

Chapter 8

Lessons Learned about Community Structure and Environmental Decision-making: Where Do We Go From Here?

Introduction

The focus of this project is to better understand the processes that environmental regulators, industrial entities and community members engage in as they define significant environmental risks and related mitigation actions, and how such processes impact community cohesion. The contribution of specific community characteristics to community-level decision-making examined in this project include: 1) shared history; 2) community identity (e.g., geographical boundaries, historical images, physical structures, stigma effects, and attachment to place); 3) control in local decisions; 4) distribution of power among local institutions; and 5) participation in decisions about environmental risks and mitigation. This chapter summarizes the roles of these characteristics and their interactions with respect to the operational premises presented in chapter two. Finally, recommendations for future study of community-level decision-making will be made. Increasing our understanding of these important social relationships may better equip both decision-makers and communities to effectively identify and manage environmental risks. This is especially important for the communities in this project as the types of risks targeted will be present in their landscapes indefinitely.

Shared History and Community Identity

Chapter four examined the degree to which community members share a common life and how their historical interactions formulate ideas about community identity, and in turn, environmental risks. It also considered how environmental regulators' understanding of shared history and community identity influence community-level decision-making processes. The first step, and perhaps the most important, in examining historical influences is to determine the appropriate starting point to ground the examination (White, 1991). While the point at which environmental

contamination occurred or risks were detected may be a tempting beginning, this project illustrates much earlier time frames require consideration.

The communities of Millersburg and Albany, Oregon, for example, take pride in more than 150 years of individualism and status as the industrial hub for the Willamette Valley (Linn County Pioneer Memorial Association, 1979). As stated in chapter four, the building blocks of this industrial hub include: 1) favorable geographical conditions; 2) individual, predominantly white, land ownership where land was acquired by occupation largely in the absence of negotiation with its indigenous inhabitants; 3) transformation of indigenous land uses to place-fixed, long-term cultivation and manipulation of natural resources for economic gain and exchange; 4) marginal understanding and intolerance of indigenous traditions; and 5) insignificant resistance from indigenous groups to land transformations due to their reduction in numbers as a result of imported diseases. Today, industrial activities serve as a foundation for community members to establish and maintain relationships with each other, and securing long-term employment for community members remains the top community priority. Since Teledyne Wah Chang Albany is the area's largest employment this means, at least in part, maintaining TWCA as a fixture of the Millersburg and Albany community. In fact, a recent 7-month labor dispute at TWCA reminded community members of how dependent they are on TWCA economically. The strike also provided workers with an opportunity to strengthen their mutually dependent relationships rooted in union membership.

Generally speaking, Millersburg and Albany, Oregon residents perceive their long-standing and very dependent relationship with TWCA, a known polluter, to be positive. The pollution problems associated with TWCA, both past and present, tend to be perceived as both manageable and necessary for economic growth. Since the presence of TWCA is critical to the Millersburg and Albany community identity, many community members fear that excessive environmental regulations and mitigation may infer job losses and hence, community-wide economic demise. Conflicting perceptions about environmental risks held by outsiders are in many ways symbolically associated with their community identity, inadvertently turning debates about risks into attacks at their community identity. For example, concerns about pollution from TWCA operations is associated with being against TWCA in a general sense, to being anti-Millersburg and Albany, and anti-progress on the extreme end. These perceived attacks heighten distrust in regulators and encourage suspicion of mitigation activities. In fact, several community members suggested that they had more confidence and trust in TWCA than they do in environmental regulators.

This is not true for all community members, however. The recent labor dispute drew attention to long-standing worker health issues associated with TWCA that workers traditionally managed on an individual basis. Since the specific health effects from the mixture of contaminants present at TWCA is not fully understood, there is plenty of room to reframe issues once thought insignificant as new problems. Hence, the role TWCA plays in the Millersburg and Albany community identity is subject to change. The addition of new industries in the area has reframed TWCA's community role such that, as one key informant reported,

TWCA is 'not the only thing we run on anymore.' Just the same, the area's industrial focus makes the need for today's environmental regulations and mitigation difficult for many community members to fully understand and embrace.

Frustration with mitigation delays is not only associated with concerns about potential increases in unemployment but also with complex and confusing explanations of the risks present. This has left some community members wondering if mitigation is even necessary. The failure of environmental regulators to clearly answer community members questions, albeit questions entrenched in uncertainty, also exacerbates distrust in regulators and 'official' reports. Mitigation thus far expands across decades and the types of risks present require long-term management with no guaranteed end date. Hence, debates about risk management continue to threaten the Millerburg and Albany community identity. While environmental risks and mitigation have not significantly disrupted the social order of Millersburg and Albany, the potentially changing role of TWCA and changing ideas community members hold about TWCA may in the future. In the meantime, community members remain strongly attached to the Millersburg and Albany landscape, if only because that is where their jobs are. This attachment to place-based jobs may make it difficult for many community members to leave, even when leaving becomes a desirable option (Tolbert et al., 2002).

Wellpinit and Ford, Washington, residents on the other hand, incorporate interactive relationships with the land dating back to pre-colonization into their community identity. Community members tie relationships with the land to all activities. This, coupled with the fact that tribal members can practice traditional lifeways only on the reservation, reinforces their strong attachment to place. Permanent loss of land for non-tribal development is also part of that history and community identity. Moreover, the community members' process of defining community produces different geographical boundaries for their community than those utilized by environmental regulators. This is complicated by the fact that, as described in chapter six, uniform descriptions of the mine site among federal agencies and experts are lacking. Hence, when community members, industrial entities and environmental regulators sit down at the decision-making table, they bring with them different community frames. Failure to recognize these differences creates ample opportunity for conflicts about risks to evolve into symbolic conflicts about community identity and the loss of indigenous lands.

Wellpinit and Ford community members face many challenges on a daily basis including the struggle to maintain cultural traditions, subsistence-based lifestyles, and personal privacy. While the specifics of individual lifestyles vary, shared privacy desires and close relationships with the land function as the central components that establish a common life among community members. This in turn, may reinforce bonds among community members even when their interaction is minimal (Wilkinson, 1991; Bridger and Luloff, 1998). At the same time, community members recognize a need for economic development as well as how their landscape limits their development and mitigation options. They do not oppose all mining activities and have both positive, e.g., Sherwood Mine and Mill,

and negative, e.g., Dawn Mining Company operations, experiences with uranium mining and milling operations, in particular.

These competing demands, however, bring the relative function of their land into question, and highlight differences in values among community members and differences in economic benefits rendered from DMC operations. Under these circumstances, mitigation provides a means to restore the lost culture community members associate with land use restrictions. The way community members frame mitigation may, however, differ from environmental regulators and technical experts. For example, technical experts tend to frame risks in terms of prediction and prevention whereas lay persons tend to frame risks in terms of detection and repair (Gray, 2003). Since the specific health effects associated with the mixture of contaminants present at the DMC Midnite Mine and Ford mill site are not explicitly clear, the need for and type of mitigation is open for debate. In combination with differences in how community is framed, different ideas about risks and mitigation actions may heighten underlying symbolic conflicts, especially if the goal of mitigation is to control risks rather than restore affected land.

In both the TWCA and DMC cases, the lack of recognition and understanding of the community's shared history and identity amplify existing conflicts in a number of ways. First of all, the failure to recognize differences in framing community creates an opportunity for outsiders to attack, albeit unintentionally, a community's identity. Secondly, the authoritative role of the lead federal agency to make decisions for locals that feel misunderstood may build upon existing distrust in environmental regulators. Thirdly, a less than complete understanding of how community members interact with their landscape may cause environmental regulators and technical experts to incorrectly estimate potential health risks. Similarly, different ideas about community frames and boundaries may improperly identify all affected parties. Both of these actions may further increase distrust in decision-makers as well as inhibit the ability to reach consensus about mitigation actions. The indefinite mitigation timelines in both the TWCA and DMC cases, and mitigation progress barely visible on an annual basis, also breed frustration and distrust in environmental regulators. The failure to recognize the extent to which distrust in federal agencies is incorporated into community identity may make matters even more contentious.

The need for environmental regulators to become knowledgeable about the community's shared history and identity is also critical for improving risk communication strategies in both situations. It will be equally important for each community to determine and communicate what forms and methods of information exchange best suit its members. As the data in this project point out, risk communication must become a shared responsibility and shared dialogue if it is to be successful. One way to begin acquiring knowledge about a community's shared history and identity would be to measure the variables suggested to be important in both the TWCA and DMC cases, including: 1) how community members ascribe boundaries to their community; 2) traditional community functions and roles; 3) community functions and roles imposed by others; 4) disruptions in community roles and functions; 5) meanings associated with community roles and functions;

6) attachment to place; 7) uniformity in ideas and values; and 8) uniformity in the distribution of potential health effects.

Control in Local Decisions and Distribution of Local Power

Chapters 5 and 6 examined how much local control the case communities had in decisions made about the Superfund sites studied as well as the distribution of that control across local institutions. As the data indicate, the role of TWCA as the Millersburg and Albany, Oregon, area's largest employer is not only important to the local economy, but also provides TWCA with the opportunity to dominate community-level decision-making. Community members appear to readily support such a position, sometimes denouncing the input of outsiders, particularly the Environmental Protection Agency. The recent labor dispute at TWCA, however, illustrates that community members who work for TWCA are able to organize issue-specific collective responses in opposition to TWCA. Hence, while the norm is for community members to generally accept and support TWCA's dominant role in local affairs, union membership provides a means to formulate collective, issue-specific, responses to TWCA's practices. This prevents TWCA from being entirely free of local scrutiny.

In addition, the mandated authority of the lead federal agency to make local decisions counters TWCA's dominant position. Lead agency authority may also privilege 'official' and technical risk information to the extent that it is assumed correct unless proven otherwise by community members (Brown, 1992; Swanson, 2001). Such challenges to traditional lines of authority by outsiders may contribute to underlying conflicts and encourage community members to discount external perspectives (Pfeffer et al., 2001). This also creates a situation where public meetings may deteriorate into defensive contests rather than exchanges of information. Furthermore, under these mandated circumstances, efforts to solicit community input are not only subject to extreme criticism, but even under the best conditions the lead agency's ultimate decision-making authority creates the perception that community members have little influence in local decisions. As the data suggest, it will not be easy to convince Millersburg and Albany community members that their perspective weighs in or that their participation in decision-making about TWCA is important.

Unlike TWCA, the Dawn Mining Company does not occupy a favorable, dominant position in the Wellpinit and Ford community. Instead, distrust in DMC, as well as federal agencies in general, is part of the Wellpinit and Ford community identity. This makes community members suspicious of DMC's actions and decisions made by outsiders about how to manage local lands. Moreover, personal actions are no longer private but rather the subject of outsider scrutiny. Since privacy and interactions with the landscape are principle tenements for a common life among Wellpinit and Ford community members, these conditions make it difficult for community members to retain their sense of place and maintain traditional lifeways. Additional land use constraints are likely to build upon

underlying conflicts associated with historically imposed restrictions, leaving community members feeling even more powerless (Hanson, 2001; Lacy, 2000). Given their dependence on external networks to meet daily living needs, additional time constraints and limited resources may make it even more difficult for Wellpinit and Ford community members to influence local decisions in contrast to Millersburg and Albany community members. As a result, Wellpinit and Ford community members may readily become apathetic in response to the continuation of traditional paternalistic actions on behalf of federal agencies and see little reason to participate in community-level decision-making (Shrader-Frechette, 2002).

The Dawn Watch group, however, demonstrates that Wellpinit and Ford community members are capable of forming issue-specific collective responses, despite the absence of long-standing community organizations and limited collective resources. Limited resources may in fact, only allow for issue-specific collective responses (Sharp, 2001). Even under these constraints, such collective responses that promised to protect personal privacy and land use interests provided community members with an incentive to get involved in the New Jersey dirt import issue and to develop cohesive relationships that they may not have pursued otherwise. For Wellpinit and Ford community members, the New Jersey dirt issue turned out to be an empowering opportunity as was the TWCA labor dispute for TWCA workers. In both the TWCA and DMC cases, challenges to traditional community functions contributed to underlying conflicts and encouraged community members to discount external risk perspectives.

Despite the differences in shared history and community identity among the case communities, Millersburg and Albany, Oregon, and Wellpinit and Ford, Washington, community members encounter many of the same challenges when it comes to maintaining control in local decisions. In addition to a sense of powerless in local decisions overseen by lead federal regulatory agencies, the inability of the lead agency to answer questions clearly and the public airing of differences among federal and state agency personnel that occurred in both cases decreased community members' confidence and trust in said parties. Under these circumstances, community members are left wondering who is in charge and where to acquire information that empowers them to make informed personal decisions. Indirectly, little confidence and distrust in environmental regulators coupled with limited technical knowledge may heighten their fears about risks. An incomplete understanding of the area's geographical and social conditions on the part of environmental regulators further reduced confidence and trust in experts' assessments and decisions. Indefinite mitigation and post-mitigation monitoring time lines may also reinforce reduced confidence and trust in experts. To complicate matters further, other industries in the TWCA area prevent the reduction of risk altogether under the best circumstances. Likewise, for the Wellpinit and Ford community, naturally occurring sources of radon in the area allow for only risk reduction, not risk elimination. Thus, as much as community members may distrust environmental regulators, they find themselves in the awkward position of having to rely on outside expertise in new ways.

Under such conditions, establishing cohesive relationships between community members and environmental regulators is very challenging at best, and gridlock is very possible (Rosa and Clark, 1999; Williams, 2002). To minimize gridlock and conflict during decision-making processes, creating opportunities where communities maintain some sense of local control in mitigation decisions will be essential. This is especially important in situations where risk outcomes are unclear, frequently making the need and type of mitigation that is necessary and reasonable difficult to determine. Considering that technical experts tend to frame risks in terms of prediction and prevention whereas lay persons tend to frame risks in terms of detection and repair (Gray, 2003), the opportunity to associate debates about risks with attacks on community identity is great. In turn, threats to community identity may expand into debates about group legitimacy and encourage defensive behavior (Gray, 2003). These are hardly the ingredients of consensus. That is not to suggest that external agencies should cater to community desires without question or vice versa, but rather each needs to recognize the position of the other with open ears. To that end, the data suggests variables important in both the TWCA and DMC cases with respect to control in local decisions and distribution of power among local institutions include: 1) general dependency on external ties; 2) need for external funds to mitigate environmental risks; 3) quality of past relationships with regulatory agencies; 4) location of the parties responsible for environmental risks within the power structure of the community; 5) location and role of technical experts within the power structure of the community; 6) identification of and responses to victims; 7) community members' ability to organize issue-specific collective responses; and 8) degree of uncertainty associated with environmental risks and mitigation actions.

Participation in Decisions about Environmental Risks and Mitigation

Chapter seven examined how community members and environmental regulators participate in decisions about the TWCA and Dawn DMC's Midnite Mine and mill site. In communities associated with both the TWCA and DMC cases, factors that amplify conflicts and risk perceptions, and hinder participation in community-level decision-making include: 1) incomplete, unclear and uncertain risk information; 2) unclear or limited roles in decision-making processes; 3) disrespect and poor understanding of local community history and identity; 4) unclear risk characterization and risk management goals; 5) distrust in environmental regulators as well as parties potentially responsible for the environmental risks present; 6) personal time constraints; and 7) lack of resources to participate. In both the TWCA and DMC cases, community members were more likely to participate in specific, rather than general, community issues. Millersburg and Albany, Oregon, residents may resist participating in activities that oppose TWCA in general, as TWCA is an import fixture in their community and attacking TWCA may mean attacking their own community identity. The desirability of DMC's presence in the

Wellpinit and Ford community, however, has been mixed historically such that the removal of DMC may strengthen, rather than harm, their community identity.

Key informants also suggested ingredients for improving risk communication strategies. First, breaking complex issues down into specific, manageable pieces may increase community involvement. Establishing clear roles for participation and goals of participation in decision making processes are important for encouraging community involvement, as well as providing resources for community members to participate. In addition, finding ways for community members and environmental regulators to interact may help build less adversarial relationships. Environmental regulators also need to make a concerted effort to learn about the communities that they interact with. Components that risk communication strategies need to incorporate, as pointed out the key informants, include different perceptions and conflicting information about risks, the uncertainties of the potential risks, culturally sensitive language that acknowledges and respects the community's shared history and identity, and the recognition of pre-established distrust between environmental regulators and community members. In terms of measuring variables to identify strategies to both improve community involvement and better understand barriers that may inhibit participation, those suggested by the data from this project include: 1) lines of authority; 2) opportunities to participate in issue-specific matters; 3) opportunities to participate in general community matters; 5) community members' roles in participation; 5) history of conflict and cooperation between community members, industrial entities and environmental regulators; 6) benefits associated with participation; 7) community norms concerning participation; and 8) community norms about the risks in question. Increasing our understanding of these important social relationships may better equip both decision-makers and communities to effectively manage environmental risks.

An Evaluation of the Operational Premises

Operational Premise 1: The more uniform the ideas environmental regulators, industrial entities and community members hold about affected parties, the more likely it is that they will reach consensus about the significance of environmental risks and need for mitigation.

The data suggest that in both cases, community members, industrial entities and environmental regulators frame community in different ways. Millersburg and Albany, Oregon, community members begin their history with roughly 150 years as an industrial hub in the Willamette Valley. Industrial entities are an important and valued part of that history, especially TWCA, the area's largest employer. Wellpinit and Ford, Washington community members incorporate relationships with the landscape preceding colonization into their community identity, as well as the mixed blessings associated with industrial entities. Environmental regulators, however, focus on the physical parameters of contaminants and this results in a

cursory understanding of community social features. These differences in community frames also serve as a source of underlying conflict at the decision-making table.

Consensus about the health effects associated with the TWCA site, and DMC's Midnite Mine and mill site is not evident for a number of reasons. First, little is known about the specific health and ecological outcomes associated with the mixtures of contaminants present at the TWCA and DMC facilities. As discussed in detail in chapters five and six, the risk data available for both cases consists of extrapolations from animal data and estimated probabilities based on a less than perfect understanding of how community members interact with their landscapes. Others argue cause for concern is not necessary as long as no humans and animals come in contact with the substances as governed by administrative controls. With the presence of several other industries in TWCA's immediate area, and naturally occurring radon sources widely spread throughout the DMC area, it is impossible to eliminate risk completely, even given the best scenario. There is some shared concern about increased risks among workers in both situations but much less regarding community-level risks. More specifically, debates over what the risks are, who is most affected, and the need for remedial action continues for both cases, even after nearly two decades of mitigation activities at TWCA.

In the communities associated with both TWCA and DMC, lack of recognition of the different community frames that environmental regulators, industrial entities and community members utilize contributes to conflict, as does uncertainties associated with the hazards present. Being insensitive to distrust among environmental regulators, industrial entities and community members further encourages contentious mitigation discussions. An incomplete understanding of the affected community also reduces confidence and trust in experts' assessments. This makes the need for environmental regulators to learn more about the social dynamics of affected communities import for minimizing conflict as well as for properly identifying risks, especially given their lead authority role. More specifically, the data suggest it is essential to involve community members as soon as possible, particularly with respect to site assessment activities in order to develop likely exposure scenarios, rather than waiting to solicit community input at public meetings concerning mitigation plans. Given the subsistence-based lifestyle of Wellpinit and Ford community members, such efforts are crucial. Providing timely access to information about suspected risks and mitigation activities in a common language are important risk communication goals for both cases, especially since mitigation endeavors are long-term, and will also be important for reducing conflict.

Operational Premise 2: The more uniform the ideas environmental regulators, industrial entities and community members hold about affected parties and public health risks, the more likely it is that the affected community will cohesively support mitigation decisions.

Again, ideas about community frames and public health risks are not uniform in either the TWCA or DMC cases. Slow progress and ingrained distrust feed frustration among community members at both sites. Support for mitigation of TWCA historically and currently competes with economic interests to retain TWCA jobs. This makes Millersburg and Albany community members and industrial entities raise concerns about the need for mitigation. At the same time, TWCA workers are not free from occupational safety issues. For Wellpinit and Ford, restoration activities are welcomed but even under the best circumstances, will most likely never return affected lands to pre-mining conditions. Controlling risks—perhaps the only realistic option—is likely to be a disappointment to many as it implies a permanent loss of access to traditional hunting and gathering grounds, and in turn, a loss of culture for the Spokane Tribe of Indians. In both situations, it will be important for environmental regulators to work closely with the affected community to formulate risk communication strategies that are culturally compatible. Components that risk communication strategies need to incorporate, as pointed out by the key informants, include different perceptions and conflicting information about risks, the uncertainties of the potential risks, culturally sensitive language that acknowledges and respects the community's shared history and identity, and the recognition of pre-established distrust between environmental regulators, industrial entities and community members.

Operational Premise 3: A decrease in consensus among environmental regulators, industrial entities and community members will produce an increase in cohesion among community subgroups organized along lines of conflict, and a decrease in community-wide cohesion.

Those that expressed concerns about increased cancer in relationship to TWCA employment, generally interpret risk reduction largely as a personal responsibility that comes with the job and engage in individual responses, e.g., bringing bottled water to work, rather than collective responses. However, a recent labor dispute demonstrated TWCA workers' ability to formulate issue-specific collective responses. One of the issues under negotiation during the strike was maintaining health care benefits for retired workers. To that end, the strike provided an opportunity to develop cohesive relationships within subgroups formed as a result of common and very specific interests. The close physical proximity and utilization of common locations offer support to maintain such cohesive relationships. While there is no clear mass exodus from the area as a result of health or ecological concerns related to the TWCA site, one should not infer all community members have become at ease with the risks present just the same.

With respect to the DMC case, the Dawn Watch group is a good example of how Wellpinit and Ford, Washington, community members coordinate efforts around commonly shared concerns. Dawn Watch was a coming together of tribal and nontribal community members for a shared and very specific cause—to prevent the import of the New Jersey dirt. Community members also successfully acquired Superfund resources for remediation of the Midnite Mine. Once

accomplished, many people returned to focussing on their individual needs and maintaining personal privacy. While there is little evidence of long-standing community-wide organizations outside of the tribe, Wellpinit and Ford, Washington residents are not without power but rather, selectively exercise and organize their efforts for specific interests in spite of personal differences. For them, specific interests build cohesive relationships rather than reduce cohesion among community members. Hence, as both cases suggest community-wide, generally cohesive relationships among community members is not a prerequisite for forming collective, issue-specific responses to environmental risks. Likewise, cohesive relationships within subgroups did not infer reduced overall community cohesion in either of the cases.

Where Do We Go From Here?

The data support the consideration of shared history, community identity, local control in local decisions, distribution of power among local institutions, and participation as important features in community-level decision-making about environmental risks and mitigation. Incorporating local knowledge into decision-making processes will improve decision-makers' efforts to properly identify affected parties and the magnitude of effects as well as underlying conflicts that may deter agreement about mitigation actions. In turn, such efforts will lay the groundwork for making comparisons between other cases, providing opportunities to learn from both decision-making successes and failures. After all, understanding risk is not just about understanding contaminants, but also about understanding how people interact with their landscapes.

As discussed in detail in chapters 5 and 6 for example, community members and environmental regulators associated with both the TWCA and DMC cases made comparisons to Love Canal, the site that founded the Superfund program. In contrast to Love Canal, none of the communities in this study experienced significant disruptions in daily routines or residential relocations even though the hazard ranking scores for the sites under investigation were similar to Love Canal (Midnite Mine = 50; Love Canal = 54; TWCA = 54.27). Since it is impossible for communities receiving federal mitigation funds to remain anonymous, the potential for stigma associated with hazardous wastes is likely and thus, important to consider but it is not clear how environmental stigma may impact the communities studied. In both the TWCA and DMC cases, attachment to place, albeit for different reasons, discouraged community members from leaving their communities in significant numbers. The scope of this project, however, does not extend to an examination of who may not be moving into the affected communities, and why. For the communities associated with TWCA and DMC, the recruitment of new industries has been a long-standing challenge but key informants did not indicate business recruitment has become more challenging following Superfund status designation. One TWCA key informant and two DMC key informants raised concerns about stigma associated with mitigation delays

potentially hampering future business ventures so this may be an issue worth exploring down the road.

The necessity of community cohesion for effective community-level decision-making is not clear in this project and thus, is a topic warranting further investigation. Both the Millersburg-Albany community and Wellpinit-Ford community demonstrated the ability to organize collective responses to specific concerns even though community members generally focus on meeting individual needs rather than group needs. The data also suggests marginal involvement in community affairs may be the norm for the communities studied. At the same time, the data demonstrates that it is not wise for external organizations to underestimate the ability of community members, even in discordant communities, to organize collective responses—especially around specific issues. For example, the rural character and preoccupation with personal privacy among Wellpinit and Ford, Washington, residents did not deter their efforts to prevent the importation of the New Jersey dirt, in spite of their dependency on external resources for remediation of the Midnite Mine. Furthermore, the critical role that TWCA plays in the community identity of Millersburg and Albany did not prevent TWCA workers from entering a 7-month labor dispute.

Another important consideration for future research is mitigation time lines. While mitigation is nearly complete at TWCA, the long-term management of the risks present does not come with a guaranteed end date. The types of contaminants involved, the potential for a failure in current containment measures and/or administrative controls, and the potential discovery of new problems, leaves the mitigation door open indefinitely. The ability of everyone to remember the location of the hazards as new industrial development takes place poses another challenge, further complicated by the little confidence local people have in environmental regulators. Similarly, the Midnite Mine water treatment facility costs roughly \$1 million per year to operate with no termination date planned at this time. Experts specified that the mine and mill site areas must be monitored for 200 to 1,000 years if current conditions remain stable (Washington State Department of Health, 1991). This raises additional concerns about resources for long-term risk management as well as the ability of everyone to remember the location of the hazards, especially given the indigenous trees and native grasses planted on top of them, not to mention the little confidence local people have in the environmental regulators.

Clearly, the challenges that lie ahead for the communities associated with the TWCA and DMC sites are not short in number. Differences in ideas about risks and land use between community members and environmental regulators may contribute to contentious decision-making. That being the case, it will be important for those involved in community-level decision-making processes to develop realistic expectations about erasing ingrained distrust and transforming top-down risk management approaches overnight so as to not worsen the situation. Specific recommendations for improving community involvement in decision-making follow.

Recommendations for Improving Community-level Decision-making about Environmental Risks

1. Begin interactions between environmental regulators and community members with a meeting where environmental regulators focus on learning about the community from community members. Coordinating such efforts through local schools and classroom projects may be a useful way to utilize resources.
2. Ask community members about previous relationships with environmental regulators, what worked well and what did not work well. This may help identify avenues to minimize distrust.
3. Ask community members what forms of communication are most useful to them. The key informant interviews for this study took place in a variety of forms to accommodate individual needs and schedules such as telephone and in-person conversations. Submitting comments in written form including email works best for others. Electronic forums in conjunction with public meetings may be useful for some communities. It may also be necessary to develop a mechanism to protect the confidentiality of community members so that they feel more comfortable sharing information with environmental regulators.
4. Provide opportunities for community members to be part of the solution. In addition to giving community members the opportunity to educate environmental regulators about their community, it may be useful to involve community members in conducting interviews with their peers to gather information about risks and how people interact with local landscapes. The use of temporary employees and volunteers has proven to be a successful way to gather census information in hard to reach neighborhoods. Such a strategy may be useful for gathering background social information relevant to risk identification in Superfund communities as well.
5. If possible, involve community representatives in the selection of facilitators for meetings. Perhaps a respected community member may effectively serve as a facilitator.
6. Discuss time lines for assessment and mitigation actions with community members so they can develop realistic expectations. Also ask for insights about how time lines might be shortened. This provides another opportunity for community members to be part of the solution.
7. Ask community members what they want to participate in. They may only want to participate in specific types of activities concerning specific issues.
8. Establish rules for group interaction to minimize the potential of risk debates being connected to underlying symbolic conflicts.
9. Most importantly, listen, listen, listen!

Final Thoughts

The issues addressed in this project are not simple nor are these communities the only ones struggling with them. But these cases are opportunities we can learn

from. Most importantly, the approach utilized in this project demonstrates how the incorporation of sociological and biological knowledge can improve current strategies to identify and manage environmental risks. To that end, the *social amplification of risk* framework provided a means to incorporate psychological, social and cultural processes involved in community-level decision-making about environmental risks. This framework proposes risk messages pass through a variety of filters such as personal experiences, confidence in institutions, alienation from community affairs and perceived fairness of risk management processes (Kasperson et al., 1988). While this framework recognizes elaborate descriptions may be distracting, it is important to note that one has to not only receive but also understand risk messages before translation processes come into play. The extent to which community members' participate in community-level decision-making about environmental risks is in part limited by the availability of information and their skills to interpret technical information, even when such information is free of ambiguity. The point here is that psychological, social and cultural processes do not only filter risk messages but they may also block the transmission of messages altogether. Given the top down management approach ingrained in the Superfund process and lead federal agency authority to make local decisions, there was ample room to improve both the availability and clarity of risk messages to community members associated with the cases studied. Hence, improving an understanding of risk information will be dependent on increased community involvement in risk communication strategies.

The top down management approach and lead agency authority in the Superfund process also alter the direction of rippling impacts proposed by the *social amplification of risk* framework. This framework suggests signal filtering begins with individual processing, rippling outward to organizations, communities, and so on. In the case of Superfund, however, rippling impacts largely take place in the opposite direction. While individuals may be aware of hazards present in their landscapes, it is the lead federal agency that determines the significance of those hazards and that has the ultimate authority to determine how to mitigate those hazards. Processes internal to the lead federal agency filter what information becomes available to individuals. As discussed earlier, this technical information is generally assumed correct until proven otherwise (Brown, 1992; Swanson, 2001). This places community members in a situation where they may have to rely on technical experts in new ways. In order to make sense of such technical information, community members may also find themselves drawing upon personal experiences, information from family, friends, and coworkers, as well as other community and external sources. Hence, when trying to understand community-level decision-making processes, one must consider rippling impacts that begin at the lead agency level, moving inward to the individual level, and then outwards to personal, community and cultural resources. This also makes the need to understand how community structures filter risk messages all the more important in order to improve risk management strategies.

Using the *social amplification of risk* framework in conjunction with community theory, social constructionism and disaster research in order to better

understand interactions between biophysical and social features, specific community-level risk amplifiers identified here include: 1) exclusion of shared history and community identity from efforts to determine routes of potential exposures to risks; 2) challenges to traditional community functions and lines of authority; 3) differences in how community members and environmental regulators frame potentially affected communities; 4) marginal and/or uncertain technical knowledge; 5) distrust and little confidence in environmental regulators and/or potentially responsible parties; 6) dependency on external ties to meet daily needs and fund mitigation; 7) limited resources to participate in technical decisions and formulate collective responses to environmental risks; and 8) unclear roles and goals of community-level participation. Not only do these factors function as risk amplifiers, they also amplify underlying conflicts at the decision-making table. Identifying and better understanding factors that amplify community-level risk perceptions and related responses will not only allow us to develop more informed policies, but also provides opportunities to improve community involvement in mitigation efforts. As the sorts of wastes targeted in this study will require our management for many years to come, so too, will these important social issues. May the learning, not the wastes alone, guide our way.

Appendix A

Key Informant Interview Questions

Key Informant Interview Questions

1. What interests do you represent?
2. How were you selected to represent these interests?
3. Tell me about the history of the site. What are the most significant problems, concerns, challenges?
4. How would you describe the population affected by the site and related decisions?
[Who are they? What are their values? What is their culture like? How important are symbols and structures (e.g., buildings) for defining the community? What role does industry and industrial potentially responsible parties associated with environmental threats play in community identity?
5. How have environmental threats impacted community activities?
6. Have environmental threats stigmatized the community? If, so how?
7. How have you/your group participated in decision-making about the site? How long have you/your group been involved in decision-making process about the site?
8. How much time/money/resources has your group put into issues regarding the site?
9. How would you describe the distribution of power among decision-making representatives?
10. What barriers to participation have you/your group experienced?
11. What concerns are not represented? Over-represented?
12. Does public participation and consultation work? How so? How can it be improved?