Long-Term Community Impacts of the *Exxon Valdez* Oil Spill: Patterns of Social Disruption and Psychological Stress Seventeen Years after the Disaster[1]

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Introduction

On March 24, 1989, the TV *Exxon Valdez* ran aground on a well-marked reef in Prince William Sound, Alaska. The supertanker leaked 11 million gallons of oil into one of the most pristine ecosystems on the planet. The amount of oil spilled has been recently debated, with some documents suggesting that 24 to 36 million gallons were actually released (Ott 2005:4-10). Nonetheless, the *Exxon Valdez* oil spill (EVOS) was the most ecologically destructive and largest in the history of North American (Picou *et al*. 1992). As of 2006, the *Exxon Valdez* Oil Spill Trustee Council (EVOSTC) reported that only eight (8) out of twenty-two (22) species have recovered (EVOSTC 2006:6). Both intertidal and subtidal communities still contain oil residues and have not recovered. Most important for the present research, human services, in particular, commercial fishing and subsistence harvests of Alaska Natives, have not recovered from the 1989 oil spill (EVOSTC 2006:34-38).

The significance of the ecological, social, cultural, economic and psychological impacts on the residents of fishing communities and Native villages in Prince William Sound have been documented by a large body of social science research over the last seventeen years. Initial economic impacts on commercial fishing were substantial. Cohen (1993; 1997) reported that impacts in 1989 and 1990 approached 155 million dollars. However, economic impacts have persisted due to the long-term collapse of the Prince William Sound herring fishery, which had not recovered as of 2007 (Carls *et al.* 1999; Heintz *et al.* 1999). In addition, the existence of volatile levels of *Exxon Valdez* oil on beaches and salmon streams have been documented by marine toxicologists over the last ten years, strongly suggesting that lethal ecological impacts continue to plague the fish and wildlife in the spill impact area (Pigg 2004; www.cbsnews.com/stories/2007/02/01/tech/main2422515.shtml). This chronic ecological

contamination provides the context for understanding the persistence of long-term human impacts for commercial fishing and subsistence communities in Prince William Sound.

Renewable Resource Communities and Resource Loss: The Ecological-Symbolic Model

Communities directly impacted by the EVOS derive their economic and cultural base from the local biophysical environment. As such, they are unique communities in that they are intimately linked to the natural environment, that is, they are "renewable resource communities" (RRCs) (Picou and Gill 1996:6). RRCs are defined as "a population of individuals who live within a bounded area and whose primary cultural, social and economic existences are based on the harvest and use of renewable natural resources." The social structure of these communities are based on mediating symbolic interpretations and resource exchange between culture and the biophysical environment. Toxic contamination from the EVOS severed many traditional relationships between these renewable resource communities and seasonal harvest activities. Viewed from the ecological-symbolic framework in environmental sociology, this intrusion of contamination altered residents' perception of "lifescape," or personal safety and security within their immediate biophysical environment, resulting in social disruption, psychological stress and loss of institutional trust (Kroll-Smith and Couch 1993; Edelstein 1988; Erikson 1994; Freudenburg 1997).

Picou and Marshall (2002:302-303) have refined the scope of the ecological-symbolic framework to include "resource-dependency theory," that is, rather than focusing on invisible, chronic risks to human health, concern is directed to "threats to natural resources which undermine" the economic and cultural linkages of RRCs to their biophysical environment. These linkages include resource harvests that are economically structured on a subsistence or cash basis and culturally significant because values, behaviors and traditional knowledge (Picou

and Gill 1996). Economically, a wide variety of work roles in RRCs were negatively impacted by the EVOS. Not only were commercial fishermen impacted, but many support occupations such as deck-hands, net-menders, cannery workers, electronic specialists and other types of boat-repair occupations were severely disrupted and/or eliminated. The fact that such RRCs are often geographically isolated and are characterized by little occupational diversification makes the impacts of resource contamination even more severe.

Cultural linkages to the biophysical environment are particularly salient for subsistence harvest of Alaska Natives, but are also relevant for non-Native residents of fishing communities. Traditional cultural values of Alaska Natives are intimately linked to the seasonal harvests of salmon, clam, seal and other marine wildlife. Such subsistence harvests provide a collective value set that links spiritual themes, conceptions of self and traditional knowledge and seasonal rituals and behaviors to the biophysical environment. Subsistence harvests were severely disrupted by the EVOS, severing the cultural infrastructure of Alaska Natives from the ecology, thereby producing negative impacts to cultural traditions and meaningful seasonal behavior (Fall and Field 1996; Dyer *et al*. 1993; Dyer 1993). Such impacts from the massive ecological contamination and destruction of ecological resources resulted in "collective trauma" for Alaska Natives, thereby generating a host of pathological behaviors (Palinkas *et al.* 1992; 1993; Picou *et al.* 1992; Russell *et al.* 1996; Dyer 1993; Dyer *et al.* 1992).

A summary of these negative social, cultural and individual impacts from three major research projects is presented in Figure 1. Two of these projects, the "Oiled Mayors Project" (Impact Assessment Inc. 1990) and the "Social Indicators Study" (Endter-Wada *et. al* 1993) were cross-sectional studies of fishing communities and Alaska Native Villages following the spill. The third project, the "Cordova Community Study" has used a longitudinal design to

monitor the community impacts of the *EVOS* since 1989 (Picou *et al*. 1992; Picou and Gill 1996; Arata *et al.* 2000; Picou 2000; Picou *et al.* 2004; Marshall *et al.* 2004). Figure 1 reveals that the aftermath of the spill permeated and damaged social structure, culture and personal lives of the resident of Prince William Sound.

Figure1. Summary of Social Structural, Cultural and Individual Impacts Resulting from the *EVOS.*

Social Structural Impacts

-Increase population size[1]
-Competition for labor between local businesses and government with the cleanup industry[1]
-Housing shortages[1]
-Increase demands for childcare and childcare services[1]
-Decrease in tax revenues[1,2]
-Decrease and increase in crime[2]
-Delayed infrastructure projects[2]
-Concerns over public perceptions on the price, quality and demand of fish[2]
-Using reserves and investments to pay for cleanup[1]
-Closure of the drift-net fishery
-Loss of staff because of strains associated with excessive work[1,2]
-Economic losses for commercial fishers and support business[1,2,3]

Cultural Impacts

-Social conflict between drift and set letters fishers[2]
-Strained community relations[1,2,3]
-Declines in community cohesiveness[1,2,3]
-Disruption of a subsistence lifestyle[2,3]
-Some archaeological resources were damages or stolen[2]
-Sense of place and evaluation of has as safe were threatened and/or damaged[1,2]
-Uncertainty about the short and long-term effects of the EVOS on ecosystems and human communities[1,2,3]
-Loss to trust for parties responsible for protecting the community from threat of oil transport[2,3]
-Social conflict between those who worked the cleanup and those who did not[1,2]
-Public distrust of oil transportation and oil corporations[2,3]
-Long-term loss of social and economic resources[1,2,3]
-Community mental health organizations overstressed[1,2]

Individual Impacts

-Declines in children's grades[1]
-Increased levels of collective stress[3]
-Increased drug and alcohol abuse[1]
-Increased mental distress[1,2,3]
-Children were often left unsupervised[1]
-Disruptions to daily life[1,2,3]
-Disruptions to family life[1,2,3]
-Feelings of helplessness, betrayal and anger characterized the emotional state of community members[3]
-Increased prevalence of mental disorders such as depression, anxiety and Post-Traumatic Stress Disorder[1,3]
-Children experienced a range of problems such as fear of being left alone, problems getting along with other parents and fighting with other children[1]
-Self-isolation and avoidance of spill-related discourse[1,2,3]
-Long-term income loss spirals for commercial fishers[1,3]
-Litigation stress as a chronic pattern[3]

[1]Oiled Mayors Study
[2]Social Indicators Study (TR 155)
[3]Cordova Community Study

Contamination of the biophysical environment results in collective and individual stress for all human communities (Hallman and Wandersman 1992). Explaining such complex patterns of stress requires a framework that integrates both environmental and cognitive approaches. The "Conservation of Resources Stress Model" (COR) is particularly appropriate for understanding the broad range of ecological and sociocultural resources depleted by the EVOS and the resulting impacts on residents of Prince William Sound (Hobfall 989). The COR model posits that "…people strive to retain, protect and build resources and that what is threatening to them is the potential or actual loss of these valued resources (Hobfall 1989:516). Collective and psychological stress is produced when people experience "(a) the threat of a net loss of resources, (b) the net loss of resources, or (c) a lack of resource gain following the investment of resources" (Hobfall 1989:516). Object resources, personal characteristics, conditions and energies resources, all which have values and meanings for residents of human communities, are relevant for understanding the social impacts of the EVOS. These resources can be classified as "extrinsic" or "intrinsic" depending on the nature of the resource loss experienced by individuals.

Chronic Impacts of the EVOS: Persistence of the "Corrosive Community"

Disaster researchers have traditionally made the distinction between "natural disasters," i.e., "acts of God" and "technological disasters," i.e., "acts of humans" (Barkun 1974; Fritz 1961; Cuthbertson and Nigg 1987; Erikson 1994). In the 1960s, with the advent of numerous large-scale technological disasters in the United States, disaster researchers systematically documented a lack of timely community recovery and "a far more exacting and enduring pattern of social, psychological, economic and cultural impacts" for human-caused toxic catastrophes (Marshall *et al.* 2004:291). A comprehensive meta-analysis of 177 disaster studies found that technological

disasters were more psychologically stressful than natural disasters (Norris *et al.* 2001). Indeed, long-term research of the *EVOS,* that is, the Cordova Community Study, has documented chronic patterns of community disruption, resource-loss, psychological stress, community damage and psychological symptoms characteristics of Post-Traumatic Stress Disorder (PTSD) (Picou *et al.* 1992; Picou and Gill 1996; Gill and Picou 1998; Picou and Gill 2000; Arata *et al.* 2000; Marshall *et al.* 2004). Arata and associates found seven years after the EVOS that commercial fishers manifested high-levels of psychological stress and the most stressed were characterized by "resource loss spirals" (Arata *et al.* 2000). Furthermore, the breakdown of social relationships resulted in inadequate coping skills, which further exacerbated chronic patterns of psychological stress (Arata *et al.* 2000).

These dramatic long-term impacts of technological disasters have been attributed to three primary factors. First, victims are concerned about government and corporate failure, resulting in loss of institutional trust (Couch 1996; Freudenburg 1997; Marshall *et al.* 2003). Second, victims are characterized by severe mental and physical health problems (Baum and Fleming 1993; Green 1991; Arata *et al.* 2000; Picou and Gill 2000). Third, continued reminders of the technological disaster and resulting toxic contamination are generated by toxic tort litigation which often characterizes such human-caused events (Picou and Rosebrook 1993; Picou 1996a; 1996b; 1996c; Freudenburg 1997; Picou *et al.* 2004; Marshall *et al.* 2004). In turn, these factors provide the context for the emergence of "corrosive communities" or communities of survivors who suffer "ambiguity of harm," "sociocultural disruption," and engage in a social struggle for affixing blame for the original failure of technology (Freudenburg 1997:29-35).

The role of litigation has been relatively under investigated by technological disaster researchers due to the "private" character of legal "discovery," as well as the common court

procedure of "sealing" legal documents from public scrutiny (Picou *et al.* 2004). Given the complexity of toxic tort litigation, the adversarial procedures allowed for the introduction of scientific evidence, the legal costs involved in retaining attorneys, the invasion into victims personal lives and the risks of punitive damage verdicts, Kagan (2000) has introduced the concept of "adversarial legalism" to describe the stress-producing nature of toxic tort litigation. Although, critics of "adversarial legalism" have argued that this legal challenge negatively impacts the economic well-being of defendants (e.g., see Garry 1997), the social and psychological well-being of plaintiffs is also at risk (Marshall *et al.* 2004:291-293). In short, the litigation in and of itself is often traumatic (Lees-Haley 1988; Cohen and Vesper 2001). In the case of technological disasters, in general, and in particular the EVOS, the resultant litigation produced a major secondary disaster that continues to revictimize survivors nearly two decades after the spill.

Most recently empirical research by Picou and associates (2004) clearly substantiates this hypothesis. The authors utilized structural equation models to evaluate impacts of "being a litigant" and "litigation stress" on EVOS-related psychological stress and community damage. Litigant status manifested the largest indirect effects on psychological stress, while litigation stress manifested the strongest mediating impacts on psychological stress and perceived community damage. Because the models evaluated in this research included numerous variables hypothesized to be associated the origins of the "corrosive community," that is, work disruption, loss of trust in institutions, perceptions of increased risks for future spills, etc., the overwhelming empirical effects observed for being a litigant and for experiencing stress from the litigation, supports the hypothesis that litigation is the primary source for the persistence of chronic psychological stress and community disruption from the EVOS (Picou *et al.* 2004).

Further validation of this claim comes from research conducted on patterns of psychological stress observed for survivors of the EVOS eleven years after the spill (Marshall *et al.* 2004). The statistical analysis from this research is presented in Tables 1 and 2. Table 1 provides event-related levels of psychological stress for litigants and non-litigants in the community of Cordova, Alaska from 1991 to 2000. Although no direct linear pattern was observed, it is apparent that litigants experienced significantly higher levels of stress than their non-litigant counterparts for an extended period following the spill. The increase in psychological stress-levels from 1992 to 1995 probably occurred due to the loss of fishing resources during this time (Arata *et al.* 2000) and increasingly uncertainty regarding the finalization of the litigation process (Marshall *et al.* 2004). From 1995 to 1997, a slight decrease in stress-levels occurred. However, this slight reduction may reflect the positive impacts of a major intervention program, designed to reduce community stress, that existed from 1996 to 1997 in the Cordova community (Picou 2000; PWSRCA 1999). Given that mean differences between litigants and non-litigants have increased over time, it appears that "post-disaster recovery" for litigants is significantly impeded by the litigation process (Marshall *et al.* 2004:296).

Table 1. Mean Intrusive Stress Scores for Litigants and Non-Litigants from 1991 to 2000.*

	Survey Year				
Intrusive Stress Score (0-35)	1991	1992	1995	1997	2000
Litigant Mean	12.46(101)	11.78(74)	15.65 (12)	13.39 (85)	14.74 (103)
Non-litigant Mean	7.09 (127)	5.94 (89)	na	na	6.90 (87)
Mean difference	5.37**	5.84**	---	---	7.87*

Notes: Main cell entries are means; parenthetical entries are the number of respondents (n).
*Marshall, Picou and Schlichtmann 2004:297.
**Independent samples t-test statistically significant at the $p<0.001$ level.

Table 2 provides evidence that, over time, the status of commercial fishers, the highest at-risk group for spill-related economic impacts, has become a relatively inconsequential predictor of stress. As Marshall *et al.* (2004:297-298) state, "twelve years after the oil spill, Cordova's chief means of economic sustenance, commercial fishing has not recovered and litigation continues unabated, but only the latter has significant consequences for predicting spill-related psychological stress." Indeed, for the survivors of the EVOS, the on-going litigation has produced more significant long-term psychosocial damage than the original contamination and destruction caused by the spill.

Table 2. Standardized and Unstandardized Regression.*

	Survey year	
Independent variables	1992	2000
Education	0.08(-0.28)	-0.07(-0.45)
Gender (female=1)	0.06 (1.05)[1]	0.03 (0.55)
Occupation (fish-related=1)	0.20 (3.45)[2]	-0.04 (-0.91)
Litigation (litigant=1)	0.23 (3.75)[3]	0.44 (8.84)[3]
R^2	0.15	0.08
N	148	179

Notes: Main cell entries are standardized regression coefficients; parenthetical cell entries are unstandardized regression coefficients.
[1]p<.05; [2]p<.05; [3]p<.05
*Marshall, Picou and Schlichtmann 2004:297.

Objectives

Technological disasters that result in massive toxic contamination of the biophysical environment have anthropogenic causes. In contrast to natural disasters, community recovery from technological disasters is often not timely and social disruption and psychological stress continues for decades, resulting in a process of chronic revictimization for survivors. Longitudinal studies of this corrosive pattern of the breakdown of the social fabric for impacted communities are relatively rare. Qualitative studies have strongly suggested a general pattern of social corrosion, social conflict and psychological distress for the communities and victims of such events (Edelstein 1988; Erikson 1994), however only a limited number of empirical inquiries have provided evidence of this pattern (e.g., see: Baum1987; Baum and Fleming 1993). The present research is unique in that data from random household samples have been collected from five months following the disaster (1989) and the years 1990, 1991, 1992, 1995, 1997, 2000 and 2006. This report focuses on data collected in 2000 and 2006 in the community of Cordova, Alaska, which was the site of data collection for the impact community and for all previous data-collections.

This report will evaluate the perceptions of residents of the community of Cordova regarding community recovery from the EVOS, the role of litigation for recovery, perceptions of institutional trust and patterns of resource-loss. In addition, models of psychological stress and litigation stress will be evaluated for residents seventeen years after the EVOS.

Methodology

The Community

Survey data were collected in Cordova, Alaska in 2000 and 2006. The community was selected to study the social and psychological impacts of the EVOS because is essentially serves as "ground zero" for survivors of the largest oil spill in the history of North America. In March, 1989, Cordova could be described as an isolated community, highly dependent upon commercial fishing for its economic base, with a history of subsistence cultural practices. Since the 1964 Alaska earthquake, no road transportation has been available to residents. The origins of the community can be traced to four Eyak Native Villages and the territory of the Chugach Eskimos. Officially incorporated in 1909, the Cordova community became the site for the exportation of copper which was mined in the Wrangell Mountain range located North of the community (Stratton 1989). Over a ten year period, 1900 to 1910, Cordova's population increased from 222 residents to over 1,100 residents as copper production increased and mining operations were expanded (Janson 1975; *Alaska Geographic* 1989).

By 1932 the price of copper declined to the point that the Kennecott mines closed and following intermittent periods of production, the mines were permanently abandoned in 1938 (*Alaska Geographic* 1989:43-44; Janson 1975). However, from 1915 to the 1940s, Cordova's economy steadily shifted from mining to commercial fishing. In 1940, the community was characterized by razor clam, herring, crab and salmon fisheries (*Alaska Geographic* 1989). In

addition, in the 1940s, approximately 50 percent of the 1,000 fishers working in the Prince William Sound area resided in Cordova and local canneries seasonally hired nearly 1,500 workers (*Alaska Geographic* 1989:48).

In 1989, 44 percent of all Prince William Sound herring permits and over half of all salmon permits were owned by Cordova residents (Stratton 1989). Presently Cordova fishers commercially harvest chinook salmon, sockeye salmon, cohoo salmon and other salmon species along the Copper River flats and in Prince William Sound. The Prince William Sound herring and pink salmon fisheries collapsed in 1992 and 1993, resulting in severe economic impacts for Cordova fishers (Kizzia 1993). Since 1993, the herring fishery has failed to return to pre-spill status and the salmon fisheries have been erratic in terms of harvest levels. In 1988, Prince William Sound fishing permits were valued at $400,000. However, by 2004, these permits were worth less than $70,000, revealing a disastrous economic decline in permit values in post-spill Cordova (www.ecotrust.org/Copperriver/crks_cd/economy.htm). It is estimated that over 25,000 gallons of *Exxon Valdez* oil still remains along beaches and salmon streams in Prince William Sound (www.cbs.new.com/stories/2007/02/01/tech/main24Z2515.shtml).

The population of Cordova is approximately 2,350, increasing to nearly 3,500 during the summer fishing season. Fisheries related jobs still dominate the economy with well-over 750 vessels in local harbors. Over 50 percent of all jobs in the city are “directly-related” to commercial fishing and 25 percent are indirectly linked to the fishing industry. The total economic value of all commercial fisheries approaches 30 million dollars per year and four major processing plants located in the city employ seasonal workers (www.ecotrust.org/Copperriver/crks_cd/economy.htm). Although tourism and various outdoor recreation activities have increasingly becoming more important for Cordova’s economy, the

community's occupational structure remains dependent upon commercial fishing and the seafood processing industry. As such Cordova remains a renewable resource community.

Litigation[2]

The EVOS trial began on May 2, 1994, more than five years after the spill, following a very aggressive discovery phase during which Exxon's attorneys focused on reducing damage claims and deposing thousands of plaintiffs. Prior to the trial, Exxon deposed "every commercial fisherman, Alaska Native, and anyone else who brought an individual case and required these plaintiffs to produce tax returns, business records, and other documents related to their damages" (Hirsch 1997:280). Exxon's defense strategy also included issuing subpoenas for scientific information from independent experts, attempting to secure any data and confidential information that would be potentially damaging to Exxon's position during the trial (e.g., see Picou 1996a; 1996b; 1996c). The result of this aggressive and intrusive legal strategy was that many damage claims of plaintiffs were dismissed, independent social scientists were diverted from projects and "tens of millions of dollars" were spent for expert records and the depositions of hundreds of expert witnesses for both plaintiffs and defendants (Hirsch1997:280).

The trial ended on September 16, 1994, with the jury awarding a $5.2 billion punitive damage verdict for the 40,000 plus plaintiffs involved in the case. Exxon's attorneys filed repeated motions to overturn the jury verdict, to depose jurors, to depose newspapers reporters, to overturn the punitive damage award, to have a new trial and, in general, to appeal any and all plaintiffs' actions that occurred in response to Exxon's legal strategy. On September 24, 1996, more than two years following the trial, judgment was entered on the jury verdict and the award was now subject to interest payments. In summary, after seven years following the most

[2] This section of this report draws heavily from previous accounts of the EVOS litigation. For more information see: Hirsch (1997); Marshall *et al*. (2004); Picou *et al.* (2004).

devastating technological disaster in the history of North America, the trial verdict was finally recognized.

Exxon has continued its relentless legal strategy of "legitimate" frivolous appeals and motions for a new trial. On May 3, 1999, Exxon filed appeals in the Ninth Circuit Court, arguing for a new trial and the reduction of the punitive damage award from the original jury verdict. After three years, the Ninth Circuit Court of Appeals remanded the case to the United States District Court for the District of Alaska, arguing that the "5 billion punitive damages award is too high to withstand the review we are required to give it under BMW and Cooper Industries" and "it must be reduced." The Federal Court for the District of Alaska ruled that $5.2 billion damage award "was justified" and "is not grossly excessive" (ibid.:50). In 2002, U.S. District Judge H. Russell Holland reduced the punitive damage award to 4 billion and, once again Exxon appealed (Marshall *et al.* 2004).

In 2003, the Ninth Circuit Court ordered Judge Holland to revisit his earlier decision and after declaring Exxon's legal strategy as "reprehensible," he raised the punitive figure to 4.5 billion, plus interest. Once again, Exxon appealed and in December, 2006, the Ninth Circuit Court of Appeals reduced the punitive damages to 2.5 billion. Exxon continues to appeal, vowing to take the case to the U.S. Supreme Court for further review of their claim that their damage payments should not exceed 25 million dollars (www.usatoday.com/money/industries/energy/2006-/2-22-exxon-valdez-appeal). The most recent comments on the litigation suggest that damage payments may be distributed to Cordova litigants by late 2007 or in the year 2008 (www.typepad.com/t/trackback/1042604/7550259).

In short, after the reckless destruction of the ecology and fisheries of Prince William Sound, Exxon's legal strategy has resulted in over seventeen years of costly court deliberations

and the denial of the allocation of damage payments to victims. Many of these plaintiffs reside in Cordova and research indicates that the litigation has become an important source of disruption and psychological stress (Picou *et al.* 2004; Marshall *et al*. 2004).

Methods

Using random digit dialing procedures, the USA Polling Group telephoned residents of Cordova, Alaska and interviewed adult household residents during the spring of 2006 and in November and December of 2000. In 2006, the interview took respondents approximately 15 to 20 minutes to complete and a total of 372 residents were interviewed. The 2000 sample consisted of 227 residents of Cordova and 216 residents of Petersburg. To insure a random selection of respondent within each household, interviewers utilized the Dillman technique for telephone polls (Dillman 1978).

Indicators and Measures

The data analysis was conducted using SPSS for Windows. A principle components factor analysis was conducted on various questionnaire items to determine appropriate scales. Factor analysis allows for the identification of patterns among the variations of responses to several variables. Variables are identified that cluster together in terms of inter-correlations. A number of scales were developed and utilized in the data analysis. These scales, or factors, are independent of each other and identify different dimensions of latent variables that are relevant for identifying patterns which characterize the responses of subjects (Tatsuoka 1988).

The Impact of Events Scale (IES) was utilized as the primary indicator of psychological stress resulting from the original oil spill and the subsequent litigation process. The scale was modified for each event. This scale measures event-related cognitive and behavioral responses that have occurred over the last week for a specific stress-producing event. The IES consists of

15 items that provided statements of potential responses to an extraordinary event, such as a hurricane or an earthquake. The contents of the scale were originally developed from statements made by individuals who had personally experienced stressful events (Horowitz 1974; 1976; Horowitz, Milner and Alverez. 1979; Horowitz 1986). The conceptualization of the IES is directly related to the fact that the more stressful an event, the more likely that it will produce an increased incidence of recurring, distressing ideas, thoughts and feelings and deliberate attempts to avoid or suppress such intrusive, cognitive reminders of the specific stressful event (Horowitz, Milner and Alverez. 1979).

The IES is a valid and reliable indicator of event-related psychological stress and has been utilized in the sociological and psychological disaster research literature. The IES has also been found to be correlated with patterns of Post-Traumatic Stress Disorder (PTSD) experienced by residents of communities that have been severely impacted by disasters (Davidson Smith, and Kudler 1989; Shore, Tatum and Vommer 1986). Some researchers have argued that the IES actually underestimates the severity of stress patterns experienced by victims of disasters (Shore Tatum, E. and Vommer 1986). Nonetheless, the IES provides a direct measure of event-related psychological stress and also serves as an empirical indicator for inferring symptoms of PTSD (Arata *et al.* 2000). For the purposes of this research, we utilized only the intrusive or cognitive component of the scale. The 7 item intrusive stress scale can be found in Appendix A. The Cronbach's alpha calculated for the oil spill related stress scale was .87 and for the litigation-related stress, it was .89.

Personal depression was measured by a modified version of the Center for Epidemiological Studies Depression Scale (CES-D). This scale, like the IES, measures experiences over the last seven days. The depression scale solicits self-ratings of the daily

frequencies of such experiences as feeling sad, feeling lonely, having trouble concentrating, etc. The complete ten-item scale is provided in Appendix A (Mirowsky and Ross 1989:188). Scores on this summated depression index range from 0 to 70. The Cronbach's alpha calculated for this scale was .90.

We also constructed the following scales:

1. **Extrinsic Resource Loss Distress scale** (Cronbach's alpha = .75). The specific survey items included in this scale are listed below. Gains or losses measured using the following scale: 1=Major gain; 2=Some gain; 3=No change; 4=Some loss; 5=Major loss which should be interpreted to mean that the higher the average scores the greater the resource loss.
    - Commercial fishing
    - Adequate income
    - Savings or emergency money
    - Retirement Security
    - Prince William Sound natural resources
2. **Intrinsic Resource Loss scale** (Cronbach's alpha=.85). The specific survey items that comprised this scale are listed below. Gains or losses measured using the same scale described previously.
        - Family stability.
        - Motivation to get things done.
        - Feeling of personal success.
        - Feeling valuable to others.
        - Feeling that your life has meaning or purpose.

3. **Litigation Disruption scale** (Cronbach's alpha=.73). The scale items are listed below:

- "The litigation process continues to be a source of stress to me and my family."
- The litigation associated with the oil spill has caused me to have unpleasant memories of the event."
- "I have spent too much time with lawyers working on oil spill litigation."

Results

Table 3 presents a demographic overview of survey respondents. The vast majority of those interviewed were White (80.8 percent) with less than 10 percent of respondents identifying themselves as Alaska Native or "Other." Slightly more than half reported that they were single and male. Nearly the entire sample (97.2 percent) had at least a high school diploma and approximately 41 percent of those surveyed were involved with fishing as an occupation. The average age was approximately 50 years and the average number of years that respondents had lived in Cordova reveals a pattern of community stability (25.9 years).

Table 3. Demographic Characteristics of Cordova Residents, 17 Years Post-*EVOS*.

	FREQUENCY	**PERCENT**
Race/Ethnicity		
White	290	80.8
Alaska Native	35	9.7
Other	34	9.5
Marital Status		
Single	192	53.2
Married	169	46.8
Gender		
Female	168	45.2
Male	204	54.8
Education		

Some high school	10	2.8
High school	81	22.6
Some college/Associate's degree	147	41.1
Bachelor's degree more	120	33.5
Fishing as an occupation	147	40.7
Age	372	*Average* 49.4
Years lived in Cordova	372	*Average* 25.9

Table 4 presents community attitudes of Cordova residents, 17 years after the *EVOS*. Approximately 80 percent of survey respondents felt that the residents of Cordova had changed since the spill, but the vast majority maintained that the Cordova community had just about everything needed for a happy life (59.4 percent) and that is was a good place to raise children (94.3 percent). However, Cordova residents also reported that the spill had resulted in serious financial problems for a lot of people in the community (79.2 percent). These results suggest that the vast majority of residents in Cordova believe that the 1989 oil spill resulted in significant changes in their small fishing community. These changes occurred because of negative economic impacts. The fact the Prince Williams Sound Herring Fishery has been closed 11 out of the last 17 years due to the spill confirms significant economic impacts for commercial fishers in Cordova (EVOSTC 2006). Nonetheless, the results in Table 4 also reveal that internal community values, that is, believing the community is "a good place to raise children" and has social qualities for "leading a happy life," are still remain strong and are shared by the majority of residents.

Table 4. Attitudes of Cordova Residents about Their Community, 17 Years Post-*EVOS.*

	STRONGLY AGREE	**AGREE**	**NEITHER**	**DISAGREE**	**STRONGLY DISAGREE**
People in Cordova are basically the same as they were before the spill.[1]	2.1	10.9	6.7	44.5	35.8
Cordova has just about everything that is needed for a happy life.[2]	11.3	48.1	7.1	23.9	9.6
Cordova is a good place to raise children.[3]	44.6	49.7	1.1	4.0	0.5
A lot of people in Cordova have serious financial	34.9	45.2	6.5	10.8	2.6

problems because of EVOS.[4]					

[1]n=330; [2]n=364; [3] n=372; [4] n=352

Other indicators of the community impacts of the *EVOS* reveal continuing deleterious social and economic consequences (see Table 5). Nearly two-thirds (63.6 percent) believe that the community is more fragmented since the *EVOS* and 9 out of 10 residents state that the "local economy had gotten worse." However, approximately half of those interviewed did feel that there had been some recovery from the effects of the *EVOS* by community residents. Nonetheless, chronic years following negative community impacts still linger in the Cordova community, seventeen years following the spill.

Table 5. Perceptions of Cordova Residents of the Community Effects of *EVOS*, 2006.

	FREQUENCY	**PERCENT**
More fragmented as a community	192	63.6
Local economy has gotten worse	308	90.3
Residents of Cordova somewhat or completely recovered from the effects of the *EVOS*	193	53.4

Table 6 presents involvement by Cordova residents and their families in the litigation process associated with the *EVOS.* Approximately 38 percent of those interviewed were pursuing legal action against Exxon and 43 percent reported some family involvement in the litigation process. Of those individuals involved in litigation against Exxon, most (71 percent) expected to receive money when the case is resolved.

Table 6. Involvement of Cordova Residents in the *EVOS* Litigation, 2006.

	FREQUENCY	PERCENT
Personal involvement in the litigation	140	37.6
Family involvement in the litigation	159	42.7
Both personal and family involvement in the litigation	106	37.2
Expect to receive any money when the case is resolved	125	70.6

In terms of litigation stress, approximately half of the respondents reported the main source of stress for litigants was the amount of time spent working with lawyers on the oil spill litigation (see Table 7). Less than 30 percent stated that the litigation process was a continued source of stress for them and their families and that the litigation associated with the oil spill resulted in unpleasant memories of this event (23 percent and 28 percent, respectively). Approximately 55 percent of the respondents indicated that they were "rarely bothered" by the oil spill litigation, suggesting some relief for a slight majority of community residents from the chronic disruptions caused by legal deliberations.

Table 7. Cordova Residents Attitudes toward the *EVOS* Litigation Process, 2006.

	STRONGLY AGREE	AGREE	NEITHER	DISAGREE	STRONGLY DISAGREE
The litigation process continues to be a source of stress to me and my family.[1]	10.7	12.4	34.6	36.6	5.7
The litigation associated with the oil spill has caused me to have unpleasant memories of the event.[2]	14.4	13.7	35.1	32.3	4.5
I have spent too much time with lawyers working on oil spill litigation.[3]	32.7	17.6	18.0	13.7	18.0
I am rarely ever bothered by the oil spill litigation.[4]	15.5	39.7	10.3	28.3	6.2

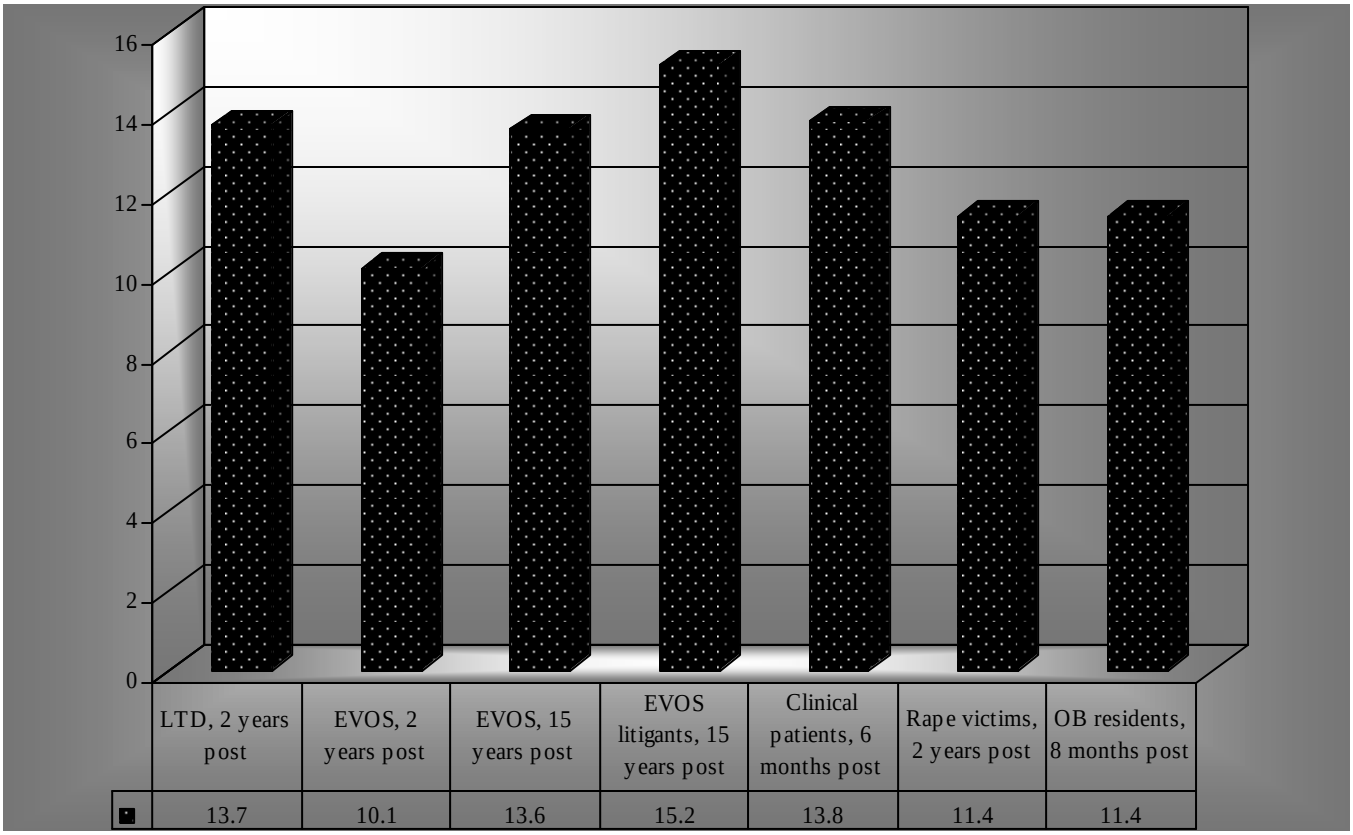
[1]n=298; [2]n=291; [3] n=278; [4] n=290

Spill-Related Psychological Stress

Over the years, patterns of social disruption and psychological stress have been documented for commercial fishers and Alaska Natives residing in Cordova (Picou *et. al* 1992; Dyer *et. al* 1993; Picou and Gill 2000; Arata *et al.* 2000; Picou *et. al* 2004). Figure 2presents a comparison of event-related intrusive stress for individuals who have experienced a traumatic event. As indicated by the findings presented in this figure, the level of stress experienced by Cordova litigants is still quite high, despite the fact that it has been 17 years since the original event. This level of stress is comparable to victims of the Livingston, Louisiana train derailment and toxic event, two years after the disaster, and clinical patients, six months post the death of a close relative, and Alabama Coastal residents 8 months following the devastation and impacts produced by Hurricane Ivan.[3] Interestingly, the level of stress experienced by EVOS litigants is the highest reported in this figure, indicating that not only was the event a source of stress of respondents, but, most important, the litigation process itself is also a source of stress for victims of this disaster, creating a chronic secondary disaster that continues to revictimize survivors (Marshall *et al.* 2000; Picou *et. al* 2004).

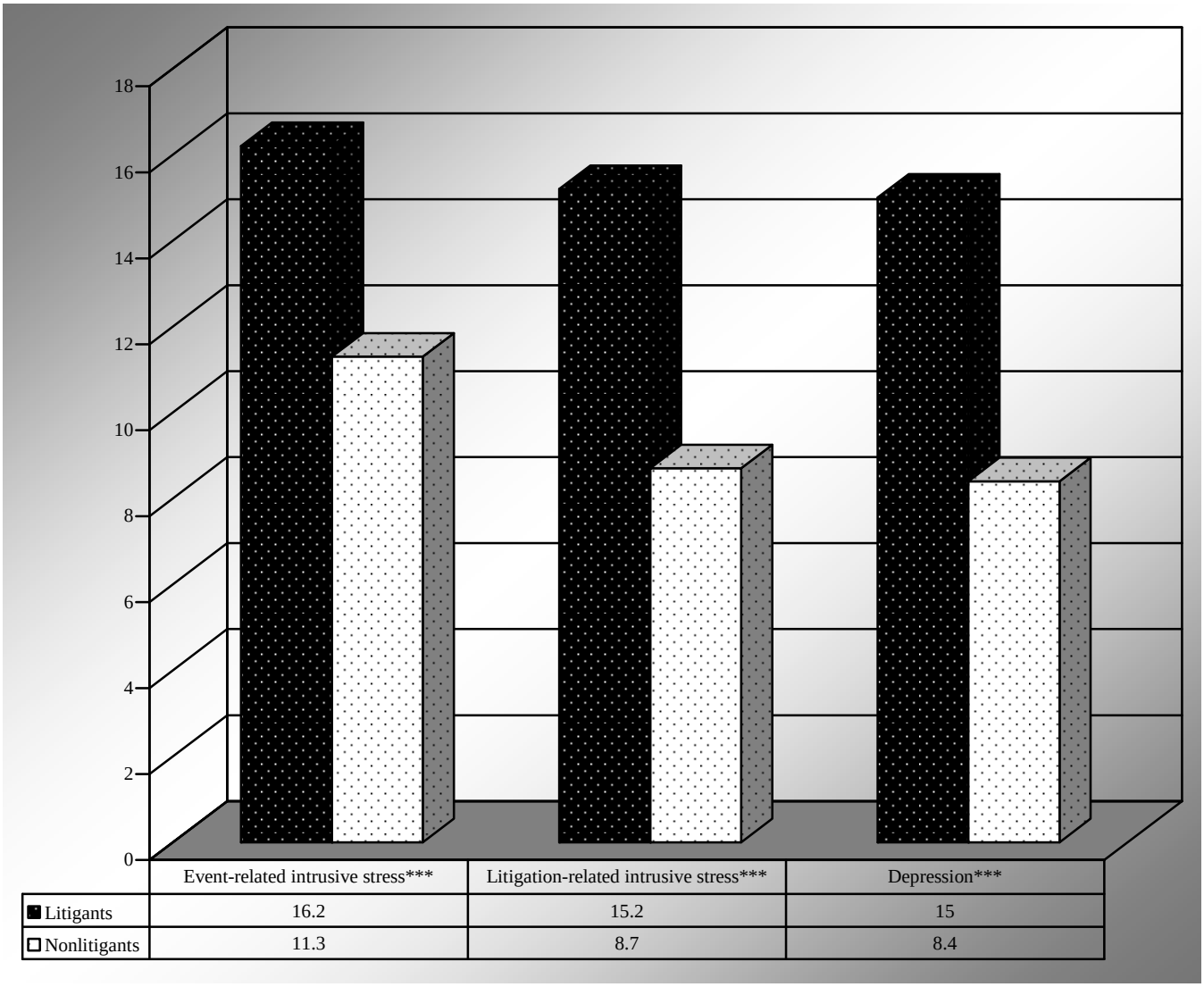
[3] Stress-levels were retrieved from Picou and Gill (2000) and Picou and Martin (2007).

Figure2. Comparisons of Event-Related Intrusive Stress Scores for Victims of the LTD and *EVOS*, 2 and 17 Years Post, EVOS Litigants, 17 Years Post, Clinical Patients, 6 Months Post Death and Hurricane Ivan Victims, Orange Beach Residents, 8 Months Post.



Tuning to Figure 3 we provide a comparison between litigants and nonlitigants in terms of event-related (oil spill) stress, litigation-related stress and depression. Litigants had the highest levels of stress and depression with means of 16.2 for event-related intrusive stress, 15.2 for litigation-related stress and 15.0 for depression as compared to 11.3, 8.7 and 8.4, respectively, for nonlitigants. All contrasts were statistically significant, clearly revealing that litigants in the Cordova community disproportionately are characterized by chronic psychological stress and depression.

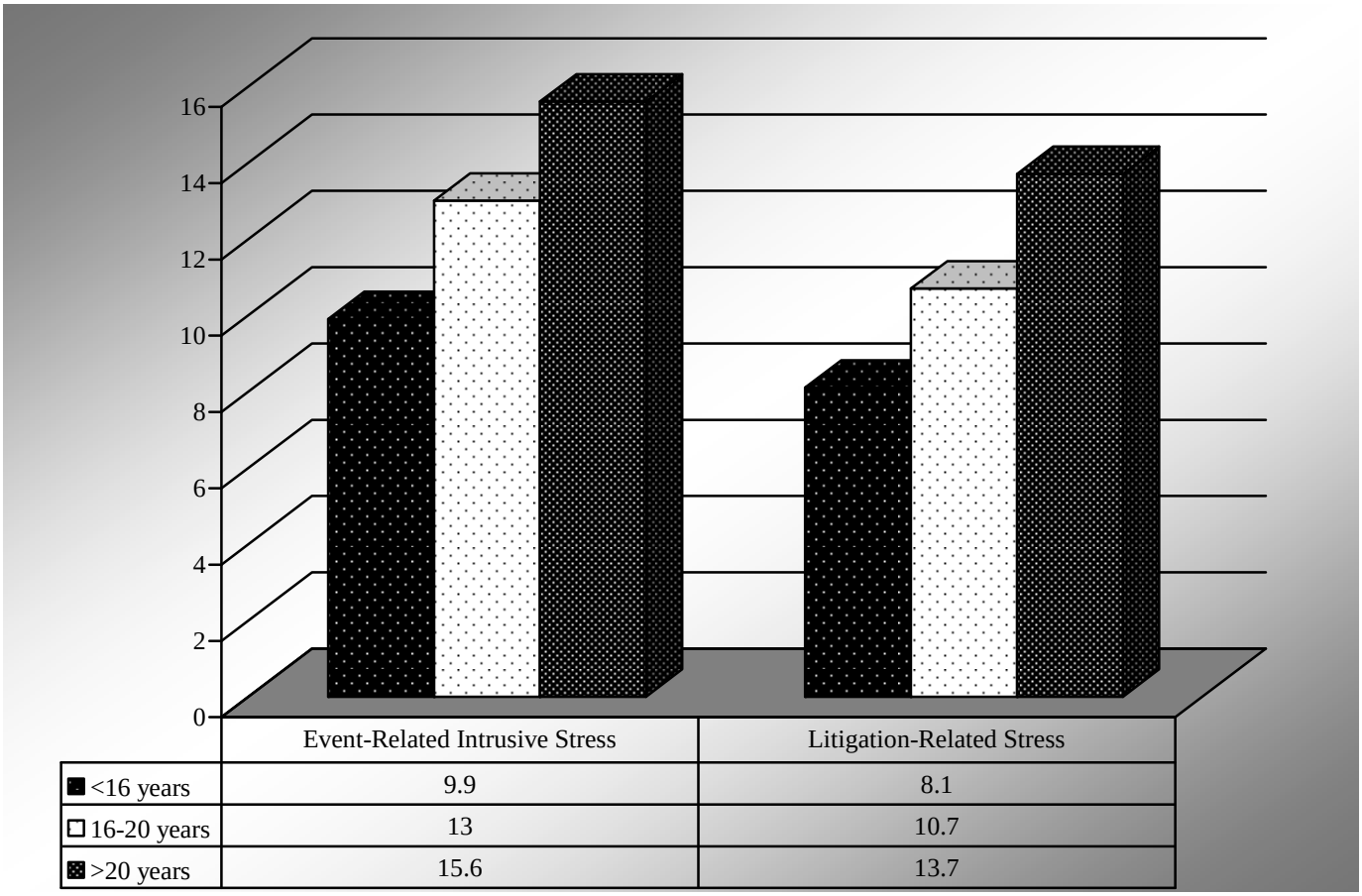
Figure 3. Comparisons of Event-Related Intrusive Stress, Litigation-Related Stress and Depression Scores for *EVOS* Litigants and Nonlitigants, 17 Years Post Event.



Event-related intrusive stress n=276; Litigation-related intrusive stress n= 273; Depression n=279; ***p<.001

Figure 4 reveals that as years residing in the community increases, so does spill-related intrusive stress and litigation-related stress. For respondents who were not community residents at the time of the EVOS, their mean level of event-related stress was significantly lower than people who have resided in Cordova since the spill. A clear linear increase can also be observed in Figure 3 for years residing in the community and oil-spill stress levels and litigation stress levels. This pattern suggests that a decrease in the collective stress levels in Cordova is invariably related to not being a resident of the community when the *EVOS* occurred and not being involved in the lingering litigation from the spill. Nonetheless, post-spill residents did experience some stress due to the lingering effects of the spill and the litigation suggesting that patterns of disruption and conflict also characterized residents who were not directly impacted.

Figure 4. Comparisons of Event-Related Intrusive Stress and Litigation-Related Stress for Cordova Residents by Length of Residency, 17 Years Post Event.*



	Event-Related Intrusive Stress	Litigation-Related Stress
<16 years	9.9	8.1
16-20 years	13	10.7
>20 years	15.6	13.7

*Event-related intrusive stress n=271; Litigation-related intrusive stress n= 269; Significant differences at .05 level were found between Event-Related Intrusive Stress and Litigation-related Stress Scores for those residing in Cordova less than 16 years and greater than 20 years.

Table 8 presents information on residents' trust in social institutions and local community organizations. Research has clearly revealed that, over time, technological disasters cause victims to distrust those responsible for protecting and responding to the disaster (Freudenburg 1997). Respondents were asked to rate their level of trust in various social institutions, as well as community organizations, friends and relatives using a scale from one to five where "one" is no trust at all to "five" which is a indicates great deal of trust. Social institutions and other community members were also ranked by level of trust. The top three social institutions who were least trusted were the federal government, with approximately 40 percent stating that they had no trust at all in this institution, the Alaska Pipeline Service Company, with 27.8 percent reporting no trust at all and the state government with slightly less that a fourth reporting no trust. Relatives and friends received the highest endorsements of trust with 76.6 percent and 61.8 percent, indicating that they trusted these people.

Table 8. Percent of Respondents' Trust in Social Institutions and Other Community Residents, 17 Years Post-*EVOS*.

	1	**2**	**3**	**4**	**5**	**LEAST TRUST RANK**	**MOST TRUST RANK**
Local government	8.2	15.0	32.1	31.1	13.7	7	7
State government	22.8	27.7	37.0	9.8	2.7	2	11
Federal government	39.7	25.5	23.9	9.2	1.6	1	12
CDFU	4.3	4.6	21.8	33.6	35.7	10	3
Eyak Village	8.7	12.9	27.5	27.5	23.3	8	5
Friends	2.7	0.3	9.1	26.0	61.8	12	2
Relatives	3.2	0.9	7.2	12.2	76.6	11	1
SAMHC	14.4	10.0	31.0	22.3	22.3	5	8
Medical facilities	12.8	13.5	28.4	29.8	15.6	6	6
School board	5.4	10.0	28.6	36.8	19.3	9	4
AK Pipeline Service Company	27.8	19.5	35.3	13.3	4.1	4	10
EVOS Trustee Council	31.1	18.3	30.0	15.2	5.4	3	9

1=No trust at all; 3=neutral; 5=great deal of trust

Resource loss was analyzed in terms of on litigant status and the length of time the respondent has resided in the community (Table 9). Extrinsic resources includes gains or losses in terms of commercial fishing, income, savings or emergency, retirement security, Prince William Sound and feelings of personal success, while intrinsic resources includes gains or losses in terms of a good marital/partner, family stability, motivation to get things done, feeling valuable to others and feeling that your life has meaning or purpose. As shown in Table 9, litigants have experienced a statistically significant higher level of resource loss. Furthermore, community residents who lived in Cordova prior to the EVOS have also experienced both a greater extrinsic and intrinsic resource loss.

Table 9. Comparisons of Extrinsic and Intrinsic Resource Loss for Litigants and Nonlitigants and Cordova Residents by Years a Community Resident.

	EXTRINSIC RESOURCE LOSS	**INTRINSIC RESOURCE LOSS**
Litigant	22.1* (n=111)	15.2 (n=119)
Nonlitigant	21.0 (n=124)	14.8 (n=128)
Years Community Resident		
<16 years	20.3* (n=72)	14.1* (n=79)
16-20 years	21.0 (n=31)	15.7 (n=30)
>20 years	22.2* (n=128)	15.3* (n=132)

*p<.05

Multiple regression models were calculated for both spill-related psychological stress and litigation-related psychological stress. The results of the calculations for the former are presented in Table 10. The model explained 46 percent of the variance in event-related psychological stress with four predictor variables being statistically significant. Extrinsic resource-loss (B=.17), depression (B=.20), age B= (.14) and litigation disruption (B=.41) were found to predict spill-related stress. Residents who had income, fishing and other economic-related losses had higher levels of stress. Older residents and those who were disrupted by litigation activities also manifested high-stress levels. The strongest predictor of spill-related

stress was litigation disruption. These results further document the role of litigation as a chronic secondary stressor for the victims of the *EVOS*.

Table 10. Multiple Regression Analysis for *EVOS*-Related Psychological Stress.

	B	**Std. Error**	**Beta**	**t**
(Constant)	-13.73	4.42		-3.11**
Extrinsic loss	.37	.16	.17	2.29*
Intrinsic loss	-.19	.18	-.08	-1.10
Depression	.12	.04	.20	3.00**
Age	.10	.05	.14	2.00*
Education	-.14	.38	-.02	-.36
Litigant	.79	1.26	.04	.63
Fishing-related occupation	.50	1.25	.03	.40
Years lived in Cordova	.06	.04	.13	1.70
Litigation disruption	1.26	.21	.41	6.00***

*<.05; **<.01; ***<.001; R^2 =.46

Only two predictor variables were found to be statistically significant for litigation stress. Depression (B=.298) and litigation disruption (B=.376) were both found to be rather strong predictors of litigation stress. These variables accounted for 48 percent of the variance in psychological stress associated with the litigation. The results from the regression analysis revealed some interesting shifts in patterns of psychological stress over time. Previous research found that commercial fishers were characterized by high-levels of psychological stress and depression (Picou *et. al* 1992; Picou and Gill, 1996; Arata *et. al* 2000), and that litigant's status was associated with high stress-levels (Picou *et. al* 2004; Marshall *et al.* 2004). Neither of these variables was found to be significant predictors in 2006. Litigation disruption, which measures personal cognitive and behavioral distractions caused legal issues, was the single strongest predictor of both types of psychological stress. However, age, that is, older respondents and extrinsic resource-loss, measured in terms of economically-relevant losses, predicted the chronic levels of litigation-related psychological stress.

Table 11. Multiple Regression Analysis for Litigation-Related Psychological Stress, 2006.

	B	Std. Error	Beta	t
(Constant)	-9.572	4.374		-2.19*
Extrinsic loss	.203	.162	.092	1.25
Intrinsic loss	-.008	.177	-.003	-.05
Depression	.188	.040	.298	4.69***
Age	.082	.050	.109	1.65
Education	-.028	.378	-.004	-.08
Litigant	-1.147	1.264	-.061	-.91
Fishing-related occupation	-.213	1.238	-.011	-.17
Years lived in Cordova	.027	.037	.054	.73
Litigation disruption	1.188	.212	.376	5.61***

*<.05; ***<.001; R^2 =.48

Because personal depression was found to be a significant predictor of spill-related and litigation-related psychological stress, a regression model was calculated for this variable. Table 12 reveals that both intrinsic and extrinsic resource-loss, gender and being a litigant were all found to be statistically significant predictors of depression. The resource-loss variables were the strongest predictors, followed by litigant status and gender. Unlike previous models, females were more depressed than males, suggesting a long-term impact of the *EVOS* that disproportionately affected women in the Cordova community.

Table 12. Multiple Regression Analysis for Depression, 2006.

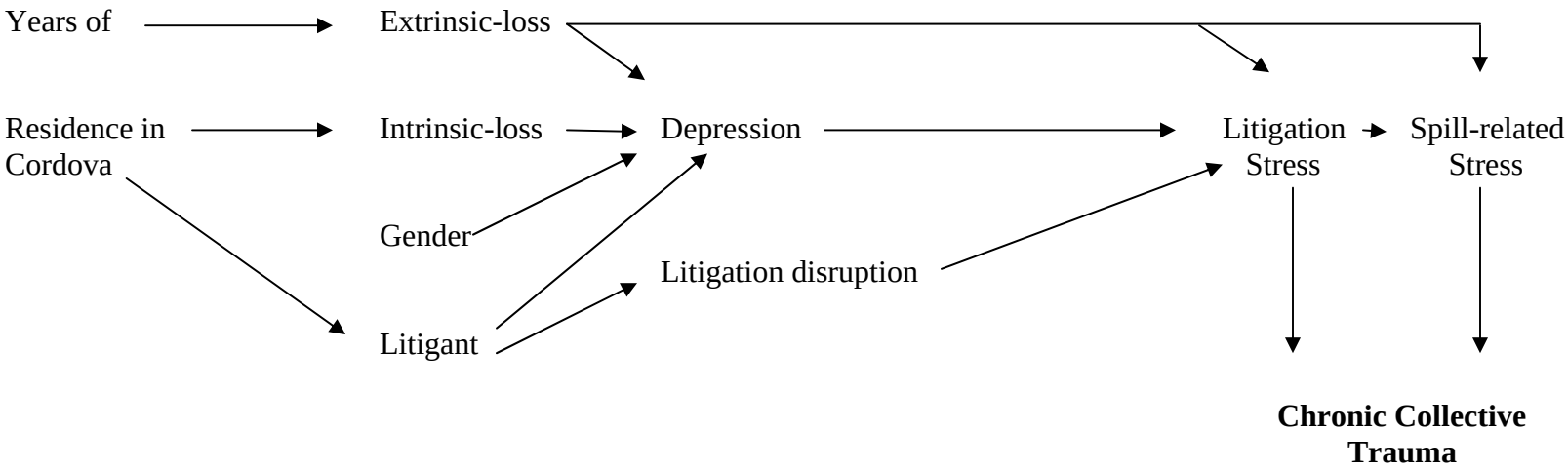
	B	Std. Error	Beta	t
(Constant)	-6.439	8.20		-.79
Extrinsic loss	.957	.263	.277	3.64***
Intrinsic loss	1.097	.314	.258	3.49***
Gender	4.082	1.89	-.138	-2.16*
Education	-.516	.67	-.052	-.77
Years lived in Cordova	-.029	.07	-.036	-.43
Age	.032	.09	.027	.36
Litigant	-6.649	2.17	-.224	-3.06*

*<.05; ***<.001; R^2 =.28

The results of the data analysis provide a basis for constructing a plausible theoretical model of chronic stress and disruption that explains the dynamics of the lack of timely community recovery for technological disasters, in genera, and the EVOS, in particular. Figure 5 presents a diagram that establishes causal links for this model. Over time, residents of the Cordova community have suffered significant resource-losses, both economically and socially, and because of their residency in the community at the time of the spill, long-term residents were more likely to become directly involved in the litigation.

The loss of physical and economic capital (extrinsic) and social capital (intrinsic) provided multiple sources for the emergence of severe depression among residents. Ongoing economic loss-spirals associated with commercial fishing failures, but also impacting many fishing-related occupations, facilitated these patterns of depression (Arata *et. al* 2000). The loss of social capital in the community resulted in interpersonal conflict and the emergence of a "corrosive community," characterized by social isolation, loss of trust and a lack of residents' participation in civic activities (Arata *et. al* 2000; Picou and Gill 2000; Picou *et al.* 2004). Accordingly, females were disproportionately more depressed because of these trends than males.

Figure 5. Summary Theoretical Model for Chronic Stress for the *EVOS*.



Litigant status provided the avenue for the perpetuation of social depression and community disruption through time. As economic resources continued to decline and residents continued to invest in commercial fishing, their businesses, and their families, without any significant economic gains, the litigation became a dominant secondary stressor (Arata *et al.* 2000; Picou *et al.* 2004; Marshall *et al.* 2004). This trend continues to the present.

The litigation resulted in constant anger and dismay for plaintiffs who, over-time, loss trust in the government and the legal system. The chronic collective trauma that has continued in the Cordova community was initiated by the economic harm originally engendered by the *EVOS*, but most important, perpetuated by fourteen years of mindless and frivolous legal appeals by the corporation responsible for the spill—Exxon (Marshall *et al.* 2004).

Although, over the years, the Cordova community has demonstrated resilience, lingering social impacts of the *EVOS* are readily apparent. Despite this lack of community recovery, Cordovans have increasingly embraced an awareness of the importance of their local ecology in terms of attitudes that reflect the "New Environmental Paradigm" (Marshall *et al.* 2005). Furthermore, the Native Village of Eyak, located in the Cordova community, has become a culturally-committed collectivity that has steadily increased village participation in the revitalization of their Alutiq and Eyak heritage (Picou 2000). Nonetheless, until the litigation is resolved, a significant portion of the Cordova community will still be characterized by chronic collective trauma.

Conclusions

The *EVOS* was the largest and most ecologically destructive technological disasters in the history of North America. Unlike other technological disasters, empirical research from 1989 to 2006 has documented a continuing legacy of severe economic, cultural, social and psychological

impacts. These impacts have focused on extremely vulnerable RRCs in isolated regions of Southcentral Alaska, that is, Prince William Sound. These resource-dependent fishing communities and Alaska Native villages are characterized by simple economies, which are highly dependent on commercial fishing and subsistence harvests. The *EVOS* directly threatened the long-term survival of these communities.

The results of our analysis clearly reveals a shifting pattern of community impacts. Initially, the source of stress, disruption and anger was located in the occupational structure of impact community, i.e., Cordova. Commercial fishers were disproportionately distressed (Picou *et al*. 1992; Arata *et al*. 2000). However, over time, survivors of the spill have experienced a shift in the source of disruption and stress from the spill to the litigation. That is, as hypothesized by seminal research on technological disasters, chronic secondary disasters emerge over time, "where an initial acute shock becomes a chronic condition, a way of keeping dead moments alive" (Erikson 1994:22). Specifically, in the case of the *EVOS*, being a litigant redefined one's social status in the community. This new status predisposed one to distractions and disruptions that regularly involved dealing with attorneys and legal appeals filed by the "principle responsible party," i.e., Exxon Corporation.

Over time, continued resource losses were experienced by litigants, and although many tried to reinvest in other economic activities, the lack of a timely resolution of the 1994 trial verdict has resulted in continued collective trauma and psychological stress (Arata *et al*. 2000). Part of this process of chronic collective trauma involves the emergence of severe levels of depression associated with litigation stress. The inability of the legal system to produce a timely resolution to damages experienced by survivors of the *EVOS* has actually resulted in a secondary disaster which may be more significant than the *EVOS*. The potential for the continuation and

expansion of these negative social impacts has been documented by recent ethnographic studies in the Cordova community (Ritchie 2004; Gill 2007). The possibility for a significant loss of population for Cordova is highly likely when the litigation is finally resolved (Gill 2007). Such out-migration patterns would seriously threaten the viability and sustainability of this small fishing community.

A resolution to the litigation appears to be possible by late 2008. However, even with the punitive damage reduction to 2.5 billion dollars, the rapid distribution of money to residents throughout Prince William Sound and, in particular, Cordova, may result in another secondary disaster, i.e., a "money spill," with similarities to the original oil spill. In 1989, various amounts of money went to selected residents in Cordova, resulting in community conflict and the initiation of the "corrosive community" (Picou *et al.* 2004). In 2008, the distribution of large sums of money (25,000 to one million dollars) to individuals who are characterized by chronic collective trauma may actually threaten the survival of fishing communities and Native Villages more than the original disaster.

Future research should document the impacts of the distribution of the punitive damage awards to the residents of Cordova and other communities in Prince William Sound. As noted above, one possible outcome would be a massive out-migration of residents to other communities. For example, damage payments to commercial fishers will not result in a vibrant and productive herring fishery. Furthermore, the distribution of damage payments will be subject to taxes, payments of debts incurred over the years, and many other types of chronic resource loss experienced by spill survivors. As noted in this report, RRCs are small, vulnerable social entities that are highly dependent on linkages to the biophysical environment. These relationships have been under severe strain since 1989. The social impacts of the distribution of

punitive damage payments to such communities in the future may be the ultimate threat to the survival of RRCs impacted by the *EVOS*.

To counter some of these potential impacts to RRCs, the Oiled Regions of Alaska Foundation (ORA) was formed to benefit communities and regions that were directly impacted by the Exxon Valdez oil spill of March 1989 (http://www.orafoundation.org/page.cfm?pgId=49) ORA holds education workshops which provide litigation update and financial planning workshop relating to the *EVOS* and the impending settlement. This program "...consists of workshops and forums: presenters cover the status of the case, tax considerations for potential awards, financial planning, estate planning and charitable giving, along with a community-wide discussion about how individuals and organizations can become involved in and benefit from ORA Foundation involvement" (www.orafoundation.org/). Future research should evaluate the effectiveness of these types of programs for facilitating recovery for survivors and communities in the EVOS impact area.

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Appendix A

Impact of Events Scale: Intrusive Stress

I thought about EVOS when I didn't want to.

Pictures about EVOS popped into my mind.

Other things kept making me think about EVOS.

I had trouble falling asleep or staying asleep because of EVOS.

I had waves of strong feelings about EVOS.

I had dreams about EVOS.

Any reminder brought back feelings about EVOS.

Impact of Events Scale: Stress

I thought about litigation stress when I didn't want to.

Pictures about I litigation stress popped into my mind.

Other things kept making me think about litigation stress.

I had trouble falling asleep or staying asleep because of litigation stress

I had waves of strong feelings about litigation stress.

I had dreams about litigation stress.

Any reminder brought back feelings about litigation stress.

Depression Scale

I felt that I could not get rid of the blues.

I had trouble keeping my mind on what I was doing.

Everything that I did took a great effort.

I felt sad.

I felt that I could not get going.

I lost my appetite.

I had trouble falling asleep or staying awake.

I felt lonely.

I was bothered by things that usually do not irritate me.

I felt that my life was a failure.