SYNTHESIS: THREE DECADES OF RESEARCH ON SOCIOECONOMIC EFFECTS RELATED TO OFFSHORE PETROLEUM DEVELOPMENT IN COASTAL ALASKA

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Chapter 9: Community Impacts of the Exxon Valdez Oil Spill: A Synthesis and Elaboration of Social Science Research

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Introduction

This chapter will focus on the social science literature regarding community and individual impacts of the EVOS.⁶⁰ It is important at the outset to understand the limitations of the relevance of EVOS to the subject of this book, the socioeconomic effects related to offshore petroleum development to coastal Alaska. The oil spilled in EVOS was produced onshore at Prudhoe Bay. The size of the spill was 50 times larger than the largest spill considered in OCS scenarios. It is fair to say that no one imagined that so much oil could be spilled in one event. Unfortunately, however, 11 million gallons of oil did spill from a tanker into the offshore environment. That said, the fact that EVOS occurred does not mean that it constitutes the best high-end scenario for an OCS-related oil spill. Smaller spills are far more likely, particularly given the attention paid to avoiding a repeat of EVOS. For this reason, we will point out in this chapter where the consequences of a much smaller, yet significant, spill would likely have been qualitatively different. We will also point out where further research is required to understand the implications of different scales of oil spills.

Included in this review are MMS sponsored studies conducted prior to and after the EVOS event. This synthesis of published research considers issues that have been “minimally addressed” by research on spill-related community impacts, i.e., “community recovery” and “litigation” (Impact Assessment, Inc.

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⁶⁰ For more detailed information on Alaska Native cultural impacts of the EVOS, especially subsistence behavior and the social organization of Native villages, see Fall, Chapter 8.
Finally, the chapter presents data on the chronic community impacts of the EVOS over a nine year period and concludes with general policy directives for facilitating the mitigation of future oil industry catastrophes in Alaska.

As part of its management strategy under the ESP, MMS sponsored a variety of research projects that provided technical information necessary to manage OCS development effectively. In addition, the National Science Foundation and the Subsistence Division of the Alaska Department of Fish and Game have funded social science projects in the region. The result is a substantial body of social science research informing questions concerning the benefits and risks of energy development to Alaska communities and Native villages.

Many of the MMS sponsored studies conducted prior to the EVOS established the significant role played by traditional subsistence activities for income, culture and social organization of local communities (Little and Robbins 1984, TR89; Jorgensen 1984, TR90, Parts II, III, and IV; Stephen R. & Associates and LZH Associates 1986, TR123; Luton 1985, TR91; Jorgensen and Maxwell 1984, TR90, Part I; Payne 1980, TR39). These same MMS studies addressed the threat to ecological resources and community structure from oil development. Researchers concluded that rapid OCS development, oil spills and other disasters would disrupt the traditional pattern of community resource dependency in Alaska communities, and change the “way of life” of local residents (Payne 1980, TR39; Little and Robbins 1984, TR89; Jorgensen 1984, TR90). Figure 9.1 is a map showing the locations of studies addressed in this chapter.

**Technological Disaster and Community Impacts: A Conceptual Overview**

Human communities exist in “ecological fields” or “networks.” An adaptive division of labor connecting interdependent social units and their “socially-constructed” relationships to the biophysical environment forms part of the structure of these networks (Bates 1993; Picou and Gill 1996; Oliver-Smith 1998). Communities are not simply autonomous social systems that exist apart from their biophysical environment. Indeed, complex technological systems in the modern world create hazards and introduce numerous involuntary risks (Perrow 1984). How such technological hazards and risks pose

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61 MMS is currently sponsoring a study of the effects of the EVOS litigation settlement (Impact Assessment, Inc., forthcoming).
Figure 9.1: Study Locations Referenced in Chapter Nine

Legend
- Communities
- Extent of the 1989 Exxon Valdez Oil Spill

Sources: Minerals Management Service and Alaska Fish and Game, Special Oil Spill Issue, July-August 1989 (Vol. 21-4), pages 20-21
potential sources of community vulnerability to disasters depends on the nature of a community’s relationship to the biophysical environment.

Local sociocultural history that establishes conceptions of culture and social organization also links communities to the biophysical environment. For example, the subsistence practices of Unalakleet residents required that they keep a “mental calendar of food resource availability” (Jorgensen and Maxwell 1984, TR90). This mental calendar of food resource availability translated into knowing how long the resource would be available, along with the proper time for harvesting. In addition, successful subsistence harvests required a certain degree of skill for obtaining the resource, as well as knowledge regarding proper resource preparation and preservation. Because households often shared and exchanged these subsistence resources with other family members, elders and neighbors, social bonds were reinforced between community members. Jorgensen and Maxwell (1984:49, TR90) also noted that subsistence “gives meaning to daily practicality and routine.” Subsistence harvesting for the Unalakleet community resulted in a deep respect and reverence for earth and all living things that constitute the biophysical environment (ibid.).

Other MMS studies have also substantiated the importance of renewable natural resources to the community. Terry, Gorham, Larson, Paust, Scoles, Johnston, Smith, Orth, and Rogers (1980, TR30) noted that in 1974, approximately 75 percent of the total employment in Cordova was tied to commercial fishing, either directly or indirectly. Kodiak is one of the nation’s top ports for harvests of salmon, halibut, herring, groundfish, king crab, Tanner crab, Dungeness crab, shrimp, razor clam and scallop fisheries (Terry et al. 1980, TR30). In King Cove, Braund’s research team found that commercial fishing practices affected household composition. During the summer months, the number of extended family households increased as individuals from other communities migrated to King Cove to live with relatives during the fishing season (Stephen R. Braund & Associates and LZH Associates 1986, TR123). In sum, subsistence and commercial harvests intimately link Alaska renewable resource communities to the biophysical environment. As such, these communities are uniquely vulnerable to ecosystem contamination resulting from a failure of human technology.

Sociologists view disasters as “social crisis situations” which “include environmental, technological and sociopolitical events” (Kreps 1995:260; see also Quarantelli 1998). Recent sociological reviews of the concept of disaster have focused on the interrelated economic, social and psychological impacts of such events on communities, organizations, families and individuals (Baum 1987; Dynes 1993; Erikson 1994; Quarantelli 1987, 1998; Freudenburg 1997). Understanding the multidimensional impacts of any disaster
requires an ecological perspective. Such a perspective articulates the interactive relationship between human communities and their biophysical environment (Kroll-Smith and Couch 1991; Oliver-Smith 1998). Kroll-Smith and Couch refer to this perspective as “the ecological-symbolic theoretical model”. The model assumes that:

1. people affect, and are affected by their built, modified and biophysical environments; and,
2. disruptions in the ordered relationships between communities and environments are locally interpreted and responded to as hazards and disasters (Kroll-Smith and Couch 1991).

Humans’ social constructions of (the meanings people attach to) culture, social organization and tradition emerge from their experience with the biophysical environment (Ingold 1992). Thus relationships between and within social units incorporate various social constructions of (the meanings people attach to) “nature” (Peacock 1991; Bates and Pelanda 1994; Oliver-Smith 1998).

These ecologically-based social relationships establish levels of community vulnerability. Culture and social organization affect a community’s potential to adapt to an “extreme biophysical environment” (Kroll-Smith, Couch and Marshall 1997). Disasters can strain or even “break” the links between communities and their historically conditioned sociocultural relationships to the biophysical environment (Kroll-Smith and Couch 1991; Bates and Pelanda 1994; Oliver-Smith 1996; 1998). In sum, toxic contamination of the biophysical environment has direct social consequences in that a risky and threatening ecology challenges expectations of ecological security.

Sociologists also have focused on attempts to classify disasters. Some disaster researchers have argued that the characteristics of the triggering agent and of the biophysical environment are irrelevant to understanding disaster impacts. They argue that it is only the community response that defines and constructs any disaster (Dynes 1974; 1993; 1994a; 1994b; Quarantelli 1987; 1998). However, over the last 20 years a preponderance of studies has documented that disasters which occur because of human and technological failure are qualitatively different than natural disasters. They often result in the contamination of natural, modified and built environments, are “conflict-prone,” and have long-term community impacts that last for decades (Edelstein 1988; Erikson 1976; 1994; Freudenburg 1997; Baum and Fleming 1993; Dew, Bromet, and Schulberg 1987; Green 1996; Glesser, Green, and Wignet 1981). Furthermore, studies that have compared “natural disaster” impacts to “technological disaster” impacts clearly reveal more severe, long-term social consequences for victims of the latter (Tierney and Baisden 1979; Smith, Robins, Przybeck, Goldring, and Solomon 1986; Cuthbertson and Nigg 1987).
A disaster typology developed by Erikson (1994) is informative and graphically presented in Table 9.1. This typology employs a property space that classifies disasters in terms of the cause of the event and the level of toxicity. This classification distinguishes between “natural” and “technological” disasters, as well as identifying “technological accidents” and “natural toxic releases” as alternative types of threatening events. From Table 9.1, it is apparent that the EVOS was a toxic technological disaster because it severely threatened the biophysical resources of Prince William Sound, as well as the ecologically contextualized culture and lifestyles of local fishing communities and Native villages.

Table 9.1: Erikson’s Classification of Disasters

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>Human (Technological)</th>
<th>Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Toxic</strong></td>
<td>Fires, dam collapses, airplane crashes, explosions</td>
<td>Hurricanes, floods, tornados, earthquakes</td>
</tr>
<tr>
<td><strong>Toxic</strong></td>
<td>Oil spills, toxic chemical spills, radiation leaks, toxic waste contamination</td>
<td>Radon gas, na-tech scenarios, natural disasters that cause a technological disaster</td>
</tr>
</tbody>
</table>

Technological disasters generate a human response that is most often characterized by anger, uncertainty, loss of institutional trust, collective stress and litigation (Edelstein 1988; Erikson 1994; Picou, Gill, and Cohen 1997). This response pattern is not common among victims of natural disasters where, typically, a therapeutic community (i.e., mental health specialists organize a response to the disaster to assist with community and individual coping) emerges (Freudenburg 1997). One of the reasons for the different patterns of response is based on the fact that people perceive technological disasters as preventable, whereas they view natural disasters as “acts of God” and are often predictable (ibid., 1997). In fact, the very lack of a therapeutic community response to technological disasters exacerbates chronic social impacts through the evolution of “corrosive communities” (Freudenburg and Jones 1991; Freudenburg 1997). “Corrosive communities” arise from the “contested” nature of determining damages from technological disasters (Freudenburg and Jones 1991; Freudenburg 1997). This “corrosive” context prolongs the social impacts of these events as victims experience continuing sociocultural disruption, uncertainty regarding actual damages and reparations and ineffective coping strategies that isolate and fragment local residents (Freudenburg 1997).

As Hewitt (1983:25) observed, “…natural disasters are characteristic, rather than accidental features of the places and societies where they occur.” Technological disasters include and are often characterized by low-probability, high consequence social risks that may accompany energy development. The adversarial discourse that emerges from litigation also generates a series of “secondary disasters” which includes socially-constructed denials of damages by “principal responsible parties” (Picou 1996c). Unlike natural
disasters, no consensus emerges among victims or with institutional authorities regarding the extent of community damage. As such, timely community recovery becomes extremely problematic following most technological disasters since “principal responsible parties” strategically use their legal rights of “discovery and appeal, thereby often taking decades before any final retribution for damages is dispensed to victims” (Hirsch 1997).

Given the multidimensional nature of disasters and the dependence of these communities on the natural environment, a variety of resources is necessary for a community to recover adequately from such a traumatic event. MMS-sponsored research has indicated that the majority of these communities lacked critical local resources, such as mental health organizations and emergency response teams, to respond adequately to disasters (Impact Assessment, Inc. 2001, TR161). One exception to this trend was Kodiak. This community had a disaster plan, that included the Emergency Services Council, that was activated before Kodiak was oiled. The Council had daily meetings to keep residents informed about any issues related to the EVOS disaster. Nonetheless, this disaster created a new level of social uncertainty for the citizens of Kodiak (ibid.).

Pre-spill Research Conducted by MMS

Prior to the EVOS, MMS funded a series of research projects through the ESP (e.g., the paired sociocultural and baseline impact studies and harvest disruption studies described in Chapter Five). These projects attempted to determine the impact of OCS activities on various Alaska communities. The objectives of these studies were to:

- Determine the impacts of oil and gas extraction on the OCS to these communities;
- Determine the extent to which these communities are dependent upon renewable resources for their livelihood; and
- Determine the economic, social and cultural impacts to community members should disruptions in the harvests of renewable resources occur.

This body of research focused mainly on Alaska Natives residing in coastal communities. Each of these studies identified the importance of a dependence on renewable resources as a source of food and income, and, for Alaska Native villages, culture. Researchers collected the data using a variety of methods, and included:

- Informal interviews with key informants
- Informal interviews with community members
- Analysis of community newspapers
- Field observations
Although this chapter focuses on the broad range of social consequences of EVOS, it also includes a discussion of a similar set of studies to those reviewed in Chapter Five (Sociocultural Research), and Chapter Eight (Long-Term Consequences of the Exxon Valdez Spill on Subsistence Uses of Fish and Wildlife). This is because the chain of causality from the spill to social impacts most often directly involves renewable marine resource harvests. To review briefly the importance of these harvests in Alaska coastal communities, in the case of Alaska Natives residing in Gambell and Savoonga on St. Lawrence Island, Little and Robbins (1984, TR89) found that approximately 80 percent of their food came from the biophysical environment. In Cordova, Bennett, Heasley, and Huey (1979, TR36) found that “...ties to the land and sea through subsistence or sport fishing, hunting, food gathering and related activities are shared by all in this area to some degree.”

In subsistence communities, the sharing and exchange of renewable natural resources is an essential aspect of the social structure of community relations. For example, Jorgensen (1984, TR90) identified consumption of subsistence resources as an important component of the culture of Unalakleet residents. Residents viewed mealtime as a social event and involved not only family members, but hunting partners, visitors and friends who often remained after the meal to socialize and exchange stories.

While subsistence practices are of central importance to most residents of rural Alaska communities, in the King Cove community, commercial harvesting of renewable resources was a more salient activity than subsistence harvesting (Stephen R. Braund & Associates and LZH Associates 1986, TR123). Summer salmon fishing was the mainstay of the economy, and since 1978, salmon had contributed over 67 percent of the market value of King Cove’s commercial fisheries. Peter Pan Seafoods, Inc. employed 46 percent of the community’s population in the early 1980s. In addition, the fishing industry accounted for a substantial portion of the community’s budget.

Researchers found the commercial salmon fishery to be an important economic resource for the Cordova community. Other major employers included canneries that provided work for both residents and seasonal migrants. In addition, residents harvested over 40 different plants and animal species each year. Community residents’ dependence on the natural environment was not based solely on need. Jorgensen and his colleagues found that income derived from fishing was sufficient for residents to purchase their food (Jorgensen 1994, TR154).

Other communities were dependent upon renewable resources as a source of income, although not to the degree of King Cove. St. Lawrence Islanders were dependent on the biophysical environment for cash
through the production and sale of ivory and artifacts. Researchers identified commercial fishing and trapping as the main source of income for half of the families in Unalakleet. Paid employment was typically seasonal (Little and Robbins 1984, TR89).

In Homer, located on the Kenai Peninsula, resource-based activities were an important aspect of the community, both socially and economically (Davis 1979, TR41). Commercial fishing, in particular, was of central importance to sociocultural systems of the area. In addition, other local businesses, such as supply stores and welding shops were heavily dependent upon the fishing industry. Other important industries for the community of Homer were found to be recreation and tourism.

This chapter focuses on the impacts of a large offshore oil spill, specifically the EVOS, on the harvest of renewable resources by coastal communities. These impacts have three dimensions: (1) consequences to the physical environment; (2) economic impacts; and (3) social impacts. In addition, these impacts primarily have either short-term or long-term community consequences.

Stephen R. Braund & Associates and LZH Associates (1986, TR123) tested the following assumptions in their assessment of potential OCS impacts to King Cove:

- The commercial harvest of renewable resources is the primary source of income for the vast majority of King Cove households while the subsistence harvest of renewable resources provides 60 percent of the meat, fish, and other seafood consumed in the community. These commercial and subsistence efforts require the majority of time allocation in the community;
- The reliance upon these resources is significant enough to shape much of the social, political, economic, ideological, and other behavior in the community;
- A significant disruption to the renewable resource harvest activities (both commercial and subsistence) will affect residence patterns, kinship, employment, social health, ethnic relations, and political dynamics as well as other elements of village culture; and
- Because the harvest of these resources is also the main source of cash income in the community (primarily through fishing and fish processing), the ramifications of a disruption would be more far-reaching than in a community where meeting household needs is not so disproportionately dependent on the harvest of natural resources (1986:11-8).

It is important to note that at varying degrees, these assumptions are applicable to most rural Alaska communities and Native villages.

If an oil spill actually occurred, Little and Robbins (1984, TR89) predicted a host of social and economic consequences for the Gambell community. These impacts ranged from increased out-migration to the Alaska mainland to changes in the patrilocal household structure and the relationship of Alaska Natives to
the federal government and the state of Alaska. In turn, these consequences would negatively impact the “way of life,” or culture, of the residents of St. Lawrence Island.

To understand how oil and gas development in the OCS would negatively impact local culture requires an understanding of values, roles and norms of Alaska Natives. For example, the culture of Wainwright Natives is very similar to that of Western Native Americans. As Luton (1985:560, TR91) stated: “Symbols are assigned to the environment, land, water, air, animals, plants that incorporate values of tradition, persistence, continuity, beauty, respect, reverence, and the expectations that its features should persist intact for future generations ... Neither among Western American Indians nor Wainwright is the environment symbolized or treated as a commodity.”

As discussed in Chapter Eight, Luton’s Wainwright harvest disruption study predicted that, if petroleum development oiled subsistence foods, Wainwrighters would be concerned about the safety of their harvests. Luton also predicted that if the disruptions resulted from the actions of state or federal agencies or corporations, residents would file lawsuits.

While Jorgensen (1984, TR90) stated that it was difficult to predict the cultural consequences of oil extraction on the Unalakleet community, he suggested that if at least one predominant staple and a total of three predominant and secondary food sources were disrupted, subsistence harvesting practices would be seriously impacted. His analysis identified seals, four species of salmon, moose, and caribou as predominant staples in at least one season, and more than a half-dozen species as secondary food resources. As a result of such a disruption, Unalakleet residents would then have to purchase foods from local grocery stores and rely on credit as their cash reserves decreased. Social conflict would emerge among community members. If petroleum development disrupted four predominant staple and secondary food resources, Jorgensen contended that out-migration would occur along with the intensification of cultural and behavioral disruption. Non-Natives would not be affected to the degree experienced by Alaska Natives.

In their assessment of the impact of OCS development for King Cove, Stephen R. Braund & Associates and LZH Associates (1986, TR123) considered two different scenarios: no fishing in South Unimak for one year and the placement of a trans-peninsular pipeline and tanker terminal facility in Morzhovoi Bay. If OCS development closed South Unimak to fishing for one year, some of the potential OCS related impacts for the commercial fishing industry included:

- Reduction of the resource base through pollution-related events or habitat modification;
• Temporary and/or permanent usurpation of fishing grounds by OCS oil and gas-related facilities or activities, e.g., seismic surveys, oil spills, pipelines, drilling or production platforms;
• Competition for labor;
• Port congestion/competition for berthing space;
• Increased vessel traffic;
• Product marketing difficulties caused by actual or perceived tainting; (ibid. 11-30)
• Up to one-third of a loss of gross earnings to the King Cove fleet;
• Alteration of fishing practices;
• Lost raw fish tax and sales tax revenues to the city; and
• Increased alcohol consumption by some community members (ibid., Chapter 11).

MMS supported a similar study of the impacts of OCS development for the fishing community of Kodiak (Payne 1980, TR39). If OCS development did not occur, Payne (1980, TR39) predicted that Kodiak would continue to thrive as a community through the year 2000. Economically, He expected Kodiak would have increases in fish harvests, thereby increasing processing activities. He expected crime rates, as well as alcohol and mental health problems, to decrease. Payne (1980) also suggested that there would be an increase in population that would result in the urbanization of the community in terms of its physical structure and social patterns.

MMS pre-spill research provided several important conclusions regarding the community impacts of OCS development. These studies arrived at rather similar predictions regarding potential negative social impacts. Negative impacts from a high-risk, low probability technological disaster scenario predicted serious social, psychological and behavioral consequences from the contamination of the biophysical environment for subsistence-based Native villages (for example, see Luton 1985; Jorgensen 1984; Stephen R. Braund & Associates and LZH Associates 1986). Furthermore, pre-spill MMS sponsored researchers pointed out the vulnerability of communities economically dependent on commercial fishing (Payne 1980; Little and Robbins 1984; Jorgensen 1984; Stephen R. Braund & Associates and LZH Associates 1986).

The next section presents a discussion of the theoretical issues related to the impacts of the EVOS on resource-dependent communities, noting that consequences occur at three levels: the community, family, and individuals. It also includes a discussion of the actual impacts of the EVOS on communities, noting in particular that the impact scenarios presented in the pre-EVOS studies provided an accurate, but incomplete, assessment of the negative social consequences which could result from major ecological disruptions.
Social Science Approaches to the EVOS: Assumptions, Concepts and Theoretical Focus

It is useful to frame research on the EVOS along a continuum of conceptual levels. Each conceptual level offers a perspective for understanding the general relationship between social impacts and policies intended to promote community recovery. These alternative conceptual levels also help to identify high-risk communities, organizations, and groups of people, providing an initial basis for designing clinical intervention programs.

Table 9.2 provides information on the theoretical-conceptual focus of various studies of the community impacts of the EVOS event.\(^{62}\) The analytical focus of these studies has ranged from the macro (community) level, to the micro (individual) level. The middle-range level focuses on the general organization of group resources which, in turn, integrates various components of social structure and personality. Research from all of these perspectives utilizes the broad assumptions of the ecological-symbolic theoretical model discussed earlier in the chapter.

For macro-level studies of the EVOS, the focus has been on community social structure and resource dependency. The organizing concept of these studies has been the “Renewable Resource Community”, or some variation of this perspective (Picou and Gill 1996). The Renewable Resource Community concept ranges from “pure subsistence communities” to “urban communities” minimally dependent on direct renewable resource harvests. The degree to which a community is culturally and economically dependent on renewable natural resources provides a continuous scale from which researchers can estimate community vulnerability and potential disaster impacts. In general, studies of the EVOS suggested that the severity of socioeconomic impacts was positively associated with the degree of community dependency on renewable natural resource harvests (Picou and Gill 1996; Impact Assessment, Inc. 2001). That is, one can surmise from this theoretical generalization that community impacts were most severe for subsistence-based Alaska Native villages and rural communities economically dependent on commercial fishing. Communities with more diversified economies and less dependence on renewable natural resources were impacted relatively less by the EVOS.

\(^{62}\) For the development of this framework, we have focused on peer-reviewed publications since they should be the primary source for the development of policy directives (National Research Council 2002).
Table 9.2: Theoretical-Conceptual Approaches in Studies of EVOS Social Impacts

<table>
<thead>
<tr>
<th>Organizing Concept</th>
<th>Level of Analysis</th>
<th>Theoretical Focus</th>
<th>Basic Assumptions</th>
<th>EVOS Impact Summary</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro</td>
<td>Micro</td>
<td>Middle Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Group</td>
<td>Group Context</td>
<td>RRCs are comprised</td>
<td>The severity of economic, cultural, social and psychological impacts positively associated with the degree to which communities are dependent renewable natural resource harvests.</td>
<td>Picou et al. 1992; Picou and Gill 1996</td>
</tr>
<tr>
<td>Social structure</td>
<td></td>
<td>Conservation of Resource Model (COR)</td>
<td>People are motivated to obtain, retain and protect valued assets and resources. Social resources include: (1) objects (boat); (2) personal characteristics (self-esteem); (3) conditions (marriage); (4) energies (credit).</td>
<td>The severity of mental health impacts is positively associated with the deterioration of social and family resources. Long-term resource loss spirals produce severe depression and symptoms of PTSD.</td>
<td>Arata et al. 2000</td>
</tr>
<tr>
<td>Community (RRC) Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theoretical Focus</td>
<td>Macro</td>
<td>Middle Range</td>
<td>Micro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social structure</td>
<td>Group</td>
<td>Group Context</td>
<td>Individual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable Resource</td>
<td></td>
<td>Conservation of Resource Model (COR)</td>
<td>Exposure to Oil Model (ETO)</td>
<td></td>
<td></td>
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<tr>
<td>Community (RRC) Model</td>
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Using a middle-range theoretical approach represented by the Conservation of Resources Model (COR), the focus shifts to the social psychological group context to provide a conceptualization of social resource loss and individual stress responses. The COR stress model has been applied to both natural and technological disasters for explaining patterns of psychological distress (Freedy, Shaw, Jarrell, and Masters 1992; Freedy, Saladin, Kilpatrick, Resnick, and Saunders 1994; Arata, Picou, Johnson, and McNally 2000). Hobfoll developed the theoretical model (1988; 1989) and assumes that people are motivated to obtain, retain and protect that which they value. He defined “Resources” to include anything that people value, or that enable them to protect or obtain that which they value. This socially-contextualized view of resources includes finances, possessions, personal characteristics, interpersonal support groups, and, most important, the ability to acquire and maintain all of the above (Hobfoll 1988; 1989). In general, research on the EVOS has documented that long-term (six years) mental health impacts were associated with the deterioration of economic, social, and personal resources (Picou and Arata 1997; Arata et al. 2000).
At the micro-level of analysis, early studies of the initial impacts of the EVOS used personal exposure to oil as the theoretical criterion for predicting individual trauma from the EVOS. Psychologists use this traditional dose-response model to estimate mental health impacts. Exposure to oil was measured very broadly and not only included work in cleanup activities, but also included pre-spill activity in oiled areas, contact with spill-related activities and utilization of oiled areas for commercial, subsistence and recreational resource harvests (Russell, Downs, Petterson and Palinkas 1996). Greater exposure to oil was found to be associated with severe depression, anxiety, Post Traumatic Stress Disorder (PTSD) and a decline in supportive social relationships (Palinkas, Russell, Downs, and Petterson 1992; Palinkas, Petterson, Russell, and Downs 1993; Russell et al. 1996).

These three conceptual approaches provide convergent and complementary empirical evidence for understanding and explaining the multidimensional community impacts of the EVOS. Elements of resource dependency permeate each level of analysis and identify sources of disruption for communities, groups and individuals. Communities inextricably linked to and dependent upon renewable natural resources had the most severe disruptive impacts to their social structure. As discussed previously, pre-EVOS spill research conducted by MMS found that Alaska communities were both linked to and dependent upon their physical environment. Any disruptions to this balance of human dependency upon the biophysical environment was certain to have both short-term economic consequences, as well as long-term cultural impacts to local residents in the region (Jorgensen and Maxwell 1984, TR90; Stephen R. Braund & Associates and LZH Associates 1986, TR123).

Social Science Research on the EVOS

As discussed previously, MMS conducted a series of socioeconomic studies in Alaska coastal communities that sought to predict the community impacts of an oil spill or other disaster associated with OCS development. The predicted impacts ranged from social structural changes, such as economic losses and increased crime rates, to more individualized pathology manifested in the form of alcoholism and increased mental health problems (see Stephen R. Braund & Associates and LZH Associates 1986, TR123; Luton 1985, TR91; Jorgensen and Maxwell 1984, TR90; Davis 1979, TR41; Kruse, Hitchins, and Baring-Gould 1979, TR26). These predictions, unfortunately, became a reality for many communities and residents of Alaska coastal communities following the EVOS.

Following the EVOS, researchers initiated three major research projects: the Oiled Mayors Project, the National Science Foundation sponsored Cordova Community Study, and the MMS-sponsored social
indicators study. Each project had a different focus, utilized alternative and multiple methodologies and employed contrasting research designs.

A coalition of plaintiff communities that were actually oiled by the EVOS sponsored the Oiled Mayors Project. The Oiled Mayors study (Impact Assessment, Inc. 1990e) resulted in a series of four reports that documented the impacts of the EVOS in 22 communities. Impact Assessment, Inc. collected the data in the spring and winter of 1990. The research design for this project was cross-sectional and researchers completed all surveys in the spring and winter of 1990. The study utilized a multi-method approach, as well as utilizing information from:

- A household survey of 11 affected and two control communities;
- Field interviews with community leaders, municipal department heads and other key informants from 22 communities; and

The National Science Foundation primarily funded the Cordova Community Study. The Prince William Sound Regional Citizens’ Advisory Council (PWSRCAC) provided interim support.° Researchers with the Cordova study collected longitudinal data over an 11 year period (1989-2000) in the RRC of Cordova, as well as a demographically-matched Alaska control community located outside the spill area (Petersburg). Cordova and Petersburg are both communities where residents rely on renewable natural resources for commercial and subsistence harvesting. While Cordova was not directly oiled, “the oil spill severely affected the bioregion’s commercial and subsistence fisheries creating a disruption in the bioregion’s renewable resources” (Gill and Picou 1998:800). This line of research documented changes resulting from the spill, as well as consequences associated with the subsequent litigation process. Researchers also collected data in the community of Valdez in 1991 and 1992 (see Picou, Gill, Dyer, and Curry 1992; Picou and Gill 1996).

The third project involved an extension of the social indicators study of Alaska coastal villages sponsored by MMS through the Alaska OCS ESP. Researchers collected ethnographic data from key informants in impacted communities and Native villages. They collected data in Cordova, Tatitlek, Valdez, Kenai, Tyonek, Seldovia, Kodiak, Karluk, Old Harbor, and Chignik in 1992 (Endter-Wada, Hofmeister, Mason, 63 This series of projects included basic research on community impacts as well as the development and implementation of a clinical intervention program for reducing the long-term social and mental health impacts of the EVOS. For more information see Picou 2000; Arata et al. 2000; Picou et al. 2001.
Researchers selected a Solomon Four Group Design to reduce threats to validity (Jorgensen 1993, TR153). Theoretically, researchers defined communities along five dimensions as either:

- test or control;
- hub or periphery;
- mixed or Native;
- commercial fish or non-commercial fish; or
- borough or non-borough (Jorgensen 1993, TR153).

The questionnaire used was the AOSIS developed by Stephen R. Braund & Associates, ISER, and University of Michigan Institute for Social Research (1985, TR116) (Jorgensen 1993).

In addition, MMS sponsored a comprehensive review of the literature on social impacts of the EVOS compiled by Impact Assessment, Inc. (2001, TR161). This report provided an excellent and detailed review of published research conducted in affected spill areas from 1989 to 1993. The intent of this report was to provide a series of recommendations to natural resource managers and others “… who need information about how social factors affect the response of communities to a technological disaster” (ibid., 5). The authors contended that residents of communities in the affected areas were highly dependent upon the natural environment for instrumental, cultural and spiritual values. Therefore, damages to the natural environment were certain to have a host of social consequences for affected communities. For the purpose of this report, researchers categorized communities as either “Native” or “non-Native.” The non-Native communities were, to various degrees, culturally and economically dependent upon the biophysical environment. Consequently, the impacts of the EVOS on these communities were divergent. Nonetheless, Impact Assessment, Inc. researchers concluded that chronic social impacts of the EVOS related to litigation and community recovery were “minimally addressed” in the research literature (ibid., 2001). As such, this chapter will expand previous research summaries by including studies conducted from 1993 to 2000.

In order to comprehend fully the depth of devastation that resulted from the EVOS to Alaska communities, it is important, once again, to underscore the fact that Alaska community life is dependent upon natural biophysical resources and their annual seasonal cycles of availability. The biophysical environmental context in which these residents live influences the economies of these communities, as well as interactions among social institutions, cultural beliefs and values and community and individual behaviors (Impact Assessment, Inc. 2001). Picou and Gill (2000:158) pointed out that “although the EVOS did not pose a direct threat to the human residents of Prince William Sound, it placed in jeopardy
the viability of subsistence culture and the economic resources of commercial fishers.” This observation was also evident in many of the studies conducted by MMS. For instance, Endter-Wada et al. (1993a, TR155) found that Alaska Natives residing in Cordova were fearful of harvesting, consuming and sharing their subsistence foods. This concern, in turn, resulted in significant cultural consequences for the villages of Chenega, Tatitlek, and Eyak that are discussed in the following section.

A technological disaster such as the EVOS not only poses a threat to the biophysical environment, but also threatens local human communities. Any event that damages the natural environment is likely to result in a multitude of social, psychological, and economic impacts on the affected areas, particularly in the case of RRCs. It is from this theoretical orientation that we present an overview of the community impacts associated with the EVOS. Impact categories include:

- Macro or social structural impacts which included changes to the economic, civic and occupational structure of the community, and severe strains on all community resources;
- Middle-range or cultural impacts where the way of life for residents of impacted communities was disrupted; and
- Micro or individual impacts include increased family stressors, mental distress, alcohol and drug abuse and patterns of out-migration.

It is noteworthy that these impacts do not occur independently. They are interdependent processes evident by the fact that any or all of these consequences have occurred at any given time for most communities in the spill area (Impact Assessment, Inc. 1998).

**Specific Impacts**

As a result of cleanup operations, many communities experienced increases in population as predicted by pre-spill MMS research (Payne 1980, TR39). This demographic shift was sufficient enough to change the overall character of these communities and ultimately, was the source for a host of other problems. Valdez, being the center of response operations, experienced an influx of personnel from Exxon, the U.S. Coast Guard, various state and federal agencies, volunteers and other individuals seeking employment in clean-up operations. The result was a five-fold increase in population (Impact Assessment, Inc. 2001). This demographic impact was the source for a host of social structural, cultural, and individual problems associated with the EVOS. The increased population severely stressed facilities for lodging, food, recreation, and transportation, resulting in the disorganization of community services. While MMS

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64 For examples of this type of discussion pre-EVOS, see Jorgensen and Maxwell 1984; for post-spill documentation see Endter-Wada et al. 1993, TR155.
studies provided information on the potential impacts of an oil spill to communities such as King Cove, researchers did not anticipate many of the EVOS impacts in these pre-EVOS studies. For example, while pre-EVOS spill studies thoroughly demonstrated the economic consequences and demographic shifts associated with an oil spill scenario, these studies did not adequately address the ensuing social conflict, community disruption, and long-term mental health impacts which occurred in many of the affected communities.

In some instances, the EVOS produced a limited economic boom for businesses and commercial fishers. Fishers who participated in cleanup operations made money for future upgrades of their fishing equipment, which resulted in many perceived inequities from residents who did not participate in the clean up (Impact Assessment, Inc. 1990e; 2001). However, the economic boom was not without consequences for the social structure of these communities. These immediate impacts included: (1) increased health care demands; (2) increased crime rates; (3) disruption of local government activities due to labor shortages; (4) competition for labor between businesses and cleanup jobs; (5) labor shortages; and (6) short-term, divisive social conflict between community members and “outsiders” (Impact Assessment, Inc. 1990e; 2001; Russell et al. 1996).

Communities also experienced housing shortages, increased demands for childcare, disruptions to family life and a host of other problems (Impact Assessment, Inc. 2001; Gill and Picou 2001). Demand for services at the Kodiak Island Mental Health Center increased by as much as 700 percent (Impact Assessment, Inc. 1990e; 2001). The number of emergency clients and visits also increased substantially. Concerns over the future economic impacts precipitated family stress. Lack of childcare was also a problem in both Seldovia and Cordova. In some instances, parents left children unsupervised because they were involved in the cleanup efforts. Interestingly, in Kenai, crime rates decreased as transients and others left the community to work on the cleanup. In Valdez, however, arrests increased 124 percent, with police calls increasing by nearly 64 percent from the previous year (Impact Assessment, Inc. 1990e; 2001). In addition, Valdez residents complained about being depressed (Endter-Wada, et al. 1993a, TR155).

Businesses dependent upon commercial fishing lost income as result of the spill due to closed fisheries. For example, prior to the EVOS, the community of Cordova had experienced a relatively stable economy. However, in 1989, over 12 million dollars in income and revenues were lost with the closure of the shrimp, sablefish and herring fisheries (ibid.). In turn, the impact of these closures had direct financial implications for local governments due to the losses in tax revenues (Endter-Wada et al. 1993a, TR155; Reynolds 1993, TR155; Impact Assessment, Inc. 1990e, 2001). Indeed, data from commercial fishers in
Cordova indicated that, from 1990 to 1994, total economic losses averaged over $200,000 per fisher, ranging from losses of $2,650,000 to gains of $352,000 (Picou and Arata 1997; see also Cohen 1997).

The tourism industry also suffered in some communities because of unavailable rooms and services. Cleanup workers took up most of the available space in hotel rooms, leaving little room for tourists. In addition, many people canceled their summer reservations in 1989 because of the news of the spill. While lost tourism revenues for hotel rooms were offset in the short run by room revenues from cleanup workers, other tourist related services like charter services and gift shops lost business. Community leaders in Kodiak were particularly concerned about the effects of the EVOS on tourism (Endter-Wada et al. 1993a, TR155; Reynolds 1993, TR155). However, the more limited tourism industry in Cordova was also negatively impacted (Impact Assessment, Inc. 2001).

Technological disasters transform community culture (Freudenburg 1997). The communities impacted by the EVOS have multiple social ties to renewable natural resources. EVOS strained and, in some instances, severed these relationships. Residents also lost control of their “daily life routines” due to cleanup operations and the influx of outsiders. Specifically for Cordova, following the EVOS, community culture shifted from a “fishing lifestyle” to one entrenched in “cleanup operations” (Endter-Wada et al. 1993a, TR155). The issue of personal and community morals related to working for Exxon was another aspect of the social conflict identified in Cordova. Many residents felt that working for Exxon compromised their “moral principles.” Those not working for Exxon referred to clean-up workers and contractors to Exxon/VECO as “Exxon whores” who accepted “blood money” and some of whom became “spillionaires.” For example, a Cordova resident described this “moral conflict” in the following manner: “It was very hard on those who wouldn’t work the spill. They thought it was wrong to help Exxon, after what had happened. But then they were left with no money” (Endter-Wada et al. 1993a:243, TR155).

For those who did choose to work for Exxon, many claimed that there was bias in the way Exxon awarded contracts for the cleanup. In Cordova and Kodiak, fishermen complained that Exxon used biased and unfair hiring practices during the clean up (Impact Assessment, Inc. 1990e). This led many to believe that Exxon was trying to divide the community by issuing such diverse contracts. As one local resident stated:

> Exxon was not honest at any level. They were not open. They were not forthcoming. They’d be playing us off against each other. Lots of different types of contracts were floating around. Sometimes you had to sign that oil cleanup money counted against any claim you’d make in the future. Other contracts didn’t have that stipulation. Valdez got different contracts than Cordova and so on. They wanted to set people fighting amongst themselves (Endter-Wada et al. 1993a:246, TR155).
These observations describe characteristics of the “corrosive community,” in which there is a “...deterioration of social relationships, resulting from the fear, anger, apprehension, confusion, conflict and stress that characterize a social milieu of uncertainty” (Gill and Picou 1998:797).

Endter-Wada et al. (1993a, TR155) also concluded that tension and conflict emerged in Valdez. However, the researchers noted that it did not reach the levels that it had in other communities such as Cordova. Unlike Cordova, Valdez was not as economically dependent upon the well-being of renewable resources in Prince William Sound (ibid.). However, there was also evidence of the “corrosive community” in Valdez. Residents reported “a new cynicism toward the town, toward oil companies and toward the institutions of society like government” (ibid., 102). Some residents believed that since these social institutions failed during the EVOS they were no longer to be trusted. Community residents also felt that Exxon deliberately established policies that treated communities differently in an effort to promote social conflict. For example, the Kenai community received $2 million for their response effort, while the Kodiak community received only $500,000, despite the argument that Kodiak experienced more negative community impacts from the EVOS (Impact Assessment, Inc. 2001).

Culturally, the oil spill disrupted the Cordova Natives’ traditional practice of sharing and exchanging subsistence harvests. Sharing of resources among Natives was a “fundamental part of life” (Endter-Wada et al. 1993a:219, TR155). In addition, researchers found that, to Natives, subsistence practices were also a part of one’s personal identity: “When you can’t eat those foods, your body craves it. It’s tied up with our traditions and values. That’s part of our life. It’s just tradition. When the herring doesn’t come in: we just expect it, this time of year, we’re going to eat herring. It’s part of our life (Endter-Wada et al. 1993a:219, TR155). Some of those interviewed feared there would be more violence because individuals “wouldn’t be able to release their energies, that they use on hunting” (ibid., 220-221).

The Oiled Mayors study also found that groups most vulnerable to higher rates of exposure to spill impacts included Natives, females and younger individuals (Impact Assessment, Inc. 2001). As individual exposure to the impacts increased, so did levels of mental distress. The Oiled Mayors study also documented that the more parents were exposed to the impacts of the spill, the more likely they were to report the following impacts: (1) declines in children’s grades; (2) increased fear among children of being alone; (3) increased fighting among children; and, (4) increased arguing between parents and children (ibid.).

Picou and his colleagues utilized the “Impact of Events Scale” to measure spill-related stress over-time (see Horowitz, Milner, and Alverez 1979; Picou et al. 1992; Picou and Gill 1996; Gill and Picou 1998;
Arata et al. 2000). The subscale for intrusive stress measures the cognitive component of event-related psychological stress. From their research, they concluded that, in 1992, Cordovans experienced higher levels of event-related intrusive stress than did residents of Valdez, a more economically diversified community, and a control community, Petersburg, Alaska. In addition, groups such as commercial fishers, who were highly dependent on the fishing harvests for their livelihood, experienced higher levels of intrusive stress than did non-fishers (Picou and Gill 1996). Possible correlates of spill-related collective stress included observations of increased drug abuse, alcohol consumption and domestic violence which, in turn, further deteriorated social relations in impacted communities (Impact Assessment, Inc. 2001).

Researchers found high-levels of psychological stress for commercial fishers residing in Cordova six years after the spill. When contrasted to normative samples, researchers found fishers to have high-levels of depression and anxiety, as well as exhibiting more symptoms of PTSD (Arata et al. 2000). Furthermore, the researchers concluded that the effects of the EVOS “have been long-lasting and appear to be influenced by the degree to which an individual found him or herself in ‘investment without gain’ and deteriorating social support and physical health” (Arata et al. 2000:37). Commercial fishers in Cordova suffered severe long-term social, economic and mental health impacts. This outcome resulted in a fragmented community context, which provided minimal social support structures for facilitating effective coping strategies and community recovery. The existence of characteristics of the chronic “corrosive community” were evident from this study (Arata et al. 2000).

Table 9.3 presents a summary of the community impacts documented for the EVOS. As evidenced by our discussion and the table below, the EVOS resulted in a wide variety of social impacts ranging from economic losses to increased levels of psychological stress among community residents. Furthermore, a wide-range of survey, ethnographic and secondary data provides strong convergent evidence that the EVOS severely impacted the social, cultural and economic structure of communities, as well as the mental health of residents.

65 This component is comprised of survey items such as “I thought about it when I didn’t want to;” and “I had dreams about it” (see Horowitz et al. 1979).

66 Impact Assessment, Inc. (2001, TR161) examined the major socioeconomic consequences of the Exxon Valdez Oil Spill litigation process for residents of the spill affected communities.
Table 9.3: Summary of Social Structural, Cultural and Individual Impacts Resulting from EVOS

<table>
<thead>
<tr>
<th>Social Structural Impacts</th>
<th>Cultural Impacts</th>
<th>Individual Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased population size&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• Social conflict between drift and set netters fishers&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Declines in children’s grades&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Competition for labor between local businesses and government with the cleanup industry&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• Strained community relations&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Increased levels of collective stress&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Housing shortages&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• Declines in community cohesiveness&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Increased drug and alcohol abuse&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Increased demands for childcare and services&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• Disruption of a subsistence lifestyle&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Increased mental distress&lt;sup&gt;1,2,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Decrease in tax revenues&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Some archaeological resources were damaged or stolen&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Children were often left unsupervised&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Decrease and increase in crime&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Sense of place and evaluation of home as safe were threatened and/or damaged by the EVOS&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Disruptions to daily life&lt;sup&gt;1,2,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Lack of control over the clean-up effort&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Uncertainty about the short and long-term effects of the EVOS on ecosystems and human communities&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Disruptions to family life&lt;sup&gt;1,2,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Delayed infrastructure projects&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Loss of trust for parties responsible for protecting the community from the threat of oil transport&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Feelings of helplessness, betrayal and anger characterized the emotional state of community members&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Concerns over public perceptions on the price, quality and demand of fish&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Social conflict between those who worked the cleanup and those who did not&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Increased prevalence of mental disorders such as depression, anxiety and Post-Traumatic Stress Disorder&lt;sup&gt;1,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Using reserves and investments to pay for cleanup&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• Public distrust of oil transportation and oil corporations&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Children experienced a range of problems such as fear of being left alone, problems getting along with other parents and fighting with other children&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Closure of the drift-net fishery&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Long-term loss of social and economic resources&lt;sup&gt;1,2,3&lt;/sup&gt;</td>
<td>• Self-isolation and avoidance of spill-related discourse&lt;sup&gt;1,2,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Loss of staff because of strains associated with excessive work&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Community mental health organizations overstressed&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Long-term income loss spirals for commercial fishers&lt;sup&gt;1,3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• Economic losses for commercial fishers and support businesses&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td></td>
<td></td>
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</table>

<sup>1</sup>Oiled Mayors Study  
<sup>2</sup>Social Indicators Study (TR 155)  
<sup>3</sup>Picou and colleagues
Community Recovery from the EVOS: Educational Intervention as a Mitigation Strategy

Technological disasters such as the EVOS pose serious challenges to community recovery. Although all disasters seriously impact and alter community organization and culture, technological disasters produce new threats and risks because of the extended “duration of sources of stress” (Baum 1987:45). Edelstein (1988:8) suggests that community recovery “is difficult if not impossible” for victims of such events. Numerous case studies of community and individual responses to a variety of these technological catastrophes have verified this hypothesis (Baum 1987; Baum and Fleming 1993; Kroll-Smith and Couch 1993a; Erikson 1994; Green 1996; Gill and Picou 1998). This body of research on technological disasters has consistently identified community disruption, psychological stress and the deterioration of social relationships as lasting up to 14 years (Green 1996; Freudenburg 1997). Given the protracted litigation following the Exxon Valdez spill, this may be a substantial underestimate of the duration of community disruption.

These data raise questions regarding traditional disaster intervention models and identify a need for alternative mitigation programs (Mitchell 1996; Couch 1996; Picou, Johnson, and Gill 2001). “Therapeutic communities” emerge within social collectives impacted by natural disasters, oftentimes resulting in an “amplified rebound” of material and human resources for impacted populations (Friesema, Caparoso, Goldstein, Lineberry, and McClary 1979; Drabek 1986; Solomon and Green 1992). Researchers have also found the programmatic delivery of psychosocial therapy to victims to contribute significantly to community recovery (Weaver 1995).

However, the major consequence of most technological disasters like the EVOS is the absence of the formation of a “therapeutic community.” Although some immediate emergency response does occur, programmatic intervention is absent over time (Baum 1987; Baum and Fleming 1993; Kroll-Smith and Couch 1993a; Couch 1996). Resource contamination can last for decades, if not centuries. This fact places individuals and communities under continuing distress for extended periods of time. Instead of progressing through a typical natural disaster stage model that moves from “warning” to “threat,” to “impact,” and subsequently to “recovery” and “rehabilitation,” technological disasters become routinized in the early stages. Over time, “warning,” “threat,” and “impact,” merge into a continuing sequence (Couch 1996). Social conflict arises when some community members see the problem as “overblown” by

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67 This section relies on previously unpublished information presented in Picou et al. 2001.
their neighbors, while others believe that residents to not take the images and threats seriously enough (Kroll-Smith and Couch 1993a; 1993b; Couch 1996). Intervention complications also exist because the disaster agent continues to be present through time such that individual and social recovery must occur in the midst of continuing social and psychological impacts (Russell et al. 1996; Picou et al. 2001).

Given that clinical interventions for mitigating the chronic (i.e., over six years following the spill) community impacts of the EVOS were not available, researchers used a community participation model to design an intervention program implemented in the community of Cordova (Picou et al. 2001). The first stage of the community participation model involved the development of a mental health profile from available data. Researchers derived the profile from social and psychological data collected in the Cordova community over the six year period following the spill (Donald, Cook, Bixby, Benda, and Wolf 1990; Picou et al. 1992; Endter-Wada et al. 1993a, TR155; Picou and Gill 1996; Gill and Picou 1998; Arata et al. 2000). The mental health profile provided empirical data for a series of community workshops that involved representatives of identified high-risk groups. Project team members conducted workshops for members of civic, educational, mental health, religious, and medical groups. The general public was also involved in several information-based presentations that summarized the mental health profile and outlined possible objectives of the community intervention program. These participatory activities resulted in agreement between residents and researchers regarding program activities and various methods of information delivery.

The second phase of program development utilized information from the mental health profile workshops to construct specific mitigation activities. Current clinical programs and traditional methods used in community psychology served as the basis for program components. Once again, with maximum participation and feedback from community residents, researchers evaluated these activities in terms of cultural appropriateness, community acceptance, and cost-effectiveness (Picou et al. 2001). The team developed a final program and implementation strategy. Two local community organizations, Sound Alternatives Mental Health Clinic and the Cordova Family Resource Center, sponsored this program in order to promote resident participation.

From January 1996 to February 1997, the team implemented “The Growing Together Community Education Program” in Cordova. The participatory model used for program development resulted in the diagnosis that community residents needed information regarding: (1) the common and expected consequences of technological disasters; (2) effective coping responses; and (3) available resources to provide support for residents’ psychosocial problems (Picou et al. 2001). An outreach approach was
The goal of the program was the mitigation of the chronic social and psychological impacts of the EVOS for residents of Cordova. More specifically, the objectives included: (1) involving a significant proportion of community residents in program activities; (2) involving people in need of program activities; (3) increasing help-seeking behavior; (4) improving social relationships; (5) strengthening ties among Alaska
Natives to one another and to cultural tradition; (6) reducing levels of psychological stress among residents; and (7) developing a model for mitigating chronic disaster impacts that can be implemented in communities impacted by future technological disasters (PWSRCAC 1999a; Ka’aihue 1999; Picou et al. 2001).

An evaluation of the program implemented in Cordova revealed high levels of community participation by community residents (Picou et al. 2001). Contrasts with a control community found significantly more program awareness and participation for Cordova residents. In short, researchers found the programs reached their intended audience. The data analysis also revealed that social relationships with non-relatives improved and that a significant decline in spill-related psychological stress occurred for commercial fishers who participated in the program. Despite these positive outcomes, psychological stress levels were still significantly higher in Cordova eight years after the EVOS, when compared to the control community of Petersburg (Picou et al. 1997; Picou et al. 2001). In 2000, psychological stress levels were found to be near 1989 levels, indicating that most program benefits were short-term (Marshall, Picou, and Schlitmann 2004).

The completion of this program resulted in the publication of a two volume document by the PWSRCAC in May of 1999 (PWSRCAC 1999a; 1999b). The first volume of this document provides a “user-friendly” guidebook for responding to technological disasters tailored for community organizations, counselors, local government agencies, businesses, families, volunteers, and interested individuals. The guidebook outlines, in a very communicable style, appropriate collective and individual strategies for immediate and long-term responses to technological disasters based on the program information collected and analyzed from EVOS impacts (PWSRCAC 1999a). Volume two provides an appendix of actual program materials for communities, with information for conducting community surveys, training peer listeners, airing radio broadcasts to educate residents about appropriate coping skills, and information resources (PWSRCAC 1999b). Researchers distributed “Coping with Technological Disasters Guidebook” to over 100 communities throughout the United States. This document provides a tested mitigation program for communities chronically impacted by future technological disasters.

With these types of programs in place, community residents will have tools to cope with the negative social consequences of a technological disaster. In addition, these programs provide information on coping strategies relevant to the potential litigation process, a “secondary disaster.” In the section that follows, we present a discussion of the complexities associated with the litigation process and the long-term impacts of this process on community members.
Chronic Community Impacts: Litigation as a Secondary Disaster

The fact that “Principal Responsible Parties” rarely take full responsibility for economic, community, social, and psychological damages precludes the timely community recovery from most technological disasters (Picou 1996c). Class-action litigation eventually characterizes most responses to such human-caused environmental contamination in the United States (ibid.). The courts become the forum for debating community “recovery,” and in the courts, complex legal issues can result in decades of legal discourse. This scenario characterizes the EVOS some 16 years after the catastrophe. Although state and federal courts have addressed ecological restoration efforts, Exxon has yet to distribute punitive damage payments incurred by Exxon in civil court to class-action plaintiffs from Prince William Sound (Piper 1993; Picou 1996a; 1996b; Hirsch 1997). Indeed, direct community restoration efforts have been extremely limited and Exxon has made no punitive damage payments to communities, Native villages, municipalities, and individuals.

Class-action and mass tort litigation impact community social structure by defining a collectivity within the community that has been severely damaged, but has yet to receive various damage claims. The “litigant” is involved with paperwork for the documentation of legal claims, depositions and communications with attorneys. These activities serve as repeated reminders of the EVOS and, over the years, the continuing uncertainty associated with the litigation has become another source of stress to many Prince William Sound residents (Picou, Marshall, and Gill 2004).

Protracted litigation also results in a sense of frustration and loss of trust by litigants in local organizations and government agencies responsible for protecting and restoring communities and residents damaged by the reckless use of modern technology (Freudenburg 1997). Exxon’s legal strategy is that most often used by large corporations facing toxic tort legal action. This approach involves a vigorous legal challenge to all damage claims with innumerable motions and appeals that serve to delay extensively the final distribution of reparations (Picou 1996b; Hirsch 1997).

Table 9.5 presents community data collected over a nine-year period (1991-2000) for Cordova. These data document the relationship of being a litigant to levels of EVOS-related intrusive stress (Horowitz et al. 1979; Picou and Gill 1996). By using a comparison of the unstandardized beta coefficients as a

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68 MMS is sponsoring ongoing research on the social effects of the EVOS litigation (Impact Assessment, Inc., forthcoming).
measure of the strength of the relationship between litigant status and intrusive stress, it is apparent that, over time, the strength of association of litigant status and spill-related stress has increased dramatically: 1991 (4.2), 1992 (5.8), 1993 (11.5). (The higher the unstandardized beta number, the stronger the relationship between the variables and intrusive stress).

Table 9.5: Correlation and Multiple Regression Coefficients for EVOS-Related Intrusive Stress, Cordova Community, 1991, 1992, 2000

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
<th>Standardized B</th>
<th>Unstandardized b</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td></td>
<td></td>
<td></td>
<td>.12</td>
</tr>
<tr>
<td>Gender</td>
<td>-.083</td>
<td>-.058</td>
<td>-.080</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-.111</td>
<td>-.067</td>
<td>-.283</td>
<td></td>
</tr>
<tr>
<td>Fisher</td>
<td>.306**</td>
<td>.176*</td>
<td>3.598*</td>
<td></td>
</tr>
<tr>
<td>Litigant</td>
<td>.303**</td>
<td>.233**</td>
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Notes: *p < .05; **p < .01; ***p < .001

Furthermore, for the 2000 community survey, litigant status was the only significant predictor of spill-related stress, accounting for 28 percent of the variance in the intrusive stress subscale. These and other analyses clearly demonstrate that the litigation process is, in and of itself, a significant stressor for residents of Cordova (also see Picou et al. 2004). Furthermore, in 2000, over 95 percent of the residents of Cordova interviewed using random-digit dialing techniques felt that the community had not recovered from the EVOS. The chronic, spill-related social and psychological impacts of the EVOS are associated with the continuing legal discourse that precludes the distribution of damage payments to victims.

These findings reveal that litigation resulting from the EVOS has perpetuated negative community and individual impacts for over a decade. As such, litigation functions as a “secondary disaster” that denies community recovery by fostering a necessary adversarial discourse that divides and fragments
communities long after the original technological catastrophe. This legal discourse results in repeated reminders of the original event and victims continue to be economically impacted, disrupted and stressed by court procedures and appeals that appear unfair and irrelevant to the original damage claims. Furthermore, the EVOS litigation has resulted in inequitable compensation for victims (Impact Assessment, Inc. 2001). The controversy associated with victims’ damage claims also results in threats to social science research through defendants’ attempts to deny the public release of data and dispute the confidentiality of survey responses (Picou 1996a; 1996b; 1996c; Impact Assessment, Inc. 2001). Protracted litigation is almost an inevitable consequence of any technological disaster that may occur in Alaska and should be seriously considered for establishing policies and procedures for responding to these events in the future (Picou and Rosebrook 1993; Impact Assessment, Inc. 2001; Picou et al. 2001; Picou et al. 2004).

Conclusions and Recommendations

Research on the community impacts of the EVOS has resulted in convergent empirical findings from a variety of research projects sponsored by MMS, the National Science Foundation and other agencies. These studies have identified both the immediate and long term negative consequences of the largest and most ecologically damaging oil spill in the history of North America. In the case of studies sponsored by MMS, researchers accurately predicted many of the social and cultural impacts in studies conducted prior to the EVOS (e.g., see Jorgensen 1984, TR90; Payne 1980, TR39; Stephen R. Braund & Associates and LZH Associates 1986, TR123). However, this information did little to protect vulnerable communities from a wide variety of deleterious impacts.

We analytically categorized these impacts in terms of community social structure, community relations, and community residents. Numerous studies have collected data from probability samples of communities, focus groups, non-probability ethnographic interviews, and from a variety of secondary data collected from municipal and community organizational records (For example see Impact Assessment, Inc. 1990e; Picou et al. 1992; Palinkas et al. 1992; Picou and Gill 1996; Gill and Picou 2001; Endter-Wada et al. 1993a, TR155; Endter-Wada, Hofmeister, Mason, McNabb, and Mulcahy 1992a, TR152; and Reynolds 1993, TR155). Taken together, these data support the patterns of community impacts identified for other technological disasters and point to additional consequences that should be mitigated in the event of future oil transportation. We will conclude by briefly discussing some of these policy directives below.
Community Social Structure. Alaska communities that are highly dependent on the harvest of renewable natural resources tend to be small and isolated from larger communities. EVOS disrupted daily routine activities in RRCs such as Cordova, impaired the flow of goods in and out of RRCs, and adversely affected the majority of local jobs. In Cordova, there were complaints that Exxon was slow in paying for cleanup work that left some families without money for food. One family was in the process of building a house. The carpenters who were working on the house went to work for Exxon and left the family without a place to live (Endter-Wada et al. 1993a, TR155). Over time, the continuing decline in commercial fishing harvest, as well as the lack of a legal resolution to the EVOS, has resulted in chronic collective stress, social disruption, and population changes in many RRCs impacted by the EVOS.

Local governments need to be prepared for responding to such social structural impacts by developing a community emergency response plan to minimize both immediate and long-term impacts. Major complaints among residents of Cordova were that Exxon was not adequately prepared for the cleanup operation and the federal government deferred to Exxon’s cleanup strategy (Endter-Wada et al. 1993a, TR155).

Command structures should be established, such as the “Incident Command System” in which a number of agencies, including the Alaska Department of Environmental Conservation and the U.S. Coast Guard, are involved in the response effort (PWSRCAC 1999a:23-25). For Alaska communities, “local governments may sign an agreement with the Alaska Department of Environmental Conservation for cooperative responses to oil and hazardous substance spills” (PWSRCAC 1999:24). This agreement provides for direct reimbursement to communities supported by state requests for assistance. Such support is critical for financing community costs associated with responding to technological disasters.

Communities also need to organize their own structured response to technological disasters in terms of clear lines of authority and communication. Kodiak, for example, had an Emergency Services Council which provided up-to-date information to residents concerning the spill (Endter-Wada et al. 1993a, TR155). In addition, meticulous record keeping is imperative for all impacted communities. This includes documentation of fiscal impacts, as well as costs to businesses and civic organizations for nonroutine activities. This information provides an important basis for identifying legitimate damage claims to principle responsible parties (PWSRCAC 1999:28-29).

Maintaining accurate records from meetings and establishing detailed cost accounting systems provides additional information on social structural impacts. Political leaders of impacted communities should
keep daily logs of all activities and document conversations and agreements made with government, military and corporate representatives (PWSRCAC 1999).

Communities at risk for such catastrophes can reduce the social structural impacts of technological disasters through proper preparation, planning, and organization. Furthermore, communities could establish relationships with larger regional state and federal organizations and agencies that are responsible for supporting local community needs through various programs and policies designed to assist community recovery. Because the impacts of future technological disasters may vary according to community dependence upon natural resources, communities and villages that are most vulnerable to ecological contamination deserve special attention. Government could identify and provide support for funding the development of community structures to those communities and villages determined to be at “high risk” for community and individual impacts from technological disasters associated with mineral resource extraction and transportation.

**Community Relations.** Technological disasters produce a “corrosive community,” spawned by conflicts between local groups and organizations, oftentimes resulting in a fragmented, adversarial context for community relations. This situation was evident in many communities. For example, in Cordova community divisions clearly emerged between residents who worked the spill and those who did not (Endter-Wada et al. 1993a, TR155). In addition, there was the perception that Exxon fostered conflicts within the business community so as to avoid, or delay, payment of damage claims (ibid.). This contested, conflict-prone response results from the fact that “principal responsible parties” often make public promises to victims, but later deny that their activities resulted in any harmful damages. This adversarial pattern continues throughout litigation, producing the social uncertainty, economic loss, and psychological distress for victims (Picou et al. 2004).

An important response to such impacts requires that local groups understand the divisive character of technological disasters, as well as the importance of communicating information and resource availability to all sectors of the community. Social and civic organizations within the community that have longstanding established reputations should encourage understanding and participation by their members to any disaster response. Such organizations can distribute training, service delivery and informative materials, providing a strategy to minimize inaccurate information and maximize an informal, concerted response from residents. Local churches, non-government organizations, civic groups, educational organizations, law enforcement, scientific organizations, and government agencies need to establish
communications regarding the disaster and potential mitigative responses to ongoing social impacts (PWSRCAC 1999a).

Community Residents. Technological disasters such as the EVOS result in long term mental health impacts to residents of impacted communities. The EVOS was no exception to this pattern. The deterioration of social relationships within impacted communities led to coping strategies that were ineffective and to severe levels of anxiety, depression, and post-traumatic stress disorder for commercial fishers (Arata et al. 2000). Renewable resource communities have very small mental health organizations, as well as limited staff to respond to the increased demands caused by the EVOS. The problem of professional burnout was very real for local mental health experts. Outside agencies can augment local resources with professional counselors (PWSRCAC 1999a).

Intervention programs designed to mitigate longer term mental health impacts should be identified and implemented. One such program was reviewed in this chapter. Researchers developed the “Growing Together Community and Education Program” from resources provided by the PWSRCAC using a participatory program model. This clinical intervention provided information regarding coping skills, trained local volunteers in peer listening and problem solving techniques and established outreach strategies to educate all residents about the deleterious mental health impacts of the EVOS (Picou et al. 2001). The Native village of Eyak used a participatory program model to augment this clinical intervention with culturally appropriate healing activities for Alaska Natives (Picou 2000). Families and individuals need to reach out actively to relatives and community residents who have been severely impacted in order to foster a sense of social support and therapy for victims. The evaluation of the “Growing Together” program indicates that its implementation helped to reduce the negative effects of broken social bonds and psychological stress (Picou 2000; Picou et al. 2001).

The deleterious community impacts of the EVOS, one of the worst technological disaster in U.S. history, were both immediate and long-term. Many communities suffered a variety of social structural, cultural, and individual impacts that have persisted from 1989 to the present. Continued monitoring would advance our understanding of the full impacts of EVOS and contribute to community recovery efforts. In addition, government could begin to identify what community resources are lacking in the region in order for a community to recover adequately from such an event. This type of information would be directly useful for other regions of the country should this type of event occur elsewhere. Given the expansion of oil exploration in the U.S., the probability of another catastrophic oil spill, such as the Exxon Valdez, is real and requires preparation.