Keys to Effective Conservation

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The history of the Endangered Species Act (ESA) features both high-profile successes (such as recovery of the peregrine falcon [*Falco peregrinus*], whooping crane [*Grus americana*], and gray whale [*Eschrichtius robustus*]) and pervasive problems. Evaluating the act is difficult. Scientists, managers, policy makers, and the public often differ in their expectations about how the act should work and on what basis it should be appraised. This lack of consensus complicates evaluation because it produces disagreement on assessment criteria and ultimately contributes to suspect conclusions.

In this chapter, we present criteria by which the ESA can be appraised and describe how practitioners can both learn from experience and apply lessons to ongoing implementation efforts. We evaluate systematic, avoidable weaknesses in implementation and diagnose them in a way that sheds light on these sometimes “invisible” problems. Although we offer strong criticism, our goal is to introduce new methods for increasing the act’s effectiveness. Our focus is on identifying lessons from past experience and applying them to current and future planning.

Problem Definition

Clearly, work remains in order to achieve the act’s goals (Scott, Goble, et al., this volume). Indeed, implementing the ESA is a process of such complexity that the challenges likely will never diminish. Viewing recovery as a process, however, suggests that comprehensive appraisals of the act ought to occur simultaneously with its implementation. Furthermore, such assessment must be based on clear evaluative criteria and be designed to produce information that can be usefully fed back into the implementation of the act (Clark 1993, 1997, 2002; Wallace 2003). Discourse in which the act is praised or vilified without a clear basis for evaluation is not helpful in promoting either public understanding or improved implementation.
Specifically, three highly interactive problems are apparent. The first problem is one of translating a broad federal law across a large, diverse nation. Implementation must occur in many different contexts, often without consensus among the participants. Contexts for protecting and recovering endangered species vary in critical ways—biologically, organizationally, and politically—each of which requires that the ESA be adapted to local circumstances. This can be difficult when, for example, local politics are hostile to endangered species protection or national authority is not employed in ways that support the act's goals.

The second problem, related to the first, is rigidity. It is a challenge to administer the ESA flexibly when bureaucratic arrangements (such as relationships among agencies or between different offices within the same agency) are rigid. Agencies are often wedded to standard operating procedures that impede innovation when innovation may be exactly what is needed to address biologically, organizationally, and politically complex scenarios. In addition, federal or state agencies charged with conserving natural resources may be statutorily or administratively committed to goals that compete with the ESA. The long-standing conflicts within the National Marine Fisheries Service between that agency's mandates to manage commercial fisheries and protect marine resources are an example of this (Brailovskaya 1998; Wallace 2000; Zabel et al. 2003).

The third problem arises from the skill sets of the individuals involved, that is, the professional skills that practitioners bring to a program. Typically, professionals use conventional disciplinary approaches to the issues they face. By "conventional," we mean the approaches commonly taught in graduate programs and promoted in natural resource agencies, for example, the application of technical biological or ecological knowledge to complex policy problems. These conventional approaches are often employed to the exclusion of other kinds of knowledge. As a result, professional skills can trigger a "disconnect and imbalance in knowledge and skills concerning natural science research (on the one hand) and social, organizational, and values-related concerns (on the other). This leads directly to many complex and sometimes glaring problems in recovery efforts" (Wallace et al. 2002a, 70). These difficulties underscore the need for varied professional skills to address multifaceted problems.

Problem Elaboration: Three Cases

We explore ways to improve performance under the ESA through three cases, concluding with general recommendations. These cases elaborate the three problems introduced above and suggest opportunities to improve implementation of the act. Many recovery efforts are problematic because of both biologi-
cal and social challenges (Abbitt and Scott 2001). Often, it is the human system that is more problematic.

The Black-Footed Ferret Case

The black-footed ferret (*Mustela nigripes*) originally ranged across more than 100 million acres of the western Great Plains and intermountain basins from southern Canada to northern Mexico. The species began to decline in the late 1800s with the introduction of extensive prairie dog (*Cynomys* spp.) eradication. Prairie dogs provide habitat and prey for ferrets. As late as the 1920s, ferrets were still widespread, with a population of perhaps a million or more individuals (Clark 1997). In 1915 the federal government began a coordinated national effort to eradicate prairie dogs and other species considered to be agricultural pests. Poisoning eliminated more than 98 percent of the prairie dogs. Ferrets were also eliminated, both directly and indirectly. By the 1980s the ferret was considered “unrecoverable” or already extinct by the U.S. Fish and Wildlife Service (USFWS) (Clark 1997).

In 1981 the serendipitous discovery of a remnant ferret population near Meeteetse, Wyoming, created a test case for the conventional ESA formula for species recovery. The formula failed in the ferret case because it did not organize the coalition of interests concerned with ferret restoration into a functioning team. This is a “translation” problem in which statutory and administrative guidelines for recovery were undermined by local and regional participants whose conception of the common interest defied the ESA recovery mandates. Early on, operational control of the ferret program was transferred by the USFWS to the Wyoming Game and Fish Department (WGF), with the USFWS retaining overall authority. This decision was made despite evidence that Wyoming had a weak commitment to the ESA and limited organizational capability to lead a complex recovery program (Lester 1990). This transfer of responsibility fragmented management authority and control arrangements, and it precipitated a process that proved to be highly corrosive to the recovery program. The ferret recovery program turned into a power contest between Wyoming, with its states’ rights ideology, and the USFWS, with its federal mandate. The program illustrates the complexity of translating the ESA into effective action at the state level when participants (in this case, the lead federal and state agencies) and their perspectives conflict. WGF institutionalized a set of organizational relationships that were then mismanaged in the context of the recovery challenge. These conflicts introduced many weaknesses into the program that unwittingly led to near catastrophic failures. WGF became entrenched and defensive. This in turn led to poor decision making and subsequent actions that undermined the restoration goals for the ferret population.
Productive working relationships could not be established. Coordination of efforts was weak at best. Intelligence failures and delays in management decisions occurred. Failure to appreciate the vulnerability of the wild population by agency officials, even after catastrophic diseases were found in the wild and captive populations, almost led to the ferret’s extinction. After more than twenty years and millions of dollars, ferrets are still at high risk from plague, canine distemper, and other small population threats (Biggins et al. 1997).

WGF’s program design led to “goal inversion,” where control of information and decision making became more important than saving ferrets. Participants clashed and, because there were competing goals (e.g., species recovery versus bureaucratic control), conflict was rampant. Crass power came to be used to manage conflict, integrate personnel, and carry out the work. Using power for these ends is a dangerous outcome of the translation problem and underscores the failure of participants to apply the ESA successfully in this context. Successful conflict management tools were ignored or rejected, as were more appropriate program designs and operations. WGF sought to legitimize itself in the face of the conflicts and in so doing further bureaucratized the program by creating advisory teams, coordinator positions, and field teams, all for the purpose of appearing to be in control of decision making. The state also sought exclusive contact with the media to control its public image, promote itself as the “savior” of ferrets, and charge other participants with causing the problems. In short, the ferret program’s core ideology, arrangements, and dynamics made it impossible to correct shortcomings in order to better approximate the goals of the ESA. As a consequence, ferret recovery became a model of states’ rights trumping federal resource conservation mandates.

The analytic error in this case was that both state and federal officials reduced ferret restoration to a narrowly bounded set of decision and management processes. The formula used was conventional, top down, power oriented, and bureaucratic. Given the conflict-ridden history of state versus federal relations in Wyoming, the ferret case turned into just one more battle in a very long war. The program fell victim to the “translation” problem, the failure to prepare for implementing the ESA in a specific, highly conflict-prone environment. The resulting discord in turn exacerbated inadequacies in technical research and husbandry methods and organizational behavior in the lead agencies. Acting synergistically, these problems nearly caused the ferret’s extinction. Many of these problems could have been predicted and ameliorated had participants made efforts to match the ESA’s mandate to the dominant paradigm in Wyoming prior to transferring authority for ferret recovery to WGF. The failure to do so illustrates the challenges of “translating” the ESA into applied conservation, despite the act’s unambiguous mandate.
The Black-Tailed Prairie Dog Case

Prairie dogs are two-pound, colonial rodents that socially aggregate in large populations. The black-tailed prairie dog (*Cynomys ludovicianus*) is the most widespread and gregarious of the five species of prairie dogs. The species ranges over the short- and midgrass prairies of western North America, eating grasses, forbs, and shrubs along with roots and insects.

The prairie dog historically occupied parts of eleven western states (Hoogland 1995), two Canadian provinces, and one Mexican state. It is a "keystone" species in the American grasslands. Prairie dog colonies and associated species together make up the "prairie dog ecosystem" (Clark et al. 1989). Their abundance has dropped dramatically by about 98 percent over the last century. The species faces ongoing threats from uncontrolled recreational shooting, introduced diseases (especially sylvatic plague), continued poisoning, inadequate regulatory mechanisms, and lack of adaptive management (Predator Conservation Alliance 2001). Despite its population decline, the species made it onto the ESA agenda only when conservationists petitioned the USFWS to list it and the USFWS designated the prairie dog as a candidate for listing in 1999 (National Wildlife Federation 1998b).

Conflicts concerning species and habitat restoration are among the most contentious in the United States (Reading et al. 2002). The complexity and conflict comes from opposing perspectives of participants and the way they interact. The prairie dog situation is a classic example of these problems.

Several groups have organized around deeply felt, often contradictory views of the species. Each has a unique vantage point that defines the problem in narrow, incomplete, and self-interested ways. Thus, each viewpoint calls for a different solution. Ranchers and the agricultural industry want to eliminate prairie dogs or maintain them at very low numbers. Conservationists want the species recovered and their ecological function protected. Animal rights activists want abundant prairie dogs and protection of individuals. Recreational hunters want prairie dogs to be sufficiently abundant to continue hunting. Native Americans have diverse views but are generally supportive of prairie dog recovery. Although most citizens are unaware of the issue, the public also generally supports conservation. Most agencies seek to keep the species off the endangered species list. Some agencies are allied with ranchers and other land use interests. Agency personnel also hold personal and professional views that vary.

Presently, there is no adequate means to integrate these diverse and often conflicting interests into an overall program for prairie dog conservation. The response from all levels of government is best described as "defensive policy." The USFWS belatedly took the most risk-averse path when it designated the
species as “warranted” for listing as threatened, but “precluded” from listing because other, higher priority species needed attention (USFWS 1999e). The designation sent shock waves through the western cattle and real estate industries, which oppose any formal recognition under the ESA. The prairie dog’s new status focused the controversy and fueled activity by agricultural interests, wildlife and land management agencies, and nongovernmental conservation groups.

Since the USFWS did not list the species, the agency had no formal regulatory power. The warranted-but-precluded status, however, did send a strong message to the states that doing nothing was no longer an option. Western states formed a coalition to oppose listing, a manifestation of the strong states’ rights ideology of most western states (e.g., Cawley 1993; Wilkinson 1998). The states prepared an interstate management plan, the main goal of which was to prevent listing prairie dogs. It was adopted by western states. More recently, the states have sought to achieve as much management authority as possible. To the states, maintaining authority and control over prairie dog conservation efforts arguably has taken precedence over substantive conservation efforts, a classic case of “goal substitution” driven by competition for power (Daft 2003).

Recovery is never discussed as such in the interstate plan. Instead, the plan calls for preventing federal listing (Luce 2003). The long-term goal is to increase the prairie dog population, but in less than 1 percent of the species’ former range, a goal that is only marginally better than the species’ present conditions, if that. The plan primarily focuses on more research and monitoring, economic incentives for ranchers to participate, and more government oversight of poisoning and shooting. Annual reviews by the USFWS indicate that the agency’s judgment is that the states have been making adequate progress. Indeed, some progress has been made, but it has been minimal and slow. The steps taken to date are necessary for recovery, but far from sufficient.

The interstate plan raises several questions. First, it is not clear why an interstate program is necessary to conserve prairie dogs within each state since each state already has the necessary authority to conserve its own wildlife. To date, the states have not used their existing legislative and administrative authority to aid prairie dog conservation. The new arrangement only adds more “red tape” to an already complex problem. Second, most western states have limited institutional capabilities (Lester 1990). Eight of the eleven states that contain prairie dogs have been classed as “low capability” in a twenty-three-variable study. Finally, although the interstate plan cites a number of causes for prairie dog declines, it does not indicate how it will remedy these, especially those factors that fall under “human dimensions.” Overall, the interstate plan fails to demonstrate that a state-led effort will be successful.

The analytic error in this case is that officials reduced a complex challenge
to a traditional, standardized program led by agencies that have historically shown little interest in prairie dog conservation. The program is therefore highly vulnerable. First, the states have dominated planning with little input from other stakeholders. Second, the plan replays old ideas and promotes interactions that have, in fact, contributed to the decline of prairie dogs and their habitat. Third, the plan promotes traditional decision making and generally serves local, primarily agricultural, interests. And fourth, the follow-on state plans fail to provide mechanisms for addressing the human factors affecting prairie dogs, especially the widespread negative attitudes and economic and agricultural practices that harm the species. One measure of the plan is that ranchers are already resisting voluntary measures, including financial incentives that reward them for protecting prairie dogs on their lands. Recovery is unlikely. In fact, the species was removed from the candidate list in 2004.

The Southern Sea Otter Case

The southern sea otter (*Enhydra lutris nereis*) was believed to be extinct, largely a result of trapping for the fur trade, by the early 1900s. A small population, however, was rediscovered along the central California coast in 1938. Following enactment of the ESA in 1973, the USFWS took little action to investigate the species' status. To fill the void, the federal Marine Mammal Commission in 1975 sponsored research on the otter population and its habitat and found both to be at risk from possible oil spills along the coast. Risks were also mounting as fisheries, especially for abalone and other shellfish, grew, increasing both direct competition for prey species and the threat of otters becoming entangled in fishing nets. In response, the USFWS listed the sea otter as threatened under the ESA in 1977. A recovery plan was published in 1982 and revised in 2003 (USFWS 2003h).

Otters are the source of both biological and socioeconomic conflicts. Although they are opportunistic predators, otters prey actively on abalone wherever the two coexist. This creates competition between the otters and the abalone fishing industry, triggering the related dynamics between the state and federal agencies, fishers, and nongovernmental organizations involved in otter conservation. The lead state agency, the California Department of Fish and Game (CDFG), has often sided with the fishing industry in conflicts between marine mammals and fisheries; although its relationships with other participants in the otter case have often been contentious, they have remained professional. CDFG has been a willing partner in efforts to develop strategies to conserve otters while mitigating otter-fisheries conflicts. Other participants, such as the Marine Mammal Commission and the nongovernmental Friends of the Sea Otter, exert conservation-oriented pressure on the USFWS. The USFWS,
for its part, was willing to follow rather than lead, often taking the actions it was pressured to take.

In 1981 the Marine Mammal Commission suggested to the USFWS a recovery strategy described as “zonal management,” similar to a strategy considered, but not ultimately pursued, by CDFG in the mid-1970s. As eventually adopted, zonal management was intended to mitigate the ongoing conflicts between shellfisheries and otter recovery by creating an “otter-free” management zone in which shellfish stocks would be unaffected by otter population expansion. Zonal management consisted of establishing a translocated, ESA-designated, experimental population at San Nicolas Island in the Channel Islands and authorizing the removal of otters from the entirety of the Southern California Bight south of Point Conception except for the area around San Nicolas (the otter management zone) (USFWS 1987a).

According to the USFWS, the goals for establishing the new colony were to eliminate the possibility that a single natural or human-caused disaster (such as an oil spill) could wipe out the entire population and “to obtain data for assessing translocation and containment techniques, population status, and the influence of sea otters on the structure and dynamics of the nearshore community in order to better understand the characteristics and impacts of a sea otter population at its optimum sustainable level” (USFWS 1987b, 22). Implied in the second goal is the study and assessment of the community ecology of sea otters, including interactions between otters and shellfish. The role and influence of otters on shellfisheries in California, especially as compared to overharvesting, has been a point of contention between the fishing industry and CDFG on the one hand, and federal managers and researchers, Friends of the Sea Otter, and other otter recovery advocates on the other (e.g., Estes and VanBlaricom 1985; Hardy and Wendell 1982). Participants were hopeful that with zonal management, the conflicts would subside.

The translocation began in the summer of 1987 and lasted three years. During that time, 139 otters were moved to San Nicolas Island (fewer than the 250 that the USFWS had planned to establish the new colony). Soon after the first series of releases in 1987, it became apparent that the otters were not establishing a colony as had been hoped (USFWS 1991b, 1991c). The translocation of otters ended in 1990 when the permit authorizing the project was suspended. The resident population has remained stable at about 15 to 17 animals since 1989; the reasons for the lack of population growth at the island are unknown (USFWS 1996e). No otters have been removed from the management zone since February 1993, when two otters died following their capture and release, calling into question the federal permit requirement that otter control measures be nonlethal (USFWS 1993b, 1996e). Since that time,
neither the USFWS nor CDFG has allocated funds or staff to capture otters in the management zone.

In the aftermath of the zonal management experiment, several events occurred that had profound effects on the otter program. First, in March 1989 the Exxon Valdez ran aground, spilling 11 million gallons of crude oil into Alaska’s Prince William Sound. The spill’s magnitude undercut the principal assumption of the sea otter recovery program: that expanding the otter population to San Nicolas Island would reduce or remove the threat of a single oil spill devastating the entire population. Since prevailing ocean currents off the California coast move in a southerly direction, a spill north of the otters’ range could affect the entire population (USFWS 1996e). Second, following the suspension of the translocation, both the USFWS and CDFG began systematically disassembling their long-standing otter programs. The USFWS discontinued its otter recovery coordinator position, deleted its budget line for otter recovery, and reassigned its otter staff to other duties. Third, following a long and apparently inexorable decline, all five species of abalone were declared commercially extinct throughout California by CDFG in 1998 (Rogers-Bennett et al. 2002). This effectively ended the California abalone industry and forced CDFG and the fishers to develop abalone conservation plans in the absence of any fishing effort, but with the existence of otters in abalone habitat. Fourth, the otter population unexpectedly expanded its range into the otter management zone. In the spring of 1998, 101 otters were observed south of Point Conception, the northern limit of the “otter-free zone” delineated by the zonal management plan (Estes and Hatfield 1998; USFWS 1999f, 1999g). Although the otters retreated to the north and out of the management zone during the summer, they returned in the winter, and by January 1999, 152 otters occupied the waters of Cojo Anchorage, south of Point Conception. These animals are not part of the translocation effort and so represent a natural expansion of the population southward along the California coast (USFWS 1999g). Needless to say, the abalone industry and other fishing interests became alarmed and immediately called for the otters to be removed from the management zone (in accordance with zonal management policy) while Friends of the Sea Otter and other otter recovery advocates called for the immediate full protection and study of the population. These events occurred when the state and federal agencies had no dedicated otter staff or funding.

There are two analytical errors in this case, and the removal of either one would have substantially reduced the problems encountered by program participants. The first involves the failure to collect adequate data on the capture and relocation of otters. Because no prototype research program was conducted before the translocation effort was begun, the agencies were unprepared for the failure of the translocation effort and had no workable alternatives other than
to end the program at great emotional and resource expense. Had agency managers better prepared for a full spectrum of possible biological outcomes, a range of alternatives could have been discussed and contingency plans developed to address them. Instead, the agencies placed all of their proverbial eggs in one basket, and when the effort failed they were unable to face the logistical, budgetary, and emotional cost of starting over.

Their abandonment of what they had accomplished, and the learning opportunities it afforded, is the second analytical error. The otter program suffered from bureaucratic rigidity and an inability to adapt to unexpected programmatic change. The natural expansion of the otter population into the management zone was an eventuality that the USFWS and CDFG could have projected and one for which they should have been prepared. Instead, no contingency plan was in place, and following the events of 1998–99 the agencies were left scrambling to reinitiate their management programs while simultaneously operating in a conflict-prone crisis arena, far from ideal circumstances in which to implement the ESA. In this case, the USFWS has been able to build on its past experience. In the wake of the otter expansion, the agency opened the decision-making process to former program participants (notably abalone fishers, Friends of the Sea Otter, Marine Mammal Commission, and the public), initiated processes to formally end the zonal management program (which had been codified by Congress), and clarified its intent to apply the ESA fully to the newly expanded population. In conjunction with its renewed efforts on behalf of the otter, the USFWS reconvened the otter recovery team to complete the revised recovery plan, which the agency subsequently adopted.

Net Assessment

Other reviews of the implementation of the ESA suggest the analytic errors evident in our three cases may be common. Based on reviews of endangered species programs, we found three aspects of current recovery operations (i.e., decision-making process) that need explicit, systematic attention (Clark 1996, 2001; Wallace 1994, 2003). First, managers need to spend more time clarifying the conservation goal, defining the problem(s) contextually with respect to goal attainment, and examining alternative ways of achieving the goal again given the context. Second, it is essential to establish a thorough, ongoing appraisal mechanism in order to learn systematically from past conservation experience and to make practical improvements. Third, it is essential to recast the challenge of species recovery in terms of upgrading the decision-making process and learning at individual, organizational, and policy levels—in other
words, focusing attention on the adaptive management of endangered species programs.

By looking at recovery as a set of interactive activities (i.e., a decision-making process), we can systematically determine how well each activity functions case by case. One model of decision making useful in evaluating recovery programs is to illustrate the "life cycle" of a policy or program as including the following activities: planning, open debate of alternatives, deciding among alternatives, implementation, resolving disputes that flow from implementation, monitoring and evaluation, and termination or modification as indicated by the evaluation (Clark and Brunner 1996). This sequence of activities is called a "decision process" (Lasswell and McDougal 1992). By knowing how a decision process works, or does not work, people in endangered species conservation can maintain good practices or correct poorly functioning ones.

Based on reviews of nearly a hundred cases, we see recurring but preventable weaknesses. Guidelines to avoiding twenty-two common problems were offered by Clark (1997) and Clark et al. (2000, 2001) and are outlined below. A recent appraisal by Pagel et al. (forthcoming) also discovered implementation problems in many programs.

In conclusion, it appears to us and other analysts that implementation of the ESA reveals too many preventable errors. If this is true, then remedial steps could increase overall performance as well as case-by-case performance. Weaknesses in recovery programs occur when, in an effort to translate national ESA policy to specific cases, we simplify complex challenges and use only fragments of contextual knowledge potentially available on which to formulate and implement programs (i.e., the "translation" problem). Furthermore, agencies often apply standard agency operating procedures in case after case. This can impede innovation and lead to mismatches between chosen and necessary methods (i.e., the "rigidity" problem). Finally, application of traditional biological skills may predispose individuals to overlook or misconstrue important aspects of the social and organizational as well as biological context. Traditional approaches may only compound problems (i.e., the professional or skill problem).

Recommendations for Improving Performance

What can we do about these problems? Strategies, tools, and models exist to improve our individual and collective response to recovery. Together they call for a more active, systematic, and integrated approach than currently exists. They also call for more innovation and increased learning on a case-by-case basis, across programs, and about the ESA overall. These strategies, tools, and models can be used in various ways to address the problems illustrated above.
Use a Practice-Based Approach to Find Best Conservation Practices

One solution to "translation" problems is to adopt a practice-based approach to recovery. This strategy focuses on cases and best practices to improve performance. ESA policy is a complex system, the totality of which is beyond comprehension for most practitioners. Therefore, the key to improving recovery is to focus attention and resources on selected parts of the system. Much of the debate about improving the ESA focuses on top-down changes to policy. Although such changes can marginally improve the act's operation, significant improvement can take place at the "bottom" or operational level. Recovery problems stem from a multitude of private and public decisions, many of which predate the ESA and many of which take place far from Washington, D.C. Recovery depends on many local, small-scale, private, and public decisions. It is these decisions that are the appropriate focus for improving recovery efforts.

We recommend a three-part, practice-based strategy: (1) find and describe successful recovery efforts, (2) adapt and diffuse them widely, and (3) create new opportunities to build further recovery program successes (Wallace 2003). Actual programs should be identified, described, and reviewed critically to determine the reasons for their success or failure. Identifying and describing successful practices is best done through independent and continuous appraisal (Lasswell 1971). Cases are real efforts rather than theoretical constructs. Case studies can be one source of information for participants in other cases who can then adapt the prototypes to their specific situation (Clark et al. 1995). This adaptation should be iterative and designed to avoid rigidity and maximize learning. Federal and state agencies could provide leadership by supporting successful prototypes. At present, unfortunately, the ESA policy arena has few mechanisms for appraisal, prototyping, and dissemination.

A key task is creating processes that encourage improved communication. These can be formal, such as intergovernmental task forces, or less formal, such as electronic networks. Combining economic strategies for private and business interests should be considered. Because endangered species recovery varies geographically as well as ecologically, politically, and economically, it should be decentralized at the operational level. The use of case-specific strategies can help avoid a top-down approach and bureaucratic hierarchies by emphasizing the importance of individual policy contexts (and thus recognizing the dangers of taking a "one size fits all" approach to endangered species policy). To accomplish this, there is a need to shift to more progressive action plans.
Use Appropriate Tools to Address Substantive, Process, and Structural Problems

The disconnect between a broad top-down mandate and varied local context can be dealt with, at least in part, by using workshops, group problem solving, and special “decision seminars.” Workshops and group-based problem solving are sometimes used in endangered species conservation, but not to their fullest potential (Clark et al. 2001).

Effective, group-based problem solving involves “ways and means for blending wisdom and science, for balancing free association and intellectual discipline, for expanding and refining information, and for building a problem-solving culture that balances ‘permanent’ with ‘transient’ membership, thereby remaining open to new participants and to fresh ideas while retaining the capacity for cumulative learning that refines, clarifies, and simplifies” (Burgess and Slonaker 1978, 1). Workshops are a means that groups can use for problem solving, capacity building, and consensus development. In a consensus workshop, the group articulates the common interest. Consensus is a shared understanding that enables a group to move forward in problem solving; it does not mean that everyone agrees (Stanfield 2002). Guides to the design of workshops are readily available (e.g., Stanfield 2002).

To address planning and implementation successfully, recovery personnel need a comprehensive understanding of their own organizations and institutions relative to the recovery problem and its context. One means to achieve this outcome is through a “decision seminar” (Wallace and Clark 2002; Burgess and Slonaker 1978). This tool was first proposed by Harold Lasswell (1971). It is a tool for group problem solving that increases the likelihood of realistic, timely, and comprehensive solutions (Muth and Bolland 1983).

A decision seminar differs in many ways from traditional, short-term, focused workshops. First, it may not be responsible for making immediate decisions. Typically, it does not come under pressures of operational decision making. Second, it is unique because of its more thorough analysis conforming to the five tasks of problem solving described by Lasswell (1971). These tasks are (1) clarifying the goals of the program, agency, or policy; (2) describing the social, organizational, biological, and other relevant trends that pertain to the issues at hand; (3) analyzing the factors that have caused or influenced the trends; (4) projecting likely outcomes from the current state of the program or policy; and (5) inventing, evaluating, and selecting alternatives or options to solve the problem(s). These five tasks allow “the context to emerge as the focus of individual or group attention” (Lasswell 1971, 39; Cunningham 1981, 26).
Use an Integrated Framework and Civic Professionalism to Improve Recovery

Using a proven, integrative framework for problem solving combined with a civic model of professionalism can reduce the limitations of the conventional fragmented and positivistic model of professionalism. Regardless of how much knowledge or experience a professional has, each new recovery problem is unique. This requires creative application of strategies for posing, solving, and resolving the problem. A framework for problem solving and an appropriate model of professionalism are essential, but frequently absent, requirements. Wallace et al. (2002b) introduce a framework and model of professionalism that can aid recovery efforts.

Problem solving is just an effort by an individual or group to think of a way out of a difficult situation. The first requirement for improved recovery decision making is an integrated problem-solving framework that can accommodate both conceptually and practically diverse data, epistemologies, and disciplines (Clark et al. 2001). Categories are essential parts of the recovery process because they permit systematic, explicit thinking. The categories in an integrated framework can serve as a "checklist" of variables to address in any recovery problem. Furthermore, they allow us to deal intellectually, efficiently, and effectively with complex concepts and a large volume of data. Such a framework is a tool for thinking and giving direction to thought and action. It encourages professionals to ask: Why are we doing this? What should we think about? What will result from our thoughts and actions? This permits users to construct a realistic map of the conservation process, its context, and to define and solve problems.

Conventional problem solving draws on ordinary, everyday images, notions, and vocabulary about people, problems, and the process of making decisions. In the black-tailed prairie dog case, this style of problem solving is inadequate. Nevertheless, the record shows that it is used regardless of whether it is effective or not. As a result, decision makers muddle through problems and crises without fully understanding their nature, solving them, or gaining insight into why the process is not as effective as hoped. This traditional approach is inadequate to resolve the real complexity and conflict inherent in many recovery efforts.

The framework we recommend and that has served us well through many years of professional practice was developed by Lasswell (1971) and Lasswell and McDougal (1992); it was cast in terms of species and ecosystem conservation by Clark et al. (2001) and Wallace et al. (2002a, 2002b). It captures what is typically described as the facets of effective problem solving: orienting to the problem, being contextual (including mapping the social and decision
processes), and applying multiple methods to the problem at hand. It requires users to explore a problem fully through an analysis of goals, trends, conditions, projections, and alternatives. It requires users to ensure an adequate conservation decision process by mapping the activities or functions that make up that decision process and then reflecting upon and learning from them. It requires users to understand the context, that is, the human environment, that is central to understanding the biological problems and finding a solution to the recovery problem. The framework also welcomes any and all methods from the natural and social sciences and humanities, and it recognizes that information and expertise from each of these areas can help users to understand and resolve problems. Finally, the framework allows users to array categories of analysis (and data within them) in ways that reveal connections and insights not otherwise apparent. The framework encourages systematic thinking directed at the achievement of recovery goals (Brewer and Clark 1994).

The second requirement for improved decision making is that the professional understands his or her standpoint relative to society and behaves accordingly (Schön 1983; Clark and Wallace 2002). Recovery practitioners are specialized in their training, operate following some standards of practice, and show some commitment to society. The training, standards, and commitment vary dramatically. Too often problems afflict professionalism; these may include myopic overspecialization, loss of integrity, weak civic ethic, self-interested behavior, and blindness to the role of specialists in a democratic society. Professionalism requires the knowledge and skill to blend technical matters, civic responsibility, leadership, and learning into a mode of operation that contributes to communal standards of problem solving in a responsible way (Clark and Reading 1994).

Civic professionalism stresses use of an integrated approach (via a framework, as above) and commitment to public service. It requires practitioners to be self-reflective about their work and interactions with others (Schön 1983). This model requires an orientation of professional life that brings it into accord with a profession’s deepest aims and goals. It requires a greater awareness of self and the social context of problem solving than does conventional professionalism. It requires new habits of thinking, leadership, and participation for some professionals. It also often requires changes in professional education and on-the-job working arrangements.

Conclusion

Conservation of a nation’s biological heritage is a long-standing goal that is now widely recognized throughout the world. The Endangered Species Act is among the high points in our nation’s commitment to sustain biodiversity as an ele-
ment in our national security. Despite this noble goal, however, ESA implementa-
tion is problematic and successes have been too few and too slow for
some analysts. Problems stem from analytic errors on the part of implementers.
These are remedial. We recommend three ways to improve matters using a
practice-based strategy, workshops (especially decision seminars), and new,
integrative, problem-solving skills. Our recommendations are designed to shift
the conventional formula for endangered species conservation to a more prac-
tical, integrated, and continual-learning approach. This approach shifts science
from a reductionistic, predictive, positivistic mode to one that addresses multi-
ple independent sources of information, consequences of practical experience,
and qualitative, context-sensitive methods. It shifts problem solving from a
reliance on normative models of rationality, confidence in positivistic science,
and technical fixes to problem solving that relies on integrated behavior sci-
ences that address context and complexity, and contextualized, procedural solu-
tions. It shifts decision making from discrete decisions, experts, and authorities
that are bureaucratized and “top down” to decision making that is continuous
and interconnected, involves a broad spectrum of participants including non-
experts and nonofficials, and is relatively informal and “bottom-up.” These
needed shifts can capture and institutionalize our collective wisdom for
improving programs and policies. Examining these matters openly, compre-
hensively, and empirically, as this volume and the conference on which it is
based have done, can help us ensure a healthy future for humans and nature,
not only in our country, but worldwide.

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