A Pragmatic Approach to Grizzly Bear Conservation

STEVEN A. PRIMM*

Northern Rockies Conservation Cooperative, P.O. Box 2705, Jackson, WY, 83001, U.S.A.

Abstract: *Progress in grizzly bear (*Ursus arctos horribilis*) conservation in the Rocky Mountains of Canada and the United States is urgently needed. Human-caused mortality is the appropriate focal point for understanding the problem. This issue has a number of dimensions, but the human dimensions are by far the most complex and difficult to analyze. Conducting analyses and implementing conservation plans at the site or local level makes optimal use of humans' limited cognitive capabilities. Neither maintaining the status quo in grizzly bear conservation nor relying solely on major reform is a viable strategy. Instead, concerned people should take a pragmatic approach to developing innovative processes for forming reason-based public opinions that in turn inform effective public policies. There are many benefits to such an approach and, given the lack of viable alternatives, it should be tested with a pilot project by the appropriate people and organizations.*

Un Acercamiento Pragmático a la Conservación del Oso Pardo

Resumen: *Se necesitan urgentemente avances en la conservación del oso pardo (Ursus arctos horribilis) en las Montañas Rocosas de Canadá y los Estados Unidos. La mortalidad causada por humanos es el punto central apropiado para entender el problema. Este tema tiene un gran número de dimensiones, pero las dimensiones humanas son por mucho, las más complejas y dificiles de analizar. La realización de análisis y la implementación de planes de conservación al nivel local o de sitio, optimiza el uso de las limitadas capacidades cognoscitivas humanas. Ni manteniendo el status quo de la conservación del oso pardo, ni recayendo únicamente en una reforma mayor serán estrategias viables. En su lugar, las gentes preocupadas deberán tomar un acercamiento pragmático, desarrollando procesos innovadores para formular opiniones públicas basadas en la razón, que en su momento modelen políticas públicas efectivas. Existen muchos beneficios de esta aproximación y dada la falta de alternativas viables, debería ser evaluada en un proyecto piloto por las personas y organizaciones adecuadas.*

Introduction

Grizzly bear conservation in the Rocky Mountains has been a contentious issue for nearly four decades (Condin 1956). Despite the dozens of years, millions of dollars, and reams of data that have gone into securing the future of Rocky Mountain grizzly bears (*Ursus arctos horribilis*), their recovery may still be a long way off (Mattson & Craighead 1994). Mattson et al. (1995:105) state that "no grizzly bear population in the contiguous United States could be considered robust" according to accepted general criteria for population viability (Holsinger 1995). Some observers (e.g., MacCracken et al. 1994) question the amount of attention given to Rocky Mountain grizzly bears because *Ursus arctos* numbers worldwide are relatively high at approximately 200,000 individuals (British Columbia Ministry of Environment, Lands, and Parks 1995). As Herrero (1994) and Linden (1995) point out, however, grizzly bear habitat in places like the Yukon and Siberia is not well-protected and in many locales faces intensive pressure from resource extraction and sport hunting. The possibility of global fragmentation and reduction of grizzly bear populations makes a strong case for concerted efforts to stop range contraction and extirpation wherever they are occurring, with an eye toward a multi-national system of habitat conservation. Rocky Mountain grizzly bears in particular should be conserved because of their cultural significance (Kellert et al., this issue) and because rich nations such as Canada and the United States should set a strong conservation example to countries with far

*Current address: World Wildlife Fund-US, 1250 24th St., NW, Washington, DC 20037.

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fewer options (Paquet & Hackman 1995; Weber & Rabinowitz, this issue).

I consider grizzly conservation from a problem-solving perspective and advance ways to navigate the difficult cultural and political dimensions involved. Specifically, I look at the problem of human-caused grizzly bear mortality as a localized issue that must be addressed on a site-specific basis, but in conjunction with landscape-level conservation goals. Current and proposed efforts to address these issues fall short. Finding manageable segments of this multi-dimensional problem and establishing workable problem-solving processes at the appropriate scales will be the keys to successful grizzly bear conservation.

Overview of the Grizzly Bear Conservation Problem

There is considerable uncertainty in grizzly bear recovery efforts: basic questions such as population sizes, growth trends, and habitat capability remain unanswered (Mattson & Reid 1991; Mattson et al., this issue). Realistic population targets, acceptable levels of risk, and effective habitat conservation measures are likewise poorly understood (MacCracken et al. 1994). Thus, progress in grizzly bear recovery may be temporary or entirely illusory. In Montana, Wyoming, and Idaho, where grizzly bears are classified as threatened, population estimates range from 500 to 900. British Columbia, where grizzly bears are vulnerable or sensitive, has somewhere between 6000 and 12,500 grizzly bears. Only a fraction of this total, however, lives in the British Columbia Rockies. Alberta, where grizzly bears are at risk, has a population between 715 and 865 (Paquet & Hackman 1995).

Significant portions of this total Rocky Mountain population are geographically isolated. Specifically, grizzly bears in the Greater Yellowstone Ecosystem have been isolated from other populations for at least 35 years (Mattson & Reid 1991). More generally, grizzly bears in the Rocky Mountains of southern Canada and the northern contiguous United States have very little habitat connecting them to the much larger populations to the north (Herrero 1994; Paquet & Hackman 1995). Continued fragmentation of habitat and loss of populations would greatly increase their extinction risk in this region (Noss et al., Mattson et al., this issue). A coarse-scale analysis of the problem provides at least a conceptual point of departure for devising conservation action: populations numbering at least in the low thousands that are functionally connected to one another are better buffered against the effects of random demographic, genetic, and environmental setbacks than are populations that are small and distributed in isolated patches of habitat (Gilpin 1987; Noss & Cooperrider 1994). Grizzly bears in the Rocky Mountains seem to be moving toward the latter, less stable configuration (Paquet & Hackman 1995).

As a general goal, grizzly bears in the Rocky Mountains should be managed for both large total numbers and functional connectivity among populations (Noss et al., Mattson et al., this issue). But simply suggesting this course of action leaves too many questions unanswered. Some of the following questions suggest a focused research agenda: Where do we begin taking conservation action? What type of action? What constitutes functional connectivity for grizzly bears? Other questions have to do with policy and politics: How should we go about ensuring that conservation actions will be implemented and will remain effective over time and space? What is an effective, efficient, and equitable way to balance local and national interests? To answer these questions it is necessary to move beyond a coarse-scale description of the grizzly bear conservation problem and examine in detail the factors that are reducing their long-term viability.

Human-Caused Grizzly Bear Mortality

The essential problem for Rocky Mountain grizzly bears is that people kill them (Mattson et al., this issue). Craighead and Craighead (1972:304) state that "the erratic, aggressive, and frequently unpredictable behavior of both grizzly and man increases the probability of conflict." Peek et al. (1987), McLellan and Shackleton (1988), Knick and Kasworm (1989), and Weilgus et al. (1994) cite killing by humans as the main limiting factor for grizzly bear populations in the Rockies. To put the magnitude of the problem in perspective, Mattson et al. (1995) report that since the early 1970s, more than 85% of all weaned and older radio-collared grizzly bears in the Rocky Mountains died because they were killed by people.

Human-caused mortality is a deterministic factor that prevents grizzly bear populations from maintaining positive growth rates and stable sizes, which keeps small populations vulnerable to random forces (Goodman 1987). Because of these effects, human-caused mortality is a more immediate and pressing problem than demographic stochasticity or genetics (Holsinger 1995). Knick and Kasworm (1989:13) suggest that "unless shooting mortality (largely illegal killings) is curtailed, genetic considerations may be of little consequence" to grizzly bear population viability. Human-caused mortality also forms barriers to dispersal and recolonization by making it highly improbable that dispersing individuals will reach new habitat, thus preventing functional connectivity between or within populations (Turner et al. 1995).

Physiographic and Ecological Dimensions of Human-Caused Mortality

Human-caused grizzly mortality is the result of an interwoven complex of ecological, physiographic, bureaucratic, economic, cultural, and valuational factors. Mattson et al. (this issue) develop an analytic model of the

interaction of these factors and project the outcomes of alternative management strategies. Degradation and destruction of grizzly bear habitat can be defined and understood in terms of human access to bears and resultant bear mortality. In order for people to kill grizzly bears, they must be able to get to them. Roads, camps, villages, and other sites that bring people close to grizzly bears generally lead to contact, conflict, and bear deaths. The effect of human-caused mortality is compounded by its disproportionate effects on females with cubs. Females with cubs choose low-security habitat near roads and developments in order to avoid conflict with adult males (Mattson et al. 1987; McLellan & Shackleton 1988; Weilgus & Bunnell 1994; Mattson et al., this issue). As a result, females with cubs, and subadult males, are most likely to become habituated to human presence, and therefore most likely to be killed by humans in acts of poaching or defense (Mattson et al. 1992; Weilgus & Bunnell 1994).

The loss of breeding-age females along with cubs that would have otherwise contributed to effective population growth is detrimental to grizzly bear conservation. Although human-caused mortality is thus a major factor in the problem of effective grizzly conservation, defining the problem of human-caused mortality only in ecological and physiographic terms overlooks key factors that play a decisive role in the survival of grizzly bears.

Cultural and Political Dimensions of Human-Caused Mortality

Human-caused mortality is, of course, related to human behavior and is thus a cultural problem. Attempts to solve the problem occur within public policy processes, which means that it is also a political problem. Thus, technical solutions alone are inadequate (Yaffee 1982). As Mattson et al. (this issue) point out, measures to restrict human access to grizzly bear habitat may be effective at reducing human-caused mortality by reducing the frequency of human-bear encounters. But access restrictions may generate hostility and resentment among local citizens, thus potentially causing the encounters that do occur to be more deadly. Alternately, decision makers in key positions in agencies or elective offices may block access restrictions or habitat conservation measures or rescind them after such measures have been implemented (Mattson et al., this issue).

Thus, technically sound grizzly conservation programs can be thwarted by feedback from human systems. The difficulty lies in anticipating feedback and making conservation strategies resilient in the face of such feedback. Scott et al. (1995) outline such an approach to species conservation but do not offer criteria or guidelines for including "social/political/economic factors" in recovery planning. Presently, these factors are considered informally and implicitly in many conservation programs at the administrative level. This mechanism is not acceptable by democratic or professional standards because it typically involves nonelected decision makers and because it does not utilize any explicit and systematic method for assessing human factors (Yaffee 1982).

Other mechanisms also fall short of providing a useful evaluation of political feasibility. Voting in general elections provides little information because candidate platforms are far too vague for voting to be a clear expression of preference on most issues. Participation in public comment periods does not provide much detail about people's attitudes, beliefs, values, and knowledge about complex issues such as grizzly bear conservation (deLeon 1994). Public opinion surveys tend to treat political reality as an immutable fact, and they only provide conservation planners with information about sociocultural obstacles they must negotiate.

None of these mechanisms promotes reflection, deliberation, or learning among citizens, bureaucrats, and policy makers (Dryzek 1990). Actively engaging these people through multilateral dialogue could produce clarified goals, a recognition of shared values, and sufficient clarity about concerns and objections to design effective conservation programs that enjoy stable and broad-based support (Snow 1995). Such processes would operate at scales appropriate to both the ecological and social dimensions of the grizzly bear conservation problem (Norton & Ulanowicz 1992; Schneider 1994). A hierarchical scaling approach would be most effective for organizing such programs. This strategy would allow attention to specific areas where human-caused mortality is high, while aggregating such information upward to landscape-level analysis of ecological and social information (Turner et al. 1995).

Standard Conservation Approaches

Some people involved in grizzly bear conservation might question the need to reexamine the fundamental problems and design new approaches to solving them. Agencies in the U.S. would likely respond that they are already pursuing coordinated, site-specific grizzly bear conservation. Others would argue that large-scale wilderness designation is the only effective avenue for bioregional grizzly bear conservation. An examination of these alternatives reveals a number of shortcomings and demonstrates the need for innovation, pragmatism, and processes conducive to learning.

Interagency Conservation Programs: The U.S. Experience

Several federal laws in the U.S. could produce effective interagency conservation of grizzly bears and other species (Keiter 1994; Keiter & Locke, this issue). Although progress has occurred, highly effective coordination and conservation have not materialized (Clark & Minta 1994). To understand why, it is necessary to examine the legal and institutional framework that creates grizzly

bear policy to see where and why certain important decisions are made and where the deficiencies lie (Keiter & Locke, this issue). To clarify, there is no one grizzly bear policy, but rather a complex set of "actions and decisions [that] add up to agency policy—but policy that no one has deliberately planned" (Majone 1989:160).

In the U.S. the Fish and Wildlife Service's (USFWS) Grizzly Bear Recovery Plan is the primary document guiding grizzly bear conservation efforts. This document is mandated by Section 4(f) of the 1973 Endangered Species Act (ESA), which calls for the development and implementation of "plans for the conservation and survival of endangered species and threatened species" (16 U.S.C. §1533 [f]). According to the USFWS, the Grizzly Bear Recovery Plan does not mandate specific actions or programs, but instead "outline[s] steps that will facilitate the recovery of the species" (USFWS 1993:16). Thus, the recovery plan in practice mainly sets broad conservation targets and provides technical information to public land managers, who must make decisions that could affect the survival and recovery of grizzly bears. Whether this is the purpose of the ESA is questionable (Houck 1993).

Implementation of the recovery plan "is the responsibility of Federal and State management agencies in areas where the species occurs" (USFWS 1993:16). Any actions these agencies undertake—such as timber sales or construction projects—must be compatible with the goals set forth in the recovery plan. This requirement is enforced by Section 7 of the ESA, which prohibits agency actions that are "likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" (16 U.S.C. §1536 [a2]). Section 7(a)(2) requires federal agencies to consult with the USFWS to determine whether such effects would occur (16 U.S.C. §1536[a3]). Considering that Section 4(f) requires recovery plans that define appropriate conservation measures—which would likewise indicate actions that would *impede* conservation—Houck (1993:350) contends that "recovery plan mandates are powerful limits, if not mandates, for agency action." Houck argues that for recovery plans to serve as "mandates" they must be specific about what recovery will require, especially in regard to implementation duties and site-specific actions.

Unfortunately, the Grizzly Bear Recovery Plan does not make site-specific recommendations. Lacking an explicit charge to conserve grizzly bears and their habitat in a specific area, and lacking site-specific information about conservation needs, implementing agencies can simply choose not to consult with the USFWS about proposed actions (Welch 1993). Even when Section 7 consultation does take place, effective conservation action is still hamstrung by the lack of specific conservation directives and information about important sites (Primm 1993). Many specific agency actions cannot be shown to be in obvious conflict with the recovery plan (Keiter 1989).

The "management situation" system for zoning grizzly bear habitat—adopted in place of critical habitat designation—was intended to remedy these problems by establishing standardized decision rules for grizzly bear habitat (Keiter at al., this issue). (Management situations range from "needed for the survival and recovery of the species" to "lacks survival and recovery values" [Interagency Grizzly Bear Commitee 1986]). This system has been roundly criticized for its shortcomings in practice. Management situation boundaries, which are nonbinding and are drawn at the discretion of each agency in its own jurisdiction, have been questioned by independent and agency researchers (Reid & Gehman 1985; Piccoli 1989; Mattson & Reid 1991). Mattson and Craighead (1994:109) describe management situation boundaries as "strikingly compatible with pre-existing human activities and land uses." Areas that were slated for commercial development are rarely given strict protection under the guidelines, even if they provide habitat for grizzly bears (Piccoli 1989).

Also, the long-term and cumulative effects of agency actions on population viability are often discounted or ignored in the consultation process (Mattson & Craighead 1994). MacCracken et al. (1994:78) state that "it is likely that at each step from the recovery plan to the project stage, some of the original intention of the plan was compromised." The result has been a piecemeal degradation of grizzly bear habitat that, taken cumulatively, presents a poor outlook for the long-term viability of grizzly bears in the contiguous U.S. (Mattson & Craighead 1994).

Although the agencies have made progress in dealing with several aspects of grizzly bear recovery, a concerted effort to achieve long-term recovery has yet to materialize. These behaviors are rooted in a complicated matrix of mandates, budgets, agency cultures, and direct intervention by politicians (McNamee 1990; Primm 1993). Agency managers operate under the scrutiny of supervisors, politicians, the media, interest groups, and the broader public, all of which have numerous means of control over the agencies (Wilson 1989; Mattson et al., this issue). Bad press, congressional hearings, budget cuts, and more-direct actions are all threats to agency land managers. In contrast to these clear and present costs, the rewards of strong grizzly bear conservation measures may not materialize for years—if ever (Mattson & Craighead 1994). Considering the present political climate and fiscal difficulties, it appears that relying solely on the agencies to reframe and solve the grizzly bear problem would be a mistake.

Wilderness Designation

Many advocacy groups and individual conservationists have expressed skepticism about prospects for meaningful conservation on a localized basis. They have legitimate concerns that localized processes will become captured by extractive industries and that key values will be bargained away. Thus, they choose to pursue improved

grizzly bear conservation through broad-scale land-protection schemes, often relying on legal wilderness designation but occasionally promoting new categories of land-use designation. For example, the Northern Rockies Ecosystem Protection Act (cited in Craighead et al. 1995: 359) would, in addition to designating wilderness, establish "wildland recovery areas" and "biological corridors."

Just as vastly improved agency programs are now constrained by a conservative Congress and lean budgets, so are the prospects for new wilderness legislation. Anti-environmental legislators from around the U.S. now control key committees (Cushman 1995). Legislators from grizzly bear country are unlikely to sponsor any aggressive wilderness legislation themselves, and wilderness bills sponsored by outsiders have made little progress to date (Keiter & Locke, this issue). Developing a national pro-wilderness constituency to counteract such parochialism is not a promising strategy. Heinen and Low (1992: 110) point out that "humans have evolved to be concerned primarily with short-term costs and benefits on a restricted temporal and spatial scale." Thus, people at the national level may have difficulty caring about or understanding the long-term and far-away concerns of grizzly bear population viability. Many people at the national level may not understand why we might need more protected areas in addition to the ones we already have. The "marginal utility" of more wilderness may seem quite low. This prospect suggests the need to incorporate conservation biology concepts into curricula at all education levels—an important long-term objective.

Other important long-term reforms relate to the management of wilderness areas. A U.S. General Accounting Office (1989:2) report found that the Forest Service "has not periodically inventoried conditions in many of its wilderness areas [and thus] does not know whether conditions are improving or getting worse." Also, human-caused grizzly bear mortalities continue to occur annually inside wilderness areas (typically during elk-hunting season; Gunther et al. 1996). Such flaws do not argue against the value of wilderness itself, but they do suggest that larger agency and budgetary reforms are necessary for wilderness designation to be the centerpiece of a viable grizzly bear conservation strategy. These reforms may ultimately depend on campaign finance reform at the national level. The time frame of such reforms, as for education, could be on the order of decades. More timely strategies, especially ones that are not dependent on federal legislation, are necessary in the interim.

A Pragmatic Approach to Grizzly Bear Conservation

The task in grizzly bear conservation is to create opportunities for progress that make optimal use of human problem-solving abilities, which are inherently limited (Simon 1983). Most conservation problems and nearly all sociopolitical problems are far too complex for our limited mental capacities (Lindblom & Woodhouse 1993). Rather than ignore these cognitive limitations by ill-fated attempts at comprehensive problem solving, we should instead frame problems in ways that we can grapple with them cognitively and practically (Heinen & Low 1992). Thus, grizzly conservation efforts should be focused on problem sites where existing or potential human-caused mortality is impeding or could impede population growth, connectivity, and other broader-scale conservation objectives. Recent information about grizzly-human conflicts in Greater Yellowstone (Gunther et al. 1996), for example, indicates that conflicts and mortalities tend to be relatively localized, involving easily identifiable human communities. Concentrating efforts at this level provides tangible opportunities for on-the-ground conservation action. It also offers a way to manage the cultural and political complexity of grizzly bear conservation by dealing with a manageable subset of the participants in the policy process. Substantive issues such as public safety and land-use regulations could be addressed through participatory processes which, in themselves, address democratic concerns.

Such an approach presents obvious concerns. We might begin to lose sight of the larger picture of interconnected viable populations by concentrating exclusively on high-profile conflicts at local levels. Thus, there is a clear role for some form of coordination of conservation efforts at the landscape or bioregion levels. Also, the quality of localized conservation programs might develop unevenly over space and time, so there is a need for consistent performance standards, information sharing, and access to technology on a broader scale.

A network of site-specific grizzly bear conservation programs would allow for alternative solutions to be tested simultaneously at several different locations (Brunner 1994). With built-in flexibility and multivariate monitoring, feedback from multiple, concurrent, localized conservation efforts can be processed rapidly to allow for error correction (Holling 1995). Problem-solving knowledge gained in one area could then be applied to other areas. The alternatives to such an approach are doomed attempts at comprehensiveness on a bioregional scale or disjointed responses to local crises that make no use of feedback or cross-case comparisons (Lindblom 1979). I next outline the social and political aspects of designing an effective conservation strategy.

Developing Reason-Based Public Opinion

Grizzly bear recovery efforts have for the most part originated in and been dominated by the institutions of government. Bureaucratic management schemes, interagency coordination, wilderness designation, and other avenues all rely on governmental institutions to develop and implement solutions to a problem rooted in value conflicts

among private citizens. These efforts are part of a massive societal transformation that has been in motion for perhaps 500 years (Habermas 1962). This transformation has increased the importance of economic and governmental institutions to the diminishment of purely social means of organizing for collective problem solving (White 1995). These institutions grew because of the development and widespread acceptance of scientific (or instrumental) rationality and market economies. Society's problems can be solved, theoretically, by either resource allocations achieved through market mechanisms or by technical experts devising and applying rational solutions (Lasswell 1971). This transformation has been so sweeping that many people now seem incapable of imagining problem-solving efforts originating outside of governments or markets (Drucker 1994).

Thus, when social problems arise that are not necessarily amenable to market solutions—such as grizzly bear conservation—our impulse is to turn to government agencies to solve the problem with technical-rational solutions. There are two major problems with the technical-rational approach, however. First, despite tremendous scientific gains, the world is still far too complex for people to be able to explain and control it (Michael 1995). Horgan (1995:109) warns that "even if we can capture nature's intricacies on computers, those models might themselves be so complex that they elude human understanding." So, technical-rational problem solving has definite limitations. Second, technical-rational problem solving cannot begin to account for the complexities of human beliefs, values, and attitudes and thus does a poor job of solving problems rooted in value conflicts (White 1995; Kellert et al., this issue). Survey instruments are often promoted as a means to understand these variables, but they seldom generate learning or mutual understanding among citizens and do not facilitate active citizen participation in designing problem-solving efforts—a key element in maintaining the legitimacy of our sociopolitical infrastructure (Brunner 1994).

If neither government nor markets can craft and apply specific solutions to problems rooted in culture and values, who can? Not only have governments and markets failed to solve many pressing issues, but their dominance of human life has created a "growing sense of meaninglessness and dwindling freedom" in the public at large (White 1995:8). What is required, then, is the restoration of "an autonomous realm of association and discussion where influence over the state is at issue, but where a share in state power is not sought" (Dryzek 1995:102). This realm, which critical theorists refer to as the "public sphere," exists apart from but is not irrelevant to government and the market. It is meant to supplant neither (Baynes 1995). Nor does a public sphere need the blessing of government; according to Chambers (1995:238), "there is no need for a special mandate to set up discourse" among private citizens.

The idea behind using discourse in a public sphere to ameliorate social problems is simple. Beliefs and values cannot be readily and reliably measured and used to craft effective technical-rational solutions. Even if these variables could be used as such, technical-rational solutions alone only perpetuate a lack of involvement and sense of powerlessness among citizens. The solution to both difficulties is to actively engage citizens so that they may represent themselves accurately (White 1995). Working collaboratively with relevant knowledge experts and skilled mediators, citizens could work directly on designing technical solutions while resolving value conflicts among themselves. This type of discourse seeks reason through communication, as opposed to the supposedly objective reason pursued by technical-rational problem solvers (Dryzek 1990)—that is, reason in regard to social issues is a collective endeavor. Processes of this sort seek to form reason-based public opinions, as opposed to merely measuring baseline opinions in survey projects (Chambers 1995).

The purpose of forming reason-based opinions in a nongovernmental process is not to direct the affairs of government explicitly but to develop reasoned and less-conflictual demands for government action (Dryzek 1990). These demands, according to deLeon (1994:88), can give legislators and administrators "a more complete evidential base upon which to make policy decisions, now amended to include an articulated value component previously untapped or unknown." With this information, government can proceed with policy making on the basis of an articulated and legitimate mandate (Dryzek 1990; Carew-Reid et al. 1994). Government is impeded (and rightly so) from direct involvement in or sponsorship of such processes by several statutes and by resource constraints. The U.S. Federal Advisory Committee Act (5 U.S.C., app. 2, §1-15) was developed for the purpose of preventing cronyism and influence-peddling under the dubious guise of citizen advisory councils. Private citizens and nongovernmental groups likewise face resource constraints. It is likely, however, that the biggest hurdle is adjusting to the idea of citizens solving problems without the direct involvment of government (Michael 1995).

Opinion-Forming Processes for Conservation

Citizen-based processes for developing reason-based opinion have an intuitive appeal. They offer the prospect of developing an empowered, engaged, and informed citizenry. They also seem to present a reasonable alternative to dysfunctional mechanisms for solving complex problems that combine scientific uncertainty and multifaceted value conflicts. But it is important to recognize the limitations of such approaches and to evaluate their applicability on a case-by-case basis. Thus, it is appropriate to ask whether these approaches would improve grizzly bear conservation in the Rocky Mountains.

There are several reasons that grizzly conservation is amenable to opinion-forming processes, the most obvious being the prominent role of human-caused mortality in the viability of grizzly populations. Human-caused mortality is very much a matter of individual and local human behavior, and reducing such mortality will depend largely on changes in local behavior. These changes could be effected through restrictions in access to grizzly habitat, but such restrictions could be rescinded if local sentiments were decidedly negative and if higher-level decision makers were responsive to these sentiments. This is often the case in the Rocky Mountains. Overcoming this obstacle will require efforts to reduce local hostility to grizzly bear conservation measures (Kellert et al., this issue). Also, grizzly bear conservation is highly polarized at broader scales, where it is inextricably bound up with a number of other contentious issues (Primm & Clark, this issue). At state, regional, or national levels, participants in the policy process do not communicate well and often have their messages distorted by the mass media. At these scales, people are unlikely to have the time or attention to analyze and solve specific, local-level grizzly bear conservation problems. In place of careful and productive analysis, the media instead report the localized grizzly "horror story," which becomes the basis of negative attitudes toward grizzly bear conservation (Sugg 1993).

Local support is critical because the larger political system and the national public are unlikely to force grizzly bears on people who do not want them. To some observers, grizzly conservation is "a burden placed on the rural minority . . . by government to satisfy the aesthetic preferences of the urban majority" (Sugg 1993:A15). The human residents of grizzly bear country contend with sporadic livestock predation, property damage, and the anxieties of living near an animal that could kill and eat them. These people are often quite outspoken against these impositions (Associated Press 1994; Kellert et al., this issue).

In contrast, the national constituency for stronger grizzly bear conservation measures is difficult to mobilize. The outcome of these dynamics so far is clear: for the last 150 years or more the federal domain of western North America has been managed for local benefit (Cowart & Fairfax 1988). This is a clear and durable trend that—right or wrong—must be considered part of the political landscape of grizzly bear conservation. The supposed national constituency either does not pay much attention to grizzly bear conservation or is not willing to assert its demands over the objections of local citizens. Conservation proposals that appear to impose the costs of grizzly bear conservation on an unwilling minority allow demagogues to brand advocates as callous and undemocratic (Rasker et al., this issue).

A less conflictual, learning-oriented process that addresses specific conservation problems could provide a forum to bring national concerns into the process effectively. Such a forum should also provide citizens with access to experts who can explain the various dimensions of grizzly bear conservation and dispel misconceptions without dominating the process or suggesting that there is a single right answer (Dryzek 1990). This sort of process holds straightforward practical benefits. Site-specific programs that have diverse funding bases and strong local support would be resilient in the face of systemic changes in politics and budgets such as those we are experiencing now (Associated Press 1995). Successful projects would demonstrate that cooperation could in fact occur, and thus reluctant allies and strident opponents may change their behavior. Demonstrated success could in turn attract more funding and other resources, making the next projects easier to implement and speeding progress toward landscape-level objectives (Weick 1984).

Site-Specific Conservation

Collective processes to address both grizzly bear conservation needs and human needs will have to be designed on a site-specific basis. Snow (1995) notes that the processes of collaboration cannot be neatly described, nor is any one technique applicable to every situation. One possible structure would be for a nongovernmental organization to convene meetings on a trial basis in a few areas that are important to grizzly bear conservation, as identified through landscape analysis (Bingham 1986; Turner et al. 1995). The organization would need to have the appropriate financial and political resources to initiate such a process. These resources would include meeting space, travel costs, and fees for experts (if necessary), information resources, and fees for third-party mediators for the meetings (Dryzek 1990). Landy (1995) states that bureaucrats can play a key role in such processes by using their knowledge to help frame policy questions, to provide information about existing conservation programs, and to outline technical and political constraints on action. At the very least, bureaucrats should not impede collaborative processes among private citizens.

Short of being able to specify structures or institutions in advance, I offer the following grizzly bear conservation issues for consideration:

- awareness of grizzly bear presence and appropriate human behavior to avoid unnecessary defense kills;
- local participation in anti-poaching efforts, including sharing in revenues from fines and bounties;
- protocols for dealing with individual bears that threaten human safety;
- economic benefit from grizzly bear presence, including consumptive and non-consumptive use (when recovery goals are verifiably met), marketing assistance

for "grizzly country" products, and compensation for damage;

- articulation of specific conservation goals for the area, within the parameters of scientifically based conservation targets that are either mandated or tied to economic or symbolic incentives; and
- participatory research, including development of geographic information systems (GIS) databases and maps that document grizzly habitat use, contributing to better conservation planning.

Addressing these issues would give local residents a meaningful measure of control over grizzly bears with which they may come into conflict and would distribute economic benefits from conserving grizzly bears. Participatory research would provide experts an opportunity to communicate conservation objectives effectively to local residents and would give local residents more of a sense of control over conservation efforts (Carew-Reid et al. 1994). Shapiro (1995:18) aptly states that such a process has experts "on tap, not on top." That is, science should not be used as a device for gaining control over decision processes or as a means of excluding participants who lack specialized knowledge or formal training (Wynne 1984). Rather, science ought to inform collective deliberations by helping to project the possible consequences of different normative decisions and by aiding the design of action alternatives (Robinson 1992).

Although many of the proponents of this type of problem solving do not venture beyond theoretical abstractions, some real-world approximations do exist. Dryzek (1990) describes the experience of the Alaska Native Review Commission, which was created by the international nongovernmental Inuit Circumpolar Conference. Gray (1989) reports on a number of case studies of collaboration in urban planning, environmental regulation, and energy policy. Cornett (1994) and Smith (1995) relate positive outcomes from incorporating GIS on a participatory basis, which introduces a tremendously vivid and flexible communication and planning tool into the process.

It is important to recognize the challenges inherent in such participatory approaches, especially when dealing with contentious issues like grizzly bear conservation in human-dominated landscapes (Carew-Reid et al. 1994). Kelman (1992) and Popper (1994) point out that widely-divergent or even polarized opinions and standpoints should not be considered an insurmountable obstacle. Kelman (1992:193) states that "the social-psychological literature shows that if initial sources of disagreement are built into [a] group, the chances that the group will prematurely reach consensus without discussion of the alternatives declines." Popper (1994:35) asserts that "a discussion between people who share many views is unlikely to be fruitful, even though it may be pleasant; while a discussion between vastly different frameworks can be extremely fruitful, even though it may sometimes be extremely difficult."

Conclusions

Successfully dealing with human-caused mortality is integral to the long-term survival of grizzly bears in the Rocky Mountains. Human-caused mortality is so complex that we cannot solve it by means of technical-rational methods alone. Innovative approaches—which, admittedly, are not yet well specified—must be developed. The status quo appears to offer little hope for long-term viability, and major reform of land-management agencies and practices will probably not occur in time to maintain viable grizzly bear populations. The direction outlined in this paper may strike some as hopelessly idealistic. Shapiro (1995:11) notes that "lurking behind much of the appeal of the deliberative prescription is a kind of 'groves of academe' image of reasonable people calmly talking together." This ideal does in fact underlie much of the appeal of opinion-forming processes, and it yields promising, realistic options that square readily with experience (Dryzek 1990). Moreover, the lack of progress with other strategies makes a strong case for experimenting with such processes.

A pragmatic approach recognizes both cognitive limitations in problem solving and the appropriate processes for the problems at hand. Addressing problems at a site-specific level is a useful strategy for managing both technical and sociocultural complexity. An effective process for forming reason-based opinion outside government can send sensible and nonconflictual demands to government agencies. Also, the mere process of listening to others has great benefits. By recognizing that local residents matter and have legitimate concerns, these processes would reduce the resentment that is often acted out against grizzly bears as "surrogates" for the distant, callous federal government and environmental elitists. Local acceptance, mutual understanding, and reason-based public opinion—all largely missing from grizzly bear conservation strategies—would greatly improve the outlook for this species in the Rocky Mountains.

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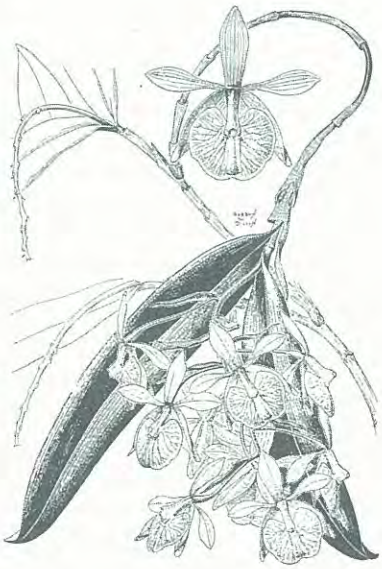
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