

CHAPTER FIFTY-FIVE

Managing Environmental Conflict

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Virtually all communities in the world experience occasional tensions over ecological issues like land use, environmental quality, water allocation, waste disposal, and natural resource management, among others (Dukes, 2004). In these conflicts, environmental factors play a significant role as either direct causes of conflict or as primary drivers of it. Environmental conflicts come in many forms, from interest-based competition over scarce or valuable natural resources, to value-based conflicts over incompatible perceptions of place, space, and our relationship with the natural world. These conflicts can also be needs based, such as conflicts involving the environmental drivers of health, security, and identity.

Despite the variety of issues that environmental conflicts encompass, they share certain common characteristics that present significant challenges to conflict resolution and require dynamic strategies for conflict management. Among these characteristics are social and ecological complexity, scientific uncertainty, and complicated legal and procedural frameworks for environmental decision making (Copple, 2011). In response to the challenges of managing this complexity, a body of theory and practice called environmental conflict resolution (ECR) has gained momentum over the past two decades as it seeks to find avenues and create tools to manage private, public, and international disputes. ECR techniques and the body of literature that underpins them offer important lessons for practitioners seeking to intervene in environmental conflicts.

This chapter explores the characteristics of environmental conflicts, discussing the challenges that they hold for conflict resolution. That discussion is followed by a review of trends in environmental conflict resolution research. Particular emphasis is placed on discussing methods and tools for overcoming the challenges that environmental conflicts pose, metrics capable of evaluating success in environmental conflict resolution, and the skills and tools that practitioners need to intervene effectively in environmental conflicts. The final section discusses implications for practice consisting of six recommendations for practitioners tasked with managing environmental conflicts.

CHARACTERISTICS OF ENVIRONMENTAL CONFLICT

A distinction should be made at the outset between *environmental conflicts* and *conflicts with environmental drivers*. The former are conflicts in which environmental issues or the impacts of environmental factors serve as direct causes or primary sources of conflict. For example, tensions surrounding the construction of dams and highways in the Brazilian Amazon have many drivers, including indigenous rights, economic development, and regional and global political factors. However, these drivers all center on land use choices and their implications on various interested parties. It is this centering on or revolving around an environmental issue (or set of issues) that makes these environmental conflicts.

In contrast, conflicts where environmental factors contribute to larger conflict dynamics but are not themselves the primary issues in the conflict are considered conflicts with environmental drivers. For instance, the role of diamonds in funding armed insurgency in several African states has been documented extensively (Olsson, 2007). However calling civil unrest in Angola, Sierra Leone, Liberia, or the Democratic Republic of Congo environmental conflicts would be a gross mischaracterization. Rather, a lootable resource in those cases served as an indirect conflict driver by incentivizing and funding insurgency in wider conflicts over governance and political power. Thus, for the purposes here, discussion of environmental conflicts refers to conflicts where the primary sources or drivers of conflict are divergence of values, preferences, or desirable outcomes resulting from some environmental factor or resource (Balint, Stewart, Desai, and Walters, 2011), and not larger conflicts where environmental factors are indirect drivers of conflict processes and behaviors.

At their core, environmental conflicts are incompatibilities in the interests, needs, positions, or objectives of various social actors concerning environmental issues (Redpath et al., 2012). These conflicts can emerge between competing users of a particular resource or parcel of land, between groups that seek to use a resource and groups that seek to preserve the resource, between decision makers and resource users, and between decision makers across a range of coinciding jurisdictions (Elias, 2008; Nie, 2003). In addition, environmental conflicts can be driven by the effects that changes in environmental quality, resource availability, or environmental access have on specific individuals, groups, or communities. For example, changes in rainfall in either micro- or macroclimatic scales may alter water availability and food production systems, requiring the renegotiation of social structures and relationships in the affected areas (Scheffran, Brzoska, Brauch, Link, and Schilling, 2012; Hsiang, Meng, and Cane, 2011).

The definition of *environmental conflict* that I have offered provides an umbrella under which a wide variety of conflict processes, patterns, and behaviors resides. The potential spectrum of conflict processes ranges from latent value differences, to policy debates, to large-scale violent confrontations. As in most other types of conflict, environmental conflicts are dynamic, undergoing ebbs and flows in intensity and cycling through periods of escalation, deescalation, stalemate, and pacification. This dynamism, coupled with a wide array of potential environmental issues at play, makes the notion of environmental conflicts seem amorphous at best. However, these conflicts typically share a number of common characteristics that help to unify them into a coherent class of problems.

The following sections discuss the common characteristics of environmental conflict and the methods that have been developed to manage the inherent social and ecological complexity that they involve. Just as in other categories of conflict, every environmental conflict has a unique set of stakeholders, issues, and drivers, and there will thus be varying degrees of complexity in the following characteristics. Despite that individual nuance, these conflicts are unified around the themes discussed below.

Ecological Complexity

As Wittmer, Rauschmayer, and Klauer observe, “A central feature of environmental conflicts is the complexity of the ecological system which is the natural base of conflicts” (2006, p. 1). This natural base and the constituent pieces that comprise it do not exist in isolation but are integral components of ecosystems at the micro, landscape, and global scales. The individual pieces are woven together in a web of trophic relationships—the flow of energy and matter through a system—that defines ecosystem functions. When part of that web is altered, those changes ripple through the trophic structure of the system in complicated ways that produce cascading impacts across interconnected elements and subsystems. Thus, changes to a single system component, whether naturally occurring or human caused, will have both predictable and unpredictable effects on the wider system. Each of those effects will in turn produce a new set of impacts that ripple across interconnected system components. This cascade of impacts and effects makes it incredibly difficult to understand, let alone predict, the systemic impact of a single event, action, or change. Ecosystems are thus dynamic biophysical environments that are constantly adjusting to fluctuations across a network of interconnected and interdependent constituent parts.

Humans are not separate from these systems; they are directly and inexorably tied to them. The trophic relationships and constant fluctuations and adaptations across a system produce the natural goods and ecosystem ser-

vices that sustain and fulfill human life (Constanza, d'Arge, deGroot, et al., 1997; Daily, 1997). In addition, individuals and groups form components and subsystems of the larger social-ecological system (Gallopín, 2006), contributing to ecosystem structure and functioning in unique and dynamic ways. Human action in and interaction with other components in the system have the same sort of cascading effect across the ecosystem as other biological and geophysical changes. Humans and social groups, as part of the system, are affected by changes in environmental factors and must respond and adapt to new dynamics by renegotiating social relationships in and with the natural world.

This environmental and social complexity can present significant challenges for resolving environmental conflicts when they arise. Due to the dynamic and adaptive nature of social-ecological systems, any management action taken to address the drivers of conflict or more sustainably govern a resource will instantiate other changes across the system, with the potential for creating, renewing, or escalating tension among affected actors. The dispersion of impacts across a system can also create new conflicts or ignite previously latent conflicts. For instance, establishing a national park or conservation area often results in changes to permissible land uses inside the protected area boundary. This can displace previous land users such as subsistence-based agricultural households and shift the spatial concentration of agriculture onto adjacent nonprotected land parcels. That shift can then alter environmental factors like soil quality and resource availability (water, space) with important implications for other stakeholders in those areas.

A final challenge rising from this ecological complexity is the fact that ecological processes and social processes operate on different spatial and temporal scales such that there may be lags between the implementation of a management decision and the ecological or environmental impact of that decision. Those lags can fuel perceptions among marginalized groups that their needs are not being considered in potential resource management strategies. Such lags can lead to delayed environmental impacts that can fuel grievances well after management decisions have been implemented. Continuing with the example of a newly established protected area, this could mean that human use inside the area may be restricted in order to allow the ecosystem to recover from previous overuse. This would have the long-term effect of improving ecosystem functioning and ecosystem service delivery. However, in the short term, it may be perceived as unfairly restricting access to the resources necessary for subsistence livelihoods and artisanal production or as giving preference to one group of users over another (e.g., deference to future generations at the expense of current users).

Social Complexity

This discussion hints at another distinguishing characteristic of environmental conflicts. In addition to ecological complexity, these conflicts

typically involve a great deal of social complexity (Wittmer et al., 2006; Funtowicz and Ravetz, 1994). For a given resource, landscape, or environmental process, a number of different social actors will have some claim to it or will be affected by it. These actors could include the consumers of a resource, the consumers of goods and services that the environmental processes provide, the owner of the land where the resource is found, the governmental or traditional authorities that manage the landscape, as well as future generations that might depend on the resources.

Collectively the groups and individuals affected by or have claims to an environmental issue are referred to as stakeholders. A stakeholder might alternatively be conceptualized as anyone who can influence or is affected by a system or subsystem (Freeman, 1984). In fact, a rich literature has developed around defining, identifying, and productively engaging stakeholders in environmental management and conflict resolution (Reed, 2008).

Stakeholders within a system are connected in complicated multinodal social networks inside dynamic social systems. The relationships among them are affected by direct interaction, indirect influences, and complex nonlinear internal and external feedback mechanisms (Coleman, Bui-Wrzosinska, Vallacher, and Nowak, 2006). These relationships, particularly those revolving around natural resources, ecosystem services, and other environmental factors, are constantly being negotiated and renegotiated in response to changes in the wider social-ecological system. At times this process of negotiation is passive or informal, with actors and groups individually adjusting to new dynamics by modifying their behaviors and mental frameworks. At other times, this negotiation is more actively manifest through formal transactions and intentional interactions. Whether active or passive, this process of adjustment, interaction, and negotiation can result in incompatible needs, goals, values, and positions around environmental factors, which can drive conflict processes.

The range of stakeholders in a given conflict will likely extend beyond the primary parties engaged in active conflict. Indeed, given the ecological complexity and the impact that a single change can have across an entire system, the potential range of stakeholders in an environmental conflict may be quite large. To be effective and sustainable, efforts to resolve an environmental conflict should include all affected stakeholders and consider the interests, needs, values, and desired end goals of each (Haydon and Kuang, 2011). However, this presents several challenges for conflict resolution efforts.

First, there are logistical issues in effectively designing and managing conflict resolution processes that can accommodate large sets of stakeholders. Bunker (2006) discusses these and advances some suggestions for working with large groups of stakeholders. Next, the costs of conflict resolution increase with the inclusion of more and more stakeholders, particularly in terms of time involved in reaching agreements and the financial

resources required to accommodate additional stakeholders. There will also be power asymmetries across different stakeholders in terms of their ability to effect change in the system, the impact they have on the process, their access to information and ability to leverage that information effectively, and the costs of participating in the resolution process (Christie, 2008). Those costs might include financial burdens, opportunity costs, and the risk of losing legitimacy in their social groups and organizations for compromising issues and positions.

Finally, some stakeholders might be unwilling to engage in conflict resolution processes due to legal, administrative, economic, or cultural constraints. In some cases, a specific stakeholder's actions may drive conflict processes, but their actions may be technically legal, and modifying their behavior may result in significant financial costs. For example, a company might be responsible for polluting a waterway through the legally permitted discharge of industrial waste. Such a situation could result in conflicts with downstream users who fear health risks associated with that contamination. In such instances, the affected communities may be willing to engage in a resolution process. The company may not, however, as it holds permits to discharge waste and therefore has no incentive to alter its behavior.

In other instances, stakeholders may face administrative barriers to engaging in conflict resolution processes. This is often the case for government agency representatives and natural resource managers. Cultural factors may prevent some groups from being willing to engage in conflict resolution or constrain their participation in such processes (Tam, 2006). Stakeholder positions and constraints therefore may add to the social complexity of an environmental conflict and produce barriers to conflict resolution.

Scientific Uncertainty

Balint et al. (2011) discuss the evolution of the scientific understanding of ecosystems and socioecological systems away from the previously held view that these systems are closed, deterministic, self-regulating systems to the current paradigm that view these as open systems affected by stochastic processes and internal and external influences. They note that given the complexity of social and ecological processes and the dynamic interaction among them, "ecosystems are characterized by high degrees of scientific uncertainty—in their basic ecology and biology, in their economic parameters . . . the effects of management actions, and . . . whether it is possible to achieve management objectives" (p. 16). Wittmer et al. (2006) echo this and suggest that efforts to resolve environmental conflicts must cope with this uncertainty and develop processes that can manage it. However, this uncertainty presents significant challenges for conflict resolution, as witnessed

by contemporary scientific debates over the causes of climate change and its impacts. Attempts to resolve conflicts over climate change remain mired in arguments over data, models, and projections. Rather than serving to inform resolution strategies, science in the climate conflict has served an adversarial role and presented a barrier to resolving the climate debate (Ozawa, 2006). For instance, there remain technical disagreements over the causal pathways through which human action affects climate cycles and conditions, as well as what effective mitigation strategies and policies might be. Thus, rather than focusing on ways to prevent, mitigate, or reverse climate change, the various stakeholders in the debate are stuck debating aspects of the scientific complexity underlying climatic processes.

The climate debate is not the only place where scientific uncertainty contributes to conflict processes. Instead, many environmental conflicts escalate due to the adversarial use of scientific data. There is a common misperception that what is needed to resolve environmental conflicts is perfect information or better data. The notion is that better science will lead to a clearer understanding of the problems at hand and the most efficient and effective solutions. However, many scholars have demonstrated that science itself is not value neutral (Carolan, 2008), but rather that the way in which scientific analysis is structured and conducted—from the questions that are explored to the funding structures for research—is itself a social construct (Sarewitz, 2004). As such, scientific processes, findings, and legacies are subject to and shaped by social biases.

This is not to discredit the scientific process or the value of science in environmental decision making. Rather, the point is to understand the limits of science and identify appropriate roles for science in informing conflict resolution processes. Ozawa (2006) emphasizes this fact, noting that disagreements in intractable conflicts are ideological or political rather than factual. This is similar to Balint et al.'s (2011) conceptualization of conflict as conflicting values, perceptions, and desired end goals.

What is needed to resolve these conflicts, then, is not better data or perfect knowledge, but frameworks capable of identifying the underlying value and interest differences and eliciting mutually agreeable solutions to those differences. Under such frameworks, science and knowledge can be used as tools to inform decision making, correct asymmetries in knowledge power, and create sustainable answers to environmental challenges (Christie, 2008).

Legal and Procedural Frameworks

In addition to scientific uncertainty and socioecological complexity, environmental conflicts occur in complicated policy and administrative spaces. In most environmental conflict, unlike some other forms of conflict

(e.g., interpersonal, communal), a government agency is charged with oversight, management, implementation, or mitigation of the elements of the natural world that contribute to conflict processes. Typically these conflicts cut across multiple jurisdictions at multiple administrative levels and involve at least some component of public disputes, including health, race, justice, development, and governance (Dukes, 2004). For instance, governance of public lands in the western United States typically involves overlapping jurisdictions at the municipal, county, state, and federal levels, with multiple intersecting bureaus and departments at each.

Borrowing from ecological metaphors, O'Leary and Bingham (2003) categorize this legal and procedural complexity according to the scale at which environmental conflicts interact with policy and procedure. Upstream conflicts involve macroscale issues over policy or laws that stipulate how a given environmental issue will be addressed. Midstream conflicts occur at the bureaucratic-administrative scale involving issues regarding how a specific issue or resource is administered. Downstream conflicts involve issues over site-specific conflicts or issue-specific enforcement. Considering the social and ecological complexity, scientific uncertainty, and spatial and temporal scales that these conflicts include, a single conflict may be expressed in each of these three policy scales.

This legal and procedural complexity presents challenges to conflict resolution by constraining the range of potential solutions for a specific issue, as well as the types of methods and forums available for pursuing resolution. Because in most instances of conflict, a government agency administers or manages the environmental issues or drivers in question, the parties in conflict and affected stakeholders may have very little power to affect decision making in the conflict. Furthermore, the range of alternative management actions available may be constrained by each involved agency's legal constraints and procedural and administrative frameworks. In addition, there may be legal and procedural constraints on the form and method with which governmental representatives engage each other and the public surrounding the environmental issues in conflict. There may be limited legal or institutional latitude for involving affected stakeholders in the decision-making process. Thus, any attempt to intervene in or manage an environmental conflict must work within these institutional and legal constraints.

Challenges for Conflict Resolution

Each manifestation of environmental conflict will have different degrees of complexity in each of the characteristics described. Some conflicts may appear relatively straightforward, and indeed may be readily negotiated, mediated, adjudicated, or mitigated. However, each incidence of conflict

on or surrounding a specific environmental issue is part of a larger history of policy, decision making and environmental management, social action, and ecological interaction that contribute to produce the current conflict dynamics. Thus, a given conflict needs to be understood in terms of both its current dynamics, as well as its history and its spatial and temporal scales. In the same vein, efforts to resolve a current manifestation of conflict need to be considered in terms of the impact that those decisions will have on the wider system dynamics at multiple temporal and spatial scales.

Because of the interconnected nature of social and ecological systems, an environmental conflict is difficult to resolve finally and fully. This is due in part to the fact that any action affects the larger system dynamics in unpredictable and unforeseeable ways. Thus, it may be better to conceptualize interventions that seek to productively manage conflicts rather than seeking to resolve them (O'Leary, Amsler, and Kopell, n.d.).

TRENDS IN ENVIRONMENTAL CONFLICT RESOLUTION RESEARCH

Given the complexity of social-ecological systems, it is clear that managing many contemporary natural resource and environmental issues requires collaboration among all affected stakeholders. This is particularly true when considering that no single stakeholder individually, or subgroup of affected stakeholders collectively, has the knowledge, authority, resources, and capabilities to manage such issues by themselves (Weber and Khademian, 2008). Environmental conflict resolution (ECR) grew out of the field of alternative dispute resolution (ADR) in response to this need for inclusion and collaboration. Whereas traditional mechanisms for resolving disputes are either adversarial (e.g., litigation and arbitration) or exclusive (e.g., legislation, or top-down administrative decision making), ECR methods use collaborative processes for problem solving to reach mutually satisfactory agreements to conflict or contentious issues (O'Leary et al., n.d.).

Initially consisting largely of environmental mediation, the breadth of methods in ECR now covers a wide range of collaborative tools and processes, including facilitated negotiation, joint fact finding, conflict assessment, policy dialogues, early neutral evaluation, collaborative planning, and community-based natural resource management (O'Leary and Bingham, 2003). Underlying the development of collaborative tools and processes for resolving and managing environmental conflicts, an expansive body of theory has emerged that explores questions such as these: What types of interventions work best in given situations or types of conflicts, and what sorts of forums do they work in? How is success defined

in ECR processes, and how is it measured? What are the skills required for practitioners to manage environmental conflicts effectively? The following sections provide a brief overview of current trends in ECR research, with the goal of identifying lessons for practitioners.

Addressing Environmental Conflicts through Collaborative Processes

Since the 1970s, there has been an increase and proliferation in the use of collaborative processes to address environmental conflicts (Singletary et al., 2008; Wondolleck and Yaffee, 2000; Bingham, 1986). This has occurred in both the developed and industrialized nations as well as in developing contexts (Cousins, 1996), and ECR processes have been applied across an incredibly diverse range of issues, from single-issue decisions such as logging versus community rights in one village (Yasmi and Shanz, 2010) to managing global commons (Ostrom, 1990). The proliferation of these processes has grown out of the limitations of other approaches for addressing environmental conflict. Traditional legislative processes, for instance, are generally not able to consider site-specific issues or incorporate individual stakeholder concerns into policymaking. Scientifically sound solutions are rarely politically acceptable, even when the facts are clear and solutions are readily devised. Furthermore, not all stakeholders possess adequate financial means to effectively lobby their position to elected representatives.

Litigation faces many of the same challenges. While litigation does (or can) represent individual stakeholder interests, the range of issues that can be addressed through litigation is constrained by legal precedence, issues of standing, and other procedural limitations (Christie, 2008). Furthermore, the adversarial nature of litigation creates win-lose outcomes and thus presents significant risks for stakeholders to engage in this sort of process.

In contrast, collaborative processes based on joint fact finding, problem solving, and shared responsibility in decision making can offer several advantages to the traditional zero-sum approaches (Susskind, Levy, and Thomas-Larmer, 2000). Among the promises of the ECR methods advanced in the literature are that they are faster and less costly than litigation; they can build social capital, which in turn serves as a foundation for future conflict resolution; they address the real issues in a conflict rather than just stated positions or issues with legal standing; they are more flexible and more inclusive than traditional methods; and they have a greater likelihood of reaching positive-sum—and thus more stable and mutually acceptable—agreements (O’Leary and Bingham, 2003; Campbell and Floyd, 1996).

As Dukes (2004) notes, there is a tendency in the literature surrounding ECR to view these processes and their more traditional counterparts as mutually

exclusive means of addressing environmental conflicts. However, environmental conflicts occur on a wide range of temporal and spatial scales, and any manifestation of conflict at a given time and place is part of a longer history of processes to manage, litigate, legislate, and mitigate the sources and drivers of a particular conflict. Environmental conflicts are also played out in a variety of forums and processes (Dukes, 2004; Buckle and Thomas-Buckle, 1986).

Daniels (2009) highlights this interplay by describing the synthesis of arbitration and mediation into a hybrid ECR method to address conflicts over land use between motorized and nonmotorized resource users in the western United States. In that case study, a long history of conflict between user groups had resulted in gridlock over land use. Because of the intractability of the conflict and the threat of litigation, the affected stakeholders agreed to a mediated solution with a final arbitrated settlement to be made by the government agency responsible for administering the land in question. Despite common agreement among the stakeholders to accept the solution, once a decision was made, the conflict again erupted and resulted in renewed litigation. Thus, the hybrid ECR process was just one part of a complex system of legal, legislative, and administrative processes.

Measuring Success in ECR Processes

Although they are only part of a larger and more complicated system of rule making and management, it is important to explore whether, in what ways, and how well ECR processes deliver on the promises of success described. A number of different metrics for success have been advanced. Susskind and Ozawa (1983), for instance, first defined successful ECR as including the following elements (Pearson d'Estree and Colby, 2003):

- The negotiated agreement is acceptable to the stakeholders.
- The results are perceived as fair.
- The results maximize joint gains.
- The process used to reach the agreement minimizes transaction costs.
- The process improves relationships among stakeholders.

While other theorists have been critical of objective criteria such as these for being incomplete (Buckle and Thomas-Buckle, 1986; Pearson d'Estree and Colby, 2003), several important elements of success stand out. First, success in ECR processes can be measured according to whether an agreement or a settlement is reached, participant satisfaction with the process (Susskind, McKearnen, and Thomas-Larmer, 1999), the cost of the process (Bingham, 1986), and the outcomes in social capital and enhancement of conflict resolution skills (Buckle and Thomas-Buckle, 1986). Additional

criteria could include whether a settlement was implemented, how fully it was implemented, and how durable it was.

A substantial body of research has emerged that explores those factors in practice. Much of this literature focuses on individual case studies and presents deep understanding of specific contexts of ECR processes to explore whether and why each instance was successful (Heikkila and Shlager, 2012). While case studies present valuable lessons extrapolated from the nuanced understanding of individual processes, there is also utility in large-number studies with more generalizable lessons regarding which factors determine whether an ECR will be successful and which characteristics drive success across cases (Emerson, Orr, Keyes, and McKnight, 2009). Dukes (2004) provides the most comprehensive (albeit dated) discussion of the large-number studies in the ECR literature and synthesizes them to discuss implications for practice.

Emerson et al. (2009) build on this to provide perhaps the clearest and most thorough empirical exploration of the factors that affect three metrics of success: whether an agreement is reached through an ECR process, the quality of the agreement, and the impact of the process on relationships among stakeholders. They find that the effective engagement of participants in the process is a key factor to success. Likewise, according to their findings, the involvement of appropriate parties, the skills and practices of ECR mediators and facilitators, and the incorporation of high-quality and relevant information and data in the intervention all affect success in ECR processes.

Pearson d'Estree and Colby (2003) attempt to bridge the case study and large-number methods of research by first explicitly defining success in environmental conflict resolution according to standardized criteria that can be employed in comparative case analysis and then demonstrating the application of those criteria to eight disparate cases of water conflict in the western United States. Through that application, they are able to refine their criteria and analytical techniques into a coherent methodology for comparative case analysis. Their final set contains seven measurable criteria for success, each consisting of a set of flexible subcomponents that can be tailored to individual contexts or potentially used in large-number studies. Adapted from Pearson d'Estree and Colby (2003), the macrocriteria are

- *Outcome reached:* This criterion is focused on the short term and may be necessary for success by giving stakeholders a common goal to work toward or a focus for collaboration. However, it may not be sufficient for success.
- *Process quality:* This criterion measures stakeholders' perceptions of and satisfaction with the process. It involves elements of justice, fairness, inclusiveness, and costs.

- *Outcome quality*: In addition to reaching an agreement, the quality of the agreement itself is an important factor in the success of the intervention. This criterion includes things like cost-effective implementation, cultural and legal feasibility, scientific and technical soundness, and environmental sustainability.
- *Relationship of parties to outcomes*: In addition to stakeholders' perceptions of the ECR process, their perceptions of the outcome itself are important criteria for success. This category of factors includes issues of whether the stakeholders feel ownership of the outcome, whether it is fair and representative, and whether they feel it is flexible, stable, and durable.
- *Relationship between parties*: This criterion asks whether the process successfully improved relationships among stakeholders. It includes short-term issues such as working relationships throughout the ECR process, as well as longer-term issues of continued postsettlement relationship quality. This criterion includes issues of cognitive and affective shift, reduction in hostility or grievance, and other transformative shifts.
- *Social capital*: The final criterion examines the impact of the ECR process on the larger system. This criterion asks whether the ECR process resulted in macrochanges such as enhanced citizen capacity to draw on collective resources, increased capacity for environmental decision making and collaboration, and social system transformation.

In their discussion of each of these criteria, Pearson d'Estree and Colby discuss the inherent trade-offs in working toward successful environmental conflict resolution—for instance, “increasing stability of an outcome may reduce flexibility . . . [and] environmental and cultural sustainability may be at odds” (2003, p. 47). Because of these trade-offs, it may not be possible to determine success based only on high rankings in all criteria. Rather, stakeholders and process managers must make explicit value choices in what they are seeking by engaging in the ECR process. They must also be realistic about the legal, historical, cultural, and environmental constraints of the situation and design a process that can work within the current context.

Skills for Effective Intervention

Conspicuously absent in Pearson d'Estree and Colby's evaluation framework are metrics evaluating the effectiveness of the ECR convener, mediator, or facilitator (hereafter *process managers*), presumably because their framework is designed to enable ex post facto cross-case comparison of the outputs and social and cross-stakeholder effects of ECR processes. However, as

seen in Emerson et al.'s (2009) large-number study, the skills of the process manager are fundamental determinants of success in ECR interventions. We are therefore left to infer that success as measured by Pearson d'Estree and Colby is facilitated in part through the inclusion of a skilled and effective process manager. The question remains, however, of what skills and competencies enable a process manager to facilitate a process toward success.

Citing Dukes (2004), Emerson et al. (2009) note, "The value of the third party neutral in conflict resolution processes has been virtually axiomatic in the literature" (p. 38). Indeed a substantial literature has developed around facilitator and coordinator skills in ECR and the importance of these in determining the success of processes. In a review of this literature, Leach (2006, p. 46) reports that "the presence of an effective facilitator/coordinator is one of the most frequently cited keys to success." But what exactly does "effectiveness" here entail?

There is a tendency to focus discussion of process manager skills directly on the negotiation or mediation process itself. For instance, studies examine effective methods of convening mediation (Susskind and Cruikshank, 2006), their ability to reduce or manage conflict toward consensus (O'Leary and Raines, 2002; Susskind, 1994), or their flexibility and ability to facilitate fair and constructive dialogue. Singletary et al. (2008) conduct a study of agricultural extension workers engaged in ECR and rank thirty-five skills on their importance for effective ECR process management.

However, despite the deep knowledge and theory regarding the skills that make facilitators and mediators effective, facilitating stakeholder dialogue is just one part of the ECR process. As Heikkila and Schlager (2012) note, much is known about the mediation process itself, but much less is known about the ECR process generally. A review of contemporary literature suggests that the front-end or preintervention analysis and coordination skills of a process manager are fundamental to designing an effective ECR intervention.

For instance, determining whether the situation is ripe for ECR, and not some other form of dispute resolution, is a prerequisite to ECR processes often cited in the literature (Emerson et al., 2009; Susskind et al., 1999; Carpenter and Kennedy, 1988). In an article discussing the effective representation of clients in ECR, Bingham, Esterman, and Riti (2009) find that assisting clients in assessing this ripeness is a fundamental skill that attorneys should develop and that conducting such an assessment should preclude any decision to engage in mediation, arbitration, or negotiation. This should ideally be done through formal conflict analysis (Coleman, 2006).

Building on this, the inclusion of the right stakeholders is imperative to success in ECR processes. There is a tension between including a broad range of affected and interested stakeholders and effective engagement of

informed and committed stakeholders in ECR processes. As Emerson et al. (2009) discuss, “striking the right balance here is a case-specific judgment call that affects . . . subsequent process design decisions . . . [as well as] the perceived internal and external legitimacy of the group” (p. 37). Here, the mastery of conflict analysis skills can assist process managers in making those judgment calls on which people to include and when to include them.

In addition to these early design and analysis skills, process managers in ECR must have a clear technical grasp on the issues in question or be able to identify and engage relevant experts to include as advisors to the process. As discussed earlier, environmental conflicts entail questions of ecological processes and scientific uncertainty. Christie (2008) discusses the mechanisms through which knowledge of facts in an environmental conflict is a significant source of power for stakeholders. According to his discussion, stakeholders possess different levels of ability to collect, process, analyze, and mobilize information in pursuit of their interests. This creates power asymmetries among stakeholders regarding knowledge power. In order to engage in effective resolution processes, these asymmetries need to be addressed.

There will inevitably be questions regarding what information is accurate and relevant to the issues at hand. The process manager must thus devise a strategy for obtaining, vetting, and making that information equally available to stakeholders in the process. This can be achieved through methods like joint fact finding, wherein stakeholders identify and agree on relevant information as well as identify knowledge gaps that need to be filled. In the review of literature on successful ECR processes, Leach (2006) finds numerous studies and cases reporting that the inclusion of high-quality, trusted information is paramount to successful ECR.

In sum, an effective process manager (or team of managers) needs to develop competency in more than just facilitation and mediation. Effective process management includes just and fair process design, effective stakeholder identification and engagement, procedural skills in ECR techniques, and technical competence in the subject matter and knowledge of institutional, legal, and administrative constraints.

IMPLICATIONS FOR PRACTICE

In light of the discussion, the question remains as to who specifically initiates, coordinates, or employs ECR processes to manage environmental conflicts. There is no single answer to that question, as each instance of environmental conflict is unique. At times, a natural resource manager may find herself or himself embroiled in a conflict between competing stakeholder interests and recognize the opportunity to use ECR techniques

to move beyond the impasse. At other times, environmental planners in governmental or private sectors may employ these techniques. Campbell and Floyd (1996) argue that planners may in fact be perfectly positioned to convene and coordinate ECR processes due to their methodological and analytical training in anticipating issues and assessing alternatives to accommodate a range of competing interests. In contrast, Bingham et al. (2009) demonstrate the attorney's role as an ECR practitioner, and Singletary et al. (2008) discuss similar roles taken on by agricultural extension workers. In still other instances, conservation managers and programming staff may employ ECR methods in their work (Redpath et al., 2012).

Despite the wide range of professions and professionals who may be involved in coordinating or employing ECR processes, there are several lessons that practitioners of these methods should take from the discussion here.

Understand the Conflict in Terms of the Larger Social-Ecological System

Given the complexity of social actors, environmental processes, and ecological relationships in modern socioecological systems, it is inevitable that at times incompatible goals, values, interests, and needs among a diverse range of stakeholders will escalate into conflict. Practitioners who find themselves charged with intervening in these conflicts need to understand them in terms of the larger systems and the nonlinear processes of cause, influence, and effect within these systems across multiple spatial and temporal scales. Without an appreciation of that complexity, it is likely that important stakeholders will be omitted from ECR processes. In a similar way, an oversimplified view of the conflict and its drivers will lead to the design of a process that addresses short-term behaviors and issues, missing the more fundamental drivers of conflict and opening avenues for future escalation of tensions.

Design a Process That Works within Existing Legal, Procedural, Technical, and Cultural Boundaries

For practitioners engaging in efforts to manage or resolve environmental conflicts, it is important to bear in mind that current resolution processes are part of a legacy of management decisions, legislative processes, legal decisions, and individual choices that gave rise to the current situation and, as part of that legacy, will influence future iterations of action, interaction, conflict, and negotiation among stakeholders. Process managers must be realistic about the legal, administrative, procedural, technical, and cultural frameworks that constrain the range of management options for the environmental factor in question, as well as the range of solution options

for affected stakeholders. Processes designed outside of those frameworks risk designing solution strategies that are not implementable. Furthermore, engaging stakeholders in processes that do not fit their organizational, cultural, legal, and economic constraints risks exacerbating gridlock and escalating tension and intractability.

Identify Clear and Explicit Objectives

Because of the social and ecological complexity involved in environmental conflicts and the legal, procedural, cultural, and administrative constraints under which they occur, no process can be a panacea capable of fully and finally resolving the sources and drivers of conflict. Practitioners thus need to be realistic in terms of what a process can accomplish within existing constraints and define success according to achievable and measurable process outcomes. Process managers should clearly communicate with stakeholders what is reasonable to expect from participating in the process, what each stakeholder's responsibility is in the process, and what success will mean or produce.

Engage All Relevant Stakeholders and Understand Their Role, Power, Needs, and Interests in the System

Including the right stakeholders in ECR processes is imperative for success. There is not, however, a universal standard of right in the case of environmental conflict. Anyone with an interest or stake in the issue at hand could be included in discussions surrounding that issue. However, some key stakeholders may not be willing to engage, particularly if there are large power asymmetries among them. Furthermore, there may be latent or potential stakeholders who have not previously played a role in the conflict itself but are affected by it. Thus, some sort of conflict and stakeholder analysis is needed in the preliminary stages of an ECR intervention in order to fully understand the range of stakeholders involved and their power and positions in the situation.

Manage Scientific Information and Uncertainty to Correct Asymmetries around Knowledge Power

Most, perhaps all, environmental conflicts involve technical questions regarding ecological, biological, and physical processes. There is often disagreement among stakeholders regarding the facts and scientific understanding of those processes. Even when the processes themselves are relatively well understood, there is often disagreement over what to do to address environmental problems. Thus, practitioners need to design processes that can manage

scientific information, identify knowledge gaps, and structure processes for filling or working around those gaps.

In addition, stakeholders will possess different levels of ability to collect, process, analyze, and mobilize information. Process managers thus need to devise strategies to balance these asymmetries in knowledge power in order to create fair, transparent, and just processes.

Identify Opportunities for Peace Building

This discussion has focused on environmental conflict, challenges to resolution, and guidance for effectively managing ECR processes. When dealing with environmental problems and natural resource issues, it is easy to focus solely on conflicts and tensions. However, as Kramer (2008) adeptly recognizes, “There are several pathways along which environmental cooperation could contribute to peace. Working together on solving problems can help replace distrust, uncertainty, and suspicion with . . . a tradition of cooperation” (p. 10). Jarraud and Lordos (2012) echo this, stating that common environmental issues can be leveraged to build cooperation. Environmental issues may provide a bridge between parties with seemingly irreconcilable differences.

Thus, the discussion ends here with a call for conflict resolution practitioners and natural resource managers to identify and capitalize on opportunities to build peaceful, productive relationships among competing stakeholders and parties in conflict by finding points of cooperation on, and pursuing sustainable solutions to, environmental issues. These points of collaboration can build trust and working relationships among stakeholders and create a foundation on which future productive interaction can be built. Such a foundation can also serve as a cross-cutting social structure that can reinforce social ties across stakeholder groups when incompatibilities in interests, needs, and objectives arise. Finally, cooperation and collaboration around environmental management and ecological considerations can demonstrate mutual concern among distinct social groups that might potentially bridge ideological, cultural, and identity-based divides.

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