

Managing Yellowstone National Park into the Twenty-first Century: The Park as an Aquarium

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ABSTRACT Civilization continues to encroach on the borders of Yellowstone National Park. The ecological well-being of Yellowstone in the twenty-first century will depend on public policy decisions made today. Critical observers generally agree that the overall health of the park is inextricably linked with environmental conditions in the region, a vast area now being termed the Greater Yellowstone Ecosystem. Conservationists have presented numerous proposals to correct perceived problems in the agencies' approach to integrated resource management within the ecosystem. This perception generally dwells on the fundamental absence of commonly held goals, plus the lack of effective communication and data management systems within the managing entities. Despite the agencies' optimistic view of current and projected future conditions within the ecosystem, the widely held public view is that unless deficiencies improve, the future of Yellowstone National Park, and its broader ecosystem, will remain in doubt.

A disturbing question is being asked by a growing number of people, and the answer is as elusive as it is complicated. The question, indeed the issue, in Yellowstone National Park—and the National Park Service in general—is whether Americans are truly committed to the preservation of their parks in the face of rising economic costs and allied social tensions. The value of the national park idea seems widely accepted and supported by the American public. Certainly, the love affair shared by 250 million persons who visit parks annually and the fact that Congress, with some regularity, continues to create more parks (much to the delight of most citizens) attest to this. Nevertheless, even large, wild areas like Yellowstone National Park are confronted with ever-increasing threats to their integrity and health. One wonders if the parks in the twenty-first century will be left as a select congressional committee envisioned them in 1885: "The park should so far as possible be spared the vandalism of improvement. Its great and only charms are in the display of wonderful forces of nature, the ever varying beauty of the rugged landscape, and the sublimity of the scenery. Art cannot embellish them" (Hampton 1965:132).

Both the public and government must be committed to the protection of these parks so that they might be left, as Interior Secretary Franklin K. Lane stated early in the century, "unimpaired for future generations" (Lane 1918). The condition of Yellowstone Na-

tional Park in the twenty-first century will depend largely on decisions made today, and there is little agreement among the decision makers about how that should be done.

Most early parks were set aside by Congress for their scenery and curiosities, and they reflected the public's fascination with monumentalism as well as their ignorance or naïveté when it comes to biology (Sax 1980). Laws creating parks were passed because individuals or special interest groups perceived threats to an area recognized to be of an unusual or superlative nature. Therefore, parks were set aside through a political process and are thus the children of politics.

Because of political compromises, park boundaries usually failed to encompass complete ecological units. This is a fundamental flaw for most parks. Many of the great natural area parks, to some extent or another, are in danger of becoming static islands, frozen in space, as mounting internal and external threats foster increasing isolation within fixed boundaries. The monumentalism ideal of the eighteenth century may become a self-fulfilling prophecy.

National parks were founded on the principle of preservation and public enjoyment. Sentiments expressed as early as 1885 (as noted in the congressional report cited) established the principle of "driving forces," later understood to be natural processes, and the importance of minimizing human interference. In the administration of these natural areas, management's primary purpose is to maintain the area's pristine condition to the fullest extent possible (National Park Service 1968). This includes the perpetuation of natural processes in the absence of human interference—processes essential to the existence of a healthy ecosystem. This means that ecological processes, including plant succession, lightning-caused fires, and the natural regulation of animal populations, should be permitted to proceed as they did under pristine conditions, and that human uses must generally be restricted to nonconsumptive ones (Houston 1971).

The implementation of this principle has been hindered because few of our parks are completely self-contained units, and problems are rampant. Lemons (1986) summarized the problem facing contemporary park managers: "The *State of the Parks* report (National Park Service 1980) was the first and most comprehensive attempt by the NPS to systematically identify threats to parks. The report identified 73 different kinds of threats in the following categories: aesthetic, air pollution, physical removal of resources, encroachment by exotic species, visitor physical impacts, water quality pollution and water quantity changes, and park operations and planning of facilities. A total of 1,954 internal threats and 2,391 external threats in these categories were reported. . . ." The overall summary of the report stated, "The results of this study indicate that no parks of the system are immune to external and internal threats and that these threats are causing significant and demonstrable damage. . . . In many cases this degradation or loss of resources is irreversible. It represents a sacrifice by a public that, for the most part, is unaware that such a price is being paid."

Although parts of it were challenged, the report was significant because it introduced to the American public the idea that not all is idyllic in their national parks. Applying comprehensive management to a park within the context of its ecosystem requires a consistent policy base, adequate administrative arrangements, and diverse technical capabilities—some of which have been developed, while others have not. Yellowstone National Park provides an excellent example of the difficulties encountered by modern park managers.

THE AQUARIUM ILLUSION

At first glance, an aquarium appears to offer the perfect, intact ecosystem. But on closer inspection, it is apparent that an aquarium represents an eclectic, incomplete collection of aquatic life preserved only through the labor of its keeper. Artificially extracted from most natural processes, the aquarium's uniform walls seem to emphasize the degree to which it has been made nearly sterile by isolation, and therefore totally dependent on continuous external input. An aquarium is dependent on its four fragile walls; they are all that stand between it and virtual nonexistence. Yellowstone Park, on the other hand, is hampered by what many perceive to be its aquariumlike walls—its boundaries. The park also suffers from the public's tendency to ignore and neglect the "fish" until it is time to peer at the life behind the "walls." An aquarium's walls allow all manner of diverse, unrelated activities to go on around it without imposing deleterious effects on the aquarium's inhabitants. This is not the case with Yellowstone, and this is the aquarium paradox.

Most of the renewable and nonrenewable resource problems that Yellowstone National Park faces today trace back to its creation over a hundred years ago and to the establishment of its boundaries. When the area was set aside in 1872, protection of geologic wonders was paramount. Wildlands and wildlife, two of the most important aspects of the park today, were recognized by Congress in a somewhat indirect, offhand fashion. The boundaries they set failed to encompass a complete ecological unit. When the park was designated a biosphere reserve a century later, it was again set aside within the existing park boundaries, denying recognition of the remainder of the ecosystem—thus repeating and reaffirming the earlier congressional oversight. While the congressional designation did not account for the ecological integrity of the area, the second failed to consider or recognize that the greater Yellowstone area is one of the largest, essentially intact, wild ecosystems remaining in the earth's temperate zone.

Because of their mobility, wildlife are one of the special resources that suffer from a lack of ecosystem integrity. In the future, both quality and quantity of Yellowstone's wildlife populations could be severely compromised as a result of the boundary designations, despite the existence of the greatest and most popular display of wildlife in the contiguous forty-eight states. Congress at one point extended and modified the boundaries of Yellowstone Park, created additional park lands, and established national forests. In many respects it was too little, too late. The tremendous growth and development of the Intermountain West has severed key connections between the greater Yellowstone ecosystem and the remaining Rocky Mountains. The greater Yellowstone region has become an ecological island, potentially an aquarium in the making, requiring more and more external lifelines to the outside world. Development encroaches on those misplaced boundaries with steady and cumulative results.

INTERAGENCY COOPERATION

A brief summary here of the various entities responsible for land management in the Greater Yellowstone Ecosystem will help define the size and complexity of the management problem. Located in an area of northwestern Wyoming, southwestern Montana, and eastern Idaho, the Greater Yellowstone Ecosystem includes two national parks; a national parkway; seven national forests answering to three U.S. Forest Service regions;

three wildlife refuges; numerous parcels of state, corporate, and private lands; and multiple town, city, and county jurisdictions. With the great number of parties involved—Yellowstone Park personnel meet with twenty-two governmental entities on an annual or more frequent basis—resource decision making throughout the ecosystem ranges from excellent to disjointed and inconsistent. There are superlative examples of cooperation (e.g., the Interagency Grizzly Bear Committee, Greater Yellowstone Bald Eagle Working Group), and examples of essentially no cooperation (e.g., hydrology and geology related topics, osprey and other sensitive species management).

The official stance of the federal agencies of the Greater Yellowstone Ecosystem toward ecosystem management is that it is achievable without altered administrative boundaries or legislatively induced change. The agencies are quick to point out that the concept of ecosystem management is very young and that critics have not given the agencies time to put the necessary processes in place. They point to the successes of the formally chartered groups, like the Interagency Grizzly Bear Committee, and informal ad hoc groups, like the Bald Eagle Working Group, as examples of the kind of integrated resource management that can be achieved, if given time.

Critics of the official stance argue that all parties involved do not necessarily look first to the care and maintenance of the ecosystem, which is experiencing serious, cumulative threats to its integrity. They point to a recent publication produced by a group that supports the idea of treating the greater Yellowstone area as an ecosystem (Greater Yellowstone Coalition 1984). Threats listed were varied and covered numerous topics: oil, gas, and geothermal development; proposed wilderness areas and wilderness study areas; numerous proposed timber sales; utility corridors; air and water pollution; proposed recreational developments (e.g., Ski Yellowstone, Squirrel Meadows); existing recreational developments (e.g., Fishing Bridge, Alpine Village); proposed hydroelectric plants and instream flow problems; old and proposed new mining districts; wildlife management (e.g., bears, elk, bison, wolves, swans); and trail and road management (e.g., snowmobile trails, highway truck traffic).

Reese (1984), McNamee (1987), and others present persuasive arguments that the federal agencies lack common policy, administration, and resource management vision and that the most significant barrier to meaningful management progress in the Greater Yellowstone Ecosystem is the illogical administrative boundaries that bear no relation to the biological world. Others claim that if the federal agencies can be accused of lacking cooperative vision, then the integration of state agencies, municipalities, and private landowners into areawide management can be said to be blind.

If Yellowstone Park is to survive as the healthy core of the Greater Yellowstone Ecosystem, its neighbors must treat it less like an aquarium and more like a park. The park is more dynamic and interactive than an aquarium. Every component of the park's environment—animals, vegetation, geologic features—change and interact; and this interaction extends beyond the artificial, politically created boundaries of the park. An aquarium is more static. While its components may interact with each other, they interact infrequently and in a limited fashion with entities beyond the aquarium's transparent, but nonporous, walls. A ripple in the aquarium stops at its walls. An "ecological ripple" generated from within or originating outside the park passes directly through the park boundary without hesitation.

Some citizens would like to think of Yellowstone as an aquarium; they believe that civilization can be brought to the very boundary of the park without producing harmful

effects. Yellowstone Park cannot be thought of as functioning like an aquarium, and it cannot be managed like one. To be perpetuated, an aquarium requires much external manipulation and input. The ecosystem existed before modern man arrived on the scene and requires the least amount of management effort when undisturbed by the presence or encroachment of man.

The goal of the park's management program is to maintain the natural processes that support the special features, native biota, and landscape dynamics. Park management is based on the total array of components of the ecosystem within the park. It is most often passive management that allows natural processes to govern ecosystem behavior. Management actions are initiated primarily in ecological situations where human disturbances force the ecosystem outside of its normal pattern of fluctuation. But if the natural, relatively pristine condition of Yellowstone Park is to survive, an innovative strategy for management must be devised. This strategy must include the idea of total ecosystem management. The perception of the park's glass pane boundaries must be shattered, and management thought must assume a grander scale.

IMPEDIMENTS AND CHALLENGES

From an ecosystem management standpoint, the relative lack of ecosystem thinking within the National Park Service and among our neighbors is the fundamental problem, but there are other thorny difficulties as well, some independent of the ecosystem concept and some inextricably entwined.

1. The lack of commonly held policy and management goals among the agencies is the single greatest impediment to sound ecosystem coordination. The integrated management of the Greater Yellowstone Ecosystem is hindered for lack of an agreed-upon public policy. Many people and interest groups see the highest social value of the ecosystem to be the continuation of existing multiple-use policies. These proponents see the ecosystem's worth in terms of a balanced mix of commodity extraction, recreation, and preservation. Others (Reese 1984, McNamee 1987) see the preservation of the wildlands and all life in them as the desired primary goal. Clark (1987) proposed that management of the Greater Yellowstone Ecosystem should be the "management of natural resources using systems-wide concepts to ensure that all plants and animals in the ecosystem are maintained at viable levels in native habitats and that basic ecosystem processes (e.g., nutrient cycling) are perpetuated indefinitely." Theoretically, agencies could achieve that stated goal and carry out recreation and resource extraction activities at the same time. In practical terms, the agencies have difficulty proving (or convincing the public) that extraction projects are harmless (or may even be helpful) and that all types of recreation are compatible. Proponents of ecosystem preservation have an equally difficult time convincing bureaucrats that the agencies do not have a compatible management vision for the area.

2. The crushing complexity of coordinating management activities between scores of separate political and administrative entities looms as the second most important challenge. The agencies believe it can be done, but the fact is there are few examples of it ever having been accomplished successfully and efficiently. The venerable Adirondack State Park system in New York and the more recent New Jersey Pine Barrens project have been cited as successful examples in the East, but the West lacks analogous role models. Many observers believe different cultural values exist in the West and the fact that the federal

government has the lead responsibility in the Greater Yellowstone Ecosystem reduces the value, and example, of the successful eastern models.

The agencies may not be adequately prepared for such substantial coordination responsibilities. For instance, it appears that none of the administrative units involved in the Greater Yellowstone Ecosystem have staff people whose primary responsibilities include coordination activities with other agencies.

There is even some question that first-rate cooperation is attainable. One possible scenario, diagrammed in Figure 13-1, predicts that maximum coordination efficiency is attained only when relatively few institutions are involved. Optimal conditions are created by enhancing the competitive spirit between agencies, reducing tunnel vision in any one agency through information sharing, and adopting the "small is beautiful" concept. According to this hypothesis, increasing institutional involvement beyond that optimum point incrementally decreases efficiency through lack of consensus, diluted leadership, and lack of accountability, leading to stagnating bureaucracy. Whatever the future may bring in this regard, improved coordination would be virtually automatic with any added measure of simplification.

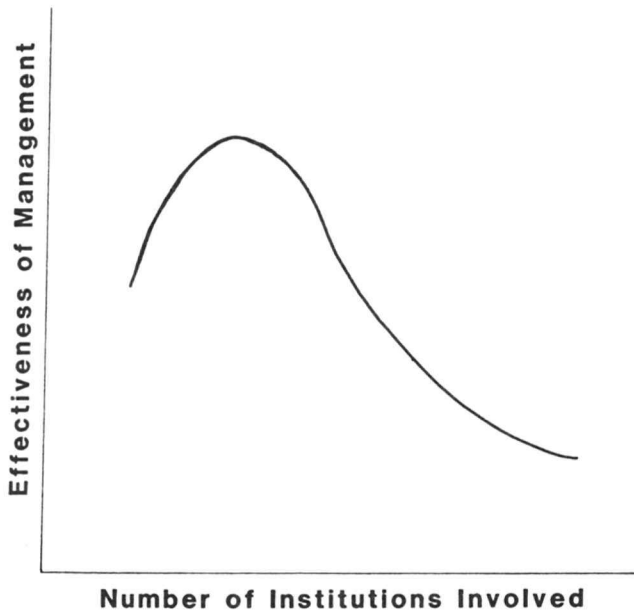


Figure 13-1. Relation between coordinated operational efficiency of management and the number of institutions involved.

3. The chronic problems that fall under the umbrella term "internal threats" range from residues of leaded gas, to alien and exotic species, to heavy visitor use. High on that list is the difficulty of managing common property resources like park and national forest lands, which are free and open-access resources with unlimited entry (Hardin and Baden 1977). Despite repeated evidence that tighter controls are needed in order to ensure a quality park experience and protect resources, it is clear that the public resists any efforts by agencies to put capacity limits on parks.

4. External threats are in many ways more difficult to deal with than internal threats. Dealing with problems outside one's jurisdiction increases their magnitude of difficulty. This is a common impediment between agencies, but is most pronounced when dealing with privately owned lands. No one, it seems, wants to tackle the issue of threats to the park (or ecosystem) that arise on private lands.

5. The technical capabilities for dealing with specific problems lag behind problem identification. Since the National Park Service has a slender science budget, some decisions must necessarily be made on the basis of conventional wisdom, without benefit of scientific documentation.

OPTIONS AND SOLUTIONS

Innovative proposals have been presented that would solve, according to their proponents, the majority of the perceived problems in both the park and the ecosystem.

1. *Improved coordination through existing organizational structure.* The stance of federal agencies is largely based on continuing improvements of on-the-ground coordination within the greater Yellowstone area. They have chosen a stepwise procedure to achieve this goal beginning with an "overview" of the ecosystem. Each national forest and park has completed or is completing its land management plan. The information in these plans, along with planning documents from other federal and state agencies, will be combined to show current or planned direction for the ecosystem. The overview presents a picture of Yellowstone's ecological, economic, and social conditions and provides a blueprint of what these conditions might be like in ten to fifteen years (Tixier 1986, Greater Yellowstone Coordinating Committee 1987). The second phase, not yet begun, is to initiate dialogue between agencies to determine if a joint policy and management vision is possible to develop within the constraints of each agency's legislative mandate.

2. *Consolidation of all federal lands within the ecosystem under one management agency with a single management plan.* Perhaps because of the political difficulties involved, this is the proposal offered least often. A suggestion has been made to enlarge Yellowstone National Park (*Salt Lake Tribune* editorial, October 26, 1985), but most often the proponents of this idea do not directly address which agency would be the surviving (or ascending) entity. Instead, they argue the wisdom of having a single "Director of the Greater Yellowstone Ecosystem" (Clark 1987). Perhaps the most radical proposal suggests the establishment of a nonprofit, public corporation, governed by a board of trustees (Baden 1986). According to this view, the corporation would protect the resources of the region, manage them efficiently, and insulate the decision makers from political pressures.

3. *Retention of the existing administrative configuration but with new, commonly held guiding principles.* There are many variations to this basic proposal, including the establishment of a National Recreation Area (Reese 1984); the expansion of Yellowstone Park's current international biosphere reserve designation (Barbee and Varley 1985, Pritchard 1986) under the new concept of "ideal" or "model" biosphere reserves (Gregg and McGeen 1985); the creation of a new national biosphere reserve program (McNamee 1987); the establishment of "common ecosystem management units" (Baucus 1986); and congressionally mandated principles, with built-in accountability, directing agencies to maintain the ecosystem's health "forever" (Anderson 1986). These ideas probably have the greatest chance to be implemented, simply because they are politically less volatile than most of the others.

4. *Retention of the existing administrative configuration but with an umbrella federal land use control system.* This concept encompasses several ideas that include phrases like "land use control systems" or "federal zoning." Considering the public attitudes in the western United States toward the principle of zoning, these concepts are bound to generate controversy. The conceptual basis for most of the variations proposed is rooted in the approximately fifteen-year-old "forever wild" clause in the New York State Constitution creating the Adirondack State Park. More recently Baden (1985) suggested that the concepts and language found in the Coastal Barriers Resources Act of 1982 could be used in solving the problems of the Greater Yellowstone Ecosystem. Others (Duerksen 1986) have proposed that public-private partnerships involving land trusts are the most sensible route to pursue within the ecosystem.

5. *Simplification of the existing interagency structure.* Based on the thesis that improved coordination would be virtually automatic with any measure of simplification, adherents to these proposals seek to redraw certain boundaries without tampering with overall agency proportions. Because of the complexity of the federal configuration (e.g., seven national forests reporting to three regional offices), proposals (Eno and Evans 1986, Congressional Research Service 1986, Clark 1987) generally involve consolidation within existing agencies. Suggestions for consolidation are generally directed toward Forest Service administrative structure, but closer scrutiny reveals it could be extended to all federal functions and perhaps some state functions as well.

None of the alternative proposals mentioned above appear to have enough adherents and public support to rally a sufficiently large constituency to force change. As the machinery of the ecosystem management debate continues to ease forward, so does the encroachment of human development. In time, the debate could very well be settled for us. In the event that Yellowstone comes to more closely resemble an isolated aquarium and much of the dynamic, interactive nature and the integrity of the Greater Yellowstone Ecosystem are lost, we could learn just how much effort is required to operate that type of aquarium. In a different context, Yellowstone has always been a "goldfish bowl" on public display. Given the national visibility of Yellowstone Park and the Greater Yellowstone Ecosystem issue, the ultimate resolution of this question may affect the way all natural area parks are managed in the next century. The common thread that unites virtually all of these proposals is the need for the agencies to establish common goals, data management systems, and an effective apparatus for communication. Unless this can be done, using any one of the suggested alternative structures or a combination of several, the future of Yellowstone Park and its broader ecosystem will continue to be in doubt.

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LITERATURE CITED

- Anderson, R. 1986. Testimony on behalf of the Greater Yellowstone Coalition. *In* U.S. Congress. House Committee on Interior and Insular Affairs. Oversight hearing on the Greater Yellowstone Ecosystem. October 24, 1985. 99th Cong. U.S. Government Printing Office, Washington, D.C. Ser. 99-18. 697 p.
- Baden, J. A. 1985. Federal programs called Yellowstone area peril. *Salt Lake Tribune*, September 29, 1985.
- . 1986. Get the national parks out of Washington's hands. *Houston Chronicle*, July 8, 1986.
- Barbee, R. D., and J. D. Varley. 1985. The paradox of repeating error: Yellowstone National Park from 1872 to biosphere reserve and beyond. *In* J. D. Peine (ed.) *Proceedings of the Conference on the Management of Biosphere Reserves*, pp. 125-130. Great Smoky Mountains National Park, Gatlinburg, Tennessee.
- Baucus, M. 1986. National parks interagency management and coordination act of 1986. 99th Cong., 2d sess., discussion draft, May 12, 1986.
- Clark, T. W. 1987. The Greater Yellowstone Ecosystem: The evolving ecosystem concept in policy, administration and management. Unpublished manuscript. Northern Rockies Conservation Cooperative, Jackson, Wyoming. 18 p.
- Congressional Research Service. 1986. Greater Yellowstone Ecosystem. U.S. Congress. House Committee on Interior and Insular Affairs. 99th Cong. Committee print 6. U.S. Government Printing Office, Washington, D.C. 210 p.
- Duerksen, C. J. 1986. Testimony on behalf of the Conservation Foundation. *In* U.S. Congress. House Committee on Interior and Insular Affairs. Oversight hearing on the Greater Yellowstone Ecosystem. October 24, 1985. 99th Cong. U.S. Government Printing Office, Washington, D.C. Ser. 99-18. 697 p.
- Eno, A. S., and B. Evans. 1986. Testimony on behalf of the National Audubon Society. *In* U.S. Congress. House Committee on Interior and Insular Affairs. Oversight hearing on the Greater Yellowstone Ecosystem. October 24, 1985. 99th Cong. U.S. Government Printing Office, Washington, D.C. Ser. 99-18. 697 p.
- Greater Yellowstone Coalition. 1984. Threats to the greater Yellowstone. Bozeman, Montana. 94 p.
- Greater Yellowstone Coordinating Committee. 1987. The Greater Yellowstone Area: An aggregation of National Park and National Forest management plans. Shoshone National Forest, Cody, Wyoming.
- Gregg, W. P., and B. A. McGean. 1985. Biosphere reserves: Their history and their promise. *Orion Nature Quarterly* 4(3):40-51.
- Hampton, H. D. 1965. Conservation and cavalry: A study of the role of the U.S. Army in the development of a national park system, 1886-1917. Ph.D. diss., University of Colorado.
- Hardin, G., and J. Baden (eds.) 1977. *Managing the commons*. W. H. Freeman Co., San Francisco. 278 p.
- Houston, D. L. 1971. Ecosystems of national parks. *Science* 172:648-651.
- Lane, F. K. 1918. Letter from Franklin K. Lane, secretary of the interior, to Stephen T. Mather, director of the National Park Service. 4 p. NPS Archives, Washington, D.C.
- Lemons, J. 1986. National parks research. *The Environmental Professional* 8(2):128-131.
- McNamee, T. 1987. *Nature first: Keeping our wild places and wild creatures wild*. Roberts Rinehart, Inc., Boulder, Colorado. 54 p.
- Pritchard, P. C. 1986. Testimony on behalf of the National Parks and Conservation Association. *In* U.S. Congress. House Committee on Interior and Insular Affairs. Oversight hearing on the Greater Yellowstone Ecosystem. October 24, 1985. 99th Cong. U.S. Government Printing Office, Washington, D.C. Ser. 99-18. 697 p.

- Reese, R. 1984. Greater Yellowstone: The national park and adjacent wildlands. Montana Geographic Series 6, Montana Magazine, Inc., Helena, Montana. 104 p.
- Sax, J. L. 1980. Mountain without handrails: Reflections on the national parks. University of Michigan Press, Ann Arbor. 152 p.
- Tixier, J. S. 1986. The greater Yellowstone: An introduction to an area and its issues. *Western Wildlands* 13(3):2-6.
- USDI National Park Service. 1968. Administrative policies for natural areas of the National Park System. Government Printing Office, Washington, D.C. 144 p.
- . 1980. State of the parks: A report to Congress. U.S. Department of the Interior, Washington, D.C. 52 p.