The Extractive Industries and Society xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

The Extractive Industries and Society

journal homepage: www.elsevier.com/locate/exis

Review article

Sociocultural and psychosocial impacts of the exxon valdez oil spill: Twenty-four years of research in Cordova, Alaska

Duane A. Gill[a,*], Liesel A. Ritchie[b], J. Steven Picou[c]

[a] Oklahoma State University, Department of Sociology, 431 Murray, Stillwater, OK 74078, USA
[b] University of Colorado, Natural Hazards Center, 483 UCB, Boulder, CO 80309-0483, USA
[c] University of South Alabama, Department of Sociology, University of South Alabama, Mobile, AL 36688, USA

ARTICLE INFO

Article history:
Received 20 June 2016
Received in revised form 13 September 2016
Accepted 13 September 2016
Available online xxx

ABSTRACT

This article documents 24 years of social science research on sociocultural and psychosocial impacts of the *Exxon Valdez* oil spill (EVOS) on the community of Cordova, Alaska. This study began in August 1989 and officially ended in 2013—making it the longest running study of a technological disaster in U.S. history. We followed a longitudinal field experiment design using Petersburg, Alaska as a control community. Our research utilized a mixed-methods approach that included document review, observations, interviews, and surveys. Serial cross-sectional community surveys were used and we developed a panel design for surveys of commercial fishermen and Alaska Natives. Inquiries into sociocultural and psychosocial impacts of the EVOS were guided by theories and concepts emerging from studies of numerous technological disaster events. These included ecological symbolic theory; renewable resource community; conservation of resources theory; recreancy; corrosive community; individual, collective, and secondary trauma; lifestyle and lifescape change; social capital theory; and contextual constructivist approaches to risk. Results focus on four areas: event-related psychosocial stress as measured by the Impact of Event Scale; litigation impacts; resource loss; and beliefs about recreancy. Findings document acute and chronic psychosocial stress within the community and identify involvement in litigation, resource loss, and perceptions of recreancy as significant contributors to high levels of stress. Further, the loss of the herring fishery has had adverse economic and sociocultural effects on Cordova that may persist.

Contents

1. Introduction . . . 00
   1.1. Documented community impacts . . . 00
   1.2. Summary . . . 00
2. Theories and concepts . . . 00
3. Methods . . . 00
4. Results . . . 00
   4.1. EVOS-Related psychosocial stress . . . 00
   4.2. Litigation impacts . . . 00
   4.3. Resource loss . . . 00
   4.4. Recreancy . . . 00
5. Summary . . . 00
6. Conclusions . . . 00
   Acknowledgements . . . 00
   References . . . 00

* Corresponding author.
E-mail addresses: duane.gill@okstate.edu, duane_a_gill@hotmail.com (D.A. Gill), liesel.ritchie@colorado.edu (L.A. Ritchie).

http://dx.doi.org/10.1016/j.exis.2016.09.004
2214-790X/

1. Introduction

In March 1989 the *Exxon Valdez* ran aground in Prince William Sound, Alaska releasing an estimated 11 to 33 million gallons of crude oil. "The accident occurred after the tanker's captain, Joseph Hazelwood—who had a history of alcohol abuse and whose blood still had a high alcohol level 11 h after the spill—inexplicably exited the bridge, leaving a tricky course correction to unlicensed subordinates" (Exxon v. Baker, 2008:Syllabus p.1). Alyeska Pipeline Service Corporation (Alyeska) was responsible for spill response, but it lacked capacity, allowing the oil to spread across more than 44,000 square kilometers of waters and 1900 kilometers of rugged coastline (Spies et al., 1996; see also, http://www.evostc.state.ak.us). Controversial cleanup techniques exacerbated ecological damages and subsequent ecosystem impacts were so severe that 25 years later, only 14 out of 26 injured species had fully recovered and four species were listed as not recovering (EVOSTC, 2014). Among those species not recovering is Pacific herring—the population crashed in 1993 and had not recovered as of 2016.

The *Exxon Valdez* oil spill (EVOS) unleashed disastrous impacts on local communities, especially those with cultural, social, and economic ties to renewable resources damaged or threatened by the oil and cleanup. Cordova, Alaska, a commercial fishing community with a subsistence heritage rooted in Alaska Native culture, became 'ground zero' for EVOS-related social impacts (Gill, 1994; Picou and Gill, 1996, 1997). Located at the southeastern edge of Prince William Sound, the community is geographically isolated by mountains, glaciers, and the sea, but strategically located for fishing in the Sound and the Copper River Delta.

Prior to the spill, the year-round population of Cordova was about 2500, but it nearly doubled during the March to September commercial fishing season. Commercial fishing dominated the local economy. The community was home to the region's largest fishing fleet and hosted canneries and numerous supporting businesses. Cordova was a remarkably resilient community, rich in many forms of capital—natural, cultural, social, human, and political. Local organizations such as the Cordova District Fishermen United and Prince William Sound Aquaculture Corporation were instrumental in developing and constructing a hatchery system. They also worked with the State to co-manage fishery resources for economic gain and sustainability (see Gill, 1994). Moreover, these organizations and Cordova as a community were at the forefront of a legal and political battle to keep the Trans-Alaska Pipeline System (TAPS) out of Valdez, in efforts to avoid the need for tanker traffic through the Sound (see Clarke, 1997; Gill, 1994; Gramling and Freudenburg, 1997). These activities were indicative of high levels of social capital (Ritchie, 2004; Ritchie and Gill, 2011).

1.1. Documented community impacts

The massive EVOS cleanup effort attracted more than 15,000 workers to the region, creating a boomtown effect in Valdez and to a lesser extent, Cordova (see Bushell and Jones, 2009; Piper, 1993). Both communities saw sharp increases in population, accompanied by housing and lodging shortages, excessive demands for services, and increases in crime (Endter-Wada et al., 1993; Impact Assessment, Inc., 1990, 1998; Rodin et al., 1992). Employment opportunities associated with the cleanup led some locals to quit their regular jobs, which disrupted the local labor force and caused adverse effects on local businesses and government agencies (Cohen, 1995, 1997; Endter-Wada et al., 1993; Impact Assessment, Inc., 1990, 1998).

The broader economic impacts were shocking. Prior to the spill, Cordova's $12 million herring industry accounted for almost one-third of the local economy and helped place it in the top ten most profitable seafood ports in the U.S. After the herring fishery collapse in 1993, Cordova's rank dropped to 54th place and did not regain top ten status until 2008 and 2010 (NOAA nd). A Prince William Sound herring permit valued at $245,000 in 1989 was valued at just $9800 in 2008 (https://www.cfec.state.ak.us/pmtvalue/X_G01E.HTM). As other fisheries struggled to recover, jobs vanished, businesses and individuals declared bankruptcy, and the community lost valuable tax revenues.

Communities like Cordova experienced high levels of social disruption and collective stress, as well as strained relationships and diminished social capital (Arata et al., 2000; Endter-Wada et al., 1993; Gill and Picou, 1998; Impact Assessment, Inc., 1990; Picou and Arata, 1997; Picou et al., 1992; Ritchie, 2004; Ritchie and Gill, 2007). Researchers documented increases in social conflict, particularly between locals versus newcomers and those who worked on the cleanup versus those who did not (Endter-Wada et al., 1993; Rodin et al., 1992).

Local communities experienced adverse psychosocial impacts such as increased drug and alcohol use and domestic abuse (Impact Assessment, Inc., 1990); increased levels of depression, anxiety, and PTSD (Gill and Picou, 1998; Impact Assessment, Inc., 1990; Palinkas et al., 1992, 1993a, 1993b; Picou et al., 1992); the use of avoidance coping strategies (Endter-Wada et al., 1993); and feelings of helplessness, betrayal, and anger (Picou et al., 1992). Children, particularly those left unattended or with strangers during the cleanup, were likely to express fears of being left alone, experience declines in academic performance, and have difficulties relating to others (Impact Assessment, Inc., 1990, 1998; Rodin et al., 1992). Commercial fishermen and Alaska Natives had greater levels of adverse psychosocial impacts compared to other groups (Gill and Picou, 1997, 1998, 2001; Impact Assessment, Inc., 1990; Picou and Gill, 1996, 1997).

Alaska Natives in Cordova experienced declines in obtaining, giving, and receiving traditional foods and resources (Fall and Field, 1996; Gill and Picou, 1997, 2001), which disrupted traditional ways of life (Dyer 1993; Dyer et al., 1992; Endter-Wada et al., 1993; Fall and Utermohle, 1995; Ritchie and Gill, 2010a; Rodin et al., 1992). More broadly, spiritual ties to the environment, a sense of place and feeling safe, exchange relationships, sharing harvested resources, and traditional reliance on harvesting renewable resources were diminished (Endter-Wada et al., 1993; Impact Assessment, Inc., 1990; Ritchie, 2004).

Litigation became a prominent part of the *Exxon Valdez* disaster and it became a primary factor in chronic sociocultural disruption and psychosocial stress. The State of Alaska and U.S. Government negotiated a settlement with Exxon for approximately $900 million in criminal and civil fines in 1991. The *Exxon Valdez* Oil Spill Trustee Council (EVOSTC) was established to oversee these funds, which were primarily dedicated to ecosystem recovery, restoration, and monitoring. Class-action litigation, however, took much longer to resolve.

The class action consisted of almost 33,000 plaintiffs including local governments, Alaska Native Corporations, business owners, commercial fishermen, deckhands, cannery workers, and land owners. More than one-third of Cordova households had a member involved in litigation. The case was heard in Alaska's Federal District Court in 1994 where a jury found Exxon negligent and awarded compensatory damages of $287 million and punitive damages of $5 billion. Exxon appealed the decision and the case bounced back and forth between the Ninth Circuit Court of Appeals and Federal District Court for 14 years until it was taken up by the U.S. Supreme Court. Issuing its ruling in June 2008, the Court upheld a lower court ruling that Exxon was liable, but it reduced the punitive damage award to $507 million—a one-to-one ratio to 'actual' damages. Almost 20 years after the *Exxon Valdez* ran aground, damage awards began to be disbursed in late 2008 and

most plaintiffs had received their damage awards by December 2009 (see Gill et al., 2015).

Although many Alaskan communities experienced adverse effects from the oil spill, Cordova bore the brunt of them. Throughout the economic boom of the 1990s, most Alaskan communities thrived while Cordova struggled to survive. Within the community, out-migration, business closings, bankruptcies, and low tax revenues became the norm (Gill, 2008; Picou, 2009a; Ritchie, 2004). Delayed justice combined with slow resource recovery contributed to a chronic psychosocial malaise that drained Cordova of social capital as people and groups became deflated with each legal delay (Gill, 2008; Ritchie, 2004, 2012; Ritchie and Gill, 2007; Ritchie et al., 2012). As a result of the spill, prolonged litigation, and loss of key resources, Cordova experienced a variety of adverse sociocultural and psychosocial impacts, some of which persisted for more than two decades.

1.2. Summary

Against this backdrop, our research team examined and documented EVOS-related sociocultural and psychosocial impacts in Cordova from 1989 to 2013. In August 1989, Steve Picou and Duane Gill began a study of Cordova that evolved into a four-year community study (1989–1992). From 1995 to 1997, we used a participatory action design to develop, implement, and evaluate a series of alternative mental health programs for Cordova. Liesel Ritchie joined the team in 2000, as we set out to explore impacts of the unresolved litigation. We were particularly interested in documenting how litigation resolution and disbursement of damage awards would affect the community and its citizens. Our research efforts to understand the intersection of litigation, continued resource losses, and social impacts in Cordova officially concluded in 2013.

This article provides an overview of the theories, concepts, and methods behind our research. We present four key findings regarding event-related psychological stress, litigation impacts, resource loss, and recreancy. Conclusions drawn from 24 years of social science research in Cordova provide useful insights for those dealing with more recent oil spills such as the 2010 BP Deepwater Horizon disaster in the Gulf of Mexico. We provide commentary on the common patterns which surfaced in the aftermath of these two catastrophic oil spills.

2. Theories and concepts

Our research has been grounded in theories and concepts emerging from a body of work on technological disasters, environmental sociology, and risk. Our initial observations of the close relationship between Cordova and its bioregion in the context of ecological-symbolic theory led to development of the renewable resource community (RRC) concept. As noted by Kroll-Smith and Couch, (1993a), ecological-symbolic theory focuses on sociocultural and psychosocial relationships with ecological processes. Cordova's social fabric was clearly tied to its bioregion. It was a community "whose primary cultural, social and economic existences are based on the harvest and use of renewable natural resources" (Picou and Gill, 1996,881).

The RRC concept provided a context for examining how communities, groups, and individuals react and respond to loss of resources—particularly those directly and indirectly affected by the oil spill. Hobfoll's (1989,1991) Conservation of Resources theory of loss and stress provided a framework for identifying different types of resources and how loss, threat of loss, and/or investment without gain can induce psychosocial stress. This approach led us to consider damaged ecosystem resources and economic losses, as well as losses of human, social, and cultural capital within a community. We hypothesized that resource losses and gains contributed to psychosocial stress and disruption in Cordova.

Concepts of 'recreancy' and 'corrosive community' had emerged from studies of technological disasters and were relevant to Cordova and the Exxon disaster. Defined as, "the failure of experts or specialized organizations to execute properly responsibilities to the broader collectivity with which they have been implicitly or explicitly entrusted" (Freudenburg, 2000:116; see also Freudenburg, 1997), recreancy becomes evident in technological disasters because a 'primary responsible party' is identified. Perceptions of recreancy, particularly beliefs that the disaster could or should have been avoided, contribute to feelings of anger, moral outrage, betrayal, and sadness. In this case, Exxon was the primary responsible party for the oil spill and later became viewed as 'responsible' for prolonged litigation and delayed justice (Picou, 2009a; Ritchie et al., 2012).

The corrosive community (Freudenburg, 1993, 1997, 2000; Freudenburg and Jones, 1991) is related to recreancy and litigation, as well prolonged uncertainty, contested meanings, claims and counterclaims (see also Kroll-Smith and Couch, 1993b). A corrosive community is characterized by conflict, deterioration of social relationships, loss of trust, social isolation, and demoralization, which contribute to chronic psychosocial stress and mental health problems. The strained relationships within Cordova documented by Endter-Wada et al. (1993) and Rodin et al. (1992) were indicative of a corrosive community. Picou et al. (2004) documented the roles of litigation and beliefs about recreancy in perpetuating this atmosphere in Cordova during the early 1990s.

Edelstein's work on contaminated communities identifies changes in lifestyle and lifescape as event-related impacts ([1988] 2004, 2000). By definition, all disasters involve lifestyle changes—temporary disruptions in routines and practices meant to help people cope with, respond to, and recover from a stressful event. However, loss of trust, prolonged dread, and uncertainties accompanying technological disasters—particularly those involving toxic contamination—can evoke changes in lifescapes, both individually and collectively. Lifescape changes after a technological disaster often generate feelings of distrust, alienation, and vulnerability. Technological disasters challenge ontological security—"the confidence that most human beings have in the continuity of their self-identity and in the constancy of the surrounding social and material environments of action" (Giddens, 1990:92; see also Giddens, 1991). Particularly in Cordova, the loss of trust in institutions and agencies that were unable to prevent the oil spill disaster had long-lasting negative social impacts. This, combined with ongoing uncertainties regarding resource recovery, compensation, restitution, and justice, contributed to changes in basic assumptions about how the world works.

Erikson's work on trauma—individual, collective, and secondary—provided another perspective for examining the oil spill's sociocultural and psychosocial impacts (Erikson, 1976, 1994; see also Kroll-Smith and Couch, 1993b). Erikson identifies two uses of the term, 'trauma'—the event that results in injury or disruption and the disruptions created by the event. Individual trauma involves a breakdown of psychosocial defenses leading to withdrawal, numbness, and feelings of vulnerability. Collective trauma involves damage to social bonds and 'communality' within a community, disrupting its sociocultural structures and processes. Secondary trauma focuses on events or conditions that unfold after an initial disaster event. In Buffalo Creek, the loss of communality was a secondary stressor (Erikson, 1976). More recently, bureaucratic compensation processes and prolonged litigation resulting from technological disasters have been conceptualized as a secondary trauma (see also Gill, 2007a; Ritchie and Gill, 2007; Ritchie et al., 2012). In addition to prolonged litigation, the collapse

and failed recovery of herring served as another secondary trauma for the Cordova community.

Advancements in conceptualizing risk provided another perspective on technological disasters and the *Exxon Valdez* oil spill. Beck (1992, 1996) and Giddens (1990, 1991) posit a contextual constructionist approach to understand risk in late modernity (see also Cohen, 2000; Lupton, 1999a, 1999b). In contrast to objective or realist approaches to risk, a contextual constructionist approach focuses on sociocultural processes that define and mediate risks. Chief among these are processes employed by governments, multinational corporations, and other stakeholders to 'manage' definitions and perceptions of risk. In late modernity, processes of risk claims and counterclaims combined with 'sponsored' science are played out in an increasingly public arena (see Hannigan, 1995). Moreover, some risks unique to late modernity are viewed as transcending time and space (e.g., nuclear waste). When applied to Cordova and the *Exxon Valdez* disaster, concepts and theories from Beck's risk society had mixed results. For example, his ideas regarding the 'unbinding' of science and politics during such events were evident, but instead of mobilizing citizens as theorized, the disaster divided people and contributed to a corrosive community milieu (Picou and Gill, 2000).

As our research evolved, social capital theory was used to link many of these theories and concepts (Ritchie, 2004; Ritchie and Gill, 2007; Ritchie et al., 2012). Recreancy involves a loss of trust and the corrosive community, challenging fundamental aspects of social capital by disrupting social relationships, creating mistrust, diminishing civic engagement, and promoting withdrawal. Lifestyle and lifescape changes affect patterns of social interaction that may reduce social capital as do avoidance behaviors and depression typical of individual trauma. When confronted with risks, individuals are torn between competing definitions and who/what to trust. This contributes to an erosion of institutional trust and a questioning of individual ontological security. Collective trauma and secondary trauma further weaken social capital. As Ritchie (2004, 2012) documented, the cumulative effects of the aforementioned concepts perpetuated chronic social capital loss spirals in Cordova.

3. Methods

Our 24 year study of Cordova was founded on a field experiment design with Petersburg, Alaska as a control community. Like Cordova, Petersburg is a commercial fishing community with similar demographic characteristics, geographical isolation, and ties to renewable resources. The community of 3500 is located on Mikoff Island in southeast Alaska and is only accessible by boat or air. Both communities had similar subsistence patterns prior to the oil spill (Smythe, 1988; Stratton, 1989). Because of its location, Petersburg has stronger economic connections with Juneau and Seattle, while Cordova is more economically tied to Anchorage. Although most Alaskan fishing communities were affected by the spill in some way, a relatively small percentage of Petersburg's commercial fishermen owned fishing permits for damaged areas. Thus, Petersburg was deemed the most appropriate control community.[1]

Survey research was a primary means of data collection. We used telephone and self-administered surveys to collect data from a random sample of residents from both communities in 1989, 1990, 1991, 1992, 2000, and 2013 (see Gill et al., 2013). In addition, telephone surveys of Cordova residents were completed in 2006 and 2009. Our quantitative research design evolved as we identified commercial fishermen and Alaska Natives in Cordova as 'renewable resource user groups' that were particularly vulnerable to chronic adverse impacts associated with the *Exxon Valdez* disaster. Using self-administered surveys, a panel study of Alaska Natives in Cordova was conducted in 1991 and 1992 (see Picou and Gill, 1995) and a panel study of Cordova commercial fishermen was carried out in 1995 and 1997. A panel study combining Cordova commercial fishermen and Alaska Natives was conducted in 2001, 2006, and 2009 using self-administered survey instruments (Gill, 2007b; Gill et al., 2013).

All surveys contained sets of common indicators for measuring demographic characteristics, community attachment, social disruption, and psychological stress. For example, we used the Impact of Event Scale to measure event-related stress in every survey. Surveys conducted after 1992 included measures of depression, self-efficacy, resource loss, and attitudes toward litigation. Self-administered survey instruments also included open-ended questions that provided opportunities to collect qualitative data.

Qualitative approaches permeated our community research, providing a context for framing survey items and interpreting findings. Throughout our 24 year study of Cordova we reviewed documents and media reports, engaged in conversations with community leaders and key informants, and participated in various community events and organizational meetings. Ritchie (2004) conducted an independent, formal qualitative study in Cordova from 2002 to 2003. After the 2008 Supreme Court decision, this research evolved into a panel study with a follow-up of 35 of the original 48 participants. A criterion-based selection technique was used to develop a sample representative of community stakeholder groups and community demographics. Interviews focused on community attachment, oil spill experiences, resource loss, community disruption, lifestyle changes, and litigation. Our qualitative panel data provided in-depth understanding of chronic impacts of the spill, continued resource losses, and the extended litigation process (see Ritchie et al., 2012).

In sum, we utilized a mixed-methods approach that included document review, observations, interviews, and surveys. Qualitative approaches not only informed survey development throughout the research process; they served as a stand-alone, in-depth analysis of Cordova's experiences. The 'hard' evidence from the quantitative surveys documented various sociocultural and psychosocial conditions and impacts after the oil spill, during the ongoing litigation and continued resource loss, and after litigation settlement. Our observations, informal conversations, and formal interviews increased our understanding of Cordovans' perspectives and interpretations of these circumstances. Combined with relevant theories and concepts, our mixed methods: approach provided a wide spectrum of perspectives to advance understanding of sociocultural and psychosocial impacts of the Exxon Valdez disaster and technological disasters more generally.

4. Results

Our results focus on four research issues related to sociocultural and psychosocial impacts of the EVOS. We begin by examining psychosocial stress and focusing on findings from the Impact of Event Scale. Next, we present results related to litigation and resource loss noting connections to both psychosocial and sociocultural changes in Cordova. Finally, we examine beliefs about recreancy, particularly as they came to be applied to the U.S. justice system and government.

4.1. EVOS-Related psychosocial stress

Various indicators of psychosocial stress were used in our surveys. For example, we measured social disruption relative to

[1] A community survey was conducted in Valdez in 1991 and 1992, which provided another comparison community for those years (see Picou and Gill 1996, 1997).

self, family, work, future plans, and community and documented significantly higher levels of social disruption in Cordova when compared to Petersburg (Gill et al., 2013; Picou et al., 2009; Picou and Martin, 2007). Fragmented relationships were another indicator of psychosocial stress. We found that commercial fishermen, Alaska Natives, and litigants in Cordova were more likely to report breakdowns in personal relationships relative to their counterparts (Gill, 2007b; Gill et al., 2013). Alaska Natives reported disruptions in their subsistence practices, declines in sharing, and lack of traditional foods such as herring (Gill, 2007b; Gill et al., 2013).

Our primary measure of psychosocial stress was the Impact of Event Scale (IES) (Horowitz et al., 1979; see also Horowitz, 1974, 1986). The underlying premise of the scale is that the more stressful an event, the more likely it will elicit two types of reactions: (i) *intrusive recollections* such as unwanted, recurring, and distressing thoughts and feelings and (ii) *avoidance behaviors* intended to suppress feelings and stay away from reminders of the event. The scale contains 15 statements reflecting forms of intrusion and avoidance.[2] Respondents are asked to consider a particular event and indicate how often in the past seven days they experienced each statement. Responses are coded as often (5); occasionally (3); rarely (1); or not at all (0). The 'Intrusion Subscale' consists of seven items (range of 0–35), the 'Avoidance Subscale' has eight items (range of 0–40), and a total IES combines the two subscales (range of 0–75).

We used the IES in all of our surveys from 1989 to 2013.[3] The scale was advantageous because it could be administered over the phone or by face-to-face interview and could also be self-administered in a mail survey format. The scale has been used in other technological disaster settings and provided an opportunity for comparisons across events (Gill and Picou, 1998). Moreover, the IES has clinical applications allowing for comparisons with patients in therapy for stressful events such as rape or bereavement (see Horowitz, 1986; Seidener et al., 1988). Finally, clinical classifications based on IES scores provide an indicator of mental health needs within a community (Hutchings and Devilly, 2005).

Table 1 contains IES and Intrusion and Avoidance subscale means for the Petersburg and Cordova communities, as well as Cordova commercial fishermen and Alaska Natives from 1989 through 2013.[4] In each comparison year, scale and subscale means were significantly lower in Petersburg than in Cordova (see also Gill et al., 2013; Picou and Gill, 1996, 1997). Five months after the spill, Cordova residents reported total scale and Intrusion subscale means comparable to those of clinical patients two years after therapy for rape and patients six months after bereavement therapy following the death of a parent[5] (see Arata et al., 2000; Gill and Picou, 1998; Picou et al., 1992; Picou and Arata, 1997; Picou and Gill, 1997). Scale and subscale means for the Cordova community declined from 1989 to 1992, but were slightly higher in 2000 during the midst of unresolved litigation. By 2013, the scale and subscale means were about one-half of those recorded in 1989.

Compared to the broader community, Cordova commercial fishermen reported significantly higher scale and subscale means the first four years after the spill (see Picou et al., 1992; Picou and Arata, 1997; Picou and Gill, 1996, 1997). Intrusion subscale means during this time were comparable to those of clinical patients two years after a rape—a pattern that continued in 1995, 1997, 2001, and 2006. Relative to 1992, scale and subscale means for commercial fishermen were higher in 1995—two years after the herring fishery collapse—and remained so until 2009 and 2013 when they declined.

IES data from Alaska Natives collected in 1991, 1992, 2001, 2006, and 2009 reveal significantly higher scale and subscale means that those found in the broader Cordova community (see Gill, 2007b; Gill et al., 2013; Picou and Gill, 1995). Indeed, across these years, scores for Alaska Natives were consistently higher than those of commercial fishermen and remained relatively constant—IES means ranged from 25.0 to 27.3; Intrusion subscale means ranged from 13.4 to 14.7; and Avoidance subscale means ranged from 10.7 to 13.5. Relative to clinical results, the 2009 IES and Intrusion subscale means for Alaska Natives remained comparable to rape victims two years after their attack. These results clearly demonstrate the impacts of the *Exxon Valdez* disaster were more acute and prolonged for Alaska Natives.

Analysis of 1989 and 1990 Cordova community data revealed a significant relationship between social disruption and scale and subscale means, but no significant differences based on demographic characteristics such as age, sex, education, and income (Picou et al., 1992). Analysis of 1991 and 1992 data indicated disruptions in work patterns, oil spill risk perceptions, and litigation stress were significantly related to Intrusive stress (Picou et al., 2004). In this respect, being involved in litigation had become as stressful, if not more so, as the oil spill itself. Analysis of 2000, 2006, 2009, and 2013 community data revealed similar patterns—being a litigant consistently predicted EVOS-related Intrusive stress (Gill et al., 2013; Picou and Martin, 2007). Other factors significantly related to IES scores throughout this period included resource loss, perceptions of recreancy, years of residency, being single, and being non-white (Gill et al., 2013). Cordovans who perceived the government and judicial system as being recreant and those who reported loss of resources were also more likely to have higher scale and subscale means. These quantitative findings were further supported by qualitative accounts (Ritchie, 2004; Ritchie et al., 2012).

Among the panel of commercial fishermen and Alaska Natives, the decline in total IES and the Avoidance subscale from 2001 to 2009 was not significant—there was, however, a significant decline in the Intrusion subscale (Gill et al., 2013). Compared to non-Natives, Alaska Native panelists reported significantly higher levels of Intrusive stress. Resource gains as measured by self-efficacy significantly reduced IES and Intrusive stress scores among the panel, as did higher levels of education. Analysis of 2009 IES and subscale means indicated that a lack of trust in Exxon, the Ninth Circuit Court of Appeals, and the U.S. Supreme Court (all reflecting beliefs about recreancy) and high loss of objects resources were significant factors resulting in higher levels of stress. Years of schooling remained inversely related to IES and subscale scores (Gill et al., 2013).

Table 1 also includes the percent of each sample in the 'severe' clinical classification based on IES scores. In 1989, 15 percent of the Cordova community sample and almost 30 percent of commercial fishermen were in the severe category. Percentages of the

[2] The statements are as follows: 1) I thought about it when I didn't mean to; 2) Pictures about it popped into my mind; 3) Other things kept making me have thoughts about it; 4) I had to stop myself from getting upset when I thought about it; 5) I tried to remove it from my memory; 6) I had trouble falling asleep or staying asleep; 7) I had waves of strong feelings about it; 8) My feelings about it were kind of numb; 9) I had a lot of feelings about it that I didn't know how to deal with; 10) I had dreams about it; 11) I stayed away from reminders of it; 12) I felt as if it had not really happened; 13) I tried not to talk about it; 14) I tried not to think about it; and 15) Reminders of it brought back feelings I first felt about it. Intrusion combines items 1, 2, 3, 6, 7, 10, and 15. Avoidance combines items 4, 5, 8, 9, 11, 12, 13, and 14.

[3] The 2006 and 2009 Cordova community surveys only included the Intrusion subscale items.

[4] For all years and samples, IES items with missing data or "don't know" responses were recoded to '0'—"not at all"—the most conservative approach to replacing missing data.

[5] For clinical patients seeking counseling for rape two years after the assault, the IES mean was 27.4; the Intrusion subscale mean was 11.4; the Avoidance subscale mean was 16.0. For clinical patients seeking counseling for bereavement after the death of a parent, the Intrusion subscale mean six months after the death was 13.8.

Table 1
Impact of Event Scale, Intrusive Stress, Avoidance Behavior Means for Petersburg and Cordova Communities and Cordova Commercial Fishermen and Alaska Natives 1989–2013.

Year	Sample	IES Mean	Intrusive Stress Mean	Avoidance Behavior Mean	Percent of sample in 'Severe" clinical category
1989	Petersburg Community (n = 73)	16.2	11.0	5.2	1.4%
	Cordova Community (n = 117)	27.6	16.6	11.0	15.3%
	Cordova Commercial fishermen (n = 41)[a]	33.2	20.3	12.9	29.3%
1990	Petersburg Community (n = 53)	5.2	3.7	1.5	0.0%
	Cordova Community (n = 69)	19.6	10.1	9.6	10.1%
	Cordova Commercial fishermen (n = 22)[a]	21.9	11.0	10.9	13.6%
1991	Petersburg Community (n = 98)	3.5	2.4	1.5	0.0%
	Cordova Community (n = 228)	16.9	9.5	7.5	5.5%
	Cordova Commercial fishermen (n = 75)[a]	23.1	13.1	10.1	13.9%
	Cordova Alaska Natives (n = 62)	25.0	13.4	11.6	11.3%
1992	Petersburg Community (n = 56)	4.9	2.8	2.1	1.8%
	Cordova Community (n = 159)	16.6	8.6	8.1	8.8%
	Cordova Commercial fishermen (n = 48)[a]	22.5	12.0	10.5	16.7%
	Cordova Alaska Natives (n = 40)	25.3	14.6	10.7	17.5%
1995	Cordova Commercial fishermen (n = 88)[b]	28.1	15.1	13.0	19.3%
1997	Cordova Commercial fishermen (n = 61)[b]	23.8	12.9	10.9	16.4%
2000	Petersburg Community (n = 216)	3.9	2.0	1.9	1.0%
	Cordova Community (n = 227)	18.7	9.4	9.3	12.8%
2001	Cordova Commercial fishermen (n = 135)	24.3	13.3	11.0	13.2%
	Cordova Alaska Natives (n = 61)	27.3	14.7	12.6	13.1%
2006	Cordova Community (n = 372)	NA	10.7	NA	NA
	Cordova Commercial fishermen (n = 64)	24.6	13.5	11.1	6.3%
	Cordova Alaska Natives (n = 34)	26.2	14.3	11.9	8.8%
2009	Cordova Community (n = 278)	NA	9.8	NA	NA
	Cordova Commercial fishermen (n = 99)	20.6	10.2	10.4	10.1%
	Cordova Alaska Natives (n = 36)	26.9	13.4	13.5	11.1%
2013	Petersburg Community (n = 89)	8.2	4.6	3.6	0.0%
	Cordova Community (n = 195)	13.6	7.1	6.5	7.2%
	Cordova Commercial fishermen (n = 57)[a]	16.6	8.7	7.9	10.5%

[a] Data for commercial fishermen identified from the Cordova community survey.
[b] Data for commercial fishermen who were full time residents of Cordova.

community sample in the severe category tended to decrease through 1992, but were slightly elevated in 2000—partly driven by unresolved litigation. By 2013, less than seven percent of the community sample was classified in the severe clinical category. Cordova's commercial fishermen and Alaska Natives generally had greater percentages in the severe category relative to the community at large. In 1992, 17 percent of commercial fishermen and Alaska Natives were in the severe category. By 2009, about one out of ten Cordova commercial fishermen and Alaska Natives was in the severe category. As expected, for each year, very few Petersburg respondents had IES scores in the severe category.

These high levels of stress as measured by the IES and other indicators of psychosocial disruption created demands that exceeded the capacity of Cordova's community mental health providers. We observed high turnover rates among mental health counselors and administrators, which further eroded the capacity to deal with chronic mental health and psychological stress issues. Further, a perceived stigma associated with seeking mental health treatment led many individuals to avoid counseling, resulting in prolonged suffering. This became particularly acute in Cordova after the 1993 herring collapse. In response, we developed and implemented an alternative mental health program from 1995 through 1997 (Picou, 2009b; Picou and Arata, 1997). A "Coping with Technological Disasters Guidebook" was developed to provide user-friendly information on how communities can better cope with technological disasters and strategies for dealing with psychosocial stress and disruption (see PWSRCAC, 2004). This intervention had modest positive impacts as social relationships improved and overall stress levels declined in Cordova (Picou, 2000, 2009b)

After the 2008 Supreme Court decision and distribution of damage awards, scale and subscale means declined in the community and among fishermen, as did the percent in the 'severe' category. In 2013, almost two-thirds (65%) of Cordova residents had sub-clinical scores suggesting that EVOS-related stress had significantly declined and some semblance of community recovery had been initiated.

4.2. Litigation impacts

Litigation is the primary mechanism to obtain compensation for losses from technological disasters and accidents. The U.S. adversarial system of litigation, however, can be a source of stress and trauma for litigants (Cohen and Vesper, 2001; Lees-Haley, 1988; Relis, 2002; Strasburger, 1999; Sward, 1989). Technological disaster-related litigation typically involves multiple parties (e.g., Exxon and Alyeska), contested scientific findings (e.g., corporate-sponsored versus government-sponsored science and expert witnesses), tactics of delay and appeal, and high-stakes (e.g., a $5 billion punitive damage award). Scientific and legal uncertainties combined with the adversarial process produce psychosocial stress that becomes chronic as litigation becomes

protracted (Picou et al., 2004; see also Marshall et al., 2004; Picou, 2009a). The result is delayed individual and community recovery and perhaps more importantly, delayed justice (see Hirsch, 2007). Moreover, litigation becomes intertwined with beliefs about recreancy as litigants lose trust in social institutions that they believe should to protect the public.

Litigation often becomes a secondary trauma for many survivors of technological disasters (Gill, 2007a). Such was the case in Cordova where EVOS-related litigation processes contributed to psychosocial stress and community disruption. Picou et al., (2004) found that being a litigant was significantly related to litigation stress, work disruption, oil spill risk perceptions, and beliefs about recreancy. These factors combined to predict perceptions of chronic adverse community impacts. As previously noted, involvement in litigation processes was a significant predictor of IES scores and other indicators of psychosocial stress in Cordova (Gill et al., 2013). For some, being involved in litigation became more stressful than the spill itself, a pattern that persisted during the litigation and up to five years after the Supreme Court decision.

These quantitative findings were corroborated by qualitative narratives of community members (Ritchie 2004, 2012; Ritchie et al., 2012). A Cordova resident recounted the trauma of litigation as follows:

> The litigation process is where a lot of the trauma is right now. The spill is traumatic. We know that the oil is out there, and we know that it affected the economy, but nobody has paid for it. That is where the post-traumatic type symptoms come into [play] . . . . This isn't our fault. Somebody needs to help us. We are losing our culture, our livelihood, and yet there is nothing. The litigation draws it out and keeps the feelings on the surface. It re-traumatizes folks.

Another Cordovan stated:

> I can't get anything from the attorneys anymore at the post office without actually almost having an anxiety attack. It has gotten to the point where their paperwork is almost as stressful as the actual spill was.

Some narratives demonstrated the physical manifestations of stress felt by many litigants in Cordova:

> I think eventually I am just going to simply drop dead. I'll have a heart attack because I internalize all my stress (*laughing*) . . . . I laugh because if you don't laugh you feel like bawling your eyes out, and there's just no point.
>
> On top of all my other daily stuff I was having to dig up all of this [legal] paperwork bullshit for something that we had no control over or didn't want nothing to do with. It was eating on me . . . . I was stressed out . . . . There was some stuff that I couldn't even eat because . . . I had an upset stomach a lot.

A Cordova resident observed how the spill and litigation became inseparable and produced chronic effects:

> If you take the spill, the litigation . . . it's all one continuum and all part of the same process. It's not been good. Most people can take a hit if it's defined. Okay, that was the hit. They pick themselves up and start over and . . . do whatever they have to do. But [the EVOS], it's that hit that keeps on hitting (*laughing*) . . . . It won't be 'after the spill' until everything is done. As a group we are not going to pick ourselves up and move on until that's done.

Other Cordova litigants talked about a fundamental unfairness in the legal process that gave advantages to big corporations. One litigant observed:

> Every time you think you are finished with something [about the litigation] . . . there would be something else. You have done all this and what for? To me the most valuable thing a person has is their time. For somebody [Exxon] to use the system, then there should be some kind of standard that works across the board . . . . [Exxon] put a known drunk on an oil tanker trying to thread his way through icebergs and rocks and mountains on both sides of the boat. [They knew] he was a drunk. He's got a long history of it. It's well documented and [Exxon kept] letting him drive the boat. . . . It doesn't seem fair and it's not consistent.

Survey data from 2000 and 2006 revealed that most Cordova residents expected the punitive damage award to be upheld. This view was shared by commercial fishermen and Alaska Natives. Most expected resolution of litigation would result in positive changes in family, work, future plans, and community, an upswing in the local economy, and improved mental health. Residents also believed it would provide a sense of closure. Conversely, some expressed concern about damage award payments exacerbating disparities between the 'haves' and 'have nots' and a few others anticipated little or no community changes. Although many Cordovans were cautiously optimistic when the U.S. Supreme Court agreed to hear the case, few could have imagined what was finally decided.

The 2008 Supreme Court decision was a letdown for most plaintiffs. The reduction of punitive damage awards to $507 million was seen as a defeat and evoked "feelings of betrayal, shock, injustice, anger, depression, resignation, defeat, sadness, and hurt" among plaintiffs. Moreover, they "lost faith in the justice system and felt helpless, invisible, and insignificant compared to corporation citizens" (Gill, 2008:5). The decision reduced the punitive damages to one-tenth of the original $5 billion awarded by the 1994 jury. In response a fisherman stated, "It kind of sends the message that big corporations that have the right money and political power can throw safety and responsibility to the wind" (Gill, 2008:5). The Court was characterized as being "part of owned-and-operated corporate America." "A Cordova fisherman observed, 'It gives big business the formula they need to calculate the cost of their actions when they destroy the environment. This gives them the formula to calculate their risks.' Another quipped, 'I found out what the meaning of punitive damages is; puny" (Gill, 2008:5).

Most Cordovans believed justice was not served by the outcome of the litigation. Many expressed 'reluctant resignation' regarding the litigation outcome as years of litigation contributed to an apathy that affected perceptions of big business, government, and the judicial system (Ritchie, 2004). Instead of providing closure, the decision prevented some from ever shutting the book on the Exxon disaster.

4.3. Resource loss

Sociocultural and psychosocial impacts associated with resource loss were documented using quantitative and qualitative approaches. Survey data focused on perceptions of damage to and recovery of the PWS ecosystem and reporting of resource gains and/or losses in four resource categories: objects, conditions, personal characteristics, and energies (see Hobfoll, 1989, 1991). Qualitative interviews provided insights into the importance of Pacific herring to the Cordova community and how the loss and failed recovery of that resource resulted in chronic adverse sociocultural and psychosocial impacts.

Survey data indicated that many Cordova residents believed the spill had caused permanent damage to Prince William Sound and that it would never fully recover. This was particularly the case with commercial fishermen and Alaska Natives—90 percent of the panel agreed that permanent damage had been done and almost all did not expect the ecosystem to recover during their lifetime. Damage to the Sound translated into a loss and threat of loss of

resources. Moreover, those who were heavily invested in the herring fishery experienced extreme investment without gain.

Survey data documented losses of all four resource categories after the spill until resolution of litigation. Analysis of data from the community and the panel of fishermen and Natives revealed significant relationships between resource loss/gain and psychosocial stress. Those reporting losses tended to experience high stress and those with resource gains tended to have less stress. Slow and failed recovery of bioregional resources contributed to chronic stress, particularly among commercial fishermen and Alaska Natives. Analysis of data collected after the Supreme Court decision (2009 and 2013), indicated that perceptions of PWS ecosystem resource losses significantly increased psychosocial stress, but stress was significantly reduced if there were gains in conditions resources (e.g., family stability) (Gill et al., 2013).

Qualitative findings revealed how ecosystem resource loss became a primary factor for chronic psychosocial stress and community disruption (Gill et al., 2013; Gill, 2007b; Ritchie, 2004, 2012; Ritchie and Gill, 2007). As a cultural and biological keystone species, Pacific herring was most often discussed when considering ecosystem and objects resource losses. Narratives from our qualitative panel describe ways in which rhythms of community life were rooted in the annual herring spawn and accompanying subsistence and commercial fisheries. A long time resident explained:

> It [the beginning of herring season] was just wonderful . . . . People were just coming alive . . . . Everyone would come back to town and we would all get together. It would just be this big influx of people and boats. . . . Within a couple of days . . . the harbor would just be [full]. . . . And there are all kinds of people in town . . . the divers, the processors . . . just this big influx. And the town would just come alive. . . . It was just energetic . . . just the coolest thing. . . . like the gold rush or something. We are here to make money. But also at the same time we just had a great time and the town would come alive. We would get cash, much needed cash. We just had fun. . . . that spring fling . . . . [It] just gets in your blood.

The RRC concept illuminated an anticipatory-utilization cycle that demonstrated how the subsistence and commercial herring fishery contributed to Cordova's sociocultural structures and processes (see Gill and Picou, 1997, 2001; Ritchie, 2004; Ritchie and Gill, 2010b). Traditionally, the community is in a winter slumber and awakens as activities associated with herring fishing began in February. The annual herring spawn signaled the onset of spring with the fishery opening in March. The herring fishery set up the salmon fishery, which began in May and continued through September. Herring was an integral aspect of Cordova's lifescape and sociocultural rituals and practices associated with the fishery permeated the social fabric. A Cordova resident observed:

> Herring was a big part of my family's enterprise for many years and it is gone, and all the elements that were associated with it—like getting out there in the spring and participating in this revival of life in the Sound. There were certain spiritual qualities to these activities beyond going and trying to make a profit at some business. That is why the people that did it loved doing it. They loved getting out there.

The collapse of herring contributed to adverse sociocultural impacts in Cordova. In addition to economic loss and decline, the community's commercial fishing season shortened by almost three months. The truncated season changed community structures and dynamics and increased social disruption. Community subsistence and 'personal use' patterns were disrupted and residents reported losses of subsistence resources, especially herring (Gill, 2007b). A fisherman observed:

> That [herring fishery] was a big income. Everybody looked forward to that. It's like, 'Oh good, here comes the herring fleet, we have money now. You know it's been a tough winter and now we can start going again.' And now we have to wait till May [to start fishing]. That doesn't give me a very long season to make it through a year.

An Alaska Native noted how the loss of herring contributed to stress within the community:

> Well [stress in the community] got elevated. 'Cause being a Native we still can't go out and pick herring—you know pick up herrings and kelp out here. It's never came back to what it was before the spill . . . . A lot of things will just never come back to the way that it was. The fish, the eulachon [herring], everything was affected by it. People, their livelihoods, what you eat [were affected by the spill].

The herring population collapse was directly attributed to a viral infection, but debate continues between 'corporate' and 'government' sponsored research about factors that increased vulnerability to disease and that have repressed species recovery. Many Cordovans were distrustful of corporate science and critical of government science. Almost every person in our qualitative panel drew upon traditional knowledge and personal observations to conclude the oil spill factored into the collapse. As a commercial fisherman observed:

> To go right to the heart of it, one of the most significant changes from the spill is the herring. . . . They [Exxon] can't tell you, or me, or anyone in this town that the lack of herring is from anything but from the spill . . . . You go right to the heart of the whole environment when you take away the basis for that lower level of life, then you take away food for every follow up consumer after that. The birds and the animals that feed on, everything gets affected.

Although not all community, family, and personal problems are blamed on the spill, it was almost always mentioned as contributing to the herring collapse. One resident explained:

> You just can't blame all [community problems] on the oil spill . . . but I do blame the [loss of the] herring on the oil spill because you just don't fish that for years and years and all of the sudden have an oil spill and never fish it again. There has got to be some correlation there.

Herring contributes to how community residents frame ideas about disaster recovery. Discussions about ecosystem recovery typically involve restoration of herring and the herring fisheries. A commercial fisherman noted:

> I think that it [the PWS ecosystem] is recovering. I think we still got a long ways to go. And I believe the oil that's on the beaches right now will affect Prince William Sound until it's gone. I don't think it will ever recover until it's truly gone. I think it's getting better, slowly. Now, if the herring were to come back—if we were to have a herring fishery—that would be a huge plus. But they're not comin' back.

Our qualitative data demonstrated how herring was embedded in the sociocultural fabric of Cordova. It was a subsistence staple in the community long before the commercial fishery created economic opportunities and generated tax revenues. The herring spawn symbolized the arrival of Spring and the start of a new fishing season as seasonal residents returned earlier in the year and renewed social bonds within the community. Now shortened by three months because of the loss of herring resources, the commercial fishing season offers fewer opportunities to foster strong relationships that contribute to social capital. The community's diminished economic capacity and sociocultural

changes caused by the loss of herring resources will likely continue until a sustainable fishery returns.

4.4. Recreancy

Recreancy involves individuals, organizations, and/or institutions failing to uphold the public's trust that they will act and operate responsibly. Technological disasters inevitably lead to controversy over blame and responsibility, and the *Exxon Valdez* disaster exemplified this. In searching for underlying causes of the oil spill, Gill notes, "there is almost as much blame to spread around as there was oil on Alaska's shoreline" (2008:5). Exxon and Captain Hazelwood stood out as the most blameworthy, but Alyeska failed in its responsibility to respond to the spill. Alaska and its Department of Environmental Conservation failed to oversee Alyeska by ignoring inspector reports detailing the corporation's violations and lack of spill preparedness. The federal government failed to fund state-of-the-art radar equipment as authorized by the original TAPS legislation. If such equipment had been in place to monitor marine traffic throughout the Valdez Arm, the grounding might have been averted. Exxon took control of clean-up operations and seemed to usurp the authority of the U.S. Coast Guard, U.S. Environmental Protection Agency, and other state and federal agencies. Some blame fell on the global oil industry—the 1980s was in a bust cycle, which led to risky, cost-cutting practices and complacency in oil transportation. From another perspective, some blame could be placed on the public's high demand for oil.

In Cordova, first reactions to the grounding ranged from sadness and concern to anger and outrage. When TAPS was approved, industry and the government assured the public that a world class tanker system would be in place and no significant oil spills would occur. When locals learned about the failure of Alyeska to contain and cleanup the oil, many felt betrayed and frustrated.

Data from our qualitative panel revealed how recreancy was initially perceived. One respondent referred to the lack of response as "corporate paralysis." Others stated:

> I was pretty devastated. I fought for years to keep it [the pipeline] out and we fought hard to try to ensure that the best safety measures were in place. All the promises that were made about high technology being used were basically not ever fulfilled.
>
> They [Alyeska and Exxon] had nothing. They had nothing to clean this oil up. They had no equipment. . . . They had no plan. They had nothing.

Beliefs about recreancy and Exxon's culpability deepened after corporate representatives came to the community in the summer of 1989 and vowed "to make Cordova whole"—a promise most every panel member noted. As one Cordova resident recalled:

> I remember [an Exxon official] saying, "Be glad it's Exxon that spilled the oil. We will take care of you and we will make you whole . . . ." They don't realize how much damage they have caused, how many generations they have affected, and how many lives they have destroyed by what they did.

More than 20 years after the spill, most respondents believed Exxon did not fulfill its promise. One respondent summed it up, "They said they were going to make us whole, fix us up. They never did a damn thing. All they did was [contribute] to the stress of the community by carrying on this litigation."

Prolonged litigation fostered beliefs and perceptions of recreancy that focused on the U.S. justice system and government (Ritchie et al., 2012). In this context, both institutions were perceived to have failed to protect citizens and promote timely justice. In Cordova, many viewed the government as favoring big corporations such as Exxon over the interests of damaged communities, local businesses, and people. This sentiment was expressed by the following two statements:

> Our legal system has allowed them to get away with it. It's not just the legal system; it's the political system. There could be enough pressure brought to bear [to make them pay] . . . . Nobody has brought any pressure to bear [on Exxon].
>
> [The government] is much more corrupt than I thought prior to the spill. I'm sure of that. I'm not nearly as naïve or trusting [anymore] . . . . I'm not the only one. Nobody [here] trusts the federal government anymore.

Reflecting on the Supreme Court ruling, a Vietnam veteran and commercial fisherman declared:

> I mean, I can't even say the Pledge [of Allegiance] to the flag anymore because at the very end it says "with liberty and JUSTICE for all." What the fuck are you talking about, you know? It's [a] political rip-off. I mean that's, that's why I am as angry as I am about it. It isn't like we lost because of something that was basically legal. We just got fucked!

Most respondents from our qualitative panel distinguished their perceptions of recreancy attributed to industry from those attributed to government and the justice system. They believed the protracted litigation was preventable—Exxon could have settled early and facilitated community recovery. They also maintained that the state and federal government could have done more to hold the corporation accountable, especially during Exxon's merger with Mobil and when clauses of the 1991 government settlement with Exxon that would have required additional damage payments were ignored or dismissed. Conscious decisions by Exxon, the government, and the courts were perceived by respondents to have contributed to chronic community impacts.

Beliefs about and perceptions of recreancy can lead to profound lifescape changes. A well-respected community leader and commercial fisherman described how the Supreme Court decision changed his worldview:

> The disappointment over not having my $2.5 million [claim paid] wasn't as profound to me as the loss of confidence in our legal system. I'd always thought that the Supreme Court was near to God, [that] they were just above reproach, and could not be influenced by even the biggest corporation. [But] the Supreme Court is not above reproach. And the biggest corporation in the world is in charge. That was hugely disappointing and I'm still disappointed. If . . . any semblance of the original trial by jury, the verdict, and the compensation had been awarded, that could have provided closure for me. But now there'll never be closure for me, because it's influenced how I look at the United States and our legal system. It's just changed everything . . . . I don't trust anybody anymore in government.

Public beliefs and perceptions of recreancy are related to social capital because they reflect institutional trust and civic engagement. When widely held, as they were in Cordova, perceptions of recreancy contribute to adverse sociocultural and psychosocial impacts. People with strong beliefs about recreancy are likely to have high levels of distrust in institutions and organizations, particularly those directly and indirectly linked to the disaster. Loss of trust can diminish civic engagement and when experienced at a collective level, can weaken a community's bonding and bridging social capital (Ritchie, 2004, 2012).

5. Summary

The *Exxon Valdez* oil spill and ensuing ecological damages, acute and chronic resource losses, and protracted litigation had

disastrous impacts on Cordova. Damaged ecosystem resources and services were significant losses to the community, particularly Alaska Natives and commercial fishermen. The collapse and failed recovery of the herring fishery was a substantial resource loss. Psychosocial stress emerged soon after the spill and became chronic for some residents. As predicted by COR theory, resource losses were major contributors to psychosocial stress and provided explanations for collective stress and adverse sociocultural impacts. Cordova experienced a corrosive community effect initially fueled by disputes about working or not working on the cleanup and later disputes regarding resource recovery and litigation.

Litigation—the principal means to receive compensation for technological disaster losses, deter negligence, and promote resilience—became a source of secondary trauma and contributed to psychosocial stress. After languishing in the courts for years, the compensation and punitive damage awards from the final settlement did not come near to covering most plaintiffs' accumulated economic losses. Moreover, most felt that there was no compensation for the years of stress and disruption experienced by individuals, families, and the Cordova community. The delayed justice and unfavorable Supreme Court decision contributed to beliefs about recreancy that diminished social capital and led some individuals to alter their lifescape and reluctantly resign themselves to the outcome.

Although litigation was resolved—and with it, some of the uncertainty in the community—many individuals could not envision closure on this disaster until the ecosystem was restored. For most, ecosystem recovery includes a return of a sustainable herring fishery. Community structures and processes changed in response to the loss of herring. The fishing season has shortened, relationships between seasonal and permanent residents have weakened, and the loss of financial capital has not been replaced. Without restoration of the herring fishery, sociocultural changes associated with the fishery demise will likely persist.

Resolution of litigation and disbursement of damage awards combined with modest gains in the commercial fishing industry helped to significantly reduce psychosocial stress in Cordova by 2013. However, Alaska Natives and commercial fishermen continued to deal with ecological and economic uncertainties associated with the *Exxon Valdez* disaster and have been slower to recover from these disruptions. Although there have been improvements in tanker safety and oil spill response capability, Cordovans continue to be keenly aware of risks associated with tanker traffic through Prince William Sound.

The evidence of adverse sociocultural and psychosocial impacts of the *Exxon Valdez* disaster in Cordova portrays a somewhat dire picture of the community and its residents. It is important to note, however, that the community continued to persevere and exhibit a level of resilience. Cordovans have strong community ties that were maintained throughout the duration of our research. A consistent finding from community surveys from 1989 to 2013 was the high level of community attachment reported by respondents. Moreover, during the 24 years of formal interviews and informal conversations, no individual blamed the Exxon disaster for all of the adversity experienced by the community and themselves.

On April 20, 2010, U.S. oil spill history seemed to repeat itself when the *Deepwater Horizon* drilling vessel under contract to BP in the Gulf of Mexico exploded, killing 11 workers and breaching the Macondo well. Located one mile below the sea surface, an estimated 55,000 barrels of oil gushed from the wellhead each day for almost three months as corporations and government agencies struggled to cap and seal the well and respond to oil flowing into the Gulf of Mexico. Part of the response included the controversial use of Corexit, a dispersant that was pumped down and mixed with gushing oil at the wellhead. By the time it was permanently sealed on September 19, 2010, an estimated 2.45 to 4.2 million barrels of oil and more than 1.8 million gallons of dispersant we released into the Gulf.

From the perspective of technological disaster and oil spill research, the BP *Deepwater Horizon* oil spill was a "rerun" of the *Exxon Valdez* disaster with some "upgraded" features (Ritchie et al., 2011 ; see also Gill et al., 2015). The BP disaster oiled five coastal states and affected multiple coastal communities—many of which were still recovering from hurricane disasters including Ivan, Katrina, Rita, and Ike. Human health effects became a major concern, particularly because a far greater number of people were exposed to the oil and dispersants than was the case in the *Exxon Valdez* disaster. Issues of recreancy emerged that implicated BP as well as the Minerals Management Service, the Federal agency responsible for oversight of off-shore oil and gas operations. The compensation and litigation processes between BP and claimants were influenced by the recognition of increased stress from litigation after the Exxon disaster. There were also multiple research efforts to document sociocultural, psychosocial, and health effects of this disaster.

Our own research on the BP *Deepwater Horizon* oil spill built on our work on the Exxon disaster. Picou adapted elements of the alternative community mental health program developed for Cordova and developed a Peer Listener Program that was implemented in coastal communities throughout the region (Picou, 2009b). Furthermore, an expanded disaster intervention program was developed that trained community health workers and volunteer peer health advocates in Florida, Alabama, Mississippi, and Louisiana. More than 400 residents have been trained and data strongly suggest that the program has helped to improve community resilience (Nicholls et al., 2015).

Five months after the BP spill began Gill, Ritchie, and Picou initiated research in coastal Alabama to examine event-related stress using the Impact of Event Scale—the same scale used in Cordova after the Exxon disaster. They found similar levels of psychosocial stress between Cordova and south Mobile County five months after the respective oil spills began (Gill et al., 2012). Factors that significantly contributed to elevated levels of stress were resource losses (especially economic losses); vulnerability (including exposure to oil and ties to renewable resources); perceptions of risk (related to concerns about family health, air quality, and seafood safety); and beliefs about recreancy (especially lack of trust in BP, the Federal and state government, and judicial system). A follow-up survey in 2011 found similar results. Levels of event-related stress were comparable to Cordova 18 months after the spill and the strongest predictors were exposure to oil, ties to renewable resources, uncertainty about economic future, concern about air quality, and safety of seafood harvests in oiled areas (Gill et al., 2014). Analysis of data collected in 2013 reveal statistically significant relationships between involvement in claims, settlement, and litigation processes associated with the BP disaster and elevated IES scores (Ritchie et al., 2015). 2013 data also highlight the continuing significance of resource loss, vulnerability, and risk perceptions in explaining psychosocial stress as measured by the IES.

6. Conclusions

The *Exxon Valdez* disaster was more than an oil spill. Chronic resource losses, an ecosystem that has yet to recover, and protracted litigation were prominent features of this technological disaster. Although litigation has been resolved, the final judgment and damage awards failed to mitigate sociocultural and psychosocial impacts. As the community moves forward, most residents who experienced the spill do not expect Prince William Sound to recover in their lifetimes. Twenty-six years later, the herring

population has not recovered and there are beaches and shorelines in the Sound where *Exxon Valdez* oil can still be found a foot below the surface. The disaster may be considered over by outsiders and some Cordovans, but impacts continue to unfold and for some residents, the *Exxon Valdez* disaster will only be over when they die.

In their longitudinal study of two New Orleans neighborhoods in the context of Hurricane Katrina, Kroll-Smith and colleagues critiqued conventional notions of recovery as 'disaster's coda' (Kroll-Smith et al., 2015). That is, recovery "marks both the end of a disaster and the beginning of life renewed" . . . suggesting a "return to life rehabbed and set right" (2015:116). That version of recovery was not observed in these two neighborhoods leading the researchers to ask, to what extent does a disaster "forever haunt the present?" (2015:116). They further note that perspectives on recovery are contingent on whether observations are made from afar or by one who has lived through the events. To outsiders, New Orleans seems to be recovered—but many residents do not define their conditions as recovered.

Similarly, recovery has been elusive for Cordova and those most affected by the *Exxon Valdez* disaster. From afar the community appears to be recovered—there have been some good seasons for the commercial salmon fisheries the past few years. The litigation is over and many have 'moved on' in a form of reluctant resignation. Yet, most believe the litigation failed to set things right. Those who experienced Cordova's way of life before the spill and lived through the disaster during the past 24 years know that things have not been "set right." They have not been made whole. From their perspective, recovery of the Cordova community depends on recovery of the ecosystem and renewable resources such as herring. Considering these factors, it becomes apparent why the Exxon disaster might continue to haunt the community. At some point however, it seems that a 'new normal' will take hold and that both the old ways of life and the disaster will become part of the community's legacy.

Acknowledgements

Major funding for our research was provided by grants from the National Science Foundation, Arctic Social Science Division: ARC-1042926, DDP-910109, OPP-0082405, OPP-002572, and OPP-0852932. Additional support was provided by the Natural Hazards Center, Institute of Behavioral Science—University of Colorado; the Coastal Resource and Resiliency Center and Department of Sociology and Anthropology—University of South Alabama; and the Department of Sociology, Center for the Study of Disasters and Extreme Events, and College of Arts & Sciences—Oklahoma State University. The Social Science Research Center and Department of Sociology at Mississippi State University provided support for this research from 1989 to 2009.

References

Catalina, M., Steven Picou, J., David Johnson, G., McNally, T.S., 2000. Coping with technological disaster: an application of the conservation of resources model to the *Exxon Valdez* oil spill. J. Trauma. Stress 13, 23–39.
Beck, Urlich, 1992. Risk Society: Towards a New Modernity. SAGE Publications, Inc., London, England.
Beck, Urlich, 1996. World risk society as cosmopolitan society? Ecological questions in a framework of manufactured uncertainties. Theory Culture Soc. 13 (4), 1–32.
Bushell, Sharon, Jones, Stan (Eds.), 2009. The Spill: Personal Stories from the Exxon Valdez Disaster. Epicenter Books.
Clarke, Lee, 1997. Supertanker politics and rhetoric of risk. In: Picou, J.S., Gill, D.A., Cohen, M. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque, IA, pp. 55––69.
Cohen, Larry J., Vesper, Joyce H., 2001. Forensic stress disorder. Law Psychol. Rev. 25, 1–27.
Cohen, Maurie J., 1995. Technological disasters and natural resource damage assessment: an evaluation of the *Exxon valdez* oil spill. Land Econ. 71 (1), 65–82.
Cohen, Maurie J., 1997. Economic impacts of the Exxon Valdez oil spill. In: Picou, J.S., Gill, D.A., Cohen, M.J. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque Iowa.
Cohen, Maurie J., 2000. Risk in the Modern Age: Social Theory, Science and Environmental Decision-Making. St. Martin's Press, Inc., New York.
Dyer, Christopher L., Gill, Duane A., Picou, J. Steven, 1992. Social disruption and the valdez oil spill: Alaskan Natives in a natural resource community. Sociol. Spectr. 12, 105–126.
Dyer, Christopher L., 1993. Tradition loss as secondary disaster: long-term cultural impacts of the Exxon Valdez oil spill. Sociolo. Spectr. 13, 65–88.
Exxon Valdez Oil Spill Trustee Council (EVOSTC), 2014. Update on Injured Resources and Services, 2014Exxon Valdez Oil Spill Trustee Council, Anchorage, AK. . (November) http://www.evostc.state.ak.us/static/PDFs/2014IRSUpdate.pdf.
Edelstein, Michael, 1988. Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure. Westview Press, Boulder, CO [2004].
Edelstein, Michael, 2000. Outsiders just don't understand. In: Cohen, M.J. (Ed.), Risk in the Modern Age: Social Theory, Science and Environmental Decision-Making. St. Martin's Press, Inc., New York, pp. 123–142.
Endter-Wada, Joanna, Jon Hofmeister, Rachel Mason, Steven McNabb, Eric Morrison, Stephanie Reynolds, Edward Robbins, Lynn Robbins, and Curtiss Takada Rooks 1993. Social Indicators Study of Alaskan Coastal Villages: IV. Postspill Key Informant Summaries: Schedule C Communities, Part I (Cordova, Tatitlek, Valdez) and Part 2 (Kenai, Tyonek, Seldovia, KodiakCity, Karluk, Old Harbor, Chignik). Prepared for Minerals Management Service, Alaska OCS Environmental Studies Program, Technical Report 155, OCS Study MMS 92-0052.
Erikson, Kai T., 1976. Everything in Its Path: Destruction of Community in the Buffalo Creek Flood. Simon and Schuster, New York.
Erikson, Kai T., 1994. A New Species of Trouble: Explorations in Disasters, Trauma, and Community. W.W. Norton, New York.
Exxon v. Baker, 2008. Exxon Shipping Company, et al., Petitioners v. Grant Baker et al., 554 U.S. Supreme Court.
Fall, James A., Field, Jay L., 1996. Subsistence after the spill: uses of fish wildlife in Alaska Native villages and the Exxon Valdez oil spill. Am. Fish. Soc. Symp. 18, 819–836.
An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska, II Prince William Sound (OCS Study MMS 95-011). In: Fall, James A., Utermohle, Charles J. (Eds.), U.S. Department of the Interior., Anchorage, AK.
Freudenburg, William R., Jones, Timothy, 1991. Attitudes and stress in the presence of technological risk: a test of the supreme court hypothesis. Soc. Forces 9 (4), 1143–1168.
Freudenburg, William R., 1993. Risk and recreancy: weber, the division of labor, and the rationality of risk perceptions. Soc. Forces 71, 909–932.
Freudenburg, William R., 1997. Contamination, corrosion and the social order: an overview. Curr. Sociol. 45 (3), 19–40.
Freudenburg, William R., 2000. The 'Risk society' reconsidered: recreancy, the division of labor, and risks to the social fabric. In: Cohen, M.J. (Ed.), Risk in the Modern Age: Social Theory, Science and Environmental Decision-Making. St. Martin's Press, New York, pp. 107–122.
Giddens, Anthony, 1990. The Consequences of Modernity. Polity Press, Cambridge, UK.
Giddens, A., 1991. Modernity and Self-identity: Self and Society in the Late Modern Age. Polity Press, Cambridge, UK.
Gill, Duane A., Picou, J. Steven, 1997. The day the water died: cultural impacts of the Exxon Valdez Oil Spill. In: Picou, J.S., Gill, D.A., Cohen, M. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque, IA, pp. 167––91.
Gill, Duane A., Picou, J. Steven, 1998. Technological disaster and chronic community stress. Soci. Nat. Res. 11, 795–815.
Gill, Duane A., Picou, J.Steven, 2001. The day the water died: the Exxon Valdez disaster and indigenous culture. In: Biel, S. (Ed.), Modern American Disasters. New York University Press, New York, pp. 277––301.
Gill, Duane A., Picou, J. Steven, Ritchie, Liesel A., 2012. The Exxon Valdez and BP oil spills: a comparison of initial social and psychological impacts. Am. Behav. Sci. 56 (1), 3–23.
Gill, Duane A., Ritchie, Liesel A., Picou, J. Steven, 2013. Collaborative research to investigate and document social impacts of high-stakes litigation resolution in a renewable resource community. Final Report (ARC-0909497). National Science Foundation, Washington, D.C.
Gill, Duane A., Ritchie, Liesel A., Picou, J. Steven, Langhinrichsen-Rohling, J., Long, Michale A., Shenesey, J.W., 2014. The exxon and BP oil spills: a comparison of psychosocial impacts. Nat. Hazards doi:http://dx.doi.org/10.1007/s11069-014-1280-7.
Gill, Duane A., Ritchie, Liesel A., Picou, J. Steven, 2015. Litigation and settlements following the Exxon Valdez and BP deepwater horizon oil spills: when the disasters are crimes, In: Harper, D.W., Frailing, K. (Eds.), Crime and Criminal Justice in Disaster. third edition Carolina Academic Press, Durham, NC.
Gill, Duane A., 1994. Environmental disaster and fishery co-management in a natural resource community: impacts of the Exxon Valdez oil spill. In: Dyer, C.L., McGoodwin, J.R. (Eds.), Folk Management in the World's Fisheries: Implications for Fisheries Managers. University of Colorado Press, Boulder, CO, pp. 207–235.
Gill, Duane A., 2007a. Secondary trauma or secondary disaster? Insights from Hurricane Katrina. Sociol. Spectr. 27 (6), 613–632.
Gill, Duane A., 2007. Technological Disaster, Resource Loss and Long-Term Social Change in a Subarctic Community: Exxon Valdez Oil Spill Impacts on Alaska

Natives and Commercial Fishermen in Cordova, Alaska—2001–2006. National Science Foundation award # 0082405. Social Science Research Center, Mississippi State University. Available at: www.ssrc.msstate.edu/publications/ExecSumm_NSF_2007.pdf.
Gill, Duane A., 2008. Exxon valdez oil spill litigation and community resilience. Nat. Hazards Observer 33 (2) (1,4-6 Available at: http://www.colorado.edu/hazards/o/archives/2008/nov08/nov08_observerweb.pdf).
Gramling, Robert, Freudenburg, William R., 1997. The Exxon Valdez oil spill in the context of U.S. petroleum politics. In: Picou, J.S., Gill, D.A., Cohen, M. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque, IA, pp. 71–91.
Hannigan, John A., 1995. Environmental Sociology: A Social Constructionist Perspective. Routledge, London.
Hirsch, Willaim, 2007. Justice delayed: seven years later and No end in sight. In: Picou, J.S., Gill, D.A., Cohen, M. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque, IA, pp. 271––307.
Hobfoll, Stevan E., 1989. Conservation of resources: a new attempt at conceptualizing stress. Am. Psychol. 44 (3), 513–524.
Hobfoll, Steven E., 1991. Traumatic stress: a theory based on rapid loss of resources. Anxiety Res. 4, 187–197.
Horowitz, Mardi J., Wilner, N., Alvarez, W., 1979. Impact of event scale: a measure of subjective stress. Psychosom. Med. 41, 209–218.
Horowitz, Mardi J., 1974. Stress response syndromes: character style and brief psychotherapy. Arch. Gen. Psychiatry 31, 768–781.
Horowitz, Mardi J., 1986. Stress Response Syndromes. Aronson, New York.
Hutchings, E., Devilly, G.J., 2005. Impact of Event Scale. . (Retrieved from) http://www.swin.edu.au/victims/resources/assessment/ptsd/ies.html.
Impact Assessment, Inc. (IAI), 1990. Economic, social and psychological impact assessment of the Exxon Valdez Oil Spill. Final Report Prepared for Oiled Mayors Subcommittee, Alaska Conference of Mayors, Anchorage, Alaska.
Impact Assessment, Inc, 1998. Exxon Valdez Oil Spill, cleanup and litigation: a collection of social impacts information and analysis, final report. Prepared for the Minerals Management Service, Vol. 1. Impact Assessment, Inc., LaJolla, CA.
Kroll-Smith, J. Stephen, Couch, Stephen R., 1993a. Technological hazards: social responses as traumatic stressors. In: Wilson, J.P., Raphael, B. (Eds.), International Handbook of Traumatic Stress Syndromes. Plenum Press, New York, pp. 79––91.
Kroll-Smith, J. Stephen, Couch, Stephen R., 1993b. Symbols, ecology and contamination: case studies in the ecological-Symbolic approach to disaster. Res. Soc. Prob. Public Policy 5, 47–73.
Kroll-Smith, J. Stephen, Baxter, Vern, Jenkins, Pam, 2015. Left to Chance: Hurricane Katrina and the Story of Two New Orleans Neighborhoods. University of Austin Press, Austin.
Lees-Haley, Paul R., 1988. Litigation response syndrome. Am. J. Forensic Psychol. 6, 3–12.
Lupton, Deborah, 1999a. Risk. Routledge, New York.
Lupton, Deborah, 1999b. Risk and Sociocultural Theory: New Directions and Perspectives. University Press, Cambridge, England.
Marshall, Brent K., Picou, J. Steven, Schlichtmann, Jan, 2004. Technological disasters, litigation stress and the use of alternative dispute resolution mechanisms. Law Policy 26 (2), 289–307.
Nicholls, Keith, Nicholls, J. Steven, Curtis, Joycelyn, Lowman, J.A., 2015. The utility of community health workers in disaster preparedness, recovery, and resiliency. J. Appl. Soc. Sci. Vol. 9 (2), 191–202.
National Oceanic and Atmospheric Administration (NOAA) nd. https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/other-specialized-programs/total-commercial-fishery-landings-at-major-u-s-ports-summarized-by-year-and-ranked-by-dollar-value/index.
Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), 2004. Coping With Technological Disasters: A User Friendly Guidebook. .
Palinkas, Lawrence A., Russell, Jon, Downs, Michael A., Petterson, John S., 1992. Ethnic differences in stress, coping and depressive symptoms after the Exxon Valdez oil spill. J. Nerv. Mental Dis. 180, 287––295.
Palinkas, Lawrence A., Petterson, John S., Russell, John, Downs, Michael A., 1993a. Community patterns of psychiatric disorders after the Exxon Valdez oil spill. Am. J. Psychiatry 150 (10), 1517–1523.
Palinkas, Lawrence A., Downs, Michael A., Petterson, John S., Russell, Jon, 1993b. Social, cultural, and psychological impacts of the Exxon Valdez oil spill. Hum. Org. 52 (1), 1–12.
Picou, J. Steven, Arata, Catalina M., 1997. Chronic psychological impacts of the Exxon Valdez oil spill: resource loss and commercial fishers. Report Prepared for the Prince William Sound Regional Citizens' Advisory Council, .
Picou, J. Steven, Gill, Duane A., 1995. The Exxon Valdez Oil Spill and Alaskan Natives in Cordova: A User's Guide to 1991 and 1992 Survey Data. Social Science Research Center, Mississippi State University.
Picou, J. Steven, Gill, Duane A., 1996. The Exxon Valdez oil spill and chronic psychological stress. In: Rice, R., Wolfe, D., Wright, B. (Eds.), Proceedings of the Exxon Valdez Oil Spill Symposium American Fisheries Symposium, vol. 18. American Fisheries Society, Bethesda, MD, pp. 879–893.
Picou, J. Steven, Gill, Duane A., 1997. Commercial fishers and stress: psychological impacts of the Exxon Valdez oil spill. In: Picou, J.S., Gill, D.A., Cohen, M. (Eds.), The Exxon Valdez Disaster: Readings on a Modern Social Problem. Kendall-Hunt, Dubuque, IA, pp. 211–236.
Picou, J. Steven, Gill, Duane A., 2000. The Exxon Valdez disaster as localized environmental catastrophe dissimilarities to risk society theory. In: Cohen, M.J. (Ed.), Risk in the Modern Age: Social Theory, Science and Environmental Decision-Making. St. Martin's Press Inc., New York, pp. 143–170.
Picou, J. Steven, Martin, Cecelia G., 2007. Long-Term impacts of the Exxon Valdez oil spill: patterns of social disruption and psychological stress seventeen years after the disaster. Report Prepared for the National Science Foundation. University of South Alabama.
Picou, J. Steven, Gill, Duane A., Dyer, Christopher L., Curry, Evans W., 1992. Disruption and stress in an Alaskan fishing community: initial and continuing impacts of the Exxon Valdez oil spill. Ind. Crisis Q. 6 (3), 235–257.
Picou, J. Steven, Marshall, Brent K., Gill, Duane A., 2004. Disaster, litigation and the corrosive community. Soc. Forces 82 (4), 1448–1482.
Picou, J. Steven, Formichella, Cecelia, Marshall, Brent K., Arata, Catalina, 2009. Community impacts of the Exxon Valdez oil spill: a synthesis and elaboration of social science research. In: Braund, Stephen R., Kruse, Jack (Eds.), Synthesis: Three Decades of Social Science Research on Socioeconomic Effects Related to Offshore Petroleum Development in Coastal Alaska. MMS OCS Study Number 2009-006. Minerals Management Service. Anchorage, AK, Alaska,OCS Region, pp. 279–307.
Picou, J. Steven, 2000. The 'Talking circle' as sociological practice: cultural transformation of chronic disaster impacts. Sociol. Pract.: J. Clin. Appl. Sociol. 2, 77–97.
Picou, J. Steven, 2009a. When the solution becomes the problem: the impacts of adversarial litigation on survivors of the Exxon Valdez oil spill. Univ. St. Thomas Law J. 7 (1), 68–88.
Picou, J.S., 2009b. Disaster recovery as translational applied sociology: transforming chronic community distress. Humboldt J. Soc. Relat. 32, 123–157.
Piper, E., 1993. The Exxon Valdez Oil Spill: Final Report, State of Alaska Response. Alaska Department of Environmental Conservation, Anchorage, AK.
Relis, T., 2002. Civil litigation from litigants' perspectives: what we know and what we don't know about the litigation experience of individual litigants. Stud. Law Politics Soc. 25, 151–212.
Ritchie, Liesel A., Gill, Duane A., 2007. Social capital theory as an integrating framework for technological disaster research. Sociol. Spectr. 27, 1–26.
Ritchie, Liesel A., Gill, Duane A., 2010a. Fostering resiliency in renewable resource communities: subsistence lifescapes and social capital. In: Rivera, J.D., Miller, D. S. (Eds.), Minority Resiliency and the Legacy of Disaster. Edwin Mellen Press, Ltd., Lewiston, NY.
Ritchie Liese, A., Gill, Duane A., 2011. Considering Community Capitals in Disaster Recovery and Resilience PERI Scope (Public Entity Risk Institute) 14(2). https://www.riskinstitute.org/peri/component/option,com_deeppockets/task,catContShow/cat,86/id,1086/Itemid,84/.
Ritchie, Liesel A., Gill, Duane A., Picou, J. Steven, 2011. The BP disaster as an Exxon Valdez rerun. Contexts 11 (1), 30–35.
Ritchie, Liese A., Gill, Duane A., Farnham, Courtney, 2012. Recreancy revisited: beliefs about institutional failure following the Exxon Valdez oil spill. Soc. Nat. Res. 26, 617–655. doi:http://dx.doi.org/10.1080/08941920.2012.690066.
Ritchie, Liesel A., 2004. Voices of cordova: social capital in the wake of the Exxon Valdez oil spill. Ph.D. Dissertation, Department of Sociology, Anthropology, and Social Work. Mississippi State University.
Ritchie, Liesel A., 2012. Individual stress, collective trauma, and social capital in the wake of the Exxon Valdez oil spill. Sociol. Inq. 82 (2), 187–211.
Ritchie, Liesel, A., Gill, Duane, A., Picou, Steven, J., 2015. Mitigating litigating: an examination of social and psychological impacts of the 2012 BP claims settlement in coastal Alabama. Presentation at the annual meetings of the Southern Sociological Society, New Orleans, LA.
Rodin, Mari, Downs, Michael, Petterson, John, Russell, John, 1992. Community impacts resulting from the Exxon Valdez oil spill. Ind. Crisis Q. 6, 219–234.
Seidener, A.L., Amick, A.E., Kilpatrick, D.G., 1988. Impact of event scale. In: Hersen, M., Bellack, A.S. (Eds.), Dictionary of Behavioral Assessment Techniques. Pergamon Press, New York, NY, pp. 255–257.
Smythe, C.W., 1988. Harvest and Use of Fish and Wildlife Resources by Residents of Petersburg, Alaska. Alaska Department of Fish and Game, Department of Subsistence, Anchorage, Alaska (Technical Paper 164).
Spies, Robert B., Rice, Stanley D., Wolfe, Douglas A., Wright, Bruce A., 1996. The effects of the Exxon Valdez oil spill on the Alaskan coastal environment. Am. Fish. Soc. Symp. 18, 1–16.
Strasburger, Larry, 1999. The litigant-Patient: mental health consequences of civil litigation. J. Am. Acad. Psychiatry Law 27, 203–211.
Stratton, Lee., 1989. Resource use in cordova: a coastal community of southcentral Alaska. Technical Paper 153. Alaska Department of Fish and Game, Department of Subsistence, Anchorage, Alaska.
Sward, Ellen E., 1989. Values, ideology, and the evolution of the adversary system. Indiana Law J. 64, 301–355.