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Well I'm standing by the river
But the water doesn't flow
It boils with every poison you can think of.
And I'm underneath the streetlight
But the light of joy I know
Scared beyond belief way down in the shadows.
And the perverted fear of violence
Chokes the smile on every face
And common sense is ringing out the bell.
This ain't no technological breakdown
Oh no, this is the road to hell

Chris Rea, The Road to Hell (part 2)

Note: St Martin's Press was unable to obtain permission to include the above lyrics from Chris Rea's album: Road To Hell, but we feel they were an important statement for this work and have 'unofficially' included them in this reprint.

7 The *Exxon Valdez* Disaster as Localized Environmental Catastrophe: *Dissimilarities to Risk Society Theory*

J. Steven Picou and Duane A. Gill

This . . . transformation of threats to nature from culture into threats to the social, economic, and political order is the concrete challenge of the present and the future.

Ulrich Beck, *Risk Society*

INTRODUCTION

Contemporary social theorists have begun to devote increasing attention to the sources, nature, and consequences of ecological degradation in the modern world.¹ This work has begun to amend the historically conditioned social science view of the natural environment as an 'objective reality.' The pre-existing perspective legitimized opportunities for control by human social organization and created a theoretical void concerning the social risks posed by massive environmental catastrophes and global environmental damage.² As such, recent conceptualizations of the environment-society relationship have provided both theoretical and empirical direction regarding the economic, social, and psychological consequences of contamination to the biosphere. The emergence of environmental harm as a barometer for the distribution of technological risks represents a paradigmatic shift in social theory to a more 'analytical heuristic' concern with global environmental degradation and its attendant social consequences. Although the latter issue is inextricably interwoven with postmodern thought, several European sociologists have begun to focus on technological risk and catastrophe, as well as on the emergence of a modern 'consciousness of threat,' as one perspective for explaining the demise of classical industrial society.³

In particular, the German sociologist Ulrich Beck argues that the broad contours of this social malaise of modernity include a variety of known risks, dangers, and impacts produced by industrial society and transformed through the process of 'reflexive modernization.' This transformation signals that, ultimately, the entire planet may succumb to the 'juggernaut of modernity,' the runaway train that leads down the 'road to hell.'⁴ Toxicity in modernity is more threatening and ominous because it introduces new forms of uncertainty, posing decisive risks to humans which are irreversible and cumulative, and environmental degradation that can be disastrous in scope. These modern risks are often both physically and socially invisible, therefore inviting debate and conflict over the calculation of alleged impacts and damage claims.⁵

Beck also asserts that through a process of so-called 'organized irresponsibility' the institutions and calculus of classical industrial society fail to restore catastrophic damage in the risk society. The insecurity of the present is further elaborated by ongoing scientific debate and social criticism, mediated by reflexive modernization, which results in the unbinding of both science and politics. As Beck suggests, until now, 'sociology . . . has not asked what the threat of self-annihilation means to society.'⁶ In his writings, environmental degradation becomes the focal point for a theory of modern society. This theoretical development out of European sociology is relevant to American environmental sociology, particularly that line of research concerned with the social effects of human-caused environmental contamination.⁷

As outlined in this volume's introductory chapter, environmental sociology in the United States has been rather atheoretical in its development through its failure to address adequately environmental degradation and to build a theoretical consensus.⁸ Although issues of political economy, environmental values, social movements, and environmental attitudes have traditionally provided the content of courses on environmental sociology in American universities, none of these approaches conceptually integrates social structure and change with the biophysical environment.⁹ Indeed, one can argue that the significance of the social is completely overlooked in environmental risk assessments that, as Beck asserts, '[R]esult in a sometimes trivial and meaningless discussion of nature without people.'¹⁰

John Hannigan criticizes this 'nonreflexive realist' position and proposes in its place a social constructivist paradigm for environ-

mental degradation and the emergence of social movements around such issues.¹¹ Given that ecological consciousness and action show variation over the course of time, Hannigan argues that 'environmental problems do not materialize by themselves; rather they must be "constructed" by individuals or organizations who define pollution . . . as worrisome and seek to do something about it.'¹² Hannigan applies his constructivist model to environmental problems, communications, science, and risks through case studies of acid rain, biodiversity loss, and biotechnology, providing a conceptual framework for environmental sociology. However, this model ignores any realist account of environmental degradation and is limited by an 'oversocialized' conception of the environment.¹³

A more 'reflexive realist' view recognizes that the physical destruction of the environment can be empirically measured and scientifically monitored, thus avoiding an extreme form of naive constructivism. Both perspectives – constructivist and realist – are relevant and necessary for understanding the human consequences of environmental degradation. We need to view the physical deterioration of the natural environment, the social construction of this demise, and the subsequent consequences for the human community within a dynamic socio-cultural context. Culturally based relationships between the biophysical environment and human communities connect realist and constructivist positions. As Szerszynski and his collaborators have recently noted, risk society is characterized by 'the problematization of objective physical-biological dangers.'¹⁴

Contamination of the biophysical environment results in 'a social crisis in the relationship to nature.'¹⁵ Risk society theory frames this crisis in terms of localized hazards and reinterprets them through global concepts such as 'organized irresponsibility,' 'anxiety community,' and 'reflexive modernization.' In this chapter, we will review selected themes from these macro-theoretical concepts and contrast them with data from a more localized catastrophic event.

The verification of elements of risk society theory for environmental catastrophes should provide important information for understanding social change in late modernity. As such, the remainder of this chapter will focus on an evaluation of the appropriateness of selected themes from Beck's theoretical approach for explaining community responses to catastrophic environmental degradation. Specifically, we will use longitudinal social impact data from the 1989 *Exxon Valdez* oil spill to illuminate the utility (and indeed non-utility)

of themes from risk society theory for explaining community responses to the most environmentally destructive oil spill in North American history.

ENVIRONMENTAL CATASTROPHE AS TECHNOLOGICAL DISASTER

Beck elaborates a model of social change that moves from pre-modern through classical modern to late-modern society.¹⁶ This global model identifies a historical shift from natural hazards to technological hazards for the risk society, as well as a corresponding transformation from local to global threats. Beck is rather adamant about the dire invisible, irremediable, and irreversible consequences of catastrophes arising from chemical, nuclear, and genetic technologies. Risks emanating from these industrial activities are also socially explosive and contribute to organized public mobilization efforts.

This perspective has commonalities with recent social science research concerning technological disasters in the United States. In particular, case studies of localized contamination have documented social conflict and disruption, psychological pathology, and negative health impacts.¹⁷ These slowly evolving 'chronic technical disasters' and more sudden 'technological disasters' typically result in toxic contamination of the environment through organizational agency and involve the identification of a principle responsible party for legal reparations.¹⁸ Researchers have debated the utility of distinguishing technological disasters from natural disasters and it is increasingly apparent that untoward events resulting from the failure of technology are coming to occupy key theoretical and empirical positions among scholars working in this field.

Although any type of disaster may impair a social system's ability to maintain biological survival, social order, social meanings, and social interaction, research has revealed some fundamental differences between the consequences of natural and technological disasters. Erikson describes these technological catastrophes as a 'new species of trouble,' in that these events 'contaminate rather than damage; pollute, befoul, and taint rather than just create wreckage' and 'scare human beings in new and special ways.'¹⁹

Whereas the literature defines events such as floods, volcanic eruptions, earthquakes, hurricanes, drought, blizzards, and torna-

does as disasters caused by 'nature' or 'acts of God,' the causes of technological disasters are frequently traced to human culpability or technological malfunction. Natural disasters involve a lack of control over processes perceived to be beyond human dominion, while technological disasters engender a loss of control over technical processes generally thought to be subject to management. Accordingly, technological disasters involve the identification of certain entities that can be blamed and held accountable for malfeasance. It is also worthwhile to observe that historical experiences with natural disasters have led communities to develop emergency preparedness and planning procedures, as well as disaster subcultures (sets of cultural defenses grounded in knowledge, norms, values, and technology) with which to respond to hazardous situations arising from the forces of nature. Society cannot wholly prevent adversity from such sources, but it can anticipate, predict, prepare, defend, and recover from nature's most extreme environmental events.²⁰ In contrast, we tend to perceive technological disasters as preventable and thus the organizations whose actions are ultimately responsible for these situations rarely anticipate them in advance. Government has certain responsibilities in all untoward events, but the plot thickens when industrial corporations become the focus of public blame and acrimony. The complexity of organizational and technological operations, combined with the secretiveness in which many firms shroud their manufacturing operations, confounds local efforts to prepare for a technological disaster.²¹

Because toxic contamination threatens assumptions about environmental safety, technological disasters frequently sever the relationship between people and the natural environment. This loss of 'lifescape' (i.e. the personal security of the biophysical surround) leads to the erosion of institutional trust among victims.²² Natural disasters produce obvious physical damage to the built environment (e.g. buildings, roadways, bridges), but communities typically rebuild and recover quickly.²³ However, many technological disasters do not result in physical damage to infrastructure, but rather contaminate the local ecology. We cannot observe these agents through conventional means and, as Vyner notes, 'it is quite impossible for humans to determine if and when they are being exposed.'²⁴ The intractability of these events is further compounded when physicians using sophisticated equipment are unable to confirm cases of exposure. The undetectability of contaminants and the complex etiology of resulting health effects contribute to lingering uncertainty concerning

the personal threats of exposure (see also the chapter by Michael Edelstein in this volume).

Within this milieu of indeterminacy, potential victims often advance rival interpretations of the situation. Kroll-Smith and Couch observe that, 'What emerges are competing views of the same local world: It is dangerous and uninhabitable; you should be concerned. No, the environment is safe and habitable; you should get control of yourself.'²⁵ Contamination engenders numerous risks – for instance to family and personal health, financial security, social relationships – and creates considerable distress among victims as they respond as best they can to these novel threats.²⁶

As researchers have frequently observed, natural disasters follow a predictable pattern in which a community moves from a state of equilibrium through a series of stages: warning, threat, impact, inventory, rescue, remedy, recovery, and rehabilitation.²⁷ Technological disasters rarely follow such a linear pattern. Although some of these events have an identifiable beginning (e.g. Three Mile Island, Chernobyl, Bhopal), others originate long before people develop an awareness of a specific problem. Many instances of slow-onset chemical contamination, in which hazardous substances can remain buried underground and can seep slowly into homes and water sources over extended periods of time, fall into this latter category. Kroll-Smith and Couch contend that such cases of contamination 'trap portions of the population in the warning, threat, and impact stages.'²⁸ Efforts to secure assistance and gain recompense after a technological disaster typically require affected communities to enter into class-action litigation. Responsible organizations generally react defensively and attempt to minimize the perceived amount of damage for which they (and their insurers) could be financially liable. Protracted legal wrangling and processes of restoration following technological disasters may continue for decades and this creates ambiguous endings and deprives individuals of a sense of event closure.²⁹ These unsettling features usually give rise to a subsequent disaster – an emergent stressor that victims continue to experience over time. Such secondary disasters keep people locked into a state of long-term distress by evoking recurrent reminders of the original event and perpetuating uncertainty regarding future outcomes. In short, this chronic pattern creates a 'corrosive community,' an important analogue to Beck's concept of the 'anxiety community.'³⁰

The corrosive community is characterized by the deterioration of social relationships resulting from apprehension, fear, anger,

confusion, and stress. This breakdown of the social fabric occurs in a milieu of anxiety and unease, facilitated by competing definitions of contamination, environmental damage, and pending threats. Victims also become distrustful of institutional offers of compensation and support. In some cases, as occurred at the infamous Love Canal, the community consequences of technological disasters are ultimate – residents disappear, although homes and buildings might remain intact.

This point is instructive because it suggests that American environmental sociologists have independently been investigating the outcomes of Beck's notion of 'localized self-annihilation,' providing micro-level evidence of themes found in contemporary social theoretical literature. In the following section we outline some of the global concepts from risk society theory that are relevant to environmental sociologists' empirical understandings of technological disasters.

CATASTROPHE IN MODERNITY: COMMUNITY IN RISK SOCIETY

Technological disasters are clearly part of the landscape of the twenty-first century. The modern age signals a shift in the nature of risk. 'Modernity is risk culture' and the acknowledgment of late and high modernity phases, or even a postmodern society, identifies a sociological concern with the 'unthinkable' or the 'dark side' of progress. This theme is embodied in the recent work of both Ulrich Beck and Anthony Giddens, who pose the 'risk of societal self-annihilation' and a social dynamic that creates doubt regarding incalculable high-consequence risks as characteristics of the present era. 'Risk society is catastrophic society' and Beck distinguishes a class of novel, contemporary hazards that are different from the natural disasters which have customarily threatened humanity.³¹

Beck's conceptualization of catastrophe is global in scope. Modern concerns such as anthropogenic climate change and ozone depletion have a holistic impact on all organic matter and extend across both time and space to encompass distant others and future generations. Importantly, these new threats preclude the provision of compensation for victims (or at least make this task very difficult given prevailing institutional mechanisms).³² Such situations are technological breakdowns that harm the physical environment in

largely invisible and unknown ways. Accountability for the social problem of environmental degradation cannot be determined and victims confront corporate, government, and legal institutions engaged in weaving webs of 'organized irresponsibility.'³³

Although for Beck catastrophes are supra-national, he notes that the social risks of late modernity have both short- and long-term consequences for plants, animals, and people. Furthermore, in building his theory of risk society he uses the chronic mercury contamination of Villa Parisi (Brazil) and the explosive industrial accident at Bhopal (India) to illustrate actual technological disasters in developing countries.³⁴ Elsewhere, he evokes Chernobyl as the classic example of the tendency of the risk society for self-annihilation.³⁵ Beck has also written that the risks of modernity can be geographically localized and forecasts their unpredictable social consequences to be tortuous.³⁶ He describes the emergence of a 'solidarity of anxiety' among victims and how such a condition contributes to the 'anxiety community.' Beck skirts the details concerning the anxiety community because, in his estimation, the ability of such a collectivity to withstand stress and not self-destruct is unknown. As he observes, 'anxiety has not been a foundation for rational action.'³⁷

Beck's theoretical treatment contains occasional reference to more situated contexts. Specifically for our current purposes we suggest a more focused definition of catastrophe, relative to the concept of disaster. Furthermore, Beck's notion of the anxiety community, and his subsequent questions regarding this construct, suggests that environmental disasters may very well range in scope from ultimate global self-annihilation to instances of smaller-scale destruction. The accumulation of thousands of small-scale incidents of environmental harm could give rise to a pattern of collective anxiety in the culture of the risk society. Accordingly, an understanding of localized catastrophes and their social impacts, as well as the identification of either mobilized 'anxiety' or depressed 'corrosive' communities and subsequent patterns of social change, provides a pathway for verifying empirically aspects of Beck's theoretical work.

We are particularly interested in several of Beck's macro-level themes and his occasional examples of concrete, localized catastrophes. Our discussion will attempt to bridge these abstract theoretical concerns to the micro-context of the 1989 *Exxon Valdez* oil spill in Alaska. This objective is, at best, a hazardous undertaking. Nonetheless, Beck describes the articulation of risk society as

containing 'some empirically oriented, projective social theory without any methodological safeguards,' and such a statement suggests relevance to the social impacts of localized environmental destruction. We derive some middle-range interpretations of risk society theory and contrast these themes with data on the *Exxon Valdez* disaster.

Beck's notion of catastrophe connotes an unthinkable and irreversible risk of environmental harm that threatens the lives and livelihoods of present and future generations of people, flora, fauna, air, water, and soil. Researchers have traditionally viewed the concept of 'catastrophe' in terms of extreme events in which the vast majority of residents of an area suffer dislocation. The incident disrupts normal, everyday routines for an extended period of time and strains the local social and cultural infrastructure with continuing threats to vulnerable human groups.³⁸ In short, we can differentiate catastrophes from disasters by the fact that they produce social damage for entire communities and this impairment can persist over an extended period of time.

Localized environmental catastrophes are highly probable in the risk society. Concrete experiences of technological failure from Chernobyl, Bhopal, Three Mile Island, and Love Canal, as well as a host of other less ignoble places, alert us to the possibility of the 'ultimate catastrophe,' that is the destruction of all organic life on the planet. However, the global risk society – particularly in a post-Cold War era – will in all likelihood come about through the accumulation of an ever-growing number of smaller-scale incidents. The proliferation of novel threats will occur within situated socio-cultural contexts engaging in processes of reflexive modernization and producing communities that are self-conscious of present and impending dangers.³⁹

For Beck, it is this 'reflexivity of self-destruction' that drives people together, generating a 'solidarity of anxiety.' At this point, Beck becomes rather vague about the nature of the anxiety community. Initially, it seems to be a critical prerequisite for political action (i.e., a response of reflexive modernization), yet he acknowledges that it is unclear how such mobilization will occur.⁴⁰

The important question at present is whether the anxiety community associated with the risk society is able to mobilize residents for collective action. Alternatively, will it generate a pattern of local social fragmentation and distress? Studies of the community impacts of technological disasters in the United States point to an important parallel with the concept of the corrosive community.

This socially destructive process tends to emerge during the aftermath of technological disasters, thereby denying the possibility of recovery or mobilization for recovery. Such collectivities are characterized by: (1) the ambiguity of biophysical damage, (2) the likelihood of a debilitating (rather than a therapeutic) process of social response, and (3) the overall tendency toward socio-cultural disruption.⁴¹ In contrast to the solidarity of Beck's anxiety community, the conflict, uncertainty, fear, and distrust in the corrosive community loom as the 'tortuous' path for localized victims traumatized by these untoward events.

We turn our attention toward exploring these themes in the light of data on the social impacts from the *Exxon Valdez* accident. This examination will give a hearing to people Beck describes evocatively as the 'voices of the side-effects,' in this case those individuals who bear the risks of the sprawling technical system responsible for the global transport of oil. Industry experts estimated that an oil spill of catastrophic proportions would occur in Alaska only once every 227 years.⁴² However, this low probability event did take place and it had profound consequences for the three small communities in the surrounding vicinity that are economically and culturally dependent on renewable natural resources.⁴³

THE EXXON VALDEZ DISASTER AS LOCALIZED CATASTROPHE

On March 24, 1989, the supertanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound off the southcentral coast of Alaska resulting in an oil spill that caused extensive ecological damage. The vessel released over 11 million gallons of crude oil that over the course of the following weeks and months inundated a vast intertidal area and eventually spread south into the Gulf of Alaska. Alyeska, the consortium of multinational oil companies that operates the pipeline and the oil transport facility located in the coastal town of Valdez, was responsible for containing the spillage. Corporate officials, however, missed numerous opportunities to limit the effects of the accident within the first 72 hours due to inadequate communications and a lack of readily available equipment. Ultimately, the initial organizational response proved to be a complete failure. Ensuing storms and high seas over the next three-month period washed oil across approximately 1900 kilometers of rugged Alaskan coastline. Controversial clean-up methods, including the

use of hot water and chemical detergents, resulted in further damage to the surrounding ecological resources and alarmed local residents.

Because the oil spill occurred during the season of greatest biological productivity, it had an immediate and devastating effect on both the natural environment and the human communities that rely on the region's renewable natural resources. The casualty list of most visible damage included more than 250 000 seabirds, 144 bald eagles, approximately 3500 sea otters, 300 seals, and 22 whales. Furthermore, marine scientists have linked declines in populations of pink salmon and herring to destruction of the bioregion's food chain and to contamination of spawning areas.⁴⁴

Needless to say, the oil spill severely impaired the isolated local communities that are economically dependent on commercial fishing. Furthermore, the Prince William Sound area is home to several groupings of Alaska Natives, and village life, largely arranged around the subsistence gathering of fish and wild game, was severely disrupted.⁴⁵ These local residents could not conduct their traditional harvests of herring, seal, salmon, and clams because of fears of contamination (and a state-imposed moratorium). We have elsewhere described these settlements as *renewable resource communities*, that is localities with cultural, social, and economic structures organized around the collection and exchange of renewable natural resources.⁴⁶ There are three such communities in Prince William Sound – two Alaska Native villages (Cheneg Bay and Tatitlek) with populations of less than one hundred persons and a primarily non-Alaska Native town (Cordova) comprising approximately 2500 people. All three communities are located in an extremely remote area and are accessible only by airplane or boat. Given their distinct dependence on renewable natural resources, these communities are extremely vulnerable to perturbations of the biophysical environment. In addition to its obvious immediate social dislocation, the oil posed longer-term threats to the cultural and economic viability of these communities due to the damage suffered by local biota.

Commercial fishers in Prince William Sound have experienced a succession of unusual seasons since the accident. State authorities canceled the annual herring season five times during the seven years following the oil spill. Although there was a limited herring harvest in 1997, prospects for the recovery of this fishery remain uncertain. Pink salmon have experienced sporadic returns during most years since the accident and the stability of this species is questionable. Among local residents, economic hardships resulting from disruption of commercial fishing and uncertainty regarding

resource recovery have contributed to ongoing cultural, social, and psychological stress.

The *Exxon Valdez* oil spill exemplified the basic features of a localized technological catastrophe for these Prince William Sound communities. The accident was the result of a loss of control over complex organizational and technical activities involving corporate, political, and societal arrangements.⁴⁷ The public variously assigned blame to the tanker captain, Exxon, Alyeska, oil corporations, and government agencies.⁴⁸ Litigants (many from the Prince William Sound communities) filed hundreds of lawsuits and the legal proceedings will likely continue well into the next century.⁴⁹ The biophysical damage stemming from the oil spill directly disrupted local environment-community relationships. Differing definitions of the amount of ecological damage, the threat to future economic viability, and the legal responsibility of corporate and government actors created deep schisms and sharp conflicts. Some community members earned considerable sums of money working on the clean-up during the oil spill's immediate aftermath, while other local residents did not, would not, or could not gain employment. Such inequity intensified internal disputes.⁵⁰

For many local residents, the early announcements of a catastrophic oil spill virtually within sight of their homes served to give the event an identifiable beginning. However, few people living in the Prince William Sound area have experienced a sense of closure and, indeed, the accident's residual effects continue to take their toll. The aftermath of the oil spill, in the form of failed fisheries and protracted litigation, have contributed to a continuing pattern of social anxiety and distress. Over the past eight years, we have used survey and ethnographic methods to systematically collect data in several Alaskan communities on the accident's social impacts. In the following section, we draw upon this research to highlight selected themes in Beck's risk society theory.⁵¹

DISSIMILARITIES TO REFLEXIVE MODERNIZATION: SCIENCE, COUNTER-SCIENCE, AND ORGANIZED IRRESPONSIBILITY

The extent of the ecological damage caused by the *Exxon Valdez* oil spill has been the subject of numerous scientific debates that continue to be socially constructed nearly a decade after the actual

event. Although it is indisputable that the *Exxon Valdez* spilled more than 11 million gallons of oil into Prince William Sound, it has been impossible to apply rigorous scientific models to determine unambiguously the accident's immediate and continuing ecological damages. This feature has given Exxon, the principle responsible party, a moral and legal rhetoric to avoid ultimate accountability.⁵² During the four years following the oil spill, a judicially ordered moratorium prevented data pertaining to biological effects from being publicly released and this caused many local residents to question both the legal and scientific rationale for perpetuating uncertainty. Once researchers working for the state and federal governments made public their initial findings at an Anchorage symposium early in 1993, Exxon utilized one month later the annual meeting of an industrial research association, the American Society of Tests and Measurements, to present and promote the results of its own studies. While the evidence aired at the Anchorage conference described a pattern of serious – albeit in certain instances uneven and indistinct – damage, Exxon's investigations suggested that the oil spill had minimal, if any, ecological impacts.⁵³ More recently, a researcher who was working under Exxon sponsorship, suggested that because of 'environmental advocacy,' early calculations overestimated the oil spill's impacts, thereby exaggerating Exxon's moral and legal obligations. This assertion appeared in a peer-reviewed academic journal, adding credibility to the oil company's assessments of the damage caused by the accident.⁵⁴

The socially constructed 'spill science,' or research into the event's effects premised on preconceptions, resulted in two distinct – and contradictory – bodies of purportedly objective data. Ott describes this incompatible discourse in the following manner:

Something went terribly wrong with 'science' in the aftermath of the *Exxon Valdez* oil spill as illustrated by the extreme differences in the findings of key studies between government and industry. These differences are symptomatic of underlying problems with the scientific and regulatory processes that were designed to produce quality science.⁵⁵

After the *Exxon Valdez* accident, as has become routine for large oil spills, the federal and state trustees for natural resources and the principle responsible party (i.e. Exxon) designed and executed studies to collect data to support their partisan positions. For the government, the claim was that the spillage injured resources and

the relevant agencies conducted research to determine the extent of those damages. In contrast, Exxon held the position that resources may have been impaired, but natural recovery would be rapid and the company (and its contractors) proceeded to determine what and how much was unharmed to minimize its liability.⁵⁶

For many residents of the Prince William Sound area this pattern of science and counter-science continues to be disconcerting and frustrating. A leading marine scientist residing in Cordova noted:

The local people do not understand the complexity of determining spill impacts on the salmon and herring fisheries. There has been more variation in catch totals in the years preceding the spill than the years since the spill. So how can you absolutely say that poor salmon runs are due to the spill?⁵⁷

Local residents interpreted this spill science as politics and the resulting litigation, in Beck's terminology, as 'institutional political discourse.' The following statements by Cordova residents illustrate this point:

The whole mess – the spill, studies of impacts and the lawsuit – is all about money. Exxon's too powerful and rich – they will buy their own science and through their PR [public relations] make it real. We are just a gnat on an elephant's leg.

I don't understand why scientific information hasn't been released. Decisions are being made that could be clarified by information.

I think that it is all politics. Exxon is not really out to pay for what it has done. Exxon will fill a few pockets to avoid paying. It has also made money as a tax write-off.

Exxon and politicians put pressure on the news media to suppress the news. What they claim to be real is not. It's all hype to make money.

Spill science created a sense of distrust among local residents. Many Cordovans soon after the accident became sensitive to this loss of control and lack of institutional trust. For example, a majority of respondents from a community-wide survey expressed skepticism about Exxon's ability and willingness to clean up the oil spill, the science of ecological damage assessment, and the legal system set up to distribute compensation. In August 1989, only five

months after the accident, roughly seven out of ten Cordovans felt that the legal system would not require Exxon to conduct a satisfactory clean-up. Furthermore, 83 percent of our respondents thought that the company had publicly presented misinformation, 55 percent opined that Exxon was not telling the truth, and 51 percent asserted that there was a lack of public information about the oil spill and its ecological impacts. Most residents also maintained that Exxon's activities following the accident and the ensuing clean-up reflected 'legal advice' rather than a sincere effort to restore Prince William Sound and the surrounding vicinity.

This disenchantment with institutional responsibility is further reinforced by the survey data in Table 7.1. We found that the overwhelming majority of both community residents and commercial fishers were dissatisfied with corporate, government, scientific, legal, and media responses to the oil spill. Perhaps surprisingly, only one out of three respondents expressed satisfaction with local government activities, suggesting estrangement from both primary and secondary institutions responsible for managing risks associated with the local transport of oil. The pattern of organized irresponsibility observed by local residents, as well as issues of uncertainty associated with incomplete scientific accounts of ecological damages, contributed to a loss of institutional trust among community residents.

These observations also relate to the 'unbinding of science' that Beck discusses as part of the process of reflexive modernization. For the *Exxon Valdez* oil spill, competing social constructions of ecological damage were correlated with institutional interests and local residents quickly lost faith in science's ability to measure impacts objectively. For many of our respondents the ecological damage and the long-term threat to Prince William Sound was obvious and logical. The community-wide consensus regarding dissatisfaction with the accounts emanating from the full range of institutional actors is clearly indicative of a lack of trust in experts and their relevant support systems. This pattern of 'social recreancy' deters participation in community social movements and restricts the emergence of the subpolitical structures Beck foresees as emerging out of the anxiety community.

Table 7.1 Community satisfaction with institutional truth regarding the Exxon Valdez oil spill in Cordova, Alaska, 1992

| | Total community | Commercial fishers |
|---------------------------|-----------------|--------------------|
| Federal government | 14.9 | 8.3 |
| Alaska state government | 14.1 | 14.6 |
| Alyeska Corporation | 5.2 | 2.1 |
| Exxon Corporation | 6.1 | 2.7 |
| VECO Clean-Up Corporation | 6.3 | 0.0 |
| United States Coast Guard | 31.9 | 17.0 |
| Local government | 30.4 | 22.9 |
| Scientists | 19.9 | 20.5 |
| Lawyers | 8.5 | 8.7 |
| Local newspapers | 26.5 | 23.4 |

DISSIMILARITIES TO THE ANXIETY COMMUNITY: SOLIDARITY OR CONFLICT?

Although the *Exxon Valdez* oil spill did not pose a direct threat to the human residents of Prince William Sound, it placed in jeopardy the viability of Alaska Native subsistence culture and the economic resources of commercial fishers. Local renewable resource communities faced both immediate and long-term ecological damage from the unknown consequences arising from the sizeable release of 'a toxic, persistent chemical' in waters so necessary for their way of life.⁵⁸ One Alaska Native stated, '[The spill] is hurting more than anything else we ever experienced. Its like losing everything you had.'⁵⁹

The late Chief Walter Moganack, a widely respected Alaska Native elder, expressed the trauma of the unthinkable in the following manner:

The excitement of the season had just begun, and then, we heard the news, oil in the water, lots of oil killing lots of water. It's too shocking to understand. Never in the millennium of our tradition have we thought it possible for the water to die, but it's true.⁶⁰

Residents active in the local fisheries also felt immediately the impact of the oil spill. Following exceptional seasons during the two years prior to the accident, many commercial fishers invested their profits in additional capital equipment (e.g. boats, electronic equipment, nets). One of our respondents remarked in 1995:

I made a lot of money in [19]88, so I bought a warehouse to start a new business, a new boat, and a pick-up truck. In six years I've lost everything – three [fishing] permits, the boats, the warehouse, my wife, my family – everything! I don't think I'll get anything from the court, either – if I do its way too late to help me.

Some especially prescient local residents began to recognize the seriousness and the enduring quality of the oil spill's economic impacts as early as 1992. Several of them described to us the financial dislocation that the accident produced:

Since the spill I've lost a house in Montana, a lot in Montana, a new fishing boat, 25-foot Boston Whaler, 21-foot Munson Aluminum, 15-foot Boston Whaler, boat trailers, all my savings and my credit. Need I say more?

Cordova is suffering economic disaster at this time and is causing extreme hardships here. These surveys do not accurately portray the fear and despair that many of us are feeling. We have always been highly independent and now seem to have no control over our lives.

Since 1985 my husband and I have fought very hard to get ahead. We have worked very hard to get ahead. In 1988 we had \$180,000 saved to build a new boat and since that time we have had to sell everything – crab pots, property, one boat – just to stay afloat which we are not. Last year we couldn't even make our [fishing] permit payment for the first time since we got it in 1985. Fishing is only opened half as much. We just can't make it.

Our survey data from 1995 reveals that from 1990 to 1994 the per capita economic loss (projected less actual earnings) for local commercial fishers was nearly \$215 000. This continuing economic loss spiral severely affected the fishing economy of Cordova and is a major source of continuing social disruption and mental health impairment in the community.⁶¹

Beck acknowledges that anxiety communities are stressed. He also notes that it is an empirical question whether or not these communities can withstand stress, become politically mobilized, organize, and exert a reflexive political force. Table 7.2 addresses this theme by providing insight into the patterns of oil spill-related stress in Cordova over the last eight years. Data pertaining to the

Table 7.2 Intrusive stress and avoidance behavior scale means for the Exxon Valdez oil spill in Cordova, Alaska, 1989-97

| | Intrusive stress | Avoidance behavior |
|--|------------------|--------------------|
| Cordova community | | |
| 1989 (n = 117) | 16.5 | 11.1 |
| 1990 (n = 68) | 10.1 | 9.6 |
| 1991 (n = 221) | 9.4 | 7.3 |
| 1992 (n = 151) | 8.5 | 8.1 |
| Cordova Commercial Fishers | | |
| 1989 (n = 49) | 19.3 | 12.1 |
| 1990 (n = 27) | 10.1 | 9.7 |
| 1991 (n = 73) | 13.1 | 10.1 |
| 1992 (n = 48) | 11.8 | 11.4 |
| 1995 (n = 88) | 13.2 | 13.0 |
| 1997 (n = 65) | 13.1 | 11.3 |
| Cordova Alaska Natives | | |
| 1991 (n = 62) | 13.4 | 11.5 |
| 1992 (n = 40) | 14.6 | 10.7 |
| Clinical cases ¹ | | |
| Clinical patients (symptoms due to bereavement from death of a parent 3-6 weeks after death) | 21.6 | n.a. |
| Clinical patients (6 months after therapy for symptoms due to bereavement from death of parent) | 13.8 | n.a. |
| Clinical patients (11 months after therapy for symptoms due to bereavement from death of parent) | 11.4 | n.a. |
| Rape victims (2 years after incident) | | |

1. Data for clinical patients obtained from Howowitz (1976) and data for rape victims obtained from Seidner et al. (1988).

'impact of events' scale are available for the entire community and two high-impact groups: commercial fishers and Alaska Natives. The impact of events scale is a standardized psychological scale that measures two components of stress: (1) intrusive thoughts and recurrent images of a traumatic event, and (2) active attempts to avoid discussions or reminders of a traumatic event. This scale uses a specific event, in this case the Exxon Valdez disaster, to identify oil spill-related stress responses.⁶² As noted, intrusive stress refers to the extent to which individuals endure recurrent memories of troublesome events. This component of the scale is informative

because the frequent mental repetition of distressing experiences over long periods of time may indicate an increased vulnerability to disease progression and the deterioration of both physical and mental health.⁶³

Table 7.2 clearly reveals a chronic pattern of collective stress. However, as presented these measures may not capture the full dimensions of the anxiety community because groups within such aggregates are affected differently. For instance, commercial fishers and Alaska Natives – two groups intimately linked to local environmental systems – experienced higher levels of intrusive stress. These incidences of stress among Cordovans appear substantial when contrasted to clinical patients (e.g. rape victims), further underscoring the scope of the chronic, debilitating consequences of this event for local communities.

Social disruption and psychological stress from the accident also affected utilization patterns for mental health facilities in the Prince William Sound area. Rates of mental health and alcohol counseling during the post-accident period in two local clinics (Cordova and Valdez) were significantly higher than those recorded for the pre-oil spill years. Despite this trend, mental health service delivery was severely restricted after 1989 by high personnel turnover (during an eight-year period Cordova's mental health center had five directors and over 14 staff members) due to heavy client loads and 'professional burnout.' Such evidence raises questions about whether anxiety communities are able to mitigate the long-term collective stress produced by technological catastrophes solely with local resources.

As previously described, event-related stress characterizes most communities that have suffered the effects of technological failures. In the case of the Exxon Valdez oil spill we have been concerned primarily with the psychological symptomology of members of vulnerable groups. We collected psychological data for commercial fishers in Cordova in July 1995 and included in our survey instrument items designed to ascertain respondents' psychological symptoms and interpersonal relationships.⁶⁴

The results reveal that commercial fishers experienced relatively high levels of psychopathology – 20 percent of our sample evidenced severe anxiety and we classified 40 percent as having severe depression. Six years after the oil spill, we found 37 percent of commercial fishers had symptoms of spill-related Post-Traumatic Stress Disorder (PTSD). PTSD is a psychological disorder that identifies a delayed response

to a traumatic event characterized by intrusive thoughts and images, avoidance behaviors, and hyper-vigilant reactions. These psychological symptoms result from a specific traumatizing event. Even more significant was the finding that one out of every two commercial fishers manifested either severe depression, PTSD, or a combination of these symptoms of psychological impairment.

The identification of severe depression and PTSD among commercial fishers provides an indication that within the anxiety community, serious emotional disorders are associated with vulnerable groups and this may preclude the emergence of collective political responses. Furthermore, our data identify two additional factors that may limit the politicization of the anxiety community, specifically the breakdown of social support systems and severe economic dislocation.

We found that commercial fishers who experienced severe depression and PTSD encountered difficulty with their interpersonal relations. Problems with relatives and within families were correlated with severe levels of psychopathology. Additionally, commercial fishers with severe levels of depression and PTSD also reported deterioration of their physical health since the oil spill.

These results clearly suggest that residents of anxiety communities may be preoccupied with resolving internal social conflicts, grappling with economic losses, and (for some) dealing with the effects of severe psychopathology. Beck notes that in risk society the 'quality of community begins to change' – indeed, our analysis of data from the *Exxon Valdez* accident suggests that the quality of community deteriorates sharply in the aftermath of an environmentally destructive event and the transformed collectivity resembles more the conflict-based corrosive community than it does the politically charged anxiety community.⁶⁵ This situation is apparent from our respondents' descriptions of community changes over a seven-year period:

It is not the same small town with everyone pulling for each other. Now we are small groups going our own ways. Some old timers just couldn't handle the aftermath and moved away. The new people mostly seem to want to make a pocket full of money and leave for somewhere else.

The oil spill has permanently changed our lifestyle, our community will never be the same. There is a different feeling to me; more stress, less open, less everyone helping each other. The community does not feel as safe.

The food prices are atrociously high. Thirty families have moved away. People are drinking more – more alcoholism and more fights. Some friendships are only seasonal now.

More harsh feelings. More separation of the town. Oil spill issues have affected the community.

My husband got cancer three months after the spill. We believe that the stress from the oil spill caused cancer. There are many cancer cases in Cordova. The oil spill divided a lot of people, and it also reunited a lot of friendships. The spillionaires [residents who made sizable sums of money during the accident's immediate aftermath] caused a lot of resentment between those who helped and those who did not. Prices of groceries doubled and never went back down.

The town remains split because of the spill and those who made too much money from it. Also, a lot of people have died – seems like more than usual – stress?

Everyone got along well before, but now the city government and everybody else are fighting. There is a lot of bickering in the community.

When asked this question, my immediate response is tears welling up. I don't know why, but the pain and loss I felt two years ago can suddenly come forth. The spill and the subsequent disfunctionalism of many people in this town feels like a horrible killing cancer has been planted in our community and I feel ineffectual in bringing a positive change. I even feel a diminished energy to seek solutions.

The people in Cordova used to be so upbeat, but now they're so negative. There's a big split between the haves and have nots, particularly those who worked on the cleanup. Businesses are being told by banks to stop extending credit. Also backstabbing is going on, but before people were more congenial.

Other data collected from Cordova in 1992 do not support Beck's hypothesis that the anxiety community will evolve into a more active, politicized locality. This survey found that only 26 percent of our respondents had become more involved in community affairs since the oil spill. In contrast, over 40 percent indicated that they had become less active during the same time period. These findings

point to patterns of social fragmentation, distrust, and isolation that are characteristic of corrosive communities.

While social and economic instability continue to plague Cordova, Exxon's legal strategy has perpetuated divisiveness and uncertainty.⁶⁶ Rather than enhanced community solidarity, a significant proportion of Cordova residents have experienced since the oil spill continuing social conflict, economic loss, deteriorated social relationships, increased social isolation, severe psychopathology, and loss of trust in self and others. A long-time Cordova resident summarized his corrosive situation as follows:

I won't be the same, my family won't be the same, the community won't be the same. I don't go out on the Sound much any more. When I go, I don't see oil. (Unless you dig on the beaches) the scenery is just as nice as before, but is like someone turned off the sound. The [animals] are few, as are the birds. You cannot go two blocks in town without seeing some leftover from the spill. The papers, radio, and publications of any group talk about the oil spill, the environment, and our health. Every group has its own scientists, lawyers, and reports (none ever agree with anyone else). Mostly I'm just mixed up, I don't know who to believe or why. I don't trust my fellow man much any more and I don't know why. My life isn't as much fun and I don't know what to do about it.

CONCLUSIONS

Modern, high-consequence catastrophes are a critical element in Ulrich Beck's theoretical writings on risk society. We have attempted in this chapter to identify certain themes from Beck's oeuvre and to contrast his macro-level contentions with the micro-level formulations emerging from field studies of technological disasters. The conceptual *dissimilarity* between the anxiety community and the corrosive community provides one avenue for examining the social responses to the *Exxon Valdez* oil spill in the light of Beck's predictions concerning an emergent risk society. As we noted above, Beck is rather ambivalent about the outcomes of the anxiety community. Political mobilization, or meaningful subpolitical action, is also associated with other structural changes contained in his wide-ranging risk society theory. In this chapter, however, we have focused

solely on the issue of technological catastrophe and subsequent community response. Our analysis suggests that the contrasting concept of the corrosive community is more applicable to victims of the *Exxon Valdez* oil spill. The lay public's loss of trust in relevant institutions, prolonged economic dislocation, chronic patterns of psychopathology, and continuing community conflict has not created a social context conducive to political mobilization, community solidarity, or social movements.

We observe that when viewed as a macro-level theory of social change, Beck's writings may be temporally bound to the post-World War II period, geographically limited to northern Europe, and (as noted by Jeffrey Alexander) subject to cultural modification.⁶⁷ Our analysis of the aftermath of the *Exxon Valdez* oil spill reveals that some aspects of Beck's theory are simply not generalizable to localized hazards. Nonetheless, other insights from his work – such as the unbinding of science and politics – appear to be outcomes that correspond quite favorably with our findings from the *Exxon Valdez* case. However, local responses to competing scientific claims of ecological damage resulted in hostility to institutional claims and less participation in community organizations. For this localized catastrophe, we witnessed a pattern of internal conflict and social isolation rather than a mobilized consensus for subpolitical change.

Current social theorizing with respect to the environment provides an abundance of hypotheses that require detailed sociological analysis. In this chapter we have attempted to draw on certain themes from Beck's writings and to evaluate their applicability in terms of one localized disaster. This daunting objective invariably involved some 'theoretical slippage' to transform macro-level heuristics to plausible middle-range empirical outcomes. We acknowledge this limitation and urge others to pursue empirical inquiries into the viability of the ambitious work now being produced under the rubric of environmental social theory. Through these efforts we may be able to establish the macro-micro linkages between these discourses.

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2. For example, see T. Parsons, *Essays in Sociological Theory: Pure and Applied* (Glencoe IL: Free Press, 1949); T. Parsons, *The Social System* (Glencoe IL: Free Press, 1951); and L. White, *The Science of Culture* (New York: Farrar Strauss, 1949).
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22. Edelstein, *Contaminated Communities*; and Erikson, *A New Species of Trouble*.
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Part V

Risk and Environmental Decision-Making