were less common during cleanup. City workers did not leave their jobs to work on the cleanup, and only the Women's Resource and Crisis Center experienced a small loss of staff, and a 30 to 40 percent increase in shelter occupancy associated with stress in families employed in the driftnet fishing sector. There were economic losses to businesses in the construction sector, and to guides and some businesses and services related to fishing.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kenai] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, VECO, Exxon, municipal workers, business sector, residents] SOCIAL_EFFECTS[reduced crime] CULTURAL_EFFECTS[sense of place] FAMILY_EFFECTS[domestic stress] ECONOMIC_EFFECTS[business losses, economic gains, fishing industry sectors] PSYCHOLOGICAL_EFFECTS[substance abuse, stress] MUNICIPAL_EFFECTS[preparedness plans revised]

CITATION[McNabb, Steven, with contributions from Jon Hofmeister and Robert Heasley. 1993. Tyonek and Seldovia. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[There are a number of differences between Tyonek and Seldovia. Tyonek is predominately Alaskan Native, while Seldovia is a mixed community. Oil never reached Tyonek in Upper Cook Inlet, and commercial fishing and subsistence were not affected,

while there was some oil in Seldovia. The economy in Tyonek is dependent on government transfers, commercial fishing and subsistence, and Seldovia has a more diversified cash economy and includes tourism and timber sales. Seldovia's citizens were more often employed in the cleanup work than were citizens of Tyonek. Tyonek organized an effort to find employment for its citizens in the cleanup, and the residents sent fish to communities that had been affected by the spill. There were resentments between those employed in cleanup, and those not so employed. Fish prices were considered low, and some considered the harvest amounts low. There were fuel shortages and increased fuel costs for residents, due to changes in fuel transportation regulations and diversion of barges to the cleanup. Seldovia experienced more impacts from the EVOS than did Tyonek. There was increased work for social service and public safety workers, due to child neglect, stress, and the instability caused by rapid influx of people. There was deferred institutional business, delayed public works projects, jeopardized funding, and stress among staff. Cleanup jobs provided income that was about equal to work lost in the depressed commercial fishing and tourism sectors. The researchers observe that the social impacts of the cleanup were as significant as the impacts of the spill, and propose that this is not an inevitable situation, and that the course and impacts of EVOS cleanup were a product of time and place, and the interactions between Exxon, VECO, businesses, and the State and Federal governments.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Tyonek, Seldovia] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Exxon, VECO, commercial fishermen] SOCIAL_EFFECTS[population increase, social tension] FAMILY_EFFECTS[child neglect, domestic stress, parent absence] ECONOMIC_EFFECTS[commercial fisheries, tourism industry, cleanup employment, fuel prices, employment] PSYCHOLOGICAL_EFFECTS[stress] MUNICIPAL_EFFECTS[mitigation, employment] SUBSISTENCE_ACTIVITIES[sharing, subsistence unaffected] CULTURAL_SUBSISTENCE[sharing]

CITATION[Endter-Wada, Joanna, Rachel Mason, Joanne Mulcahy, Jon Hofmeister. 1993. The Kodiak Region. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This was one of the areas most affected by the spill, and Kodiak's fishing areas in the Shelikof Straits were oiled, and the oil reached Kodiak's beaches within three weeks of the spill. The researchers write that Exxon's actions inhibited community mobilization of the kind that had occurred after the 1964 earthquake. At the time of the spill, Kodiak City was struggling to remain a major US fishing port and regional processing center. The fishing industry itself had become more competitive, diversified, capitalized and risky, leading to tensions that were exacerbated by the spill. Exxon's spill response created differential impacts in Kodiak, which produced some community factionalism. There was an active Emergency Services Council in place, which had been formed after the 1964 earthquake. The cleanup process required local governments to formulate plans and submit them to Exxon for approval, then finance the cleanup plan and submit claims for reimbursement. By the time oil reached Kodiak, Exxon had begun to limit its cleanup costs and liabilities. There were lost tax revenues and increased social service costs. Local government faced conflicts with Exxon over

defining the geographic extent of the problem and the nature of impacts, and conflicts over preventing the spill's spread. Communities had difficulty obtaining uniform treatment from Exxon, leading to the formation of the 'Oiled Mayors' to provide formal, uniform negotiation. Economic effects were uneven, and some lost financially while others gained. Impacts on fishing, tourism, and service and support industries are discussed. Other topics are factionalism, and subsistence.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Kodiak, Kodiak Archipelago, Prince William Sound, Shelikof Strait, Alaska Peninsula, Chignik, Kodiak Island Borough, Kenai Peninsula Borough, Kodiak City, Port Lions, Kukak Bay, Karluk Lagoon, Olga Bay] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Oiled Mayors, Exxon, VECO, Emergency Services Council, U.S. Coast Guard, Kodiak Area Native Association, National Park Service, Alaska Department of Environmental Conservation, Advanced Environmental Technology] SOCIAL_EFFECTS[emergent groups, factionalism] CULTURAL_EFFECTS[sense of place] FAMILY_EFFECTS[divorce, domestic violence] ECONOMIC_EFFECTS[fishing industry sectors, economic loss, economic gain, unemployment, banking industry, loans] PSYCHOLOGICAL_EFFECTS[substance abuse, alcohol abuse, domestic violence] MUNICIPAL_EFFECTS[service demands, mitigation, expenditures, media, lost time, lost revenue] SUBSISTENCE_ACTIVITIES[decreased harvest, contamination fears] CULTURAL_SUBSISTENCE[cultural identity, family ties, community ties, cooperation]

CITATION[Rooks, Curtis Takada. 1993. Karluk. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[Subsistence harvests in this Alaskan Native community decreased, and there were contamination fears. Most losses were adequately compensated. There was an influx of outsiders in the community, associated with Exxon and the cleanup effort, they operated outside of local authority and the community was powerless to manage them. People left positions of responsibility for cleanup jobs, and temporary employment increased. Much of the money earned in cleanup was spent outside the community. There was a large difference between public sector wages and wages from the cleanup, and this created dissatisfaction. 25% of the population left Karluk, enabled to leave by more money, and encouraged to leave by local problems.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Karluk] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Exxon, VECO] SOCIAL_EFFECTS[social tension, leadership] ECONOMIC_EFFECTS[economic loss, economic gain] MUNICIPAL_EFFECTS[influx of outsiders, emigration, population] SUBSISTENCE_ACTIVITIES[decreased harvest, contamination fears]

CITATION[Rooks, Curtis Takada, with contributions from Joanna Endter. 1993. Old Harbor. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies

Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[Old Harbor had a population of 284 in the 1990 census, and residents are predominately Alaskan Native, and refer to themselves as Aleut. The Russian Orthodox church is the primary local organization not based in kinship. The village is about 2 miles across, and it is described as affluent by Alaska Native village standards. Participation in the fishing industry is the major source of income, while traditional Native customs of subsistence and sharing are maintained. This study in a predominately Native community mentions changes in subsistence activity, financial losses, and widespread depression. Fears of subsistence food contamination were common, especially among the elderly. Villagers mentioned changes in the appearance and apparent health of seafood, and children increasingly rejected traditional foods in favor of purchased foods. The only available work was in the cleanup effort, and it required that villagers wait to be called to work by Exxon, rather than take the more active role they were used to in commercial and subsistence fishing. Parents were more often absent from the home, and children did not have the opportunity to learn in the company of their parents how to harvest subsistence foods. For those not normally employed in the fishing sector, the cleanup work provided an economic boon, stores may have made more money, and those serving the housing needs of Exxon and VECO workers also benefitted. There were eventual difficulties with income taxes and fishing boats were lost for financial reasons and because small-boat repairs were neglected. An additional consequence was seen the next season, when there was greater competition for Old Harbor fish from Kodiak City fishermen who had made a lot of money renting large boats to VECO, and were able to upgrade their equipment to travel to Old Harbor. Village governmental institutions were overwhelmed with work associated with the spill, and with quelling rumors. Insulation work scheduled by the Housing Authority was delayed, and the Village Council, hired by VECO as local coordinators, missed the submission dates of grants, which eventually called into question local leadership.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Old Harbor, Kodiak City, Sitkalidak Strait, Sitkalidak Island] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, fishermen, Village Council, VECO, Exxon, Housing Authority, children, elderly] SOCIAL_EFFECTS[leadership, inter-generational discord, social tension] FAMILY_EFFECTS[domestic stress, parent-child conflicts, parent absence] ECONOMIC_EFFECTS[economic loss, economic gain, taxation, property loss] PSYCHOLOGICAL_EFFECTS[depression] MUNICIPAL_EFFECTS[government overwhelmed, rumor control, grants missed, Village Council as VECO coordinators] SUBSISTENCE_ACTIVITIES[decreased harvest, change from subsistence foods to purchased foods, contamination fears] CULTURAL_SUBSISTENCE[enculturation, subsistence traditions]

CITATION[Rooks, Curtis Takada. 1993. Chignik. Social indicators study of Alaskan coastal villages: IV. Postspill key informant summaries; schedule C communities, Part 2 (Kenai, Tyonek, Seldovia, Kodiak City, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[Chignik, also referred to as Chignik Bay, is located in the Anchorage Bay and its population is mostly Alaskan Native. Residents include employees in the fish processing sector, non Native educators and employees in the public sector, Native

fishermen who winter out, and Native fishermen who winter in. A large portion of the Chignik fishery was closed by the *Exxon Valdez* spill, and different sectors of the fishing industry experienced different degrees of impact. The small fishing operations were most seriously affected, while intermediate and large operations reportedly had fewer negative effects. The largest operations (highliners) had opportunities to fish elsewhere, and also received compensation from Exxon for fishing losses, and some hired their boats to Exxon for cleanup activities. Exxon's compensation procedures were suited to the business practices characteristic of large fishing operators. Chignik Lagoon was the only area open to fishing, and there was much competition in that area. There was a considerable amount of social tension, sometimes involving arguments over truthfulness with respect to compensation claims and the degree of financial loss. These disputes involved adults and children, families and friends, and increased tension between large and small operators. There were fiscal losses to the city because of lost fish tax revenues, and longer work days for city workers. And there were financial losses in the fish processing and other business sectors.]
KEYWORDS: SOURCE_TYPE[report chapter] GEOGRAPHY[Chignik, Chignik Bay, Chignik Lagoon, Anchorage Bay] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, fishing sectors, children, fish processors, non-Natives, municipal workers, Exxon, VECO] SOCIAL_EFFECTS[subsistence-based community, social conflict, increased competition] FAMILY_EFFECTS[domestic stress] ECONOMIC_EFFECTS[fiscal loss, business losses, fish processing, commercial fisheries] PSYCHOLOGICAL_EFFECTS[stress, anger] MUNICIPAL_EFFECTS[fiscal losses, lost tax revenue, increased workloads, delayed work] SUBSISTENCE_ACTIVITIES[decreased harvest]

CITATION[Endter-Wada, Joanna, Lynn A. Robbins, Douglas W. Levine, Daniel L. Boxberger, Paula D. Nohalty, Joseph G. Jorgensen, and Steven L. McNabb. 1992. Final Report: Bristol Bay Subsistence Harvest and Sociocultural Systems Inventory. Prepared for Alaska Outer Continental Shelf Office, Social and Economic Studies Program, Minerals Management Service. Technical Report No. 150; OCS Study MMS 92-0036. Logan, UT: Social Science Research Associates.]
ABSTRACT/ANNOTATION[Along with communities in the greater Bristol Bay region, this work contains subsistence resource utilization oriented community profile of the Alaska Peninsula community of Chignik Lake. While fieldwork for Chignik Lake took place in 1990, the *Exxon Valdez* spill is not analyzed with respect to the subsistence resource base. The report includes discussion of the meanings of subsistence activities for interviewees, the social patterning of subsistence cooperation and sharing, and draws conclusions about the importance of subsistence in maintaining Native cultural traditions and as a foundation of regional social structure.]
KEYWORDS: SOURCE_TYPE[report volume] GEOGRAPHY[Bristol Bay, Chignik Lake, Togiak, Dillingham, Nushagak Bay, New Stuyahok, Nushagak River, Nondalton, Iliamna Lake, Naknek, Bristol Bay Borough/ Upper Alaska Peninsula, Port Heiden, Chignik] EVENT_PHASE[general] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] SUBSISTENCE_ACTIVITIES[harvest amounts, species] CULTURAL_SUBSISTENCE[subsistence culture, social patterning of subsistence]

CITATION[Endter-Wada, Joanna, Jon Hofmeister, Rachel Mason, Steven McNabb, Joanne Mulcahy and Lynn Robbins. 1992. Social indicators of Alaskan coastal villages: I key informant summaries; volume 2, schedule B regions. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 152, OCS Study MMS 92-0032. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This volume two of a two-volume set of key informant summaries from the social indicators studies of seven different regions of Alaska. The Schedule B regions, covered in this volume, include the Bering Straits region, the Bristol Bay region, and the Kodiak region. The regional discussions follow a common outline of: historical context; population and demography; community organization and economy; household organization and kinship; and ideology. Two regional discussions encompass areas of the *Exxon Valdez* spill: the Bristol Bay region (which includes 'Gulf of Alaska side' portions of the Alaska Peninsula) and the Kodiak Region. The Bristol Bay regional discussion does not contain information on the *Exxon Valdez* spill. The Kodiak regional discussion has a number of references to the oil spill (including documenting a pre- and post-spill shift in KI opinions on the beneficial or detrimental aspects of OCS development), and has an entire additional section (pages 807-869) devoted exclusively to the effects of the *Exxon Valdez* oil spill on the City of Kodiak, which appears to be the same as the *Exxon Valdez* section of the 1993 volume on Kodiak City (for annotation and keywords in this section, see above).]

CITATION[*Exxon Valdez* Oil Spill Forum. 1994. Five years later: what have we learned?: proceedings of a public forum, Anchorage, Alaska, March 2, 1994. Anchorage, AK: Oil Spill Public Information Center.]

CITATION[*Exxon Valdez* Oil Spill Trustee Council. 1993. Summary of public comment on alternatives: of the draft *Exxon Valdez* oil spill restoration plan. Anchorage, AK: *Exxon Valdez* Oil Spill Trustee Council.]
ABSTRACT/ANNOTATION[Public comment on alternative ways to achieve restoration following the *Exxon Valdez* oil spill is summarized in this document. Comment was sought through the distribution of 33,000 copies of a newspaper brochure on the proposed alternatives, accompanied by a questionnaire, and in public meetings. 799 questionnaires were returned, and two-thirds were from within the spill area, another quarter from other parts of Alaska, and the remainder from outside Alaska. 792 letters were also sent in, and around 500 people attended public meetings. Comments concerned the scope and duration of restoration efforts, and the sorts of projects that restoration funds should be spent on, including habitat protection and acquisition, monitoring and research, general restoration, expenditures on administration and public information, endowment or savings account, injured resources and services, and the process of restoration.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska, Anchorage, Cordova, Tatitlek, Chignik Lagoon, Larsen Bay, Seward, Seldovia, Juneau, Ouzinkie, Old Harbor, Kodiak, Chenga Bay] EVENT_PHASE[restoration]

CITATION[*Exxon Valdez* Oil Spill Trustees. 1994. Draft 1994 work plan: (without brief project descriptions). *Exxon Valdez* Oil Spill Restoration. Anchorage, AK: *Exxon Valdez* Oil Spill Trustee Council.]

ABSTRACT/ANNOTATION[With respect to archaeological resources, the report finds that injury to sites comes from looting and vandalism, and erosion around the sites from cleanup activity. The repair of sites and artifacts, protection from further damage, and monitoring are indicated, and projects are outlined. These projects include restoration of sites, training of volunteers to monitor the sites, and the design of heritage centers to store artifacts from damaged sites. With respect to subsistence, the report outlines projects to promote the recovery of subsistence resources including harbor seals, sea otters, clams, Pacific herring, pink and sockeye salmon. Removal of remaining oil on beaches and mussel beds are also planned. A project to test the safety of subsistence food is continued from 1993, with meetings to be held in Native villages to disseminate the results. Projects directed at commercial fishing damaged by the spill are also discussed, and projects to restore recreation and tourist areas.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska, spill area, Prince William Sound] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, Alaskan Natives, tourists, sportsmen] SUBSISTENCE_ACTIVITIES[contamination assessment]

CITATION[*Exxon Valdez* Oil Spill Trustee Council. 1996. *Exxon Valdez* Oil Spill Restoration Plan, Draft update on injured resources and services, April 1996. Anchorage, AK: *Exxon Valdez* Oil Spill Trustee Council.]
ABSTRACT/ANNOTATION[This document reports on the progress of the restoration effort directed by the Trustee Council. It includes a review of species recovery and the recovery of archaeological sites, and lost services. A list at the end of the document indicates which resources have recovered, which are recovering, which have not recovered, and those for which recovery is unknown. Lost or reduced services tracked here include commercial fishing, passive uses, recreation and tourism, and subsistence. With respect to archaeological resources, it states that the oil spill area contains more than 3,000 sites of archaeological and historical significance, and that twenty-four sites on public lands were damaged by cleanup activities, looting, or vandalism following the spill. Most of the vandalism took place in 1989, and involved searches by cleanup personnel. Measures were put in place to protect the sites from further damage. With respect to commercial fishing, the report states that fishing was reduced because of fishery closures, and because some fish species were reduced in number by the spill. The list of injured species, and the progress toward their recovery, is included in this report. In 1989 there were fishery closures in Prince William Sound, lower Cook Inlet, upper Cook Inlet, Kodiak and Chignik. These fisheries opened in 1990, but the Prince William Sound herring fishery closed in 1993 and remained closed because of low herring population. The Trustee Council projects to restore commercially important fish species are described. Passive use of resources, such as aesthetic appreciation of the environs, is also discussed as an injured resource, and recovery is defined. Impacts on recreation and tourism are also discussed in terms of wildlife viewing of species injured by the spill (killer whales, sea otters, birds) and recreation use of beaches with oil residue. Sports hunting and fishing are also affected by closures, and since 1992 restrictions were placed on sports fishing of cutthroat trout in parts of Prince William Sound, and restrictions were placed on the hunting of harlequin ducks in 1991. Another change brought by the spill was a shift in tourist and recreational use to areas unaffected by the spill, which brought management problems. And some recreational facilities were damaged by cleanup workers. Subsistence is another injured resource, and the report states that fifteen communities with predominantly Alaskan Native populations rely on harvests of fish, shellfish, seals, deer, ducks and geese, while

residents of other communities are also reliant on resources shared by residents of this area. Subsistence harvests declined in these villages, for reasons of reduced species availability, contamination fears, and disrupted activities due to cleanup and other spill related events. The report notes that subsistence foods were tested for hydrocarbon contamination through 1994, and were determined to pose no significant additional risk to health. However, an exception was noted for shellfish, which may continue to accumulate oil, and subsistence users were advised to avoid shellfish from an area where oil can be seen or smelled. Subsistence harvests have returned to pre-spill levels in some villages. Harvest levels recovered first in the communities of the Alaska Peninsula, Kodiak Island and lower Kenai Peninsula, but recovery has lagged in the Prince William Sound villages. Additionally, the harvest of some species remains low, and in some cases there is a shift to greater use of other species to compensate for the loss. Sometimes greater effort is required in time and travel to provide for subsistence. The cultural significance of subsistence harvests is also discussed as an injured resource, and the disruption of the subsistence way of life and the chance for children to learn subsistence culture are mentioned.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Chenega Bay, Prince William Sound, Alaska Peninsula, Kodiak Island, Kenai Peninsula, lower Cook Inlet, upper Cook Inlet, Kodiak, Chignik] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[commercial fishermen, sportsmen, Alaskan Natives, tourists] CULTURAL_EFFECTS[sense of place] ECONOMIC_EFFECTS[economic loss, commercial fisheries, subsistence economy, tourism industry, lost passive use] MUNICIPAL_EFFECTS[tourist sites shift] SUBSISTENCE_ACTIVITIES[decreased harvest, contamination fears, resource availability, increased effort] CULTURAL_SUBSISTENCE[enculturation] REMAINDER[recovered species, recovering species, species not recovered, species recovery unknown]

CITATION[*Exxon Valdez* Oil Spill Trustee Council. 1997. 1997 Status Report. Anchorage, AK: Oil Spill Trustee Council.]
ABSTRACT/ANNOTATION[The contents of this document include a list of the Council and Public Advisory Group members, brief summary of the recovery status of natural resources and human resources and services, summary of ongoing research and monitoring activities sponsored by the Council, habitat protection efforts, public participation projects, a short summary of the civil and criminal settlements in Exxon litigation and the uses of civil settlements, and an audit of Trustee Council Expenditures. The section on human resources states that subsistence harvests in some villages have returned to levels before the spill, but some resources continue to be scarce. In particular, studies continue to learn why harbor seal populations continue to decline. Various projects to raise subsistence resources are mentioned. The section on recreation indicates that lands have been purchased for the creation of a State campground and recreation area, and another as a U.S. Forest service campground. A brief description is offered monitoring and research programs to promote fisheries and fish habitats. The public participation and outreach programs, and the overall organization of the public participation component, are outlined.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Oil Spill Trustee Council, public, Public Advisory Group, Alaskan Natives] SUBSISTENCE_ACTIVITIES[resource availability]

CITATION[Fall, J.D. 1995. Harbor seal and sea otter cooperative subsistence harvest assistance. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Projects

94244 and 95244). Anchorage, AK: Alaska Department of Fish and Game, Division of Subsistence.]

CITATION[Fall, J.A. 1995. Subsistence restoration planning and implementation. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 94428/95428). Anchorage, AK: Alaska Department of Fish and Game, Division of Subsistence (NTIS No. PB96-208426).]

CITATION[Fall, James A. and Charles J. Utermohle (eds.) 1995. An investigation of the sociocultural consequences of outer continental shelf development in Alaska, II Prince William Sound (OCS Study MMS 95-011). Anchorage, AK: U.S. Department of Interior. (See entry under ADF&G)]

CITATION[Faro, J.B., R.T. Bowyer, J.W. Testa, and L.K. Duffy. 1994. Assessment of injury to river otters in Prince William Sound, Alaska, following the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Terrestrial Mammal Study Number 3). Soldotna: Alaska Department of Fish and Game, Wildlife Conservation Division.]

CITATION[Farro, J.B., R.T. Bowyer, J.W. Testa, and L.K. Duffy. 1994. River otter component of the oiled mussel-bed study. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study Number 103-3). Soldotna, AK: Alaska Department of Fish and Game, Wildlife Conservation Division.]

CITATION[Feder, H.M. 1995. Injury to deep benthos. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study 2B/Air Water 2). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division (NTIS No. PB96-194618).]

CITATION[Ferren, H. and J. Milton. 1995. Chenega chinook release program. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95272). Cordova, AK: Prince William Sound Aquaculture Corporation.]

CITATION[Ferren, H. and J. Milton. 1995. PWSAC-PWS system investigation: experimental fry release. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95320K). Cordova, AK: Prince William Sound Aquaculture Corporation.]

CITATION[Forage fish study in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94163). Fairbanks, AK: University of Alaska Fairbanks, School of Fisheries and Ocean Sciences.]

CITATION[Freese, J.L. and C.E. O'Clair. 1995. Injury to crabs outside Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 22). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194782).]

CITATION[Frost, K.J., L.F. Lowry, J. Small. and S.J. Iverson. 1996. Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95064). Fairbanks, AK: Alaska Department of Fish and Game, Division of Wildlife Conservation.]
CITATION[Frost, K.J., L.F. Lowry, and J. Ver Hoef. 1995. Habitat use, behavior, and monitoring of harbor seals in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94064 and 94320F). Anchorage, AK: Alaska Department of Fish and Game, Wildlife Conservation Division.]

CITATION[Frost, K.F., and L.F. Lowry. 1994. Habitat use, behavior, and monitoring of harbor seals in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 93046). Fairbanks, AK: Alaska Department of Fish and Game, Wildlife Conservation Division.]
ABSTRACT/ANNOTATION[Restoration Project 93046 continued the effort initiated under Marine mammal Study Number 5 (Assessment of injury to harbor seals in Prince William Sound, Alaska, and adjacent areas) in 1989 through 1991. The project was reclassified as a restoration project in 1992 (study number 73, Harbor seal restoration study) and continued in 1993 as study number 93046 (Habitat use, behavior, and monitoring of harbor seals in Prince William Sound, Alaska). Aerial surveys of harbor seals were conducted at 25 trend count sites in PWS during pupping and molting in 1990-1993. Molting period counts at oiled sites were 51 percent lower in 1993 than in 1988, compared to 11 percent lower at unoiled sites. Pupping counts for all sites combined were 23 percent lower in 1993 than in 1989. The study concluded that harbor seals in PWS had not recovered since the *Exxon Valdez* oil spill. Satellite-linked time-depth recorders were attached to 20 harbor seals in PWS during 1991-1993. Tagged seals moved an average of 5 to 10 kilometers/day. Seals showed strong site fidelity, each hauling out mostly at the site it was tagged and sometimes at another nearby location. Daily maximum dive depths for seals smaller than 50 kilograms were usually 100 to 130 meters, compared to 130 to 150 meters for larger seals. For all seals combined, 58 percent of the dives were less than 50 meters.]
KEYWORDS: SOURCE_TYPE[EVTC Project Annual Report] GEOGRAPHY[Prince William Sound] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[subsistence resource users] SUBSISTENCE_ACTIVITIES[harbor seals]

CITATION[Frost, K.J. and L.F. Lowry. 1994. Assessment of injury to harbor seals in Prince William Sound, Alaska, and adjacent areas following the *Exxon Valdez* Oil Spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 5, Restoration Study Number 73). Fairbanks, AK: Alaska Department of Fish and Game, Wildlife Conservation Division (NTIS No. PB96-197116).]

CITATION[Geiger, H.J., W.D. Templin, J.S. Collie, and T.J. Quinn II. 1995. Run reconstruction and life history model. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 28). Juneau, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-208418).]

CITATION[Goldberg, Victor P. 1991. Recovery for economic loss following the *Exxon Valdez* oil spill. New York, N.Y.: Center for Law and Economic Studies, Columbia University School of Law. Series title: Working paper #62.]
ABSTRACT/ANNOTATION[This legal work considers the arguments surrounding recovery for indirect losses suffered as a consequence of environmental disasters, in particular the *Exxon Valdez* case. The author questions the allowance of collection by third parties for indirect losses in such cases. Commercial fishermen were the only parties whose claims for indirect damages were recognized in the *Exxon Valdez* case, and the article explores the historical conditions and precedents for the exception allowed fishermen. Legal issues discussed include the fact that most of the direct damage was to unowned assets, the question of how value should be assessed (the value of the fish destroyed or the losses consequent to the loss of the fish), the issue of fishermen's reliance on the fishery and the question of how broadly the idea of 'reliance' on an asset should be applied, and the legal question of the victim's responsibility for mitigation of loss after a disaster, and before (such as preparation and diversification). The author concludes that government should compensate those who suffered direct losses during such disasters, and then recover expenditures by suing those responsible. Further, it argues that third parties and indirect losses, including among commercial fishermen, should not be paid under tort law.]
KEYWORDS: SOURCE_TYPE[academic report] GEOGRAPHY[Alaska] EVENT_PHASE[spill, litigation] ECONOMIC_EFFECTS[indirect damages, direct damages, compensation for damages] LITIGATION_EFFECTS[damages, direct costs, indirect costs, liability]

CITATION[Greenpeace. 1990. The dinosaur's path: the *Exxon Valdez* oil and national security.]
ABSTRACT/ANNOTATION[This brief document by the environmental organization Greenpeace offers an overview of the spill and its impacts, and focuses more extensively on energy policy and the environmental consequences of energy use. The disaster is described as an accident waiting to happen. Conditions that contributed to the occurrence of the spill, the lack of preparation for mitigating its environmental effects, and the impacts on Native communities and subsistence practices, and the altered sense of place for Alaskans, are all mentioned. It also mentions that legal 'gag orders' associated with litigation following the disaster have restricted the release of scientific and other information on the impacts of the spill and the efficacy of clean-up efforts. Renewable energy policy and the reliance on foreign oil are also discussed.]
KEYWORDS: SOURCE_TYPE[pamphlet] GEOGRAPHY[Alaska, US, global, Bligh Reef] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Department of the Interior, Department of Energy, Environmental Protection Agency, General Accounting Office, Minerals Management Service, National Research Council, Natural Resources Defense Council, Exxon, Alyeska, Native Alaskans, Alaskans, Alaska Department of Environmental Conservation, fishermen, Alaska Volunteer Independent Cleanup Effort] SOCIAL_EFFECTS[social disruption] FAMILY_EFFECTS[domestic violence] PSYCHOLOGICAL_EFFECTS[substance abuse, domestic violence] LITIGATION_EFFECTS[litigation restricts information, litigation and scientific research] SUBSISTENCE_ACTIVITIES[decreased harvest, resource availability] CULTURAL_SUBSISTENCE[cultural meaning of subsistence]

CITATION[Hanable, William S. 1990. Military support for the cleanup of the *Exxon Valdez* oil spill: a special historical study. Elmendorf Air Force base, Alaska: Headquarters, Alaskan Air Command, Office of History, 76 pages.]

ABSTRACT/ANNOTATION[Although there was no declaration of a disaster following the 11-million gallon *Exxon Valdez* oil spill, President Bush directed that an Alaskan Oil Spill Task Force be formed to coordinate military support for oil spill cleanup activities. Troops were not involved in the actual physical cleanup activities. Rather, the military provided airlift, command control, communications, equipment, landing craft for ship-to-shore transportation and in-shore operations, medical support, oil skimmers, and ships for berthing civilian workers. This report documents the activities of the task force and its management of the military's response to the oil spill cleanup effort.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_EFFECTS[Multi-Agency Coordinating Group, response organization]

CITATION[Hanable, William S. And C. Burkhart. 1990. The *Exxon Valdez* oil spill and the National Park Service: A report on the initial response. Anchorage, Alaska: National Park Service, Alaska Region, 115 pages plus appendix.]
ABSTRACT/ANNOTATION[This work is intended as an official history or record contemporary to the events that it documents -- National Park Service activities in response to the *Exxon Valdez* oil spill. It covers the period of time from the beginning of the incident until the end of the first phase of the cleanup, when cleanup field teams left the area in the fall. The report focuses on the use of the Incident Command System, a pre-existing mechanism for managing federal agency response to fires, as the management system used by the national Park Service in their efforts. This was the first time that this system was applied in Alaska, and to a different kind of environmental disaster than it had been previously been used for. The report is divided into several parts. Chapter one describes spill events, provides historical background, identifies the national Park Service resources threatened by the spill, and the existing mechanisms for dealing with such threats. The initial National Park Service response is also documented. Chapter two further describes the methods used to direct and control National Park Service response to the spill during its first phase, and the coordination of that direction and control with similar efforts by other agencies and institutions. Chapter three is an account of staff and field operations conducted in anticipation of the arrival of the spilled oil at various on-shore locations. Chapter 4 expands on the topics of chapters 2 and 3 (command and control, and field operations) as they evolved after the spilled oil arrived at these on-shore locations. Chapter five summarizes the interpretations of previous chapters and presents additional conclusions.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_EFFECTS[Multi-Agency Coordinating Group, response organization]

CITATION[Hatch, S.A., P.M. Meyers, D.M. Mulcahy, and D.C. Douglas. 1996. Seasonal movements and pelagic habitat use of murres and puffins determined by satellite telemetry. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 95021). Anchorage, AK: National Biological Service (NTIS No. PB97-112726).]

CITATION[Hayes, D.L. 1995. Recovery monitoring of pigeon guillemot populations in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 94173). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194790).]

CITATION[Haynes, E., T. Rutecki, M. Murphy, and D. Urban. 1995. Impacts of the *Exxon Valdez* oil spill on bottomfish and shellfish in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 18). Juneau: U.S. National Marine Fisheries Service.]

CITATION[Heintz, R.A., S.D. Rice, and J.W. Short. 1995. Injury to pink salmon eggs and preemergent fry incubated in oiled gravel (laboratory study). *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94191-2). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Hepler, K.R., P.A. Hansen and D.R. Bernard. 1994. Impact of oil spilled from the *Exxon Valdez* on survival and growth of Dolly Varden and cutthroat trout in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 5; Restoration Study Number 90). Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish.]

CITATION[Highsmith, R.C., M.S. Stekoll, .P.G. Van Tamelen, A.J. Hooten, L. Deysher, L. McDonald, D. Strickland, and W.P. Erickson. 1993. Herring Bay experimental and monitoring studies. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study 60C). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-194949).]

CITATION[Highsmith, R.C., M.S. Stekoll, P.G. Van Tamelen, S.M. Saupe, T.L. Rucker, and L. Deysher. 1995. Herring Bay experimental and monitoring studies, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94086). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division.]

CITATION[Hoffmann, A. and P. Hansen. 1994. Injury to demersal rockfish and shallow reef habitats in Prince William Sound, 1989-1991. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 6, Fish/Shellfish 17). Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish.]

CITATION[Holland-Bartels, L. 1996. Mechanisms of impact and potential recovery of nearshore vertebrate predators. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95025). Anchorage, AK: National Biological Service.]

CITATION[Impact Assessment, Inc. 1990(a) Analysis of fiscal impacts to local jurisdictions. Interim report number 1. Prepared for Oiled Mayors Subcommittee, Alaska Conference of Mayors. La Jolla, CA: Impact Assessment Inc.]
ABSTRACT/ANNOTATION[The report looks at local government revenues and expenditures, and revenues and expenditures related to the oil spill, and impacts related to the fish tax.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska] EVENT_PHASE[pre-spill, spill, cleanup] ECONOMIC_EFFECTS[public expenditures, fish tax] MUNICIPAL_EFFECTS[public expenditures]

CITATION[Impact Assessment, Inc. 1990(b). Public and Private Sector Impacts of the *Exxon Valdez* Oil Spill. Second Interim Report. Prepared for the Oiled Mayors Subcommittee, Alaska Conference of Mayors. La Jolla, CA: Impact Assessment Inc.]
ABSTRACT/ANNOTATION[This research report for the Oiled Mayors Subcommittee uses an economic base model to analyze private and public sector economic impacts of the spill and the cleanup effort. The discussion of the public sector compares a set of populous jurisdictions with a set of communities that are more remote and less populous. In the economic model used here, industry sectors which drive the economy ('base sectors') include fish harvesting and processing, and tourism. An additional base sector industry, spill cleanup, developed after the spill. Support sector industries (which vary with the fortunes of the base sectors) increased employment during the cleanup and after cleanup ended in September 1989. Continued economic expansion during the fourth quarter of 1989 was associated with the windfall earnings during cleanup. Commercial fishing continued to be the major contributor to the economy, though fish harvests were below official projections for some species and areas. In terms of public sector fiscal impacts, the report found that revenues were moving back to normal patterns, though perhaps not in the case of fish tax. Further, it was unclear how the postponement of projects would affect their eventual costs, or the fiscal impact on insurance and auditing. Mental health and alcoholism costs increased after the spill, but future costs in these areas were unknown. It appeared that Exxon paid less attention to the less populous set of communities. The spill and cleanup extended social and governmental resources beyond capacity, especially in smaller cities, while accounting staffs were often overwhelmed, and many costs likely remained unreported and un-reimbursed.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Cordova, Valdez, Kodiak, Homer, Kenai, Seward, Soldotna, Old Harbor, Ouzinkie, Seldovia, Whittier] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, merchants, cleanup workers, Alaskan Natives, government] ECONOMIC_EFFECTS[service sector, public expenditures, fiscal impacts, economic gain]

CITATION[Impact Assessment, Inc. 1990 (c). Social and psychological impacts of the *Exxon Valdez* oil spill: for the economic, social and psychological impact assessment of the *Exxon Valdez* oil spill. Prepared for Oiled Mayors Subcommittee, Alaska Conference of. Mayors. Interim Report Number 3. La Jolla, CA: Impact Assessment, Inc.]
ABSTRACT/ANNOTATION[An academic study of the social and psychological impacts of the *Exxon* Valdez spill and cleanup in the regions of Kodiak Island, Chignik Bay, Kenai Peninsula, Southern Kenai Peninsula, and Prince William Sound, this report presents data from field interviews, a household survey, and data from local agencies such as police departments, mental health clinics, and hospitals. After presenting pre-existing differences in the characteristics of these areas, and the different conditions surrounding the spill and cleanup in each area, the villages are described in terms of the response effort, local government, and changes in community, way of life, family, mental health, medical factors, and changes in personal experience. The report notes that most of the municipalities were extended beyond capacity, and ordinary services suffered. In many communities, there was an increase in destructive behavior, as indicated by increases in drunk driving arrests, crime, visits to mental health clinics, and admittance to women's shelters. Potential long term impacts emerged in peoples concerns about the future of subsistence activities, subsistence food sources, and the cultural and social life surrounding the partial reliance on these activities. The oil producing sectors expressed concern

over a legislative backlash against the oil industry, and in the influx of money for the cleanup brought new people to the area and changed expectations among Alaskan Natives about their role in the economy.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Kenai Peninsula, Southern Kenai Peninsula, Prince William Sound, Kodiak Island, Chignik Bay] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Natives, police, clinics, hospitals, women's shelter] SOCIAL_EFFECTS[social disruption, natural resource community, subsistence-based community] ECONOMIC_EFFECTS[economic loss, increased wealth, wage expectations] PSYCHOLOGICAL_EFFECTS[crime, mental health, violence, destructive behavior, alcohol abuse, substance abuse] MUNICIPAL_EFFECTS[service demands, fiscal losses] OTHER_EFFECTS[legislative change, increased regulation] SUBSISTENCE_ACTIVITIES[resource availability, contamination fears] CULTURAL_SUBSISTENCE[threat to subsistence culture, subsistence roles]

CITATION[Impact Assessment, Inc. 1990 (d). Economic, social, and psychological impact assessment of the *Exxon Valdez* oil spill: final report. Prepared for Oiled Mayors Subcommittee, Alaska Conference of Mayors. La Jolla, CA.: Impact Assessment, Inc.]
ABSTRACT/ANNOTATION[This report presents the results of research carried out between November of 1989 and September 1990, on the social, psychological and economic impacts of the oil spill and cleanup on twenty-two Alaskan communities in three areas, including the villages of Kodiak, the Alaska and Kenai Peninsula, and the villages of Prince William Sound. Population size of the twenty-two communities before the spill ranged from 6,774 in Kodiak to 55 in Chignik Lagoon. Social and psychological data were gathered through interviews with mental and social health providers and an archival survey, fiscal impacts were studied through interviews and reviews of records, and a survey provided data on impacts to the private sector. With respect to psychological and social problems, the study found 90% more general anxiety disorder in case than control communities, 99% more post traumatic stress disorder, and 90% more depression, as well as 11.4 times more drinking, 7.4 times more drug use, and 11.6 times more domestic violence. There were also affects on health, specifically on individuals' sense of their own health and the number of health problems verified by physicians as measured before and after the spill, with more health problems in those most exposed to the spill. Mental health impacts were especially common in Native communities, in part because mental health services were less available, since these services were in high demand and many of the counselors and staff had left to participate in the cleanup. Participation in the cleanup effort had an impact on family and community social life, and participants spent less time with family and friends and in community and religious activities. Further, the involvement with the cleanup was a source of some community controversy and conflict. 45% of those who worked in the cleanup reported that they spent less time with members of their households, compared to 16% of those not taking part in the cleanup. Parents reported effects on their children, including separation anxiety, parent-child discord, and behavioral problems. The spill and cleanup had an especially marked impact on subsistence activities in Native communities, and the social and spiritual values linked to traditional uses of the environment were perceived as threatened. While hunting, fishing, and gathering decreased by a reported 42%, the social aspects of subsistence, such as joint subsistence activities, sharing with other households, available food to share with elders, receiving shared food, also decreased. With respect to the economy, the report finds both impacts on local government operations, and fiscal impacts. It notes that usual government

business was displaced by the demands of responding to the spill and cleanup, there were communications problems among various entities, the political context was altered by factionalism that emerged over the spill and cleanup, and new organizations and alliances formed. Local communities were reimbursed by Exxon for only a portion of actual costs, and fiscal impacts were not uniform among communities. In terms of private sector economic impacts, the report finds the highest cleanup participation in some business sectors and occupations, and higher participation in some communities than others. Firms that participated in cleanup had lower income in 1988 than firms that did not participate, but participating firms had higher income in 1989. Future community preparedness is discussed.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[North Gulf Coast, Kodiak, Alaska Peninsula, Kenai Peninsula, Prince William Sound, Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, Chignik Bay, Chignik Lagoon, Chignik Lake, Kenai, Soldotna, Seward, Homer, Seldovia, Port Graham, English Bay, Valdez, Cordova, Whittier, Chenega Bay, Tatitlek] EVENT_PHASE[pre-spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[cleanup workers, Alaskan Natives, local government, Exxon, merchants, residents] SOCIAL_EFFECTS[social disruption, social conflict, crime, kinship, subsistence-based community, emergent groups] CULTURAL_EFFECTS[risk perception, sense of community, cultural persistence] FAMILY_EFFECTS[role relationships, domestic violence, behavioral problems, separation anxiety, children, generational tension, obligations] ECONOMIC_EFFECTS[economic gain, economic loss, fiscal impacts] PSYCHOLOGICAL_EFFECTS[depression, anxiety, post-traumatic stress disorder, PTSD, substance abuse, separation anxiety, behavioral problems, counselors] MUNICIPAL_EFFECTS[service demands, fiscal losses, operational disruption, mayor, city council, Oiled Mayors, service providers take cleanup employment] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, decreased harvest, contamination fears, contaminated resources, sharing] CULTURAL_SUBSISTENCE[sharing, cooperation, cultural meaning of resources, enculturation.]

CITATION[Jewett, S.C., and T.A. Dean, R.O. Smith, M. Stekoll, L.J. Haldorson, D.R. Laur, and L. McDonald. 1995. The Effects of the *Exxon Valdez* oil spill on shallow subtidal communities in Prince William Sound, Alaska 1989-93. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93047, Subtidal Study Number 2A). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division, NTIS No. PB96-194865).]

CITATION[Jorgensen, Joseph G. 1995. Social indicators study of Alaskan coastal villages: VI. Analysis of the *Exxon Valdez* spill area, 1988-1992. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 157, OCS Study MMS 94-0064. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[A number of findings are discussed and summarized in this volume. Among the findings, the spill sparked a brief boom and bust cycle in employment, income, and commercial activities. There were increases in proceeds for rents, services, and products. There were job losses, especially in the commercial fishing sector, while there was added employment in the cleanup of the spill. Job loss in the private sector was greater than in the public sector between 1989 and 1990, and there was a steeper increase in income among Native Alaskans than non-Natives, partly because the pre-spill incomes among Native Alaskans were lower. In terms of subsistence activities, the study found that Natives decreased their food

harvests after the oil spill, and relied more on preserved food harvested before the spill, while non-Native Alaskans increased their harvest of subsistence foods. It also found that Natives and non-Natives define the environment and its resources differently: Instrumental use and cultural and spiritual valuation are important parts of the Native definitions, while commodity valuation takes precedence in the definitions of non-Natives. The Native study members displayed much greater knowledge of the environment, especially species and habitats, than did non-Natives, and were able to identify each of the 77 species presented to them in a survey. Comparisons are made between Native and non-Native study members in terms of beliefs about managing the environment, evaluation of whether such a spill would be likely to occur again, social organization, visiting patterns, sharing, conceptions of the environment, religion, knowledge of political issues and political participation. In most areas, the study found changes in behavior after the *Exxon Valdez* oil spill among both Natives and non-Natives, and differences in Native and non-Native responses to the spill as manifested in different behaviors.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Kodiak, coastal village, Alaska] EVENT_PHASE[pre spill, spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Natives, fishermen] SOCIAL_EFFECTS[sociability, sharing, political activity] CULTURAL_EFFECTS[traditional knowledge, religion, stewardship of the environment, political attitudes] FAMILY_EFFECTS[household organization, household composition] ECONOMIC_EFFECTS[economic gain, economic loss, unemployment, cost of living, inflation] SUBSISTENCE_ACTIVITIES[harvest amounts, harvest methods, decreased harvest, increased harvest] CULTURAL_SUBSISTENCE[sharing, significance of habitats, knowledge of species]

CITATION[Jorgensen, Joseph G. 1994. Social indicators study of Alaskan coastal villages: V. Research methodology for the *Exxon Valdez* spill area, 1988-1992. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 156, OCS Study MMS 93-0071. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This report discusses the methodology used in an expanded study of Alaskan coastal villages. Thirty-one villages had been part of an ongoing study, begun in 1986, on the effects of oil-related factors on Alaskan village life; of those villages, only two, Kodiak City and Old Harbor, were within the area affected by the *Exxon Valdez* oil spill. After the spill, several villages in spill-affected areas were added to the study, and this volume discusses the research methodology used in this expanded study. As in the pre-EVOS phase of this study, the research instruments were a questionnaire and a key informant protocol. The instruments included a series of questions on the EVOS. This document provides information on the study sites, time period covered by the study, response rates and reasons for refusal, and issues of instrument reliability and validity. A considerable amount of data appears interspersed with the discussion of design, methods and data analysis.]
KEYWORDS: REMAINDER[research methods]

CITATION[Jorgensen, Joseph. 1994. Social indicators of Alaskan coastal villages: III analysis. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 154, OCS Study MMS 93-0070. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This document contains analysis on a wide range of social indicators topics.

Exxon Valdez post spill analysis includes an examination of changes in earnings based on village type, degree of participation in village corporation elections, changes in employment, and whether or not oil exploration was considered good or bad for the (individual) village, in relation to the spill. Three variables are analyzed with respect to their association with impacts from the spill. The mixed/Native contrast refers to village composition, and a mixed village is defined as one in which over 25% of the population was non-Native, and Native villages, in which over 75% of residents were Native. A Native/non-Native contrast refers to ethnicity rather than village type. The third contrast, commercial fishing versus non-commercial fishing, refers to the degree to which the village economy is dependent on commercial fishing.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaskan coastal villages] EVENT_PHASE[pre-spill, spill, post-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, non-Natives, commercial fishermen] CULTURAL_EFFECTS[traditional knowledge, belief and cognition, ethics, values] MUNICIPAL_EFFECTS[infrastructure as a variable] CULTURAL_SUBSISTENCE[knowledge, beliefs, cognition, values]

CITATION[Jorgensen, Joseph. 1993. Social indicators of Alaskan coastal villages: II. Research methodology; design, sampling, reliability, and validity. Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 153, OCS Study MMS 93-0035. New Haven, CT: Human Relations Area Files.]
ABSTRACT/ANNOTATION[This volume introduces the research design and research methods, and the sampling procedures used in the social indicators study conducted in 30 Alaskan villages beginning in 1986. The project called for an analysis of contemporary life in the 30 villages in seven Native regions associated with the Alaska Native Claims Settlement act of 1971, in an area that reached from Kodiak Island to the North Slope. Attention in the research design was to be paid to differences among ANCSA regions, between Native and non-Native residents, between villages with developed infrastructure and those with minimal infrastructure, and between Outer Continental Shelf oil-related activities and other development that could affect village life. To this end, two social indicator research instruments were developed to monitor social conditions in these communities over time. A questionnaire and an interview protocol were the instruments developed. This volume addresses the issues of instrument validity, research design (including the selection of communities, the sampling design with respect to persons and households), variance, reliability, non-response, field testing the instruments in 1987, and further testing in 1988, 1989, and 1990.]
KEYWORDS: SOURCE_TYPE[report volume] GEOGRAPHY[ANCSA communities, Kodiak Island, North Slope] EVENT_PHASE[pre-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[ANCSA communities, Alaskan Natives, non-Natives] REMAINDER[research methods]

CITATION[Joyce, T.L., Evans, and R. Riffe. 1996 Otolish marking of pink salmon in Prince William Sound hatcheries, 1995. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95320C). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Klosiewski, S.P. and K.K. Laing. 1994. Marine bird populations of Prince William Sound, Alaska, before and after the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal

Natural Resource Damage Assessment Final Report (Bird Study Number 2). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB97-112684).]

CITATION[Kuletz, K.J. 1994. Marbled murrelet abundance and breeding activity at Naked Island, Prince William Sound, and Kachemak Bay, Alaska, before and after the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 6). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB97-112692).]

CITATION[Kuletz, K.J. N.L. Naslund, and D.K. Marks. 1994. Identification of marbled murrelet nesting habitat in the *Exxon Valdez* oil spill zone. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study Number 15-2). Anchorage, AK: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge (NTIS No. PB97-112718).]

CITATION[Kuletz, K.J., D.K. Marks, N.L. Naslund, N.G. Goodson, and M.B. Cody. 1994. Information needs for habitat protection: marbled murrelet habitat identification. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93051B). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-196886).]

CITATION[Kuletz, K.J., D.K. Marks, and N.L. Naslund. 1994. At-sea abundance and distribution of marbled murrelets in the Naked Island area, Prince William Sound, Alaska, in summer, 1991 and 1992. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study Number 15-1). Anchorage, AK: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge (NTIS No. PB97-112734).]
CITATION[Kuwada, M.N., and K. Sundet. 1993. Stream Habitat assessment project: Afognak Island. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study 47). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division (NTIS No. PB96-194915).]

CITATION[Lee, Martin R. 1989. After the *Exxon Valdez* spill: oil pollution liability and compensation legislation. Washington D.C.: Congressional Research Service, The Library of Congress.]
ABSTRACT/ANNOTATION[Transporting oil involves risks of accidents and thus requires established liability and compensation standards. This work describes the extent to which such a set of standards existed in 1989. Four Federal statutes -- the Clean Water Act, the Deepwater Port Act, the Trans-Alaska Pipeline Authorization Act, and the Outer Continental Shelf Lands Act Amendments -- established the basic parameters of the system, with additions through the actions of specific states and two international agreements. The result was a patchwork of coverage lacking uniformity and perhaps equity. Although the Department of Justice had recommended a uniform Federal oil pollution liability and compensation standard be established, and Congress had repeatedly considered such legislation, no act had been passed. The Senate generally favored the rights of States to establish their own liability standards, whereas the House had been more willing to preempt those standards.]
KEYWORDS: SOURCE_TYPE[report] EVENT_PHASE[litigation] OTHER_EFFECTS[legislation, liability standards]

CITATION[Lipscomb, T.P., R.K. Harris, R.B. Moeler, J.M. Pletcher, R.J. Haebler, and B.E. Ballachey. 1996. Histopathologic lesions associated with crude oil exposure in sea otters, *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-10). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Lipscomb, T.P., R.K. Harris, A.H. Rebar, B.E. Ballachey, and R.J. Haebler. 1996. Pathological Studies of sea otters. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-11). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Lyles, Dianna M. 1990. *Exxon Valdez* oil Spill: A geographic information management response. National Governors' Association third annual conference, integrating data for decision making. Juneau, Alaska: Alaska Department of natural Resources.]
ABSTRACT/ANNOTATION[The response to the *Exxon Valdez* oil spill required an immense management and coordination effort. A key aspect of this was the role of the Alaska Department of natural Resources, Land Records Information Section, in performing comprehensive damage assessment mapping and analysis for the involved State and Federal agencies. This required gathering information, designing database systems, procuring necessary computer capacity, and implementing production responses. This effort yielded enormously valuable rewards, and three simple but important lessons:
1) Using a sophisticated GIS in a large assessment exercise is a strategic decision that requires top management understanding and commitment.
2) Excellent implementation skills must be immediately applied to similar emergency situations.
3) Contingency planning should comprehensively address issues of geographic information management.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[state government, cleanup workers] SOCIAL_EFFECTS[Multi-Agency Coordinating Group, response organization]

CITATION[Martin, P.D. 1993. Effects of the *Exxon Valdez* oil spill on migrant shorebirds using rocky intertidal habitats of Prince William Sound, Alaska, during spring, 1989. *Exxon Valdez* oil spill state/federal natural resource damage assessment final report (bird study number 12-1). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Marty, C.D., E.F. Friedberg, T.R. Meyers, J.A. Wilcock, C.R. Davis, T.B. Farver, and D.E. Hinton. 1995. Ichthyophonus hoferi, viral hemorrhagicsepticemia virus, and other causes of morbidity in Pacific herring spawning in Prince William Sound in 1994. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94320S). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division.]

CITATION[Matkin, C.O., D. Scheel, G. Ellis, L. Barrett-Lennard, and E. Saulitis. 1996. Comprehensive killer whale investigation. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95012). Homer, AK: North Gulf Oceanic Society.]

CITATION[McCarron, S. and A.G. Hoffman. 1993. Technical support study for the restoration of Dolly Varden and cutthroat trout populations in Prince William Sound, *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study 106). Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish.]

CITATION[McClintock, Sharon. 1989. Alaska oil spill commission oiled communities response investigation report. Alaska Oil Spill Commission.]
ABSTRACT/ANNOTATION[The Alaska Oil Spill commission gathered information following the spill in communities affected by the spill. Issues discussed include the spill's proximity and effect on local resources, community responses to the spill, the impact on the community, social impacts, response to the cleanup and containment efforts, causes for community specific impacts, and recommendations. Communities included in this work are: Akhiok, English Bay (Nanwalek), Port Graham, Kodiak, Larsen Bay, Seldovia, Cordova, Chenega Bay, Old Harbor, Karluk, and Whittier. Brief discussion of social impacts indicate: social disruption, changes in subsistence harvests and practices, conflicts and social dissension, individual and communal stress, disruption of local and tribal government, inadequate child care, economic loss for commercial and subsistence fishing and their support industries, health concerns about contaminated resources, distress and grief following observing dead and dying wildlife, frustration with Exxon's perceived insincere cleanup, suicides and other psychosocial problems, influx of outsiders into communities, loss of control over community life and processes, and fiscal losses to local governments.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Akhiok, English Bay, Nanwalek, Port Graham, Kodiak, Larsen Bay, Seldovia, Cordova, Chenega Bay, Old Harbor, Karluk, Whittier] EVENT_PHASE[post-spill] SOCIAL_OR_CULTURAL_IDENTIFIER[residents, Alaska Oil Spill Commission, Exxon, Alaskan Natives] SOCIAL_EFFECTS[social disruption, social conflict, disruption of Native communities, population increase] FAMILY_EFFECTS[childcare] ECONOMIC_EFFECTS[economic loss, commercial fisheries losses] PSYCHOLOGICAL_EFFECTS[grief, frustration, suicide, stress, mistrust, disruption] MUNICIPAL_EFFECTS[influx of outsiders, fiscal losses] SUBSISTENCE_ACTIVITIES[decreased harvest, contamination fears]

CITATION[McDowell Group. 1990. An assessment of the impact of the *Exxon Valdez* oil spill on the Alaska tourism industry: phase I, initial assessment. Prepared for Preston, Thorgrimson, Shidler, Gates, and Ellis. Seattle, Washington: Preston, Thorgrimson, Shidler, Gates, and Ellis.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* oil spill of March 24, 1989 had major effects on the tourism industry throughout Alaska. There were five major negative effects identified by the business surveys conducted for this report:
1) Decreased resident and non-resident vacation/pleasure traffic in the spill-affected areas of Valdez, Homer, Cordova, and Kodiak due to the lack of available visitor services (accommodations, charter boats, air taxis).
2) Forty three percent of surveyed businesses felt their business had been significantly adversely affected by the oil spill in the summer of 1989.
3) Costs of doing business were higher due to a severe labor shortage in the visitor industry throughout the state, due to traditional service industry workers seeking high-paying spill clean-up jobs.
4) Cancellations due to the spill were reported by 59 percent of the businesses.

5) Most negatively affected were lodes and resorts, Alaska-based package tour companies, guided outdoor activities, and charter and sightseeing boats. These businesses did not have the opportunity to reap spill benefits (such as spending for accommodations) because they were located away from spill clean-up operations or operated a business which could not serve clean-up needs.
Other negative effects noted in the report, based on other cited survey work, was the net loss of $5,500,000 to $19,000,000 in visitor spending in 1989, compared to 1988 (an 8 percent decline in Southcentral Alaska, but 35 percent in Southwest Alaska). Also, of those visitors who did go to Alaska in 1989, 16 percent reported that the spill affected their planned activities. Half of these people avoided the Prince William Sound area altogether. Some businesses (sectors such as hotels/motels, car/RV rentals, air taxi and boat charters) in areas such as Kodiak, Homer, Seward, Valdez, and Anchorage experienced increased earnings due to spill clean-up demand for their
services. Effects in 1990 were generally perceived as less than those for 1989, but still present. No long term effects assessment was made.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Kodiak, Homer, Seward, Valdez, Anchorage] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[tourism industry] ECONOMIC_EFFECTS[economic gain, economic loss, money spill] SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources]

CITATION[Mills, Michael J. 1992. Alaska sport fishing in the aftermath of the *Exxon Valdez* oil spill. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish. Special Publication #92-5.]
ABSTRACT/ANNOTATION[The report is based on a mail survey sent to a random sample of those holding sports fishing licenses in Alaska. The survey was conducted annually since 1977 by the Alaska Department of Fish and Game, Division of Sport Fish. This report compares survey results in the area affected by the spill in the five years prior to the EVOS, 1984-88, to survey results in the year 1989. The report includes survey results for streams, but not lakes in the area affected by the EVOS. In general, the study finds that in the geographical area of the EVOS, sports fishing increased between 1984 and 1988, and then decreased in 1989. In 1984-88 there was a mean increase per year of 10% in the number of anglers, a mean increase of 10% per year in the number of household trips, a mean increase of 8% per year in the number of days fished, and a mean increase of 14% per year in the number of fish harvested. The pattern of increase continued in areas outside the spill-affected region. In the region of the spill, the number of anglers decreased 13% in 1989 from levels in 1988, while household trips decreased 15%, the number of days fished decreased 6% and the fish harvested decreased 10%. There was a difference within the spill area between saltwater sports fishing and freshwater sports fishing, and saltwater areas had greater impacts on sportfishing: in streams, the number of anglers decreased 16%, but the number of trips increased 5%, the days fished increased 11%, and fish harvested increased 9%. The study found different degrees of impact in subareas of the spill region. In Prince William Sound the number of anglers, the number of household trips and the days fished decreased, but the number of fish increased; in the Kenai Peninsula area all measures decreased more than the mean for the spill region as a whole, and the same pattern held for the Westside of Cook Inlet. In contrast, in the Kodiak subarea there was only a slight decrease in the number of anglers, along with an increase in the number of trips, and in the days fished, but the

fish harvest decreased 20%. And in the Alaska Peninsula anglers and trips decreased, while days fished and fish harvest increased. There was a difference found between Alaskan residents, and non-residents of Alaska, with a decrease in fishing and harvesting in the spill area among Alaskans, and an increase in fishing and harvesting for non-residents of Alaska. The study found that 10% of those fishing in the oil spill area were cleanup workers, and they accounted for 24% of the fish harvesting. The report includes tables representing data by year and area, and an appendix of comments made by sports fishermen.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska, Prince William Sound, Kenai Peninsula, West Cook Inlet, Kodiak, Alaska Peninsula] EVENT_PHASE[pre-spill, spill] SOCIAL_OR_CULTURAL_IDENTIFIER[sportsmen, residents, cleanup workers] REMAINDER[recreation]

CITATION[Miraglia, Rita A. 1995. Subsistence Restoration Project. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93017). Anchorage, AK: Alaska Department of Fish and Game, Division of Subsistence.]
ABSTRACT/ANNOTATION[Restoration Project 93017 was initiated as a result of data gathered by the Alaska Department of Fish and Game, Division of Subsistence, documenting injury to the subsistence resource by the *Exxon Valdez* oil spill. The goal was to restore the confidence of subsistence users in their abilities to determine the safety of consuming subsistence resources. Methods included community meetings, collection and testing of subsistence resource samples, accompanying community representatives on test laboratory tours, and informational newsletters to communities. Community anticipation was emphasized in every phase. Hydrocarbon testing occurred on ninety composite samples from harbor seals collected in 1993. The tests of the edible tissue showed aromatic contaminants at low levels so as to be within the test's margin of error. The bile of rockfish, seals, and one duck were screened for the presence of metabolites of fluorescent aromatic contaminants. The levels were low, so one would not expect to find elevated concentrations in the edible flesh of these organisms. The project was partly successful in disseminating the subsistence food safety advice of the Oil Spill Health Task Force and in improving the level of trust in the results of hydrocarbon test on the resources.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Kenai Peninsula, lower Cook Inlet, Kodiak Island, Alaska Peninsula, Port Lions, Old Harbor, Karluk, Kodiak, Ouzinkie, Akhiok, Larsen Bay, Nanwalek, English Bay, Port Graham, Chenega Bay, Tatitlek, Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, Ivanoff Bay] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, subsistence resource users] SOCIAL_EFFECTS[community stability, community resources, social organization] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, risk communication, traditional knowledge] FAMILY_EFFECTS[domestic stress, sharing] PSYCHOLOGICAL_EFFECTS[mental health] MUNICIPAL_EFFECTS[service demands, operational disruption] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, decreased harvest, contamination fears, contaminated resources] CULTURAL_SUBSISTENCE[sharing, symbolic expression of culture]

CITATION[Monnett, C. and L.M. Rotterman. 1992. Movements of weanling and adult female sea otters in Prince William Sound, Alaska after the T/V *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal

Study Number 6-12). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194899).]

CITATION[Monnett, C. and L.M. Rotterman. 1992. Mortality and reproduction of female sea otters in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-13). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-195964).]

CITATION[Monnett, C. and L.M. Rotterman. 1992. Mortality and reproduction of sea otters oiled and treated as a result of the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-14). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-196902).]

CITATION[Monson, D.H. and B. Ballachey. 1995. Age distributions of sea otters found dead in Prince William Sound, Alaska Following the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-14). Anchorage, AK: U.S. Fish and Wildlife Service, (NTIS No. PB96-194675).]

CITATION[National Wildlife Federation. Citizens Commission on the *Exxon Valdez* Oil Spill. 1990. The day the water died: a compilation of the November 1989 Citizens Commission hearings on the *Exxon Valdez* oil spill. Edited by Thea Levkovitz. Anchorage, Alaska: Alaska Natural Resource Center, National Wildlife Federation.]
ABSTRACT/ANNOTATION[In November of 1989, four days of public hearings sponsored by the National Wildlife Federation, the Wildlife Federation of Alaska, the Natural Resources Defense Council, and the Windstar Foundation were held in Cordova, Kodiak, Old harbor, Homer, and Anchorage. The hearings were intended as a chance for Alaskans to describe how the *Exxon Valdez* oil spill and subsequent cleanup efforts had affected their lives, and to offer recommendations on how to avoid or at least minimize the effects of any similar future events. The testimony is quite difficult to summarize and full transcripts are not included in this relatively short document. Selected quotes are presented within the categories of testimony constructed by the editors:
"It couldn't happen"
"Who's in charge?"
"The futility of cleaning rocks"
"Impacts of the cleanup"
"The human cost"
"The Native perspective"
"The future"
"Corporate ethics"
The document also contains a selected event chronology of the oil spill and oil spill response, and a complete list of those who provided testimony.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Cordova, Kodiak, Old Harbor, Homer, Anchorage] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, deckhands, cleanup workers, local government, state government, subsistence resource users] SOCIAL_EFFECTS[social disruption, conflict, local resources, subsistence-based community, response organization,

alienation] CULTURAL_EFFECTS[perceived risk, sense of place, sense of community, lifestyle, ethics, dislocation, disruption] FAMILY_EFFECTS[role relationships, stress, roles, children] ECONOMIC_EFFECTS[economic boom, economic loss, money spill] MUNICIPAL_EFFECTS[service demands, fiscal loss] SUBSISTENCE_ACTIVITIES[hunting, fishing, contamination fears, contaminated resources] CULTURAL_SUBSISTENCE[symbolic expression of culture] REMAINDER[community involvement, community participation]

CITATION[Nishimoto, G. and G.V. Byrd. 1993. Effects of the *Exxon Valdez* oil spill on fork-tailed storm petrels breeding in the Barren Islands, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 7). Homer, AK: U.S. Fish and Wildlife Service (NTIS No. PB97-112676).]

CITATION[Nyswander, D.R., C.H. Dippel, G.V. Byrd, and EP. Knudtson. 1993. Effects of the *Exxon Valdez* oil spill on murres: a perspective from observations at breeding colonies. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 3). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB97-112700).]

CITATION[O'Clair, C.E., J.W. Short, and S.D. Rice. 1995. Subtidal monitoring: recovery of sediments in the Northwestern Gulf of Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94285). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[O'Clair, C.E., J.W. Short, and S.D. Rice. 1996. Petroleum hydrocarbon-induced injury to subtidal marine sediment resources. *Exxon Valdez* Oil Sill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 1A). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-196944).]

CITATION[O'Clair, C.E., J.W. Short, and S.D. Rice. 1996. Recovery of sediments in the lower intertidal and subtidal environment. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93047-1). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-194832).]

CITATION[O'Clair, C.E., J.W. Short, and S.D. Rice. 1996. Subtidal monitoring: recovery of sediments in the northern Gulf of Alaska. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 95285). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Oakley, K.L. and K.J. Kuletz. 1994. Population, reproduction and foraging of pigeon guillemots at Naked Island, Alaska, before and after the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Bird Study Number 9). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-204276).]

CITATION[Olsen, J., H. Ferren, and C. Kerns. 1994. Chenega chinook release program. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94272). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division.]

CITATION[Olsen, J., H. Ferren, and C. Kerns. 1994. Prince William Sound system investigation: experimental manipulation. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 94320L). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division (NTIS No. PB96-208434).]

CITATION[Olson, R.A. 1995. Use of aerial photograph, channel-type interpretations to predict habitat availability in small streams. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 95505B). Anchorage, AK: USDA Forest Service, Chugach National Forest (NTIS No. PB96-194923).]

CITATION[Picou, J.S., K. Arata, and S.R. Couch. 1995. The mental health demonstration project: an interim report (9/27/95). RCAC Contract No. 7.4021.702.]
ABSTRACT/ANNOTATION[Little or no social science information exists on the mitigation of and recovery from disasters and technological accidents. Research does indicate that technological disasters resulting in toxic contamination have different, more severe, and longer-term and more chronic social and psychological impacts than do natural disasters resulting primarily in immediate property destruction and/or loss of life. This information on community recovery from disasters, with special emphasis on the special characteristics of technological disasters, is briefly reviewed in the interim report. The Mental Health Demonstration Project (MHDP) itself is an ongoing project to provide original data and information on programmatic strategies for reducing the severity of chronic impacts of oil spills for Prince William Sound communities. This first interim report provides a overall description of the seven-stage project, an initial update on project activities, and outlines proposed intervention strategies proposed as pilot programs for enhancing community recovery from the effects of oil spills (stage five of the project, the current stage at the time of this interim report). These pilot programs were field-tested in later stages of the project. A major goal of these pilot programs was to aid in the "transformation" of an affected community (Cordova) to a healthy post-event state, recognizing that the pre-event state can never be "recovered." The pilot programs proposed were:
Community Education Radio Programs -- annotated separately
Community Education Leaflets -- annotated separately
Community Education Newspaper Series -- annotated separately
The Growing Together Program -- Family/individual group therapy (9 sessions). Outline provided in interim report.
The Peer Listener Program -- outline provided in interim report.]
KEYWORDS: SOURCE_TYPE[progress report] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Alaskan Natives, family] SOCIAL_EFFECTS[community stability, social disruption, social conflict, leadership, emergent groups, kinship, response organizations, alienation] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, lifestyle] FAMILY_EFFECTS[domestic stress, domestic violence] ECONOMIC_EFFECTS[economic gain, economic loss, work disruption] PSYCHOLOGICAL_EFFECTS[stress, depression, anger, anxiety, mental health, substance abuse, therapeutic community, PTSD, post-traumatic stress disorder, corrosive community, mistrust, mental health services]

SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources] REMAINDER[talking circle]

CITATION[Picou, J.S. 1996. The mental health demonstration project: interim report (3/01/96). RCAC Contract No. 7.4021.702.]
ABSTRACT/ANNOTATION[This second interim report is much briefer than the first and is more of a project management document. It briefly summarizes pilot program development in the five months since the first report and presents a schedule for the completion of all project activities.]
KEYWORDS: SOURCE_TYPE[progress report] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Alaskan Natives, individual, emergent groups] SOCIAL_EFFECTS[community stability, social disruption, social conflict, leadership, emergent groups, kinship, response organizations, alienation] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, lifestyle] FAMILY_EFFECTS[domestic stress, domestic violence] ECONOMIC_EFFECTS[economic gain, economic loss, work disruption] PSYCHOLOGICAL_EFFECTS[stress, depression, anger, anxiety, mental health, substance abuse, therapeutic community, PTSD, post-traumatic stress disorder, corrosive community] OTHER_EFFECTS[health] SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources]

CITATION[Picou, J.S. 1996. The mental health demonstration project: a progress report (9/26-27/96). RCAC Contract No. 7.4021.702.]
ABSTRACT/ANNOTATION[This third interim or progress report is a synthetic document incorporating the two previous reports. All scheduled project activities had been accomplished at the time of this report. The final phase of the project remained, for the preparation of a final research report, a final programmatic evaluation, and preparation of a draft guidebook for implementation of the pilot mitigation programs. This third progress report also reported more detailed psychological data on long-term symptoms experienced by commercial fishermen, one of the identified high-risk groups affected by the 1989 *Exxon Valdez* oil spill. The specific psychological symptoms of severe depression, post-traumatic stress disorder, anxiety, social isolation, anger, and work disruption were then targeted for mitigation by the pilot programs.]
KEYWORDS: SOURCE_TYPE[progress report] GEOGRAPHY[Prince William Sound, Cordova, Eyak, Tatitlek, Chenaga Bay, Port Graham] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Alaskan Natives, individual] SOCIAL_EFFECTS[community stability, social disruption, social conflict, leadership, emergent groups, kinship, response organizations, alienation] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, lifestyle] FAMILY_EFFECTS[domestic stress, domestic violence] ECONOMIC_EFFECTS[economic gain, economic loss, work disruption] PSYCHOLOGICAL_EFFECTS[stress, depression, anger, anxiety, mental health, substance abuse, therapeutic community, PTSD, corrosive community] SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources] OTHER_EFFECTS[health] REMAINDER[talking circle]

CITATION[Picou, J.S. 1997. The mental health demonstration project: a progress report (2/03/97). RCAC Contract No. 7.4021.702.]

ABSTRACT/ANNOTATION[This fourth project progress report reviews activities completed for each of the six pilot programs since the last progress report (9/96). As of 2/97, the date of this last progress report, all pilot program activities were completed or in their final stages, with all formal pilot program activities ending 2/11/97. All pilot programs are described and summarized. Outlines for the research report and the guidebook are provided, but delivery of draft products was not anticipated until 3/97. These materials are still in draft form and not available for review (as of 10/97).]
KEYWORDS: SOURCE_TYPE[progress report] GEOGRAPHY[Prince William Sound, Cordova, Eyak, Tatitlek, Chenaga Bay, Port Graham] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, individual] SOCIAL_EFFECTS[social conflict, leadership, emergent groups, kinship, alienation] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, lifestyle] FAMILY_EFFECTS[domestic stress, domestic violence] OTHER_EFFECTS[health] SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources] REMAINDER[talking circle]

CITATION[Piper, Ernest. 1993. The *Exxon Valdez* oil spill: final report, state of Alaska response. Juneau, Alaska: Alaska Department of Environmental Conservation.]
ABSTRACT/ANNOTATION[The report starts with an introduction that traces the most recent history of Alaska and the important role of oil and gas development in that history, as background to its discussion of the response to the *Exxon Valdez* oil spill. The report itself consists of five main components, from the perspective of the state of Alaska, and especially the Alaska Department of Environmental Conservation. Chapter 1 discusses the oil spill response organization. It explains how the standard institutions functioned within the spill response, and how separate and unique institutions emerged. It looks at how decisions were made (although primarily at the state level), but also how state interests and decisions conflicted with, overlapped, or were harmonized with the decisions of other entities involved in the response. Chapter 2 examined how oil response technology worked on the oil spill. It discusses how public and private institutions viewed certain technologies and how they made the decisions to use (or not use) certain types of technology. Chapter 3 is a somewhat sequential description of the shoreline cleanup, begun after the relatively brief water-response phase. While continuing the discussion of earlier sections -- institutional interaction, technology assessment, etc. -- its main purpose is to apply the analysis of previous sections to specific incidents and periods of the response effort. Chapter 4 is a brief overview of state and federal law and regulation changes made since the *Exxon Valdez* oil spill and the date of the report (June 1993). Chapter 5 describes how and why the state of Alaska addressed the principal legal issues raised by the spill. It briefly discusses two early, failed attempts to settle various aspects of the cases, as well as the final civil and criminal settlements of October 1991. It then examines the basic approaches to restoration anticipated by the state and federal governments in the early stages (winter 1992-93) of the restoration process.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Alaska] EVENT_PHASE[pre-spill, spill, cleanup, restoration, litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, local government, state government]
SOCIAL_EFFECTS[Multi-Agency Coordinating Group, response organization]
LITIGATION_EFFECTS[court settlement, class action, damages, plaintiffs, defendants, common property resource, maritime law]

CITATION[Prince William Sound Economic Development Council. 1996. Sound waste management plan, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 95115), Valdez, Alaska.]
ABSTRACT/ANNOTATION[Restoration Project 95115 was the initial phase of the Sound Waste Management Plan project. It was designed to address marine pollution generated from land-based sources within the Prince William Sound communities of Cordova, Valdez, Whittier, Tatitlek, and Chenega Bay. The project recommended ways to improve the management of three different waste streams generated within the communities are a chronic source of marine pollution: used oil, household hazardous waste, and solid waste. Proper handling of these wastes reduces the stress on recovering resources and services. The recommendations of the report, some already implemented, include: creation of a comprehensive used oil management system in each
community, construction of Environmental Operation Stations to improve the overall management of solid and oily wastes, and the development of a regional household hazardous waste program. The Sound Waste Management Plan is based on the premise that a coordinated regional effort will be more effective and cost efficient than individual community efforts.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Chenega Bay, Cordova, Tatitlek, Valdez, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[local government] SOCIAL_EFFECTS[community resources, response organization]

CITATION[Rebar, A.H., B.E. Ballachey, D.K. Bruden, and K.A. Kloecker. 1996. Hematology and clinical chemistry of sea otters captured in Prince William Sound, Alaska following the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-17). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Reeves, G.H., K. Griswold, and K.P. Currens. 1996. Cutthroat trout and Dolly Varden in Prince William Sound, Alaska: the relation among and within populations of anadromous and resident forms. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 96145). Corvallis, OR: U.S. Department of Agriculture, Pacific North West Research laboratory.]

CITATION[Reger, Douglas, Linda Yarborough, Jeanne Schaaf, Pat McClenahan, and Richard Bland. 1996. Archaeological site monitoring and restoration, 1994. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94007-2). Anchorage, AK: Alaska Department of Natural Resources.]
ABSTRACT/ANNOTATION[The Index Site Monitoring project originated as an attempt to monitor vandalism and other site injury through time in the *Exxon Valdez* oil spill area. Sites were vandalized and unintentionally injured during and immediately after oil spill cleanup efforts ceased. Additionally, the potential for oil to adversely affect their research value made monitoring intertidal sites for intrusion by buried or retransported remnants of the oil spill another concern of land managers. Because the large number of sites made monitoring of each site impossible, a few sites were selected to be visited. Monitoring of selected sites commenced after Project 93007 as a reasonable approach to tracking injury to sites. The aim of the program is to provide monitoring of area sites for a ten year period after the spill, in order to allow

managers to detect trends of injuries. Some sites are visited yearly and others on a less frequent schedule. Condition of the index sites have been mapped and those which suffered oiling are sampled for encroachment of retransported oil. None of the monitored sites have been re-oiled. The AFG-046 Site and AFG-098 continue to erode and provide fresh exposures to attract vandal attention. The AFG-097 Site continues to be affected by campers tenting and building campfires on the site. The SEL-215 Site continues to erode and lose cultural data. The remaining sites do not appear to be seriously affected.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Kenai Peninsula, Kodiak Island] EVENT_PHASE[restoration] REMAINDER[archaeology]

CITATION[Reger, Douglas, Debra Corbett, Mark Luttrell, and Linda Yarborough. 1996. Archaeological site restoration, index site monitoring, 1995. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95007A). Anchorage, AK: Alaska Department of Natural Resources.]
ABSTRACT/ANNOTATION[The Index Site Monitoring project originated as an attempt to monitor vandalism and other site injury through time in the *Exxon Valdez* oil spill area. Sites were vandalized and unintentionally injured during and immediately after oil spill cleanup efforts ceased. Additionally, the potential for oil to adversely affect their research value made monitoring intertidal sites for intrusion by buried or retransported remnants of the oil spill another concern of land managers. Because the large number of sites made monitoring of each site impossible, a few sites were selected to be visited. Monitoring of selected sites commenced after Project 93007 as a reasonable approach to tracking injury to sites. The aim of the program is to provide monitoring of area sites for a ten year period after the spill, in order to allow managers to detect trends of injuries. Some sites are visited yearly and others on a less frequent schedule. Condition of the index sites have been mapped and those which suffered oiling are sampled for encroachment of retransported oil. None of the monitored sites have been re-oiled. The AFG-046 Site and AFG-098 continue to erode and provide fresh exposures to attract vandal attention. The AFG-097 Site continues to be affected by campers tenting and building campfires on the site. The SEL-215 Site continues to erode and lose cultural data. The remaining sites do not appear to be seriously affected.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Kenai Peninsula, Kodiak Island] EVENT_PHASE[restoration] REMAINDER[archaeology]

CITATION[Reger, D. R., J.D. McMahan, and C.E. Holmes. 1992. Effect of crude oil contamination on some archaeological sites in the Gulf of Alaska, 1991 investigations. *Exxon Valdez* Oil Spill State/Federal natural Resource Damage Assessment Final Report (Archaeology Study Number 1). Anchorage, AK: Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Office of History and Archaeology (NTIS No. PB96-194659).]

CITATION[Riffe, R.R., S. Gehlbach, D.G. Evans, and B.G. Bue. 1996. Coded wire tag recoveries from pink salmon in Prince William Sound fisheries, 1995. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95320B). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Rosenberg, D.H. 1995. Experimental harlequin duck breeding survey in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration

Project 94427). Anchorage, AK: Alaska Department of Fish and Game, Wildlife Conservation Division.]

CITATION[Rosenberg, D.H., M.J. Petrula, and D.W. Crowley. 1996. Distribution, abundance, and composition of harlequin duck populations in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95427). Anchorage, AK: Alaska Department of Fish and Game.]

CITATION[Roseneau, D.G., A.B. Kettle, and G.V. Byrd. 1995. Common murre restoration monitoring in the Barren Islands, Alaska, 1993. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93049). Homer, AK: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge (NTIS No. PB96-204334).]

CITATION[Rotterman, L.M. and C. Monnett. 1991. Mortality of sea otter weanlings in eastern and western Prince William Sound, Alaska, during the winter of 1990-91. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-18). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194998).]

CITATION[Russell, John C., Lawrence A. Palinkas, and Michael A. Downs. 1993. Social, psychological, and municipal impacts related to the *Exxon Valdez* oil spill. Report prepared as a litigation support document concerning the *Exxon Valdez* . Placerville, CA: Expert Support Services. (*Note: This source is still under court protective order and not yet in the public domain.)*]

CITATION[Sale, D.M., J.C. Gibeaut and J.W. Short. 1995. Nearshore transport of hydrocarbons and sediments following the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 3B). Juneau, AK: Alaska Department of Environmental Conservation (NTIS No. PB96-194907).]

CITATION[Sanger, G.A. and M.B. Cody. 1994. Survey of pigeon guillemot colonies in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93034). Anchorage, AK: U.S. Fish and Wildlife Service (NTIS No. PB96-194808).]

CITATION[Scheel, D., R. Dodge, and T.L.S. Vincent. 1996. Survey of octopus in the intertidal in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95012). Homer, AK: North Gulf Oceanic Society.]

CITATION[Schell, D.M. and A. Hirons. 1996. Isotope ratio studies of marine mammals in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94320I). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division.]

CITATION[Schmidt, D.C., K.E. Tarbox, B.M. Barrett, L.K. Brannian, S.R. Carlson, J.A. Edmundson, J.M. Edmundson, S.G. Honnold, B.E. Kind, G.B. Kyle, P.A. Roche, P. Shields, and C.O. Swanton, 1993. Sockeye salmon over escapement. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 27). Soldotna,

AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Schmidt, K., E.P. Bailey, and G.V. Byrd. 1995. Introduced predator removal from islands. *Exxon Valdez* Oil Spill Restoration Project Annual Report(Restoration Project 94041). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[Schmidt, D.C., K.E. Tarbox, B.M. Barrett, G.B. Kyle, J. A. Edmundson, B.E. King, S.G. Honnald, L.K. Brannian, C.O. Swanton, P. Shields, J.M. Edmundson, P.A. Roche, and S.R. Carlson. 1995. Sockeye salmon over escapement. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94258). Soldotna, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Schmidt, D.C., K.E. Tarbox, G.B. Kyle, and S.R. Carlson. 1995. Sockeye salmon over escapement. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 93002). Soldotna, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Seeb, L., J. Seeb, R. Gates, and C. Habicht. 1993. Assessment of genetic stock structure of salmonids. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Annual Report (Restoration Study number 59). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Seeb, J.E., S.E. Merkouris, L.W. Seeb, P. Bentzen, and J.M. Wright. 1995. Genetic discrimination of Prince William Sound herring populations. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95165). Anchorage, AK: Alaska Department of Fish and Game, Genetics Laboratory.]

CITATION[Sharr, S., B.G. Bue, S.D. Moffitt, A. Craig, and D.G. Evans. 1994. Injury to salmon eggs and preemergent fry in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report(Fish/Shellfish Study Number 2). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-194840).]

CITATION[Sharr, S., C.J. Peckham, D.G. Sharp, D.G. Evans, and B.G. Bue. 1995. Coded wire tag recoveries from pink salmon in Prince William Sound salmon fisheries, 1993. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93067). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-196928).]

CITATION[Sharr, S., C.J. Peckham, D.G. Sharp, L. Peltz, J.L. Smith, M.T. Willette, D.G. Evans, and B.G. Bue. 1996. Coded wire tag studies on Prince William Sound salmon, 1989-1991. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 4, NMFS Component). Anchorage, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-196936).]

CITATION[Sharr, S., C.J. Peckham, D.G. Sharp, J.L. Smith, D.G. Evans, and B.G. Bue. 1995. Coded wire tag studies on Prince William Sound salmon, 1992. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study 60A). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-196878).]

CITATION[Sharr, S., R. Riffe, S. Gehlbach, D.G. Evans, and B.G. Bue. 1995. Coded wiretag recoveries from pink salmon in Prince William Sound salmon fisheries, 1994. *Exxon Valdez* Oil Spill Restoration Project (Restoration Project 94320B). Cordova, AK: Alaska Department of Fish and Game.]

CITATION[Sharr, S., J.E. Seeb, G.B. Bue, A. Craig, G.D. Miller. 1994. Injury to salmon eggs and preemergent fry in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93003). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Sharr, S., J.E. Seeb, B.G. Bue, A. Craig, and G.D. Miller. 1994. Injury to salmon eggs and preemergent fry in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study 60C). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Short, J.W. and P.M. Harris. 1996. Petroleum hydrocarbons in near-surface seawater of Prince William Sound, Alaska, following the *Exxon Valdez* oil spill I: Chemical sampling and analysis. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Air/Water Study Number 3). Auke Bay (Alaska): National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NTIS No. PB96-196951).]

CITATION[Short, J.W. and P. Rounds. 1995. Petroleum hydrocarbons in near-surface seawater of Prince William Sound, Alaska, following the *Exxon Valdez* oil spill II: analysis of caged mussels. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Air/Water Study Number 3, Subtidal Study Number 3A). Juneau, AK: National Oceanic and Atmospheric Administration (NTIS No. PB96-196969).]

CITATION[Steiner, Rick and Kurt Byers. 1990. Lessons of the *Exxon Valdez*. Fairbanks, AK: Alaska Sea Grant College Program, University of Alaska Fairbanks.]
ABSTRACT/ANNOTATION[This report includes in introduction on the damage caused by the oil spill, and suggestions aimed at preventing future spills. It suggests new liability standards, research on prevention and mitigation, mentions the dangers inherent in current energy use, and discusses the impact of oil on sea life and the marine environment. Impacts on people, including possible contaminated food resources, economic and social impacts, and psychological impacts are also reviewed. The various measures used to clean up oil are presented. Legal issues are mentioned, including new federal laws and funding, and the restriction on release of scientific data, and the denial of funding for scientific research based on legal considerations. There is also a short annotated bibliography at the end of the report, and a 1991 update on the impact of the spill on wildlife and archaeological sites. This section concludes that a minimum of 26 archaeological sites were damaged, including home sites and burial sites that suffered severe damage. There is the additional concern about looting of exposed sites. Also, the 1991 update indicates that subsistence patterns remain disrupted.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska, Cordova, Valdez, Kodiak, Prince William Sound] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Alaskan Natives, Alaska Department of Environmental Conservation, Food and Drug Administration, National Oceanographic and Atmospheric Administration, Exxon, Alaska Department of Fish and Game, Oiled Mayors, Minerals Management Service, Oil Spill Health Task Force, Valdez Counseling Center, National Wildlife Federation, Alaska Department of Environmental Conservation, National Marine Fisheries Service] SOCIAL_EFFECTS[social disruption] ECONOMIC_EFFECTS[economic loss] PSYCHOLOGICAL_EFFECTS[stress, depression] LITIGATION_EFFECTS[litigation

and scientific research, litigation restricts information] SUBSISTENCE_ACTIVITIES[decreased harvest, contaminated resources] REMAINDER[archaeology]

CITATION[Stephan R. Braund & Associates and Jon Isaacs & Associates. 1995. Community conference on subsistence and the oil spill: summary report. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95138). Anchorage, AK: Alaska Department of Fish and Game, Division of Subsistence.]
ABSTRACT/ANNOTATION[Six years after the *Exxon Valdez* oil spill (EVOS), the subsistence activities of people from the spill area were still being negatively affected. Due to reduced subsistence resource uses, opportunities to teach subsistence skills and traditional knowledge have also been reduced, thereby affecting cultural life. A conference was sponsored by the EVOS Trustee Council and the Alaska Department of Fish and Game, Division of Subsistence to bring together elders, youth, and other subsistence users from all over the spill region to share observations, experiences, and ideas about their continuing subsistence and natural resource problems and possible solutions. The following goals emerged: to allow users from 20 communities to talk to one another about their common experiences related to the spill and subsistence; to facilitate communication between communities, regions, resource managers, and the EVOS Trustee Council; and to identify how communities can be more involved in the restoration of subsistence resources. Outcomes included the formation of a Steering Committee composed of representatives from each region as a vehicle for continuing the work begun at the conference and the formation of a committee to seek funding for a spirit camp/healing conference. The conference was videotaped to serve as an educational tool. Participant lists are included in the summary report.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Alaska Peninsula, Kodiak Island, Kenai Peninsula, lower Cook Inlet, Southeast Alaska, Chenega Bay, Tatitlek, Cordova, Valdez, Nanwalek, English Bay, Port Graham, Seward, Seldovia, Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, Kodiak, Chignik Bay, Chignik Lagoon, Chignik Lake, Ivanoff Bay, Perryville] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, local government, subsistence resource users] SOCIAL_EFFECTS[community resources, subsistence-based community, community stability, social disruption] CULTURAL_EFFECTS[sense of place, sense of community, lifestyle, traditional knowledge] FAMILY_EFFECTS[domestic stress, sharing] PSYCHOLOGICAL_EFFECTS[chronic psychological stress, mental health] MUNICIPAL_EFFECTS[service demands, Oiled Mayors] SUBSISTENCE_CULTURAL[hunting, fishing, decreased harvest, contamination fears, contaminated resources] CULTURAL_SUBSISTENCE[sharing]

CITATION[Sundet, K., M.N. Kuwada, and J. Barnhart. 1994. Stream habitat assessment project: Prince William Sound and Lower Kenai Peninsula. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93051). Anchorage, AK: Alaska Department of Fish and Game, Habitat and Restoration Division, (NTIS No. PB96-195029).]

CITATION[Swanton, C.O., T.J. Dalton, B.M. Barrett, D. Pengilly, K.R. Brennan, and P.A. Nelson. 1993. Effects of pink salmon (Oncorhynchus gorbuscha)escapement level of egg retention, preemergent fry, and adult returns to the Kodiak and Chignik management areas caused by the *Exxon Valdez* oil spill. *Exxon Valdez* Oil Spill State/Federal Natural Resource

Damage Assessment Final Report (Fish/Shellfish Study Number 7B and 8B). Kodiak, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Tarbox, K.E., R.Z. Davis, L.K. Brannian, B.E. King, J.R. Fox, and S.M. Fried. 1994. Kenai River sockeye salmon restoration. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 93015). Soldotna, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Tarbox, K.E., D.L. Waltmyer, L.K. Brannian, R.Z. Davis, B.E. King, J.R. Fox, and S.M. Fried. 1994. Kenai River sockeye salmon restoration. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Annual Report (Restoration Study Number 53). Soldotna, AK: Alaska Department of Fish and game, Commercial Fisheries Division.]

CITATION[Tarbox, K.E., R.Z. Davis, L.K. Brannian, and S.M. Fried. 1995. Kenai River sockeye salmon restoration. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94255). Soldotna, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Townsend, Richard and Burr Heneman. 1989. The *Exxon Valdez* oil spill: a management analysis. Washington, D.C. Center for Marine Conservation.]
ABSTRACT/ANNOTATION[The intent of this document is to assess the effectiveness of the response to the *Exxon Valdez* oil spill, concentrating on conditions prior to the spill that may have contributed to its occurrence and which conditioned industry and government efforts in response to it. Members of the research team spent several weeks in the area of the spill and interviewed dozens of government and industry officials, scientists, and private citizens. They concluded that there is a need for a much greater commitment to preparing for the next spill. The chief recommendation of the report concerned the organization and management of spill response -- their recommendation is that one person in the federal government should be in charge of any oil spill response effort. Other recommendations emphasize more practical aspects of preparedness (equipment on hand, standardization of equipment, and soon). The tone of the report continually underlines the need for continued public scrutiny of oil companies and government regulators. As the report summarizes, "Early commitments to oil spill response by Alyeska, the consortium of oil companies responsible for the operation of the Valdez terminal, faded with time until Alyeska had eliminated independent oil spill response teams entirely. Assurances and contingency plans alone do not make for meaningful preparedness." The report also assesses the preliminary research plans for assessing damages to resources caused by the *Exxon Valdez* oil spill, and makes recommendations for suggested immediate and future research.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Valdez, Seward, Cordova, Anchorage, Alaska] EVENT_PHASE[pre-spill, spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] SOCIAL_EFFECTS[local resources, response organization] CULTURAL_EFFECTS[perceived risk] MUNICIPAL_EFFECTS[service demands, fiscal loss, operational disruption] SUBSISTENCE_ACTIVITIES[contamination fears, contaminated resources]

CITATION[Trowbridge, Charles. 1992. Injury to Prince William Sound spot shrimp. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 5). Anchorage, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Udevitz, M.S., B.E. Ballachey, and D.L. Bruden. A population model for sea otters in western Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93043-3). Anchorage, AK: National Biological Service.]

CITATION[Udevitz, M.S., J.L. Bodkin, and D.P. Costa. 1995. Detection of sea otters in boat-based surveys of Prince William Sound, Alaska. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Marine Mammal Study Number 6-19). Anchorage, AK: U.S. Fish and Wildlife Service.]

CITATION[United States. Congress. House. Committee on the Budget. Task Force on Urgent Fiscal Issues. 1991. Budgetary implications of the *Exxon Valdez* oil spill settlement. Hearing before the Task Force on Urgent Fiscal Issues of the Committee on the Budget, House of Representatives, One Hundred Second Congress, first session, October 31, 1991.]
ABSTRACT/ANNOTATION[The document opens with the statement of the Chair, Congressman Guarini. Also included are the statements of a resource economist with the National Wildlife Federation, a representative of the Alaska Attorney General's Office, an Alaska State Legislator, the Acting Assistant Attorney General with the Environmental and Natural Resources Division of the Department of Justice, a representative of the Natural Resources Defense Council, and a prepared statement was submitted by the American Petroleum Institute among others. The following excerpts the opening statement by the Task Force Chair: The Federal Government, Exxon, and the State of Alaska reached an agreement in which Exxon would pay $1.025 billion in fines and damages. No public comment on the agreement was taken. This agreement represented the largest settlement on record of an environmental case, and was meant to cover cleanup costs and the long-term expenses of restoring ecological balance. It was also to include claims, including those by third parties. The question to be addressed in the Hearing was whether it was a good settlement. Estimates of cleanup costs and environmental restoration range from $3 to $15 billion, and if this proves true, taxpayers are paying a large part of the cleanup costs. The Federal Government commissioned studies to establish the magnitude of the spill, but the studies were not released. The Chair goes on to say that the criminal penalties indicated in the settlement appear to have been manipulated for tax deductibility. For example, Exxon says it paid $2.5 billion in voluntary cost cleanup, and this expense is cited as a reason to offset criminal penalties, while the cleanup costs were deducted from Exxon's taxes. The Chair stated that "in the end, the agreement will actually cost Exxon perhaps, according to our calculations, $463 million in today's dollars. Almost all of the total settlement is deductible for Exxon."]
KEYWORDS: SOURCE_TYPE[Congressional Hearing] GEOGRAPHY[Alaska] EVENT_PHASE[cleanup] US Congress, Task Force on Urgent Fiscal Issues, Committee on the Budget, National Wildlife Federation, Attorney General of Alaska, Alaskan Legislature, Department of Justice Division of Environmental and Natural Resources, Natural Resources Defense Council, American Petroleum Institute, taxpayers, Exxon, Federal Government, Alaska State Government] MUNICIPAL_EFFECTS[municipal and State costs, fiscal impacts]

LITIGATION_EFFECTS[litigation, adequacy of settlement] REMAINDER[who paid costs of spill]

CITATION[United States. Congress. House. Committee on Merchant Marines and Fisheries. Subcommittee on Coast Guard and Navigation. 1989. *Exxon Valdez* oil spill: hearing before the Subcommittee on Coast Guard and Navigation of the Committee on Merchant Marines and Fisheries, House of Representatives, One Hundred First Congress, first session, on topics concerning the *Exxon Valdez* oil spill into the Prince William Sound of Alaska. April 6, 1989.]
ABSTRACT/ANNOTATION[This document includes statements, a chronology of Exxon's response to the oil spill, reviews and discussion of spill liability laws, and interviews of witnesses. Statements included those made by Representatives Bentley, Brennan, Carper, Clement, Coble, Curtis, Davis, Hughes, Inhofe, Jones, Laughlin, Lent, Lowey, Manton, Miller, Moore, Pickett, Schneider, Shumway, Tauzin, Weldon, and Young. There are also statements from a representative of the Commerce division of NOAA, the U.S. Coast Guard, the Prince William Sound Aquaculture Association, the EPA, the Trans Alaskan Pipeline Liability Fund, the US Fish and Wildlife Service, Exxon, the Department of Transportation, the National Marine Manufactures, and a statement by the Lieutenant Governor of Alaska.]
KEYWORDS: SOURCE_TYPE[Congressional Hearing] GEOGRAPHY[Alaska, Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[Rep. Bentley, Rep. Brennan, Rep. Carper, Rep. Clement, Rep. Coble, Rep. Curtis, Rep. Davis, Rep. Hughes, Rep. Inhofe, Rep. Jones, Rep. Laughlin, Rep. Lent, Rep. Lowey, Rep. Manton, Rep. Miller, Rep. Moore, Rep. Pickett, Rep. Schneider, Rep. Shumway, Rep. Tauzin, Rep. Weldon, Rep. Young, National Oceanographic and Atmospheric Administration, U.S. Coast Guard, Prince William Sound Aquaculture Association, Environmental Protection Agency, Trans Alaskan Pipeline Liability Fund, U.S. Fish and Wildlife Service, Exxon, Department of Transportation, National Marine Manufactures, Lieutenant Governor of Alaska] REMAINDER[liability laws]

CITATION[United States. Congress. House. Committee on Merchant Marine and Fisheries. Subcommittee on Coast Guard and Navigation. 1989. Hearing Before the Subcommittee on Coast Guard and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, One Hundred First Congress.]
ABSTRACT/ANNOTATION[This Congressional Hearing was held in Cordova, Alaska, in August of 1989 at the Mt. Eccles Elementary School. The Members present were the Chairman of the Subcommittee, the Hon W.J. Billy Tauzin, and Representatives Lowey, Studds, Young, Goss, Herger, and Unsoeld. This document is a transcript of the Hearing, along with the statements and letters filed by those attending or otherwise involved in the Hearing. Thee document begins with a statement from Chairman Tauzin from Louisiana, followed by a statement from Rep. Young from Alaska, and then Rep. Davis from Michigan. Next there is a statement from Victor Rezendes, the Associate Director of Transportation Issues with the General Accounting Office. He was accompanied by Assistant Director Maccaroni, G. Ziebarth, an evaluator, and by Consultant V. Keith and Jackie Goff the GAO General Counsel. They state that the response to the *Exxon Valdez* oil spill was clearly inadequate, and that we are equally unprepared elsewhere in the US. Second, they note that even if more resources were devoted to spill cleanup, the ability to manage a spill of that magnitude is very limited. Third, they state that it is important to avoid scattered leadership, and mention that one problem currently is that

there is no single designated leader. They believe the Federal Government should take the leadership role. They conclude that it is important to significantly increase funding to aid preparation. Following this statement, the GAO personnel were questioned by the Congressional panel. Then others offered statements and were questioned by the panel, including the head of Exxon in the US, the Vice President for Operations of the Alyeska Pipeline Service, the Assistant Regional Administrator for Alaska Operations of the Environmental Protection Agency, the Alaska Dept. of Environmental Conservation, the Hazardous Material Response Branch Representative for the National Oceanographic and Atmospheric Administration, and the Coast Guard's Federal on-scene coordinator. Written statements were submitted by a larger number of individuals and groups, and those submitting statements included Cordova District Fishermen United, Chugach Alaska Corporation, a commercial fisherman, the mayor of Cordova, and the US Fish and Wildlife Service.]
KEYWORDS: SOURCE_TYPE[Congressional Hearing] GEOGRAPHY[Alaska, Prince William Sound] EVENT_PHASE[pre-spill, spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[General Accounting Office, Alyeska, Exxon, Environmental Protection Agency, Alaska Department of Environmental Conservation, National Oceanographic and Atmospheric Administration, U.S. Coast Guard, Cordova District Fishermen United, Chugach Alaska Corporation, commercial fishermen, Cordova mayor, U.S. Fish and Wildlife Service, federal government] SOCIAL_EFFECTS[social disruption]
CULTURAL_EFFECTS[sense of place] ECONOMIC_EFFECTS[economic loss]
MUNICIPAL_EFFECTS[municipal actions, municipal costs] SUBSISTENCE_ACTIVITIES[decreased subsistence activity, resource availability, contaminated resources] REMAINDER[legislative oversight]

CITATION[United States. Congress. Senate. 1989. National Ocean Policy Study. Exxon oil spill: hearings before the National Ocean Policy Study and the Subcommittee on Merchant Marine of the Committee on Commerce, Science, and Transportation, United States Senate, One Hundred First Congress, first session on cleanup, containment, and impact of the *Exxon Valdez* oil spill and oil spill prevention and maritime regulations. Washington, D.C.: U.S. GPO]
ABSTRACT/ANNOTATION[The first part of the Senate hearings was held on April 6, 1989, and included a statement by the chair Ernest Hollings, and Senators Stevens, Packwood, Gorton, and Inoye. The document includes a transcript of the statements and the questioning of witnesses, who included representatives from National Oceanographic and Atmospheric Administration, Exxon, the Environmental Protection Agency, the Department of the Interior's Fish and Wildlife Service, the US Geological Survey, and the U.S. Coast Guard. The document also includes letters from the governor of Alaska, and the president of Exxon. The second part of the document includes hearings held on May 10th and July 20, 1989. There were additional Senators present, and witnesses included representatives from the US Navy, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, the Center for Marine Conservation, Cordova District Fishermen United, Exxon, the U.S. Coast Guard, the Port Pilot's Association, Chevron, the American Institute of Marine Shipping. Letters and statements were introduced from the Chugach Alaska Corporation, the Forest Service, NOAA, and Laborer's International Union.]
KEYWORDS: SOURCE_TYPE[Senate Hearing] GEOGRAPHY[Alaska, Prince William Sound] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Senator Hollings, Senator Stevens, Senator Packwood, Senator Gorton, Senator Inoye, William E. Evans, Under

Secretary of Commerce for Oceans and Atmosphere, National Oceanographic and Atmospheric Administration, L.G. Rawl, C.E.O. of Exxon, William Reilly, Environmental Protection Agency, Samuel Skinner, Department of the Interior, Captain Larrabee, U.S. Geological Survey, Admiral Paul Yost, U.S. Coast Guard, Captain Ken Thompson, Captain Dave Spade, Governor Steve Cowper, L.R. Raymond President of Exxon, Senator Kerry, Senator Burns, Senator Breaux, Senator Bryan, Senator Lott, Senator Gore, Senator Adams, Senator Pressler, U.S. Navy, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, Center for Marine Conservation, Cordova District Fishermen United, Exxon, Port Pilots Association, Chevron, American Institute of Marine Shipping, Chugach Alaska Corporation, U.S. Forest Service, Laborer's International Union] REMAINDER[legislative hearings]

CITATION[United States. General Accounting Office. 1989. Coast Guard: adequacy of preparation and response to *Exxon Valdez* oil spill: report to congressional requesters. Washington, D.C.: U.S. General Accounting Office.]
ABSTRACT/ANNOTATION[The report was requested by the House Committee on Merchant Marines and Fisheries to evaluate how well the Coast Guard was carrying out its environmental responsibilities. After the spill, the Committee requested that the topic be redirected to include the *Exxon Valdez* oil spill. The report finds that no one realistically prepared to deal with a spill of such magnitude in Prince William Sound. Alyeska had equipment available to manage a spill of 42,000 to 84,000 gallons, which was less than 1% of the oil spilled from the *Exxon Valdez*. It indicates that current technology is unable to contain or recover a spill of that size, and therefore emphasis must be placed on spill prevention. The report also faults the leadership structure overseeing transportation of hazardous materials by sea, and problems with the National Response System. It observes that states often leave spill planning to be done by industry on a voluntary basis, and suggests that National standards and oversight be developed. With respect to the spill, the Coast Guard reported that there were equipment breakdowns and that weather and water conditions made recovery more difficult. Spill prevention would include monitoring or directing ship movements, and harbor pilot or tug assistance. These were rarely done in Prince William Sound. Further, the Coast Guard did not have radar coverage for the whole Sound, because of the cost. And it indicates that greater funding would be needed to improve spill prevention. An appendix outlines the current National Response System.]
KEYWORDS: SOURCE_TYPE[government report] GEOGRAPHY[Alaska, Prince William Sound, U.S. states] EVENT_PHASE[pre-spill, spill, cleanup]
SOCIAL_OR_CULTURAL_IDENTIFIER[Alyeska, Exxon, U.S. Coast Guard, National Response Team, On Scene Coordinators, National Response Center] REMAINDER[regulatory change, spill response, risk estimates, risk assessment]

CITATION[United States. General Accounting Office. 1990. Coast Guard: federal costs resulting from the *Exxon Valdez* oil spill. Washington, D.C.: U.S. General Accounting Office.]
ABSTRACT/ANNOTATION[The report finds that as of September of 1989, nine federal agencies incurred costs from the *Exxon Valdez* oil spill. These agencies were the Departments of Defense, the Interior, Commerce, Agriculture, Justice, Transportation, Health and Human Services, Labor, and the Environmental Protection Agency. The total estimated costs were $125.2 million, with 89% representing cleanup costs, 9.8% damage assessment costs, and .9% other costs. The agencies spending the most were, the Department of Defense ($62.8 million), the Department of Transportation ($33.3 million), Department of the Interior ($12 million), and

the Department of Commerce ($9.6 million). Distribution of costs with in the agencies is presented, as is an overview of the cost reimbursement procedures, and also cases in which reimbursement is uncertain.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[General Accounting Office, Department of Defense, Department of the Interior, Department of Commerce, Department of Agriculture, Department of Justice, Department of Transportation, Department of Health and Human Services, Department of Labor, Environmental Protection Agency, Exxon] ECONOMIC_EFFECTS[economic loss, claims process]

CITATION[United States. General Accounting Office. 1990. Coast Guard: millions in federal costs may not be recovered from *Exxon Valdez* oil spill: report to Congressional requesters. Washington, D.C.: U.S. General Accounting Office.]
ABSTRACT/ANNOTATION[The report finds that the federal government reported spending $154 million on the *Exxon Valdez* oil spill as of June 30, 1990, but might recover only $123 million. Further, there are millions in costs that the government will not recover because they were undocumented or unreported.. The amount of un-reimbursed costs is likely to grow. Reasons for the limited recovery are investigated and reported in this document. The report finds that Coast Guard regulations provide for reimbursement of oil removal costs from the pollution funds, and agencies have been unable to collect directly from Exxon. Damage assessment and restoration of natural resources may not be funded unless Exxon agrees to fund the costs. A second reason for losses is that the Coast Guard's spill coordinator, responsible for approving the spill costs incurred by agencies, did not authorize agencies to recover some spill costs from the pollution fund, though these expenditures could have been authorized under the broad definition of oil removal. The spill coordinator's definition of these costs as unrelated to oil removal meant they could not be reimbursed. The study concludes that there was significant confusion over the reimbursement process and suggest the kinds of information that should be provided following a disaster.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Alaska] EVENT_PHASE[spill, cleanup, restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[U.S. Coast Guard, General Accounting Office, Coast Guard Spill Coordinator, Secretary of Transportation, Department of Defense, Department of Energy, Environmental Protection Agency, Federal Aviation Administration, National Oceanic and Atmospheric Administration, National Park Service] ECONOMIC_EFFECTS[economic loss, federal costs, claims process] REMAINDER[inter-agency coordination, reimbursement process]

CITATION[United States. National Transportation Safety Board. 1990. Marine accident report: grounding of the U.S. tankership *Exxon Valdez* on Bligh Reef, Prince William Sound near Valdez Alaska, March 24, 1989. Washington, D.C. : The Board.]
ABSTRACT/ANNOTATION[This report of the investigation, analysis, findings, and recommendations was signed on July 31, 1990 by the chair and members of the NTSB. The report indicates that during the *Exxon Valdez* accident, there were no injuries, but that around 258,000 barrels of crude oil spilled following the rupture of 8 cargo tanks. Damage to the vessel was estimated at $25 million, the cost of the lost cargo had an estimate of $3.4 million, and the cost of the cleanup during 1989 was $1.85 billion. The report found that the specific cause of the accident was the failure of the 3rd mate to properly maneuver the vessel due to fatigue and an

excessive work load, along with the failure of the master to provide a proper navigational watch because of alcohol, the failure of Exxon to provide a fit master and a rested and sufficient crew, the lack of vessel traffic service because of inadequate equipment and manning levels, inadequate personnel training and deficient management oversight, along with a lack of effective pilotage services. The general safety issues involved in the grounding included the adequacy of the navigation watch on the night of the grounding; the role of human factors, including fatigue and alcohol use; the Coast Guard and Exxon Shipping Company manning standards, along with Exxon's procedures for determining manning levels for tanker-ships; Exxon Shipping Company's drug and alcohol testing and rehabilitation programs; the Coast Guard regulations and procedures for drug and alcohol testing aboard commercial vessels; the role of the Coast Guard Vessel Traffic Service at Valdez; and the oil spill contingency planning and initial response. Recommendations included research, education, regulations regarding fatigue, and a range of recommendations regarding substance use and toxicology testing. One of the Board members filed an exception in which he concurred with the probable cause of the accident but added that a factor contributing to the severity of environmental damage was the lack of a double bottom on the *Exxon Valdez*, and a failure to initiate early burning of the crude because a needed boom was lacking. And in addition to the recommendations offered by the other Board members, this member recommended that all tank vessels over 20,000 dead weight tons and foreign vessels over that weight entering US waters, have double hulls.]
KEYWORDS: SOURCE_TYPE[government report] GEOGRAPHY[Prince William Sound, Bligh Reef] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Exxon crew, U.S. Coast Guard, Environmental Protection Agency, U.S. Geological Survey, Alaska Regional Response Team] ECONOMIC_EFFECTS[economic loss] REMAINDER[regulatory change]

CITATION[Varanasi, Usha, Donald W. Brown, Tom Hom, Douglas G. Burrows, Catherine A. Sloan, L. Jay Field, John E. Stein, Karen L. Tilbury, Bruce B. McCain, and Sin-Lam Chan. 1993. Volume I: Survey of Alaskan subsistence fish, marine mammal, and invertebrate samples collected 1989-91 for exposure to oil spilled from the *Exxon Valdez*. Seattle, Washington: National Marine Fisheries Service, Northwest Fisheries Science Center. U.S. Department of Commerce, NOAA technical memorandum NMFS-NWFSC-12, 110 p.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* oil spill raised concerns of native Alaskans that their subsistence seafoods were contaminated by the spilled petroleum. A study was conducted as a cooperative effort among NOAA, Exxon, and the Alaska Department of Fish and Game to assess the degree of contamination of subsistence organisms by Prudhoe Bay crude oil. Samples of edible flesh of fish, marine mammals, and shellfish were taken from 22 potentially affected native subsistence food collection areas and from two reference areas (Angoon and Yakutat) and analyzed for aromatic compounds. Elevated concentrations of fluorescent aromatic compounds in some samples from fish and marine mammals was clear evidence of their exposure to petroleum. However, aromatic compounds were not found in the muscle tissue of fish, harbor seals, and sea lions. Some harbor seal blubber samples did contain aromatic compounds, but generally at low levels (less than 100 ng/g). Smoked salmon contained higher concentrations of aromatic compounds (8,000 to 20,000 ng/g) than any of the untreated subsistence samples. The concentrations of aromatic compounds were less than 100 ng/g in approximately 90 percent of the more than 1,000 mollusc samples from 80 different beaches sampled. The concentrations of aromatic compounds were elevated in some mollusc samples (as

high as 18,000 ng/g) and exceeded 1,000 ng/g in 24 samples. In an advisory opinion, the Food and Drug Administration indicated that little risk was involved in the consumption of the nonsmoked subsistence foods studied. Subsistence food gatherers were advised not to collect or consume food if oil was observed to be present. The results also show that in future oil spills, shellfish tissue should be given the highest priority for analysis, whereas rapid screening of bile from fish and marine mammals should be sufficient to provide information on their level of exposure.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound, Tatitlek, Chenega Bay, Port Graham, Nanwalek, English Bay, Kodiak, Larsen Bay, Karluk, Akhiok, Old Harbor, Ouzinkie, Port Lions] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[subsistence resource users] SOCIAL_EFFECTS[subsistence-based community, local resources] SUBSISTENCE_ACTIVITIES[hunting, fishing, gathering, clamming, contamination fears, contaminated resources]

CITATION[Varanasi, U., T.K. Collier, C.A. Krone, M.M. Krahn, L.L. Johnson, M.S. Myers, and S.L. Chan. 1995. Assessment of oil spill impacts on fishery resources: measurement of hydrocarbons and their metabolites, and their effects, in important species. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 7). Seattle, WA: National Marine Fisheries Service, NOAA (NTIS No. PB96-194741).]

CITATION[Wedemeyer, K. and D. Gillikin. 1995. In stream habitat and stock restoration for salmon, Shrode Creek Barrier bypass subproject. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93139-B1). Anchorage, AK: USDA Forest Service (NTIS No. PB96-194766).]

CITATION[Wedemeyer, K. and D. Gillikin. 1995. In stream habitat and stock restoration for salmon, Otter Creek barrier bypass subproject. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93139-B1). Anchorage, AK: USDA Forest Service (NTIS No. PB96-194774).]

CITATION[Wells, Peter G., James N. Butler, and Jane Staveley Hughes, (eds.). 1995. *Exxon Valdez* oil spill: fate and effects in Alaskan waters. Philadelphia, PA: ASTM, Series title: ASTM special technical publication; 1219.]

CITATION[Wertheimer, A.C., A.G. Celewycz, M.G. Carls, and M. V. Sturdevant. 1994. Impact of the oil spill on juvenile pink and chum salmon and their prey in critical nearshore habitats. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 4, NMFS Component). Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.]

CITATION[Wertheimer, A.C., S.D. Rice, A.G. Celewycz, J.F. Thedinga, R.A. Heintz, R.F. Bradshaw, and J.M. Maselko. 1996. Affects of Oiled incubation substrate on straying and survival of wild pink salmon. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95076 and 95191B). Juneau, AK: Auke Bay Fisheries Laboratory, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.]

CITATION[Wilcock, J.A., E.D. Brown, and E. Debevec. 1995. Herring spawn deposition and reproductive impairment. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 94166-1). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Willette, T.M., N.C. Dudiak, G., Honnald, G. Carpenter, and M. Dickson. 1995. Survey and evaluation of in stream habitat and stock restoration techniques for wild pink and chum salmon. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Restoration Study Number 105-1, Restoration Project 93063). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division.]

CITATION[Willette, T.M., G. Carpenter, P. Shields, and S.R. Carlson. 1994. Early marine salmon injury assessment in Prince William Sound. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 4A). Cordova, AK: Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division (NTIS No. PB96-194758).]

CITATION[Wolf, D.A. 1994. Fate and toxicity of spilled oil from the *Exxon Valdez*. *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Subtidal Study Number 4). Silver Spring, MD: National Oceanic and Atmospheric Administration (NTIS No. PB96-194857).]

CITATION[Yarborough, Linda Finn. 1995. Site specific archaeological restoration. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 95007B). Anchorage, AK: Chugach National Forest.]
ABSTRACT/ANNOTATION[Project 94007 provided for restoration of two archaeological sites (SEW-440 and SEW-488) damaged during the *Exxon Valdez* oil spill and its subsequent cleanup program. Assessment and test excavations were carried out during 1994 field season. Because restoration was not completed during 1994 at one of the sites, field work continued in 1995. No further field work is anticipated, and the project is in its final phases of analysis (FY 96) and public presentation of results is planned for FY 97. This report describes the analysis and field work that took place in 1995.]
KEYWORDS: SOURCE_TYPE[report] GEOGRAPHY[Prince William Sound] EVENT_PHASE[restoration] CULTURAL_SUBSISTENCE[symbolic expression of culture] REMAINDER[archaeology]

COMMUNITY OUTREACH DOCUMENTS

CITATION[Picou, J.S. 1996. March 24, 1989: trying to understand. RCAC Contract No. 7.4021.702. Developed by Sound Alternatives and the Family Resource Center (Cordova) in cooperation with the University of South Alabama. Reprint of newspaper articles originally published in The Cordova Times.]
ABSTRACT/ANNOTATION[This document contains reprints of nine newspaper articles published in the Cordova Times from May to August in 1996. The series provides information about technological disasters, their impacts on communities, and strategies that people can use to overcome chronic stress. The articles were developed as one part of a larger mental health

demonstration project developed, funded, and directed by the Prince William Sound Regional Citizens' Advisory Council. Brief summaries of the main points put forth in each article follow below.

"Technical disasters: why are they different?"

Natural disasters are caused by uncontrollable forces of nature, bring people together to rebuild and help each other, and allow people to rebuild and return to their pre-disaster lives. Technological disasters are caused by humans or human error, produce mistrust and anxiety in people unable to repair the environment affected by such disasters, and do not allow people to return to predisaster conditions, instead requiring communities to form new patterns for their lives.

"Three Mile Island: a continuing disaster"

Technological disasters become embedded in the consciousness of victims, producing uncertainty long after the event is over. Chronic stress is common because of the fear of a potential second technological disaster. Guilt is produced from the fear of passing on genetic defects potentially caused by exposure to toxic contamination. Additional stress is produced from increased sensitivity to other potential environmental problems.

"Understanding anger from technological disasters"

Anger is a normal and healthy response that can help ease the pain and stress of a trauma. Allowing anger to be all-consuming is unhealthy and prolonged anger does nothing for long-term recovery. Deal with anger by directing it only at those responsible, understand that you have control only over yourself and your own emotions, that anger harms only you. Talk about your feelings, get physically active, and redirect your anger to concentrate on solutions rather than blame. Let go of your anger by realizing that you have no control over those who caused the disaster. Realize that others are sharing the pain and emotions of the disaster.

"Letting go of chronic depression"

Signs of depression are persistent sadness, loss of interest in usual activities, poor appetite, weight loss, sleeplessness or excessive sleep, fatigue, low self-esteem, guilt, difficulty concentrating, and thoughts of suicide or death. Release depression by accepting that a disaster has occurred and concentrate on helping yourself and others. Do not dwell on retribution. Rather, become a helper for others, even if only by listening to them. Establishing a new routine of regular sleeping, eating, and exercising will help reduce depression. Isolation increases depression, so talk with others and work together on solutions.

"Chronic stress and alcohol consumption"

Stress and alcohol become a vicious cycle when the desire to drink is associated with stress. The use of alcohol decreases an individual's ability to seek solutions to stressful situations. Being male, single, unemployed, and/or angry is correlated with abusive drinking patterns. To break the cycle, realize you have a problem, learn what situations cause you to desire alcohol, and seek professional help.

"Talking to children in stressful situations"

Children need to understand why their parents and other adults are acting differently following a technological disaster. Be honest and reassure them that the family will work through the problem together. Children may react to stressful situations by reverting to earlier developmental habits. Children need to know that they can ask questions about what they see and hear, and feel that they are secure within their families. Allow children to express and talk about their emotions. Show children that adults are seeking solutions and not affixing blame or projecting anger into the family.

"The mood-food connection and stress"
Negative emotions may trigger the desire or produce the opportunity to overeat. Limit sugar, salt, saturated fat, caffeine, and alcohol, and try to drink eight glasses of water a day. Remove tempting food from areas you are likely to be, establish regular meal times, and don't snack between meals. Stress can cause people to lose their appetites, but a regular schedule of exercise, sleep, and meals will help maintain health and decrease the incidence and effects of chronic stress.
"Chronic stress and cancer: is there a link?"
Depression and stress are thought to be commonly linked to cancer through effects on the immune system. Chronic stress causes people to begin or increase habits (smoking, alcohol abuse, overeating) which are known to increase the incidence of cancer. To reduce the risk of cancer, establish a regular schedule of eating, sleeping, and exercising and avoid alcohol, tobacco, red meat, and heavy diary products.
"Coping with technological disasters"
Victims of technological disasters commonly wish to withdraw and try to shelter their own families. For individuals this often leads to depression, and collectively to the formation of a corrosive community where people are mistrustful of each other and all institutions and feel powerless. Instead, people must realize that parts of the disaster will be permanent, recognize that anger is justifiable and that they need not forgive nor forget, but that they cannot be forever preoccupied by the past. They must assert control over what they can affect and actively seek positive solutions in conjunction with other community members.]
KEYWORDS: SOURCE_TYPE[public outreach document] PSYCHOLOGICAL_EFFECTS[psychological outreach, mental health services]

CITATION[Sound Alternatives. 1996a. Community Education Leaflets. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[This eight leaflet series presents different aspects of the "Growing Together Program." The first leaflet is a general introduction to the series, while the others describe potential psychological or social pathological consequences of technological disasters and ways to counter or cope with them. Titles of the leaflets are:
Growing together: a community education program
Plain talk about depression
Plain talk about domestic violence and wife abuse
Plain talk about managing anger
All about alcohol just for kids
Plain talk about alcohol
Plain talk about helping children cope with disaster
Plain talk about post-traumatic stress disorder.]
KEYWORDS: SOURCE_TYPE[community outreach documents] SOCIAL_EFFECTS[social disruption] CULTURAL_EFFECTS[risk communication] FAMILY_EFFECTS[family outreach] PSYCHOLOGICAL_EFFECTS[psychological outreach, mental health services]

CITATION[Sound Alternatives. 1996b. Community Education Taped Radio Programs. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]

ABSTRACT/ANNOTATION[This five tape series presents an overview of the characteristics of technological disasters and some of the psychological and other impacts which commonly result from them. The tapes also discuss ways to mitigate, cope with, and recover from such effects, on the personal as well as community level. Each tape features host Ray Farnell and a variety of academic and professional specialists. Titles of the tapes programs are:
Growing Together: Program One -- What are Technological Disasters
Steve Kroll-Smith, Bill Freudenburg, Dwayne Gill
Steve Picou
Growing Together: Program Two -- Community Recovery
Growing Together: Program Three -- Depression
Growing Together: Program Four -- Anxiety and PTSD
Growing Together: Program Five -- Substance Abuse and Anger
Each tape is separately annotated. Keywords included here are a combination of those from all five tapes.]
KEYWORDS: SOURCE_TYPE[public outreach radio/audio tape] SOCIAL_EFFECTS[social disruption] CULTURAL_EFFECTS[risk communication] FAMILY_EFFECTS[family outreach] PSYCHOLOGICAL_EFFECTS[psychological outreach, mental health services]

CITATION[Sound Alternatives. 1996b1. Growing Together: Program One -- What are Technological Disasters. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[Host Ray Farnell, specialists Steve Kroll-Smith, Bill Freudenburg, Dwayne Gill, and Steve Picou. The program summarizes the differing patterns of sociological disruption of natural (geological and meteorological) disasters as compared to technological (human caused) disasters. Effects of natural disasters tend to be short-term, unambiguous (or at least largely agreed upon by all concerned), and provoke responses conducive to the formation of a "therapeutic community." Effects of technological disasters tend to be longer-term, ambiguous and not agreed on by all concerned, and provoke responses more conducive to the formation of a "corrosive community" rather than a therapeutic one. The bulk of the program is concerned with the differences between the "therapeutic community" and the "corrosive community," especially in terms of the psychological pathologies characteristic of the second and the characteristics of technological disasters which seem to foster them.]
KEYWORDS: SOURCE_TYPE[taped radio program] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[spill, cleanup, restoration, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[rural residents, fishermen, Alaskan Natives] SOCIAL_EFFECTS[community stability, social disruption, social conflict, leadership, community resources, crime rates, response organizations, demographic characteristics, alienation] CULTURAL_EFFECTS[risk perception, sense of place, sense of community, ethics] FAMILY_EFFECTS[domestic stress] PSYCHOLOGICAL_EFFECTS[chronic stress, depression, anxiety, isolation, dislocation, disruption] LITIGATION_EFFECTS[litigation, lawyers, litigation as secondary disaster] OTHER_EFFECTS[health]

CITATION[Sound Alternatives. 1996b2. Growing Together: Program Two -- Community Recovery. Prepared in cooperation with the Family Resource Center (Cordova) and the

University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[Host Ray Farnell, specialists Steve Kroll-Smith, Bill Freudenburg, Dwayne Gill, and Steve Picou. This program proceeds from the concept of technological disasters as "technological violence" and discusses the effects of technological disasters in terms of victims -- both individual and collective (community). Recovery is dependent upon moving out of the "victim" category, and depends upon the realization of several unalterable aspects of the situation:
1) the pain of trauma being expressed is real
2) the pain being expressed is not the fault of the victims
3) while the pain is real, and not the victim's fault, what the victim does about the pain is the victim's choice
4) it is most often impossible to return to pre-event conditions, so victims need to progress towards positive (individual and community) transformation.]
KEYWORDS: SOURCE_TYPE[taped radio program] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[rural residents] SOCIAL_EFFECTS[social disruption, social conflict, crime rates, alienation, social pathology] CULTURAL_EFFECTS[sense of community, ethics] FAMILY_EFFECTS[domestic stress, domestic violence] PSYCHOLOGICAL_EFFECTS[victim stress, depression, anxiety, therapeutic community, corrosive community, mental health] OTHER_EFFECTS[health]

CITATION[Sound Alternatives. 1996b3. Growing Together: Program Three -- Depression. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[Host Ray Farnell, specialists K. Arata, K. Welsh, and S. Picou. This tape focuses on one individual psychological response common after technological disasters -- depression. It discusses what depression is, what it often derives from, correlates of depression, and how one can cope with and move beyond it.]
KEYWORDS: SOURCE_TYPE[taped radio program] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[rural residents] SOCIAL_EFFECTS[alienation] CULTURAL_EFFECTS[risk perception, sense of community] FAMILY_EFFECTS[domestic stress] PSYCHOLOGICAL_EFFECTS[chronic psychological stress, depression, self-image]

CITATION[Sound Alternatives. 1996b4. Growing Together: Program Four -- Anxiety and PTSD. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[Host Ray Farnell, specialists K. Arata, K. Welsh, and S. Picou. This tape, like the last, focuses on selected individual psychological responses to technological disasters. For both anxiety and PTSD it defines what they are, their relationship to the characteristics of technological disasters, and what people can do about them. For PTSD the interesting point is raised that in many cases the technological disaster is not really over. This stresses the ambiguity of the effects of a technological disaster, the variable nature of individual experiences, and the long-term nature of those effects.]

KEYWORDS: SOURCE_TYPE[taped radio program] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[rural residents] SOCIAL_EFFECTS[alienation] CULTURAL_EFFECTS[risk perception, sense of community] FAMILY_EFFECTS[domestic stress] PSYCHOLOGICAL_EFFECTS[chronic stress, PTSD, self-image]

CITATION[Sound Alternatives. 1996b5. Growing Together: Program Five -- Substance Abuse and Anger. Prepared in cooperation with the Family Resource Center (Cordova) and the University of South Alabama for the Prince William Sound Regional Citizens' Advisory Council.]
ABSTRACT/ANNOTATION[Host Ray Farnell, specialists K. Arata, K. Welsh, and S. Picou. This tape concentrates on a few behavioral responses to technological disasters, where previous programs have discussed psychological responses. As discussed, all are related and in the end are discussed in much the same terms. An important aspect of the program is advising people how to deal with these problems, how to seek the help of others in this regard, and the recovery/transformation process in general.]
KEYWORDS: SOURCE_TYPE[taped radio program] GEOGRAPHY[Prince William Sound, Cordova] EVENT_PHASE[restoration] SOCIAL_OR_CULTURAL_IDENTIFIER[rural residents] SOCIAL_EFFECTS[social disruption, social conflict, crime rates, alienation] CULTURAL_EFFECTS[lifestyle, ethics] PSYCHOLOGICAL_EFFECTS[chronic stress, sense of health, pathology, disruption, substance abuse, anger] OTHER_EFFECTS[health]

VIDEOTAPE

CITATION[Seed, Paul. 1992. Disaster at Valdez. Videocassette. British Broadcasting Company.]

NEWSPAPERS

Newspaper Search Resources

CITATION[Anchorage Daily News (ADN).]
ABSTRACT/ANNOTATION[The Anchorage Daily News is Alaska's largest newspaper. At the time of the EVOS, it was engaged with the Anchorage Times (AT) in a vigorous circulation battle which contributed to the eventual sale of the AT to the ADN as of June 4, 1992. The AT now exists only as a half page editorial forum in the ADN, and its archives are the property of the ADN. Nonetheless, this situation created a spirited competition for EVOS news for the period 03/23/89-06/03/92. The coverage of the two papers appears to be somewhat different, but we have not been able to devote the time to examining them to draw any firm conclusions in this regard. Most mention of potential social effects of the EVOS is in terms of stories about specific people or more general speculation -- little "hard" news has general perspectives on the potential social effects of the EVOS as its primary aim. The main exception to this may be coverage of fishery effects. On the other hand, many stories contain facts which contribute to an understanding of the socioeconomic effects of the EVOS. Access to newspaper files is unfortunately somewhat limited. The ADN library is open only one hour a day. Arrangements may be available to allow greater access, but would require negotiation with the ADN and an

allocation of time for the desired analysis. It appears that a commercial service has digitized at least some ADN archives and has them available via the Internet on a for-fee basis, but those of the AT are not digitized.]

CITATION[Alaska Resource Library and Information Service (ARLIS).]
ABSTRACT/ANNOTATION[ARLIS contains two main resources in terms of newspaper accounts related to the EVOS. The first is electronic access to various databases which index some newspapers for that period. The one with the most potential use, PolarPac, unfortunately lumps newspapers and books together as a searchable area. That is, there is no easy way to search indexed newspaper sources only. This limits the utility of the database in terms of recovering information from newspaper accounts. The second ARLIS newspaper resource is an extensive clippings file for various newspapers, for various periods of time. This is a physical clippings file, with no index, filed in roughly chronological order. No attempt has been made to gauge the "completeness" with which articles related to the EVOS and its effects were clipped, and no documentation or guidelines are explicated for the files. The clippings do appear to be extensive and are presumed to be at least fairly comprehensive. Papers included, and period of coverage, are as follows:
Alaska Commercial Fisherman 05/19/89-09/08/89
Aleutian Eagle 03/31/89-06/15/90
Aleutians East Borough Advocate 03/31/89-06/15/90
Anchorage Daily News 03/24/89-12/31/95a
Anchorage Times 03/24/89-06/03/92b
Arctic Sounder 06/30/89-12/01/89
Barrow Sum 03/31/89-04/13/90
Borough Post 03/31/89-06/15/90
Bristol Bay Times and Dutch Harbor Fisherman 03/31/89-06/15/90
Bristol Bay News 03/31/89-06/15/90
Chilkat Valley News 04/13/89-06/21/90
Copper valley Views 03/29/89-04/26/89
Cordova Times 04/12/89-06/21/90
Cordova Valdez Special Combined Issue 04/05/89
Delta Paper 04/05/89-03/14/90
Fairbanks Daily News Miner 03/25/89-06/21/90
Homer News 06/23/89-06/07/90
Island News 04/10/89-06/18/90
Juneau Empire 03/23/89-12/12/91
Ketchikan Daily News 03/23/89-06/20/90
Kodiak Daily Mirror 03/24/89-01/01/90
Mukluk News 04/06/89-05/17/90
Nome Nugget 04/13/89-05/17/90
Palmer Frontiersman 03/31/89-05/23/90
Peninsula Clarion 03/27/89-06/20/90
Petersburg Pilot 03/30/89-12/28/89
Pioneer All-Alaska Weekly 03/30/89-06/22/90
Senior Voice 01/89-07/89
Seward Phoenix Log 03/30/89-12/31/89

Skagway News 05/12/89-06/22/90
Southeastern Log 06/89-10/89
Tundra Drums 04/17/89-06/14/90
Tundra Times 04/03/89-05/23/90
USA Today 03/27/89-06/15/90
Valdez Pioneer 09/01/89-06/15/90
Valdez Vanguard 03/29/89-06/20/90
Valley Sun 04/18/89-03/27/90
Wrangell Sentinel 04/05/89-04/05/90
Librarians state that the clippings service continue (at least for the ADN) but that funding and staff shortages have not allowed for their processing for public access.
aFor the Anchorage Daily News, clippings from 1992 were not found. Also, clippings for years after 1990 were much more sparse than for 1989 and 1990. This is no doubt related to reduced press coverage.
bFor the Anchorage Times, clippings after 1991 are much sparser than for 1989 and 1990. This is probably related to reduced press coverage.]

CITATION[Z. J. Loussac Public Library.]
ABSTRACT/ANNOTATION[The Z.J. Loussac Library contains several newspaper resources of note. First, it maintains microfilm copies of all available Alaskan newspapers. Second, it possesses the electronic backfiles for the ADN, which are searchable by key words. Third, it maintains a physical clippings file related to the EVOS for Anchorage papers. Fourth, it allows access to various electronic databases which include newspaper sources. The microfilmed newspapers are not indexed, and thus are minimally useful without some sort of filtering device. The ADN electronic back files are potentially useful, but would require an extremely developed search strategy to recover useful article without a large number of "false positives." The physical clippings file appears useful for 1989 and 1990. Although the intent of the library staff is to keep it current, it is obvious from the file that the clipping guidelines for more recent stories is quite rigid -- relatively few are included. The databases accessible from library terminals do not appear to index newspapers from the EVOS time period.]

Newspaper Articles

CITATION[Galagher, Susan. 1989. Editorial on the proper importance and overall significance of the spill. Anchorage Times 3/25/89.]
ABSTRACT/ANNOTATION[The content and tone of the piece is that while people should not overreact to the spill with doom-and-gloom scenarios, neither should its potential for significant negative effects be minimized or overlooked.]
KEYWORDS: SOURCE_TYPE[newspaper editorial] EVENT_PHASE[spill] PSYCHOLOGICAL_EFFECTS[emotional response]

CITATION[Lamming, Jean. 1989. Damage to wildlife feared. Anchorage Times 3/25/89, A1, A8.]
ABSTRACT/ANNOTATION[This article gives a brief report of the spill and stresses the many unknown factors and dynamics at work. It discusses the obvious concern of the herring (roe) fishery. The spill occurred days before the opening of two large roe fisheries, sac roe and

roe-on-kelp. Much (25% to 50%) of the herring in PWS spawn just outside Port Valdez. Rick Steiner is quoted on the general perception of the cleanup -- "The fishermen expected a quicker job and a more professional response. People around here are shocked, ... and worried, really worried. They're walking around in a daze." The article concludes that "The spill may draw increasing fire from environmentalists already sensitive about the trans-Alaska pipeline and efforts to open the Arctic National Wildlife Refuge to oil development."]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Port Valdez] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] PSYCHOLOGICAL_EFFECTS[shock, worry, dazed] REMAINDER[environmentalist's response, trans-Alaska pipeline]

CITATION[Ortega, Bob. 1989. Different kind of oil boom explodes in Valdez. Anchorage Times 3/26/89, A8.]
ABSTRACT/ANNOTATION["The massive oil spill in PWS is creating an economic boom in Valdez, where hundreds of workers are being hired to help with the cleanup and to work at overstuffed hotels and other facilities in the small town." "But the influx of money is overshadowed by the potentially disastrous long-term economic effects of the spill on highly profitable herring, pink salmon and other fisheries in the sound." "The immediate result of the spill has been to transform Valdez into a boom town. By mid-day Friday, there was not a hotel room or rental car available in town, and waiting lists grew longer by the hour." The Westmark Valdez was booked as of 7AM, and had opened a wing that had been closed for the winter. Boats were offered for hire, as were rooms in private homes -- for stiff fees. At least temporarily, local unemployment was non-existent. "'The {unemployment} office was open Saturday, to help line up 150 laborers, mostly local, being hired to help with the cleanup.'" "'And those are just jobs we're looking at as a direct result of the spill.'" "'All the hotels are also in dire need of housekeeping help, dishwashers, cocktail waitresses, and that kind of help.'" (Doris Giusti, manager of Valdez state Job Service office). Sea Hawk Seafoods Inc. had already suffered a loss due to spill. It had to turn away a scallop boat after the port of Valdez was closed (the boat went elsewhere to offload). Sea Hawk Seafoods normally hires 40 people for 2 weeks to process $2 million in roe (last year, 20 million pounds, paid wages of $2 million), but was worried that the spill could wipe this out completely (Sandy Cesarini, executive vice president of Sea Hawk Seafoods).]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Valdez] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, boat owners, service workers] ECONOMIC_EFFECTS[economic gain, labor shortage] MUNICIPAL_EFFECTS[service sector]

CITATION[Hunt, Joe. 1989. Irate fishermen assess damages. Anchorage Times 3/26/89. A-1,A-12.]
ABSTRACT/ANNOTATION[The article discusses how local people cite the slow response time of the state and oil companies in dealing with the spill, and the potential damage to the herring and salmon fisheries (through damage to the biological resources). It is stated that the situation could be worse, but that there still many unknowns.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[residents, state government, oil companies] REMAINDER[spill response time]

CITATION[AP story. 1989. Oil prices leap in trading after tanker spill. Anchorage Times 3/27/89.]
ABSTRACT/ANNOTATION[The article notes that oil prices increased in trading after the spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] ECONOMIC_EFFECTS[fuel prices]

CITATION[Brendler, Beau. 1989. Environmentalists ask Bush to stop offshore drilling. Anchorage Times 3/27/89.]
ABSTRACT/ANNOTATION[The article reports that environmentalists asked President Bush to stop offshore oil drilling.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[environmentalists, President Bush] REMAINDER[environmental concerns, offshore drilling]

CITATION[Hebert, H. Josef. 1989. Spill fuels scrutiny of Bush ANWR plan. Anchorage Times 3/28/89, A1, A8.]
ABSTRACT/ANNOTATION[Bush had a proposal to open ANWR to oil drilling, which now faces more scrutiny in Congress.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[President Bush, Congress] REMAINDER[Congressional debate, ANWR, increased environmental scrutiny]

CITATION[Kranish, Michael (Boston Globe). 1989. Valdez spill triggers concerns over ANWR plan. Anchorage Times 3/28/89.]
ABSTRACT/ANNOTATION[Pipeline construction was authorized by Congress by a tie-breaking vote by Spiro Agnew in 1973 -- over warnings from Senator Walter F. Mondale about the potential dangers of tanker spills. Now the EVOS spill threatens the opening of ANWR to oil exploration and drilling. The Senate Energy and Commerce Committee has voted 12-7 to approve drilling in ANWR 2 weeks ago, but the future of the bill is now stated to be unclear.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[pre-spill, spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Congress, Spiro Agnew, Walter Mondale, Senate Energy and Commerce Committee] REMAINDER[Congressional debate, ANWR]

CITATION[Lamming, Jean. 1989. Sound fishermen demand immediate compensation. Anchorage Times 3/27/89, B1, B6.]
ABSTRACT/ANNOTATION[The article reports that local fishermen want and need immediate compensation if herring are tainted or the fishery is called off. Many have borrowed against the herring and salmon fisheries and have immediate debt service needs. They cannot afford to wait years as those hurt by the Glacier bay spill incident had to. Raymond Cesaruni, owner of Sea Hawk Seafoods, Inc. (one of 2 processors in Valdez and one of the biggest Alaska-owned operations) foresees dismal prices as an effect of the spill on the herring fishery. He thinks that Japan may not even want to buy PWS herring in 1989, and that the effect could last 15 to 20 years.]

KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Valdez] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] ECONOMIC_EFFECTS[debt service, compensation for damages]

CITATION[Lamming, Jean. 1989. Spill stench permeates Aleut village. Anchorage Times 3/28/89.]
ABSTRACT/ANNOTATION[Residents of the village can smell the slick, and fear the potential effects of burning if the wind should change. Some people (especially pregnant women) have flown or plan to fly to Cordova for personal health reasons or to protect their unborn children. Residents are also worried about the possible tainting of subsistence resources.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Aleut] FAMILY_EFFECTS[children] OTHER_EFFECTS[odor of oil, health concerns, health] SUBSISTENCE_ACTIVITIES[contamination fears]

CITATION[Whitney, David. 1989. Spill could add to development foes' arguments. Anchorage Daily News 3/27/89, E1, E2.]
ABSTRACT/ANNOTATION[Bristol Bay, ANWR -- state opposed to the first, wants exploration and development of the second. The spill may well argue against both.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Bristol Bay, ANWR] EVENT_PHASE[spill] REMAINDER[future oil exploration, Bristol Bay, ANWR]

CITATION[AP story. 1989. Valdez spill boosts U.S. crude oil prices. Anchorage Daily News 3/28/89.]
ABSTRACT/ANNOTATION[The article reports that U.S. crude oil prices increased after the spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] ECONOMIC_EFFECTS[fuel prices]

CITATION[Medred, Craig. 1989. Spill dooms Sound animals. Anchorage Daily News 3/28/89 E1, E3.]
ABSTRACT/ANNOTATION[The article reports on damage to animals in the Sound.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill] REMAINDER[wildlife impacts]

CITATION[Laurie, Robert. 1989. Oil spill consumes employees' time. Anchorage Times 3/29/89.]
ABSTRACT/ANNOTATION[The State DEC office has expended 20 to 25% of the agency's staff to the task of coordinating the state's response to the spill. Forty agency officers (including Com. Dennis Kelso) were in Valdez with another ten to twelve in other offices devoting time to it. This hurt the other duties of the agency. Other state agencies were similarly affected. 20 ADF&G biologists and administrators were in Valdez. The Division of Emergency Services has six staff in a mini-Emergency Operations Center in Valdez. The Department of Military and Veterans Affairs was assisting with air support. Two assistant attorneys general from the Department of Law provided legal advice to stat officials, while DNR deployed Infrared Camera with two technicians, and also had three other specialists to determine the priority of cleanup for

the oiled beaches. The Division of Forestry was to deploy five emergency fire crews (80 people) to help cleanup. These 16 member crews were from Delta, Copper Center, Wasilla. The Division of Parks has offered two six-member Alaska Conservation Corps crews. The Department of Public Safety has several State Troopers assisting in the investigation of the accident.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[municipal workers, state workers, federal workers] MUNICIPAL_EFFECTS[infrastructure demands]

CITATION[Francis, Karl. 1989. Congratulations, Alaska, the spill is our own fault. Anchorage Daily News 3/29/89.]
ABSTRACT/ANNOTATION[Alaska lives on oil and its politicians kowtow to oil. The logical way to deliver oil from the North Slope was through a Canadian pipeline rather than through the Trans-Alaska pipeline aimed at Asian exports. Spill contingency plans were grossly inadequate, but this was the result not only of Alyeska/oil company noncompliance but also of lax state oversight.]
KEYWORDS: SOURCE_TYPE[newspaper editorial] EVENT_PHASE[pre-spill, spill] SOCIAL_OR_CULTURAL_IDENTIFIER[oil companies, Alaska] REMAINDER[causes of spill]

CITATION[Murphy, Mary Pat. 1989. Oil cleanup efforts leave many legislators seething. Anchorage Times 3/29/89.]
ABSTRACT/ANNOTATION[‘If there's one word I can convey to you from the people of Valdez and Cordova, that word is betrayal,' McAlpine told those gathered for a briefing on the spill called by House Speaker Sam Cotten, D-Eagle River. 'Every citizen feels betrayed,' McAlpine said, adding that the city of Valdez years ago offered to stockpile boom materials and other materials needed to respond to an oil spill".]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Cordova, Valdez] EVENT_PHASE[spill] PSYCHOLOGICAL_EFFECTS[anger, sense of betrayal]

CITATION[Saddker, Daniel R. 1989. Cordova fishermen fear lifestyle threat. Anchorage Times 3/29/89 A1, A8.]
ABSTRACT/ANNOTATION[Most of the reported concern has so far focused on Valdez, but residents note that Cordova is more dependent on fishing than Valdez. They worry that the spill may claim the fish, fishermen’s jobs, their town, and their way of life. Exxon reportedly promised to pay off reasonable claims. "But fishermen were skeptical of any rapid settlement of their claims, and many doubted any monetary value could be placed on their loss. 'How much is your lifestyle worth to you?' challenged one speaker." Shrimp pot harvest was halted, the pending black cod opening was canceled, and the salmon season was uncertain. "After listening politely to the fisheries managers, questioners zeroed in on representatives of the Coast Guard, Exxon, and Alyeska Pipeline Service Company. Fishermen blasted them for inadequate contingency plans, insufficient quantities of clean-up materials, delays in deciding whether to use chemical dispersants, and their refusal to accept volunteer cleanup help offered by fishermen." John Mehelich, seiner from Cordova -- "'My biggest concern is my whole way of life. This year I'm going to have to go out and clean up oil, and I'd rather be fishing.'"]

KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Cordova, Valdez] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[U.S. Coast Guard, Exxon, Alyeska, fishermen, volunteers] ECONOMIC_EFFECTS[claims process] PSYCHOLOGICAL_EFFECTS[anger] REMAINDER[contingency plans and preparation]

CITATION[Times Staff. 1989. Battle rages to save hatcheries. Anchorage Times 3/29/89, A1, A8.]
ABSTRACT/ANNOTATION["It's not a cleanup anymore; it's a long-shot effort to avert a total disaster for one of the largest salmon hatchery systems in the world." One estimate of potential losses to the fisheries was put at $150 million.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Alaska] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, hatchery workers] ECONOMIC_EFFECTS[fish hatchery industry]

CITATION[Tson, Ray. 1989. State losses from spill keep rising. Anchorage Times 3/29/89, B6, B8.]
ABSTRACT/ANNOTATION[Pipeline flow reduced, revenue losses projected to be $90 million (state share about $20 million).]
KEYWORDS: SOURCE_TYPE[newspaper article] ECONOMIC_EFFECTS[revenue loss]

CITATION[AP story. 1989. Washington fishermen lament loss. Anchorage Times 3/31/89.]
ABSTRACT/ANNOTATION[Estimates of losses from spill -- $11 million from herring, $200 million from salmon. 250 of 910 herring permits held by WA state residents, so losses felt in Washington as well as Alaska.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Washington State] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[Washington State fishermen] ECONOMIC_EFFECTS[economic loss, commercial fishermen]

CITATION[Hunt, Joe. 1989. Sierra club targets loading tankers. Anchorage Times 3/31/89.]
ABSTRACT/ANNOTATION[The Sierra Club had questioned of why tankers could be loaded in Valdez during the cleanup effort -- since most or all of cleanup equipment was deployed away from the port. The oil spill contingency plan requires that a minimal amount of spill response equipment is required to be available in the event of a spill during tanker loading, and such events have occurred in the past.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Valdez] EVENT_PHASE[spill] SOCIAL_OR_CULTURAL_IDENTIFIER[environmentalists, Sierra Club] REMAINDER[spill response, contingency plans]

CITATION[Times Staff. 1989. Murkowski's faith in oil unshaken. Anchorage Times 3/31/89.]
KEYWORDS: SOURCE_TYPE[newspaper article] SOCIAL_OR_CULTURAL_IDENTIFIER[Murkowski]

CITATION[Akre, Brian S. 1989. Oil firms withdraw advertising. Anchorage Times 3/31/89.]
ABSTRACT/ANNOTATION[Oil companies withdraw ads about their contribution to the state in light of the ongoing spill and cleanup effort.]

KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill, cleanup] REMAINDER[oil company advertizing]

CITATION[Katz, John. 1989. Action on pending policy issues could be influenced by Valdez spill. Anchorage Times 3/31/89.]
ABSTRACT/ANNOTATION[Issues: 1) Federal oil leasing in Bristol Bay, 2) arctic offshore seasonal restrictions on drilling, 3) drilling in ANWR, 4) even non-oil and gas matters -- Tongass National Forest management, federal lands protection in general. Author supports exploration and appropriate development of ANWR, opposes any oil and gas leasing in Bristol Bay.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill] REMAINDER[increased scrutiny of oil companies, ANWR]

CITATION[Saddler, Daniel R. 1989. Anger gives way to depression. Anchorage Times 3/31/89, A1, A8.]
ABSTRACT/ANNOTATION[Doris Lopez, Valdez. She and husband have two limited entry permits, representing a $450,000 investment. "'It's like somebody died. People are experiencing the grieving process. First they are extremely irate, now they are angry and depressed.'" "'It's like we lost all the innocence. No matter how they clean it up, it's never going to be the clean Prince William Sound again.'" The article reports that "Instead of preparing for what was predicted to be a record salmon harvest, the frustrated fishermen are beached, hoping to contribute their efforts to the cleanup." There are many people who want to go to work but have no direction or organization. Exxon says they cannot use volunteers because of the lack of workman's compensation coverage for them.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Valdez, Prince William Sound] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, Exxon, volunteers, Doris Lopez] ECONOMIC_EFFECTS[economic loss, workmen's compensation] PSYCHOLOGICAL_EFFECTS[anger, depression, loss of innocence, frustration]

CITATION[Toomey, Sheila. 1989. 2 fishermen file first lawsuit over spill; more suits likely. Anchorage Daily News 3/30/89 C1, C3.]
ABSTRACT/ANNOTATION[see headline]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] LITIGATION_EFFECTS[first lawsuits filed]

CITATION[Wohlforth, Charles. 1989. Valdez folks feel 'cheated'. Anchorage Daily News 3/30/89 A1, A6.]
ABSTRACT/ANNOTATION[Valdez always has been a pro-development town, married to oil, but now realizes some of the downside to this. But Valdez lives on oil -- except for the fishermen -- but they are relatively muted compared to Cordova fishermen. Alyeska pays 90% of Valdez' annual city budget of $33 million (4 to 5 times the size of other cities its size). The article reports that "For that minority of people in town who lived here before the pipeline was built and don't owe oil a thing, the dependence of Valdez on oil and the cozy relationship it led to can be frustrating." As a example it cites Doris Lopez -- married into a two-generation Valdez fishing family -- who says that Alyeska was always apathetic about the risks of a spill. Still, the

article concludes that "The town was shocked (by the spill), but for land dwellers in Valdez, the spill is already fading." "For fishermen, it's harder."]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Valdez, Cordova] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen, oil industry] ECONOMIC_EFFECTS[fishing sector vs oil sector]

CITATION[Pulliam, Elizabeth. 1989. Nothing to do. Anchorage Daily News 3/30/89 D1, D2.]
ABSTRACT/ANNOTATION[Sort of a "feeling" piece, about lack of use of volunteers (especially those from outside PWS who felt an attachment to the area) by those seen to be "in charge." Kelly Weaverling --"'Perhaps that is the definition of a true disaster, when even your best efforts are basically useless.'" Michael O'Callaghan of Anchorage raises and for most part dismisses idea of a grass-roots cleanup effort described. Reasons for the lack of use of volunteers were that there was no room in Valdez for outside volunteers, and conditions were quite harsh.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Anchorage, Valdez] EVENT_PHASE[spill, cleanup] SOCIAL_OR_CULTURAL_IDENTIFIER[volunteers] CULTURAL_EFFECTS[sense of place] PSYCHOLOGICAL_EFFECTS[futility] REMAINDER[lack of use of volunteers]

CITATION[Postman, David. 1989. Cordova fears end of the line. Anchorage Daily News 3/30/89 A1, A6.]
ABSTRACT/ANNOTATION[Local residents feel Cordova has been left out and will die as a town if the spill seriously affects fish resources. Other towns have tourism or the pipeline terminal or other economic options, while Cordova is dependent on fishing. The article's tagline description of Cordova -- "Cordova has more canneries than bars and more bars than anything else."]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Cordova] ECONOMIC_EFFECTS[economic diversification, fishery dependence] PSYCHOLOGICAL_EFFECTS[fear about future, fear for town]

CITATION[Letters to the Editor. 1989. Anchorage Daily News. Readers respond with anger, sadness to PWS oil spill. Anchorage Daily News 4/01/89.]
ABSTRACT/ANNOTATION[Mostly from non-PWS residents, emotional for the most part.]
KEYWORDS: SOURCE_TYPE[newspaper article] PSYCHOLOGICAL_EFFECTS[emotional response]

CITATION[O'Harra, Doug. 1989. Pilots, in treacherous waters. Anchorage Daily News 4/02/89 (We Alaskans section).]
ABSTRACT/ANNOTATION[Portraits of Alaskan pilots working in Port Valdez, especially in relation to the EVOS.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Port of Valdez] REMAINDER[life of pilots]

CITATION[Wohlforth, Charles. 1989. Scientists turn Sound into laboratory. Anchorage Daily News 4/03/97 A1, A?.]

ABSTRACT/ANNOTATION[Straight reporting, except for a comment that the spill is a boon to scientists' careers.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound] REMAINDER[science]

Recent Newspaper Articles

CITATION[Wall Street Journal. 1994. *Exxon Valdez* Natives' claims. Wall Street Journal 11/17/94]
ABSTRACT/ANNOTATION[This article discusses payments to 4,000 Alaskan Natives for replacement cost of food.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Alaskan Natives] LITIGATION_EFFECTS[claims, payments, Native claims]

CITATION[New York Times. 1995. Exxon verdict is upheld. New York Times 1/29/95.]
ABSTRACT/ANNOTATION[Verdict for punitive damages is upheld in the Exxon case.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] LITIGATION_EFFECTS[verdict, punitive damages, verdict upheld]

CITATION[Wall Street Journal. 1995. Exxon plans to appeal Alaska court ruling for damage award. Wall Street Journal 1/30/95]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] LITIGATION_EFFECTS[appeal, damages, award]

CITATION[Los Angeles Times. 1995. *Exxon Valdez* $5 billion verdict affirmed by judge. Los Angeles Times 1/31/95]
ABSTRACT/ANNOTATION[A $5 billion dollar verdict in the *Exxon Valdez* case is affirmed by Judge H. Russel Holland]
KEYWORDS: SOURCE_TYPE[newspaper articles] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Judge H. Russell Holland, U.S. District Court] LITIGATION_EFFECTS[verdict, $5 billion award]

CITATION[New York Times. 1995. Part of Valdez award is voided. New York Times 4/1/95.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, jury] LITIGATION_EFFECTS[damages, jury, award, voided]

CITATION[Los Angeles Times. 1995. Judge clears Exxon of duty to pay natives. Los Angeles Times 4/3/95.]
ABSTRACT/ANNOTATION[Exxon cleared of liability for damages to Native Alaskans from the oil spill]

KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives, Exxon, judge] LITIGATION_EFFECTS[liability, damages, judicial decision]

CITATION[Wall Street Journal. 1996. Exxon seeks a new trial in Valdez oil-spill case. Wall Street Journal 9/12/95.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] LITIGATION_EFFECTS[new trial]

CITATION[Wall Street Journal. 1996. Exxon has partial accord with Lloyd's of London. Wall Street Journal 1/18/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] LITIGATION_EFFECTS[partial settlement, lawsuit, recovery] REMAINDER[insurance claim]

CITATION[New York Times. 1996. Exxon to get $300 million in a partial settlement. New York Times 1/18/96]
ABSTRACT/ANNOTATION[Exxon to receive $300 million in a partial settlement from insurers including Lloyd's of London.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[insurers, Lloyd’s of London, Exxon] LITIGATION_EFFECTS[settlement] REMAINDER[insurance claim]

CITATION[Wall Street Journal. 1996. Request for new trial for Exxon is denied. Wall Street Journal 2/22/96.]
ABSTRACT/ANNOTATION[Request for a new trial for Exxon in the oil spill case is denied.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] LITIGATION_EFFECTS[request new trial]

CITATION[Los Angeles Times. 1996. Exxon loses appeal on Valdez case. Los Angeles Times 2/22/96.]
ABSTRACT/ANNOTATION[Exxon loses liability appeal for oil spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] LITIGATION_EFFECTS[liability, appeal]

CITATION[Phillips, Natalie. 1996. A $5 billion payday could make rich Alaskans as common as moose. Anchorage Daily News 3/17/96, B-1 and B-3.]
ABSTRACT/ANNOTATION[This article discusses the probable split of the $5 billion punitive damage award assessed to Exxon as a result of the *Exxon Valdez* oil spill. Although most of the award will be paid to commercial fishermen and their attorneys, the article makes it clear that not all claimants will receive an equal amount. A complex distribution matrix has been agreed to which allocates the proceeds of the award based on a number of factors, some related to the degree of harm caused by the spill, and others more related to the practicalities of pursuing and increasing the probability of success in the legal case. While there is no true "average" award that can be noted, many of the claimants will indeed receive large payments if and when Exxon

pays the award (estimated as 2.5 to 4 years from the date of award by the winning attorneys, based on how long Exxon's appeals would take to be heard).]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound] EVENT_PHASE[spill, litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] ECONOMIC_EFFECTS[money spill]

CITATION[Phillips, Natalie. 1996. Payout comes at high price. Anchorage Daily News 3/17/96, B-1 and B-3.]
ABSTRACT/ANNOTATION[This article provides somewhat more detailed information on the probable payout of the $5 billion *Exxon Valdez* punitive damage award to a specific group of claimants, salmon fishermen with permits for the Chignik area. The 92 to 100 permit holders will split about $186.8 million, or about $1.9 million each. This must be shared with crew members, typically three or four per vessel. While these payments appear to be large, the fisherman interviewed for the article points out that before the spill Chignik permit holders earned $80,000 to $240,000 a season, but averaged a lower $130,000 after the spill. Further, this decline was not shared equally by all fishermen, but hit the "highliners" the most. All Chignik permit holders had additional expenses and worries. The fisherman interviewed concludes that while the award may appear large, it is balanced by the heartache and losses he has had to sustain since the spill event, and that the delay of any settlement is an additional cost.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Chignik] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[fishermen] ECONOMIC_EFFECTS[economic gain, economic loss, money spill]

CITATION[Gerstenzang, James. 1996. Tanker seeks return to Alaskan waters. Los Angeles Times 5/4/96.]
ABSTRACT/ANNOTATION[*Exxon Valdez* has been forbidden to return to Prince William Sound, but Exxon seeks to see that situation reversed.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound] EVENT_PHASE[litigation] LITIGATION_EFFECTS[lawsuit]

CITATION[Wall Street Journal. 1996. Jury decides insurers should pay Exxon for Valdez expenses. Wall Street Journal 6/11/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, insurers, jury] LITIGATION_EFFECTS[verdict, jury, lawsuit] REMAINDER[insurance claim]

CITATION[Strom, Stephanie. 1996. Exxon wins $250 million from Lloyd's for Alaska oil spill. New York Times 6/11/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Lloyd’s of London, insurers] LITIGATION_EFFECTS[lawsuit, verdict] REMAINDER[insurance claim]

CITATION[Los Angeles Times. 1996. Exxon wins $250-million verdict in Valdez suit. Los Angeles Times 6/11/96.]
ABSTRACT/ANNOTATION[Exxon wins lawsuit against Lloyds of London for unpaid insurance claims relating to the *Exxon Valdez* oil spill]

KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, insurers, Lloyd's of London, court] LITIGATION_EFFECTS[lawsuit, win lawsuit, verdict] REMAINDER[insurance claim]

CITATION[McCoy, Charles. 1996. Exxon's secret Valdez deals anger judge. Wall Street Journal 6/13/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, judge] LITIGATION_EFFECTS[punitive damages, damage awards, secret agreement]

CITATION[McCoy, Charles; Fritsch, Peter. 1996. Exxon defends its 'novel' approach to reducing Valdez punitive damages. Wall Street Journal 6/14/96.]
ABSTRACT/ANNOTATION[Discussion of secret agreements made by Exxon that would enable Exxon to reduce its punitive damage payments]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] LITIGATION_EFFECTS[secret agreement, punitive damages, payments]

CITATION[Salpukas, Agis. 1996. Exxon is accused of 'astonishing ruse' in oil-spill trial .New York Times 6/14/96.]
ABSTRACT/ANNOTATION[A federal judge criticizes a secret agreement made between Exxon and seafood processors over damage awards for the oil spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[judge, Exxon, seafood processors] LITIGATION_EFFECTS[secret agreement, judicial criticism, damage awards]

CITATION[Murphy, Kim. 1996. Valdez spill's sticky legacy of public land. Los Angeles Times 6/23/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Latouche Island] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Alaskan Natives] REMAINDER[public land]

CITATION[McAllister, Bill. 1996. Report says Congress is sinking traffic control system for ships. Washington Post 6/28/96.]
ABSTRACT/ANNOTATION[Traffic control systems for vessels was an important issue after the *Exxon Valdez* oil spill. This article cites a National Research Council report that the Congress, specifically the House Appropriations Committee, eliminated $6 million that the U.S. Coast Guard states is critical for Vessel Traffic Services.]
NOTATION: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] REMAINDER[regulation]

CITATION[Wall Street Journal. 1996. Insurers owe energy giant $161 million over Valdez. Wall Street Journal 7/25/96.]
ABSTRACT/ANNOTATION[Insurers owe Exxon $161 million in claims over the oil spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[insurers, Exxon] LITIGATION_EFFECTS[insurance award] REMAINDER[insurance]

CITATION[Los Angeles Times. 1996. Exxon insurers ordered to pay interest in Valdez spill. Los Angeles Times 7/25/96.]
ABSTRACT/ANNOTATION[Insurers, including Lloyd's of London and other underwriters are ordered to pay Exxon on an insurance policy, for the *Exxon Valdez* oil spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Lloyd's of London, underwriters]
LITIGATION_EFFECTS[insurance award] REMAINDER[insurance claim]

CITATION[McCoy, Charles. 1996. Exxon's effort to secure award for spill rejected. Wall Street Journal 9/20/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
LITIGATION_EFFECTS[insurance award] REMAINDER[financing of award]

CITATION[Wall Street Journal. 1996. Judgement over Valdez entered in Exxon case, starting long appeal. Wall Street Journal 9/26/96.]
ABSTRACT/ANNOTATION[Appeals process begins in 9th U.S. Circuit Court of Appeals over *Exxon Valdez* judgement.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Court of Appeals]
LITIGATION_EFFECTS[appeal, judgement]

CITATION[Wall Street Journal. 1996. Exxon, Lloyd's agree to Valdez settlement. Wall Street Journal 11/1/96.]
ABSTRACT/ANNOTATION[This article concerns settlement of insurance claims by Exxon for coverage for the *Exxon Valdez* oil spill. The insurers include Lloyd's of London.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Lloyd's of London]
LITIGATION_EFFECTS[settlement] REMAINDER[insurance claim]

CITATION[Treaster, Joseph B. 1996. With insurers' payment, Exxon says Valdez case is ended. New York Times 11/1/96.]
ABSTRACT/ANNOTATION[Settlement between Exxon and an insurer, Equitas, over the *Exxon Valdez* oil spill.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Equitas] LITIGATION_EFFECTS[settlement] REMAINDER[insurance claim]

CITATION[Los Angeles Times. 1996. Exxon, insurers settle Valdez litigation. Los Angeles Times 11/1/96.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation]
LITIGATION_EFFECTS[settlement] REMAINDER[insurance claim]

CITATION[Wall Street Journal. 1997. Exxon pushing for return of Valdez to Alaska Sound. Wall Street Journal 1/16/97.]

ABSTRACT/ANNOTATION[Exxon seeks to return the *Exxon Valdez* tankership to Prince William Sound, and wants to have a law overturned that prevents the ship from visiting Valdez.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Prince William Sound, Valdez] EVENT_PHASE[litigation] LITIGATION_EFFECTS[overturn law]

CITATION[Schoch, Deborah. 1997. *Exxon Valdez*-linked funds to help Bolsa Chica. Los Angeles Times 2/14/97.]
ABSTRACT/ANNOTATION[Funds to be used for Bolsa Chica wetlands restoration project.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Valdez, Bolsa Chica wetlands, California] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon] LITIGATION_EFFECTS[settlement expenditures]

CITATION[Los Angeles Times. 1997. Exxon appeals judgment in Valdez case. Los Angeles Times 2/14/97.]
ABSTRACT/ANNOTATION[Article describes legal appeal in *Exxon Valdez* case.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Court of Appeals] LITIGATION_EFFECTS[appeal]

CITATION[Wall Street Journal. 1997. Appeal is filed of award in *Exxon Valdez* oil spill. Wall Street Journal 2/14/97.]
ABSTRACT/ANNOTATION[This newspaper article concerns a legal appeal filed by Exxon Corporation.]
KEYWORDS: SOURCE_TYPE[newspaper article] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Court of Appeals] LITIGATION_EFFECTS[appeal]

CITATION[Goldberg, Carey. 1997. A tanker hauling memories is shunned; Alaska residents oppose Exxon's effort to bring back the Valdez. New York Times 3/16/97.]
ABSTRACT/ANNOTATION[The *Exxon Valdez* has been renamed the Mediterranean, and Exxon Corporation wants to send it back to Prince William Sound, though some Alaskans object to its return.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Alaska, Prince William Sound] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Alaskans]

CITATION[Wall Street Journal. 1997. Exxon Corp. submits brief outlining Valdez appeal. Wall Street Journal 6/20/97.]
ABSTRACT/ANNOTATION[The award in the *Exxon Valdez* oil spill case is appealed to Ninth Circuit United States Court of Appeals in California.]
KEYWORDS: SOURCE_TYPE[newspaper article] GEOGRAPHY[Alaska, California] EVENT_PHASE[litigation] SOCIAL_OR_CULTURAL_IDENTIFIER[Exxon, Court of Appeals] LITIGATION_EFFECTS[award, appeal, Court of Appeals]

CITATION[Martin, Douglas. 1997. *Exxon Valdez* money to aid city wetlands. New York Times 9/11/97.]