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Large-Scale Conservation in the Common Interest

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Preface

Many people are currently working toward sustainability using available natural and human resources. These efforts include locally focused initiatives and others at regional, national, and international scales. As we see it, a sustainable world is characterized by intact and healthy environments that support clean air, abundant water, and a diversity of life. This is also a world in which people live and enjoy well-being and dignity. Large-scale conservation inherently involves large spatial, temporal, and complexity scales. It also includes intermixed geophysical, biological, and political dimensions. Coming to grips with these many natural and human forces and factors at large scales, much less the myriad details in any single case, is challenging to the extreme. There are many well-intentioned and near-heroic sustainability initiatives underway throughout the world. Presently, some are more successful than others. We can learn from them in our search for the most appropriate concepts, methods, and tools to aid this vital work. This book aims to help those who are engaged in the interactive tasks of conserving sustainability and human dignity.

This volume draws on a proven integrative, interdisciplinary framework called the policy sciences or the configurative approach to address these dynamic dimensions, natural and human. Throughout the book we argue that a more holistic and genuinely interdisciplinary approach is required to solve the growing complex challenges associated with large-scale conservation. Continuing to rely solely on the principles of reductionist management and techno-rational expertise is not an option: such approaches often overlook important contextual matters and will ultimately result in the further erosion of ecosystems and human well-being.

Scientists, lawyers, and activists have successfully used this interdisciplinary framework across the globe in natural resource conservation over the last half century. The framework that we introduce in the early chapters and use throughout the book, including in all the case studies, can significantly strengthen large-scale conservation efforts. We believe that large-scale conservation poses many complex challenges that single disciplines (e.g., ecology), approaches (e.g., systems theory), or methods (e.g., quantitative models)—although helpful and often necessary—cannot fully address alone. Interdisciplinarity is a comprehensive method to identify, arrange, and integrate variables that otherwise may be overlooked by established

disciplines or combinations of them (e.g., via multidisciplinarity). Applying interdisciplinary problem solving successfully to the complex problems of large-scale landscape conservation, sustainability issues, and human dignity can produce reliable and persuasive decision making for management and policy. People knowledgeable and skilled in interdisciplinarity can put it into practice in a broad range of cases.

This book was written by 13 authors. Three chapters were originally written for Yale University graduate seminars on interdisciplinary large-scale conservation (described in Chap. 1) taught by Susan Clark. Our perspective, in the seminars and in this book, focuses on the contextual, foundational, and practical elements of large-scale conservation, including the formulas, doctrines, and symbols that are typically used, regardless of the case. Our volume is intended to help readers move beyond existing paradigms, while retaining the best of what they have to offer. Our goal is to encourage movement toward greater integration, interdisciplinarity, comprehensiveness, and effectiveness that seeks human dignity and sustainability for all.

This book is intended for a broad audience, including students and professors new to the field of large-scale conservation, experienced field-based practitioners in science and management, and decision and policy makers who set specific and strategic direction for large landscapes. Professors can use this book to introduce students to the challenges of successful large-scale conservation design and implementation and to teach interdisciplinarity as a framework, concept, and tool. Professionals will find this book offers a new way of using science, management, and policy to make decisions. Finally, this volume can be used also as a guide to set up workshops, seminars, or projects involving diverse people and perspectives.

The book's introduction (Chap. 1) provides a first look at the interdisciplinary approach. It offers a problem-oriented perspective of large-scale conservation, defining key terms used throughout the book and making recommendations. Part I provides an overview of large-scale conservation, the interdisciplinary method, and the educational strategy used throughout the book. Chapter 2 presents our problem typology: a view of human behavior that can be summarized as "people seek values through institutions using and affecting resources," along with some observations. Chapter 3 surveys seven major approaches to large-scale conservation, the last being adaptive governance, which is the approach detailed and illustrated in the book.

In Part II, three "rapid appraisals," conducted by student teams and informed by the fundamentals described in Part I, illustrate the application of the interdisciplinary approach: the Connecticut River watershed that connects much of New England (Chap. 4), the Greater Yellowstone Ecosystem in the Rocky Mountains (Chap. 5), and the Last Green Valley, an initiative involving three states in the northeastern United States (Chap. 6). All three chapters offer practical and strategic recommendations.

Part III offers three more in-depth cases by "participant observers" on specific issues, again applying the interdisciplinary approach: a national hiking trail (Chap. 7), wildlife conservation in Tanzania (Chap. 8), and the Humboldt Bay Initiative (Chap. 9). Again, all three chapters make practical, strategic recommendations. The

conclusion (Chap. 10) offers final words on large-scale conservation using interdisciplinary means and makes recommendations.

March 25, 2014   The Editors
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Susan Clark's primary goal in her research and teaching is to improve conservation of species and ecosystems at professional, scientific, organizational, and policy levels. In addition to ecological and behavioral field research on thirty-five mammals and other species, she has conducted research and applied projects in North America, Australia, Asia, and Central America, building case studies, evaluating policies and programs, helping organizations to incorporate reliable science into management, helping students to develop proficiency in the policy sciences method of problem solving, and working with a wide range of groups to improve conservation problem solving through workshops and other analytic exercises. Recent books include *Large Carnivore Conservation: Integrating Science and Policy in the North American West* (2014)*, The Policy Process: A Practical Guide for Natural Resource Professionals* (2002)*,* and *Foundations of Natural Resources Policy and Management* (2000)*.* She is a professor (adjunct) at the Yale School of Forestry and Environmental Studies.

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Chapter 1
A Problem-Oriented View of Large-Scale Conservation

Susan G. Clark, Catherine H. Picard and Aaron M. Hohl

Abstract This introductory chapter provides an overview of large-scale conservation, which takes into account both the content (biophysical substance) and process (relations, procedures, and decision-making patterns) of conservation. Large-scale conservation recognizes technical problems but also looks well beyond them to political problems (in decision-making systems) and cultural problems (in the underlying assumptions, expectations, and norms that guide societies and determine how people make decisions). This analysis adopts an explicitly interdisciplinary and problem-oriented approach that focuses on the social and decision-making processes inherent in large-scale conservation. A brief problem-oriented appraisal looks at people's goals, ideally, environmental sustainability, human dignity, and common interests. It also looks at current trends in conservation toward larger scales and at underlying conditioning factors behind the widespread adoption of large-scale conservation, specifically, innovations in ecology, economic factors, and sociopolitical dynamics. Finally, it offers future projections, i.e., the widespread assessment that environmental problems are likely to worsen in the coming decades. The chapter concludes by summarizing the proposed alternative to current efforts—the practice of adaptive governance—which promises to be more effective in achieving these goals because it is more contextual and practical, fosters integrative decision making and sound judgment by skilled leaders, and creates more inclusive social and decision-making processes.

Keywords Large-scale conservation · Interdisciplinary problem solving · Sustainability · Common interest · Human dignity · Adaptive governance · Problem orientation

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1.1   Introduction

A growing number of scientists, managers, and resource users worldwide recognize that short-term, local, and narrowly focused remedies to environmental problems are not tenable. Traditional, "expert-knows-best" interventions based on the principles of reductionistic, scientific management, wherein communities' values are ignored, frequently fail to achieve the desired outcome. Moreover, these approaches have failed to meet the demands for increased community participation in policy and management (Wilkinson et al. 2007). As a result, people are increasingly turning to large-scale conservation strategies—from ecosystem management to transboundary conservation—to address the growing number, scope, and complexity of environmental problems (Gordon et al. 2005; Robbins 2013). However, facile solutions for alleviating environmental problems do not exist, and scaling up existing models is insufficient for several reasons (Clark 1993). First, sustainable solutions to large-scale conservation challenges must account not only for large spatial and temporal scales but also for biophysical and sociopolitical complexity. Second, they must attend not only to intergenerational equity but also to spatial equity (Chapin et al. 2009). Finally, they must account for both human uses and the needs of other species (Kellert and Wilson 1993; Craighead and Convis 2013). The problem-oriented approach used throughout this volume seeks to overcome the incomplete formulas currently in use by integrating knowledge and action in order to meet the twin goals of human dignity and sustainability.

1.2   Large-Scale Conservation: A Problem Orientation

Large-scale conservation is being intensely promoted and rapidly adopted around the world; however, there is no agreed definition of the concept. Large-scale conservation is used simultaneously to refer to increased spatial scales (e.g., landscape-level conservation), ecological criteria (e.g., biodiversity hotspots), as well as the need to attend to the political dimensions of conservation (e.g., transboundary protected areas and peace parks). These approaches are promoted under different labels and rationales, some of which have garnered great symbolic appeal (e.g., the Yellowstone to Yukon, "rewilding" North America, and the "Free to Roam" initiatives). With so many overlapping conceptions, definitions, and typologies in use, it has become difficult to distinguish among the many approaches and how they differ with respect to their underlying assumptions and beliefs, formulas for implementation, and symbolic appeals.

In this volume, we use the term large-scale conservation to refer to conservation efforts that deliberately seek to function and integrate at larger and more complex spatial, temporal, and governance scales than previous efforts. Our approach requires that the mix of technical, political, and sociological challenges inherent at large scales be addressed simultaneously, pragmatically, and justifiably. Considering

larger spatial scales, for example, shifts the target of conservation from individual protected areas to ecosystem dynamics and functions and finally to human dignity and sustainability. Accounting for expanded temporal scales requires giving explicit attention to the historical context and future impact of a conservation intervention. Finally, addressing more complex scales of governance depends on expanded participation, coordination, and cooperation in natural resource decision making. This volume introduces concepts, methods, and case studies to meet the goals of human dignity and sustainability in large-scale conservation.

Large-scale conservation is inherently complex and requires integrating information and action from disparate disciplines and participants into a rational, intentional, and systematic framework for decision making. A variety of research methods, policy instruments, and management approaches is currently used to address the challenges posed by large-scale conservation, with varying degrees of success. Our analysis differs from many existing efforts by adopting a logically comprehensive, problem-oriented approach that focuses on the social and decision-making processes that characterize large-scale conservation as well as the biophysical elements. Being problem oriented instead of solution oriented requires that problem solvers clarify participants' goals and values, describe the history of the problem, analyze why the problem exists, and envision possible future developments; this exercise produces a problem definition. Finally, it requires the identification, evaluation, and selection of management policy alternatives. These problem-oriented tasks must be addressed explicitly and systematically in an interactive fashion (Clark 2002).

1.2.1 Content and Process

Large-scale conservation takes into account the interrelationship between content and process (Clark 2008). The content (biophysical substance) of a problem and the process (relations, procedures, and decision-making patterns) of its development and solution are interrelated elements of any real-world problem. Traditional ecologists and conservation biologists typically prioritize content issues and ignore or underappreciate process issues. Maris and Bechét (2010) argued, for example, that adaptive management takes scientific uncertainty (e.g., how to preserve biodiversity) into account but ignores normative uncertainty (e.g., which biodiversity to preserve and why). And as Li (2007, p. 7) notes, "Questions that are rendered technical are simultaneously rendered nonpolitical. For the most part, experts tasked with improvement exclude the structures of political economic [process] relations for their diagnosis and prescriptions." Conversely, social scientists tend to emphasize processes or relations (such as power and economic wealth) at the expense of biophysical dimensions, including the structure and function of ecosystems. Whatever the discipline used, each has strengths in clarifying challenges, but each also suffers from blind spots that cause important aspects to be overlooked and not integrated into the picture as a whole (Clark 1997). We contend that successful large-scale conservation efforts must simultaneously attend to both content and process

issues in a manner that is realistic, explicit, and practical. Concepts and methods exist to do this but are underused at present in large-scale conservation. The adaptive governance approach proposed and detailed throughout this volume is an example of an integrated, balanced approach between content and process concerns.

1.3 Our Goals

We specifically recommend three goals for improving the design and practice of large-scale conservation—human dignity, sustainability, and the common interest—which we offer not as ambiguous abstractions but rather as concrete objectives that can be subjected to empirical criteria, standards, and tests, and achieved in practice (Brunner et al. 2002, 2005).

1.3.1 Human Dignity

We believe there is no higher goal than human dignity (McDougal et al. 1980). Some may feel that discussions of such topics are far removed from natural resources, but large-scale conservation cannot be achieved without sustainable, healthy societies based on human dignity for all people. The goal of human dignity arises from respect for the value of the individual, equal treatment under the law, individual freedom, and social justice (Lasswell and McDougal 1992). This widely supported goal in human affairs is articulated in the United Nations Universal Declaration of Human Rights and many other constitutions, declarations, and conventions worldwide (Hunt 2007; Weston 2008; Mattson and Clark 2011). Human dignity rests on the principles of respect, participation, and freedom of choice. Applying these principles in practice is often problematic. The perennial challenge is to honor the principles without violating the basic rights of others. Freedom of choice, for example, requires mutual deference to others' choices. Finding the most efficacious approach to achieve human dignity in large-scale conservation can be both difficult and contentious, but it is possible.

1.3.2 Sustainability

Sustainability in large-scale conservation requires maintaining the potential of a system to persist or improve its functioning and the benefits derived from that system over time. There are no precise criteria to determine if something is sustainable, although it is often painfully clear when policies and practice fall far short of sustainability (Rayner 2001). Sustainability has been criticized as a "woolly, ambiguous concept that is resistant to precise definition, fraught with internal inconsistencies, and difficult to apply in practice. It shares these difficulties with

other core societal values, such as freedom, equality, and justice" (Sarewitz 2001, p. 74). To achieve institutions and practices of sustainability will require learning and change at the individual and organizational level (Clark 2002, 2008). It will also require a special kind of strategic leadership and professionalism, which is why this volume stresses the importance of leadership skills, critical thinking, and problem solving.

1.3.3   Common Interest

An interest is a demand for values made on behalf of a person or group and supported by expectations that the demand will be advantageous (McDougal et al. 1980). A common interest is at stake for people "whenever people act on their perceived interests and form a community around an issue" (Brunner et al. 2002, p. 12). A distinction can be made between common and special interests. In the simplest conception, "interests are 'common' when they are shared, 'special' when they are incompatible with comprehensive goals" (Lasswell and McDougal 1992, p. 360). For example, safe drinking water and clean air are inclusive common interests. The common interest should not be assumed or taken to be permanent. Nor is it a collection of special interests that are fused together into a forced "win–win" scenario. The common interest is composed of mutually dependent interests such that, in order to further any one set of values, the interests of other participants must also be advanced. It is "a process of balancing, accommodating, and integrating the rich diversity of culture, class, interest and personality which characterizes all arenas" (McDougal et al. 1980, p. 207), including, we add, large-scale conservation. Finally, the common interest should not be confused with unanimity. "Unanimity is a euphemism for minority veto power, in which the negative decision of one community member enforces policies on all" (McDougal et al. 1980, p. 202).

Steelman and DuMond (2009, p. 408) note that "We have lost the language, vocabulary, and ability to talk about the common interest." The job of clarifying the common interest in large-scale conservation may depend on distinguishing between valid (evidence-based) versus assumed or expedient interests (McDougal et al. 1980). In practice, determining the common interest is full of procedural, substantive, and pragmatic challenges. We must relearn how to clarify, secure, and sustain our common interest. There are partial tests that can be applied to determine if a project or policy is achieving the goals described above. These include a procedural test to determine if decision making is inclusive, participatory, and representative, a substantive test that asks if concerns are valid, appropriate, and broadly supported, and finally a pragmatic test that determines if participants' expectations have been upheld and if policies or decisions work in practice (Cromley 2002).

Effective leadership is essential if large-scale conservation is going to achieve the goals described above. According to Dietz et al. (2004), among other characteristics, effective conservation leaders have an ability to inspire and influence others, the courage necessary to vocalize controversial opinions, strong interpersonal skills, passion for their work, and the skills to apply insight and creativity to

real-world problems. They are also viewed as being fair, respectful, and nurturing. Manolis et al. (2009) define leadership as the ability to inspire and mobilize others to achieve purposeful change while noting that effective conservation leaders may or may not have formal authority. They suggest that effective leaders need to be able to recognize the social dimensions of conservation problems, cycle frequently through action and reflection, get and maintain attention, combine the strengths of multiple leaders, extend their influence through networks of relationships, time their efforts strategically, nurture productive conflict, and cultivate diversity. One of the goals of this volume is to help practitioners and students to become skilled leaders—aware of their own standpoints and psychodynamics—in the service of large-scale conservation.

1.4 Historic Trends

A core premise of large-scale conservation, according to Noss (2002, p. 10), "is that the integrity of any piece of land or water is ultimately dependent on the health and quality of the broader landscape that surrounds it…. Therefore, larger scales are ultimately more meaningful than smaller, isolated efforts." A consequence of this premise has been an expansion of the scale and breadth of conservation efforts from isolated protected areas and single-use management strategies to regional and even international efforts that transcend political boundaries and encompass multiple goals (e.g., integrated conservation and development projects). These large-scale conservation approaches are justified as efficient, science- or development-based strategies that enable practitioners and donors to identify the most effective means of expending their limited resources (Groves et al. 2002).

Large-scale conservation strategies are now embraced by most major conservation organizations and donor agencies around the world (Gordon et al. 2005). Between the late 1980s and 2007 (the last year for which a global inventory has been published), the number of transboundary protected area complexes increased globally from 59 to 227 (Lysenko et al. 2007). In 2010, 12.7 % of the world's terrestrial and inland water areas and 1.6 % of the global ocean area were protected (Bertzky et al. 2012). More land is now under official protected status than is currently used for permanent arable crops (Chape et al. 2003). However, in spite of the significant increase in the number, size, and type of large-scale conservation initiatives established around the world, biological diversity and ecosystem services remain severely threatened.

According to the Millennium Ecosystem Assessment report (2005), human activities have accelerated the rate of species' extinction by as much as 1000 times the historical average. This means that more biodiversity has been lost over the past 50 years than during any other period of human history. Fifteen out of 24 of the world's ecosystem services considered in the assessment are listed as "degraded," including air and water quality, the health of marine fisheries, and the ability to protect against

natural hazards. The costs of environmental problems are disproportionally borne by people with limited resources and access to decision-making processes. This in turn has led to increased tensions—even violence—over access to and control over the world's remaining natural resources. These trends suggest that simply increasing the spatial and temporal scale of protected areas or harmonizing natural resource policies across administrative and political boundaries is by itself insufficient to secure environmental sustainability.

1.5   Conditions

The widespread adoption of large-scale conservation can be traced to three underlying conditions: innovations in the study of ecology, economic factors, and sociopolitical dynamics. Groves et al. (2002) highlight several advances in ecological research that led to the promotion of large-scale conservation approaches. First, conserving ecosystem processes and functions rather than individual species or habitats allows for a wider assemblage of biological communities and ecosystems to be protected. Given that scientists are dealing with incomplete and changing data, protecting ecosystems and not individual species is a useful precautionary strategy. Second, research has demonstrated that ecosystems function across multiple spatial and temporal scales and these factors must be considered when planning conservation targets and goals. Finally, ecosystems are not locked in a steady state or predetermined structure or successional trajectory but are instead characterized by dynamic and often unpredictable fluctuations and emergent surprises. Accordingly, ecologists argue that conservation interventions should focus on increasing ecological connectivity and resilience if they are to achieve any lasting impact.

Economic conditioning factors also play an important role in the rise of large-scale conservation. First, large-scale approaches should provide efficiencies based on economies of scale. Second, they may increase net benefits for communities when the cost of conserving one particular location is offset by benefits of conserving a broader set of ecosystem services. Third, large-scale approaches such as ecoregional planning are also used to make conservation more economically efficient by prioritizing conservation targets in order to get the greatest return from every conservation dollar.

Finally, as the world's population becomes increasingly connected and interdependent, there are social and political conditioning factors that encourage the coordination of natural resource policies across administrative and political boundaries. The cooperative management of wildlife and water across international boundaries has, for example, been widely promoted as a way to promote regional peace and security (Ali 2007). Together, these ecological, economic, and sociopolitical conditioning factors work in conjunction to drive the growth of large-scale conservation approaches across the globe.

1.6   Problem Definitions

We identified three basic types of problems in large-scale conservation, which are further described below. First, there is a range of technical problems, including a global decline in biodiversity, the degradation of ecosystem processes, and mounting pressures on the earth's resources as human populations expand. These technical problems threaten to impair the ability of future generations to live high-quality, dignified, and sustainable lives. Second, there are political problems as our decision-making systems have proven inadequate to address the diversity and complexity of environmental problems that we currently face. This has led to increased demands for community participation in natural resource policy and management that many institutions are ill equipped to handle. Third, there are cultural problems that concern the underlying assumptions, expectations, and norms that guide the organization of our societies and determine how we carry out decision making. For example, our basic doctrine for managing natural resources privileges scientific management, technical rationality, and economic efficiency, making it difficult for participants to identify, let alone secure, their common interests. Democracy often suffers in the process. These less than effective approaches have become institutionalized in many organizations' operations. Large-scale conservation efforts are inherently complex and must address all three types of problems if they are to be successful.

1.7   The Future

Based on current trends and conditions, the Millennium Ecosystem Assessment projects that environmental problems—including significant losses of biodiversity and the widespread degradation of ecosystem services—are likely to continue unabated over the next 50 years. The report also suggests that our current governance systems, institutions, and legal frameworks are ill-suited to effectively manage large-scale ecosystem processes such as international watersheds (Millennium Ecosystem Assessment 2005). As resources continue to be degraded and threatened, people are demanding greater participation in the decision-making process. In doing so, they often run up against the limitations of existing governance institutions. It is not clear, however, if such demands are having any lasting effects on the institutions and policies that govern large-scale conservation. In short, the common interest has not yet been clarified, much less secured, in most large-scale conservation initiatives. The chapters in this volume suggest that the goals of environmental sustainability and human dignity are not likely to be achieved by relying solely on technological fixes, increased cooperation, or additional research. Current approaches to large-scale conservation can be improved by being more contextual, problem oriented, and attentive to the constitutive and governance processes involved.

1.8   Our Recommendation

A growing consensus is emerging among conservation scientists, practitioners, and local resource users. Simply put, it is that contextual and practical methods are essential when undertaking large-scale conservation projects. We recommend using adaptive governance when undertaking large-scale conservation projects. Adaptive governance assumes that natural resource management depends on context as much as on traditional scientific principles or disciplinary knowledge. Adaptive governance relies on integrative decision making and sound judgment by skilled leaders in order to address multiple goals in real-world contexts. Problem definitions are contextual and draw from both local and scientific knowledge (Wilkinson et al. 2007). An adaptive governance approach to large-scale conservation recognizes that management and policy reform depends on regular monitoring, evaluation, and a comprehensive focus on how decisions are made. Failed policies and programs should be terminated, but lessons should also be harvested and disseminated from unsuccessful large-scale conservation projects (Clark et al. 2000).

Undertaking adaptive governance requires creating more inclusive social and decision-making processes. This can help everyone clarify their own and others' values and expectations. Stakeholders need to clarify and communicate their views and values in civil, respectful dialogue. Finally, everyone's expectations and demands about problem solving, coordination, and participation need to be blended and accommodated to the extent possible. Practitioners of adaptive governance strive to find ways to help people clarify, secure, and sustain the common interest in these tasks. This leads to integrated solutions and enduring outcomes. The goal is not to impose supposedly "compromise" scenarios but to identify mutually dependent and interdependent interests that are secured through an interactive, effective, and practical decision-making process.

1.9   Conclusion

In this volume, we look at large-scale conservation approaches that address complex environmental problems in ways that are sensitive to sustainability, human rights, and social justice. All are large in scale, based on spatial as well as temporal and complexity scales. All are facing significant challenges in identifying, securing, and sustaining the common interest. Accordingly, each case study provides an appraisal of a specific approach and recommends best practices that can be identified, diffused, and adapted successfully (Brunner et al. 2002, 2005). This volume moves beyond descriptive or technical typologies of large-scale conservation to explore and analyze the fundamental formula, symbols, and doctrines that underpin a diversity of large-scale conservation models currently in use (Gordon et al. 2005). We also advocate undertaking a comprehensive, integrative, problem-oriented approach that distinguishes among ordinary, governance, and constitutive problems

and their interrelationship. Finally, we seek to clarify and upgrade the social and decision processes that form the very foundation of not only all large-scale conservation efforts but, for that matter, society itself.

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Part I
Overview

Chapter 2
The Importance of People, Institutions, and Resources in Large-Scale Conservation

Susan G. Clark, Aaron M. Hohl and Catherine H. Picard

Abstract Large-scale conservation in the common interest requires that people be clear about the nature of the problems they face, the utility of the theory or assumptions they employ, and the features of the situation they try to manage. This chapter introduces ideas and language for realistically conceptualizing problems in large-scale conservation, and it presents a framework for making sense of the human as well as biophysical dimensions in natural resource management. Three types of problems are described—technical (ordinary), governance (political), and constitutive (cultural); too often in large-scale conservation governance and constitutive problems are overlooked, misconstrued, or inadequately heeded. Large-scale conservation also requires integrating information into a rational, yet practical, framework for decision making. The framework presented here to understand and carry out the integration task can be most simply stated as "humans seek values through institutions using and affecting resources." These four vital elements of management and policy making—humans, values, institutions, and resources—all of which are open for empirical, systematic study, are described. Skillful application of this three-level problem typology and framework can enable practitioners to analyze the full suite of problems and develop realistic solutions.

Keywords Large-scale conservation · Values · Institutions · Resources · Human behavior · Technical problems · Governance problems · Constitutive problems · Framework

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2.1   Introduction

Large-scale conservation efforts are a response to the growing awareness that many environmental problems can be understood and successfully remedied only by taking into consideration larger spatial, temporal, and social complexity scales than in the past. However, successful large-scale conservation requires more than just "scaling up" previous formulas, established organizational designs, or traditional mindsets. Problems must be addressed holistically and contextually, and attention must be given to social and decision processes inherent in the case at hand. For this to happen, practitioners require critical thinking, problem solving, observational, management, leadership, and technical skills (Clark and Wallace 2013). We are not alone in believing that practitioners, scientists, and decision makers need a pragmatic guide to aid them in understanding the social–ecological system in which they work (e.g., Folke et al. 2005; Collins et al. 2010; Ostrom 2011; Westley et al. 2013).

This chapter introduces several important concepts for realistically conceptualizing problems in large-scale conservation, and it presents a framework for making sense of the human and other dimensions in natural resource management. This framework has been used in diverse contexts and illuminates ways to enhance both sustainability and human dignity (Ascher 2009). Most current large-scale conservation efforts do not attend to these foundational elements. This chapter offers a typology of problems and the view of natural resource management and policy that are used throughout this volume.

2.2   Problem Orientation and a Problem Typology

Problems can only be effectively addressed if people orient to them realistically. As Clark (2008, p. 21) notes, "This seems obvious, but too often we misconstrue a problem, identify the wrong problem, see only part of a problem, or overlook it entirely." Consequently, one of the major challenges facing practitioners of large-scale conservation is articulating the most relevant problem definition. Practitioners must often contend with facile, yet conventional, problem definitions that can be clearly stated and rigorously solved but are irrelevant to the actual solution. A problem definition may, for example, be highly relevant, but insoluble using old paradigms, professional skills, and institutions. It is common during the early phases of any decision-making process to frame problems rather narrowly, typically in technical terms, and often on the basis of special interests. However, large-scale conservation problems are multifaceted, have wide-ranging effects, and do not lend themselves easily to narrow or technical definitions. A narrow focus on problem solving, rather than a contextually sensitive problem framing, may lead a practitioner to uncritically accept a proposed solution without taking into account past trends and conditions, probable futures, or the value dynamics at play (Rocheport and Cobb 1990; Picard 2010).

Table 2.1 Examples of approaches to large-scale conservation and the three problems encountered in each

Approach	Problem type		
Large-scale conservation approach	Ordinary (technical)	Governance (decision making)	Constitutive (cultural)
Single- and multiple-use management	Calculate maximum sustained yield	Distribute grazing rights among ranchers	Allocate authority to make decisions about land in the public domain
Ecosystem management	Assess trade-offs between species/habitat conservation and extractive uses of resources	Develop habitat conservation plans (HCPs)	Clarify treaty rights of tribes and first nations
Ecoregional planning	Identify wildlife migration corridors	Implement legislation that protects corridors from fragmentation	Restructure traditional/permitted uses of resources by local communities
Trans-boundary management	Map cross-border habitats used by large herbivores and carnivores	Negotiate cross border/international natural resource management agreement	Balance valid and appropriate interests and create an arena for local and cross-border cooperation

We recommend adopting a problem-oriented approach to large-scale conservation that includes five tasks (Clark 2002). The tasks of problem orientation are goal clarification (identifying values sought), trend description (reviewing relevant history), condition analysis (identifying relevant scientific knowledge and data that might explain matters), trend projection into the future, and alternative or solution analysis (including invention, evaluation, and selection of options). All five tasks should be initiated early in the decision-making process and interactively heeded throughout the life of the conservation effort.

A comprehensive problem orientation often reveals three types of problems—technical (ordinary), governance (political), and constitutive (cultural; Clark 2008). Practitioners of large-scale conservation are frequently confronted with all three classes of problems (Table 2.1), although they may or may not recognize this fact. It is easy to misidentify types of problem and consequently pursue ineffective solutions (Box 2.1). Often, these solutions are based on prepackaged disciplinary, bureaucratic, or institutional formulas.

Box 2.1   Three Papers That Describe Complexity and Multidimensionality of Problem Definitions of Large-Scale Conservation Projects

Understanding Patterns of Human Interaction of Decision Making: An Initial Map of Podocarpus National Park, Ecuador (Cherney DN, Bond A, Clark SG, 2009, Understanding patterns of human interaction of decision

making: an initial map of Podocarpus National Park, Ecuador, J Sustain For 28:694–711).

Rapid deforestation, poor water quality, rural poverty, and transportation difficulties are just some of the technical problems that participants are focused on in Podocarpus National Park. Underlying these problems, however, is the lack of arenas where people can discuss and balance their competing interests or identify common interest goals. Moreover, the heavy focus on surveillance, planning, and promotion has resulted in a decision-making process that restricts participation to experts and ignores the social context in which the park operates. The authors conclude that understanding the role of deliberative arenas and how deliberately to change the structure and function of those arenas can greatly improve the efficacy of problem solving.

The Promise and Peril of Large-Scale Conservation: An Appraisal of the Selous Niassa Wildlife Corridor (Picard CH, 2010, The promise and peril of large scale conservation: an appraisal of the Selous Niassa Wildlife Corridor, Dissertation, Yale University, New Haven).

The Selous Niassa Wildlife Corridor (located on the Tanzanian–Mozambique border) is designed to address two major problems: an increase in wildlife poaching and habitat fragmentation. While these are worrisome trends, they are driven by three conditioning factors that have been overlooked by the current (biophysical) perception of the problem: (1) the historical impact of socialism which profoundly reshaped the physical landscape and continues to influence social and decision process trends in the Corridor today, (2) the rapid transition to a neoliberal free market economy, which created a demand for cash crops, and (3) the sociocultural concept of wilderness, which has deeply influenced participants' expectations and identities, including how problems are defined in the first place.

The American West's Longest Large Mammal Migration: Clarifying and Securing the Common Interest (Cherney DN, Clark SG, 2009, The American West's longest large mammal migration: clarifying and securing the common interest, Policy Sciences 42(2):95–112).

Participants in the 170-mile pronghorn antelope migration in western Wyoming articulate three distinct problem definitions. The ecological–scientific view advanced by scientists and environmentalists focuses on bottlenecks in the migration route that will cause the antelope to be extirpated locally. The local rights problem advanced by some local residents and property owners suggests that the concerns about the antelope are a guide for environmentalists to lockup public and private lands. The cultural–heritage view advanced by others emphasizes the cultural significance of the migration while rejecting the need for government intervention. The authors argue that underneath each of these problem definitions are governance and constitutive challenges to securing a common interest solution. In particular, the highly fragmented patterns of authority and control and the parochial perspectives of many participants (including scientists) impede resolving the issue satisfactorily.

2.2.1 Technical Problems

Technical problems are what most natural resource professionals deal with in their day-to-day work (e.g., what is the estimated population of osprey in the Connecticut River watershed?). Scientific inquiry is typically organized into discrete disciplines that assume the world can be understood by breaking it down into component parts and solutions. The methods associated with disciplinary scientific inquiry are well suited to providing answers to technical problems, especially problems with well-defined spatial, temporal, and other contextual boundaries. However, focusing exclusively on technical problems restricts the range of considerations, participation, and often limits debate to those who have similar language, training, and resources. In contrast, all the chapters in parts II and III focus on the social and decision processes involved in large-scale conservation and move well beyond only technical considerations.

2.2.2 Governance Problems

The formal and institutionalized processes represented by government are not necessary for creating the conditions for ordered rule and collective action. The term "governance" has been adopted to refer to "the development of governing styles in which boundaries between and within public and private sectors have become blurred" (Stoker 1998, p. 17). Governance problems arise out of the need to make decisions about policy; however, the institutions and actors involved in governance problems extend beyond the traditional bounds of government and do not necessarily rely on the government's authority or capacity to get things done. Governance problems deal with both the arenas within which and the processes by which decisions are made, carried out, and appraised.

Moving toward sustainability requires healthy governance processes (Cortner and Moote 1999). Folke et al. (2002, p. 441) found that "adaptive governance systems often self-organize as social networks with teams and actor groups that draw on various knowledge systems and experiences for the development of a common understanding and policies. The emergence of 'bridging organizations' seems to lower the costs of collaboration and conflict resolution, and enabling legislation and governmental policies can support self-organization while framing creativity for adaptive co management efforts." Price-Hall et al. (Chap. 9) recount the development of a bridging organization in northern California.

Unfortunately, adaptive governance systems do not always arise spontaneously. For example, Cherney et al. (Chap. 4) found that fragmented decision arenas in the Connecticut River watershed created a barrier to developing an effective, more comprehensive, common interest conservation management policy. A narrow, localized focus in this case restricted deliberation about local issues at the expense of a holistic vision that could have enhanced system-wide cooperation and outcomes. The problem identified by Cherney et al. is characteristic of the many governance

problems that arise when numerous participants with diverse perspectives are spread out over a large spatial area. Participants may not share the same problem definitions or value outlooks and often lack a practical theory about the social and decision processes of which they are part. The Connecticut River case is a clear example of where participants could better organize for improved governance outcomes.

2.2.3   Constitutive Problems

Constitutive problems arise from the norms or cultural rules that guide individual and collective decision making in a community or society. They are implicit and fundamental, yet often difficult to perceive. For example, what should the Tanzanian landscape should look like (wilderness, farmland, pasture), who should have the authority to manage wildlife, and what types of knowledge are necessary for effective decision making? These are constitutive problems that are often overlooked in the current debate about Tanzania's wildlife (Chap. 8). Constitutive norms determine how and why decisions are made and who is involved in the decision-making process; they represent the rules for making the rules about ordinary decision-making interventions. The case studies in this volume suggest that models of large-scale conservation can be improved by being more attentive to constitutive and governance problems.

   The implicit norms that underlie governance processes can be adjusted only by changing societal rules through what are commonly described as constitutive processes. Decisions affecting the constitutive process are frequently made unconsciously. The evolving structure of the constitutive decision process is often a result of the way in which a series of ordinary decisions were made, rather than an outcome of an explicit decision about how the overall constitutive process should work. In contrast to technical and governance problems, constitutive problems can be essentially opaque to those within a situation, making such problems difficult to identify, let alone address. Furthermore, few people engaged in large-scale conservation projects are trained to understand constitutive process or identify constitutive problems. As a consequence, constitutive problems are overlooked, misidentified, and rarely addressed.

2.3   A View of Human Behavior

Managing natural resources in pursuit of large-scale conservation requires integrating information into a rational framework or practical theory for decision making. In this volume, the theory and framework that we use to understand the integration task can be most simply stated as "humans seek values through institutions using and affecting resources" (Lasswell 1971, p. 19). The centrality of these four elements—humans, values, institutions, and resources—in policy cannot be overstated. Carrying out large-scale conservation successfully requires understanding

Resources
Raw materials
Culture materials

Resources are allocated
and used through decision
processes

Values are shaped and
shared by using resources
in social processes

Clarifying and securing the

**Common
Interest**

Decision Process
Decision making focused
on solving problems

Social Process
People, groups,
organizations, and institutions

Decision-making processes occur
in the context of social dynamics

Fig. 2.1 A framework for clarifying, securing, and sustaining the common interest in communities seeking human dignity and environmental sustainability

and improving the way people make decisions about themselves, their values, institutions, and resources. This practical theory is foundational to this volume and informs case studies of this volume.

2.3.1 Humans

All people have perspectives made up of identities, expectations, and demands. Understanding the social process in a large-scale conservation venture requires discerning the motivations of all participants by analyzing their values, perspectives, and actions.

In addition to participants' standpoints, one should be cognizant of the situations (arenas) in which participants interact and the strategies they use to pursue their objectives. If one hopes to achieve outcomes that respect human dignity and are in the common interest, arenas should be open (i.e., relevant stakeholders must be included and allowed adequate participatory opportunities) and transparent (Steelman and DuMond 2009). Furthermore, because common interest actions may result in value deprivations (e.g., loss of respect, wealth, well-being) for some participants, decisions should be made in a situation or an arena that is perceived as legitimate by relevant participants (Fig. 2.1). Lundqvist (2004), for example, suggested that good governance of ecosystems requires solving the trilemma characterized by tensions between effectiveness, participation, and legitimacy.

The goals of participants in any large-scale conservation effort reflect not only their values but also their perceptions, or standpoint. In short, people are "predisposed to complete acts in ways that are perceived to leave them better off than if [they] had completed them differently" (Lasswell 1971, p. 16). Standpoint is the perceptual lens through which an individual views the world. It is a function of personal experience, professional training, and organizational affiliation. Individual experiences inevitably lead to preconceptions and biases that limit our ability to be fully rational. They influence what specific outcomes we value, how and what we perceive to be problems, and what we see as reasonable solutions. Clarifying one's standpoint requires recognizing one's own biases, whether they are personal, epistemological, disciplinary, organizational, or parochial. A number of methods can be used to facilitate standpoint clarification. For example, several authors have used the Q-method to illuminate people's perspectives and to identify common ground in contentious conservation cases (Chamberlain et al. 2012; Mazur and Asah 2013). Standpoint clarification will not ensure complete objectivity, but it can help temper the effects of the biases.

2.3.2   Values

Values are "orientations toward what is considered desirable or preferable by social actors" (Zavalloni 1980, p. 74) and are often used as "criteria for preference or choice or as justifications for proposed or actual behavior" (Williams 1970, p. 27). Values are embodied in ethical principles, normative properties, and moral responsibilities of society; they often appear as moral or ethical statements about conduct that is beneficial or necessary for attaining human dignity at the individual, group, and societal level. Values are at the very heart of daily life, individual meaning, and social meaning. Consequently, value dynamics must be understood in order to collectively articulate the common interest.

Although potential values are multitudinous, they can be classified in terms of eight functional values, which represent a comprehensive list of underlying human motivations (Table 2.2). Using this classification scheme permits a more objective study of values and focuses attention on the key role that values play in decision making (Bell 1997). Particular things that are valued or desired (e.g., the presence of wolves in Yellowstone, preservation of cultural landscapes in the Connecticut River valley) can be ascribed to one or more of these values. For example, Picard (Chap. 8) describes how some participants use wildlife in Tanzania to secure the values of wealth, power, and skill, while others seek rectitude in establishing a wilderness devoid of people. All eight values are at play in human interactions. Relative preferences among these values determine the importance placed on specific outcomes. For example, participants might argue about the moral imperative to save an endangered species (rectitude) versus preserving jobs (wealth and well-being).

Four basic types of strategies can be used to obtain desired value outcomes: diplomatic, ideological, economic, and coercive. Diplomatic strategies are used by

Table 2.2 Values that motivate human behavior (Lasswell 1971)

Value	Definition	Analytical questions
Affection	Desire for friendship, loyalty or love	How are professional, friendship, and loyalty values used in decision process? What are the outcomes?
Enlightenment	Desire to give and receive information	How is information given and received? What are the outcomes?
Power	Desire to make and carry out decisions	How is power given and received in inter-personal and decision process? What are the outcomes?
Rectitude	Desire for moral or ethical standards	What ethical considerations are at play in interpersonal relations and in the deci-sion process? What are the outcomes?
Respect	Desire to give and receive rec-ognition within a community	How is respect or deference used in deci-sion process? What are the outcomes?
Skill	Desire to develop talents	What kinds of skills are used in problem orientation and in decision process? How and with what outcomes?
Well-being	Desire for mental, physical, and spiritual health	How is well-being affected by the decision process? What are the outcomes?
Wealth	Desire to control resources (money, land, human capital)	How is wealth used and affected (given and received) by the decision process?

leaders and their representatives to communicate with one another. Ideological or educational strategies offer words, deeds, and other symbols. Economic strategies involve goods and services (incentives and disincentives). And coercive strategies use force and threats of force.

In general, persuasive strategies (diplomatic and ideological) are more likely to be sustainable than coercive strategies. Collaborative management and learning typically combine diplomatic and ideological strategies seeking more sustainable management actions (Fernandez-Gimenez et al. 2008). Well-designed economic strategies can also be powerful (e.g., payments to ranchers for livestock depre-dations in order to conserve large carnivores). However, coercive strategies have sometimes been clothed in the guise of economic strategies with appeals to eco-nomic efficiency and rationality (e.g., the expropriation of customary use rights for "the public good," or the fines and fences approach to park management).

2.3.3 Institutions

Improving large-scale conservation requires not only changing the way decisions are made and the content of those decisions, but also changing the constitutive fac-tors that influence how we perceive of and think and feel about large-scale con-servation problems. Conventional appraisals of decision making usually fail to examine both the decision-making process and the decision-making culture com-prehensively. A functional appraisal of the decision process requires analyzing all

Table 2.3 An overview of decision functions and examples (Lasswell 1971)

Function	Definition	Examples	
		Legal proceeding	Timber management
Intelligence (planning)	Gathering information about the problem	Congressional hearings	Cruise, market analysis
Promotion (open debate)	Weighing and recommending alternatives	Debates	Forest planning process/ workshop
Prescription (selection)	Authoritative decision about what to do	Legislation	Management plan
Invocation (enforcement)	Preliminary effort to put a prescription into effect	Filing a legal case	Putting a sale up for bids
Application (implementation)	Final interpretation of the decision in practice	Court decisions	Harvest and receipt proceeds
Appraisal (evaluation)	Comparing goals and performance of the decision	Congressional Budget Office review	Post-harvest survey, annual accounts
Termination (conclusion)	Decision to end a prescription	Repeal or significant amendment of legislation	Revision of management plan

the specific functions (activities) that must be completed in order to move toward a preferred future. A complete decision process requires attending to seven decision functions (Table 2.3). Standards exist for evaluating the efficacy of each function. The decision process as a whole should be dependable, comprehensive, and integrative, and focused on common interests (Clark 2002). Although the functions can be carried out either sequentially or concurrently, it is important to attend to all seven functions since ignoring any one can lead to suboptimal outcomes. For example, plans end up sitting on the shelf when the prescription and application functions are not considered in tandem.

Adequate appraisal of large-scale conservation initiatives as part of any decision-making process is especially important. Particular initiatives can be treated as practice-based prototypes or innovations. As these prototypes are applied, they should be monitored and evaluated in order to identify what works, why, and under what circumstances. Adequate appraisal requires (1) determining whether an effort met its goals, (2) identifying shortfalls and accomplishments, (3) analyzing the causal factors behind the level of success of the effort, and (4) making recommendations on how future efforts can be made more effective. Being clear on evaluative standards is essential to close feedback loops and actively learn at individual, organizational, and policy levels. Rigorous appraisal of prototypes will facilitate identifying best practices, diffusing those lessons widely, and adapting the lessons to new contexts. Appraisal of large-scale conservation initiatives should also indicate whether the project passes the three tests of the common interest (Chap. 1).

Institutions develop when habitual actions that were initially undertaken for pragmatic reasons take on a normative force (Berger and Thomas 1966; Ostrom 2005). Institutionalization allows us to construct our social reality. Institutions not only control behavior by dictating what actions are acceptable but they also free us to make decisions by letting us know what another's actions are supposed to mean. People take part in institutional cultures, which mediate how resource management decisions are made. According to Schein (1990, p. 111), "Culture can now be defined as (a) a pattern of basic assumptions, (b) invented, discovered or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is taught to new members as the (f) correct way to perceive, think, and feel in relation to those problems."

All people are part of cultures and subscribe to basic belief systems, or myths, about how the world works (May 1991; Patai 1972). Myths are not right or wrong per se, but some myths are more useful in a given context than others (Brown 2001; Cherney et al. 2009). Within disciplinary cultures, myths are embodied in scientific paradigms (Kuhn 1970) and mental models (Senge 1990). Often epistemic communities develop around particular suites of issues, and members of these communities play an important role in framing issues for debate, articulating causal relationships, proposing alternatives, and identifying negotiable elements (Haas 1992; Raymond et al. 2013). Over time, epistemic communities can develop distinct institutionalized cultures with their own sets of myths. Cultures have begun to develop around different approaches to large-scale conservation. Each approach is associated with a package of ideas, methods, and underlying philosophies that guide practitioners as they make judgments and carry out conservation interventions.

Myths can be defined in terms of doctrine, formula, and symbols. Although large-scale conservation approaches have different origins and have been developed in different contexts, they all have been developed as part of an ongoing adaptive process. Consequently, while there are variations in the doctrine, formula, and symbols employed by different approaches, there are also areas of similarity. Doctrine is a set of basic assumptions or philosophy that underlie an approach. Doctrine includes, for example, assumptions about the appropriate relation between humans and nature, the inherent value of biodiversity, and ecological and social paradigms. Formula is the set of operating principles that guide practices on the ground. The goals sought, the appropriate target of intervention, the acceptable methods, the degree of social and disciplinary integration, how decisions should be made, and who should make them are all defined by an approach's formula. Symbols are used to promote and legitimize the approach. GIS maps, charismatic megafauna, and even "fences and fines" take on symbolic import as practitioners seek to promote, justify, and defend proposed interventions. Symbols, such as grizzly bears and wolves in the American West, are sometimes manipulated to convey implicit but very specific messages to a broad public audience. It is precisely because most doctrines, formulas, and symbols (e.g., myths) are seldom made explicit that they often go unchanged, even in the face of public demands to do so.

2.3.4 Resources

Ecosystems are the basic resource unit of large-scale conservation. As was noted in Chap. 1, ecosystems are being degraded and destroyed at unprecedented rates worldwide because of a complex mix of direct and indirect human activities. All living things depend on healthy ecosystems to provide life-sustaining services. Consequently, destruction of native ecosystems is expected to have harmful and long-lasting effects for all species, including humans. Avoiding or ameliorating harmful effects requires maintaining ecosystem structures, processes, and resiliency (Walker et al. 2004).

In addition to ecosystems as a whole, large-scale conservation efforts are also intended to conserve ecosystem processes and functions. Large-scale conservation projects may address concerns about preserving specific ecosystem services such as carbon sequestration potential, water quality and quantity, and fisheries. Additionally, attention is being paid to issues of spatial and temporal scale. For example, forest managers are now designating relatively young stands of trees for protection in order to provide old-growth habitat in the future, and protected areas are being designed with climate change in mind. Although large-scale conservation efforts may eschew species-specific interventions, charismatic megafauna, rare and endangered species, and old growth habitat still top the list of conservation priorities for donor organizations and individuals. It is often assumed that large-scale efforts will benefit these individual ecosystem elements.

Sustainability is often depicted as a Venn diagram in which social, economic, and environmental domains partially overlap. This picture suggests that ecosystems interact with social systems. It is an improvement on the framework that places man and nature in separate conceptual domains (Folke et al. 2002). However, it does not go far enough since the boundary between social and ecological systems is actually an artificial construct. The use of the term social–ecological system helps to emphasize that social systems do not merely interact with ecosystems; they are the context within which ecosystems are embedded, and vice versa (Berkes and Folke 1998). Yet, we contend that it does not go far enough to conceptualize realistically the actual "singularity" of natural and human systems. Today even the most "natural" of areas in the USA (e.g., wilderness areas) reflect human values and management decisions and, consequently, are socially constructed. The line that separates wilderness from nonwilderness is primarily a management boundary on a map, not a natural feature of the ecosystem. Advances in large-scale conservation will be more rapid when we start using a framework in which ecosystems are seen as fully integrated with social systems. Consequently, in addition to ecosystems and the biophysical elements of ecosystems, we must be attuned to the human resources that we are also striving to conserve. These include sustainable natural resource-based industries and economies (e.g., fishing, ranching, forestry), cultural resources (e.g., opportunities for aesthetic and spiritual renewal), and social capital.

2.4   Conclusion

Large-scale conservation in the common interest requires that people be clear about the nature of the problems they face, the utility of the theory they employ, and the features of the situation that they attend to and try to manage. To better ground our large-scale conservation work, we offer a typology of problems and a practical theory to guide practitioners who wish to enhance sustainability and human dignity in the common interest. The problem typology distinguishes between ordinary, governance, and constitutive problems. Too often, governance and constitutive problems are overlooked or misconstrued. The theory we present is grounded in the observation that "humans seek values through institutions that use and affect resources." All four elements—humans, values, institutions, and resources—are open for empirical, systematic study. Skillful application of this theory enables practitioners to analyze the full suite of problems and develop realistic solutions. This problem typology and theory can significantly aid practitioners in achieving large-sale conservation in the common interest.

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Chapter 3
Approaches to Large-Scale Conservation: A Survey

Aaron M. Hohl, Catherine H. Picard, Susan G. Clark and Arthur Middleton

Abstract Seven approaches to large-scale conservation can be distinguished by their different doctrines (basic assumptions or philosophy), formulas (standard operating principles and on-the-ground actions), and the symbols used to promote and legitimize them. (1) Single- and multiple-use resource management, which manages nature for sustained use or profit, is a historical cornerstone of conservation. This chapter examines its historical origins, philosophical bases, and the multiple criticisms that have led to development of a range of alternatives. These include (2) parks and protected areas approach, which focuses on geographically well-defined areas; (3) ecosystem management, which draws on modern ecology to conserve ecosystems while providing multiple resource values; (4) ecoregional conservation, which identifies the ecological attributes of a landscape and then selects a set of target elements to conserve; (5) integrated conservation and development projects (ICDPs), which attempt to ensure the conservation of biological diversity while attending to the needs of local people; (6) transboundary conservation, which assumes that ecosystems and their attendant functions transcend political and administrative boundaries and thus require cross-boundary cooperation and coordination; and (7) adaptive governance, which holds that large-scale conservation should strive to secure people's common interests, including a healthy present and sustainable future for both people and the environment. Adaptive governance, which this chapter promotes, offers a holistic, integrative, and fully contextual approach.

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3.1   Introduction

Various approaches to large-scale conservation have evolved over time. Although significant overlap exists among the approaches and the terminology used to describe them, each one can be distinguished using its somewhat unique doctrine, formula, and symbols. Doctrine is the set of basic assumptions or philosophy that grounds an approach. Formula is the set of standard operating principles and guidelines that govern project implementation, and on-the-ground actions. Symbols are used to promote and legitimize the approach (e.g., words, logos, phrases, ideas). By clarifying the distinctions in doctrine, formula, and symbols that underlie each approach, participants can better discern the true differences and similarities between large-scale conservation approaches and their evolutionary development.

In this chapter, we survey seven relatively distinct approaches. First, we trace the development of the single- and multiple-use approach in the USA and discuss its limitations. Next, we discuss the archetypal parks and protected areas management approach, as well as four more recent approaches to large-scale conservation. We argue that the doctrines of all six approaches have important limitations. Finally, we describe adaptive governance, the doctrine of which promotes a culture of human dignity and environmental sustainability. Consequently, we recommend its use when engaging with problems of large-scale conservation.

3.2   Single- and Multiple-Use Management: Philosophy, History, and Critique

Single- and multiple-use resource management, in which humans manage nature for sustained use or profit, is one of the historical cornerstones of conservation and the one from which many other approaches to conservation have evolved. It is deeply institutionalized in natural resource management organizations and is used by governments worldwide (Kaufman 1960; Pinchot 1972; Doyle 2000; Dudley 2008). Based on scientific positivism, economic efficiency, and expert authority, it divides the world into resource cells (e.g., soil, forestry, water, range, wildlife, fisheries, crops, recreation) and attempts to maximize or optimize outputs from each cell. The formula is typically employed by bureaucratic organizations that are hierarchical, rely heavily on task differentiation, and employ specialized, skills-based professionals to seek optimal solutions to resource management problems (Williams 2002). Implementing contextually sound large-scale conservation requires understanding the history and philosophical basis of single- and multiple-use management. Consequently, this section explores the tradition in some detail.

3.2.1 Philosophical Roots

The intellectual history of single- and multiple-use management begins in the philosophy of the seventeenth- and eighteenth-century Enlightenment. The philosophy of the period—and increasingly, the culture—conceived itself in opposition to the "Dark Ages" of the preceding millennium. Progress was cast in stark contrasts of light winning over darkness, advancement over stagnation, science over superstition, and freedom over authoritarianism (Gay 1996). Although Enlightenment philosophy, science, and technology provided new tools for cultivating and subduing nature, the urge for mastery over nature predates the period. Even before the Enlightenment, Europeans perceived wilderness as something alien and often dangerous or, in the words of Nash (1967), as "an insecure and uncomfortable environment against which civilization had waged an unceasing struggle." To cultivate and subdue nature was to bring the boon of civilization.

The Enlightenment philosopher John Locke wrote extensively on humanity's relation to nature. For Locke (1982, p. 24), wild nature was useless—even vile—until converted for human use: "land that is left wholly to nature, that hath no improvement of pasturage, tillage, or planting, is called, as indeed it is, waste; and we shall find the benefit of it amount to little more than nothing." In Locke's view, 1 acre enclosed and cultivated was worth 10 acres "lying waste in common." In the same passage, he expands his ratio even further when he refers directly to America.

Alexis de Tocqueville (2000, p. 485), an astute observer of American culture, perceived the depth of America's dominionistic and utilitarian relation to nature. In 1835, he wrote: "The wonders of inanimate nature leave [Americans] cold, and, one may almost say, they do not see the marvelous forests surrounding them until they begin to fall beneath the axe. What they see is something different. The American people see themselves marching through wildernesses, drying up marshes, diverting rivers, peopling the wilds, and subduing nature. It is not just occasionally that their imagination catches a glimpse of this magnificent vision. It is something which plays a real part in the least, as in the most important, actions of every man, and it is always flitting before his mind." De Tocqueville's vision—one of a people valuing land for its utilitarian purpose—is essentially the large-scale enactment of Locke's views.

America's dominionistic and utilitarian approach to managing nature was reinforced as efficiency was adopted by the American Progressive movement of the early twentieth century (Hays 1972). The gospel of efficiency, as applied to natural resources, held that the principles of scientific management could be used to optimize economic output and solve pending natural resource problems (e.g., perceived imminent shortages of food, water, and timber). A management system based on Frederick Winslow Taylor's model of scientific management was adopted. The system claimed to increase industrial efficiency and output through the scientific study of labor and production, the elimination of waste, and a search for the single, best way (Kanigel 1997).

The single- and multiple-use method was rooted ontologically in scientism (Stenmark 1997), its ethical roots were utilitarian, and its epistemology was

based on positivism. As we will see, Jeremy Bentham's (2000) principle of utility (i.e., act so as to produce the greatest happiness for the greatest number) was firmly entrenched in the minds of Progressive leaders in the conservation movement. Positivism holds that that scientific methods are the only means of obtaining authentic knowledge and that correct answers will emerge once a subject is understood in sufficient detail. The failure of reductionistic methods to adequately address some conservation problems would eventually spur the development of other approaches to large-scale conservation. However, scientific management and positivism remained firmly entrenched in American politics and decision making (Lee 1995).

3.2.2 History

Well into the nineteenth century, the frontier mentality described by de Tocqueville played out as European settlers moved westward: forest and rangeland were converted to agricultural uses, wildlife was harvested, and mineral deposits were located and extracted. When forested land was unsuitable for agriculture, it was often managed using a strategy of "cut out and get out." Standing timber was rapidly cut and sold before the population moved to a new location (Cox 1985). Under the belief that "rain follows the plow," attempts were made to cultivate arid grasslands that were ultimately found to be incapable of supporting rain-fed agriculture. Wildlife populations were exploited, sometimes to the edge of extinction. Perhaps the most famous examples are the passenger pigeon, the last of which died in 1914, and the American bison, brought back from the brink of extinction over the course of the twentieth century.

By the latter half of the nineteenth century, however, de Tocqueville's vision of Americans as incapable of seeing a forest until it began to fall under the ax was starting to be challenged. In a book that reviewed the effects of civilization on the natural world, George Perkins Marsh (1965 p. 29) wrote: "Man has too long forgotten that the earth was given to him for usufruct alone, not for consumption, still less for profligate waste. Nature has provided against the absolute destruction of her elementary matter, the raw materials of her works; the thunderbolt and the tornado, the most convulsive throes of even the volcano and the earthquake, being only phenomena of decomposition and recomposition. But she has left it within the power of man irreparably to derange the combinations of inorganic matter and of organic life, which through the night of aeons she had been proportioning and balancing, to prepare the earth for his habitation, when in the fullness of time, his Creator should call him forth to enter into its possession." Marsh (p. 36) went on to assert that "Man is everywhere a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords." Widespread concern over excessive and wasteful consumption—stimulated, in part, by the familiar imagery of wanton bison massacre and smoldering clearcuts—would fuel a nascent interest in developing new ways to relate to nature.

Amid rising concern that America's inexhaustible natural abundance might soon be depleted, Theodore Roosevelt's administration prescribed a conservation

strategy that would stabilize and prolong resource productivity in the nation's long-term economic interest (Box 3.1). In 1905, the US Forest Service was established within the Department of Agriculture. Both Gifford Pinchot, first chief of the Forest Service, and the Forest Service itself have been closely associated with the development and implementation of single- and multiple-use management (Miller 2001).

Box 3.1. An Illustration of the Single- and Multiple-Use Approach. Excerpt from a Letter(dated February 1, 1905) from Secretary of Agriculture James Wilson to Forester Gifford Pinchot officially informing him of the transfer of Forest Reserves from the Department of the Interior to the Department of Agriculture. The letter was actually composed by Pinchot and his assistant Frederick Olmstead.

In the administration of the forest reserves it must be clearly borne in mind that all land is to be devoted to its most productive use for the permanent good of the whole people, and not for the temporary benefit of individuals or companies. All the resources of forest reserves are for use, and this use must be brought about in a thoroughly prompt and businesslike manner, under such restrictions only as will insure the permanence of these resources. The vital importance of forest reserves to the great industries of the Western States will be largely increased in the near future by the continued steady advance in settlement and development. The permanence of the resources of the reserves is therefore indispensable to continued prosperity, and the policy of this department for their protection and use will invariably be guided by this fact, always bearing in mind that the conservative use of these resources in no way conflicts with their permanent value. You will see to it that the water, wood, and forage of the reserves are conserved and wisely used for the benefit of the home builder first of all, upon whom depends the best permanent use of lands and resources alike. The continued prosperity of the agricultural, lumbering, mining, and livestock interests is directly dependent upon a permanent and accessible supply of water, wood, and forage, as well as upon the present and future use of their resources under businesslike regulations, enforced with promptness, effectiveness, and common sense. In the management of each reserve local questions will be decided upon local grounds; the dominant industry will be considered first, but with as little restriction to minor industries as may be possible; sudden changes in industrial conditions will be avoided by gradual adjustment after due notice; and where conflicting interests must be reconciled the question will always be decided from the standpoint of the greatest good of the greatest number in the long run.

These general principles will govern in the protection and use of the water supply, in the disposal of timber and wood, in the use of the range, and in all other matters connected with the management of the reserves. They can be successfully applied only when the administration of each reserve is left very

largely in the hands of the local officers, under the eye of thoroughly trained and competent inspectors.

Very respectfully,

[signed]

James Wilson

Secretary [US Department of Agriculture]

For Pinchot, forestry amounted to scientifically managed tree growing. While other uses (e.g., water, grazing) of the national forest lands were recognized as important in theory, their economic value was usually assumed to be less than the value of timber and, consequently, they tended to be discounted in practice (Clary 1986). The Forest Service, under Pinchot's leadership, adopted a utilitarian creed: the greatest good for the greatest number in the long run. The agency's doctrine also reflected the fixation of newly industrialized nations on efficiency, technology, and positivistic science. By the late 1930s, this approach to conservation had been applied to other resource cells and had contributed to the creation of specialized agencies for managing specific resources at both the state and federal levels (e.g., US Fish and Wildlife Service, Bureau of Land Management, state bureaus of fish and game).

Statutory standards promulgated in the mid-twentieth century (e.g., Multiple-Use Sustained-Yield Act of 1960, National Environmental Policy Act of 1970) called for agencies to satisfy the increasingly diverse interests of the public by managing multiple resource cells relative to one another and taking into account public comments. While the symbols (especially the symbolic language) and formula changed somewhat, these updates did not fundamentally alter the doctrine endorsed under the original model. The doctrinal underpinnings of the single- and multiple-use tradition remain deeply institutionalized in government and academia although, in practice, the doctrine is often veiled in the language and symbols of newer paradigms.

3.2.3   Critique

The single- and multiple-use approach has faced criticism for failing to be sufficiently contextual as it tries to adapt to a rapidly changing world and demands from a more diverse array of interests (Kohm and Franklin 1997). For example, the Endangered Species Act (ESA) applies this formula to the conservation of biodiversity. The act's clear implementation timelines and narrow focus on the well-being of individual species have been recognized as a powerful driver of ecological restoration in the USA. However, the ESA framework has been equally criticized for failing to consider all relevant viewpoints and to take into account the larger dynamic and interconnected social ecological system in which species exist (Benson 2012).

The proliferation of specialized resource-based agencies has also been criticized for contributing to fragmented decision making and interagency competition (Brunner et al. 2002). Whereas some practitioners of scientific management have looked

for better ways to measure and rigorously quantify resource cells, critics have asked whether it is even possible to quantify all important attributes of resource systems (Ascher 2001). In some cases, organizations have responded by adopting the symbols of a new tradition (e.g., ecosystem management, adaptive management, transboundary peace parks) while maintaining the same basic doctrine and formula. When this occurs, the adaptations that do take place are minor and at the margin; innovations (new practices) are restricted to things that are congruent with the embedded doctrine and formula (Rutherford 2003). This defensive response allows the organization to maintain its cultural structures and formulas, while deflecting pressure to make additional systemic changes (Kaufman 1960).

Historically, the doctrine of single- and multiple-use management encouraged the growth of bureaucratic conservation organizations that subscribed heavily to positivism. In such organizations, it is assumed that natural resources can and should be managed using reductionistic, quantitatively based methods that strive to make the inherent "messiness" of natural resource management more "legible" (Scott 1998). Cortner and Moote (1999, p. 15) have noted that, "the legacy of the last 100 years of resource management is a politics of expertise, of maximum sustained yield, and of [special] interests." A reliance on experts and focus on technical issues restricted participation by other valid participants in part because they were perceived to lack the requisite skills, experience, resources, and technical training. Ultimately, the creation of arenas in which values could be shaped and shared was minimized and the decision process was turned over to experts whose decisions were perceived to be rational, efficient, and objective.

Taylor's scientific management formula ignored the complexity of human nature and psychology in its quest to control human labor and interaction with the precision and efficiency of a machine. Problems were viewed as technical issues to be resolved by reasoned experts. Knowledge not easily quantified (e.g., local or indigenous knowledge) was discounted or excluded from consideration. Normative questions about social justice, human dignity, and the decision-making process, for instance, that could not be answered using empirical methods were marginalized. Instead of taking contextual factors into account and developing common interest goals, efficiency in progress toward preconceived ends became the basic value. Ordinary citizens were left frustrated and alienated by the ascendancy of remote, insulated, and idealized professionals, by decisions veiled defensively in the technical language of objectivity, and by a seemingly uncaring government that ignored real-world problems.

At the same time, the administration of the resource bureaucracies became concentrated in government centers such as Washington, D.C. Under the bureaucratic governance formula, citizens found it "difficult to identify the remote officials and non-officials most responsible for policies that affect their interests and to hold them accountable amid the growing number and complexity of issues" (Brunner et al. 2002, p. 23). The concentration of decision-making power in distant cities permitted special interests to wield even more influence on decision making. Managers and administrators soon felt pressure to approve liberal resource harvests, often without adequate discussion with the affected communities. In some cases, as in fisheries and wildlife, the intended beneficiaries of resource management agencies

became benefactors as license sales became a major revenue source. Withdrawal of governance from conflicted localities to distant cities made it more difficult to secure common interest solutions to local problems and left a legacy of distrust between local communities and resource management agencies.

The single- and multiple-use management approach to large-scale conservation has often failed to identify and secure the common interest because it relies too heavily on science and scientific management at the expense of rigorously analyzing and incorporating the social context and value dynamics of particular resource management decisions. No matter how technical or allegedly impartial an expert's conceptions, decisions are ultimately grounded in human values. Under the single- and multiple-use approach, conservation fails in its primary goal of fulfilling a broad national interest, or, as Pinchot would have it, providing the greatest good for the greatest number in the long run.

3.3 Alternative Approaches to Large-Scale Conservation

A range of alternatives that attempt to rectify the perceived inadequacies of single- and multiple-use management have been proposed. However, most of these approaches have reproduced the problems of single- and multiple-use management because they have not adequately changed the fundamental formula and doctrine; in many cases, only the symbols changed, which exemplifies the adage of "pouring old wine into new bottles." We profile several of the major alternatives below, paying particular attention to their doctrine, formula, and symbols (Table 3.1). Many of the innovations embodied by newer approaches are beneficial. For example, incorporating knowledge of ecosystem processes (ecosystem management) and economic interests (e.g., integrated conservation and development projects) into resource management decisions can result in more contextual decision making and successful conservation outcomes.

However, we feel that fundamental doctrinal change is also necessary. A reductionist, instrumental, and positivistic science must be augmented by a holistic and integrative approach that can accommodate and adapt to normative questions and nontraditional knowledge sources (Wilkinson et al. 2007). Although the proposed alternatives summarized below share a notion of systems-level, holistic resource management, at their core many still remain grounded in a bureaucratic, positivistic, science-based approach. Consequently, we recommend adaptive governance as an approach that prioritizes cultural change and addresses fundamental philosophical issues. Adaptive governance focuses on developing practical, collaborative solutions that are sensitive not only to substantive issues but also to procedural norms.

3.3.1 Parks and Protected Areas Management

The national park model is typically traced back to the establishment of Yellowstone National Park in 1872, although the formula has antecedents in both Western

Table 3.1 The myths associated with seven approaches to large-scale conservation. Examples of symbols, overarching formula, key doctrinal points, and representative users are listed for each.

Approach	Doctrine	Formula	Symbols	Example
Single- and multiple-use management	Natural resources should be rationally managed to benefit society	Employ science-based expertise and knowledge to maximize extractive utility in an economically efficient manner	"The greatest good for the largest number in the long term"	US Forest Service
Parks and protected areas	"Man is everywhere a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords"	Enforcement, policing strategies, and scientific management used to preserve culturally, aesthetically, or biologically significant areas for recreational, educational, and scientific purposes	Wolves in Yellowstone	Yellowstone National Park
Ecosystem management	The integrity of ecosystems is paramount and includes social, ecological and economic values	Balance utilitarian and political demands with ecosystem processes and functions	Adaptive management plan	Greater Yellowstone Ecosystem
Integrated conservation and development	Poverty, underdevelopment, and resource degradation are inextricably linked	Integrate nature conservation, poverty alleviation, and sustainable development goals	Biosphere reserves	Annapurna Conservation Area Project (ACAP), Nepal
Ecoregional planning	Protecting biodiversity from human damage requires maintaining or restoring connectivity between protected areas	Designate, connect, and manage ecological zones that represent distinct assemblages of natural communities	Spatial analysis (GIS, satellite imagery)	World Wildlife Fund for Nature (WWF) Global 200 priority ecoregions
Transboundary management	Natural resources persist across political and administrative boundaries	Integrate conservation and development via coordination and collaboration across political boundaries in order to link fragmented ecosystem of processes	Peace parks	Great Limpopo Transfrontier Conservation Area

Table 3.1 (continued)

Approach	Doctrine	Formula	Symbols	Example
Adaptive governance	Human social relations are part of the solution, uncertainty is expected, and flexibility is obligatory	Management is contextual, practical, interdisciplinary, collaborative, and focused on substantive issues and procedural norms	Interdependent goals	MendoFutures (see Box 3.7)

GIS Geographic Information System

and Eastern culture that date back to the earliest written records (Perlin 1991; Winters 1974; Nash 1967). Almost from their inception, tensions existed between the competing formulas of the Forest Service and National Park Service (Box 3.2) and bureaucratic rivalry became a permanent feature. Early conflict between the two amounted to an argument about formulas of use, not basic doctrines. The parks and protected areas approach to large-scale conservation shares the strongly utilitarian aspect of single- and multiple-use approach. Sellars (1997, p. 16) noted that "the national park movement pitted one utilitarian urge—tourism and public recreation—against another—the consumptive use of natural resources, such as logging, mining, and reservoir development."

Box 3.2. An Illustration of the Parks and Protected Area Management Approach. Excerpt from *The Yosemite* by John Muir (1912).

The making of gardens and parks goes on with civilization all over the world, and they increase both in size and number as their value is recognized. Everybody needs beauty as well as bread, places to play in and pray in, where Nature may heal and cheer and give strength to body and soul alike. This natural beauty-hunger is made manifest in the little window-sill gardens of the poor, though perhaps only a geranium slip in a broken cup, as well as in the carefully tended rose and lily gardens of the rich, the thousands of spacious city parks and botanical gardens, and in our magnificent National parks—the Yellowstone, Yosemite, Sequoia, etc.—Nature's sublime wonderlands, the admiration and joy of the world. Nevertheless, like anything else worthwhile, from the very beginning, however well guarded, they have always been subject to attack by despoiling gain seekers and mischief-makers of every degree from Satan to Senators, eagerly trying to make everything immediately and selfishly commercial, with schemes disguised in smug-smiling philanthropy, industriously, sham piously crying, "Conservation, conservation, pan utilization," that man and beast may be fed and the dear Nation made great. Thus long ago a few enterprising merchants utilized the Jerusalem temple as a place

of business instead of a place of prayer, changing money, buying and selling cattle and sheep and doves; and earlier still, the first forest reservation, including only one tree, was likewise despoiled. Ever since the establishment of the Yosemite National Park, strife has been going on around its borders and I suppose this will go on as part of the universal battle between right and wrong, however much its boundaries may be shorn, or its wild beauty destroyed.

These temple destroyers, devotees of ravaging commercialism, seem to have a perfect contempt for Nature, and, instead of lifting their eyes to the God of the mountains, lift them to the Almighty Dollar. Dam Hetch Hetchy! As well dam for water-tanks the people's cathedrals and churches, for no holier temple has ever been consecrated by the heart of man.

The parks and protected area approach focuses on geographically well-defined areas, which are designated, regulated, and managed to achieve specific conservation objectives (Keiter 2013). The approach rests on a doctrine that preserves protected areas as places of intrinsic biological, cultural, or scenic value. Accordingly, the model often treats human agency as a threat to—as opposed to an integral element of—nature. In its most conservative form, the protected area approach has been characterized as a "fences and fines" model that "locked up" landscapes, and relied heavily on coercion and force to achieve its objectives. When this approach proved unsustainable, a more liberal form of the model emerged, such as biosphere reserves, that permitted resource use and extraction within certain management zones. The World Conservation Union (IUCN) has now established a classification system that recognizes the legitimacy of diverse uses of protected areas. The categories range from strict wilderness areas and national parks that restrict human agency (categories I and II) to sustainable use areas that allow human occupation and resource extraction (category VI; IUCN 1994).

The model relies almost exclusively on professionals and agency experts to inform decision making. There have been criticisms, especially in developing areas, that parks and protected areas have profound negative impacts on how local residents access, use, and interact with natural resources (West and Brechin 1991; Western et al. 1994). Symbolic megafauna such as bears, lions, and wolves have also played important symbolic roles in both the defenses of and attacks on this approach (Clark et al. 1999, in press). Critics argue that the establishment of protected areas has resulted in the displacement of local residents, exacerbated existing inequalities within communities, disrupted social structures and cultural traditions, and threatened the overall health and well-being of local communities (Ghimire and Petty 1997).

More recently, professionals have sought to adapt this tradition in response to people's demands to access and use protected areas for farming, timber harvesting, grazing, or hunting. Adaptations have also been proposed that are designed to devolve authority over resources to the local level and distribute benefits to those who bear the costs associated with parks and protected areas. Wildlife Management

Areas in Tanzania, for example, exemplify this devolutionary approach (Chap. 8; Sulle et al. 2011). As this happens, this tradition becomes more similar to the "integrated conservation and development" tradition described below. In each case, the protected areas model remains embedded in a doctrine that privileges scientific management and positivism over contextual data such as values, identities, and perspectives of people involved. The use of participation, for example, as a means to a predetermined end, and not as a goal unto itself, exemplifies how little the doctrine has changed over time.

3.3.2   Ecosystem Management

The ecosystem management tradition is a rapidly evolving approach that originated during the 1980s and 1990s in response to perceived limitations of the single- and multiple-use approach (Meffe 2002). Instead of utilitarianism, this approach is grounded in the land ethic of Aldo Leopold (Box 3.3). The approach draws on modern ecology as it attempts to conserve ecosystems while at the same time providing multiple resource values in ways that are ecologically appropriate and socially acceptable (Mirovitskaya and Ascher 2001). An example in which ecosystem management principles have been applied is the ongoing restoration of the Florida Everglades. In this case, the intent is to preserve and restore the ecosystem of South Florida while at the same time maintaining water resources and flood protection benefits of the Central and Southern Florida Project (Zellmer and Gunderson 2008).

   One of the broadest definitions of ecosystem management concludes that it "integrates scientific knowledge of ecological relationships within a complex sociopolitical and value framework toward the general goal of protecting native ecosystem integrity over the long term" (Grumbine 1994). However, no universally accepted formula for operationalizing the concept exists, and different practitioners of ecosystem management almost certainly ascribe to different doctrines. Yaffee (1999) identified three major variations of the ecosystem management formula currently in use: (1) environmentally sensitive multiple use, (2) ecosystem-based approaches to resource management, and (3) ecoregional management.

   Symbols employed by practitioners of this approach include adaptive management plans, attempts to incorporate a range of stakeholders' concerns (including socioeconomic concerns, often via public meetings or workshops), and giving advantage to large-scale temporal and spatial dynamics of ecosystems (Forest Ecosystem Management and Assessment Team 1993; Redford and Fearn 2007). In the case of the Florida Everglades, several of these symbolic elements were incorporated into legislation, including the development of a comprehensive plan and public participation (Water Resources Development Act of 1996, 2000). Unfortunately, legacies of past management and limitations in infrastructure, laws, and policy have proven a challenge.

Box 3.3 An Illustration of the Ecosystem Management Approach. The Land Ethic as Defined in an Excerpt from *A Sand County Almanac and Sketches Here and There* by Aldo Leopold (1989, original edition 1949).

The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land. This sounds simple: do we not already sing our love for and obligations to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter downriver. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic of course cannot prevent the alteration, management, and use of these "resources," but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state. In short, a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow- members, and also respect for the community as such.

Typically, ecosystem management has been implemented by natural resource management organizations that have traditionally stressed biophysical sciences (e.g., US Forest Service, Bureau of Land Management, Army Corps of Engineers). Consequently, it is not surprising that many retrospective studies of ecosystem management projects have found that practitioners have not sufficiently integrated social and economic dynamics with ecological concerns (Bissix and Rees 2001). Zellmer and Gunderson (2008) found that there were two primary criticisms of the Comprehensive Everglades Restoration Plan. First, the project devotes too much effort to engineering efforts that will expand water supply and ensure flood control (i.e., it addresses technical problems rather than governance or constitutive problems). Second, the plan prioritizes economic considerations over the improvements needed for environmental restoration (i.e., it does not sufficiently integrate the social and biophysical dimensions of the problem).

Critics have argued that the concept is not clear enough for public policy or specific management applications (Fitzsimmons 1996). Additionally, the tradition has been criticized for not adequately taking into account the multiplicity of interests and values represented. For example, Cosens (2013) cautions that the changes needed to foster ecosystem management "will not be adopted by democratic societies without careful attention to their effect on the social system itself. Delegation of increased flexibility for adaptive management to resource management agencies must include careful attention to assuring that increased flexibility is exercised in a manner that is legitimate and responsive to the social system."

3.3.3 Ecoregional Planning

Ecoregional planning emerged during the 1990s as a strategic, "performance-based" planning tool for large-scale conservation (Butler and Koontz 2005; Charnley 2006; Dekker et al. 2007). The approach has been widely disseminated and is now used by several large nongovernmental organizations (including the Nature Conservancy, the World Wildlife Fund for Nature, and the Wildlands Project). Such planning would be almost impossible without ready access to large amounts of data, and Geographic Information System (GIS) maps play a prevalent role both in the formulation of plans and as symbolic representations of the approach. An ecoregion is defined as "a relatively large unit of land or water containing a geographically distinct assemblage of species, natural communities, environmental conditions" (World Wildlife Fund for Nature 2009).

The doctrine of ecoregional planning rests on the perception that protected areas were historically established based on an ad hoc process guided by the presence of charismatic megafauna, scenic values, or large concentrations of wildlife, and less by the principles of landscape ecology. The result was the establishment of protected areas "too small to sustain the full spectrum of processes that sustain diversity" (Soulé and Terborgh 1999). In order to conserve large landscapes more effectively and efficiently, the ecoregional formula identifies and prioritizes the ecological attributes of a landscape, including habitat types, ecosystem services, and the richness of biodiversity, and then selects a set of target elements (i.e., species and communities) and levels of representation for each target (Nature Conservancy 1994). Described as a "science-based approach" or "conservation by design," the tasks of classification, priority setting, and decision making are often dominated by conservation practitioners and other experts. The overall management goal is to maintain or restore natural ecosystem processes, ecological resiliency, and biological diversity.

Ecoregional planning is often criticized for being technologically narrow and mechanistic in its planning and not fully contextual (Brosius 2003). Proposals often ignore the very real uses to which the landscape is being put. In its most extreme form, it has justified the exclusion of human activities from large portions of the landscape as the most appropriate way to preserve nature. Because of the fundamental disconnect between what is proposed and the complex context of the landscape, ecoregional planning can overlook the ongoing social and decision-making processes. Critics also argue that the approach favors technocratic skills and devalues local knowledge and experience (Box 3.4). Given that ecoregional plans are often insufficiently contextual, they have encountered stiff resistance at the local level by participants who feel excluded from the decision-making process (Chapin 2004).

> **Box 3.4   An Illustration of the Ecoregional Planning Approach. Excerpts from the Website of the Wildlands Network (2014) Which (A) Outlines the Organization's Conservation Methodology and (B) Provides Details About Stakeholder Involvement.**
>
> A. Each WND [Wildlands Network Design] is generated through a systematic process that adheres to five key principles.
>
>   1. Establish planning boundaries based on ecological features.
>   2. Compile existing data on biological resources and identify those that are most of biodiversity.
>   3. Set clear biodiversity conservation goals and carry out explicit and objective conservation area design in support of those goals.
>   4. Evaluate the degree to which conservation goals are currently being met in existing areas and identify new areas needed to meet those goals.
>   5. Involve a broad array of stakeholders in design and implementation.
>
> B. Involve a broad array of stakeholders in design and implementation.
> It is critical to involve regional stakeholders, scientific and otherwise, in the process of designing and implementing a network design. The draft network design should undergo a series of rigorous expert reviews before a final design is released. This process should be guided by a scientific advisory committee made up of committed scientists who are familiar with the region or with the Wildlands Network's scientific methods, who can guide and direct necessary research, fieldwork, and data collection by staff, interns, and volunteers. At the same time, we work closely with our partners to integrate the network design process with local and regional efforts to identify and protect conservation areas.

3.3.4   Integrated Conservation and Development Projects

Integrated Conservation and Development Projects (ICDPs) attempt to ensure the conservation of biological diversity while attending to the needs of local people (Box 3.5). This approach is grounded in the paradigm of sustainable development and is particularly prevalent in developing countries. It gained popularity in the 1980s and 1990s as the protected area formula fell under increased scrutiny for its negative impact on local livelihoods (Western et al. 1994). As practitioners searched for a substitute for the "fences and fines" approach to conservation, the ICDP model was proposed as a participatory and contextually sensitive method for balancing the needs of conservation with the demands for poverty alleviation and sustainable development. Common ICDP formulations include biosphere reserves, buffer zones, multiple-use areas, and regional development programs. The goal of most ICDP efforts is to educate and benefit local communities through a mix of nature conservation and socioeconomic development. Often the formula requires including

local peoples in intelligence gathering and decision making. Ideally, it mitigates or deflects pressure on conservation areas by devolving decision making and benefits to local residents. The approach seeks behavioral change by compensating people who live in and around parks and other conservation areas who have lost access to natural resources or are negatively impacted by wildlife populations (McShane and Wells 2004). Ecotourism, nontimber forest products, and other resource-based income-generating projects and developments are oft-cited symbols of the success of this method.

Box 3.5 Articulating the Doctrine, Formula, and Symbols of ICDPs.

Doctrine

  Protected areas are under increasing pressure from the expanding scale of human activities, they are underfunded, and traditional "fences and fines" approaches are unable to balance the competing objectives between protected areas and local people. In response, ICDPs attempt to ensure the conservation of biological diversity by reconciling the management of protected areas with the social and economic needs of local people. Efforts to promote local social and economic development activities among communities adjacent to protected areas distinguish ICDPs from other conservation approaches. The underlying (and often unsupported) assumption is that people who are made better off as a result of development projects will refrain from the illegal exploitation of a nearby protected area.

  Formula

1. Conceptualization: Biological, socioeconomic surveys conducted by technical experts
2. *Endorsement:* Participatory meetings held with local residents to explain ICDP objectives
3. *Funding:* Donors and host governments establish project agreements and fund ICDP
4. *Capacity Building:* Buildings constructed, project staff and equipment procured, capacity building and educational activities undertaken in project villages
5. *Implementation:* Sustainable income-generating opportunities launched based on the sustainable use of natural resources
6. *Evaluation:* Wildlife censuses, attitudinal studies, socioeconomic surveys, Log Frame "outputs"

Symbols

1. 1980 World Conservation Strategy and the 1982 World Parks Congress in Bali
2. Biosphere reserves, buffer zones, multiple-use areas, large-scale development projects with links to nearby protected areas and integrated sustainable use projects

ICDPs have received considerable criticism in recent years, even from some of the model's originators (Brandon et al. 1998). The criticisms include a general lack of success in practice, unclear objectives, vague linkages between the twin goals of development and conservation, and ambiguous definitions of community (Barrett and Arcese 1995). Critics also suggest that ICDPs overlook the limitations of government, fail to target key ecological threats, and underemphasize the utility of law enforcement (Terborgh 1999). Despite these criticisms, the doctrine that underpins the ICDP model—namely, breaking ecosystems into resource cells in order to balance conservation with poverty alleviation—continues to inform many large-scale conservation interventions in the developing world.

3.3.5 Transboundary Management

A transboundary protected area is "an area of land and/or sea that straddles one or more political boundaries…whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed cooperatively through legal or other effective means" (Sandwith et al. 2001). The doctrine of transboundary conservation assumes that ecosystems and their attendant functions (e.g., wildlife migration routes) transcend political and administrative boundaries, and therefore their use and management requires cross-boundary cooperation and coordination. The concept of connectivity, both spatially and rhetorically, is integral to the transboundary conservation formula (Goodale et al. 2003). The formula includes identifying biologically significant but fragmented habitats, which are then connected via corridors or contiguous protected areas or indirectly through complimentary policies or the cooperative management of resources across a border. The approach acknowledges the role of social and political realms in managing landscapes, though it may underemphasize the complex and contested social and political landscape of international border regions. Transboundary conservation efforts also have significant implications for national security and territorial sovereignty (Ali 2007).

Transboundary conservation deploys a range of symbols to convey a shift from the original protected area approach to a model that is, at least rhetorically, concerned with promoting participation, benefit sharing, and collaboration (Box 3.6). GIS-based maps are frequently used to illustrate the need for increased ecological connectivity and to rationalize the approach based on scientific principles. Critics argue that while the ecological benefits of transboundary conservation have been well articulated, the dynamic social context of border regions, including colonially constructed boundaries, vulnerable populations, and a history of armed conflict, are often overlooked. Transboundary approaches are also subject to many of the same critiques of the ICDP and protected areas approach, including displacement, inadequate local participation, and the exacerbation of existing inequities (Wolmer 2003). While a relatively new approach, transboundary management appears to be most successful where local support is strongest. In such settings, top-level leaders can foster, encourage, and nurture these sentiments and efforts (Zbicz 2003).

Box 3.6 An Illustration of the Transboundary Management Approach. "Transboundary Conservation in Practice: Vision and Mission Statements of the Great Limpopo Transfrontier Park in southern Africa" (cited in Picard 2010). The Park is a Joint Initiative Between Mozambique, South Africa, and Zimbabwe.

Description

The establishment of the Great Limpopo Transfrontier Park is a process that will link the Limpopo National Park in Mozambique, Kruger National Park in South Africa, Gonarezhou National Park, Manjinji Pan Sanctuary and Malipati Safari Area in Zimbabwe, as well as two areas between Kruger and Gonarezhou, namely the Sengwe communal land in Zimbabwe and the Makuleke region in South Africa. The total surface area of the transfrontier park will be approximately 35,000 km². The establishment of the Transfrontier Park is the first phase of creating a bigger transfrontier conservation area measuring a staggering 100,000 km². Once open, tourists will be able to drive across the international borders of the three countries within the boundaries of the park. In addition to the usual game-viewing opportunities, visitors will have a broad range of new attractions including bird-rich tropical wetlands, lake cruises, tiger-fishing, rugged 4×4 adventure drives, and much more. A mix of cultural experiences will be offered, with traditional healers explaining their trade, storytelling, foods, dance, music, handicraft, and art to explore and enjoy. The Great Limpopo Transfrontier Park will be a worldclass ecotourism destination, with extensive private sector involvement, but managed to optimize benefits for sustainable economic development of local communities and biodiversity conservation.

Vision

To achieve interstate collaboration in the conservation of transboundary ecosystems and their associated biodiversity, promoting sustainable use of natural resources to improve the quality of life of the peoples of Mozambique, South Africa, and Zimbabwe.

Mission

To collaboratively establish and manage, on a sustainable basis, a viable Great Limpopo Transfrontier Park with full stakeholder participation, including local communities, fostering regional cooperation, biodiversity conservation, and cross-border socioeconomic development.

3.3.6   *Adaptive Governance*

Adaptive governance is the latest and most comprehensive of the large-scale conservation approaches we examined. It is not to be confused with adaptive management, which is often associated with single- and multiple-use management and positivism. The tradition of adaptive governance is intellectually rooted in the policy sciences (Lasswell and McDougal 1992), although some authors with a different ground-

ing have picked up the label and use it without knowledge or clarity of its doctrine and formula rooted in the policy sciences. Unlike other approaches, which focus more on substantive than procedural issues, the basic units of attention in adaptive governance are the social and decision-making processes, including the processes of participation, collective action, and learning (Brunner et al. 2005; Folke et al. 2005). The tradition's doctrine holds that large-scale conservation should strive to secure the common interest, which includes a healthy present and sustainable future for both people and the environment. It assumes that securing the common interest requires effective social processes that permit timely, open, fair, and comprehensive use of information, people, and resources. The social and decision processes must be open to all reasonably interested parties and must allow all participants—even those with disparate and opposing interests—to feel respected.

The formula advocates using fully contextual analysis that permits experimentation and learning while eschewing rigidly formulaic interventions (Box 3.7). Individual decisions are evaluated in terms of procedural, substantive, and pragmatic criteria (Steelman and DuMond 2009). While scientific reasoning, especially as it pertains to understanding ecosystem dynamics, is recognized to have an important role (Ascher 2004), science is not emphasized above all other considerations. Decisions must account for multiple scientific methods, forms of knowledge, and uncertainty, and they must be coupled with meaningful monitoring and evaluation so that adjustments can be made if desired outcomes are not being achieved. Additionally, the formula supports the development of flexible institutions and multilevel governance systems that are resilient to both social and environmental perturbations.

Symbols of this method include inclusive arenas in which information is shared and discovered, transparent analyses, rigorously analyzed alternatives, and participatory decision making.

Few groups focus on the adaptive governance approach per se. In fact, adaptive governance systems often self-organize. The Blackfoot Challenge in Montana is

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Box 3.7 An Illustration of the Adaptive Governance Approach. Vision Statement of MendoFutures (2014), a Grassroots Organization in Mendocino County, California.

Our Vision

We are a community of people, resources, and unique beauty. We produce economic vitality that is highly visible, is good for people, and is good for the ecology. MendoFutures' vision is to be a catalyst in creating:

- A healthy community that engages in the ecological, economic and equity (E3) issues of our community.
- Locally sustainable and renewable.
- A community that has a shared identity and sense of ownership for its activities and its commitment to creating a future together.

- A place that mobilizes and focuses its resources toward its future through sustainable practices.
- A place that knows how to work together. A place that has an "infrastructure" of effective community engagement and communication processes. A community that values diversity of opinions and culture.
- A community that values education as a way of building awareness and connections to our diversity, our resources and possibilities. We teach the old ways in new ways.

one such group that trends toward adaptive governance, yet it has a way to go yet to be an ideal prototypical model (Wilson and Clark 2007). In a sense, this tradition targets the very foundation of large-scale conservation—the human dimension at both individual and community levels and in the most fundamental relationship of people and nature.

3.4 Conclusion

Sustainability and human dignity are important societal goals, but achieving them in large-scale conservation has proven to be difficult. Despite a century of symbolic updates, the basic formulas and doctrines of natural resource management have remained relatively static. The core weaknesses of the single- and multiple-use approach have been an over-reliance on scientific management and its purely positivistic, instrumental worldview and practices. As a result of these two doctrinal elements, the formulaic approach has been largely technical and bureaucratic. An approach based on the single- and multiple-use doctrine is inadequate for addressing problems in social and decision processes and incapable of addressing constitutive problems. Consequently, they are not sufficient to address the complex challenges of large-scale conservation. We must look elsewhere for innovations and solutions. Sound leadership and change at technical, political, and cultural levels are required to bring about effective wide-scale change. Adaptive governance offers a holistic, integrative, and fully contextual approach. Many and diverse projects, prototypes, and programs worldwide are moving in the direction of adaptive governance, with varying degrees of success.

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Part II
Rapid Assessments

Chapter 4
The Connecticut River Watershed: Using Adaptive Governance Arenas for Collaboration and Integration

David Cherney, Yuko Kurauchi and Alex McIntosh

Abstract This chapter gives a contextual overview of large-scale conservation in the Connecticut River watershed of New England and identifies decision-making challenges that participants face. As New England's largest river system, the Connecticut River watershed has ecological importance and a rich cultural heritage, but faces urban sprawl, habitat fragmentation, and nonpoint source pollution. A rapid assessment, conducted as a class project at the Yale School of Forestry and Environmental Studies in 2004, examined the goals and strategies of five conservation groups, found that they share considerable common ground but often worked at cross-purposes. Problems included fragmented arenas, goal substitution, and limitations of the scientific management paradigm as persistent policy problems. Three likely future scenarios were envisioned: business as usual, competition and fragmentation among the groups, or—most promising—a larger, more collaborative, and integrated approach to river conservation. Three strategies—a decision seminar, problem orientation workshops, and practice-based learning—are recommended to help the groups find common ground, create a functional network, and transform the ineffective patchwork approach to a coordinated approach at a larger scale.

Keywords Large-scale conservation · Connecticut River watershed · Conservation planning · Decision process · Common ground

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4.1   Introduction

As conservation organizations move away from small-scale efforts and increasingly engage in planning at an ecosystem or watershed level, new methods of thinking and practice are needed. In the Connecticut River watershed in the northeastern USA, conservation organizations, both governmental and nongovernmental, are experimenting with innovative approaches to conserving nature at larger scales. In spite of these organizations' well-meaning efforts, it is widely agreed among participants in the region that successful long-term conservation of the watershed has yet to be realized. Several persistent policy problems contribute to a poorly functioning decision process.

   This chapter provides a contextual overview of large-scale conservation in the Connecticut River watershed and identifies major process-oriented challenges that participants face. Our recommendations are oriented toward anyone interested in large-scale conservation, but are particularly practical for participants interested in increasing the effectiveness of this watershed's policy process and conservation.

4.2   Standpoint and Methods

In order to gain knowledge of the Connecticut River system, we embarked on a rapid assessment from March 24 to 28, 2004 (Fig. 4.1). Certain base values typified our standpoint as student evaluators: We were primarily enlightenment- and skill-driven, eager to "test out" and further develop our skills and knowledge as policy analysts in a real-world scenario. A rational, academic vantage point prevailed, which, when combined with a relative lack of historical or contextual understanding of the Connecticut River system and its conservation actors, resulted in a more generalized rather than specific understanding of this large, complex natural system. On the other hand, our vantage point as outsiders enabled us to perceive and analyze the system as a whole, rather than as individual parts.

   The policy sciences' framework and propositions were used to guide our inquiry (Lasswell 1971; Lasswell and McDougal 1992; Clark 2002). Information for this appraisal was collected from multiple sources. Students arranged informational sessions with five organizations engaged in large-scale conservation of the watershed (Table 4.1). These meetings consisted of presentations by the host organization followed by a period of questions and discussion. During the meetings, students gained insight into the history of the various organizations, the challenges they face, and the conservation strategies they employ. A basic content analysis of materials and websites of each organization was conducted to compare institutional values, symbols, and goals to understand the context of this region.

   The Connecticut River watershed was selected as a case study because of the large area represented and the diverse environmental, social, and economic issues confronting its inhabitants. In contrast to more detailed, long-term studies, a rapid

Fig. 4.1 Locations visited during the Connecticut River Rapid assessment

Table 4.1 Main characteristics of five organizations visited during Connecticut River appraisal

Variable	CT River Watershed Council (CRWC)	CT River Joint Commissions (CRJC)	US Geological Survey (USGS)	Silvio O. Conte National Wildlife Refuge (USFWS)	The Nature Conservancy (TNC)
Type of institution	NGO	Governmental (state)	Governmental (federal)	Governmental (federal)	NGO
Enforcement	Nonregulatory	Nonregulatory	Nonregulatory	Regulatory (inside refuge)	Nonregulatory
Lobbying capacity	High	Low	Low	Low	Low
Principal funding mechanism	Private donations and grants	State funding	Federal appropriations clients	Federal appropriations	Private donations
Recognition by other organizations	High visibility	High visibility	High visibility	High visibility	High visibility
Level of partnership with each other	Moderate	Moderate (focused on VT and NH)	Minimal	Moderate	High, but on their terms
Flexibility to change	Medium	Resistant	Limited only to biophysical context; institutional constraints	Limited only to biophysical context; institutional constraints	Medium

assessment is a research tool that allows analysts to gather and process a significant amount of information in a short period (Del Campo and Clark 2009). The aim of this method, from a policy sciences perspective, is to produce a snapshot of the likely challenges and possible means of intervention (Clark and Ashton 1999; Clark and Ashton 2004). Our intent was to explore the strategies used by different organizations as they attempted conservation efforts within the Connecticut River watershed. Although our travel and meetings did not present us with a complete picture of the region, we amassed many useful insights. Over 3 days we met with representatives from the Nature Conservancy (TNC), the US Geological Survey's Conte Anadromous Fish Laboratory (USGS), the Connecticut River Watershed Council (CRWC), the Connecticut River Joint Commissions (CRJC), and the US Fish and Wildlife Service Silvio O. Conte Refuge (USFWS).

4.3   Challenges Faced

The Connecticut River is New England's largest river system and was recently designated one of 14 American Heritage Rivers (Environmental Protection Agency 2006). The watershed encompasses over 11,000 square miles of land in Connecticut, Massachusetts, New Hampshire, and Vermont (Connecticut River Watershed Council [CRWC] 2006). Several endangered species exist within the watershed, a contributing factor in the decision to list the tidal wetlands in southern Connecticut as "Wetlands of International Importance" under the Ramsar Convention (Connecticut Department of Environmental Protection (CDEP) 2004). In addition to its ecological importance, the watershed has a rich cultural heritage. Rural farming villages and urban commercial centers have relied on the watershed for more than 250 years (Delaney 1983). As urban sprawl, habitat fragmentation, and nonpoint source pollution increase throughout the region, conservationists are looking for ways to preserve this ecosystem. While many regional conservation groups and natural resource management agencies are focused on improving the watershed—and the definition and concept of improving varies among organizations—few have developed effective strategies for navigating the complex political and social dimensions.

Participants in the Connecticut River system are focused on solving a range of challenges that they believe are contributing to its degradation, including impaired water quality, invasive species, wetlands loss, acid rain, dams, native species decline, and loss of historical culture, among others. Addressing these challenges is necessary to maintain the health of the watershed, but simply solving these ordinary problems is far from sufficient. In contrast to the issues that the regional organizations focus on, our assessment looks at the functional, process-oriented challenges that act as barriers to lasting conservation solutions.

We sought to assess the policy challenges and the goals and specific values for each group we visited. We also identified persistent decision process problems (Table 4.2), which ranged from biophysical concerns (e.g., point source pollution, invasive species) to cultural issues (e.g., clashes of worldviews, methods of

Table 4.2 Organizational perspectives visited during the Connecticut River appraisal

	Connecticut River Watershed Council (CRWC)	Connecticut River Joint Commissions (CRJC)	US Geological Survey (USGS)	US Fish & Wildlife Service (USFWS) Silvio O. Conte Refuge
Formula for conservation	Advocacy+education=conservation	Community partnerships=maintaining cultural heritage	Biodiversity+good science=good management	Education+science+land acquisition=sustainable management
Vision/objectives	1—Promote restoration, conservation, wise development, and use of the natural resources 2—Protect and conserve fish and wildlife 3—Promote and encourage an understanding among citizens (need to conserve)	1—Advocate and ensure public involvement in decisions that affect "their" river and valley 2—Create a citizens' river corridor plan 3—Describe the cultural heritage of the valley	1—Help visualize the desired future condition of the Connecticut River 2—Publish the tools that will "give managers and planner the ability to 'see' in a dynamic way the present and future conditions of the watershed"	1—"Involve the people of the watershed, especially landowners and land managers, in environmental education programs and cooperative management projects" (only during initial phase through public hearings) 2—"cooperative strategies and a landscape viewpoint will be required to protect the natural diversity of the watershed"
Symbols	Dams, fish and fish ladders, atlas, logos, river stewards, Connecticut River, "working in partnership with people to protect the Connecticut River"	Cultural heritage, Connecticut River, logos, book, "The catalyst for cooperatively meeting the Valley's challenges is the Connecticut River Joint Commissions, who seek a strong and vibrant economy while capitalizing on the natural wealth of this place"	Anadromous fish, USGS logo, "science for a changing world"	Fish and wildlife, invasive species, migratory birds, maps, USFWS logo, "The Silvio O. Conte National Fish and Wildlife Refuge is no ordinary refuge!" Roman columns (formula)
Values (entry points into the organization)	Rectitude and wealth (resources)	Respect	Skill and wealth (resources)	Enlightenment

conservation) to decision making (e.g., transboundary management, technocratic vs. democratic control). The scope of our analysis included the constitutive challenges, i.e., securing a decision process that will allow the watershed's community to find common ground.

4.4 Goals

Understanding a public policy problem requires a detailed understanding of the common expectations of a community. Problems do not exist independent of human interpretation: Problems may be defined as conflicts between a desired state of affairs (goals) and current or projected future conditions (Clark 2002). The five organizations visited were asked what an ideal Connecticut River watershed would look like (Table 4.2). All five support the general objective of "securing the health of the Connecticut River Watershed," while fully realizing that this statement is subject to multiple legitimate interpretations. For example, four of the five groups understood this goal primarily in terms of improving the biophysical aspect of watershed, whereas the CRJC saw it as focused on the overall quality of life for the human inhabitants. These multiple interpretations do not prevent us from using this shared statement since the various interpretations are not mutually exclusive.

4.5 Persistent Problems

Each organization believes it has been successful in undertaking a variety of on-the-ground projects and activities that serve their priorities for the Connecticut River. For example, the USGS implemented a successful program over the last ten years to reintroduce anadromous species into the Connecticut River watershed (United States Geological Service 2006). The CRJC has concentrated on creating a historic understanding of the northern portion of the watershed to promote a shared sense of community and caring for the river (Connecticut River Joint Commission 2006). These are just two examples of many success stories we encountered. However, despite the effectiveness of any single organization's strategy, there is broad agreement that conservation in the Connecticut River system is far from realized.

Using the shared goal statement as a basis, we identified three persistent policy problems facing participants in conserving the Connecticut River watershed: fragmented arenas, goal substitution, and limitations of the scientific management paradigm. These problems are not specific to any one organization, but are institutional challenges that have created difficulties in "securing the health of the Connecticut River Watershed" as a whole.

4.5.1 Persistent Problem #1: Fragmented Arenas

One of the major limitations to achieving successful conservation in the Connecticut River system is the current structure of the arena. Arenas are physical places, or zones of interaction, where participants engage each other to reconcile their interests (Cherney et al. 2009). Arenas, which might include town hall meetings, litigation, informal discussions/meetings, financial markets, and many others, can be understood functionally in terms of their geographic, temporal, value-orientation, and (inter) crisis components (Lasswell 1971). An arena that aims to serve the broad public interest will ideally be open to broad participation (McDougal et al. 1981).

The current political fragmentation of the Connecticut River watershed arena is evident in its division into the jurisdictions of four states, over 300 cities, and various federal agencies. Fragmentation is also apparent in the history and traditions of the region, in particular the New England concept of "home rule," a governance tradition whereby central authority devolves both authority and control to the regional or local level. Fragmented systems of authority and control are often desirable in policy settings because they orient governance toward shared local interests (Brunner 2005).

This fragmented, decentralized system may have been an ideal form of governance in the historical context of the region, but a narrow and localized focus restricts both access and consideration of issues to the concerns of the communities immediately adjacent to the Connecticut River. To achieve a large-scale conservation focus for the watershed, some level of communication and coordination among participants is necessary. For example, controlling actions of participants in Vermont may potentially affect participants in Massachusetts, who in turn may affect participants in Connecticut. The converse is also true. Consequently, from a common interest perspective it is desirable for participants in Connecticut to have access to a forum in Vermont where they can contribute to policy making, and vice versa.

Political fragmentation—in values and interests, for instance—is also a barrier because it creates a situation where the diverse participants are unable to engage each other in an effort to reconcile their interests and find common ground. The desire to overcome fragmentation is evident in the numerous plans developed by participants for managing the watershed, including the most recent by the CRWC. These plans advance a holistic vision and prescriptions for the region, but according to both TNC and CRWC, every plan created ends up "sitting on the shelf." This is not surprising: Fragmentation contributes to the creation of plans by a limited number of participants rather than by the watershed's larger community to which the plan is meant to be applied.

4.5.2 Persistent Problem #2: Goal Substitution

While common ground exists in the goals of the five organizations we visited, all are hindered by issues of goal legitimacy and substitution. Each group has a slightly different vision of an ideal Connecticut River watershed. These visions are not

mutually exclusive, but the various organizations have set themselves up as competing to determine whose vision or goal is "correct" for the region. This competition is manifested in values of power (who can actually effect change), wealth (who can raise more capital), and respect (who is perceived as the lead organization).

This competitive dynamic is a significant factor contributing to goal substitution, i.e., focusing on an intermediate goal to the detriment of an overriding goal, most evident in the relationship between TNC and the CRWC. TNC, an international nongovernmental organization with substantial monetary resources, entered into the Connecticut River policy arena much later than the CRWC, whose sole purpose is to secure the future of this watershed. From the CRWC's perspective, the much larger TNC has attempted to wrest control of the conservation arena from local hands and has not attended to the region's rich history. The CRWC perceives this as a deprivation of respect for their effectiveness as a conservation organization, a deprivation of power because of their inability to get a seat at the table next to TNC, and a deprivation of wealth because of the competition for conservation funds. As a result, the CRWC spends considerable time and resources trying to increase their monetary base and public profile as a conservation organization. In other words, rather than trying to cooperate with TNC on shared goals, the CRWC is focused on developing and meeting indicators to demonstrate their organization's superiority to TNC.

While it is possible for healthy competition to benefit conservation activities, it can also orient groups away from their primary goals and instead narrow the focus to low-priority, short-term goals. As a result, organizations such as CRWC measure their success in terms of funds raised, numbers of donors or members, positive references in popular media, and other easily quantifiable measures that they can compare against those of their perceived competitors, rather than judging their success by improved conservation outcomes.

Goal substitution is also evident in the failure and unwillingness of organizations to terminate ineffective conservation programs. Termination is often viewed as an organizational or conservation failure, rather than a restructuring of the decision process. For example, the USGS claims that it is interested in developing interdisciplinary indicators to better understand the system as a whole, but it resists revising the current set of indicators beyond biological or hydraulic data, which portray the agency in favorable terms. There is concern that adding social variables may decrease or threaten their claims of success.

4.5.3 Persistent Problem #3: Limitations of the Scientific Management Paradigm

The perspectives of participants in the Connecticut River system—their identities (formulas, doctrine, and symbols), expectations, and demands—have a significant effect on the quality of management policy and thus on conservation outcomes (Lasswell 1971). With the exception of the CRJC, all of the organizations we visited use a biology-based, expert-driven approach to conservation, which is characteristic

of scientific management. Scientific management, a paradigm based in positivism (Brunner 2006), is well entrenched in popular scientific and policy culture, where reductionism and replication to develop generalizable laws of nature are regarded as the accepted way to understand and operate in the world. While essential for studying isolated technical phenomenon, this approach has proven insufficient as a management paradigm to resolve complex policy issues (Brunner et al. 2005). The reductionist mentality is prone to overlook or discount critical components of context in a policy setting, often because some factors are not easily quantifiable.

The USFWS is a prime example of how this management paradigm hinders effective conservation in the Connecticut River system. In the development of the Silvio O. Conte Refuge design, although the agency realized that social and political factors would be critical components for creating an effective reserve, the staff fell back almost entirely on their technical backgrounds to complete the reserve plan. They justified the exclusion of social components and indicators from their plan (e.g., value dynamics and demands) simply because these factors are "difficult to quantify and measure."

This tendency was also evident in the other four organizations—to frame issues using simplistic, expert-defined problem definitions (whether it be hydraulic, biological, or economic), and, consequently, to focus on technical problems at the expense of solving basic constitutive decision-making problems. Such problem definitions may be advantageous to particular organizations (for reasons of goal substitution, funding, or the perception of political support); however, it fundamentally excludes legitimate participants, such as nonexpert citizens, from the arena.

4.6   Looking to the Future

Based on the trends, conditions, and problems revealed in our rapid assessment, it is possible to envision three likely future scenarios for conservation in the Connecticut River watershed.

4.6.1   Business as Usual

In this scenario, the most likely of the three, current trends and conditions are carried into the future without significant alteration, and problems of urban sprawl, habitat fragmentation, and nonpoint source pollution gradually but consistently become more chronic in the Connecticut River watershed. Each organization will continue to undertake on-the-ground projects and activities reflecting its perspective of successful resource conservation, without a larger constitutive decision process or a larger arena to streamline efforts or to integrate organizational strengths and resources for greater impact. Though there will be occasional partnerships and collaborations, the underlying competition for power, wealth, and respect will preclude

more integrated conservation solutions. The major environmental organizations will continue to focus on intelligence gathering and promoting their institutional doctrines, resulting in narrow, expert-defined problem definitions. Without a larger, coordinated effort to improve the cumulative social and decision-making processes, it is unlikely that the business-as-usual scenario will achieve the overarching goal shared by the river's environmental groups—improving the overall health of the Connecticut River watershed.

4.6.2   Competition and Fragmentation

In this scenario, both the cumulative and individual activities of the river's major environmental groups are hampered by parochialism, competition for scarce resources, and struggles for power and respect. Both the social and the decision processes at the watershed scale become less contextual, integrative, and effective. For example, the current unease between the CRWC and TNC could grow into a malignant competition, with the CRWC then shifting valuable organizational effort from outreach to fundraising in an effort to replace key funders "stolen" by TNC. TNC might then find its ecoregional approach hampered at the local level by suspicious or hostile community leaders who have seen CRWC pushed aside and local contextual issues largely ignored. Alternatively, in another illustrative scenario, the largely successful but geographically restricted CRJC might avoid "exporting" its success stories and templates to other groups on the lower river, instead maintaining a narrow focus on its backyard (as currently outlined in the CRJC legislative mandate). This might virtually eliminate the watershed's ability to benefit from local innovation and experimentation and to integrate conservation solutions at a larger level. The result, in both the short and long term, is that sprawl, habitat fragmentation, and nonpoint source pollution along the river could increase unabated. Perhaps as important, community and social justice opportunities could be severely hampered by regional and organizational competition.

4.6.3   Collaboration and Integration

The final and most promising scenario is one in which the leading environmental groups recognize the need for—and implement—a larger, more collaborative, and integrated approach to river conservation. This might be led by any number of groups: the CRWC might acquire the resources or power, or TNC might find that sharing or distributing power, respect, and wealth to a larger group of stakeholders is more productive than is its current approach. In any case, the major groups might engage in a constitutive decision process that more effectively and contextually identifies problems, describes trends, analyzes conditions, projects developments, and creates, ranks, and selects alternatives for achieving their common goals. In this case, the arena and, consequently, the social process could be clarified and

improved, solutions could be more contextual, and failed efforts could be instructive but terminated. The relative strengths of the different environmental organizations could be harmonized and brought to bear on the river's biophysical problems, including urban sprawl, habitat fragmentation, and nonpoint source pollution. The overall health of the river could improve, and through time the opportunities for social benefit and justice are created and spread throughout the watershed geography.

4.7 Recommendations

In order to encourage movement toward the collaboration and integration scenario, we propose three different but related strategies—a decision seminar, problem orientation workshops, and practice-based learning—the common theme of which is encouraging a problem-oriented approach to conservation in the watershed. These recommendations provide entry points to encourage each of the river's organizations to work toward a common purpose, especially if they perceive that they will be enriched through this process. While these alternatives are suggested specifically for the participants in the Connecticut River watershed, they also address ways that future students could continue to engage in this case.

4.7.1 *Decision Seminar*

It appears that the groups we interviewed share a common desire to improve the social and biological conditions of the Connecticut River watershed. Unfortunately, this goal is highly prone to substitution by the five organizations, and they lack agreement on how to achieve this outcome. This deficiency in the policy process provides an opportunity for Yale to lend its skill and knowledge by coordinating a policy clarification exercise called a decision seminar (Willard and Norchi 1993). A decision seminar is an ongoing, group-based exercise that helps participants solve problems in a policy-oriented, multi-method, and contextual manner (Burgess and Slonaker 1978; Willard and Norchi 1993). It helps participants find and maintain a common problem definition, that is, a set of goals, trends, conditions, projections, and a range of alternatives.

Muth (1987) lists six operational procedures that are necessary for a decision seminar to occur. First, a dedicated nuclear group of participants is essential to maintain the seminar through time. Second, a permanent local site is necessary to be a symbol for the exercise and to house the materials used. Third, audio-visual aids are needed to remind the problem-solving group of its progress and its goals. Fourth, outside experts are crucial to increase the knowledge of the participants. Fifth, a detailed record-keeping system is required to document the continual changes in data. Finally, a research system is vital to add to and update the data on which the group relies.

An outside group, such as a future Yale class, could try to organize and coordinate such a seminar. Most of the organizations and individuals involved in the conservation of the Connecticut River watershed see a need for a larger understanding of the problem. The individuals involved in this case are highly motivated and dedicated to this effort. If approached in a manner playing to their core values, all of the institutions involved in this appraisal would likely be willing to participate in such a seminar. This sets the stage for a core group of participants; the students could find ways to secure and sustain the other five operational procedures and ultimately create a termination strategy for Yale's involvement as the facilitator.

4.7.2 Problem Orientation Workshop

The organizations that are pursuing conservation of this watershed often compete and do not address their shared goals. One method for finding common ground would be to organize a workshop centered on problem orientation. In order to work collaboratively, they need to develop a good understanding of their own perspectives as well as the perspectives of the other participants. Exploring these questions would help participants attend to the five tasks of problem orientation: What do we want to achieve? How well have we done so far? What has influenced these circumstances? What will happen if things go on as they have? What must we do to achieve what we want?

Students from the Yale School of Forestry and Environmental Studies could play an important role in organizing this type of workshop and serving as facilitators. Students could reveal common ground among the participants through a Q-method workshop, wherein participants are asked to generate responses to questions about problem definition, goal clarification, and potential strategies for meeting goals, and then they are asked to rate the degree to which they agree or disagree with the responses (Brown 1980, 1993). Analysis of the responses places the participants into factor or cluster groups, which provides insights into the similarities and differences among the participants and a better working relationship between the participants. If successful, the workshop could produce a shared problem definition and new opportunities for collaboration, such as the creation of a "Connecticut River Congress" as suggested by CRWC.

4.7.3 Practice-based Learning

For large-scale conservation efforts to be successful, it will be necessary for stakeholders to combine efforts and work toward mutually compatible goals. Although all of the organizations involved with conservation in the region have partnerships and programs that have individually been successful, coordination at a larger scale has not occurred. This stems, in part, from the lack of clarified goals among all the organizations and from the highly fragmented arena. The creation of a joint

initiative would provide a unique opportunity to overcome these problems; several mechanisms are already in place that would facilitate its creation. For example, the CRJC, the CRWC, and the USGS all expressed interest in developing an atlas for the region. Although the CRJC intends to focus only on Vermont and New Hampshire, and the USGS is focused on biophysical elements, their desire for a similar output is a first step in aligning interests. In addition, the Connecticut River Watershed Initiative, being developed by the USGS and researchers at the University of Massachusetts, provides a newly created arena for bringing together stakeholders and a diverse set of interests. Although the current focus is on biophysical elements, USGS has indicated an interest in developing a framework and tools that incorporate other perspectives and values.

Creating a pilot project and using a practice-based approach will enable the organizations to test different conservation strategies and create new arenas at a smaller scale before trying to translate these approaches into a watershed-wide approach. Yale students could play a role in implementing this recommendation by highlighting best practices in the region and assisting them in encouraging similar practices among their constituents. In doing so, the students would essentially be providing these groups with an entry point for appraisal.

4.8   Conclusion

All the organizations appraised in this chapter have successfully undertaken conservation activities using a variety of formulas to achieve the overarching goal of maintaining a healthy Connecticut River watershed. However, these efforts have tended to be a patchwork of often fragmented projects with limited functional linkages. Yet, it appears that they share considerable common ground, even if they do not fully recognize it at present. While competition can spur innovation, the overriding goal among these organizations is a healthy ecological and social system, not institutional continuity or plaudits. Achieving their common interests can best be accomplished by working toward collaboration and integration and, in order to shift the future trajectory of conservation in the watershed in that direction, we offered three alternative measures—find common ground, create a functional network, and transform the ineffective patchwork approach to a coordinated approach at a larger scale.

It is important to recognize, however, that these large-scale recommendations complement rather than replace the ongoing watershed conservation strategies and practices. Given the existing social and political conditions, such as home rule and parochialism, a top-down regulatory approach is unlikely to succeed. Each organization has an important role to play in its respective arena. We hope our recommendations will assist in creating a new large-scale arena that embraces a more bottom-up approach. Finally, by sharing their common vision, pooling their collective wisdom and experiences, and establishing a joint initiative, the Connecticut River stakeholders are more likely to find true lasting solutions to the broad set of

challenges facing the river system. Our hope is that our research, though limited in scale and scope, provided a platform for improved dialogue and concerted actions among players involved in the conservation and management of the Connecticut River watershed.

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Chapter 5
The Greater Yellowstone Ecosystem: A Rapid Appraisal and Recommendations

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Abstract This chapter describes a rapid appraisal in the northern Greater Yellowstone Ecosystem (GYE)—a high-profile, large-scale ecosystem with unique biological and geological systems—conducted in March 2009 by a class at the Yale School of Forestry and Environmental Studies. The group's methods and theoretical foundations are described. The assessment showed that conservation management and policy, as evidenced in the programs surveyed (e.g., grizzly bear and wolf management, snowmobile use, tourism, and others) and the people interviewed, are fraught with conflicting perspectives, contested problem definitions, symbol inflation, and politics. Particular problems in the GYE's social process and decision process are examined. The team's recommendations encourage common interest outcomes: learning from practice-based, prototyping experiences, creating new

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arenas for community-based participation, and adopting an adaptive governance framework in problem solving. Such a framework emphasizes ongoing adjustment of decision-making processes to actual, on-the-ground situations, and it provides a unique platform for creating a process that is more inclusive and capable of harnessing local knowledge and experience, bridges the divide between science and the practical measures needed for effective conservation, and fosters respect and pursuit of human dignity as overarching goals.

Keywords Large-scale conservation · Greater Yellowstone Ecosystem · Fragmentation · Decision making · Arenas · Prototyping · Active learning

5.1   Introduction

For 140 years, Yellowstone National Park has served as a powerful symbol of the importance of protecting nature for the benefit of present and future generations (Keiter 2003, 2013; National Park Service 2013). Today, the park and surrounding region are home to abundant wildlife, alpine flora, and unique geological features. Some people perceive the park as a positive symbol of America's ideals, while others see it as a symbol of federal presence in the Greater Yellowstone Ecosystem (GYE) and government intrusion in the lives of locals (Schullery 1997a; Preston 2005; Clark 2008). Through its role as a symbolic and political landscape, the park and the larger-scale GYE have become a confluence of wide-ranging and conflicting values, perspectives, and strategies for management and policy. Stakeholders on all sides of the many issues are generally well informed and immensely passionate, and they display an intelligent and caring regard for their interests. In this context, persistent policy problems impede achievement of a common interest-oriented approach to wildlife and resource management (Schullery 1997b; Clark 2008; Vogel 2006).

This chapter describes a 10-day field trip in March 2009 by nine students enrolled in Professor Susan Clark's large-scale conservation seminar at the Yale School of Forestry and Environmental Studies. The field trip was a rapid appraisal in the northern GYE from Cooke City to West Yellowstone and Old Faithful to Madison Valley, MT. We describe the trip and our interactions briefly, analyze them, and offer our perspective and recommendations. We surveyed selected persistent policy problems (e.g., wolf and grizzly bear management) and sought innovative programs to address these problems, i.e., examples of efforts that are already working on the ground. These innovative efforts are advancing interests shared by citizens and officials, and as such they can serve as exemplars for resolving the widespread conflict in the GYE and other large-scale ecosystems. Since the rapid appraisal, we have continued to track management and policy issues in GYE.

5.2 Study Area, Methods, and Standpoint

In this section, we describe the large-scale ecosystem that we visited, our observational methods and theoretical foundation, and our standpoint as observers and researchers.

5.2.1 Study Area

The GYE is a very high-profile, large-scale ecosystem that has been described by diverse authors (Clark and Minta 1994; Schullery 1997a; Ferguson 2003). It is a large and unique biological and geological system about 500 km north to south and 250 km east to west (77,000 km^2 or 7,600,000 ha; Fig. 5.1). The GYE is headwaters to the Yellowstone–Missouri, Green–Colorado, and Snake–Columbia river systems. With over 300 bird and 70 mammal species, the ecosystem's flora and fauna are relatively intact, but invasive species and beetle kills are changing its biota.

Colonized by Euro-Americans since the 1850s, the former wilderness has been transformed into a destination today for millions of visitors each year (Turner 2008; Murie and Murie 1985). Much of the ecosystem is under federal government ownership as parks, forests, sagebrush basins, and wildlife refuges. There are many concerns about the conservation of natural resources, especially rare species, but the core issues we discovered are problems with how people interact with one another, how decisions are made, and with leadership (Clark 2008; Yellowstone National Park 2008, 2011, 2013). We visited parts of the northern GYE encompassing the Lamar Valley in the northeastern section of the park and saw firsthand some of these challenges.

5.2.2 Methods

We chose to go to the GYE because it is important globally and is often touted as a model large-scale conservation system. Our team sought to gain insight into the management challenges facing the region through firsthand observations and conversations with relevant officials, experts, and other participants. We used the rapid assessment method, which is increasingly popular and can be implemented with limited resources to great effect (Clark and Ashton 2004). Rapid assessments are generally performed within a short period, from a few days to a few weeks, with the aim of identifying specific problems, determining why these problems exist, and proposing what might be done about them (Grandstaff et al. 1985; Del Campo and Clark 2009). Many rapid assessments focus only on technical and ecological aspects of a problem; others focus more on human components but often lack adequate problem orientation or a thorough contextual focus (Clark et al. 2000). Rapid assessments that lack a contextual approach preclude an integrative or interdisciplinary perspective on problems, as well as the possibility of formulating practical,
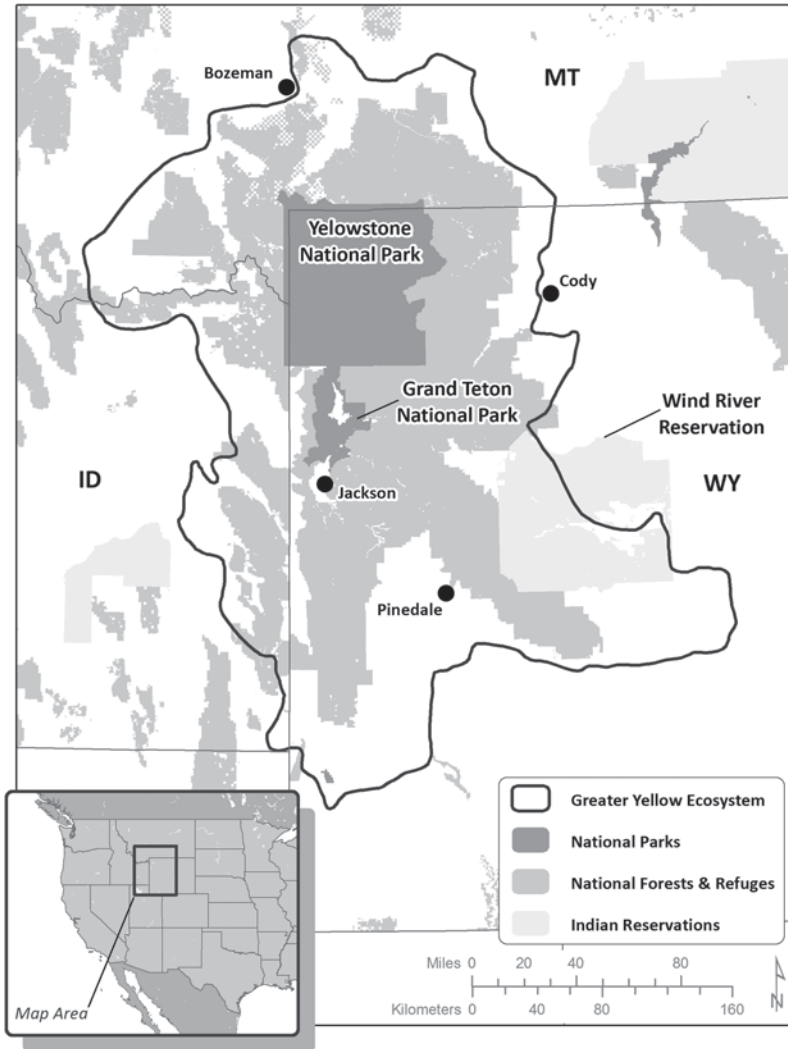
Fig. 5.1 Locations visited during the Greater Yellowstone Ecosystem rapid assessment

justified, and reasonable solutions (Clark and Gillesberg 2001). In contrast, we sought to be explicitly and systematically problem-oriented, contextual, and inter-disciplinary—in other words, integrative.

Our team had only a few days for on-site assessment in the geographically vast, ecologically complex, and contested ecosystem. We employed rapid appraisal to gain a broad overview and understanding of issues as circumstances permitted. We took copious notes, many anecdotal. Our rapid assessment consisted primarily of discussions with selected participants associated with the GYE's key management challenges. We met formally with ten professionals actively working in the GYE

and had informal discussions with dozens of tourists, recreationists, local community members, conservation advocates, scientists, and park employees. We spoke with officials and leaders in government and outside government. We also spoke informally with snowmobilers, local business owners, tourist guides, service workers, and local citizens, totaling >50 people. From these sources, we were able to parse distinct and recurring themes and patterns in people's standpoints, management paradigms, problems, conflicts, and possible solutions. Throughout this document, attributions are anonymous out of respect for the participants we interviewed.

We followed up with more intense discussions among ourselves and literature reviews over 9 months after the field trip (e.g., Robbins 2006). The data from the trip, largely based on participant observation, open-ended interviews, and lectures/presentations, were analyzed using the concepts and framework of the policy sciences, literature, and guest speakers in the seminar knowledgeable with the region, and from our collective life experiences in other diverse contexts (Lasswell 1971).

Interdisciplinary problem solving relies on mapping problems contextually, that is, examining management and policy issues, including decision process activities. We thus mapped the interactive activities or components of the decision process we observed—intelligence (planning), promotion (debating, recommending), prescription (deciding), invocation (initial implementation), application (final implementation), termination (ending or succeeding), and appraisal (evaluation). The content of these activities differed across different substantive issues (e.g., fire management, wolf reintroduction, or grizzly bear recovery). Interdisciplinary problem solving also includes examining organizational cultures and structures, leadership, and many other factors in evidence-based ways.

We analyzed data from our interviews, conversations, and observations of social process and differing perspectives on problems. First, all resource management problems occur within a context, characterized here as the interaction of individuals and organized interests in the arena or social process. Data were obtained on participants and organizations, their perspectives, values, strategies for attaining values, and outcomes.

Next, problem orientation serves as a guide to identifying problems that impede the sustainable management of the GYE. It calls for describing circumstances and problems empirically and exploring remedies to identified problems. We used five critical thinking elements to orient to the problem: (1) clarifying goals and finding measurable indices of them, (2) mapping trends (historical data on these indices that affect the problem), (3) determining the conditions behind or underlying the trends, and (4) projecting likely future conditions if nothing is done. Then, having analyzed the trends, conditions, and future projections as they pertain to achieving the specified goals, we were able to come up with a problem definition. Finally, based on this analysis, we sought (5) to invent, evaluate, and select possible solutions. In short, through our rapid assessment, we sought to find alternatives to "business as usual," so as to improve decision processes currently at play in the GYE in ways that serve the common interest. Finally, we drew on three tests of common interest to assess the efficacy of the present management and policy in the GYE. Our approach included procedural, substantive, and pragmatic tests (Brunner et al. 2002,

2005; Clark 2002; Steelman and DuMond 2009). The main goal of our trip was to identify innovations that address underlying decision-making problems; we focus on those in our recommendations.

5.2.3 Standpoint

Our standpoint during the field trip and in this report was an amalgamation of the perspectives and backgrounds of nine observers. Because our standpoint, collectively and individually, influenced our analysis and recommendations, it is appropriate to discuss it here.

The team members possessed broad experience in conservation and resource management across diverse contexts from local to international. Our backgrounds included work in conservation advocacy groups, government and private wildlife research, international conservation NGOs, government and contract positions, and extensive technical field research. Most team members are published authors. This grounding in real-world experience enabled the team to gather and analyze data as experienced practitioners with a collective understanding of the realities of complex and sensitive management problems.

The team embarked on the survey of the GYE with a shared regard for clarifying and promoting participants' common interests and a keen interest in conserving the natural environment. We were aware of the range of widely accepted approaches to large-scale conservation, including parks and protected areas, single- and multiple-use management, ecosystem management, integrated conservation and development, ecoregional planning, transboundary management, and adaptive governance (see Chap. 3) before the trip. We used the trip to improve our skills as observers, researchers, and analysts. We sought to advance our skills in assessing management and policy in a complex, large-scale ecological system. Our recommendations are intended to aid all participants, including policy makers in the GYE and elsewhere, as well as future students of conservation policy and natural resources management.

5.3 Assessment

All problems have a social and a decisional context. Mapping and understanding these is essential to clarifying problems and searching for solutions (Clark 2009; Cherney and Clark 2009; Mattson and Clark 2009). This section briefly examines these two contextual elements.

5.3.1 Social Process Mapping

Broadly speaking, in their daily interactions, people seek to maximize human values for themselves—power, wealth, respect, affection, rectitude, skill, enlightenment,

Table 5.1 A selected overview of the complex social process in the Greater Yellowstone Ecosystem

Participant	Perspectives	Values	Outcomes of past social process
Wildlife conservation groups	Wolves, grizzlies, and other species deserve protected status to enable their numbers to grow beyond park boundaries	Rectitude, power, respect	Lack of respect, some degree of power through litigation, feeling of inadequate rectitude
Ranchers	Wildlife conflicts with ranchers' ability to earn a living and therefore should be kept within park boundaries	Respect, wealth, well-being	Lack of respect, damage to wealth and well-being through continued conflicts with wildlife
Government and park managers	Much variation: Commonalities include the bureaucratic tendency to embrace the status quo	Power, skills, respect, enlightenment, rectitude	Lack of respect, some enlightenment via scientific research, significant power

and well-being (Lasswell 1971). In any social process, individual and organizational participants have value assets and liabilities they seek and use in every interaction (Clark 2002). Diverse problems throughout the GYE can be defined not only in biophysical terms or conditions but also in terms of actual value deprivations and indulgences, that is, whether the participants get more of what they want or less (Clark and Wallace 2002). Within the GYE, the value position or standing of some participants has eroded through social process. For example, locals feel that respect for their views has declined over the years. Environmentalists feel they are being slighted. And many people, wanting to influence decision making, feel their power has diminished. This has led to a drawdown of trust and cooperation among participants that may have existed historically (Table 5.1). In turn, this constrains the ability of social and decision processes to identify enduring solutions to problems. Understanding how value deprivations can be reversed through improved social and decision process is critical to clarifying and securing the common interest (Kahn 2000; Cromley 2000).

In short, participants in the GYE currently lack an effective arena through which they can explore their different perspectives and relative value indulgences and deprivations in a realistic, problem-oriented, and contextual way. Consequently, special interests clash ceaselessly in the media, politically, and in the courtroom. This lack of an arena only inflames and recycles conflict, escalates the symbolic politics of matters at hand, and further precludes working toward common interest outcomes and effects. It is clear that the value demands of diverse stakeholders are being stymied in many ways, with the value of respect being denied or drawn down for most participants. Although some officials and environmentalists do realize the need for a common platform to discuss and identify common interests, they have lacked the authority, applied tools, and the arena that would enable them to move forward.

A superficial understanding of differences in demands among stakeholders masks value similarities (e.g., demands for respect). Conflict, for example, is most visible between the ranching/agricultural community and the federal government (Taylor and Clark 2005). The ranching community feels deprived of power (over grazing lands and lack of means to voice their views on problems and solutions) and wealth and respect (because of real and perceived restrictions on how they manage their land relative to large carnivores such as wolves and bears). This leaves ranchers, like many other participants, feeling disrespected, slighted, and powerless. This is compounded by an increasing number of residents in the GYE who do not share a ranching background, combined with increasing tourism and its growing importance to the region's economy, which symbolically threatens the ranchers even more.

Additionally, the environmental community feels that its voice remains largely unheard as well, unless they can reach officials via litigation. Weekly newspapers are full of examples of these value deprivations across diverse issues (e.g., endangered species, oil and gas development, tourism issues). This widespread feeling of loss of respect and dignity across most sectors complicates social and decision processes and further alienates individual participants and groups.

Additionally, the social process in the GYE has been ineffective at addressing some of the major policy problems because some major stakeholders have been historically excluded from the process (or more specifically, some actors have been excluded from appropriately scaled and well-designed arenas). Combined with other historic trends and conditions, conflict with large carnivores, in particular, has become highly symbolic of deeper value dynamics, perspectives, and practices (Taylor and Clark 2005). With the spread of wolves and grizzlies throughout the GYE in the past few decades, for example, wildlife–livestock conflict has become one issue that local community members feel they need to address. Some locals fear that change, including accommodating large carnivores, would lead to sacrificing their way of life, a belief that has led to conflict over the values of respect, rectitude, power, and wealth. Their views differ from newer residents of the region, who view large carnivores as a critical part of the landscape and are more willing to participate in coexistence initiatives.

Finally, debates over listing and delisting of grizzlies and wolves from Endangered Species Act protection are heavily laden with symbol inflation. This process of large carnivore management has little to do with the animals and their ecology, and a lot to do with the implications of legislation, government, and bureaucracy for people's shifting value holdings and demands. Strategies employed by many participants so far have been more ideological and coercive—such as newspaper articles, letters to the editor, and organizing activist campaigns—than ameliorative and persuasive. These tactics further divide participants and preclude productive discourse. Some attempts have been made to initiate multigroup interaction, but more organized, large-scale, and authoritative efforts are necessary to make a difference (Primm and Clark 1996; Mattson et al. 2006).

Many participants, including decision makers in the GYE, rely almost entirely on scientific management in formulating management policy and actions, positioning

themselves politically, and measuring the success of their endeavors. Others seem to be transitioning toward an alternative approach—adaptive governance—and in some instances embracing it actively and explicitly (see Chaps. 1, 2, 3, and examples below).

5.3.2 Decision Process Mapping

In this section, we examine dominant patterns in the overall decision process in the region, as we saw them and as described in the literature (Clark 2008). Our descriptions focus on the interconnected activities and functions of any decision process: (1) intelligence (planning), (2) promotion (debating, recommending), (3) prescription (deciding), (4) invocation (initial implementation), (5) application (final implementation), (6) termination (ending or succeeding), and (7) appraisal (evaluation). We draw on widely recognized standards for each function as listed in Table 5.2 and described by Lasswell (Brunner et al. 2005). Other researchers have arrived at conclusions similar to ours, for example, Cromley's examinations of grizzly bear and bison management in the GYE (Cromley 2002).

Intelligence (Planning) In the GYE, scientific managers typically strive to provide data on wildlife populations and ecosystem features, which are used to assess current events and create future scenarios. Relationships among important variables tend to be tested or examined in a reductionist manner, regardless of differing contexts. However, these data are often incomplete, poorly communicated to the public, and may not be trusted by all stakeholders. Moreover, data are typically used in a partisan, political fashion to defend the status quo. Consequently, the data do not offer a complete picture of the problems at hand in the GYE or their contexts, thus lacking in comprehensiveness and other standards of a high-quality decision process (Table 5.2). This leads to suboptimal decision process outcomes.

In contrast, a growing minority of practitioners uses an alternative approach—adaptive governance—in their planning activities. They focus on studying evolving relationships among people and wildlife in differing contexts as described below and in Brunner et al. (2005). Adaptive governance requires multiple methods and triangulation of data in intelligence gathering, approaches that extend well beyond those traditionally used by resource managers. Both qualitative and quantitative methods are used and integrated. Through this approach, context-specific information about the conservation issue is collected and made available to everyone who is affected or interested by the issue. Disseminating data and research findings to appropriate stakeholders is emphasized. In this way, practitioners satisfy the high standards of the intelligence function (Table 5.2), including dependability and comprehensiveness. Intelligence experts and citizens are also creative in their methods of finding and managing the facts. For example, in Jackson Hole, WY, a wildlife conservation group is turning to "citizen science" to collect information about wildlife movements.

Table 5.2 The decision process in two different management paradigms practiced by participants in the Greater Yellowstone Ecosystem

Decision process phase	Standards	Traditional management	Adaptive governance practitioners
Intelligence (planning)	Dependable, comprehensive, selective, creative, available	Intelligence comes only from positivistic science; not comprehensive, creative, or available	Comprehensive, inclusive, multi-method approach, intelligence may come from community
Promotion (open debate)	Rational, integrative, comprehensive, effective	Goals are viewed as single-target; overly selective (not comprehensive and fails to integrate multiple valid perspectives	Multi-method, comprehensive function; fosters active debate and open dialogue
Prescription (selection)	Effective, rational, inclusive, forward-looking	Single-authority decision making; not inclusive or forward-looking	Bottom-up selection process ensures inclusivity and effectiveness in terms of expectations
Invocation (enforcement)	Timely, dependable, unbiased, constructive	Central authority enforces prescription; often extremely provocative as participants protest	All participants fully involved in enforcement ensures rational invocation
Application (implementation)	Rational, contextual, unbiased, constructive	Only experts are qualified to implement policy; fails to be unbiased, litigation is commonly used	All participants establish method of mediation to ensure continued community support, is contextual
Appraisal (evaluation)	Dependable, continuing, independent, contextual	Appraisals typically not fully problem-oriented or contextual; focused on single quantitative goals; fails to account for social and historical context	Policies are appraised in light of the perspectives of all valid participants and of the common interest
Termination (exit)	Comprehensive, timely, dependable, ameliorative	Termination rarely occurs because of the permanent nature of government programs	Prompt termination of ineffective or conclusively successful policies, with comprehensive and ameliorative stakeholder input

Promotion (Open Debate) In the promotion process, participants dedicate themselves to finding solutions to problems, as they understand them. Typically,

resource managers make policy recommendations that center only on the biological or ecological aspect of the problem at hand. They tend to see goals as single targets, ignoring context in an effort to eliminate uncertainty, and these incomplete problem definitions come to dominate promotion and debate (Brunner et al. 2002).

Often, the conclusion is that further scientific research in needed. Restrictions placed on the kind, quality, availability, and use of information produces a promotional process that does not meet recommended standards of a high-quality activity (Table 5.2). This leads to suboptimal decision outcomes.

We did observe some practitioners who were working to promote more open and active debate about the issues and testing solutions different from those promoted by government officials. Some practitioners do so quietly, working through projects with locals, whereas others do so publicly through the media, community organizing, and political advocacy. Trying to bring together participants in open discussion and to secure common interest outcomes is a feature of adaptive governance (Brunner et al. 2002, 2005). For example, Mattson and colleagues brought diverse parties together in Bozeman, MT, in 1999 to find shared interests and common ground in large carnivore conservation (Mattson et al. 2006). Adaptive governance facilitates more integrative and comprehensive means to address relevant stakeholders' values, and it considers a wider range of alternatives. In this decision process function, people's values and interests, as well as other contextual considerations, are key. Ideally, through open dialogue and commitment, communities can develop a policy alternative that is supported by a broad spectrum of participants and likely to be rational, integrative, comprehensive, and effective in the long run.

Prescription (Selection) The prescription function is the part of the decision process that creates, selects, and enables rules and norms. Decisions are made and resources are committed. Decision makers have a large role in the prescription function as they determine whether new rules will complement those already established. Scientific managers in the GYE are involved in this part of the process through the creation of management plans, environmental impact statements, and other prescriptive activities, but these efforts usually do not include the full range of stakeholders and are therefore generally not effective at addressing issues of large-scale conservation. Failure to meet the expectations of all participants in decision making or to account for how social factors might influence those outcomes in the future leads to suboptimal outcomes (Table 5.2). Clearly, attention to people and their perspectives, including their expectations, is key to successful large-scale conservation.

People who use the adaptive governance framework, in contrast, influence the prescription function by creating an arena for dialogue so that prescriptions will meet people's expectations and not disrupt the community's standards of operation. Community standards include openness, fairness, timeliness, mutual respect, and more. Selection of a policy prescription using the adaptive governance framework integrates policy from both the bottom up and top down (Brunner et al. 2005). Solutions that are based in community initiatives as well as local knowledge confer respect for participants and establish inclusivity.

Invocation (Enforcement) This part of the decision process deals with the initial implementation of the new rules, or putting the new rules into effect, including enforcement (Table 5.2). For example, in the GYE, rules and regulations are formally promulgated and officials invoke them through making regulations and citations. Invocators look for violations of the new prescription, and these may be about poaching, off-trail recreation, and other illegal activities. These public order activities are typically visible to the public, especially as they play out in application (e.g., in the courts).

In contrast, adaptive governance seeks to use civic norms as much as possible to establish and invoke new rules, regulations, and policies. Community standards and norms are brought into play as much as possible, thereby reducing the need for official public order invocation. This is community-based conservation work at its best. Brunner et al. (2002) offer diverse examples of successful community-based conservation in the American West.

Application (Implementation) This function encompasses society's response to a new rule, ideally resolving disputes over how prescriptions will be implemented and under whose authority (Clark 2002). The management system in place in the GYE dictates that these activities emanate from a single source, namely, the government. Managers view experts as the only individuals who are qualified to implement sound management plans and bureaucracies as necessary agents to enforce plans. Therefore, disputes must be appealed directly to the centralized authority, often through litigation.

Adaptive governance instead places importance on the ability of community participants to voice their concerns about a policy or plan or the way it is to be implemented. This part of the decision process helps to establish a method of mediation so that new policies can be successfully implemented with continued community support. Throughout the implementation of new rules or policies, managers who incorporate adaptive governance create open dialogue between stakeholders—for instance, those involved in grizzly bear and wolf management issues—to allow for successful mediation between individuals or groups who may have doubts about a prescription or policy. The shortcomings of bureaucracies can be balanced by using community-based initiatives to ensure effective, constructive application and to bring people together.

Appraisal (Evaluation) Appraisal is vital for the success of conservation management and policy in seeking open and honest monitoring and evaluation of past actions. Too often, honest, independent appraisal is absent, resulting in policies that do not meet their goals and create rifts between participating groups. Independent appraisals are rare because they take a lot of time and experience to do well. Resources are often not available to support them. In the GYE, we observed little thorough appraisal of past decisions, policies, and actions from sources that were independent. Appraisal should be ongoing and available to anyone.

Appraisals typically fail to consider the context fully, that is, the interests of local communities, ranchers, hunters, recreationists, and other stakeholder groups, including the management agencies themselves (Clark 1993). This oversight adds

to feelings of alienation and marginalization on the part of some participants, engendering hostility toward some policy prescriptions and among individuals and organizations. A clear example of this is the "Aggregation" and "Vision" exercises of the federal government in GYE in the 1980s (Clark 2008). Some stakeholders observe that decision makers do not have to deal with the consequences and outcomes of their actions in their everyday lives.

In contrast, an adaptive governance approach holds the appraisal function as one of the most important in achieving success. With many previously implemented conservation plans not meeting their goals, appraisal can be difficult to navigate because many policy makers are reluctant to acknowledge their policy "failures." However, dependable, contextual appraisal is necessary in order to adapt policy so that it better meets its goals. Hobbs (2009, p. 2) says that "accepting failure and learning from it are an integral part of adaptive management."

Termination (Exit, Succession) The termination function is the cancellation or adjustment of (in)effective or (un)necessary policies. Policies that have been judged successful in reaching their goals can be ended, and policies determined to be harmful or ineffective can be replaced by new policies that the community has determined will be more likely to meet the common interest. Polices that are terminated because of their success may be diffused and adapted elsewhere (Brunner et al. 2005).

Official decision processes in the GYE have consistently failed to carry out the termination function according to high standards (e.g., the delisting of grizzly bears is one such example). This has led to many problems. Many factors account for the fact that failing policy prescriptions are exceedingly difficult to end, not least of which is the tenacity of those who have benefited from the prescription.

In contrast, adaptive governance calls for active, independent, timely, comprehensive, and ongoing appraisal as a basis for learning and determining when and how termination should occur. The examples described in our recommendation section below show how active learning can be used in ongoing, actual programs.

5.4   Common Interest Tests

Unless the common interest is set as the primary goal of management and policy, sustainable solutions to problems will be difficult to achieve. The common interest can be understood as an interest that is widely shared within a community of stakeholders and is demanded on behalf of the whole community (Clark 2002). Whether the common interest has been identified and secured in any natural resource decision-making process can be deduced through the application of three partial tests, applying procedural, substantive, and pragmatic criteria (Steelman and DuMond 2009). Data from the GYE cases that we learned about show that many decision processes fall short in all three tests of the common interest.

First, the procedural criterion asserts the need for fairness in the decision process by providing the participants with a sense of inclusivity, representation of their

interests, balance, opportunities to voice their views, and sound justification for any action taken. Although the traditional management system has aided recovery of species like grizzly bears and wolves, it has made little overall progress toward increasing inclusivity for all participants, especially those historically opposed to agency decisions, except in token, ritualistic ways.

Our appraisal suggested that the existing management framework is weak in maintaining openness, representation, balance, and fairness in granting participation of diverse interests. This precludes opportunities for people to voice their perspectives in meaningful ways in existing, authoritative arenas. For example, we heard from diverse people and interests, including scientists, managers, conservationists, and ranchers, as well as park officials, who recognized that not all groups are being fairly heard at present. The issue is of one of procedural fairness and clearly needs to be rectified.

Second, the substantive criterion tests whether an outcome meets the valid and appropriate expectations of all participants, as supported by data. Again, valid interests are those that are appropriate to the issue at hand (e.g., role of hunters in grizzly bear deaths) and supported by data saying that the issue is important (e.g., too many bears are being killed by hunters). This test determines the validity of the concerns that stakeholders express, inspecting whether claims are made based on broader community goals and evidence (Brunner et al. 2002). It also seeks to determine if people's expectations are valid given the content of the issue, the data, and the process at hand.

Our assessment revealed no data that showed that the authorities had attempted to determine the validity of concerns expressed by several individuals or groups. In many instances, authorities categorically dismissed claims made by valid participants. The management process in the GYE has been dominated by government agencies, with participation from the other groups being restricted to litigation, grassroots organizing, and commenting at public meetings, in other words, mostly antagonistic strategies. There has not been in-depth analysis of the validity of the concerns raised by stakeholders to test whether the common interest has been met.

Third, the pragmatic criterion calls attention to whether a policy is implemented well, tested to make sure it works, and adapted as needed in a timely fashion. A policy must be responsive and adaptable in achieving common goals as the context changes in order to satisfy the pragmatic test. Decisions must be carried out completely and in a manner consistent with the expectations of the participants in the decision-making process (Steelman and DuMond 2009). Congruency between stakeholders' expectations and their experience with a given policy is key to this test (Brunner et al. 2002). Those community members who approve a policy should experience its application in practice in a manner consistent with their expectations.

Our observations suggest that thus far in the GYE, too many management decisions have not been carried out in a manner appropriate to meet pragmatic standards. Several stakeholders expressed their dissatisfaction with the manner in which management decisions have been practically carried out in the GYE. Our field notes are full of examples from diverse officials and others who made this point. In the cases we examined, there was little evidence of the kind (or degree) of adaptation of

official policy that is needed. Cases exist where management and policy process and outcomes do not approximate common interest standards. In contrast, some people, mostly working outside formal governmental structures, are striving toward a more inclusive, open, participatory system of problem solving and decision making that does meet these standards and passes common interest tests (examples below). These practitioners of adaptive governance seek systematically to use a proven strategy—contextual, multi-method, and inclusive—to address challenges in the region.

5.5   Recommendations

Our rapid appraisal and follow-up work enabled us to gain as deep an understanding as possible of the issues at hand, recognizing that we are outsiders who spent a relatively short time in the arena. Conservation policy decisions within the GYE have clearly had unintended negative effects on community members and resources in some cases. Our recommendations here are designed to encourage common interest outcomes (Cherney 2011; Clark and Wallace 2012). In order to achieve more successful conservation, stakeholders must be willing to work hard at finding shared interests and building on them (Knight and Clark 1998). This requires creating arenas wherein people can work together to address problems of mutual concern (Cherney et al. 2009). Finding and creating arenas in which people can explore their concerns in respectful ways is key to improving management in the region.

5.5.1   Learn from Practice-Based, Prototyping Experiences

There are successful prototypes in the GYE and the surrounding region to learn from. Harvesting this experience will yield useful prototypical elements that can be diffused to other projects (Brunner and Clark 1997). For example, Glick and Clark (1998) describe the Beaverhead County Partnership, Madison Range Landscape Assessment and Adaptive Management Project, and the Henry's Fork Watershed Council as prototypes. These authors list common elements, including building social capital prior to working closely together, creating an arena for civic dialogue, giving stakeholders a genuine voice, recognizing the shared interests at stake, and focusing on monitoring and evaluation as the principal means to learn and improve.

Two other examples of successful prototyping that we discussed with people come from outside the GYE and offer lessons applicable to the GYE. First is the Blackfoot River system case (Wilson et al. 2006, 2014). Seth Wilson and others have been working with the Wildlife Committee of the Blackfoot Challenge near Missoula, MT, for years (Wilson et al. 2006, Wilson 2007; Wilson and Clark 2007). The Blackfoot Challenge is a landowner-based group that coordinates management of the Blackfoot River watershed, its tributaries, and adjacent lands. In 2002, the Wildlife Committee was formed in response to increasing numbers of grizzly bears, wolves, and other predators that were using privately owned valley bottom habitat

and creating concerns among residents, many of whom work in the ranching business. While working closely with ranchers and conservation groups, Wilson sought innovative, yet practical, measures to reduce conflicts with bears. He advocates long-term community participation in management of cattle and sheep. He told us that "folks who have been in [a conflicted locality] a while have a lot to offer" and that engaging them directly is essential.

His approach considers local residents as a valuable source of information about conflicts and trends, and he capitalizes on local insight to create prototype projects adapted to local situations (Wilson et al. 2006). These small-scale projects allow citizens and managers to find out what works in one situation and then adapt and sometimes scale up the prototype to create successful and mutually beneficial outcomes throughout a region. These efforts are combined with the use of a geographic information system (GIS) and mapping skills to build a creative framework that brings sound intelligence to the forefront and allows for adaptation and self-correction. The work of Wilson and his associates has been highly successful in reducing grizzly bear–livestock conflicts.

Second is a case in Banff National Park, Alberta, where Michael Gibeau of Parks Canada and his colleagues organized grizzly bear management workshops that took place over 2 years. These were designed to increase the skill level, contextual understanding, and problem-solving capacity of the participants (Rutherford et al. 2009; Oppenheimer and Richie 2014). Importantly, he sought to create opportunities for all involved to increase respect and to shape and share values. Gibeau created a new arena and a new social and decision process that worked at many levels. The workshops helped participants defuse the deeply polarized conflict, develop practical insight and a more comprehensive perspective on the grizzly bear management process, create mutual respect among participants, enhance trust, and increase cooperation directed at practical problem solving. The key to success in this case was improving the problem-solving skills of the participants. These workshops helped people to clarify and secure their common interests concerning several grizzly bear management issues, such as trail use.

These and other examples are a treasure trove of lessons waiting to be harvested and diffused throughout the region. In turn, lessons can be applied to other situations or adapted (Watters et al. 2014). This constitutes the practice-based, prototyping process.

5.5.2   Create New Arenas for Community-Based Participation

Participatory, community-based processes hold great promise for producing enduring practices for large-scale conservation cases (McLaughlin et al. 2005; Wilkinson et al. 2007). Action and dialogue should be interwoven so that citizens can make headway in solving practical problems (Primm and Wilson 2004). Workshops and fieldwork may be included as Gibeau and Wilson did in their cases.

Efforts by Steve Primm, who works in the Madison Valley, MT, on grizzly bear conservation and other issues, provide two more good examples (Primm and Wilson 2004). Primm works with individuals, agencies, and conservation groups through

practice-based prototyping, engaging in hands-on projects to facilitate coexistence between carnivores and people (Primm 1996, 2000). He has worked very closely with ranchers in the Madison Valley affected by conflicts for over a decade (Wilson and Primm 2005). He believes it is important to recognize that people's objections to carnivores are legitimate and valid and that, whenever possible, local people who know the situation best should design the solution. Primm's approach is based on a formula of long-term community participation, working with locals on their terms, in settings comfortable and familiar to them. He seeks to determine how respecting participants and encouraging them to find common ground can achieve conservation goals (Primm and Clark 1996). This formula is practice-based prototyping, constantly exploring opportunities for concerned people to develop successful processes for turning experience and reason into sound public management and policies (Primm 1996).

A second example is the Northern Rockies Conservation Cooperative (NRCC), based in Jackson, WY. This NGO works in the region and beyond, with projects and associates in Canada, Mexico, and other countries (Wilmot 2004a, b, 2005; Wilmot and Dixon 2004a). NRCC has been an organizational home for Seth Wilson and Steve Primm for the past 15 years as well as 20-plus other research associates working on diverse projects. Most use practice-based prototyping to address complex wildlife problems. Avery Anderson (2007) and her colleague Rebecca Watters (2007) worked with the ranching community in the Green River Valley of Wyoming on conflicts with wolves. Elizabeth Deliso, Jon Peterson, and Marian Vernon worked on elk management in western Wyoming (Deliso 2007).

NRCC was founded in 1987 and combines a commitment to human communities with scientific expertise through place-based, adaptive governance approaches (www.nrccooperative.org). According to its website, "This intersection between ecological science and social context is where NRCC makes its greatest contributions." Unlike most NGOs in the GYE or elsewhere, NRCC focuses on clarifying and securing common interests through prototyping. NRCC's goals are accomplished by analyzing complex management and policy problems, bridging science and policy for practical solutions, building trust and facilitating dialogue among diverse people and interests, creating learning networks for conservation practitioners, developing leadership and analytical skills in others, and fostering creative and interdisciplinary approaches to problem solving (Wilmot 2007a). Further, NRCC gives particular attention to improving the decision-making process and to developing conservation prototypes (Wilmot and Dixon 2004a, b). One of NRCC's projects is the Greater Yellowstone Conservation Directory (Northern Rockies Conservation Cooperative and Charture Institute 2007). It has helped organize the arena by making people more aware of each other's work in order to avoid duplication, increase collaboration, and use scarce resources more efficiently.

Jason Wilmot, the group's executive director for 10 years, is a wolverine ecologist. Wolverine conservation in the GYE is another potentially intractable controversy (Wilmot 2007b, 2008). Wilmot works as the field director of the Absaroka Beartooth Wolverine Project, which is a collaborative, large-scale conservation effort between Rocky Mountain Research Station, Yellowstone National Park, NRCC, and others. Beyond his research efforts to acquire a better understanding of wolverines and the

threats to their survival, he is trying to maintain a dialogue between conservation groups and the federal and state agencies responsible for the species' management. People like Wilmot, who function as "insiders," able to maintain a dialogue with all stakeholders, are well equipped to create an inclusive decision process and arena to improve management and develop stronger links between science and policy.

These people and examples are a few among others in the region. They are proving successful at adaptive governance and could be joined or replicated by others.

5.5.3   Adopt the Adaptive Governance Framework in Problem Solving

Our analysis, based on our experiences as well as literature on adaptive governance, strongly indicates that the situation in the GYE would be significantly improved through use of this more complete and practical framework. Adaptive governance emphasizes adjusting current decision-making processes to actual, on-the-ground situations. It also calls for continually evaluating whether those efforts and policy decisions are effectively moving toward enduring, common interest outcomes. Constant review and learning are keys to successful adaptive governance.

As a flexible framework for policy making, adaptive governance closely evaluates how policies are actually performing and affecting the community on the ground (Brunner et al. 2005). This bottom-up, contextual approach is proving more effective in achieving conservation gains than the traditional approach of scientific management. The use of scientific research, data, and technology as the foundation for environmental policy often lacks the holistic approach necessary to create sustainable and effective policy. Although science is critical in decision making, it alone is not an adequate basis for sound policy making (Pielke 2007). Adaptive governance addresses the politics and science simultaneously in pursuit of the common interest (Brunner et al. 2002).

An important step toward adaptive governance is to accept that the current governing policies are not adequately addressing many issues at hand (Brunner et al. 2005). Managers and policy makers need to realize that instead of using scientific data alone, ideal decisions stem from using scientific knowledge in addition to local and traditional knowledge (Wilkinson et al. 2007). Moreover, decisions need to be community based. This strategy upholds the idea that the common interest is an achievable combination of individual interests of the community.

One of the most important aspects of the adaptive governance approach is its commitment to reviewing management policies, adjusting them, or occasionally abandoning them for better ones. Management and policy can be modified as the context of the issue changes. Managing carnivores and natural resources in the GYE, for example, requires an ability to define what the problems are and to create decision-making processes that are inclusive, constructive, and balanced and that meet the three tests of the common interest. Successful management to date shows this to be true. The governance problems that exist in the GYE can only be addressed if parties are able to meet and work toward common ground solutions (Smith 2012; Yochim 2013).

5.6   Conclusion

Our rapid assessment showed that conservation management and policy, as evidenced in the programs we surveyed (e.g., grizzly bear and wolf management, snowmobile use, tourism, and others) and the people we talked with, are fraught with conflicting perspectives and contested problem definitions and are fueled by symbol inflation and politics. The participants whom we interviewed and read about described the need for a new, respect-based approach to management and policy. They recognize that science is essential and must be understood in the broadest context. They feel that a new problem-solving, multi-method, contextual approach could help defuse antagonism and gridlock in the many impassioned issues in the GYE today. We recommend a transition to adaptive governance as an overarching paradigmatic framework to address management and policy problems. This could be achieved by using the practice-based, prototyping approach proven to be successful through field trials, based on a growing number of successful examples carried out by creative, committed, and skilled people in the GYE (Clark 2008).

The promise of practice-based prototyping for identifying and securing common interest outcomes in the GYE lies in the fact that this approach provides a unique platform for creating a process that is more inclusive, capable of harnessing local knowledge and experience, and bridging the divide between science and the practical measures needed for effective conservation. This approach also fosters what is currently missing in the GYE—respect and pursuit of human dignity as an overarching goal. We see that adaptive governance can help participants in the region to work toward a practical, functional, and inclusive process to protect resources and values in this highly complex and symbolically charged, yet beautiful and widely treasured, ecosystem.

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Chapter 6
The Last Green Valley: Modernization and Sustainability in a Three-State Area

Mariana Sarmiento, Megan McVey, Matt Decker, Jonathan Peterson and Susan G. Clark

Abstract The Last Green Valley (LGV) was designed to achieve large-scale conservation by melding the needs of people and nature across a large landscape. Its roots are in the mandate by the US Congress to create a National Heritage Corridor in 1994. Despite development pressures, land and forest fragmentation, loss of farmland, urban and suburban sprawl, economic challenges for the region's citizenry, and funding difficulties for the several organizations working to protect it, the region is perceived as an "oasis." This problem framing has been helpful in focusing the public's and leaders' attention on the relative uniqueness of the LGV within a larger New England context. This chapter describes and analyzes the environmental, social, and management dynamics and challenges of the LGV. It also examines likely futures for the area and offers recommendations to accelerate progress toward environmental and economic sustainability. In doing so, we focus on three prototypes that offer a general strategy for large-scale conservation in the common interest. There is an opportunity to innovate more broadly and engage citizens, activists, universities, and political leadership more inclusively. Finally, leaders who are visionary, skilled, and knowledgeable, who understand various relationships and

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interdependencies in the community, are essential for future gains. These transformative leaders should be supported and encouraged to guide the organizations involved onto a path that seeks to identify and secure the common interest.

6.1   Introduction

Within the sprawling metropolitan Boston-to-Washington corridor lies the Last Green Valley (LGV)—a rural island of sorts, by day green with forests, fields, hills, and small towns, and from the night sky distinctively dark in the surrounding urban glow. The LGV comprises the Quinebaug and Shetucket River valleys of north and eastern Connecticut, south central Massachusetts, and a corner of Rhode Island. This relatively undeveloped, 2810-square-kilometer area is a local, regional, and national resource in terms of its biological and cultural features, and as such Congress designated much of the region a National Heritage Corridor (NHC) in 1994 (with expansion to its current size in 1999). It attracts people not only from Connecticut, but also from all over New England and beyond who want to experience the history and landscapes of the area.

Despite its biological and cultural uniqueness, over the past few decades the LGV's inhabitants—about 300,000 people in 35 towns—have been trying to secure a healthy future for themselves. According to US Census Data (2000), income for LGV inhabitants lags behind Connecticut's average, although median household income exceeds the national average. The percentage of the population in the workforce exceeds the national average, although education lags behind the national average. These conditions have motivated efforts to bring in businesses and economic activities to diversify traditional farming activities. At the same time, there have also been efforts to sustain the environmental quality of the landscape (Johnson 1982; Harvey 1989; O'Connor 1989; Cronon 1990; Zielbauer 2000; Smith 2003; Bryan 2004; Webber and Karlstrom 2008; Westa 2011). These initiatives reflect an effort by many individuals to maintain and enhance ecological processes and cultural resources by pragmatically balancing diverse interests, ranging from environmental and cultural conservation to economic growth.

Like many places around the world, the LGV is an area where diverse individuals with different values and interests are coming together over concerns for their future. This chapter describes and analyzes the environmental, social, and management dynamics and challenges of the LGV. We also examine likely futures for the area and offer recommendations to accelerate progress toward environmental and economic sustainability. In doing so, we focus on three prototypes that offer a general strategy for large-scale conservation in the common interest.

6.2   Methods and Standpoint

This chapter was prepared as part of a seminar under Susan G. Clark at the Yale School of Forestry and Environmental Studies in spring 2011. We used an interdisciplinary, policy analytic framework referred to as the policy sciences to guide our inquiries, assessments, and recommendations (Clark et al. 2000; Clark 2002). This framework offers systematic, empirical inquiry and integration of comprehensive information gathered about a policy problem. The approach includes integrating social and decision process mapping, problem orientation, and standpoint clarification (see Chaps. 1, 2, and 3).

6.2.1   Methods

We collected information based on our own observations and interviews while being contextual and problem oriented in our approach. First, we clarified the goals of residents and organizations operating within the region and later created a problem definition to describe the situations they face. Second, we identified key participants, along with the values they seek and the strategies they use to accomplish their objectives. This gave us a social process "map." Third, we examined the decision-making process to assess how the prescription—i.e., Congress's designation of the region as an NHC and various state and local policies and management plans—has been implemented. Fourth, we used these data to inform our analysis about what has occurred within the LGV and to describe the underlying conditions and causes of the present problems. Finally, we appraised LGV conservation efforts using three partial tests of the common interest (Steelman and DuMond 2009). Taken together, this approach allowed us to assess what was taking place within the LGV in functional terms and, more specifically, allowed us to make projections and provide recommendations to the active organizations in order to advance their common goals.

Information came from multiple sources. First, data collection was primarily conducted via extensive web-based research, focusing on organizations active in the region. We looked at scientific articles, reports, management plans, periodicals, and promotional materials. We reviewed the goals of more than 35 organizations that work in the region. Second, we conducted a 1-day field trip to the region in order to take observational field notes and conduct informal interviews with both residents of the LGV and also with individuals from the Green Valley Institute (GVI). These data were subsequently supplemented by two lengthy, in-person discussions with key participants. Several of the authors and our classmates made other visits to the LGV. The combination of observational and primary source data mentioned above form the basis of our analysis. Limitations to our analysis include the 3-month timeline of our seminar, during which we first had to become familiar with the region, our interdisciplinary approach, and devise methods, as well as attend to logistical matters. Finally, it should be noted that when we write about the geographical region, we refer to "the LGV," and when we speak of the Last Green Valley, Inc., we

refer to the nonprofit organization that manages the heritage corridor, otherwise known by the acronym "TLGV."

6.2.2   Standpoint

We presented ourselves as students seeking skills and experiences in interdisciplinary work. The LGV offered a unique opportunity to explore the challenges of large-scale conservation close to home (i.e., Yale University) and to learn how science, management, and policy can be successfully integrated. We aimed to be analytical, rational, integrative, reflective, and helpful.

We emphasized two overarching concerns in our work—human well-being or dignity, and sustainability of nature and human well-being, which reflect common ground, or shared interests. Large-scale conservation is only achievable when societies are healthy. The human and natural worlds interact in complex ways (Chaps. 1, 2, and 3), and the degree of dignity and sustainability in any landscape is dependent on this interaction.

Finally, our analysis and recommendations reflect our backgrounds in conservation biology, public policy, political ecology, and communications, as well as our experience in several countries around the world. This chapter is a group effort among authors and our classmates. Being explicit about our standpoint allows the reader to see our vantage point on the LGV project, and it also helps us identify our own biases in the analysis.

6.3   Contextual Overview

In order to understand the current environmental, social, and management dynamics and challenges of the LGV, it is necessary to examine the local context. This includes the historical, political, and economic forces and factors that have shaped the current situation in the region.

6.3.1   Environment

The LGV sits in the northeastern corner of Connecticut, southern Massachusetts, and a corner of western Rhode Island, where the last ice age 10,000 years ago left deep and well-drained soils (Fig. 6.1) and deposited erratic rocks across the rolling terrain. The valley's two watersheds, the Quinebaug and Shetucket Rivers, flow into the Thames River, which empties into Long Island Sound at New London, Connecticut. Portions of these rivers are also protected under the Clean Water Act.

Seventy-eight percent of the LGV consists of either forest or farmland. Forests provide wildlife habitat, income from forest products, and opportunities for
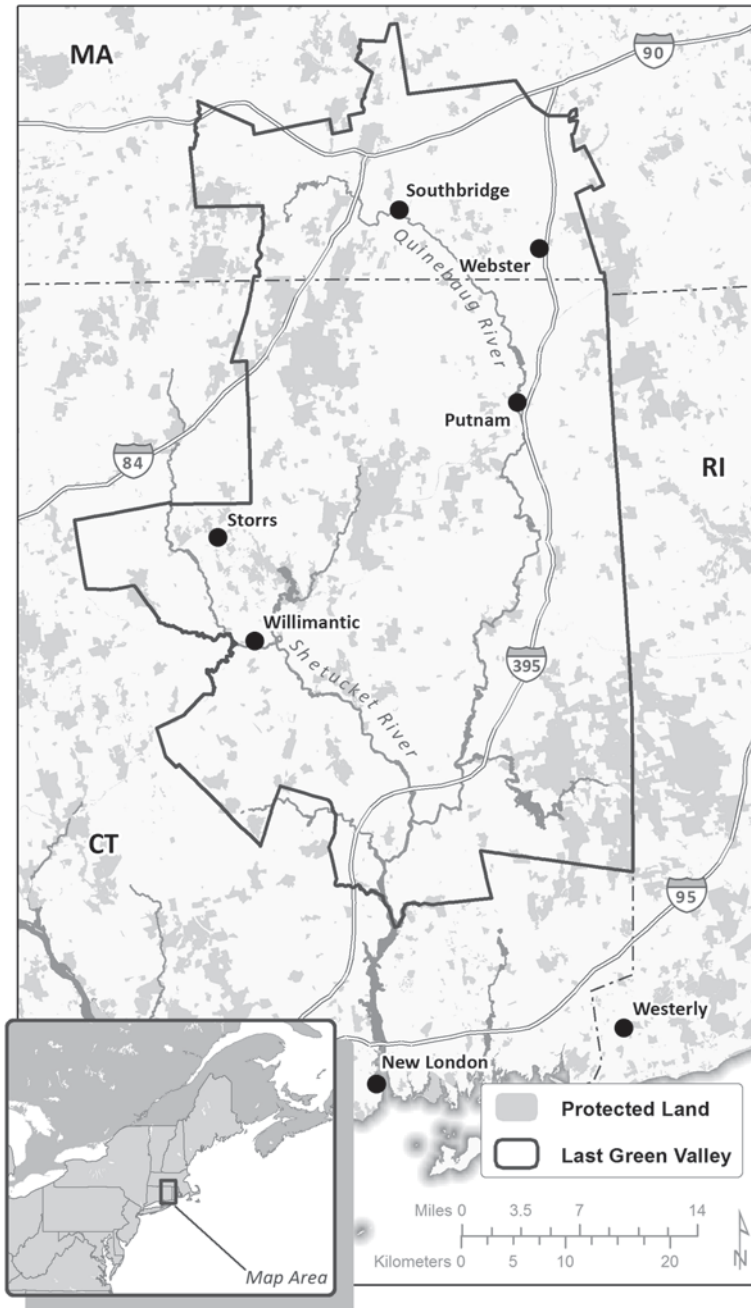
Fig. 6.1 Locations visited during the Last Green Valley study

recreation. The region was historically dominated by agriculture until the hurricane of 1938, after which a pattern of farm abandonment led to the reforestation of fields culminating in the even-aged oak-hickory stands seen today. The LGV provides critical habitat for several endangered species, including the southern bog lemming, timber rattlesnake, brown trout, bog turtle, fisher, peregrine falcon, and the New England cottontail (a candidate for the Endangered Species list).

Over the past few decades, farming in the region has decreased and deforestation is increasing as a result of development pressure. Declining forest and farmland cover resulting from land-use conversion may lead to increasing threats to wildlife, lower water quality, and other ecosystem function problems in the future.

6.3.2   Socioeconomic Dynamics

The LGV is made up of small town centers, many of which include a traditional New England town "common" or "green." Between towns, there are farms, parks, and houses, some dating back to the eighteenth century. Several important historical events in American history have occurred in the LGV over many generations. The area was originally home to Native American peoples and later experienced waves of European immigration and settlement. Remnants and relics from the Great Awakening, the American Revolution, and the Industrial Revolution are still evident in the landscape, including large mills that harken back to an era when textile production was the dominant economic force in the region (Bell 1989; Taylor 1989; Clark 1997). The LGV is an anomaly in the region's broader development pattern. Its open lands and green spaces have endured through time despite extreme patterns of urbanization across the northeast. There are many larger and more rural areas in the USA, but the LGV's proximity to areas of intense urbanization—only an hour's drive from three of the four largest urban centers in New England—is what has drawn attention to both its cultural and ecological heritage.

Symbols of early American history abound, including colonial symbols, water wells, old stone walls, red antique barns, homes that date back to the late 1600s, and colonial-style sheds and outbuildings. Whether authentic or modern replicas, these symbols are all components of the rural aesthetic playing out across the region, which evoke the values of respect, rectitude, and affection. They reveal a reverence for history and a loyalty to the American myth of rugged individualism, independence, hard work, and community. This ever-present expression of identity reveals a kind of nostalgia for, or even sentimentalizing of, a long colonial legacy. For example, one landowner reported selling an old stonewall on his property to wealthy newcomers so that they could display this iconic artifact on their property for aesthetic purposes. During settlement of the region, stonewalls were created by clearing the rocky soil for agriculture and pasture. Although the sale of the stonewall may be an isolated incident, it reveals that some in the LVG, in this case, newcomers, have a reverence for the historical aspects of the area. Traditional symbols were not as commonly seen in areas that departed from the rural aesthetic of the LGV (i.e., areas around strip malls, big-box chain stores, and franchised industries and services along major transportation corridors).

Today, the population of the LGV is racially homogeneous and older than the national average. According to US Census Data (2000), income in the region lags behind Connecticut's average, but median household income exceeds the national average. The percentage of the population in the workforce exceeds the national average, education lags behind the national average, and divorce rates exceed the national average. Looking at employment data in particular, health care and social assistance occupations are on the rise, whereas manufacturing occupations are steadily declining. Residents engaged in farming, forestry, and fishing have dropped from 1363 in 1990 to 519 in 2000, even as the total employed population increased. Both Democrats and Republicans hold power in local politics, and there is a sentiment among LGV residents that the two parties are essentially the same locally, except for differing opinions on education (Drinkuth and Westa, pers. comm., 2011).

6.3.3   Management and Policy

The LGV received federal recognition as the result of a grassroots effort initiated in the 1980s by the Quinebaug River Association (QRA) with the aid of US Congressman Sam Gejdenson. Congressman Gejdenson was concerned that Connecticut lagged behind the rest of the country in both the amount of land under federal protection and the amount of land available for recreation. He generated support for creation of the LGV NHC from state legislators and US Congress, successfully pulling resources from the National Park Service and Connecticut Department of Environmental Protection to initiate the process of creating a protected area. With the assistance of state and federal agencies, QRA researched ways in which the area could be preserved. They decided that an NHC would be the most appropriate vehicle, even though only three such corridors existed at the time. As QRA collected information to justify its creation, they also brought residents and visitors together through events such as the "Walking Weekends" series. These weekend hiking tours showcased the existing natural and cultural resources of the region. As the initiative gained strength, a formal committee, which incorporated QRA and other local organizations, was created to prepare draft legislation for the congressman. During this time, the National Park Service conducted a study of the proposed NHC. These events culminated in Public Act 103–449 in 1994, which was passed by Congress and signed by President Clinton, officially designating the Quinebaug and Shetucket Rivers Valley NHC (Last Green Valley Inc. 2010a, 2011a).

After the federal law was enacted, the Connecticut General Assembly passed a law to prepare a management plan for the corridor. Meanwhile, the grassroots committee that had led the effort was formalized as a member-supported, nonprofit corporation called Quinebaug–Shetucket Heritage Corridor, Inc. (QSHCI), which was then authorized to manage projects and funds received from the federal legislation. Although QSHCI was not given regulatory authority, it was given the responsibility to administer the management plan and produce planning documents. QSHCI created the management plan for the NHC that was first implemented in 1998. In 1999, Congressman Gejdenson, in partnership with Congressman Neal from Massachusetts, helped to reauthorize the QSNHC for another 10 years, increasing its funding

to US$ 1 million per year and expanding its boundaries to include ten additional communities. The management plan was expanded to incorporate the new political boundaries and the increase in financial resources.

As momentum grew behind the movement to preserve the LGV, the QSHCI became the Last Green Valley, Inc. (TLGV). The new name reflected the broader scope and geographic area of their work. TLGV maintained its nonprofit status and has taken on a significant role in grant-making to local organizations, towns, schools, and small conservation associations. TLGV also provides larger contributions to support staff in research and capacity building and to organizations such as the GVI. By attracting support from other organizations, TLGV leveraged four times their federal funding allocation in 2010, which helped to expand the impact of the organization's limited funds. Much of the organization's funding for operations and grants comes from the federal allocation of the National Park Service, representing approximately 80–85 % of the budget from years for which information is available (Last Green Valley 2008, 2009).

The local municipalities hold the decision-making power for local governance and land use. Each of the 35 towns in the LGV is involved in the land-use planning and zoning decisions that guide the management of the LGV and shape its future development. Because of their small size, many of these municipalities have minimal staff resources to manage their affairs. Some have a part-time planner, while others have no professional planner at all (Westa, pers. comm., 2011).

Overall, the LGV is a region that is experiencing profound change in terms of environmental, socioeconomic, and management dynamics. The traditional farming economy is transitioning as more people become employed in sectors such as the service and health care industries. These industries are not closely tied to the land, and residents fear that upcoming generations will not have the same affection and appreciation for the area. Residents are also fearful that their "oasis" is a magnet for development. "Our blessing is also our curse," one resident lamented. In 2015, Congress will likely terminate all funding for TLGV, which will jeopardize the implementation of the area's management plan. All of these changes have created uncertainty about the future of the LGV. The problem is how to continue implementing the management plan as financial resources dry up and residents' values and interests change. To get more insight into how to address this problem, we will examine what individuals and organizations are currently doing to overcome these challenges.

6.3.4   Conservation Efforts in the Region

As mentioned earlier, the efforts to consolidate the LGV have been led mainly by local actors who were able to make the region's designation as an NHC a reality and established the nonprofit TLGV partnership. While this nonprofit has been a catalyst of a significant portion of the conservation activities, other important organizations are the University of Connecticut, the GVI, National Park Service, Connecticut Department of Environmental Protection, Thames River Basin Partnership

(TRBP 2011), Eastern Connecticut Forest Landowners Association/Wolf Den Land Trust, and the chambers of commerce and conservation commissions of the different towns in the area. Ultimately, the LGV is a federal, regional, and local effort.

According to its mission, TLGV "works to enhance the region's significant natural resources in the context of a vital economy and regional cultural identity" (Last Green Valley Inc. 2010b). After reviewing the goals and values of more than 30 organizations active in the region including those above, we concluded that TLGVs' mission broadly encompasses many of the goals of other organizations as well. For example, the GVI (http://www.greenvalleyinstitute.org, accessed April 1, 2011) is a prominent organization that "exists to help communities and citizens in the LGV sustain their environment and quality of life while growing their economies." GVI is dedicated to "(1) improving the knowledge base from which land use and natural resource decisions are made, and (2) building local capacity to protect and manage natural resources as [the] region grows."

Other groups are also central to the overall conservation goal. For example, municipal entities, such as conservation commissions, are generally working to preserve natural resources in their individual towns using mechanisms such as flood control, land-use planning, and water quality enhancements. Other nonprofits focus on protecting and enhancing water quality in rivers and lakes or enjoying and treasuring the rivers and lakes. This implies a need for protection and enhancement efforts. The TRBP (www.thamesriverbasinpartnership.org, accessed March 16, 2011) is technically a quasi-governmental partnership that aims to: "(1) protect the region's agricultural and natural areas which are currently threatened by land-use changes, (2) protect ground and surface water quantity and quality which is currently threatened and degraded by contamination, (3) protect the region's biodiversity, and (4) improve the coastal zone resource conditions." Finally, cultural and historical preservation groups, such as Connecticut Landmarks, aim to foster interest and appreciation for the past by preserving and operating historic properties and museums. Friends-of-libraries groups in multiple towns hope to inspire an appreciation of local history through knowledge and books. Town-associated historical societies strive to foster an appreciation for history. Overall, the combination of these organizations' goals is based on widely shared values, such as well-being, affection, enlightenment, and wealth, and a shared concern that the LGV is under threat by sprawl and harmful development.

6.4   Challenges Ahead

As mentioned earlier, the LGV is experiencing change in terms of environmental, socioeconomic, and management dynamics that have created uncertainty about the region's future. The problem now is how to continue the initiative as financial resources dry up and as residents' values and interests change. This includes reexamining the role of TLGV as the major financial structure. A more detailed analysis of the dynamics of these social and decision processes and challenges will help clarify opportunities and guide how best to capitalize on them.

6.4.1 Social Process Dynamics

In the LGV, the demands, expectations, and identifications of individuals who make up the key organizations and leading sustainability efforts are diverse. These data enrich understanding of the context and add to our social process map. Traditionally, the population was mostly involved in farming, but now other service industries provide most of the employment. This has diversified residents' perspectives over the years, although a common demand for respect and well-being persists (Mattson and Clark 2011). The identifications of the diverse set of individuals further range over family, associations, community, state, and national symbols. Nearly all organizations (and individuals) expect that the strategies they are employing will fulfill their value demands, leading to greater enlightenment, affection, and well-being, among other values. Nevertheless, there is clearly a shared interest among them, not yet fully crystallized, to clarify, secure, and sustain the common good for their region.

At the organizational level, there appears to be a great deal of overlap between the perspectives and expectations of participants who lead organizations that are working toward specific, localized goals (e.g., preserving cultural history, forest health, wildlife conservation). Yet funding is centralized, with federal appropriations entering the region through TLGV and dispersed via grants. Most organizations in the LGV employ educational strategies to influence others and achieve their goals. They share information with residents, visitors, and one another. Economic and diplomatic strategies are also in play widely. For example, the towns of Oxford and Putnam recently used town funding to protect farmland and open space within their jurisdiction. Other municipalities, such as the Hampton Green Energy Committee, have used diplomatic strategies to negotiate policy solutions to problems in their town. There are few coercive strategies evident.

In terms of wealth, LGV appears to be struggling. Old town centers, such as Putnam (despite its thriving trade in antiques), have large sections that are gutted and abandoned, while new development sprawls along the broader region's major thoroughfares. However, there are no signs of overt and deep poverty (Drinkuth and Westa, pers. comm., 2011). Some economic stimulus is occurring in the form of mill redevelopment, and some towns seek to capitalize on the area's historical, natural, and cultural amenities by developing tourism.

Within the LGV, well-being (mental and physical health) includes caring about the quality and origins of food. This translates into caring for the small-scale farming and community gardening traditions in the area. The number of small farms is increasing in the region, and there is evidence that farmers' markets and the importance of buying food locally are important. Furthermore, the shift in employment in the health care services industry may indicate an increasing elderly population.

In the end, there is no impending natural resource crisis, heated debate, or other emergency. Despite changes in the socioeconomic conditions of the area and the pressure from urban development initiatives, the region has maintained its rural character with its forested and agricultural landscapes. Also, unlike other large-

scale conservation efforts, residents are not fighting over dam construction or decommissioning, or industrial and chemical-based agriculture, river pollution, and antidevelopment interests are not chaining themselves to bulldozers. Nevertheless, there is a distinct sense in many people that the LGV is slowly losing its unique rural character and that its natural resources are being degraded.

6.4.2 Decision Process Dynamics

The relative success of the LGV initiative can be attributed to the decision processes that people have used to organize and participate in policy making. The LGV decision process has made substantial gains in meeting participants' shared interests. All decision-making processes are made up of a number of interrelated activities or functions (e.g., planning, open debate, setting the rules or guidelines, implementation, dispute resolution, review, and termination/succession), typically performed in a complex, simultaneous mix, and all evident in the LGV project. A sound decision process that serves the common interest should be timely, factual, fair, inclusive, and more.

Our appraisal of the decision-making process revealed first that the rules or guidelines (prescriptions) for the LGV were broadly set by the US NHC legislation in 1994. The goal was to establish and conserve a nationally important protected area for ecological, cultural, and historical purposes. As part of the implementation and the refinement of rules mandating the establishment of the NHC, a formal Heritage Corridor Committee was formed as a subcommittee of the Northeast Connecticut Council of Governments. The committee incorporated the former subcommittee of the QRA and other grassroots participants. This inclusive process elevated the authority of the group and allowed its members to engage in the process of drafting the official, refined prescription that would then be presented in the US Congress. This inclusive process allowed the prescription to be harmonized initially with the rules by which the community already operated.

This prescriptive effort was logically complete in that it met five standards for good prescriptions (see Chap. 2). It was clear about the purpose and goals to be achieved, it specified rules to meet the purpose, it described the circumstances in which the rules would be applied, it laid out sanctions (Sect. 6.10), and provided financial resources for its implementation. As the prescription was drafted, the National Park Service conducted an independent appraisal of the region's history and resources. This prescription provided the authority needed to bring the NHC into being and signaled both the federal and state "control intent" to follow through on the ground.

Once the goal of establishing a national historical corridor was identified, the local QRA led an information gathering process and open discussion. The association began by researching ways to preserve the region's resources and bringing in outside agencies such as the National Park Service and the Connecticut Department of Environmental Protection. As the process to protect the area moved forward,

the association sponsored several events to acquaint residents and visitors with the resources that exist in the region. By undertaking these activities, participants began to engage in promotional activities in order to build public support and to clarify to the public the goals and the common interest efforts of the QRA.

These relatively successful implementation efforts resulted in LGV continuing to be described as "an unexpected oasis of peace and old-time nostalgia … deeply and profoundly green" (Last Green Valley Inc. 2011b). For example, TLGV has led activities to implement the NHC mandate to work with local universities and nonprofit organizations to generate and disseminate information related to land use and natural resources for a variety of interest groups. TLGV has also promoted a wide array of activities such as nature walks, farmers' markets, logging workshops, and historical tours, which focus on "inspiring a love of the region by younger generations." They help towns develop their master plans and provide the financial resources necessary for the implementation of many activities. TLGV activities have influenced how people outside the region perceive the LGV. Their work has also permeated how the LGV is perceived by those within the region who are making decisions about how their communities relate to natural resources and to the region as a whole.

Finally, monitoring, evaluation, and succession issues have not been given much attention to date. For example, appraisal has been limited to the disbursement of funds and development of documents and activities, but it has not been really conducted on the full suite of outcomes and possible shortfalls. This is evident in the TLGV annual reports and also in National Park Service documents. There is little evidence that any thorough, complete, dependable, or independent evaluation has been conducted as a basis for learning and improvement. Also, many of the so-called appraisal documents reflect a promotional focus rather than a genuine appraisal effort. Since appraisal is the chief means by which learning takes place, a full appraisal should include an assessment of the impact that the TLGV and other participants have had relative to the intent of the prescription. The termination or succession activity refers specifically to the process by which organizations evolve and adjust to changing conditions. When the public act was passed establishing the heritage corridor, its provisions came with a termination date. The expected loss of federal funding in 2015 demonstrates how this inevitable termination was inadequately addressed. As a result, TLGV has been forced to devote a lot of time to securing money to continue its existence rather than focusing on implementing its mission. Failure to tackle appraisal and termination can increase uncertainty and adversely affect implementation of the ongoing mandate established by Congress.

Overall, decision-making power (influence) is decentralized and in the hands of the municipalities and land-use planners. Within these municipalities, the responsibility for conservation and preservation efforts often falls to conservation commissions who have no regulatory authority. Instead, the commissions focus their efforts on gathering and analyzing environmental information about their towns (the learning, knowledge, and enlightenment value) in order (ideally) to serve as a reliable source of information for town residents. This condition limits the authority and impact that organizations such as TLGV have over land-use management decisions.

In the end, the LGV initiative appears to be at least partially successful. It has arguably prevented the uncontrolled spread of sprawl and land development in some areas. Of course, this is not something that can solely be attributed to the enactment of the 1994 law. Other factors such as isolation from major highways and railways and the decline of the agricultural activity have also contributed. Regardless, the LGV has established an arena and organized participants and activities to determine the future of the region. However, challenges remain and the current decision process needs strengthening. Specifically, decision makers should emphasize development plans based on a thorough appraisal of existing conditions while planning for a transition that is inclusive, comprehensive, and effective (Clark 2002).

6.5   The Policy Problem

The problem, in brief, is that the LGV seeks to preserve the open space, farmlands, and the traditional livelihoods of people in the area, yet there is evidence that these goals are not being met and there is a feeling of uncertainty about the future. Building unity and sustainable planning at the regional scale has become a significant challenge.

To provide insight into how the implementation of the LGV initiative can be improved, we analyzed the process from the perspective of the three tests of the common interest. These tests apply procedural, pragmatic, and substantive criteria (see Chap. 2) to current policies in the LGV (Clark 2008). The procedural test examines whether participation was inclusive, open to broad participation, and responsible. The substantive test focuses on whether the valid and appropriate expectations of participants are met through the current decision-making processes. Finally, the pragmatic test asks whether the process is responsive and adaptive to changing contexts. Overall, the record is mixed. A limited amount of natural resource conservation has been achieved, although landscapes continue to be fragmented and the economic conditions of the people in the area do not appear to be improving. At the same time, the process appears to be procedurally adequate in that there are a multitude of interests and organizations participating in the process. However, while there are many organizations working to help specific towns and localities, there is an absence of a collective vision and practical strategy. Because no organization in the region is fully representative of all participants, some stakeholders are not included in the social and decision processes in the LGV. Also, there is no arena in which the regional-scale concerns of participants can be incorporated in the process. As a result, the expectations of many participants are not met and therefore the process is not pragmatically adequate. Perhaps this is because many of the efforts are focused on promoting the LGV (e.g., Vision 2020) rather than focusing more on the development, implementation, and appraisal of an all-inclusive strategy to achieve regional environmental, economic, and cultural sustainability.

6.6   Recommendations

We offer specific prototyping and strategic recommendations we believe can help to bring participants together through tangible and visible actions. Both general and specific suggestions represent a combined strategy that can help advance the shared goals and expectations of the multiple participants.

6.6.1   Prototyping Recommendations

Our first recommendation is directed toward organizations working in the LGV on issues related to environmental and cultural conservation and economic development. We suggest these organizations identify, learn, and adapt based on examples of successful innovations used by other conservation groups within the LGV and elsewhere. Innovative and enduring initiatives require individuals who have the incentive and authority to change, institutions that support these changes, and consideration of cultural factors in order to frame opportunities and create awareness of what will be appropriate (Steelman 2010). This can be achieved through prototyping, which is a strategy to intervene in complex situations, as a basis for learning, and a way to accelerate tangible gains. Prototypes are often used to test large-scale regional solutions at a smaller scale and are an essential part of the learning and adaptation process (Clark et al. 2002). Organizations working in the LGV have already learned from several successful prototypes.

One example is the effort to build sustainable communities and sustainable environments in the LGV through the "Corridor Circuit Rider." This program resulted from a partnership between TLGV and the University of Connecticut Cooperative Extension System (CES). When the NHC Management Plan was complete, it became clear that the Cooperative Extension System and TLGV (formerly QSHC) had overlapping missions with regard to land-use and natural resources management. As a result, discussions between the two organizations led to the creation of the Corridor Circuit Rider (CCR), a full-time extension educator, housed at the local extension office and jointly funded by the University of Connecticut CES and the QSHC. The Circuit Rider would design and implement educational programs within the LGV area (Godin and Broderick 2001). With time, other organizations, such as the Nature Conservancy, have joined the partnership. Current activities include (1) weekend retreats to help people learn about natural systems and how community land-use decisions affect natural resources, (2) using geographic information systems (GIS) for natural and cultural resource inventories and co-occurring resource analyses (e.g., additional unfragmented, open space blocks of land), and (3) teaching individuals and communities what this information means and how to use it in their local planning, land-use decision making, and work. The CCR also helps conserve family-owned land parcels and have thus far permanently protected more than 4000 acres. They conduct land-use seminars that examine land-use economics and project land-use development, often involving local and nationally known experts.

These activities help landowners and land-use planners decide on whether to use traditional development layout or conservation subdivisions. It also allows them to look at the benefits and costs of using traditional commercial development models, including the specific costs to the rural character of the LGV. Finally, this arrangement allows them to explore alternatives for village and community development designs in order to create local development initiatives that incorporate environmental, cultural, and economic concerns.

Another example is the Quiet Corner Initiative prototype. This joint effort involves Yale University's School of Forestry and Environmental Studies, the Connecticut Forest and Park Association, and the Eastern Connecticut Forest Landowners Association/Wolf Den Land Trust, along with private landowners. The decision-making process surrounding conservation in the LGV involves landowners, local governments, state and federal governments, and nongovernmental organizations. The partnership recognizes that private landowners in northeastern Connecticut often have good intentions for natural resource management on their properties, but economic factors create a strong incentive for sale and development of forestland. To address this issue, "the QCI supports strengthened local livelihoods, increased forest health, and rural economic development for the long-term benefit of the land and those that live on it by providing knowledge, energy, and expertise to our partnering landowners and organizations." (Quiet Corner Initiative 2014, A. Barrett pers. comm. 5/3/11, R. Campbell pers. comm. 3/3/11). The goals of the partnership are to (1) ensure forested land around the Yale-Myers Forest remains in timber management, (2) share management and silviculture expertise on a regional scale, (3) establish research plots outside Yale-Myers in order to monitor area long-term ecological data, and (4) build relationships with surrounding landowners.

This prototype was started by the Yale School of Forestry & Environmental Studies and is designed to target landowners of small forested parcels that are at the greatest risk of being developed. Four land parcels were targeted in the initial phase. The partnership created a new arena and helped organize a new social and decision process to help landowners meet their value demands. The partnership's collaborative efforts created social capital among landowners and provides them with necessary tools to sustain their way of life and protect the natural resources on which their livelihoods depend. The initiative differs from other conservation efforts in that it is associated with a highly localized anchor institution (Yale University) that has specific skills and expertise that increase chances of success. Thus far, it has been highly successful.

The other two prototypes in the LGV, the Borderlands Project and Mill Redevelopment Project, focus on improving sustainability and development in the region. The Borderlands Project, based in Willimantic, Connecticut, is led by the Nature Conservancy and funded in part by the Orton Family Foundation. The Borderlands Project "aims to build greater awareness for the unique assets of the rural area that spans the Connecticut-Rhode Island border, explore the shared threats and opportunities that this region faces, and foster a culture of learning and collaboration across this bi-state, multi-town, multi-scale region" (http://www.borderlandsproject.org, accessed April 29, 2011). As part of the project there were two pilot "Heart and

Soul Visioning" exercises conducted in the towns of Killingly, Connecticut, and Exeter, Rhode Island. These exercises helped bring disparate participants together to create a unified town vision that reflected the different perspectives and values of people living in these towns. With the help of professional facilitation, the pilot projects helped participants disclose their interests, understand one another's identities, expectations and demands, and ultimately develop a unified goal for each town. In short, it created a physical and intellectual space for exploring the shared interest. In Killingly, where a long history of conflict between pro-development and pro-conservation interests prevented effective natural resource governance and economic growth, the Borderlands visioning exercise helped bring the two sides together to find more common ground than anyone originally thought existed. As a result, community engagement became a priority and all participants become more interested in innovative approaches to community growth and conservation.

The second sustainability and development prototype in the LGV is the Mill Redevelopment Project, based in Willimantic, Connecticut. Once called the Thread City, Willimantic was home to the American Thread Company mill, which in 1890 employed one-third of the town's residents. At that time, American Thread was producing 85,000 miles of thread per day and at its height the Willimantic mill was the largest factory in Connecticut (Mill Museum 2011). Unfortunately, the American Thread Company mill in Willimantic closed in 1985 when the mill relocated to North Carolina and subsequently to Mexico. After the thread industry collapsed, the Willimantic government dissolved and the town was folded in as a subsection of the town of Windham. Recognizing the mill as a symbol of the region's cultural and economic livelihood, the community endeavored to redevelop the building so that it could provide economic development while maintaining its structure and cultural significance. The mill was recreated into a nonprofit educational institution housing a museum, a library, and an archive. The museum preserves and interprets the history of the textile industry, and it also promotes greater understanding of major trends and changes in technology, economy, society, and environment that shaped Connecticut, New England, and the USA from the colonial period to the present (Mill Museum 2012). When the Windham Mill redevelopment project was conceived, it was expected to generate approximately 1200 jobs (Environmental Engineering Program 1999). Although the Windham mill redevelopment project saw a slow start and is not currently occupied to its maximum capacity, it has become a symbol of both economic and cultural vitality in the LGV (Zielbauer 2000). The Windham project and others like it in the region have helped revitalize retail and commercial investment in downtown areas, thereby serving as a nexus around which social capital can be rebuilt in an otherwise suffering region.

There are many other prototypes in the LGV focusing on topics as diverse as farmland protection, food production and agriculture, community building, education, art and crafts, tourism, land uses, and wildlife conservation and other sectors. These need to be identified, studied, and the lessons widely shared, so that they can be adapted and put to practical effect more broadly. Each prototype is an opportunity to learn and improve; the prototypes described above are examples of innovative endeavors where individuals were given an opportunity to come together in order

to bring economic development to the region, and at the same time remain aligned with the cultural context.

6.6.2   General Recommendations

The multiple prototyping examples described above reveal that, in general, more practice-based approaches should be used in the LGV. They are in essence demonstration projects that create tangible gains visible for all to see. They speak louder than words. Leaders should continue to ground their efforts and messages in demonstration-based projects. Successful stories should be widely shared. When taken independently or together, these practice-based efforts can inform higher-level decisions from the bottom up (Brunner 2010). The promotion of successful practice-based approaches that facilitate effective social and decision processes provide our greatest hope for long-term sustainability in the LGV. Leaders need to be more strategic and problem oriented in order to make greater and more substantial gains toward the overarching goals, and practice-based approaches should be central to their efforts.

The second general recommendation is to create new or strengthened partnerships around themes, such as finding alternative sources of income for farmers, foresters, and organizations. Additional resources can help organizational resiliency, sustainable agriculture, and environmental education. More arenas must also be established in which practice-based approaches are promoted. In addition, a comprehensive appraisal of what has already been accomplished in the region is needed. A well-thought-out termination/transition strategy would also help key organizations better survive in the absence of outside funding. All organizations must secure strong and strategic leadership that can guide future regional work.

The third recommendation is for everyone, especially leaders, to adopt the principle of "adaptive governance," that is, flexible, inclusive decision making focused on identifying actual problems and addressing them. Adaptive governance allows for the adaptation of social and decision (policy) process to varied contexts and problems. This, in turn, helps to promote common interest outcomes (Brunner et al. 2005). When implemented on a small scale, adaptive governance allows for the simplification of the research, implementation, and actions required to maintain a problem-oriented perspective. In other words, when put in practice in a locally grounded situation, adaptive governance promotes effective social and decision processes that drive sound policy decision making (Brunner 2010).

In sum, these recommendations can help individuals and organizations think more explicitly about goals, bolster organizational effectiveness, and promote active learning and adaptation. These strategies can result in greater resiliency in the local economy, the creation of more private–public partnerships, and generation of income from tourism, mill restoration, and other sources. These strategies translate into effectiveness on the ground, the only place that really matters. Leaders who are visionary, skilled, and understand the interrelations and interdependencies in the LGV can capitalize on these strategies to good benefit.

6.7 Conclusion

The LGV was designed to achieve large-scale conservation by melding the needs of people and nature across a large landscape. Its roots are in the mandate established to create an NHC in 1994 by the US Congress. The project seeks to "enhance the region's significant natural resources in the context of a vital economy and regional cultural identity" (Last Green Valley Inc. 2011b). Much work remains to be done. However, through the good works of many individuals and organizations, the region is currently perceived as an "oasis" amid outside-driven growth and urban pressures. This problem framing has been helpful in focusing the public and leadership's attention on the relative uniqueness of the LGV within a larger New England context. Despite these accomplishments, development pressures continue, as do land and forest fragmentation, loss of farmland, and urban and suburban sprawl. In addition, funding difficulties have created uncertainty about future work for the LGV project. Nonetheless, these funding limitations should not be seen as entirely negative. There is an opportunity to innovate more broadly and engage citizens, activists, universities, and political leadership more inclusively. This chapter helps frame the challenges and offers both general and prototypical recommendations for future work. Finally, leaders who are visionary, skilled, and knowledgeable, who understand various relationships and interdependencies in the community, are essential for future gains. These transformative leaders should be supported and encouraged to guide the organizations involved onto a path that seeks to identify and secure the common interest.

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Part III
Participant Observations

Chapter 7
Conserving Trail Corridors: The Pacific Crest National Scenic Trail

Elizabeth Thomas

Abstract Recreation-based land conservation provides numerous benefits for recreationists, local communities (by attracting tourism), the ecosystem (by protecting habitat), and migrating wildlife (by establishing corridors). This study examines the social and decision process along the Pacific Crest Trail (PCT), a 4265-km-long hiking trail beginning at the US–Mexico border and ending at the US–Canada border, and the trail's 1.6-km-wide corridor. The trail enters 3 states, 7 national parks, Native American sovereignties, 25 national forests, 33 wildernesses, and at least 73 towns and is subject to the local, state, and federal restrictions and regulations of each jurisdiction. This study of the PCT appraises land use decisions along the PCT as they apply to meeting the common interest and advancing human dignity. Using the policy sciences framework, this case study examines the trail through a problem-oriented approach and concludes that decision making can better meet the common interest by further engaging participants at the local level and taking a bottom-up approach. In order to ensure that decisions regarding the public land and the public resource of the trail meet common interest goals across the range and scale, it is proposed that participants should engage in many localized, community-based, adaptive governance models based on interactive participation among all stakeholders. Many small-scale prototypes can serve as adaptive governance models for implementation along a national scenic trail.

Keywords Large-scale conservation · Trails · Recreation · Conservation · Land management · Public lands · Forest service · Gateway communities · Public–private partnership · Adaptive management

7.1 Introduction

The Pacific Crest Trail (PCT) is the longest completed hiking and equestrian trail in the USA. Its goal is to conserve a strip of land 4265 km long and 1.6 km wide connecting California, Oregon, and Washington for recreational use (US Forest Service 1982, 2014; Pacific Crest Trail Association 2010; Alta Planning 2008). The PCT

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was established by the National Trails System Act of 1968, which governs federal agencies and nonprofit trail organizations in establishing and administering specially designated long-distance hiking trails and their corridors. The PCT's corridor traverses 8 national parks, 2 Native American sovereignties, 25 national forests, 49 federally designated wilderness areas, and 7 Bureau of Land Management districts. It is subject to local, state, and federal regulations in each jurisdiction. At least 73 towns are in or close to the corridor, and >1000 privately held parcels lie within the corridor itself (Alta Planning 2008). The trail's natural beauty, topography, and design attract users from around the world to venture both short and long distances on it. However, managing large-scale trails poses many strategic and practical problems. Although this study focuses on how best to work with communities along the trail, it is but one of many challenges practitioners face. Despite the PCT's national prominence and size, almost no literature explores how different participants work, live, and play on and near the trail, or how these groups interact with each other and the natural environment.

This chapter is a case study that examines the PCT using a problem-oriented analytic approach. It examines persistent problems with the decision process in the current system, including the lack of an arena for decision-making discussions, unclear authority and control of decisions, and the scientific management paradigm that informs decision making. It makes recommendations, elaborating on practice-based actions and existing prototypes in place along the PCT and on other trails within the National Scenic Trail System. The objectives are to aid all people associated with the PCT to identify, clarify, and sustain their common interest by exploring areas where conservation opportunities, economic development, and human dignity can be realized.

7.2   Methods, Study Area, and Standpoint

Trail management policy faces similar challenges to the ecosystem-based, large-scale conservation projects discussed elsewhere in this volume, i.e., deficiencies in social and decision-making processes that threaten future conservation. To clarify and address these weaknesses, I use multiple methods and a problem-oriented approach, relying on grounded theory and contextual data collected over 2 years (2008–2010). Grounded theory is a social science research method where a connection between theory, data collection, and analysis allows for a broad picture of the situation to be developed, and adapted, by piecing together patterns of evidence emerging from the data (Glaser and Strauss 2009; Yin 1994). "Policy" refers to the social interactions between participants that lead to decisions, including who can make decisions, when and how they can be made, and how they play out on the ground (see Chaps. 1, 2, and 3) (Lasswell and McDougal 1992).

7.2.1   Methods

Research, analysis, and recommendations are based on the interdisciplinary policy sciences framework, which provides a method for approaching complex problems using case studies (Chaps. 1, 2, and 3; Clark 2002). I examine the social processes associated with the PCT by (1) identifying participants and their perspectives as associated with biogeographic, socioeconomic, historical, and cultural aspects of participants and the trail, (2) evaluating strategies used by participants, and (3) determining outcomes and effects experienced by these participants. I focus on the social and decision process functions inherent in trail management policy by considering how participants understand and gain information, how groups promote their causes, and how decisions are authorized and implemented. I then discuss whether or not these actions meet the common interest.

Prior to fieldwork, I conducted a literature review of federal, state, and local regulations, trail management plans, and organizational and promotional documents and websites. I searched major and local newspapers for references to the National Scenic Trail System and the PCT. Internal publications were also collected at conferences and through requests to agencies. Because the topic has not been extensively explored, professional journals were used for theory and to find parallels with case studies unrelated to trails. Among them, I examined literature on social and decision-making challenges associated with large-scale conservation, especially related to migrating wildlife, watersheds, and ecosystem management. Unpublished dissertations on trails were used to corroborate on-the-ground findings.

In 2009, I interviewed representatives from eight trail organizations to learn the history of the National Scenic Trail System as well as standard management practices for long distance trails. During summer 2009, I traveled in the PCT corridor for 133 days, covering an average of 33.8 km per day. I spent a week without travel to intensively interview local people in California's Sierra region. I was both an observer and participant. I sought to build trust among participant groups to learn their perspectives. That fall, I conducted follow-up interviews. In total, I conducted 97 semi-structured interviews with participants along the entire length of the corridor, including nonprofit representatives, federal land managers, local business people, municipal officials, people living near the trail, rangers, trail activists, foot and equestrian long- and short-distance users, and local land owners. Contacts were recruited through a combination of people encountered along the trail and snowball sampling.

In winter 2010, I attended a meeting for the National Scenic Trail System in Washington, D.C., where I conducted 26 interviews with local trail managers, trail organization representatives, land trusts and conservation managers, and trail-related agency officials, all of whom make decisions about the trail. These empirical data inform my description of the trail's challenges, my analysis, and my recommendations. To verify reliability and identify patterns, I triangulated oral, written, and historical data against other sources. All interviews were conducted in accordance with the Yale Institutional Review Board's policies. To maintain source confidentiality, quotes and identifying information in this chapter are given only at the regional level.

7.2.2 Study Area

The PCT, completed in 1993, was 4274 km long in 2009 at the time of my fieldwork (Schaffer 2003a, b, c). Over 1609 km of the trail are on federal land, with 402 km traversing private land through trail rights-of-way or easements on privately held parcels (Larabee 2008). Other parts of the trail are on state or locally protected lands or in American Indian reservations.

The PCT crosses land rich in natural and cultural history (Fig. 7.1). The corridor includes important watersheds, especially in the Sierra, where up to 80 % of California's surface water originates (UC Berkeley Research News 2010). Home to numerous endangered species, including the mountain yellow-legged frog, it is one of the most geologically diverse trails in the world (Pacific Crest Trail Association 2010). The PCT also has historical significance as it winds through pioneer paths, old mining claims, and logging concessions and projects constructed by the Civilian Conservation Corp, which also constructed parts of the trail itself.

The PCT's southern terminus is the US–Mexico border in Campo, CA. In southern California, it follows the Laguna, San Gabriel, San Bernardino, Liebre, and Tehachapi mountain ranges through high semi-arid deserts and lower sections of the Anza Borrego and Mojave Deserts. From there, it enters the Sierra Nevada mountain range, crossing its highest point at Forrester Pass (4009 m) in Kings Canyon and Sequoia National Parks. Here, the forest ecology changes with elevation between alpine and subalpine meadows and coniferous forests. The trail travels through Yosemite National Park and north through chaparral zones to the crest above Lake Tahoe. In northern California, it travels through Lassen Volcanic National Park, entering the lava and cinder-cone dominated Modoc Plateau and wanders through the Sierra Nevada's mixed conifer and lower montane forests. The trail follows the Klamath range into southern Oregon and on to Crater Lakes National Park. In Oregon, it contours several notable volcanic mountains, including Mt. Hood. The trail reaches its lowest elevation of 52 m at the Columbia River. In Washington, the PCT enters temperate rainforests and coniferous forests near Mt. Rainer National Park, occasionally reaching alpine tundra at higher elevations. The trail's northern terminus is at the US–Canada border where North Cascades National Park meets Manning Provincial Park in British Columbia (Schaffer 2003a, b, c).

7.2.3 Standpoint

My standpoint is based on my experience working on conservation in academia, professional experiences including government and contract positions, and in conducting field research on public lands worldwide over the past 10 years. These factors influenced the data that I chose to collect, my analysis, and recommendations. My standpoint was also affected by my nonresearch-related experiences recreating in the outdoors, including hiking numerous long-distance trails such as the PCT, Appalachian Trail (AT), and the Continental Divide Trail. Thus, my grounding
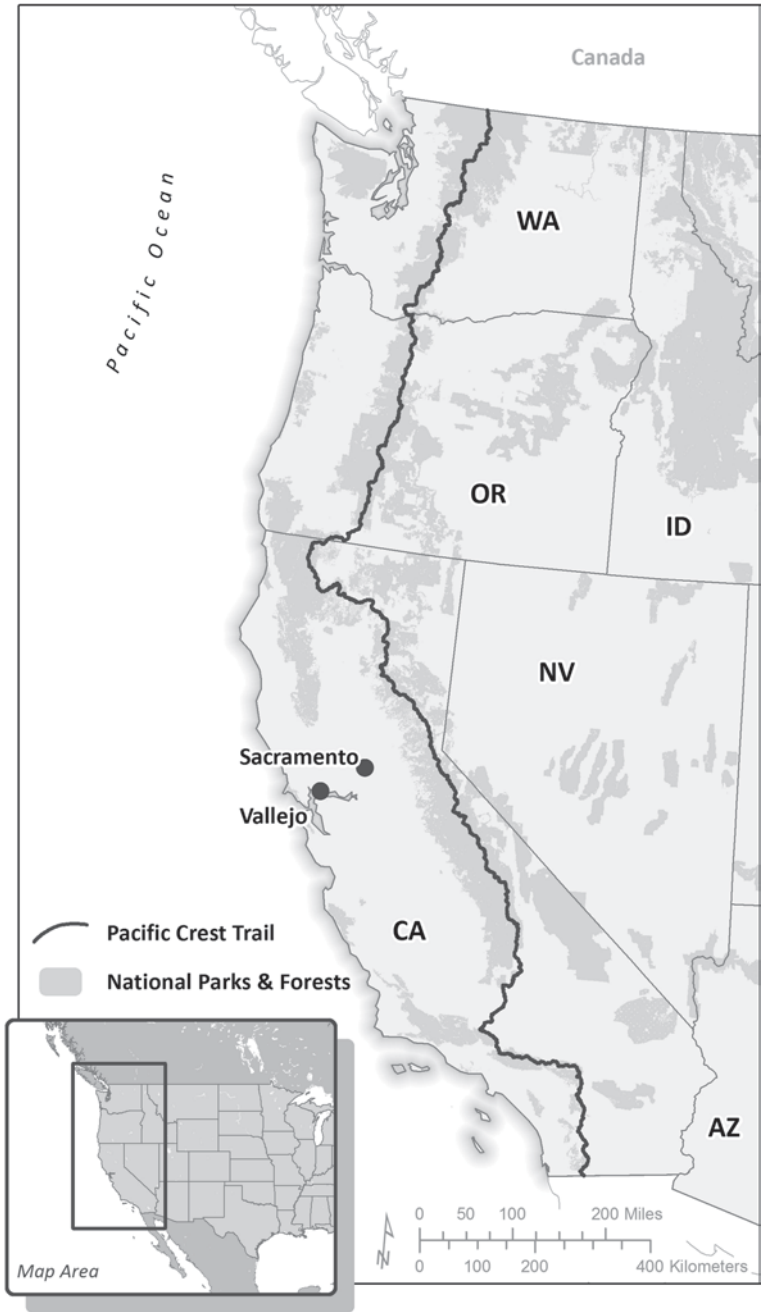
Fig. 7.1 Map of the Pacific Crest Trail study area

comes from a mix of practical, professional, and academic experiences, which gives me the background and understanding of the multiple perspectives and complex realities inherent in this project. My goal was to research how the PCT is currently managed and whether its management embodies common interests. I seek open, collaborative, inclusive, and contextual procedures to identify and define problems and realize effective solutions.

7.3   Contextual Overview

Current environmental, social, and management decisions and problems along the PCT are rooted in its history, legal requirements, and different social, economic, and political factors.

7.3.1   *History of Trail Policy*

Recreation-based land conservation and long-distance hiking trails started in the 1920s with Benton MacKaye's dream of the AT, a footpath that currently runs 3509 km from Georgia to Maine. The AT was the first regional planning project designed to "improve people's lives through development and stewardship of natural resources" (Wellman et al. 2008). MacKaye envisioned the trail to develop "communities, shelters, food, and farm camps where people could work together in common cause," and where the natural environment was used as a basis for achieving the "social and material needs of people" (MacKaye 1919; Anderson 2002).

On the other side of the country, Catherine Montgomery and Clinton C. Clark proposed the PCT to combine the extant trails—the John Muir (California), Skyline (Oregon), and Cascade Crest Trails (Washington)—with the forests and national parks on agency-owned land. The Pacific Crest Trail System Conference was founded in 1932 with support from a federation of local hiking clubs. The Sierra Club, YMCA, Boy Scouts of America, and others also lobbied for linking the trails (Schaffer 2003a, b).

In 1968, the National Trails System Act designated these trails as paths that provide "maximum outdoor recreation potential … and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the area" and formalized the AT and PCT under the National Scenic Trail System. Further amendments mandated a public–private partnership between federal agencies and a nonprofit trail organization for each trail (National Trails System Act, Public Law 1241–1251, United States Code 16, 1968). This idea extended the role of the volunteer groups already involved with scouting and construction of the trails. For the PCT, the United States Forest Service (USFS) serves as the lead federal agency. Since 1993, its nonprofit partner, established through a Memorandum of Understanding, has been the Pacific Crest Trail Association (PCTA), a descendent of the Pacific Crest Trail System Conference.

Following the passage of the 1978 National Trails System Act amendments, the National Park Service and Forest Service were given federal money for land acquisition expanding on the powers given to public agencies to acquire private land for public uses by the 1911 Weeks Act and the 1924 Clarke-McNary Act. Additionally, the National Trails System Act granted agencies the right to condemn private property (eminent domain) along the trail (National Trails System Act, Public Law 1241–1251, United States Code 16, 1978). This method of nonvoluntary acquisition was occasionally used when landowners refused to sell voluntarily (Lloyd 1990), although this practice happened more frequently on the AT than PCT. One reason for this trend is because the AT received more funding and human resources for land acquisition than the PCT. More recently, land managers on both trails have instead relied on voluntary land conservation strategies to protect the corridor, a process made possible by the Federal Land Policy and Management Act of 2000. Land trusts and the USFS, rather than the PCTA, normally handle establishment of trail easements and rights-of-way.

7.3.2   Socioeconomic Dynamics

More than 73 towns in the PCT corridor are frequently visited by trail users. The PCT even goes through the heart of some towns, such as Agua Dulce, CA. Others, such as Idyllwild, CA, are connected to the PCT by side trails. Still more towns, such as Etna, CA, can be visited by users who hitchhike, take buses, or use shuttles or taxis from roads and highways that cross the trail. Users may visit several privately owned lodges, resorts, and ranches near the trail as well, such as Timberline Lodge near Mt. Hood, Oregon.

Trail towns vary in size and economic vitality, but some generalizations can be made. The PCT traverses counties that are more economically disadvantaged than other counties in their states, where unemployment rates tend to be higher and education levels lower. Forestry has historically provided economic opportunities for many local residents, especially in Northern California and Washington. Many of the towns benefit from recreation and trail-based tourism (US Census Data 2000).

Published research that examines the effects of trails on local communities is limited to economic research. These studies have measured the financial benefits of trails to communities by determining how money that is spent by trail users enters a community through tourism and then circulates locally, multiplying its effects (National Park Service 1995). Studies of only economic values, however, do not consider the social, political, or cultural benefits and challenges to trailside communities (Clark 2002; Wellman et al. 2008). As a result, little is understood about whether decisions about trails such as the PCT reflect the values, expectations, and demands of all participants. For example, studies do not reflect costs to the towns of hiker tourism, such as possible increases in crime. While economic studies may attempt to quantify values using monetary terms, participants often seek values other

than wealth (e.g., knowledge, skill, well-being). Consequently, current research fails to disaggregate the range of people's values involved and how they may affect decisions.

7.4 Social Process

Hundreds of thousands of people hike on the PCT each year meaning that participants in social and decision processes are numerous and diverse (PCTA 2013). Participants describe the problems in the PCT corridor in different terms, each expressing different demands and expectations for the trail. Groups typically identify themselves according to their value demands and belief systems, which in turn are used to justify their viewpoints. They rely on the doctrine, formula, and symbols that comprise their beliefs (myths) about the trail to guide their decision making (see Chaps. 1, 2, and 3). At the same time, all groups demand respect from one another.

As noted, most decisions affecting the PCT are made by the public–private partnership between the PCTA and the USFS. The PCTA's mission is to "protect, preserve, and promote" the PCT; although in 2009, the executive director suggested that the first two goals received more immediate attention than the last (pers. comm., May 26, 2009). In 2010, the PCTA had 13 paid staff and 7000+ members, many of whom are trail users, maintainers, and enthusiasts. In contrast, the local USFS office has far fewer human resources; as of 2010, the USFS's program manager and liaison to the PCTA was the only employee assigned to the trail. The USFS's PCT office, based in Region 5 in California, must frequently appeal for project-based funding because the USFS region often prioritizes fire projects above management of recreational trails. The USFS and PCTA work together to address what they consider the main problems along the trail, including maintenance, connectivity, aesthetics, and safety issues. These issues are often solved by additional land conservation efforts or rerouting, strategies that are viewed differently by different participants (see Sect. 7.4).

As mentioned, the USFS and other agencies have the right of eminent domain. However, the current model uses a diplomatic and economic strategy: the PCTA raises funds from volunteers, private organizations, and state and federal governments for land acquisition projects done in conjunction with the USFS and land trusts. The USFS and Bureau of Land Management can acquire land directly, whereas the PCTA does not have the resources to buy or hold easements. Instead, it partners with land trusts. Many users, however, have not considered the challenges of trail conservation or routing and are surprised to learn that the trail's route is neither static nor always on public land (some sections of the PCT cross narrow easements on private land).

Some of those who live, work, or own farms, ranches, forests, and businesses within the PCT corridor have their own perspectives on land conservation and rerouting. Townspeople tend to have few problems with the reasons for a rerouting or conservation project; most agree that creating a trail that is beautiful and safe is a

good idea. Yet some locals have a problem with how these projects manifest themselves on the ground. Because the National Trails System Act gives the government the authority to acquire private property, some landowners perceive that the trail will impede on their long-term plans for their land (Anderson 2006). Changes in the trail can also affect landowners' long-term plans. For example, a hiker-centered business owner in southern California expanded his operation in 2010 even though the trail was set to be rerouted away from his area in the following years.

As seen along the AT, those concerned about property rights believe the government will use its authority to force rights-of-way onto private land for the trail (Cole 1985). This reasoning is not without foundation, as the USFS has used or threatened to use eminent domain in the past to acquire parcels for the PCT, although this has not occurred recently (see Sect. 7.5.2). Landowners who fall into this group feel that land takings violate their values, namely, power, respect, and skill. Conversely, some landowners consider the trail on their land to be an honor, appealing to these owners' sense of rectitude. Local people, especially those who do not live right on the trail, commonly envision trail projects to be "out there on USFS land" with little impact to their town and lives. However, some locals, predominantly those who do not live right on the trail, call themselves "trail angels," and provide rides, housing, or food to users in exchange for the friendship (affection) that comes from meeting them.

Many local residents are affected by trail users. Along narrow publicly owned rights-of-way, users may leave trash or human waste, creating a nuisance and health hazards for landowners and their livestock. Additionally, landowners near the trail are concerned that hikers' campfires or faulty camp stoves may start forest fires. In southern California, where forests are particularly susceptible to fires, one trail town resident explained, "It seems like every year I get a call from a district ranger telling me about a fire started by a hiker."

Interactions between trail towns and users are based on individual and separate incidents; yet the offenses of the few can undermine group interactions. Although rude (disrespectful) and criminal users make up only a small proportion of recreationists, hikers often dress in similar performance outdoor wear and are easily grouped together. In a southern California town, several hikers damaged a hotel room in 2006, and as a result, the hotel no longer welcomes hikers. Sour interactions between users and residents can also influence how locals interact with the PCTA–USFS partnership. As a result, user conflict can impede on some conservation plans.

In spite of occasional tensions, the majority of interactions between residents and trail users are generally positive. Local towns can benefit from recreational users who visit to resupply on food and gear (Bowker et al. 2007). An empirical study of the AT in the 1970s showed that users tend to come from relatively wealthy and well-educated backgrounds, especially compared to socioeconomic conditions along the trail, and although more recent data were not available, it is consistent with my own on-the-ground observations (Stankey 1979). As a result, users can play a sizable economic role in trailside towns. Some towns' chambers of commerce have systems to attract user tourism; Idyllwild, CA, for instance, provides users with a tailored welcome packet and a "hiker discounts" coupon book. Some

ski towns, such as Big Bear Lake, CA, profit from trail users who visit during the "off-season." Towns even compete for business by offering services that attract users. For example, the nearby towns of Tehachapi and Mojave, CA, each have employed incentives (e.g., providing free bikes for hikers to get around town, bus rides to trailheads) to paint themselves as "trail friendly" (Rufus 2009).

Trail user behavior in towns can also complicate how the trail is perceived by residents. Users, especially long-distance users, identify strongly with the PCT, sometimes feeling entitled to higher levels of respect or perks in town because of their accomplishments. Although rare, some users have been rude, trespassed, committed crimes, or stolen goods or services from local businesses. As disrespectful users generally return to the trail outside local jurisdiction, many townspeople feel there is no way to police their activity. Furthermore, as all users become dirty from their journey, some locals are intimidated by their appearance of vagrancy or dereliction.

Users themselves also have their own perspectives on land conservation and trail routing issues, which are far from homogeneous. Equestrians, long-distance hikers, weekend warriors, and day users all have their own demands and expectations for the trail; yet each group values the well-being associated with being on the trail and the rectitude realized by their physical accomplishments. Some users want the trail to be routed far from towns, in keeping with Roderick Nash's (1982) "myth of wilderness." Other users enjoy the convenience of easy resupplies and friendships formed with locals and other users. Some find parts of the trail routed by ski resorts or by windmills to be novel. Others describe them as eyesores. Short-term users frequently are not aware of the trail's length, usually only knowing the trail by local names and landmarks.

Among participants, values, identities, and beliefs inform how people define problems in the PCT corridor. Users are often PCTA members and trail advocates. Advocates turn to the trail to combat urbanization, obesity, and to find an antidote to city life. They perceive some of the objections of locals as symptoms of these problems. To some advocates the trail logo and the trail itself are symbols for wilderness, freedom, and community. Many PCTA employees, members, and trail users derive a moral value and pride (rectitude) from their involvement with the trail, their work, and contribution to keep wild lands accessible. Users especially find their identity wrapped up in the trail; most long-distance users take on "trail names" different from their birth names and will even tattoo the trail logo onto their bodies. This strong identity potentially opens the door for difficult negotiations regarding trail decisions. When opposing parties strongly identify with their cause, critiques are often interpreted as personal attacks (Clark 2002).

Local residents are diverse in their perspectives and lack a shared identity or belief system. Although towns share similar values, such as securing wealth, well-being, and skills from their land and businesses, they are not united around trail issues, partially because of the lack of a crisis (especially a widespread single issue) that warrants such an action. This is consistent with historical patterns exhibited by locals adjacent to the AT or national parks (Mittlefehldt 2010, 2013). Because residents lack organization, they likely will experience interactions with trail advocates, users, or land managers as separate incidents.

7.5 Decision Process

Participants interact with one another through social and decision processes. Along the PCT, the regional PCTA officials engage with local land trusts and meet annually with the state park, Bureau of Land Management, or USFS officials. Yet many others who are consulted sporadically or infrequently by the PCTA are also impacted by the trail, its conservation, and its users. As a result, the intelligence (planning), promotion (debate), and prescription (deciding on a course of action) phases in the decision process are constrained by a diversity of people, interests, and ideas (see Chap. 1 for introduction to decision process and functions).

For the PCT, intelligence (planning) is primarily conducted by the PCTA–USFS partnership and information is usually kept internal. Because the partnership decides what information is collected, most of the information concerns trail maintenance, reroutes, and viewshed protection. As a result, information about the trail is not comprehensive enough to address the variety of problems perceived by people affected by the PCT. Narrow problem definitions, based on limited or overly focused data, frequently result in decisions that ultimately curtail issues important to other participants, such as user-caused crime, the trail's impact on local business, and its impact on local land uses.

Groups from local communities have limited capacity to partake in intelligence activities, often because they do not know how or where to voice their opinions. These groups, as mentioned in the social process, are not organized or conversant in their collective goals. A resident California businessman explained, "I don't have any contact with the PCTA or Forest Service. I hear about the trail from hikers that come through." Many residents interviewed expressed a similar lack of interaction with the USFS and PCTA. Without this interaction, locals sometimes convey their values and perspectives on trail issues to users rather than to the partnership. An exception may be trail angels, who interact with other participants, including the PCTA, but whose perspectives may differ from other locals.

Promotion (debate) is generally conducted within the partnership and a few other groups; in that only a few groups debate and decide what policies should be discussed and eventually adopted. The PCTA and USFS usually define problems along the trail as maintenance, aesthetics, safety, or connectivity, and thus promote strategies that will solve these issues. Other concerns and strategies to solve those concerns, such as some of the perspectives addressed in Sect. 7.3, are left out of the promotion process. As a result, those groups may be ill-served by the decisions made.

The PCTA defines maintenance as one of the primary challenges of the trail and promotes courses of action to solve it. Erosion, plant growth, flooding, animal damage, and illegal use of the trail by vehicles degrade its quality each year. Maintenance also has logistical challenges such as organizing volunteers and funding operations. As of 2010, 60 % of the trail was regularly maintained to control erosion and plant growth, although the PCTA's goal is to maintain its entirety. Maintenance causes little conflict among participants. Once land is in the public domain and the trail has already been built, all participants expect that there will be upkeep.

The PCTA also defines aesthetics as a problem along the trail and promotes land conservation and rerouting strategies to address this issue. Although the PCT is located entirely on public land (or on private land with established rights-of-way), many trail enthusiasts agree that several short sections of the trail, especially those that are routed onto roads, could be rerouted to more aesthetically pleasing areas. For trail advocates, such rerouting is not only a moral obligation but also a legal one. The National Trails System Act requires that the PCT be a trail of "maximum outdoor recreation potential … and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas" (National Scenic Trails Act of 1968). How to fulfill this mission while still maintaining a contiguous trail from Mexico to Canada remains a challenge for the partnership.

Trail aesthetics are not only impacted by the trail's route but also by how the land around the trail is used. Despite public access to the footpath itself, the scenic view from the footpath is not always in the public domain (Larabee 2008). Privately and publicly owned parcels that fall within the PCT's viewshed could be developed or otherwise impact vistas. For example, in 2008, the Palomar Gas and Transmission Line LLC proposed a pipeline that would intersect the PCT in Mt. Hood National Forest (Ramsayer 2008). Because of these challenges, a journalist described the PCT as "fully designated, but not fully protected" (Ramsayer 2007).

Several sections of the trail are routed onto paved roads shared with cars. The desire to route the trail away from roads is not only for aesthetic reasons but also for safety implications. In 2005, two users were killed by a car while walking on part of the "trail" routed on a road near Agua Dulce, CA. Other sections of trail can be unsafe for users because of conflict with other recreationists, such as illegal off-highway vehicle users. A guidebook writer refused to include part of the PCT in his list of California day hikes because dirt bikes jeopardized his safety on a reconnaissance visit. The PCTA, federal land managers, and trail advocates would like to minimize the amount of the route that follows roads or has user conflict by acquiring land and trail rights-of-way far from the danger of motorized vehicles.

The partnership works to ensure that the decision chosen, i.e., the prescription, fits under the many legal requirements already established upon the land and the trail. These include USFS regulations, requirements of the National Environmental Policy Act, and the Multiple Use Mandates. Along the PCT, the decision chosen does not always positively impact the full range of participants, often because of limited participation in the decision-making process and its various functions.

7.6   Analysis

Examining participants' shared goals can help determine where participants have common interests. Next, "zooming out" or contextualizing broadly will facilitate understanding of how historical events moved the PCT toward or away from those goals. The next tasks are to identify areas to improve conservation decisions, project different scenarios based on what has happened to date, and in the next section, provide recommendations on how these problems can be addressed.

7.6.1 Goals

Participants in the PCT have multiple perspectives, and the idea of finding common goals among them for the trail corridor seems unrealistic. While there is a federal mandate to preserve the trail and its viewshed for scenic and recreational use, there is also pressure to use the land for development, resource extraction, and other competing uses. These issues are complicated by complex user interactions with diverse local people. As such, simply solving the technical problems that trail managers consider on a daily basis will not allow participants to adapt to new issues as they arise. In fact, functional and process-oriented problems, that is, problems in how decisions are made, can ultimately create significant hurdles to reaching long-term conservation solutions for the trail system.

Yet conservation organizations around the world are succeeding by finding shared objectives among diverse groups (Newsome and Gentry 2009). By setting goals that promote conservation, social development, and respect in the interest of human dignity and environmental sustainability, participants in the PCT can also identify and secure their common interests (see Sect. 7.7.1; Trust for Public Land 1995). The PCT most directly benefits trail and outdoor enthusiasts, a relatively small group, but its conservation, tourism, and open space can also meet the demands and expectations of a wide array of other participants. Not all participants need to be satisfied with every decision, but they might be able to accept them.

7.6.2 Conditions

The data on trends reveal whether conservation is moving toward common interest goals. As discussed earlier, the National Scenic Trail System allows eminent domain for trail rights-of-way. In the 1980s, a Bureau of Land Management report stated that "gaining easements across private land is becoming a problem in completing the development of the PCT. Condemnation will be necessary to obtain easements across some parcels of private land" (Bureau of Land Management 1980). This right was exercised, especially in the 1990s, as the Clinton administration aimed to complete the PCT. In northern California, the PCT was routed around land owned by a private forest products company. A former employee explained that a 10-feet wide corridor was eventually sold to the USFS after the company "was essentially told [by the USFS] to 'give us the corridor or else we'll condemn it and take it.'" Today, parts of the trail that go through that area have viewsheds that thinly veil timber cuts conducted immediately outside the narrow corridor. Although this harvesting system may have existed before the trail corridor was created, the substantive result of the decision benefits neither party. Harvesting forests in all but a thin, winding line along a trail can be difficult for foresters to plan for and manage. Meanwhile, a trail surrounded by harvesting frustrates the aesthetics of the trail experience. This is an example of a prescription that was not implemented in the common interest.

Historically, there has been backlash from landowners who have had disagreements with trail conservation projects (Anderson 2006). Along the AT, landowners were contacted on a one-by-one basis as needed, usually under expedited conditions. Trail organizations had hoped that by minimizing contact with local towns, anti-trail coalitions would not form and the process of trail protection would be expedited. A study by the Landowners Rights Association of private landowners along the AT suggested that "No one questioned the validity of the trail…. [Almost] everyone viewed it as a good thing…. The main objection heard by these people concerned the overall process of selecting the Trail: not so much the specifics of route, acreage, and width. They felt unconsulted, unnotified, and misled to the point of confusion as to whom they were confronting regarding their land and the Trail" (Anderson 2006). Nonetheless, a veteran of the National Scenic Trail System described the USFS as "notoriously hesitant to use eminent domain" for the PCT, which is consistent with the USFS's PCT program manager and the PCTA's internal decision not to use condemnation strategies any longer.

7.6.3 Persistent Challenges

Three persistent challenges hinder the goal of promoting conservation, social development, and respect in ways that serve common interests along the PCT corridor.

Lack of Participatory Arenas The inclusivity or exclusivity of people and ideas in an arena (see Chap. 2) influences the decision process. Because the PCTA and the USFS are the main players in the arena, they decide what information is collected. Some information is limited in dissemination. Although the USFS is required to accept public input through the NEPA process, as mentioned above, most townspeople interviewed had no idea where to find out about plans for the trail near their home. Those who said they know what is happening on the trail were generally trail angels who were also members of the PCTA. These individuals said they found out about what was planned for the trail in their area from users who had read the *PCT Communicator*, a PCTA newsletter sent to members, or from reading the newsletter themselves.

While many locals are interested in information and data collected about the public land around them, they are hesitant to join an environmental organization that may not advance their own interests just to get this information. As a result, many locals lament that they are never sure what will happen with the trail or what changes may be proposed until after plans are already set in place. Nonetheless, when a southern California town contacted the PCTA to ask how to become involved in decisions affecting the trail and their town, the PCTA responded, "The Chamber of Commerce should purchase a group PCTA membership and advertise in their newsletter." This anecdote is illustrative of the PCTA's belief that other participants have goals and objectives similar to their own.

A lack of arenas for towns to consult with federal land managers is consistent with the literature. A study of county-level officials showed that local government

officials often feel under-consulted, especially with land use decisions that affect their planning process (Simon and Dobra 2003). It is also consistent with the type of relationship the residents describe having with national parks and national forests, i.e., federal land the PCT travels through (Warren 2006).

Positivistic Professionalism Although trail decision makers do not seek scientific management goals such as those experienced in other large-scale projects, the single and multiple use management method used for those kinds of projects also applies to recreational projects along the PCT. The trail corridor, much like forests or parks, is separated into a resource cell. While positivism permeates wildlife conservation, trail conservation uses a similar model to preserve scenic and recreational resources. Management focuses on obtaining funding, spending budgets, and completing projects, all goals listed in the PCTA's Strategic Plan (Pacific Crest Trail Association 2009). Funds are centralized with the PCTA and USFS and reimbursed to trail crews locally as needed (PCTA website). Although regional trail maintenance clubs have some autonomy in maintenance decisions in their area, like other large-scale conservation projects, many decisions along the PCT use a top-down, centralized, decision-making model. Lacking a localized arena, as discussed above, is symptomatic of this positivistic conservation model.

Authority and Control It is often unclear to those who live near federal lands whom to contact if there is a problem and how decisions are made (Fitzsimmons 2012). Policies lack transparency, so most people who live near the PCT cannot access upcoming plans for the PCT. Scope of Proposed Activities (SOPAs), descriptions of project proposals for USFS land, are listed on the agency's website, but can be difficult for some individuals to find and read.

Given that the trail is administered and managed by a public–private partnership, the issue of whom to contact and how to address problematic decisions becomes even more complicated. Because it has the resources, time, and staff to make decisions, the PCTA can control much of the PCT decision-making process. Perhaps more notably, the PCTA has on-the-ground presence. As a result, the USFS has less control over the trail. Yet the USFS has the sole legal right to authorize policy decisions affecting the PCT, even while actual implementation of the plan is often conducted by PCTA volunteers. Furthermore, locals see and interact with PCT users, who are usually knowledgeable about the PCTA's plans from reading the PCTA newsletter. As a result, when locals have a problem with the trail or decisions related to the trail, they may be confused about who has authority over the trail.

An example of a problem exacerbated by this disconnect between authority and control occurred in 2010, when private landowners living along the PCT in Tehachapi, CA, tried to address illegal motorized traffic on the trail (Forde 2010). Although complaints had been reported to the sheriff about motorized traffic usage in 2009, the boundaries between private land and the PCT easement were not well defined, meaning that it was not always clear who had jurisdiction over the area or which regulations applied (motorized usage is allowed on private land). Given that trail–vehicle conflict was common in that area and that complaints had been made to the sheriff months earlier while conflict continued, the sheriff speculated

that residents may have decided to battle illegal off-highway vehicles themselves with homemade booby traps (Swenson 2010). The USFS and PCTA were eventually able to work with local officials to address the illegal use and traps, but it is possible that official response could have been faster had authority and control not been confused.

7.6.4   Future

Decision making for the PCT could change in the near future. In 2010, the USFS Recreation Department headquarters in Washington, D.C., developed a framework to challenge the old paradigm and address common interest goals for communities on and near its land. Conservation organizations and land trusts are also increasingly seeking common interest goals.

Land managers project that numbers of long-distance hikers will increase in the future as the number of permits issued has increased each year. Furthermore, the AT and PCT both experienced spikes in users in years following popular media depictions of the trails, such as Bill Bryson's 1998 best seller, *A Walk in the Woods*, about the AT. The popularity of Cheryl Strayed's *Wild* in 2012 appears to be yielding a similar spike for the PCT (Egbert 2013; Holt 2013; Solomon 2013). Long-distance users tend to be individuals who are out of the work force, either people in their 20s out of school but not yet working or retired people in their 50s and 60s. As baby boomers retire, it is possible there may be an increase in PCT users.

Several scenarios can be projected for the future of the trail corridor. In the first projection, business remains as usual, and the PCTA and USFS have no incentives to change their models. In the next two projections, the PCTA, USFS, or a nonprofit organization other than the PCTA incorporate partial participation. In the last projection, participants adopt an adaptive governance approach with the goal of clarifying common interest goals.

Business as Usual Trail decisions and their implementation might continue to be advanced by the PCTA, with support from the small PCT USFS staff. Projects would address trail maintenance, collecting parcel information, planning, and promotion of trail connectivity, safety, and aesthetics. Data and plans would stay within the PCTA and USFS and would be made available on a need-to-know basis.

Those in power would continue to be unaware that problems exist or that townspeople are curious about how decisions are made and have their own distinct expectations and demands. Conversations between local participants and decision makers might occur rarely and anecdotally, but there would be no formal system for communication or for accountability to these perspectives. Local people would continue to be confused about whom to contact when problems arise. Plans would continue to be made without local knowledge, and townspeople would read about final decisions in the newspaper or learn about them from users or neighbors. The PCTA would attribute problems that arise to others failing to see the value of their project or to other participants being unreasonable or not trying hard enough.

   As numbers of users increase, conflict and crime between towns and hikers would continue under this scenario. Some businesses might close their doors to users, and residents might protest or criticize some PCTA conservation projects, including projects to protect viewsheds or prevent motorized vehicles or mountain bikes.

Member-Based Participation Since the data for this project were collected, the PCTA has already implemented changes toward member-based participation. Under member-based participation, the partnership will solicit information from PCTA members using surveys, although the organization will still ultimately decide what the problems are and what the solutions will be. Some members are local residents and can incorporate some local concerns into their input, but goals among members can be similar.

Partial Participation In 2010, when asked about participation, the PCTA considered consultative participation with townspeople as ideal, if resources were not an issue. In this scenario, PCT trail managers would more actively seek townspeople's opinions, although without reaching a full participatory state. Local residents would be more frequently consulted by the PCTA and USFS, although the partnership would likely continue to decide what constitutes a problem and implement their best solution. External agents might listen to locals' views without being required to incorporate them. While data collected (intelligence) are open, promotion and prescription still would not meet broad needs. As a result, locals would continue to think of decisions regarding the trail as "out there" and as impermeable to their opinions, values, or demands. Pimbert and Pretty (1995) suggest that although member-based and partial participation are an improvement on "business as usual," these methods prevent group learning and come across as superficial without adding significant meaning to participation.

Adaptive Governance This chapter proposes that PCT participants consider adopting an adaptive governance outlook toward trail management. Adaptive governance would turn policy decisions into community-based initiatives where information is transparent and all perspectives are encouraged (Brunner et al. 2005). By proactively spending more time and resources getting people to the table early and directly involving locals in responsibility for decision making, many administrative and legal challenges could be streamlined (Steelman and DuMond 2009). Honest self-appraisal, instead of self-congratulation, would have to be conducted to determine if a problem exists. Adaptive governance would recognize that by meeting broad goals and remaining flexible, future conflict between groups that have distrusted or disagreed with one another could be avoided or reduced. Decision makers would use creative problem-solving methods that emphasize context-based approaches to problems (Clark 2002). These creative techniques would integrate multiple goals, not just on the agency or state governmental levels but also on the local level, by considering local perspectives as relevant to decision making (Brunner et al. 2005). By improving the process by which a broad base of participants and their perspectives are represented, participants in the PCT could together better approach their common interests (Lasswell and McDougal 1992).

7.7   Necessity of Pursuing the Common Interest

Before changes are made, participants must first agree, at least in principle, that finding the common interest is a worthwhile endeavor. The current strategy for PCT conservation has been successful with few legal battles or crises. Yet even when problems have not reached crisis proportion they still need to be remedied if common ground is to be reached. Why would the PCTA and USFS involve themselves in securing the common interest when other participants may obstruct or delay projects to preserve the trail? What incentives does the PCTA–USFS partnership have to pursue a different model? Three suggestions follow.

First, the partnership may discover that by identifying and securing the common interest, they can meet their own goals more effectively. Conservation groups around the country have found that broadening the conservation base is increasingly important to building membership, garnering support for conservation as a whole, and for obtaining funding (Newsome and Gentry 2009), which are goals set by the PCTA in their Strategic Plan (PCTA Strategic Plan 2007–2009). Many conservation organizations have run into problems because their membership base has been mostly urban, while the land conserved is mostly rural (Newsome and Gentry 2009). For example, each year, the PCTA encourages congressmen to sign "Dear Colleague" letters to support legislation that would benefit trail protection as part of "Hike the Hill," a hiking advocacy event in Washington D.C. Currently, congressmen from urban districts several hours from the PCT are more likely to support conservation legislation than congressmen from the districts the PCT travels through. By planning together, choosing mutually agreed plans, and coming together to implement the projects, the partnership and local groups can achieve their goals and establish incentives to create more interactive participatory programs. This can also make conservation projects eligible for a wider array of grants and funding.

Second, finding common interest goals may expedite or simplify conservation projects now and in the future. Conservationists are realizing that effective resource protection is only possible when local people participate, are engaged in defining and solving the problem, and receive benefits from the project (Pimbert and Pretty 1995). As compared to committee-led conservation–ecotourism projects, programs that used local stakeholder participation and empowered citizens proved to be a less stressful planning process for community members (Jordan et al. 2013). When locals feel like they have ownership in the trail, they are more likely to advance conservation initiatives for it.

Third, a paradigm shift may be required in the near future. As mentioned above, the USFS Recreation Department is building the institutional infrastructure and frameworks to expand how it interacts and makes decisions with local communities. By building the basis for finding common interest goals now, those involved in conservation along the PCT can proactively address what could become regulations or requirements in the future.

7.8   Recommendations

Those at the PCTA and USFS are concerned that their organizations are too limited in staff, funding, and resources to undergo a major overhaul of their decision-making processes. Neither organization has resources to bring participants to the table, the first step in approaching achievement of common ground goals. As a result, no clear entity comes forth to undertake a holistic trail corridor project. Instead, finding the common interest may require people to make a paradigm shift and to reorient their goals. The partnership has been successful in securing land and maintaining the trail, thus meeting the organization's goals. Yet the previous section explained why the partnership might find reason to change. Indeed, the PCTA's Strategic Plan sets a goal of seeking to "provide leadership … to acquire land for the trail," and working with a broad group of participants to find shared goals is one way this can be done.

Although such a change in focus may seem to require significant resources to develop, finding the common interest in the PCT corridor is actually not new at all. Indeed, it is happening already along the PCT and other national scenic trails. By scaling up prototypes, adapting to local contexts, and expanding existing projects, the partnership can achieve its own goals through meeting the common interest.

7.8.1   Prototyping

Within the PCT corridor and on national scenic trails across the country, many organizations, communities, and individuals are working on meeting their common interests. Since the bulk of the data for this project were collected, the PCTA and USFS have instigated changes that have allowed more transparency and open conversation along the trail. For example, the USFS PCT website now makes the comprehensive plan publicly accessible and posts the contacts for federal, state, and local land managers along the trail. The USFS now offers a trail-wide incident form, which, although oriented toward users, can also potentially be used by local residents. Other on-the-ground projects have allowed for trail advocates and towns to meet their needs together, including finding shared goals and expectations and pooling resources to expedite and simplify conservation projects. Many of these projects are localized, but it is possible to apply them to other sections of the trail or on the whole of PCT.

Major change does not have to happen overnight, but can be made incrementally. Innovative and lasting plans require individuals to take leadership, and require groups, towns, and communities to change their paradigms to encompass broader goals than those that immediately benefit themselves. Testing new practices by making small steps and then scaling up can minimize uncertainties and reduce surprise consequences that may upset participants. All prototypes discussed below are based on the idea that an arena needs to exist where multiple participants can address a suite of problems together. There are many examples where prototyping has been used as a successful strategy for finding and securing the common interest, including the following:

In 2009, the New England National Scenic Trail (NENST) was designated as a national scenic trail using a model that approaches adaptive governance. The NENST team appraised other national scenic trails and adapted their model to avoid problems faced by their predecessors (National Park Service 2006). In the NENST model, integrating broad perspectives and finding common interest goals are more important than even the scenic qualities of the trail. One person involved said, "We can only make a better trail by talking to local people."

The NENST is open and transparent about the studies it conducts. It holds transparent meetings in different locales across the trail's entire length and representatives from the Park Service (the NENST's head federal agency) and nonprofit groups travel long distances to ensure that trail decisions are discussed in an integrative, participatory manner at the local level. A National Park representative told Connecticut town planners: "Tell us where you want the trail to go. If you want it to go past your town green, let me know. If you have a new crosswalk, let me know. This is your trail." All elements of decision making—land use management, planning, volunteer work, and trail routing—are intended to work cooperatively and transparently. Although integrating such a system is difficult for a trail of the PCT's size, especially given that its route has already been established and completed, ample opportunities exist to address future problems in a community-based manner.

A second example of successful prototyping comes from the Appalachian Trail Towns program, Trail Town Ambassador program, and Trail in Every Classroom program. The Appalachian Trail Conservancy (ATC), the AT's analogue to the PCTA, instituted its Trail Town Ambassador program to identify individuals to be the local voice for the trail. It established an official Trail Town designation process to honor towns along the AT and to certify towns that have built mutually beneficial relationships with the ATC. Although these programs are not directly related to AT conservation, they provide local residents with a sense of ownership in the trail and its decision-making process. The Trail in Every Classroom gives teachers who work in school districts along the trail free continuing education courses to place-based science, reading, writing, and math curriculum about the AT curriculum. The coursework is designed to meet teachers' state-mandated educational requirements while being engaging for students. Educational requirements were not necessarily an interest of the ATC but were an interest to teachers and parents who live near the trail. By creatively finding shared interests between locals, their children, and the trail community, these programs are building the next generation of locally based conservationists.

Along the PCT, there are numerous opportunities for possible ambassadors, official trail towns, and school education programs. Some locals are already working as unofficial ambassadors, engaging trail issues in the community through local newspapers, and working with neighbors to address multiple problem definitions. These ambassadors can keep trail-based decision making localized while finding creative solutions and finding shared interests.

Another possible prototype focuses on town-level meetings that are not associated with any major crisis or decision. Increasing contact between the PCT partnership and trail towns has benefited many parties. In 2009, some trail advocates

held a PCT question-and-answer session in a library in Julian, CA. Although local people and businesses had seen hikers visit their town to resupply, their understanding of the trail, its purpose, and the goals of the partnership were limited. By allowing a forum for conversation, all parties felt more familiar with each other's goals and concerns. As each party voiced concerns in a low-pressure environment, they helped the other parties devise mutually useful ways of solving problems in a nonadversarial arena.

7.8.2 Locally Based Conservation and Involvement

Numerous trail organizations achieved their conservation goals by developing local decision-making groups. These groups start with local volunteers or trail enthusiasts who not only organize trail maintenance and guided trips but also are aware of local issues and land sales. The PCTA has involved volunteer groups; yet trail crews often travel as far as 100 miles for a trail-maintenance day instead of attracting locals who live close to the trail.

Many trail organizations promoting high-impact forms of recreation, such as mountain biking or snowmobiling, have strongly involved local communities in their decision-making process. These groups claim that because their activity has potential to become a liability, engaging local landowners up front and being open in decision making will be essential to getting to use the land at all. For many conservationists, this is a paradigm shift. Yet it is already happening along the PCT and other trail systems, and it looks to be the new direction of recreation-based conservation.

7.8.3 Manage Expectations

Finally, a nonprofit liaison can fill the communication gap and establish an arena where participants can voice their opinions, especially regarding managing user expectations more realistically. Much of the conflict between local people and the trail results from illegal and disrespectful activity by users in trail towns, activities that complicate conservation projects for the PCTA and USFS. The American Long Distance Hikers Association, which operates along the AT, attempts to address this conflict by outlining expectations for users in town. The group stresses that "the continued success of the A.T. and the A.T.C. [Appalachian Trail Conservancy] depends on the support of people who live near the trail. Nothing can turn a person or town against … the A.T. quicker than an ill-behaved hiker" (American Long Distance Hiking Association 2009).

Such an organization could also work with local businesses to clarify expectations for hiker behavior in town, especially regarding sharing of goods and services with other users. In 2009, hotel owners in Washington became upset when they discovered nonpaying hikers showering in their paying friends' room without

permission from or payment to the hotel. From the hotel owners' perspective, hikers were stealing showers. From the hikers' perspective, they had paid for unlimited use of showers. By establishing norms before crises develop and disseminating them to users, much conflict can be avoided.

Some users have taken the American Long Distance Hiking Association's advice realizing that they are "walking, talking billboards" for the trail (American Long Distance Hiking Association 2009). These users become self-designated trail ambassadors who talk with other users about creating a respectful hiker culture. Many users share their stories with local residents, some of whom are unaware of what the trail is. In 2009, another group of hikers performed vulgar activities in a small town in Washington, leading many townspeople to be unenthusiastic about the presence of hikers. Another hiker moved to that town and rebuilt the locals' trust in hikers. Although these individual actions are not systematized or institutionalized and the American Long Distance Hiking Association's advice does not reach every user, these represent steps toward expanding the conversation between participants along the trail. The hiking association could work with the PCTA and USFS to disseminate information about user expectations with PCT user permits to broaden the audience.

7.9 Conclusion

Aside from local communities, other groups not discussed in this chapter are also affected by trail decisions, but have a limited role in decision making. Native American sovereignties and traditional environmental and wildlife groups have not recently had a visible role in the decision making except on a project-by-project basis (one example is the Palomar Pipeline, mentioned above). Although better represented, equestrians have their own unique challenges, which were also not fully discussed in this chapter. The PCT and the goals of these groups are intertwined and there is room for collaboration and mutual benefit.

Conservation along the PCT can allow a wide array of participants to achieve their shared goals—indeed, it is already moving in that direction—yet it requires re-prioritization from multiple stakeholders and sometimes requires funding to hold workshops. Some may have to make a paradigm shift, which can be an emotionally difficult process. As paradigms shift, arenas are established, and decision making becomes more inclusive, conservation along the PCT will more closely resemble adaptive governance.

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Chapter 8
Conserving Tanzania's Wildlife: What is the Policy Problem?

Catherine H. Picard

Abstract This chapter appraises the Selous Niassa Wildlife Corridor and Wildlife Management Areas in Tanzania as a model for large-scale conservation. This appraisal suggests that common interests around wildlife management in Tanzania have not yet been identified or secured. Three main challenges persist. First, there are profoundly differing estimations of what problems exist and how to solve them. Moreover, decision making is largely restricted to resolving technical problems such as poaching and habitat fragmentation; entirely overlooked are the governance and constitutive problems that drive these threats. Second, the social process is increasingly fragmented as evidenced by participants' limited understanding of each other's perspectives, myths, and value demands. Third, there are compounding weaknesses throughout the decision-making process, including restricted debate, insufficient authority and control, and inadequate evaluations. The chapter begins with a description of major trends, conditioning factors, and perceived problems that shape the management of Tanzania's wildlife. It then analyzes the governance and constitutive problems that underscore Tanzania's wildlife policies, including how the decision-making process has fallen short of the recommended standards. The chapter concludes with recommendations to improve the policy process of large-scale wildlife management in Tanzania.

Keywords Large-scale conservation · Tanzania · Ruvuma · Wildlife management area · Selous game reserve · Selous Niassa wildlife corridor · Decision process · Problem orientation · Community-based conservation

8.1 Introduction

In 1961, the East African territory of Tanganyika declared independence from the UK and inherited a protected areas estate that amounted to approximately 9 % of the total country (Brockington et al. 2008). Today, almost 40 % (42,000 km^2) of Tanzania is protected under a variety of conservation management regimes, including conservation areas, national parks, wildlife management areas (WMAs), and

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forest reserves (Briggs 2004). This transition did not, however, come without a cost. In many instances, government authorities forcibly relocated village residents in order to establish new protected areas or prohibited local residents from entering or cultivating inside a reserve set aside exclusively for wildlife (Igoe and Schmidt-Soltau 2006; Smith 2013). As a result, wildlife populations and tourism flourished, but hostility between local residents and wildlife authorities also grew (Neumann 1998). Over time, it became increasingly clear that an authoritarian and exclusionary approach to conservation had only increased the severity of threats to wildlife by alienating and antagonizing local residents. Strategies such as *Operation Uhai* in 1989 used paramilitary forces to track and arrest suspected poachers across rural Tanzania. The operation confiscated thousands of weapons and snares but ultimately failed to prevent poaching of wildlife and antagonized rural communities (Peluso and Watts 2001). Eventually, in large part because of increasing pressure from the international community, the Tanzanian government committed to radically reforming its approach to wildlife management. Wildlife policies shifted from excluding and punishing local residents to enabling rural villages to participate in and benefit from the sustainable use of wildlife. The new "community-based" approach was premised on the theory that when local residents were given the authority to capture the economic benefits from wildlife, they would support conservation efforts and prevent the illegal poaching of wildlife. A critical component of this reform was the establishment of a new type of large-scale protected area, known as a WMA, designed to allow rural communities to manage wildlife on their land for their own benefit (United Republic of Tanzania 1998).

This chapter explores WMAs as a model for large-scale conservation and explains the systemic challenges that threaten large-scale wildlife conservation in Tanzania. The chapter begins with a description of major trends and conditioning factors that have shaped the management of the country's wildlife. It then analyzes the governance and constitutive problems that underscore Tanzania's wildlife policies, including how the decision-making process has fallen short of the recommended standards (Lasswell and MacDougal 1992). The chapter concludes with recommendations to improve the policy process of large-scale wildlife management in Tanzania.

8.2 Background

This chapter is informed by dissertation research conducted in 2007–2008 while I was a Ph.D. candidate at the Yale School of Forestry & Environmental Studies. I conducted original research in the Selous Niassa Wildlife Corridor, a large-scale, trans-boundary protected area designed to connect the Selous Game Reserve in southern Tanzania with the Niassa Reserve in Mozambique (Fig. 8.1).

A diverse set of research methods was used to collect and analyze data, including (1) a structured survey of 148 local residents from twelve villages; (2) semi-structured interviews with government officials, donors, and conservation
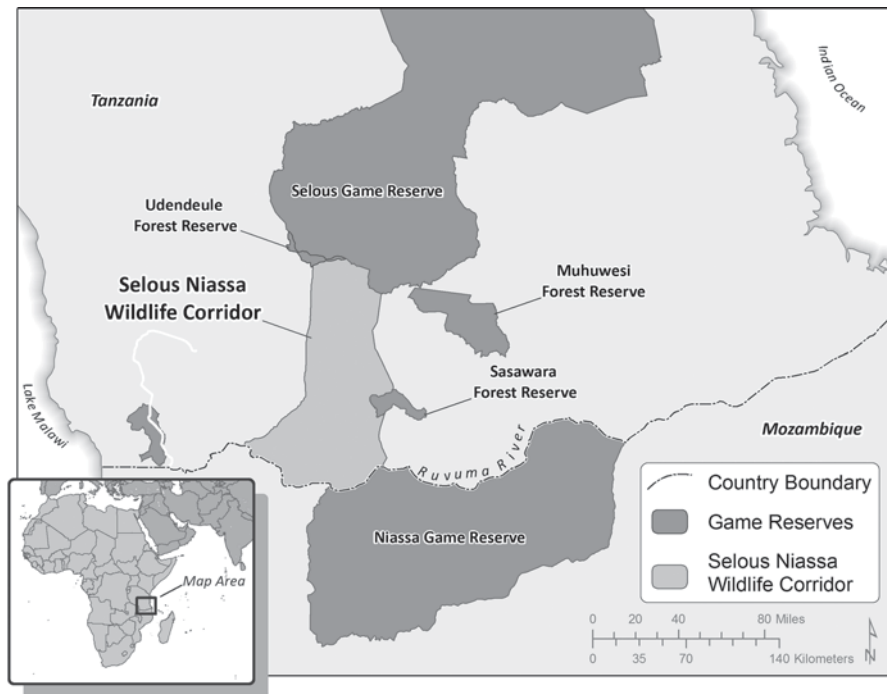
Fig. 8.1 Map of the Selous Niassa Wildlife Corridor

practitioners; (3) a review of archival documents dating back to the colonial era, including official project archives and records; (4) participant observation of meetings, study tours, training seminars, and other interactions between donors, conservation practitioners, local officials, and village residents; and (5) a literature review of published articles and primary source materials.

This chapter uses "problem orientation" (Chap. 2) to appraise WMAs as a model for large-scale conservation (Lasswell and MacDougal 1992). In contrast to a solution-oriented approach that isolates problems into discrete and resolvable components, a problem-oriented inquiry asks how a problem has been defined in the first place, by whom, and based on what information, perspectives, and values? Problem orientation relies on multiple methods to understand the context within which a problem persists and recommends practical strategies to improve decision making. Finally, a problem-oriented approach is proactive. It clarifies participants' goals, describes relevant trends and conditions, develops projections, and provides recommendations.

This orientation presumes a "problem" can be understood as a gap between expectations and reality (Clark 2002). Problems, in other words, do not exist independently. They are subjectively created based on people's experiences, values, expectations, and identities. If problems are constructed rather than discovered, then it

stands to reason that people may observe the same phenomenon, but arrive at very different problem definitions (Scheuer and Clark 2001). As Stone (2002, p 229) explains, "Problem definitions are strategic representations of situations… they are portrayals of people's experiences and interpretations, often framed in order to favor once course of action over another." In short, how people perceive, describe, and resolve problems are a reflection of their own perspectives, identities, and values.

While there are strategies to minimize bias in research, it is impossible to eliminate it entirely. It is therefore incumbent on researchers to consider how their perceptions and conclusions are shaped by their training, experience, personality, epistemological assumptions, and organizational allegiances (see Chap. 2 for more details about standpoint clarification; Clark et al. 2000). To this end, I continually reflected on my standpoint, openly discussed my values and goals, and reflected how my professional training, status, gender, and biases influenced my observations and analysis. I also explicitly clarified the purpose of my research: to understand how large-scale conservation could be implemented in Tanzania for the benefit of wildlife, local residents, government authorities, international organizations, and other stakeholders. In short, how can large-scale conservation serve the common interest? As a result, I gained a better understanding of the social and decision-making processes operating around me, what values participants were seeking, and why participants behaved the way they did.

8.3   Defining the Problem

Approximately one-third of Tanzania's terrestrial land is officially protected today under a wide range of management regimes, including game reserves, national parks, forest reserves, and WMAs (WDPA 2013). This is a significant commitment to large-scale conservation, given that 70 % of Tanzania's citizens live in rural areas and rely on agriculture and/or pastoralism to support themselves. Yet, in spite of having one of the largest protected area networks in Africa, trends indicate that many wildlife species are steadily declining in both abundance and range (TNRF 2008). In northern Tanzania, for example, aerial wildlife censuses indicated that between 48 and 68 % of species in Tarangire National Park declined in abundance between the late 1980s and early 2000 (TNRF 2008). Even species of significant economic value for hunting and ecotourism, such as buffalo and lion, have experienced population declines over the past 20 years alongside many of the nation's ungulates (Stoner et al. 2007). Poaching also continues to be a major problem in Tanzania. There were at least 60 recorded elephant deaths between October and December 2013; this, in spite of the (now former) minister of tourism declaring that all poachers should be "executed on the spot" (Smith 2013).

While data are difficult to obtain and vary temporally based on seasons, availability of water, and geography, the trend is clear. Despite having one of the largest protected area networks in Africa, Tanzania's wildlife is slowly disappearing and is increasingly isolated. Moreover, tensions between participants, particularly

between local residents and government wildlife officials, continue to rise (Nelson 2013). Given Tanzania's commitment to wildlife, how can this decline in species abundance and distribution be explained and what lessons can be drawn from Tanzania's experience to improve the practice of large-scale wildlife conservation in the common interest?

Participants currently offer a wide range of explanations for the decline of Tanzania's wildlife. These problems include habitat fragmentation, population growth, poaching, economic inefficiencies, bureaucracy, and corruption. None of these explanations alone, however, provide a comprehensive appraisal of the policy problem. To address this gap, this study considers of three types of problems—technical, governance, and constitutive—to explain the decline of Tanzania's wildlife. Examples of technical problems include poaching, habitat fragmentation, inefficient economic incentives, and corruption. Technical problems are easily observed and are frequently cited by participants as "problems" that need to be urgently addressed.

In contrast, governance problems are about decision making, which in this context is understood to be a set of iterative phases as opposed to an isolated event. The decision-making process includes data collection, debate, the selection and invocation of a choice, appraisal, and termination. A growing number of scholars, practitioners, and civil society organizations are focusing on governance problems within Tanzania's wildlife sector (Junge 2002; Nelson 2009; Nelson et al. 2007; USAID 2013). They understand that the policy process is not working as effectively as it could for large-scale conservation. In particular, they cite a failure to devolve decision making to local residents, rigid organizational bureaucracies, and a lack of economic incentives and barriers to wildlife conservation.

Constitutive problems are almost entirely overlooked in the current debate about Tanzania's wildlife. Problems that are constitutive in nature are grounded in the subjective norms and implicit doctrines that shape how decisions are made and who makes those decisions about Tanzania's wildlife. Examples include: what should the Tanzanian landscape look like, what is the "optimal" use of land in Tanzania, who should have the authority to manage wildlife, and what types of knowledge are necessary for effective decision making? While constitutive problems are more opaque than technical or governance problems, they precipitate and fuel many of the challenges facing Tanzania's wildlife today.

Focusing exclusively on technical and governance problems and overlooking more constitutive concerns can produce ineffective and even counterproductive policy prescriptions. In the Selous Niassa Wildlife Corridor (SNWC), for example, a narrow focus on the technical problem of poaching by local residents resulted in the confiscation of thousands of snares, but ultimately failed to resolve the problem by not attending to the underlying conditions, such as the lack of alternative livelihood strategies that drove residents to poach in the first place. Narrow problem definitions can also restrict how data are collected, debated, implemented, and appraised (Lasswell and MacDougal 1992). Constitutive problems help us to understand how and why a problem has been defined and offer useful insights into people's expectations, demands, and values. Taking a step back to consider these perspectives is critical for understanding the context within which policy processes take place, the

positions participants are taking, and how problems are resolved. A detailed appraisal of all three types of problems (technical, governance, and constitutive) is provided below.

8.3.1 Technical Problems

A review of the published literature coupled with primary source data reveals that participants advance several types of technical problems (scientific, economic, and bureaucratic) to explain threats to large-scale wildlife conservation in Tanzania. Proponents of a scientific problem definition assert there is a lack of adequate protection and habitat outside of protected areas, as well as increasing fragmentation of wildlife corridors, which prevent wildlife populations from moving between protected areas. This is especially critical for wildlife populations that migrate seasonally out of protected areas in search of water and grasslands. If the problem is not addressed in the near future, proponents project that Tanzania's remaining wildlife corridors will disappear within the next 5 years and some of the most significant trans-boundary ecosystems in Africa will be lost forever (Jones et al. 2009).

To solve this problem, proponents of a scientific problem definition propose expanding the amount of land under protection in Tanzania. As one scientist commented, "For a nation renowned for its protected areas and conservation commitment, some large herbivore populations need more conservation attention in order to remain stable" (Stoner et al. 2007, p 202). Proponents also propose strengthening antipoaching efforts and educating local residents about the importance and potential benefits of wildlife conservation. It is assumed that sufficient protection, enforcement, incentives, and education will alter people's behavior and reduce the primary threats to wildlife. Measures of success are based on quantifiable biophysical indicators such as species' abundance and distribution data and how many hectares and wildlife corridors are being effectively conserved.

A second type of technical problem is thought to be rooted in economic inefficiencies and inequalities, which undermine efforts to conserve Tanzania's wildlife. Proponents contend that wildlife-based revenues (particularly from sport hunting and photographic tourism) are neither efficiently generated nor equitably redistributed to local residents, who are the de facto managers of wildlife (Nelson et al. 2013). Other economic problem definitions include ambiguous and inequitable policies regarding the sharing of wildlife-based revenues, the capture of revenue by elites, the fact that net costs outweigh benefits at the village and household levels, the undervaluation of wildlife, the absence of market-based competition in the allocation of hunting blocks, and insufficient financial investments in wildlife management outside of formal protected areas (Baldus 2002; Baldus and Cauldwell 2004; Lindsey et al. 2007; Nelson 2007; TNRF 2008).

Unlike the scientific problem definitions, which stress the intrinsic and biophysical value of wildlife, an economic problem definition treats wildlife as a source of competitive economic advantage that can be used to boost economic growth,

reduce poverty, and help defray the costs of conservation. An economic focus presumes that without sufficient financial incentives, wildlife conservation will not be a sustainable or viable form of land use. From a constitutive viewpoint, the economic problem definition is grounded in the doctrine of neoliberal economics and the power of the free market to guide more efficient and effective decision making.

Finally, many participants perceive the problem to be rooted in bureaucracy. After implementing a centralized and punitive management strategy for decades, Tanzania's 1998 Wildlife Policy proposed a new category of protected area known as a WMA, wherein the authority over and benefits from the sustainable use of wildlife were devolved to the village level. Reforming wildlife management in Tanzania has, however, not come quickly or easily. Many of the problems encountered by WMAs are broadly described as "poor governance" or simply "bureaucracy" (Baldus 2006; Sulle et al. 2011). A closer analysis of the bureaucratic problem type reveals three interconnected concerns: the failure to devolve decision-making authority, corruption and lack of transparency, and cumbersome, contradictory, and vague policy prescriptions. A specific focus on authority, participation, and corruption distinguishes the bureaucratic explanation from other technical definitions. Proponents point to the enormously complex, burdensome, and expensive procedures that villages must complete in order to establish a WMA as well as the highly centralized, secretive, and reform-resistant culture that pervades Tanzania's Wildlife Division (Baldus and Siege 2001).

Those who focus on bureaucratic explanations contend that despite a rhetorical commitment to decentralization, there is actually increased centralization in decision making over wildlife in Tanzania over the past 20 years (Nelson et al. 2007). From a constitutive perspective, policies may promote a new rhetoric (e.g., community-based conservation, decentralization, and win–win solutions), but the formula and doctrine for managing wildlife has not fundamentally changed. For example, authority and decision making over wildlife remain highly centralized, nonelites at the local level continue to lack the normative authority and rights to manage and benefit from wildlife, and participation continues to be treated as a means to an end rather than a goal unto itself.

With respect to doctrines, what Tanzania should look like is an aesthetic question supported by a set of assumptions about the landscape, its value, and its future. Doctrines may not be explicitly conveyed, but they are essential for sustaining people's perspectives and expectations. Tanzania's wildlife is often depicted, for example, in terms of a dichotomy between social and ecological systems; there is a presumption that human activities are somehow distinct from natural processes and their presence on the landscape threatens, impedes, or disrupts ecological systems (Neumann 2001; Peluso and Watts 2001). "All these villages and people harm the environment, there is no place for wildlife here…. There should be elephants moving here freely, not fields and fields of cassava," a district wildlife office commented while driving in southern Tanzania (pers comm 2008). Such comments are of course anecdotal, but reflect this dichotomy.

The gap between the rhetoric of community-based conservation and the reality of continued centralized control over wildlife is in part driven by differing

assumptions, visions, and expectations for the landscape; in short, common interests have not been identified or integrated. This divergence undermines efforts to reform the country's wildlife sector and reflects a fundamental challenge facing large-scale conservation throughout much of sub-Saharan Africa and the developing world (Nelson et al. 2007).

Goldman (2003) suggests that this contradiction is driven by the government's paradoxical desire to attract donor funding tied to the devolution of power while simultaneously maintaining control over Tanzania's valuable wildlife resources. Similarly, Nelson (2009) argues that decentralization has failed because government officials have little incentive to relinquish their control over valuable resources and local communities lack the capacity and power to influence the decision-making process through existing institutions. Nelson's research suggests that the problem may be less technical in nature and more grounded in the governance and constitutive processes that drive decision making.

8.3.2 Governance Problems

Focusing on governance problems shifts the locus of attention away from technical problems such as habitat loss, economic inefficiencies, and bureaucracy to focus on the decision-making process itself. While decision making is often perceived as a single or isolated event, the process can be broken down into a set of tightly connected phases or functions. These include how and what types of information are collected (intelligence), debate and endorsement of policies by different groups (promotion), the identification and selection of policies (prescription), the invocation of policies (implementation), appraisal, and termination (Lasswell 1956). Table 8.1 illustrates how the phases of decision making unfolded in the Selous Niassa Wildlife Corridor.

Intelligence: The collection and dissemination of information (aka intelligence) is a vital and continuous part of the decision-making process. Decision makers depend on regular access to comprehensive, factual, and timely information throughout the decision-making process. What types of information are collected and how data are analyzed and disseminated are, of course, dependent on people's perspectives, values, and problem definitions. Ideally, information should be accurate, timely, comprehensive, continuously communicated, and accessible to any interested party (Lasswell 1956). In contrast, the restriction and manipulation of data are often used to secure values such as wealth and power. In recognition of the different perspectives possible in large-scale conservation, data collection and analyses should be relevant to all aspects of the problem, preferably using multiple methods and sources.

A review of primary and secondary literature regarding Tanzania's wildlife policies plus individual interviews with conservation practitioners indicate that the intelligence function has fallen short of the recommended standards. First, the collection of intelligence around WMAs has been uneven at best. For example, a major evaluation of the WMA model (USAID 2013, p. ix) determined that "There is no

Table 8.1 The decision-making process

Activity	Definition	Examples
Intelligence	Collection, analysis, and dissemination of information relevant to the problem	Research on distribution and movement of wildlife; economic analyses of sport-hunting revenues
Promotion	The process by which policies are described, debated, and advocated	Donor-sponsored, "awareness-raising" seminars, promotional materials such as posters, radio shows, etc.
Prescription	Expectations are clarified, norms and sanctions are developed through formal and informal rules	The Wildlife Policy of 1998 and the Official Guidelines for the Establishment of Wildlife Management Areas
Implementation	Putting a prescription into effect (invocation) and resolving conflicts through application of sanctions (application)	Village Land Use Plans (invocation); project-based steering committee meetings to resolve the problem of illegal settlements (application)
Appraisal	Each function of decision making is evaluated with respect to goals and standards	Official evaluations of the WMA model
Termination	The ending or adjustment of an existing policy or project	Transition from pilot phase to scaling up WMA model across Tanzania

consistent monitoring of wildlife, socio-economic or other indicators that could be used to better understand the performance of the WMAs." Without these data, participants are hard pressed to understand the impacts of WMAs as a model for improving large-scale conservation.

A second weakness in intelligence can be found in the lack of transparency and accountability regarding information, including, for example, revenues collected by local residents charged with overseeing WMAs. Access to timely and factual data, particularly in the sport-hunting industry, is also limited. Trophy hunting is permitted within approximately 15 % of Tanzania's protected areas (specifically game reserves) and generates an estimated US$ 77 million annually (Booth 2010). Despite its significant role in wildlife management, only a handful of detailed analyses of the hunting industry have been conducted and disseminated to the public. For example, data regarding the number and type of hunting permits granted by the Wildlife Division, or the total income generated by the hunting industry, are not readily made available. As a result, sport hunting remains one of the most secretive, centralized, and nontransparent components of wildlife management in Tanzania today.

There are also major concerns about the reliability and accuracy of reports filed by hunting companies, including the inaccurate recording of the age, weight, gender, or number of animals shot in order to avoid penalties and fines. Even when reports are not being deliberately distorted, Baldus and Cauldwell (2004) argue that the number and variety of animals hunted annually is often far greater than is recorded, historical census data trends are rarely analyzed in detail, and the capacity of the Wildlife Division to manage adaptively is limited. As a result, the sustainable management of wildlife hunting quotas is not likely. In short, trends suggest that the hunting industry and the Wildlife Division (which is charged with overseeing the

industry) often restrict the collection and dissemination of information in order to secure core base values such as wealth, power, respect, and skill.

Promotion: When participants use information to debate potential courses of action, advance policies, or build coalitions, they are engaged in the promotion function of decision making. Ideally, promotion allows a wide range of alternatives to be debated and discussed in an inclusive manner. The goal of the promotion function in large-scale conservation is not to advance a single fixed position but rather to encourage an open debate about the full spectrum of possible alternatives in order to identify common interests (Brunner 2005). Ideally, debate should be as integrative and inclusive as possible and valid perspectives should be heard, recorded, and addressed. The current debate over wildlife management in Tanzania exhibits very few of these standards.

The most notable weakness in promotion is the limited role that local communities exercise in the decision-making process, despite rhetoric to the contrary. Nelson (2006, p 11), for example, found that "Local communities and civil society organizations did not participate, beyond the level of the occasional formal consultation of a few hand-picked local leaders, in formulating the Wildlife Policy or the WMA regulatory framework." Likewise, observations of promotion in the Selous Niassa Wildlife Corridor revealed that participation was passive and consultative rather than inclusive and interactive (Pimbert and Petty 1995). The promotion function was largely a process of informing participants and obtaining consent as opposed to an open debate. Official meetings with local residents, for example, were used to present research results, inform residents about the concept of the WMA model, and obtain their endorsement. As such, the promotion function was structured to disseminate information and generate support rather than openly debate the problem definition, clarify goals, or select alternatives. In short, public participation is frequently used as a means to a predetermined end and not a goal unto itself.

Prescription: The prescription function in decision making is a transition from data collection and debate to the establishment of specific laws, rules, and guidelines. Prescriptions can be established through legislative means or they may be informally transmitted through cultural mores and norms. The clarity, specificity, and authority of a prescription will determine the short-term outcomes and long-term effects of a decision. According to Clark (2002), a strong prescription should (1) establish clear goals that reflect participants' expectations, (2) describe the contingencies under which the prescription will be applied and sanctions for noncompliance, (3) provide sufficient resources for the prescription to be implemented, (4) have both authority (legal mandate) and the ability (control) to act, and (5) continuously communicate the intent of the prescription to the public.

All prescriptions flow from a set of desired goals. The purported goal of Tanzania's wildlife policy is the "development of an enabling legal, regulatory, institutional environment for rural communities and the private sector to participate in and benefit from wildlife conservation" (United Republic of Tanzania 2009, p 18). The WMA Regulations (2002) and the more recent Wildlife Conservation Act of 2012 represent formal prescriptions in service of this goal (United Republic of Tanzania

2012). An appraisal of these prescriptions reveals a lack of clarity, specificity, and realism about the surrounding policy environment. While the trend is improving, clear weaknesses still persist. For example, the 1998 Wildlife Policy never clarified how decision-making authority should be coordinated between the village chairman, the village natural resource committees, or the authorized association responsible for the management of a WMA. Likewise, the WMA Regulations (2002) were roundly criticized for failing to clarify how revenues from tourism and hunting should be shared with communities (Nelson 2007). Given the enormous amount of land set aside strictly for wildlife, this was a costly weakness in the prescription function.

The original prescriptions governing wildlife management also conflicted with other policies governing natural resource use. In one example, the government issued a permit for uranium prospecting within a WMA—a clear violation of the village land use plans. This led one villager to conclude: "We doubt our land use plans have any meaning. We take this trouble to make a plan but a mining company can come in and just take what they want; it goes against everything we had hoped" (pers comm 2008).

Fortunately, trends indicate an improvement in the prescription function. After 10 years of significant public criticism and pressure, the Tanzanian Ministry of Natural Resources and Tourism finally released revised WMA Regulations in 2012. The new regulations go further than previous prescriptions to provide clarity regarding the devolution of authority, designation of hunting blocks, as well as guidance regarding contractual investment agreements and the sharing of revenue (Nelson 2013).

Implementation: The implementation phase of decision making refers to the authority and responsibility to invoke and apply a prescription. Implementation also includes the interpretation (or appeal) of a prescription in order to resolve any disputes or apply sanctions. In general, decision makers should have the necessary authority, resources, and capacity to invoke the selected policy and implementation should be dependable, consistent, and timely. In order for disputes to be resolved, prescriptions and sanctions must be clear, practical, and most importantly, they should meet the expectations, norms, and demands of the broader community (Clark 2002). Finally, all aspects of the implementation phase should be subject to continuous review and adjusted if necessary.

A significant weakness in the implementation of Tanzania's wildlife policy was the long delay between the passage of the 1998 Wildlife Policy (not revised until 2007) and the 2002 WMA Regulations (not revised until 2012). The long delay resulted in more than sixteen pilot WMAs lacking much-needed guidance, including the legal authority to enter into agreements with private operators, which caused enormous frustration among participants. In 2004, a draft version of the Wildlife Act was circulated for public comment and numerous discussions were held in which participants provided extensive feedback and comments. During this time, participants lamented that while the Wildlife Act called for the devolution of authority and decision making, in practice the prescription structured decision making almost entirely with the Director of Wildlife and the Minister of Natural Resources

and Tourism. Indeed, until the passage of the 2012 WMA regulations, residents lacked any clarity regarding their rights, responsibilities, and decision-making authority with the respect to the WMAs established on village land (Stolla 2005).

A second weakness in implementation has been the failure to sufficiently orient to the broader expectations and context of the policy environment. To assume, for example, that the Wildlife Division (and even local elites) would willingly give up control over the allocation of highly profitable hunting blocks was an acontextual perception of the policy environment. The implementation of any policy should recognize that people will inevitably act in ways which they perceive will leave them better off than had they acted otherwise (Lasswell 1971). To label the recalcitrance of the Wildlife Division to devolve power as "bureaucracy" or "greed" is inaccurate; it is a governance and constitutive problem that manifests itself in the prescription and implementation functions of decision making. Local elites and wildlife officials currently have little incentive to relinquish the values of wealth, power, respect, and enlightenment that flow from the centralized control of wildlife resources.

The ability to resolve conflicts and apply sanctions has also fallen well short of the standards for effective implementation. There are, for example, no specific guidelines or protocols regarding the displacement of local residents when a WMA is established (Brockington et al. 2008). As a result, violations are dealt with on an ad hoc and inconsistent basis. A small settlement known as Semeni in the Selous Niassa Wildlife Corridor is indicative of this weakness in application. The 400 residents of Semeni are accused of illegally residing inside a proposed WMA in southern Tanzania. Government officials claim that local residents "invaded" the WMA after it had been demarcated and that residents support and harbor poachers. Conversely, the residents deny these accusations and claim they are a "*kijiji cha asili,*" or a "natural village" that existed prior to the forced villagization schemes of mid-1970s during Tanzania's socialist era.

In resolving this controversy, officials focused exclusively on the technical nature of the problem, such as whether or not to relocate or compensate Semeni's residents, and if so, who would pay? Governance and constitutive questions, including who had the legal obligation and authority to resolve the dispute, what rights the residents of Semeni had to stay on the land, and how grievances and violations should be judged, were all overlooked. By not attending to these underlying governance and constitutive questions, the implementation function fell well short of the recommended standards and local officials will face continued difficulties in resolving this dispute.

Appraisal: A comprehensive appraisal involves evaluating each function of the decision-making process to determine if participants' goals are being met. The effectiveness of any appraisal is therefore dependent on how well the decision-making process as a whole is performing. Effective appraisals identify how a single weakness in decision making can have a compounding impact on the process as a whole. Ideally, appraisals should be continuous, independent, transparent, inclusive, and the results widely disseminated (Clark et al. 2000). The goal of the appraisal function is not only evaluation but also to harvest lessons and apply them to future prescriptions in order to secure participants' common interests.

A review of more than 30 official and independent evaluations of the WMA model revealed significant weaknesses (Picard 2010). First, there was a predominant focus on technical problems, including bureaucracy (93 %) and economic inefficiencies (63 %). Bureaucratic problems included unwillingness to devolve authority, corruption, and excessive bureaucracy. Appraisals that focused on economic inefficiencies were primarily concerned with the absence of transparent and market-based pricing mechanisms and the inequitable distribution of income from wildlife to local residents. Almost all evaluations focused exclusively on prescription and implementation, overlooking the other phases of decision making, including weaknesses in intelligence, promotion, appraisal, and termination.

Many appraisals of the WMA model focused on "verifiable targets" and assessed progress toward "project outputs" to the exclusion of governance and constitutive problems. The mid-term and final evaluations of the Selous Niassa Wildlife Corridor, for example, gave the project an overall rating of "successful" based on indicators such as the number of village game scouts trained, the amount of baseline research completed, and the percentage of residents who had been "sensitized" (Chapeyama 2007). While these indicators provide useful trend data, understanding how villagers apply and share knowledge from training seminars and what long-term effects the training had on their attitudes and behavior are arguably more important variables to consider. In short, the appraisal function focused on quantitative achievements and overlooked key questions about the decision-making process, such as: are current problem definitions and data sufficiently comprehensive, is participation and debate inclusive, and what attitudinal changes and institutional outcomes are evident?

Termination: Termination, the final phase of decision making, refers to ending or adjusting a policy or project. It is one of the most under-studied phases of decision making, yet it plays a critical role in the final outcome of any policy (Brewer and deLeon 1983). A major weakness in termination is the lack of domestic resources to support wildlife conservation in Tanzania. After Ethiopia, Tanzania is the second largest aid recipient in sub-Saharan Africa and received approximately US$ 27 billion in assistance between 1990 and 2010 (Stewart 2012). While the majority of this assistance went to health and education efforts, Tanzania's wildlife authorities have always relied heavily on foreign assistance and WMAs are no exception.

As donor priorities change, financial support for WMAs may be reduced and possibly even terminated. In 2006, for example, the German aid agency GTZ withdrew its funding for Tanzania's wildlife sector (Baldus 2006). As a result, several WMAs in southern Tanzania faltered and were forced to scale back their activities. A recent evaluation of the WMA model similarly concluded "The costs of establishing and running WMAs are high, and no WMA visited in this evaluation is yet financially self-sustaining." (USAID 2013, p 32). Until WMAs are financially self-sufficient or the government stops heavily taxing WMA revenues so more money can be plowed back into their operations, this weakness in termination is likely to persist.

8.3.3   Constitutive Problems

Unlike technical problems that are concerned with substantive phenomena, or governance problems that focus on the decision-making process, constitutive problems are about how, who, and why decisions are made. Constitutive problems arise from the implicit norms, doctrines, and worldviews that guide individual and collective decision making. While they are more opaque than technical or governance problems, constitutive problems precipitate and fuel many of the challenges facing Tanzania's wildlife today. Examples of constitutive problems include the balance between conserving wildlife and securing local livelihoods, distributing the costs and benefits from wildlife populations that migrate across administrative and political boundaries, contrasting worldviews about the value, purpose, and meaning of the Tanzanian landscape, and deciding who has the right and authority to make these decisions.

A constitutive understanding of poaching by local residents, for example, acknowledges it is a value-driven problem fueled by a desire for well-being and wealth and not simply a technical problem than can be resolved solely through increased enforcement or education. A constitutive perspective considers the larger context in which poaching is embedded. It asks what systemic conditions are driving people to poach and who should have the authority and control to make decisions about wildlife. In summary, constitutive decision making is concerned with how laws, institutions, and participants are structured, selected, and authorized to manage wildlife. Being cognizant of constitutive problems requires a deep knowledge of the social process, particularly participants' perspectives and values. While constitutive decision making can be difficult to physically observe, the technical and governance problems described in this chapter are more often than not rooted in constitutive issues.

A major, yet largely unacknowledged, constitutive problem in large-scale conservation is the contrasting meanings, values, and expectations associated with Tanzania's landscape. Some participants, for example, perceive the landscape as a "wilderness" and attribute specific values to the landscape and in turn justify its protection on moral and aesthetic grounds. In *Wilderness and the American Mind*, Nash (1967) describes how wilderness is a socially mediated construct that imbues a place and its beholder with identity and meaning. The question, Nash states, is not what constitutes a wilderness but what participants think it is. The aesthetic ideal of wilderness lies at the core of many participants' perspectives and expectations and it shapes each phase of their decision-making process. Embedded in the concept of a wilderness is a mutually exclusive and dichotomous relationship between humans and nature. This dichotomy creates a central paradox, what Cronon (1996, p 11) refers to as "a dualistic vision in which the human is entirely outside the natural… our very presence represents its fall."

For other participants, the landscape is not a wilderness but a means of production. It is a source of subsistence, security, and the foundation on which a specific set of social arrangements, obligations, and cultural identities is grounded. Neumann

(1998) captures this contrast when he describes how the creation of Tanzania's protected areas imposed a new set of meanings on the landscape. His seminal book on Tanzanian conservation *Imposing Wilderness* describes how Arusha National Park is at once "a picturesque ideal [of wilderness] and the embodiment of a decades long struggle to defend and regain ancestral land claims." (Nelson 1998, p 2). For many local residents, the expansion of Tanzania's network of protected areas is inextricably tied to the colonial and postcolonial experiences of dispossession, displacement, and centralized authority. In sum, large-scale conservation in Tanzania has erased boundaries for wildlife, tourism, and private capital, while erecting borders and restricting access to resources for others.

Finally, there are participants for whom the landscape and its wildlife represent an opportunity to secure the values of wealth, power, and skill. Wildlife in particular is a financially lucrative resource in Tanzania and there are strong behavioral and institutional incentives that drive people to retain control over it. Garland (2006), for example, describes how many young Tanzanians are choosing to become wildlife professionals as a means of gaining access to the values produced through wildlife, including income, status, social networks, education, and travel. Understandably, these participants are resistant to devolving their authority and control over such values.

Extensive research in human psychology, political science, and organizational behavior reveals that people make decisions that they perceive will leave them better off than had they decided otherwise (Lasswell 1971). Yet conservationists have been generally slow to appreciate the full spectrum of values, perspectives, and expectations that determine behavior. It is assumed, for example, that the provision of sufficient financial and material incentives will result in behavioral and attitudinal changes among local residents toward wildlife. This assumption ignores alternative values and perceptions (for example, respect and power) that may drive participants' decision making. More importantly, these assumptions presume that there is only one meaning associated with the landscape and thus only one "correct" way to manage wildlife.

The decline of Tanzania's wildlife is therefore part of a larger constitutive problem. It is a struggle over values, what the landscape represents, and the rules and norms that dictate how resources should be used and who gets to decide. Many of the technical and governance problems described in this chapter are rooted in this clash between fundamentally different worldviews about the meaning and value of the landscape, as well as who governs it and how it should be governed. It is the inability of participants to recognize, much less reconcile, these contrasting views that threaten large-scale conservation in Tanzania. In order for participants to meet their expectations and value demands collectively, fundamental improvements in decision making are required such that common interest outcomes can be identified, secured, and sustained over the long term. In sum, successful large-scale conservation is as much about the ways in which people interact (the social process) and how they make decisions as it is about the technical aspects of conserving wildlife.

8.4   Recommendations

Three strategic recommendations are offered to improve large-scale conservation in Tanzania. First, participants (from donors to local residents) must begin to address technical, governance, and constitutive problems. To do this, participants require regular, inclusive, and transparent opportunities to identify their goals and common interests as well as committed leaders who have the skills, resources, and ability to guide this process. Problem definitions must also begin to account for the broader social context, including participants' perspectives, values, and strategies. Efforts by the Tanzanian Natural Resource Forum and other civil society organizations to hold open forums, disseminate information, and create open and inclusive arenas where participants are enabled to discuss the future of Tanzania's wildlife are a promising first step and should continue to be supported.

Second, in order to improve ordinary, governance, and constitutive decision processes, the goal of reforming the nation's wildlife policies must emanate from the Tanzanian citizenry and their elected representatives. International donors and conservation practitioners have an important role to play but they cannot continue to be the primary funders, decision makers, and advocates for reform. International partners can make important contributions by continuing to invest in strengthening civil society organizations and shifting their funding strategies to support long-term, small-scale, and flexible conservation interventions.

Third, while there are differing problem definitions, values, and expectations associated with the management of Tanzania's wildlife, common interests do exist. Wildlife is an increasingly valuable resource and government officials are unlikely to voluntarily devolve decision-making authority unless individual gains are contingent on advancing the goals of others. Identifying common interests will therefore require adjustments in the norms, organizational culture, and doctrine that have guided wildlife management in Tanzania for decades. It will require renegotiating how authority and control over wildlife are allocated and it will demand that participants reflect on their own standpoints, values, and expectations. This transition will not be easy or quick, but acknowledging and addressing all three types of problems will begin a process by which Tanzania's citizens can begin to identify and secure their common interests.

8.5   Conclusion

To summarize, the policy problem facing large-scale wildlife conservation in Tanzania is a nested set of technical, governance, and constitutive problems. The problem is complex, dynamic, and not well understood by most participants. Continuing to focus the bulk of human and financial resources on technical problems such as poaching, habitat fragmentation, or the distribution of wildlife-based revenues will not achieve large-scale conservation if the underlying governance and constitutive

problems are not also addressed. To succeed, participants require regular, inclusive, and transparent opportunities to identify their goals and common interests, as well as committed leaders who have the skills, resources, and ability to guide this process. Problem definitions must begin to account for the broader social context, including participants' perspectives, values, and strategies. Finally, more effort and support should also be directed toward disseminating information, building local capacity, and creating open and inclusive arenas where participants are enabled to discuss the future of Tanzania's wildlife.

These are not unrealistic goals. In 2013, Tanzania's Prime Minister Mizengo Pinda reversed a decision by the Minister of Natural Resources to relocate thousands of Masai residents from the Loliondo area in northern Tanzania in order to establish a wildlife area (Ngoitiko and Nelson 2013). The reversal was in no small part the result of participants rallying together to protest the forced removals and demand a more inclusive solution for human livelihoods and large-scale wildlife conservation. The decision also reflects positive signs about the decision process, including the enforcement of laws protecting customary land rights and a vibrant democratic process that enables participants to establish arenas, challenge authority, and identify solutions in the common interest.

While there are contrasting problem definitions, values, and expectations associated with the management of Tanzania's wildlife, common interests do exist. The common interest is not, however, a collection of special interests that are fused together into a win–win scenario. It consists of goals that are linked and interdependent, and in order to further any one set of values, the interests of other participants must also be advanced. Identifying the common interest will require adjustments in the norms, organizational culture, doctrine, and bureaucratic patterns that have guided wildlife management in Tanzania for decades. It will require renegotiating how authority and control over wildlife are allocated, and it will require that participants reflect on their own standpoints, values, and expectations. This transition will not be easy or quick but acknowledging and addressing all three types of problems will begin a process by which Tanzania's citizens can begin to identify and secure their common interests.

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Chapter 9
The Humboldt Bay Initiative: Integrating People and Natural Resources in Northern California

Rebecca Price-Hall, Aaron M. Hohl and Susan Schlosser

Abstract The case presented in this chapter provides a prototype for using collaborative processes in large-scale conservation. The most important lesson of the chapter is that developing a program that addresses real-world social and environmental problems in ways that truly meet the common interest is both slow and time consuming. The Humboldt Bay Initiative (HBI) is composed of scientists, resource managers, and community members who came together to address the environmental problems of Humboldt Bay and its surrounding lands. The initial impetus for the group's formation was frustration with the existing arena for addressing natural resource issues in the region. The arena featured polarized public discourse, fragmented jurisdictions, and decision making that was insufficiently contextual, both socially and biophysically. In its place, the group adopted an ecosystem-based management approach that is not only rooted in ecological science but also recognizes the importance of using governance mechanisms to solve environmental problems. Its successes to date have relied on strong leadership and robust collaboration among stakeholders. Its future depends on developing an institutional structure that enables it to interface with policy makers despite the fact that the current governance and constitutive structures are not designed to allow an independent group such as HBI to integrate easily into the decision-making processes.

Keywords Large-scale conservation · Prototype · Humboldt Bay Initiative · Collaborative learning · Bridging organization · Action research · Evaluation research · Ecosystem-based management · Conservation Measures Partnership · Climate change

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9.1 Introduction

The Humboldt Bay region on the northern California coast has an economy that was historically dependent on natural resource use, including the timber and fishing industries. In the past, the environmental impacts of management activities like road building and levy construction were not well understood and little thought was given to long-term sustainability. Today the region is dealing with the legacy of past management activities. Additionally, rather than looking at the priorities of the whole ecosystem, the current institutional structures—including governance, knowledge generation, and management—promote a mentality in which each agency pursues projects based on its sometimes narrow and restricted priorities. Ultimately, this undermines our ability to pursue integrative and collaborative solutions.

This chapter explores how the collaborative processes used by the Humboldt Bay Initiative (HBI) can be applied as a prototype for large-scale conservation. We begin the chapter by briefly describing our methods and clarifying our standpoint. Next, we provide a description of over-arching problems that HBI is trying to address and recount the contextual factors that have influenced it. We analyze the strengths of the methods used as well as the challenges that have been encountered and consider some alternatives for improving the organization. Finally, we make recommendations about how the lessons of HBI could be applied in other situations.

9.2 Methods and Standpoint

The analysis in this chapter is based on our participation as members of the HBI. We draw heavily on two project reports, *Humboldt Bay Initiative: Adaptive Management in a Changing World* and *Humboldt Bay Ecosystem Program—Final Report* (Schlosser et al. 2008, 2009).

The HBI[1] is a group of scientists, resource managers, and community members with diverse viewpoints and a broad spectrum of knowledge and expertise. The organization was formed in 2006 in response to a perception that conventional resource management approaches had failed to address many of the bay's environmental problems and will ultimately be ineffective in protecting its ecosystems and natural resources. The organization's approach emphasizes collaborative learning, science-based management, sustainability, ecological health, and, importantly, it views humans as an integral part of the ecosystem (McLeod et al. 2005).

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[1] The program was initially termed the Humboldt Bay Ecosystem Based Management Program and eventually renamed the Humboldt Bay Initiative. For the purposes of this chapter, we have generally not differentiated between the two names.

9.2.1   Methods

Our analysis uses action research and evaluation research methods (Berg 2004). Action research is a collaborative research method in which those involved in the program to be studied are both beneficiaries of and active participants in the research itself. Action research and utilization-focused evaluation are intended to produce information that will enlighten and empower participants. These methods are reflexive and intended to produce results that are fed back to the program being studied (Patton 1997; Singleton and Straits 1999). Potential problems of researcher bias in action research can be reduced by employing self-evaluation methods and being transparent about the researchers' standpoints. Before describing our individual standpoints, we must provide an overview of the different levels of participation in the HBI. This overview is expanded in the management and policy problems section of the chapter.

There are three main ways in which individuals participate in HBI. First, the Core Team serves as an executive committee that provides leadership and direction for all HBI efforts. Second, the Project Team is a large group with diffuse membership of > 100 people and numerous organizations that have expressed interest in participating in the program. The Project Team identifies priority issues and develops strategies for addressing the issues. Finally, Work Groups function as subcommittees that take on the work of translating strategies into projects.

9.2.2   Our Standpoint

We have engaged in the project from different disciplinary, professional, and personal standpoints. All three authors are members of the HBI Project Team, have served on various Work Groups, and were actively involved in drafting the organization's strategic plan. Two of the authors, Becky Price-Hall and Susan Schlosser, have been actively engaged in the organization since its inception and are members of the Core Team. Schlosser has been the lead facilitator of the group, convening meetings, reaching out to the general public, working with others in the group to develop agendas and proposals, and overseeing the overall functioning of the group. Becky Price-Hall has served as a meeting facilitator, led working groups, and written grants on behalf of the organization, and serves on the nonprofit board of directors.

Although Price-Hall and Hohl have academic training in natural-resource-related fields, both initially got involved in the project as members of the general public. Price-Hall is a nearly life-long resident of Humboldt County who promotes collaborative approaches to address diverse social and environmental concerns ranging from homeless issues and community development to reducing the impacts of development on the ecosystem and adaptation to climate change. She has been engaged with HBI both as a volunteer and in a professional capacity as a social scientist. Hohl was a relatively recent transplant to Humboldt County when he started

attending meetings. He had a long-standing personal and professional interest in environmental management and its relation to sustainable development. He saw involvement with the project as a way to learn more about the community as well as to contribute his skills in a way that enhanced the well-being of the community. Schlosser developed and undertook the project as part of her professional duties as a California Sea Grant Extension Program advisor. Recently retired, in her professional capacity, she provided science-based knowledge through her education, outreach, and applied research programs. Her work focused, on estuarine ecology, ecosystem-based management (EBM), and coastal habitats, was broadly inclusive, and facilitated collaboration among stakeholders to implement projects.

9.3   Problem Orientation

Whereas the economy of the Humboldt Bay region is more diverse today than it was historically, it still depends on its natural resources. Additionally, the people of the region care deeply about the local environment; many of them were attracted to the region by its natural beauty. Unfortunately, the integrity of the environment is threatened by the past legacy of unsustainable management. In the period leading up to the formation of HBI, several factors essentially threw participants into an uneasy truce. The impact of national and global economic conditions on the regional resource-based economy combined with the declining availability of natural resources made collaboration more tenable. New relationships between industry groups, agency resource managers and regulators, workers, and environmentalists developed. The easing of conflict also provided an opportunity for a more collaborative and integrated approach to resource management. This type of effort, conducted at the community level and directed at multiple issues, goals, and outcomes, was considered an optimal way to build capacity, constituencies, and credibility (Wondolleck and Yaffee 2000; UNEP/GPA 2006). In this section, we will describe the study area, discuss the social and decision process related to natural resource management that led to the formation of HBI, and clarify the specific organizational goals of HBI and the ecosystem-based management goals for the bay.

9.3.1   Humboldt Bay Region

Located 360 km north of San Francisco, the Humboldt Bay region presents a rich physical, biological, and cultural setting (Fig. 9.1). It contains a wealth of aquatic and terrestrial ecosystems that support a diversity of wildlife species, unique Native American cultures, and a network of small communities and towns. Historically, Humboldt Bay was a large complex of wetland, marsh, and slough habitats. Although the bay is technically California's second largest estuary, in the summer
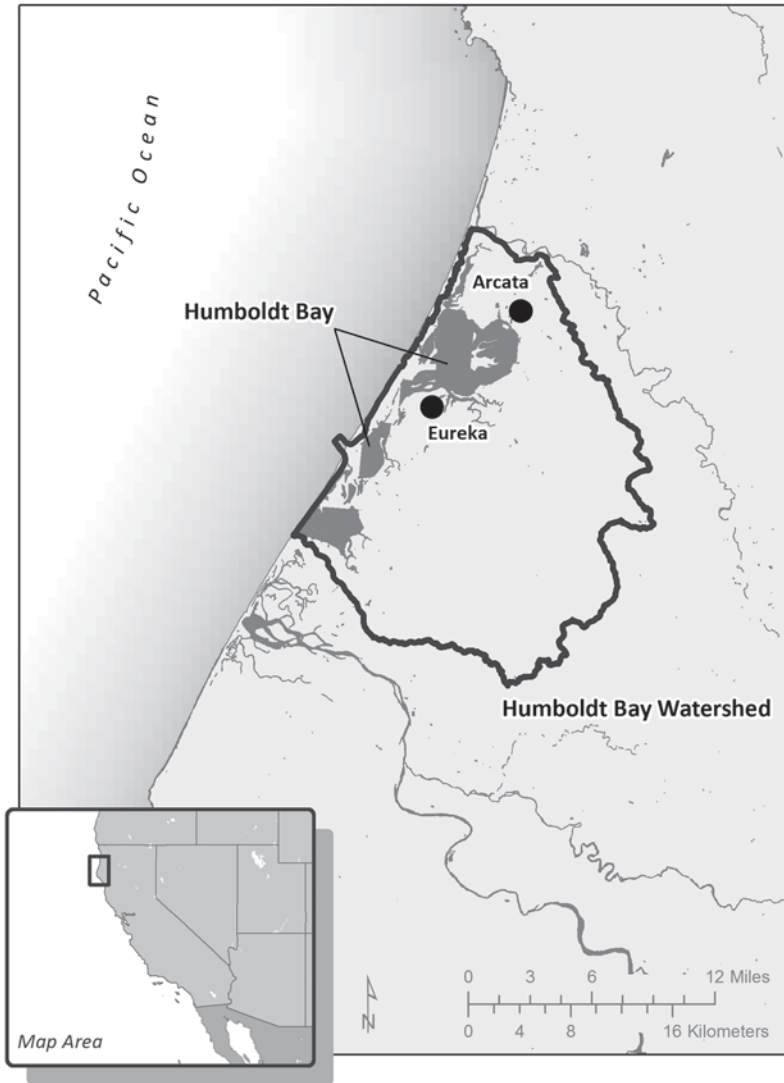
Fig. 9.1 Map of the Humboldt Bay watershed

months, it functions as a marine system with strong tidal influences. More than 40 %
of the eelgrass (*Zostera marina*) beds in the state occur in Humboldt Bay. The bay
is a stopover point on the Pacific flyway and serves as habitat for >200 species of
birds as well as juvenile Dungeness crab, rockfish, and salmonids. More than 60 %
of the oysters sold in the state are grown in Humboldt Bay and 60 % of the Pacific
brant (*Branta bernicla nigricans*) population uses the bay for foraging, roosting,
and staging.

The HBI has assigned the Humboldt Bay Ecosystem to primary, secondary, and tertiary zones to reflect the ecosystem processes that occur on different spatial and temporal scales. All three zones include ecological, social, cultural, and economic processes involving the biological and physical components of the Humboldt Bay Ecosystem. The primary zone includes the bay itself and is defined as waters inside the jetties, its historical tideland area, and all current and historical tidally influenced areas. The waters of the bay are public trust resources that are subject to the regulatory jurisdiction of the Humboldt Bay Harbor, Recreation, and Conservation District, the City of Arcata, the City of Eureka, and numerous state and federal agencies. Currently, existing tidelands and subtidal channels are used for commercial (e.g., oyster farming) and recreational (e.g., boating and birding) activities. Many of the historical tidelands have been converted to highly productive grass lands that are relied on by the local dairy and ranching industries. These areas are owned by public and private entities including federal and state agencies, local governments, land trusts, farmers, ranchers, and others.

The secondary zone includes all of the primary zone, plus the Humboldt Bay Watershed, and the nearshore extending from Trinidad Head to False Cape and out to a maximum of approximately 30 fathoms (55 m). This includes the major urban centers, small communities, and other watershed land uses. This zone encompasses the Eureka littoral cell, as well as coastal areas outside of Humboldt Bay that are affected by human activities within the bay. The waters within the secondary zone are used by the fishing and crabbing industries. The lands within the secondary zone are predominantly privately owned. The valley bottoms closer to the bay are used for residential development, small-scale crop agriculture, and grazing operations. The uplands are largely forested. There are a number of ranches and family forest operations and three major forest products companies that manage land within the secondary zone. Additionally, numerous marijuana grows exist in the zone. The grows frequently occur without the authorization of the landowners and sometimes have detrimental environmental impacts (Greenson 2011, 2012; Mintz 2012; Harkinson 2013; Donahue 2014).

The tertiary zone of influence includes the watersheds of Trinidad, Little River, Mad River, Humboldt Bay, Eel River and Bear River, and the nearshore ocean from Trinidad Head to Cape Mendocino. This tertiary zone is meant to encompass large-scale processes where effects on the Humboldt Bay ecosystem are less well understood. Onshore and offshore uses are generally similar to those in the secondary zone.

The bay and its ecosystems presently experience stresses from both its geological setting and the anthropogenic activities that sustain our local economies. The watersheds contributing to the bay are geologically young with a high rate of tectonic activity that contributes to a high rate of sedimentation. The marijuana industry is unregulated and, though the extent of its impacts is hard to qualify, the industry has been linked to problems such as spills of diesel and other chemicals into waterways, use of rodenticides impacting sensitive species, and excessive withdrawals of water from streams during the dry season (Humboldt County 2012). Although improved environmental management practices have been adopted by the agricultural and

forest products industries, especially with respect to the ongoing maintenance of road networks and the management of habitat for endangered species, a legacy of unsustainable land management practices contribute to additional environmental stresses (Five Counties Salmonid Conservation Program 2005, 2010). Streams and rivers in the region have been impacted by sediment runoff from surfaced and un-surfaced roads, and three of the four major tributaries to Humboldt Bay are now on the California Clean Water Act Section 303(d) list as impaired because of exces-sive sediment (North Coast Regional Water Quality Control Board 2009). Industrial waste has contaminated areas in and adjacent to the bay, and Humboldt Bay is considered impaired because of dioxin and PCB contamination. Habitat loss and modification are widespread in terrestrial and marine environments. More than 90 species of plants and animals have been accidentally or intentionally introduced into Humboldt Bay (Boyd et al. 2002).

9.3.2 Social and Decision Process

The HBI was formed because of a frustration among local scientists and govern-ment agency staff with the previous way in which natural resource issues had been addressed around the bay. There had been several decades of polarized public dis-course in Humboldt County about natural resource management and who was to blame for environmental and socioeconomic problems. The most vociferous, and at times violent, confrontations were between timber companies (notably Pacific Lumber Company) and environmentalists and were centered on the management of old growth redwood timberlands. In fact, the period starting in the late 1980s and running through the 1990s is referred to as the Timber Wars (Chase 2001; Widick 2009). The acrimony and distrust between environmental groups and the timber industry sometimes spilled over onto those whose jobs it was to regulate, study, and manage natural resources, as well as workers employed in the timber-dependent industries. While the issues that motivated the founders of HBI centered on the bay and had not involved the same level of scrutiny and controversy as forest manage-ment, participants were certainly aware of the degree of acrimony that natural re-source management could engender. The model of the Timber Wars is not one they wished to follow.

The HBI is an expression of sustained community effort and support. In the period leading up to the formation of HBI, a succession of groups formed to ad-dress bay-related resource issues on a technical level. The HBI Project Team and project partners have sought to build on several completed and ongoing planning and policy efforts (Fig. 9.2).

Early in the period, the Science and Technology Alliance of North Coast Estu-aries (STANCE) met regularly to share information and to discuss an ecosystem approach to resource management in the Humboldt Bay region. Two bay-related management plans were developed concurrently between 2002 and 2006. The *Humboldt Bay Watershed Salmon & Steelhead Conservation Plan* was developed
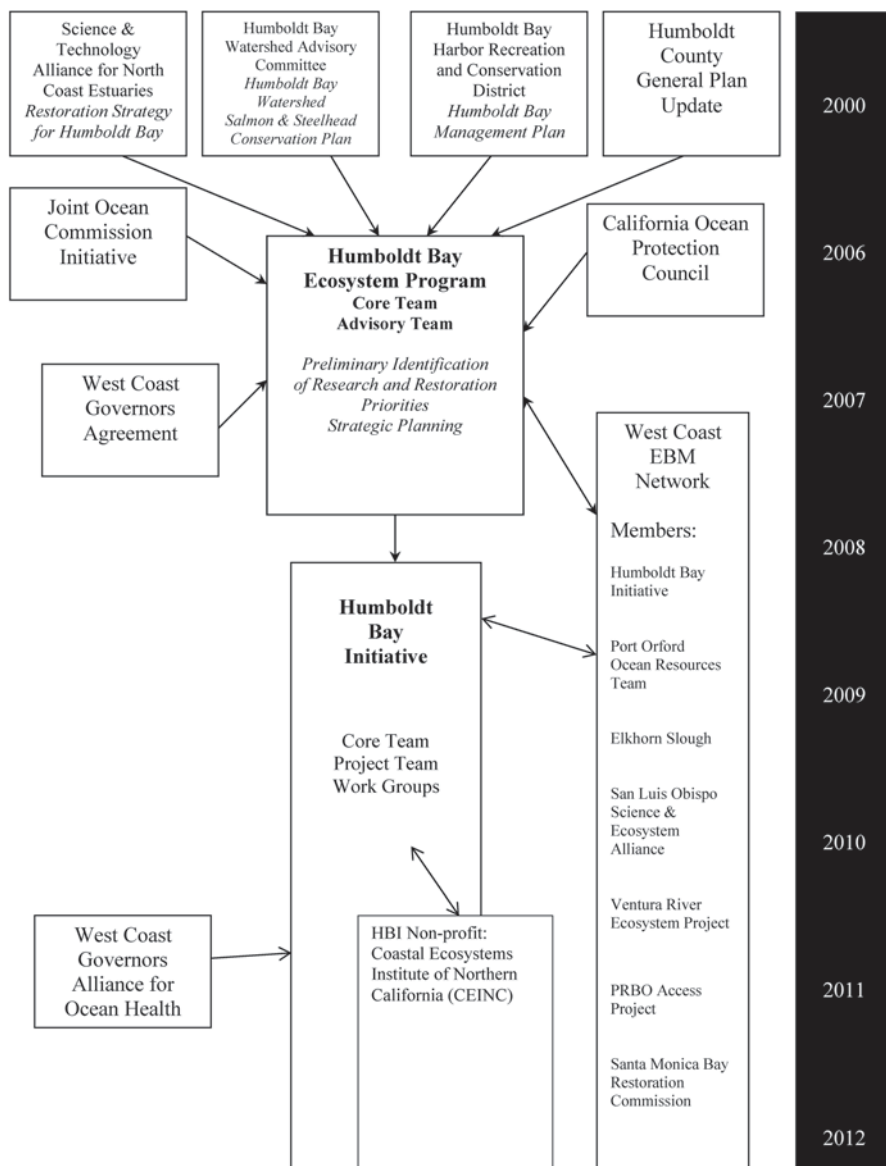
Fig. 9.2 Development of the Humboldt Bay initiative

by an ad hoc, community-based collaboration called the Humboldt Bay Watershed Advisory Council. The collaboration aimed to improve the bay watersheds, anadromous salmonid populations, and related resources while considering regional ecological and socioeconomic needs (Humboldt Bay Watershed Advisory Council and RCAA National Resources Service 2005). At the same time, the Harbor, Recreation

& Conservation District was working on the *Humboldt Bay Management Plan*, which provided a comprehensive framework for balancing and integrating conservation goals with economic opportunities (Humboldt Bay Harbor, Recreation and Conservation District 2007). Dozens of workshops, public meetings, syntheses of historical information, and hundreds of pages of written comments were incorporated into the two plans.

Many community members collaborated on both plans, and one result of these efforts was to highlight the need to use an integrated approach to address watershed and bay issues. It became apparent, first, that many environmental issues within the bay itself were driven by land-use decisions and activities in terrestrial environments around the bay and, second, that multiple jurisdictions and regulatory agencies would need to be involved if durable solutions to the environmental problems were to be developed. Traditional natural resource management is limited by management and regulatory structures that divide responsibilities along disciplinary lines, have authority within political boundaries, and often ignore ecological processes. Currently, most management jurisdictions and laws apply to a small segment of that ecosystem, and the impacts of management decisions on other parts of the ecosystem are not always considered. The institutional structures make it difficult to address ecosystem function and services, natural events, and unintended consequences that are part of most natural resource issues (Fiorino 2001).

9.3.3 Goal Clarification

The HBI is simultaneously pursuing two types of goals: substantive goals related to improving the bay ecosystem and supporting the local socioeconomic system, and procedural goals related to human dignity and political participation. Defining these goals has been an iterative process. We will first look at the goals of EBM in a general sense and then address how the specific goals articulated for HBI have changed over time based on ongoing conversations among participants in the process.

EBM, as embraced by HBI and the larger coastal and marine conservation community, is similar to ecosystem management except it has focused on the conservation of coastal and ocean ecosystems (e.g., Morro Bay Estuary, Marine Life Protected Areas off the coast of California) rather than terrestrial ecosystems. EBM approaches ecosystem conservation from the perspective of ecological science, but also recognizes that governance mechanisms are required to translate concepts into practice (Slocomb 1993). In brief, ecosystem management is understood to require groups and management institutions that engage in the collection and sharing of various sources of information among stakeholders, use monitoring to anticipate systemic change, and build adaptive capacity (Olsson et al. 2004).

Early in the formation of the Humboldt Bay Ecosystem Program, the Project Team read articles and identified a set of principles that were considered essential elements or criteria for EBM projects. Ultimately, the team crafted the following definition of EBM: "The Humboldt Bay Ecosystem-Based Management Program

is a collaborative approach to encourage and support human activities that promote the sustainable coexistence of productive and resilient biological resources and human communities. Ecosystem-based management seeks to balance ecological, economic, and social considerations in a science-based management approach so that ecosystem integrity and human well-being are maintained and improved. The Humboldt Bay Ecosystem-based Management Program considers multiple external influences, cumulative effects, ecosystem dynamics, trends and variability at multiple scales. This acknowledges that our understanding of ecosystem processes and human interactions is incomplete and inherently limited. We recognize the constraints of resource policies and governance structure to implementation of ecosystem-based management and strive to enable coordinated management in the Humboldt Bay Ecosystem" (Schlosser et al. 2008).

We turn now to how the general goals of EBM fit into the specific context of HBI. Both substantive and procedural goals are encapsulated in the organization's original vision and mission statements that were crafted by the Project Team and incorporated in the Humboldt Bay Ecosystem Program report. They were initially approved during an April 2008 meeting. The vision statement states: "Our vision is a vibrant, thriving, and resilient Humboldt Bay ecosystem that supports the well-being of our human and natural communities." The mission statement expanded on the vision statement and made an initial attempt to operationalize the vision: "The mission of the Humboldt Bay Initiative is to increase our scientific understanding of the Humboldt Bay ecosystem and to create an integrated framework for resource management and community-wide collaboration that links the needs of people, habitats and species to ensure a healthy future for Humboldt Bay's natural and human communities."

The following year, as part of a strategic planning process proposed and funded by the David and Lucille Packard Foundation, the Project Team developed a more detailed description of the HBI's proposed program and specific strategies the organization would use to accomplish its goals. The organization proposed to address stresses to the ecosystems resulting from human activities, climate change, excessive sediment, and invasive species. As a result of the strategic planning process, it was decided that rather than continuing to operate as an ad hoc organization, a nonprofit would be established. The nonprofit organization could undertake specific roles that were not feasible or appropriate for existing entities or partners in the project area. Essentially, it was hoped that HBI could serve as a bridging organization, that is, a network of collaborators that lowers the cost of collaboration and is able to draw on the diverse knowledge of various members to come up with a common understanding of problems and strategies for solving those problems (Folke et al. 2002). The roles for the nonprofit included: (1) Developing, integrating, and disseminating the information necessary for taking an ecosystem approach in community planning, economic development, and restoration efforts. HBI strategies have identified specific information needs. HBI will take responsibility to maintain and update the conceptual model with new information to facilitate adaptive management. (2) Promoting effective, efficient coordination mechanisms between local, state, and federal government agencies for better planning, implementation,

regulation, and monitoring. (3) Facilitating collaboration among government agencies, industry, and community groups to pursue shared goals for improving ecosystem and community well-being.

9.4   Management and Policy Problems

Our experience suggests that just as large-scale conservation problems are messy and complex, the process of developing a program designed to manage large-scale conservation problems is equally as complex. The HBI has involved a variety of entities and phases as it has developed. In this section, we describe the developments that led to the formation of the HBI.

9.4.1   Developing EBM in Humboldt Bay

The US Commission on Ocean Policy and the Pew Oceans Commission completed ocean policy plans in 2003 and 2004. Both of these plans recommended taking an EBM approach to coastal and ocean management. In response to these plans, California passed the Ocean Protection Act in September 2004. The West Coast Governor's Agreement on Ocean Health, which was signed in September 2006, identified EBM among its priorities and organizing concepts. The agreement is a partnership between California, Oregon, and Washington to protect coastal and ocean resources and the economies they support. These regional, state, and federal plans support and encourage EBM.

In a local response to these conditioning factors, the idea of a Humboldt Bay Ecosystem Program was presented at a workshop wrapping up the *Humboldt Bay Watershed Salmon & Steelhead Conservation Plan* program in November 2006. It was suggested that a local EBM program was possible, desirable, and could potentially enhance resource management for the Humboldt Bay region. The proponents included representatives from local cities, federal and state agencies, private restoration businesses, the local California Sea Grant office, and the harbor district. The Humboldt Bay ecosystem program was designed to conduct a scientific and management review of the watershed and bay plans and to develop an ecosystem approach to natural resource management issues important to the community.

This initial group of self-selected project proponents led by Schlosser, a California Sea Grant Marine Advisor, drafted a work plan to develop an EBM program for Humboldt Bay. The project proponents became the Core Team for initiating and steering the process. One of the initial steps was to create a larger group of experts and representatives from a range of viewpoints and disciplines. The Core Team contacted > 60 local scientists, managers, and community members between January and April 2007 to invite them formally to participate in the Humboldt Bay Ecosystem Program and to make a commitment that included a monthly 3–4-hour meeting and 1–2 hours of reading and study. These scientists, resource managers, business

representatives, tribes, local government staff, and elected officials agreed to form a 32-person Project Team. The Core Team met monthly to develop meeting agendas and prepare presentations and meeting materials for Project Team meetings.

Participants in the Project Team meetings and workshops deliberate on various aspects of the technical and governance problems identified by participants and review relevant planning and informational documents.

The Humboldt Bay Ecosystem program, initially funded by the California Coastal Conservancy, was administered through the University of California Sea Grant Program in Eureka. Three meetings in 2007 were facilitated by a professional facilitator. The professional facilitator helped the Project Team build an understanding of EBM, jointly develop vision and mission statements, and develop procedures for analyzing issues and articulating goals. For subsequent Project Team and Work Group meetings, the Sea Grant Marine Advisor (Schlosser) or a Project Team member facilitated or led meetings. Detailed meeting notes taken by Sea Grant office staff were circulated via e-mail to the Project Team for review before posting to the program website. Meetings were public and were announced through e-mail, the program website, and outreach events.

9.4.2   The Process of Clarifying the Organization's Purpose and Goals

Initially, the Core Team used literature reviews to identify and provide key EBM papers and reports to Project Team members. The development of the program as a learning organization was critical for the Project Team. Learning is central to establishing a well-informed constituency and to developing local capacity (Gunderson and Holling 2002). The learning process helped the Project Team establish ground rules, a decision-making process, geospatial boundaries, an ecosystem conceptual model, criteria for watershed and bay plan analysis, and written descriptions of ecosystem issue concepts. Work Groups were formed to develop proposals that would take the first steps toward addressing the priority issues using EBM principles. The initial EBM Program proposals included a conceptual model for physical, ecological, and social processes; modeling sediment dynamics and circulation in the bay; developing ecosystem indicators; developing a socioeconomic process model; and developing a Humboldt Bay "EBM Entity." Ultimately, these proposals were combined into a "unified proposal," which served as the action plan for the program.

Formal decisions on specific goals have been documented and publicly available throughout the process. However, outreach to the larger community during the initial year of the program was limited, and this was soon recognized by the Core Team as a limitation to the effectiveness of the program. Consequently, in the second year of the program, Schlosser and other members of the group were involved in significant and extensive community outreach. Presentations were given to city councils, county supervisors, industry associations, community groups, nonprofits, academic boards, other small EBM groups (e.g., other projects in the West Coast

EBM Network), and at professional society meetings. The HBI has been featured at each of the Humboldt Bay Symposia held since 2008. Outreach efforts have been important not only to inform the public about what the organization was trying to accomplish but also because EBM relies on a critical analysis of ecosystem issues by the community and needs community support.

At the same time, HBI participants were reaching out to the local community, the organization was getting recognition from outside organizations. The California Ocean Protection Council recognized HBI as an example of a local EBM project in 2007, leading to its inclusion as part of the West Coast Ecosystem Based Management Network (EBM Network), created as a result of the West Coast Governors' Agreement on Ocean Health (now the West Coast Governors' Alliance). The HBI Core Team members have presented each year to the West Coast EBM Network annual meeting. The network produced a guidebook for EBM practitioners based on these discussions (West Coast EBM Network 2010).

The HBI was also contacted by representatives of the David and Lucille Packard Foundation and the Resources Legacy Fund Foundation in April 2008. The Packard Foundation representatives recommended and funded a formal strategic plan using Open Standards for Conservation developed by the Conservation Measures Partnership (Conservation Measures Partnership 2007). The Conservation Measures Partnership is a group of national and international conservation organizations that have adopted a unified adaptive management framework for developing, implementing, and monitoring conservation projects. They lay out specific, iterative, and interactive steps for conceptualizing the project vision and context, planning actions and monitoring, implementing actions and monitoring, analyzing data and using the results to adapt the project, and capturing results and sharing what has been learned. Fundamental to the Open Standards strategic planning process was the use of a specialized decision support software system, Miradi, to facilitate the process of developing diagrams and conceptual models that provide visible, tangible, and adaptive learning tools.

The HBI leaders chose to accept the Packard funding. Participants felt that engaging in the strategic planning process would help to focus funding efforts. The Open Standards planning process is meant to capitalize on participants' knowledge of the study area in question in developing site-specific conservation strategies. Members of HBI saw this as an opportunity to use local expertise to meet the vast knowledge and scientific requirements of EBM. Additionally, the Project Team recognized that this process met an important element for the ecosystem approach, specifically, articulating the issues and outcomes that people of the Humboldt Bay ecosystem care about deeply.

In preparation for this strategic planning workshop, the Project Team conducted a stakeholder analysis and developed a list of individuals to invite to the Strategic Planning Workshop. Stakeholder participation nearly doubled, increasing the Project Team from 30 to 58. Following several months of preparatory work and consultation with an outside facilitator, the 5-day Strategic Planning Workshop took place from January 12 to 16, 2009. During the workshop, HBI brought together >40 people from >30 organizations to envision the desired future state of Humboldt Bay

ecosystem, understand past, current, and future conditions, identify priority threats, and chart a course toward a more sustainable future.

In practice, we found that the Miradi software had limitations for an EBM approach that acknowledges and accommodates the community's place in the ecosystem, including resource-dependent activities. The region's history of intractable natural resource conflicts required that the participants use sensitivity in how they described problems since the entities and groups seen by some as having caused the problems were key stakeholders in the strategic planning process. During the process, there was general agreement about the conservation issues facing the region, but there was not much interest in analyzing and assigning blame for why the problems exist. The focus was on prioritizing the issues and threats and developing strategies to address them and the sources of the problems. The Miradi software's use of the term "threat" was off-putting for some participants in the process. For example, while timber management activities can cause adverse effects on the environment and fishing can reduce salmon stocks, HBI participants felt that these activities were also crucial to the well-being of the human communities. Rather than referring to such activities pejoratively as "threats" some participants preferred to identify them as "human factors" that needed to be managed appropriately. This more neutral vocabulary was adopted in order to avoid language that promoted polarization and division or could have resulted in participants withdrawing from the process.

9.4.3   Institutional Structure

The final day of the strategic planning workshop was devoted to the question of what type of institutional structure would be appropriate for HBI. The planning participants heard presentations from two institutes with similar missions, the San Francisco Estuary Institute and the Southern California Coastal Water Research Project. These institutes both have dual legal status as a nonprofit and with an associated Joint Powers Authority. A Joint Powers Authority is a public entity formed jointly by agencies and local municipalities. The participants then began facilitated deliberations about potential arrangements for an institute for HBI. Based on the discussion during the last day of the workshop, a work group for "establishing the HBI" began to research what type of more formal entity was needed and feasible. The "HBI Institution" work group met a number of times during the year following completion of the strategic plan and considered a number of possible organizational structures.

The HBI strategic plan generally envisioned two mechanisms for achieving its ecological goals in each strategy, a "regulatory" and a "nonregulatory" path. The regulatory path involves HBI providing information and technical assistance to the regulatory and land use authorities to develop standards and policies that provide a better "return on governance." The nonregulatory path engages nongovernment stakeholders and the public through education and outreach and provides technical assistance that addresses stakeholder needs while providing ecological and conservation benefits. Issues not conducive to resolution through these two paths fall by

default to the relevant government authorities. The use of the term "governance" in this chapter refers to government, market, or social pressure on actors intended to result in conservation or other desired outcomes (Olsen et al. 2006). Therefore, HBI's regulatory and nonregulatory paths would both be considered forms of governance. The authors would like to point out, however, that many HBI participants equate "governance" with government and so would not consider the nonregulatory paths to be governance mechanisms.

Because of the range of perspectives embodied in HBI, there is no "ideal" structure. One of the bargains we make when we accept a stakeholder-driven process is that there may be a divergence between what the literature and "experts" consider ideal and what is chosen by consensus based on the local participants' knowledge and experience. The HBI institutional structure is developing to meet the needs of the group and adapting in response to the resources available. Prior to the strategic planning process, the consensus ideal was for the agencies with management authority to enter into a memorandum of agreement to work toward taking an EBM approach to resource management. The goal was to have every relevant agency sign on to this agreement. The first major adaptation in the program occurred when the effort to reach an agreement fell flat and the group was unsuccessful in getting their initial EBM proposals funded.

The program participants then modified their structure in response to the Packard Foundation funding for the strategic planning process. When the strategic planning effort was completed and the implementation proposals were again not funded, the group again refined the HBI structure: They chose to pursue the strategies on a less ambitious timeline based on specific funding opportunities. In June 2010, the "HBI Institution" work group recommended the formation of a nonprofit institute. Coincidentally, the Work Group was presented with the opportunity to take on an existing, inactive watershed research and education nonprofit corporation. In this way, the Coastal Ecosystems Institute of Northern California became the "official" HBI entity. The decision by the Project Team to create a nonprofit did not rule out the establishment of other potential legal entities, such as a Joint Powers Authority. However, it provided the program with a formal entity to secure funding and accomplish the other work outlined in the strategic plan.

9.5   Lessons Learned and Recommendations

In the previous sections, we defined some of the important social and environmental problems facing the Humboldt Bay region, articulated the goals of EBM and of HBI as an institution, and described the developmental trajectory of HBI. We now turn our attention to the future. In this section, we will summarize what we have learned about large-scale conservation projects during the development of HBI, make recommendations about how to further facilitate the implementation of EBM in the Humboldt Bay ecosystem, and identify the lessons that can be applied to other large-scale conservation projects.

Perhaps the most important lesson we have learned in working on EBM in the Humboldt Bay region is that developing a program that addresses the real-world social and environmental problems in ways that truly meet the common interest is both slow and time consuming. A long-term commitment is essential to success and sustainability. The problems we are trying to address are complex in terms of the value dynamics at play, the scientific and technical information needed to understand them, and the multiple, overlapping governance systems that apply. All of this points to the need for collaboration and participatory processes. Collaboration involves the interaction between different knowledge systems (e.g., different sciences, lay vs. expert), interaction between different values (e.g., use vs. conservation), and interaction between stakeholders (e.g., scientists, government agencies, industries, community members, environmental groups, resource users, etc.). In EBM, participatory processes should center on deliberative discussions that include the full range of stakeholders. Furthermore, discussions should be based on the exchange of information, ideas, and arguments between coequal partners. This contrasts with some versions of participatory processes in which high-status participants (e.g., scientific or governmental elites) dominate the discussions. Given, first, that decision-making authority is disjointed under the current governance system and, second, that the constitutive regime favors the fragmentation of knowledge and interest groups, we feel that the key resource necessary for implementing large-scale conservation is good leadership. Consequently, our lessons and recommendations are organized under three major themes of leadership, collaboration, and governance.

9.5.1   Leadership

There are multiple levels of leadership in the HBI. In the following discussion, we focus on two types of leadership, namely, the focused leadership provided by the recognized project leader and the more diffuse leadership provided by members of the Core Team and Project Team.

The organization needs to be aware of several issues related to the project leader as it moves forward. First, despite the collaborative nature of the project, someone needs to coordinate project activities and provide overall communication. While this person should not make decisions for the group, he or she does need to be able to articulate what decisions have been made and provide a path to implementation. Throughout the existence of the program, Susan Schlosser served as the recognized project leader. As part of her job responsibilities at California Sea Grant, she was able to facilitate development of the EBM program that ultimately became the HBI. She served in both transactional and transformative roles. As a transactional leader, she organized and facilitated meetings, took the lead on drafting reports, took the lead in presenting HBI to the larger community, and was the primary point of contact for anyone interested in learning more about HBI. Basically, she kept the group moving and chipping away at ecosystem-based problems. Her transactional leader-

ship has been important because, although other members of the Project Team have the skills to be transactional leaders, few have the time to devote to these functions. Equally important, however, is the transformational leadership she provided in getting the program started. As a transformational leader, she was instrumental in helping to articulate the vision of HBI and encouraging the new members of the Project Team to adopt that vision. She took responsibility for garnering resources for the project, from contributions of meeting space and staff time to funding. Between 2009 and 2012, two projects in the Coordinated Response to Climate and Coastal Change strategy projects were completed. Projects to develop a local climate model and a project to develop specific climate adaptation strategies are in progress.

Second, it may not be sustainable in the long term to have the project leader be a California Sea Grant employee. It will probably continue to be advantageous for HBI to be associated with Sea Grant. Because of its status as a university-based program, California Sea Grant is seen as a credible source of nonbiased information, but does not advocate for particular decisions. If HBI is to continue, community support and other organizational structures should be considered. It is partially for this reason that HBI has formed a nonprofit. It is hoped that eventually there will be funding for an executive director who can oversee HBI-related activities. While it has the same limitations as California Sea Grant in terms of management authority, formation of a nonprofit would not preclude forming a joint powers authority or other type of agreement between relevant agencies giving the resulting group joint authority. Two such dual nonprofit/JPA entities in California, the San Francisco Estuary Institute and the Southern California Coastal Water Research Project would be appropriate models for HBI to consider in the next phases of its development.

Finally, when the next project leader emerges, the incumbent will need to have a particular set of skills. First and foremost, he or she will need to be able to instill broad-based cooperation in decision making by everyone interested or concerned with the bay (e.g., scientists, conservationists, users, agency personnel, and decision makers). This may require developing formal agreements with well-organized partner organizations, but it will also require working with diffuse interests groups. It will also necessitate someone who is adept at capacity building—pulling together the people as well as funding and other resources needed to establish a sustainable program.

While it is important to have a program leader, that person is not and should not be the sole leader in the group. Members of the Core Team and Project Teams should also provide leadership. In fact, members of these groups have provided key leadership in addressing technical and scientific issues. For example, members of the Core and Project Teams have been providing guidance and support for taking on elements of HBI's Climate Change Adaptation strategy. However, the Core Team and Project Team members are participating on a semi-voluntary basis. Typically, their employers are aware of their involvement and, to the degree that their HBI activities fall within their job descriptions, are supportive of that involvement up to a point. However, many of the integration and implementation tasks require moving beyond a particular set of job responsibilities. For example, a timber company

employee noted at the strategic planning workshop that she would need to make the case to her boss that engaging with the group (HBI) would be beneficial for her company.

Additionally, the Core and Project Teams provide collaborative leadership. The HBI program leaders regularly reflect on the quality of collaboration. We believe substantial, meaningful, and successful collaboration requires planning and managing for interactions between diverse sectors and disciplines, a high degree of information sharing, synthesis, and dissemination of the information in a format usable to specific audiences. The HBI participants are dedicated to providing resources to improve the public's knowledge of the biophysical environment and to increase availability of the best available scientific and technical information about the Humboldt Bay ecosystem to support decision making by elected officials and other authorities.

The authors feel that the Core Team and Project Team leadership structure is working well, but program participants will need to continue to refine their roles and the scope of their responsibilities. Ideally, the Core and Project Team will be closely involved with selecting a new project leader, coming to a consensus about where that leader should be based (i.e., at the HBI nonprofit, the Humboldt Bay Harbor, Recreation & Conservation District, etc.), and defining the job description and desired attributes of that leader.

9.5.2   Collaboration

Integrating the information, values, and viewpoints of diverse stakeholders is an important part of EBM because diverse perspectives are needed to understand and develop solutions to complex issues. The multifaceted perspective it engenders is useful because it helps elucidate various views on what is important, and it supports the incorporation of various forms of knowledge that are indispensable to understanding the ecosystem dynamics and socioeconomic considerations. During the strategic planning process, a lot of effort was made to find regional consensus on the situation, natural resource management issues, and solutions to those issues. One of the benefits was that by including local, technical, and scientific knowledge and at the same time identifying examples of joint gains, we were able to develop innovative strategies.

One of the important lessons of HBI is that it is difficult to get the right people at the table. Schlosser and other members of HBI have made extensive and sustained outreach efforts that have included presenting at public meetings, radio and print media interviews, public service announcement to local media, and word of mouth invitations. The outreach efforts have had variable success. The HBI has had good participation from scientific/technical community and the staff of natural resource management agencies. In fact, one of the successes of HBI is that it has developed a network of knowledgeable professionals who can provide the scientific and technical information needed to address many ecosystem issues.

The network is important because although HBI can serve as a forum for prioritizing issues, agencies and organizations other than HBI will be taking on direct conservation activities such as restoration projects, adopting legislation, implementing policies, enforcing regulations, and managing critical infrastructure. Additionally, HBI has demonstrated that this social capital can be quickly leveraged to develop a project when an opportunity arises. Ultimately, this should improve compliance with regulation and should produce more effective responses to environmental problems. The HBI can achieve cost efficiencies through pooling (rather than duplication) of its member agencies' efforts and resources.

There are clearly costs associated with collaboration, including the cost of cross sector communication, coordination, and participation. For example, collaboration and engaging stakeholders are expected to widen the scope of issues addressed (Thompson 1998; Weber 2003). In HBI's case, these costs were primarily in the form of thousands of hours contributed per year devoted to meeting preparation, attendance, and follow-up. In fact, working collaboratively may increase costs in the short term. However, it is our hope that in the long run the collaborative approach will reduce costs associated with reaching agreement on the solutions for addressing priority conservation and development issues (Hanna 1995).

The HBI has had more limited participation by resource user groups (e.g., fisheries and ranchers) and people whose interests are more focused on economic development. This is unfortunate because it is clear that resource user groups have a practical role in bringing the knowledge and experience needed to discuss management options including how particular policy decisions are affecting both them and the environment they are familiar with. We recognize we will never have complete scientific knowledge, but local knowledge is important and can help address uncertainties found in the ecosystem approach. Engaging diverse stakeholders can enrich the knowledge base, create a positive social dynamic, and bring greater legitimacy for the project as a whole. Conducting research, monitoring and management efforts in collaboration with stakeholders can improve the sustainability of a management regime. For example, a number of creek and wetland restoration projects have been carried out on public and privately owned grazing land around the bay. Owners and operators have been supportive of these efforts because they recognize their dependence on the environment (Cejnar 2011).

While the outreach efforts did garner a fairly broad-based group to participate in the strategic planning process, some groups were not represented. One notable example of why this might have occurred is that the strategic planning workshop was scheduled during crabbing season and so one should not have expected large participation by crabbers. Attendance at the ongoing meetings is less inclusive. In part, this probably reflects the timing and location of the meetings, typically weekday mornings in a government agency meeting room. Those who show up are those who are able to be there at that time and comfortable in that kind of environment. A different venue and time for meetings may be necessary to accommodate a larger diversity of participants.

Additionally, most meetings have been technically focused and their relevance may not be clear to many nontechnical stakeholders. It is expected that as HBI

moves from a phase of learning about the problems and compiling scientific infor-
mation to a phase of engaging with the solutions, the relevance will become clear to
groups likely to be affected. Further development of an outreach and media strategy
could yield additional benefits in terms of reaching a wider audience and promoting
inclusion of additional participants. If integration is going to occur, a way must be
found to engage leadership from other sectors of society.

9.5.3   Governance

One recognized limitation of traditional science-based resource management is that
there is a tendency for technical experts to come up with what they see as optimal
solutions and leave it up to policy makers to implement that solution (Clark 2002).
The authors believe that the organizational leadership in EBM efforts must be aware
of the governance and constitutive aspects of EBM and large-scale conservation.
The HBI has very strong science and management perspectives. However, there
could be a great benefit in analyzing options for how to pursue and implement col-
laborative, adaptive governance mechanisms for a variety of EBM issues.

A major challenge to HBI and EBM in general is that the current governance and
constitutive structures are not designed to allow an independent group such as HBI
to integrate easily into the decision-making processes. There are numerous agen-
cies with responsibilities in the watershed and bay and their areas of authority often
overlap. Because state and federal hierarchies are difficult to interface with, it may
be more productive to interface with city and county decision-making bodies and
subsequently enlist local officials to champion the proposals at higher levels. The
HBI has engaged with local stakeholders including government agencies. Deliber-
ating on solutions to Humboldt Bay issues at HBI meetings and during the Strategic
Planning workshop has sometimes caused discomfort to local planners, regulators
and managers, as well as other stakeholders because the engagement occurred in a
process outside of the official authority structures for natural resource regulations
and management. While representatives from local agencies are present at meetings
in these venues, neither the group nor the representatives are in a position to make
changes to policies that are in place in their respective agencies.

In contrast, stakeholders seemed less sensitive to discussion of specific ecosys-
tem issues. The HBI provides a good example of multi-governmental, multi-stake-
holder deliberation about potential approaches to resolve those issues. The HBI is
seen by the participants as a good option for joint regional activities and finding
resources for regional projects. Adoption of policies and incorporation into plan-
ning documents remains in the purview of the agencies at the local level. Recent sea
level rise adaptation planning efforts by the municipalities, the county, and several
resource agencies may result in changes to how governance issues are viewed by
the involved parties, potentially leading to shifts in the governance structure. Ad-
dressing some of the potential infrastructure and inundation problems caused by sea
level rise, for instance, will require collaboration between the cities, county, and

other agencies, as the issues are not confined to the boundaries of a given jurisdiction. In fact, some type of interagency agreement or mechanism will be needed to jointly implement solutions to these issues.

As discussed above, neither the ad hoc HBI nor the Coastal Ecosystems Institute (the HBI nonprofit) will have any sort of management authority, which implementing EBM will ultimately require. Formation of a Joint Powers Authority or a legal agreement of some sort would be viable options for the government agencies associated with HBI. The groundwork for such arrangements has been laid, with establishment of collaborative working relationships, clarification of purpose and goals, and understanding that taking an ecosystem perspective will require shared authority in addressing bay-wide issues such as sea level rise.

Governance changes at the state and federal levels have been and will continue to be much more of a challenge. The HBI and the Coastal Ecosystems Institute maintain their neutral, nonadvocacy position locally, although HBI participants occasionally advocate for legislation, funding, and other types of support at the state and federal level. Continuing to advocate jointly with the seven other place-based EBM projects that form the West Coast EBM Network provides a broader base of support and experience for the higher-level policy advocacy that will be needed to enact the legislation and policies to truly enable EBM to be implemented.

9.6   Conclusion

The HBI was formed because current management strategies were not adequately meeting the needs of society or the environment in the Humboldt Bay region. The crises caused by the faltering of the global economy in conjunction with the biological and policy constraints on the use of natural resources opened a window of opportunity to change the local constitutive and governance regimes in the region. The initial proponents of HBI felt that adopting EBM would help to better solve the complex social and environmental problems faced by the region. They also recognized that there was a place for a bridging organization that could facilitate collaboration between stakeholders. Within this organization, previous "opponents" in this rural regional economy have found reason to work collaboratively to confront external threats such as cumbersome and ineffective state and national regulations, international competition, and other global economic drivers.

EBM, whether in Humboldt Bay or elsewhere, cannot succeed if project participants only recognize technical problems and think that they can be solved using technical expertise alone. Ecosystem problems are embedded in a larger constitutive and governance regime. Restoration experts may identify a way to enhance the functioning of a wetland by replacing tide gates and breaching levees. However, such projects will not go forward on a large scale without reformulating the current governance structures. Reducing the large loads of sediment introduced to streams by poorly constructed logging roads required not only better road design but also a timber industry that was willing to admit the poor practices of the past and a public

that was no longer willing to allow blatant disregard of the environmental impacts of unsustainable practices. In other words, it required a constitutive change in how the timber industry and the general public viewed their relationship with the environment. Similarly, it is unlikely that the ongoing environmental damage caused by marijuana grow operations to headwater streams will change while marijuana growers are able to get away with causing the damage and externalizing the costs of that damage.

There is a tacit agreement that the participants have all turned the page on the timber wars and other environmental disputes in order to move forward collaboratively. The process of developing HBI has been slow, but the organization continues to work toward its vision of "a vibrant, thriving, and resilient Humboldt Bay ecosystem that supports the well-being of our human and natural communities."

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Part IV
Conclusion

Chapter 10
Large-Scale Conservation in the Common Interest: Conclusions and Recommendations

Aaron M. Hohl, Susan G. Clark and Catherine H. Picard

Abstract Throughout this volume, we have argued that short-term, narrowly focused technical interventions will be insufficient to address the governance and constitutive problems that resource management practitioners face today. We are not alone in coming to this realization. There is a growing community of resource management professionals who are seeking more integrative and holistic approaches to conservation. This volume presents a set of techniques and conceptual models for engaging in contextually sensitive, integrative problem solving. It is our hope that readers of the volume will become part of the cadre of professionals who will play key leadership roles in ongoing efforts to find common interest solutions to large-scale conservation problems.

Keywords Large-scale conservation · Parks and protected areas · Ecosystem management · Integrated conservation and development · Ecoregional planning · Transboundary conservation · Adaptive governance · Enlightenment · Conservation · Sustainability · Common interest

The number of large-scale conservation projects being carried out around the world has burgeoned as practitioners recognize that traditional management strategies are not capable of meeting the present threats to our environment. In this volume, we have used the term large-scale conservation to refer to conservation efforts that deliberately seek to function at large and complex spatial, temporal, and governance scales. We have described several approaches to large-scale conservation models—traditional parks and protected areas, ecosystem management, integrated

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conservation and development, ecoregional planning, transboundary conservation, and adaptive governance. This list was not meant to be comprehensive. Individual organizations continue to come up with new terms to describe their large-scale conservation practices. However, the approaches do give a sense of the range of efforts being undertaken.

The most important factors driving the adoption of these and other similar approaches is, first, a rapidly growing appreciation on the part of many of the world's citizens that we are placing too heavy a burden on the earth's resources and systems and, second, a realization by at least some practitioners that strategies designed to address discrete technical problems often fail to recognize the complex interactions between social and biophysical systems. The burden humans are placing on the environment is obvious and we will not dwell on it here. It can be seen in the excessive sediment load in the streams that feed Humboldt Bay the declining wildlife populations of Tanzanian wildlife and the impaired water quality in the Connecticut River system. Many of the case studies in this volume, including the three just referenced, illustrate the limitations of addressing technical problems while failing to recognize the importance of governance and constitutive issues. The complexity of our social systems becomes more apparent when the target of conservation involves multiple landowners, crosses jurisdictional boundaries, or involves large, diverse communities of interest. In addition to the biophysical complexities that manifest when conservation projects are scaled up, large-scale conservation also reinforces the need to take human social and decision processes into account explicitly and systematically. We argue that in order to address complex issues one must understand and be able to use a flexible, interdisciplinary approach.

The legacy of the Enlightenment over the past few hundred years has given rise to the modern university, an explosion in information, and a profusion of scientific disciplines that specialize in narrow fields of inquiry, but lack an integrative framework to move beyond disciplinary boundaries. To be sure, disciplinary specialization has yielded many benefits not only in the field of conservation but also in the overall human enterprise. For example, knowledge of behavioral ecology has led to the successful reintroduction and subsequent maintenance of wolves in the greater Yellowstone ecosystem. Advances in remote sensing technology have enhanced our understanding of the scale and consequences of deforestation. Social survey methods have resulted in a better understanding of the societal values placed on ecosystems in places like the Last Green Valley region of New England. Environmental economics is allowing us to calculate the economic value of natural amenities like the Pacific Crest Trail system and ecosystem services like those provided by the Connecticut River watershed. In spite of these and other advances, however, problems in large-scale conservation persist.

Unfortunately, we conclude that, with the exception of adaptive governance, most approaches to large-scale conservation continue to be unduly guided by the doctrine of reductionism, positivism, and scientific management. Traditionally trained resource managers, who are usually well schooled in the precepts of scientific management, tend to frame issues as technical problems and consequently undervalue the importance of context, process, and governance dimensions. Often

these individuals believe that improving conservation, sustainability, and decision making is a matter of increasing the amount of scientific (i.e., positivistically derived, factual) information available to the decision makers and the public. This prevents them from articulating the community's common interest, let alone finding and implementing common interest solutions. Consequently, they focus their efforts on dealing with technical issues when attention should be focused on constitutive issues.

In cases in which disciplinary scientists work strictly within disciplinary or even multidisciplinary perspectives, partial solutions are often advanced that, in retrospect, prove to have missed key contextual elements. For example, if one views poaching of wildlife in Tanzania through a purely technical lens, one may conclude that it can be resolved through increased enforcement or education. Perhaps one might even implement Wildlife Management Areas that allow rural communities to manage wildlife for their own benefit. However, this view fails to take into account the preexisting social arrangements, obligations, and identities that are grounded in the Tanzanian landscape. There are those, for example, who perceive (and desire) the Tanzanian landscape as a wilderness devoid of human impact, while others see it as farmland or pasture. If they do not recognize and acknowledge their different standpoints, they are unlikely to agree on what the problem is, let alone come to an agreement on the solution.

What is needed if we are to accomplish large-scale conservation is a cadre of professionals who are trained in using contextually sensitive, interdisciplinary methods and who are capable of providing leadership in conservation efforts. In part one of this volume, we present a framework that was initially developed by social scientists who observed how successful problem solvers address complex, large-scale, and messy problems across many contexts and abstracted the key elements. The interdisciplinary framework is also being taught in universities, professional seminars, and workshops around the world. Prof. Clark, for example, has been teaching students and practitioners to use this method for more than three decades. She has found, however, that teaching the framework and fostering problem-solving skills is challenging because it requires students to transition from a single disciplinary outlook in which problems are discretely bounded to complex real-world situations that cannot be resolved by neat technological fixes.

However, she has had success in developing transformative experiences for students by having them address real-world problems during rapid appraisal exercises, several of which were described in this volume (see Chaps. 4–6). Students learn that the framework is problem-oriented, contextual, and multi-method. It requires analyzing not only the biophysical and resource dimensions of conservation problems but also their human dimensions. In particular, it requires studying the basic values of individuals, social dynamics, decision making, and institutional processes at play. Practitioners who use this approach will have a better understanding of the problems that arise in large-scale conservation projects and what to do about them in rationally, politically, and morally justifiable ways.

The interdisciplinary approach is what allowed the authors in this volume to identify the problems described in the cases presented in parts two and three. Part

two consists of three rapid appraisals that were developed as part of classes taught by Clark, which were designed to impart the interdisciplinary methods explained in part one. These case studies illustrate how familiarity with the methods can allow practitioners to identify relevant types of information quickly, analyze it in a contextually sensitive manner, and develop reasonable suggestions for improvement. Part three consists of case studies written by people who have been embedded as both participants and observers within large-scale conservation efforts for extended periods of time. These case studies illustrate the utility of using the interdisciplinary methods while being actively engaged with large-scale conservation problems on an ongoing basis.

Throughout this volume, we have seen that each large-scale conservation project has context-specific goals for both biophysical and social targets. However, we maintain that all large-scale conservation projects must address three fundamental goals. First, participants should pursue strategies that are biophysically and socially sustainable. Sustainability has proven difficult to define precisely, but we suggest that sustainable solutions should, at a minimum, maintain the ability of socioeconomic systems to provide human and environmental benefits over time. Ideally, large-scale conservation efforts will actually improve the functioning of socioeconomic systems. Second, participants should identify common interest outcomes because they are the only ones likely to be fully embraced and supported by the community. Finding such solutions is always a difficult task since it requires integrating and accommodating interdependent interests that grow out of diverse and complex personal and cultural histories. While it will not be possible to accommodate the interests of all participants in all cases, more enduring solutions are likely to be found if both participants and their interests are dealt with respectfully and fairly. Finally, and most importantly, participants should strive for solutions that enhance human dignity for all people.

In closing, we hope the readers of this volume will respond to the challenges of large-scale conservation by adopting a problem-oriented, contextual, and multi-method approach that strives to identify and secure people's common interests. The interdisciplinary approach to large-scale conservation that we recommend acknowledges the importance of biophysical and social sustainability, it is premised on the belief that common interest solutions should be sought and that developing such solutions requires attending to the social and decision processes, and it prioritizes human dignity for people over other considerations. Attending to these priorities will lead to durable solutions for large-scale conservation efforts that are sustainable both environmentally and socially.

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