

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

***Final Report, Volume II:***  
***Final Analysis on Social Factor by Social Factor Basis***

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## REFERENCES

### LIST OF ACRONYMS

ADF&G	Alaska Department of Fish and Game
CESD	Center for Epidemiologic Studies of Depression
EVOS	<i>Exxon Valdez</i> 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 environment 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), steelhead, 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, Hazlewood 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 murre[s] [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.

C 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:

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



- C Community conflict.
- C Information about contaminated resources.
- C Recovery of individual and community damages.
- C 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 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:

C 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).

C 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).

C 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 to 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 Strait 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 "organoleptic 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 1991 and 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 there is an 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 have 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 compete 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, there 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 jealousy 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**

	<b>N</b>	<b>Mean Score</b>	<b>% High Exposed</b>	<b>% Low Exposed</b>	<b>% Not Exposed</b>
English Bay	24	3.92	62.5	37.5	0
Tatitlek	14	3.79	71.4	21.4	7.1
Cheneg 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
<b>Total</b>	<b>593</b>	<b>1.96</b>	<b>24.5</b>	<b>28.2</b>	<b>47.4</b>

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 lose 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 saw 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 suggests 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 spill's immediate economic impacts were mitigated by a privatized cleanup that employed many persons 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 that 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:

<b>Spill-Related Expenditures for Selected Communities</b>	
<b>Jurisdiction</b>	<b>Reported Spill-Related Expenditures</b>
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 economies 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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