
Natural Experiments

Ecosystem-Based Management and the Environment

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Introduction

Since the 1980s the theory and practice of natural resource management have undergone a profound transformation. The environmental movement of the late 1960s and early 1970s spawned an avalanche of federal statutes, as well as state laws and local ordinances, that addressed the environmental problems caused by more than a century of industrialization. By the early 1980s, however, a three-pronged critique of the newly instituted regulatory framework had emerged. Detractors charged that centralized decision making produced uniform rules that did not reflect local conditions, ignored interrelationships among natural system elements, and stifled innovation; top-down, expert-driven regulation prompted local resistance and endless rounds of legislative, administrative, and judicial appeals; and inflexible mandates resulted in minimal compliance and an inability by regulators and the regulated community to learn or adjust to new circumstances. Yet even as these allegations gained political traction, observers were documenting a spate of innovations in environmental problem-solving that, according to their proponents, promised to reinvigorate efforts to mitigate human impacts on the natural world.

Among the most potentially revolutionary of the new approaches was ecosystem management, now more commonly known as ecosystem-based management (EBM).¹ Scholars and practitioners have offered dozens of formal definitions, but most agree that at a minimum EBM entails collaborative, landscape-scale planning and implementation that is flexible and adaptive (Cortner and Moote 1999; Grumbine 1994, 1997; Hartig et al. 1998; B. R. Johnson and Campbell 1999; Karkkainen 2002a, 2002b; Keiter 1998; Meffe et al. 2002; Szaro, Sexton, and Malone 1998). Although EBM shares attributes with many of the other environmental problem-solving approaches that emerged in the 1980s and

1990s—particularly an emphasis on decentralization, holism, collaboration, and flexibility—it is distinct from its various cousins in some important respects, the most important being the scale at which problems are addressed (Cestero 1999) and the nature of government involvement (Koontz et al. 2004).² For example, the efforts that Edward Weber (2000, 2003) terms “grassroots ecosystem management” (GREM), which aim to change the culture rather than the rules of a place, are typically initiated by residents of rural, western communities threatened by disputes over natural resource extraction, mostly on public lands. By contrast, EBM—as more commonly defined—tends to be instigated by government officials and seeks to institutionalize new forms of governance to address pollution and resource management problems. EBM initiatives span large landscapes that may encompass marine or other aquatic ecosystems, publicly and privately owned land, and urban as well as rural areas.

The ecosystem-based approach has gained particular prominence in the United States and elsewhere because it promises to coordinate the activities of jurisdictions and agencies with disparate missions, integrate management of public resources with stewardship of the surrounding matrix of private land, and facilitate policy learning and adjustment. It has the potential to resolve the apparently intractable controversies that accompany our ubiquitous sprawling, resource-depleting pattern of development. Because of the concept’s broad appeal, during the 1990s a host of nongovernmental organizations, professional societies, federal agencies, and state officials endorsed ecosystem-based approaches to land-use and natural resource policy-making (see, for example, Beattie 1996; Christensen et al. 1996; Dombeck 1996; USEPA 1994; Interagency Ecosystem Management Task Force 1995; NAPA 1995; PCSD 1996; Society of American Foresters 1993; J. W. Thomas 1996; Western Governors’ Association 1998). In the 2000s scientists, managers, and advocates began promoting EBM for marine systems as well (McLeod et al. 2005; Pew Oceans Commission 2003; U.S. Commission on Ocean Policy 2004). Yet despite widespread enthusiasm for EBM, scholars have not provided systematic evidence of its efficacy in practice—until recently, few initiatives had existed long enough for evaluators to assess their substantive benefits, and of those few, their complexity and heterogeneity made evaluation particularly challenging.

That said, in recent years scholars have been analyzing aspects of EBM, particularly the effects of stakeholder collaboration on natural resource planning and management. They have ascertained that, consistent with proponents’ claims, watershed collaboratives and other participation-

intensive problem-solving efforts *do* appear to increase human and social capital, as well as the level of stakeholder agreement (Beierle and Cayford 2002; Gunton, Day, and Williams 2003; Huntington and Sommarstrom 2000; Innes et al. 1994; Leach, Pelkey, and Sabatier 2002; Lubell 2005; Weber 2003). In addition, many participatory schemes have taken concrete steps—such as implementing restoration projects and instituting monitoring and education/outreach programs—toward their environmental goals (Huntington and Sommarstrom 2000; Imperial and Hennessey 2000; Leach, Pelkey, and Sabatier 2002).

Researchers have not discerned a clear relationship between these two central achievements, however; in fact, some analysts suggest that funding levels and the passage of time, rather than trust and social capital, are the keys to successful implementation (Beierle and Cayford 2002; Leach and Sabatier 2005; Raymond 2006).³ Others argue that the context, rather than the internal characteristics of a collaborative group, largely determines a community's willingness to implement a collaboratively formulated plan (Koontz 2005). More important, scholars have been unable to document a causal relationship between collaboration and improved environmental conditions, despite widespread agreement that the most important measure of success is achievement of on-the-ground environmental benefits beyond what would have occurred anyway (Beierle and Cayford 2002; Born and Genskow 1999; Imperial and Hennessey 2000; Kenney 2000; Leach, Pelkey, and Sabatier 2002; Lubell 2004; O'Leary, Nabatchi, and Bingham 2004). In short, although existing empirical work highlights a small number of variables that appear to be correlated with "success," serious gaps remain in our understanding of whether, how, and under what conditions collaborative governance arrangements yield genuine environmental improvements. Systematic evidence of the efficacy of landscape-scale planning and flexible, adaptive implementation is even more elusive.⁴

In an effort to fortify and build on existing scholarship, this book investigates seven efforts to conserve and restore terrestrial or aquatic landscapes, with the goal of ascertaining whether ecosystem-based management produces in practice the benefits promised in theory. More precisely, it asks: to what extent, how, and under what conditions does EBM yield durable, environmentally protective policies and practices that (1) constitute improvements on the status quo and (2) are likely to conserve and restore ecological health?

I chose ecosystem-based management as a category for exploration for several reasons. Of all the new approaches to environmental problem-solving,

EBM is arguably the most likely to achieve environmentally protective results. Unlike national-level decision making, working at a landscape scale facilitates tailoring remedies to the particular ecological and socioeconomic conditions of a specific region. At the same time, landscape-scale efforts can take into account many of the factors—particularly critical ecological processes or functions, pollution that crosses political boundaries, and features of the larger economic or regulatory context—that typically overwhelm the efforts of local jurisdictions. Moreover, regional initiatives may be more likely than local ones to muster the financial and technical capacity to commission and implement sophisticated scientific assessments, as well as the resources to monitor policy implementation.

On the other hand, there are some potentially significant tradeoffs in moving from a local to a landscape scale. In particular, collaboration among stakeholders seems most likely to produce social and human capital when citizens bound by attachment to a particular place can engage in face-to-face deliberation; by contrast, large-scale projects rely on interest-group representatives, whose capacity to speak on behalf of their “constituents” may be limited (Cestero 1999). The trick for EBM initiatives, then, is to capture the purported advantages of working at a landscape scale while harnessing at least some of the benefits of engaging stakeholders.

The importance—in fact, the urgency—of assessing whether and how EBM is likely to conserve or restore the health of natural systems is clear. No economic or social system can survive in the long run if it destroys the resilience of the ecosystems it depends on (Arrow et al. 1995; Daly 1997; Diamond 2005; Rees 2000). As global climate change advances—bringing with it rising sea levels, changing patterns of precipitation, and more severe storms—landscapes will need to be more resilient, not less so. Nevertheless, we are degrading the landscape at an accelerating rate, and the cumulative effects of human activity are becoming increasingly severe and irreversible (Lubchenco 2002; Millennium Ecosystem Assessment 2003; Noss and Scott 1997; Orians 1995; Pew Oceans Commission 2003; U.S. Commission on Ocean Policy 2004). Although the global pursuit of sustainability is essential, the United States is particularly culpable here, since American lifestyles depend heavily on the appropriation of resources from other countries and future generations (Beatley 1998; Wackernagel and Rees 1996).

In the remainder of this book I provide a detailed analysis that supports the following general conclusion. On the one hand, all seven of the initiatives I examine have generated land-use or natural resource management

plans that are more holistic and comprehensive than the piecemeal approaches they replaced. Each also boasts concrete achievements, such as the public acquisition of ecologically valuable land. On the other hand, comparison among the cases reveals that the initiatives whose goals were set in collaboration with stakeholders have produced environmental policies and practices that are less likely to conserve and restore ecological health than those whose goals were set through conventional politics.

The initiatives in which goals were set collaboratively have yielded fewer-than-anticipated environmental benefits for a variety of reasons. Above all, to achieve consensus, planners promised to pursue environmental and economic goals simultaneously. To this end, they reframed problems in ways that allowed them to avoid tackling controversial issues or seriously considering policies that would impose short-run costs on development interests. They also adopted technology- and management-intensive solutions that aim to “expand the pie,” in the process imposing substantial risk on the environment. In some cases, efforts to implement plans’ provisions exposed disagreements that had been glossed over during the collaborative process, resulting in stalemate and delay. Because of insufficient funding and inadequate margins for error in the plans themselves, flexible policy tools and a rhetorical commitment to adaptive management appear unlikely to compensate for these shortcomings.

By contrast, the initiatives in which goals emerged out of conventional politics have yielded greater-than-expected environmental benefits because political officials—judges, administrators, or elected officials—employed political capital and regulatory authority to promote an overarching, environmentally protective goal. Such pro-environmental leadership, which typically occurred in response to lawsuits or campaigns to raise the salience of an environmental problem, enhanced the influence of precautionary interpretations of science and established strict floors below which plans could not fall. It thereby mitigated the disparity in power between development and environmental interests. It also induced a positive feedback, as environmentally protective policies and practices yielded tangible benefits around which new constituencies formed.

A Road Map

In the chapters that follow, I lay out the empirical basis for and elaborate on the argument summarized above, drawing on evidence from seven cases that all involve efforts to conserve or restore ecosystems but vary

in the extent to which they include the three elements—a landscape-scale focus, collaborative planning, and adaptive implementation—that constitute full-fledged EBM. In chapter 2, I describe the impetus for EBM in greater detail and propose two models of EBM—optimistic and pessimistic—derived from the writing of scholars and practitioners. I also explain my criteria for choosing cases and assessing the consistency of the evidence in those cases with each model.

In chapters 3 through 6, I analyze four nationally recognized EBM projects. The first two cases involve efforts to protect and restore *terrestrial* ecosystems in rapidly urbanizing regions of the Southwest: Austin's Balcones Canyonlands Conservation Program (BCCP, chapter 3) and the San Diego Multiple Species Program (MSCP, chapter 4). Both of these cases concern habitat conservation planning initiatives that were sparked by the listing of endangered songbirds, and both were cited by prominent federal officials as exemplars of the ecosystem-based approach. Chapters 5 and 6 describe two highly publicized efforts to conserve or restore *aquatic* ecosystems—the Comprehensive Everglades Restoration Plan (CERP, chapter 5) and the California Bay–Delta Program (CALFED, chapter 6). In all four cases, efforts to appease conflicting interests by meeting all demands simultaneously yielded minimally protective plans and halting implementation. As a result, although each project has produced impressive advances in scientists' understanding of damaged ecosystems and has enhanced localities' ability to raise money for environmental improvements, in their current form none are likely to conserve or restore the landscapes they aim to protect.

In chapters 7 through 9, I analyze three comparison cases. Chapter 7 describes Pima County, Arizona's Sonoran Desert Conservation Plan (SDCP), which, like the MSCP and the BCCP, was triggered by the proposed listing of an endangered species. By contrast with the MSCP and the BCCP, however, Pima County officials, not stakeholders, took the lead in devising the SDCP. Moreover, from the outset they portrayed the plan as primarily a mechanism for conserving Pima County's biological diversity, not simply meeting the legal requirements of the Endangered Species Act; they also imposed strict restraints on development until the plan's details were finalized, despite the vociferous objections of development interests. As a result, the SDCP's habitat preserve hews closely to the configuration prescribed by the county's scientific advisory team.

In the last two cases—the efforts to restore Florida's Kissimmee River (chapter 8) and California's Mono Basin (chapter 9)—proponents

pursued ecological restoration through conventional politics, such as salience campaigns, lawsuits, and expert planning. Political officials responded by supporting a single, environmentally protective goal and employing regulatory tools to ensure that goal was met. These two cases affirm that when planners focus primarily on ecological restoration, even if doing so provokes resistance, they can achieve genuine environmental improvements.

Finally, in chapter 10, I examine the similarities and differences among all seven cases to evaluate the benefits and drawbacks of landscape-scale planning, stakeholder collaboration, and flexible, adaptive implementation; situate those findings among the claims of theorists, as well as the conclusions of scholars who have evaluated EBM or its constituent elements; and raise some methodological caveats about which claims I am most and least confident of. I conclude by suggesting some implications of my findings for advocates and policymakers, and proposing policy changes that might improve their ability to promote environmentally beneficial outcomes.

