

The George Wright

FORUM

Volume 7 • 1990 • Number 1

- *Agenda for the El Paso conference*
- *The politics of removing trees:
A case from Golden Gate NRA*
- *The Everglades and the future of
Florida's environment*
- *Scientific research in the parks:
Do we need more, or do we just need
to make better use of what we have?*

The George Wright Society

Dedicated to the Protection, Preservation and Management
of Cultural and Natural Parks and Reserves
Through Research and Education

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The George Wright Forum

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and information form follows p. 54.**

Translating Scientific Information into Park Management at the Operational Level

Susan L. Consolo

Resource Management Office
Box 168
Yellowstone National Park
Wyoming 82190

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Presented at the University of
Wyoming Symposium on
*"Examining the Greater
Yellowstone Ecosystem"*
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FROM MY PERSPECTIVE, SOME-where in the mid-levels of the vast bureaucracy that staffs Yellowstone National Park, the major objective of park science is to improve park management. Much attention has been placed, from the Leopold Committee to the recent NPCA Commission on Science and Resource Management in Parks, on improving the science program and budget in the National Park System. Park managers have an on-going need for, and derive great benefits from, receiving up-to-date scientific information. While efforts to build stronger science programs for parks are commendable, we must also keep the practical goal in mind—improved management of and for park resources.

I suggest that the question today is not "Do we need more and/or better research?" so much as "Are we making the best possible use of the research we have?" How well do we translate it into operations at the park level? And, if we are not doing this as well as we can, how can we improve the transfer of good science into better management?

Applications of Research to Park Management

In reviewing the classic branches of park operations, I will cite some examples of how we have successfully applied results of the park research program to each. The first of the traditional park disciplines is **Resource Management** (often, as in Yellowstone, branched with Visitor Protection). This is the division that: a) protects resources from visitors; b) protects visitors from resources; and c) protects visitors from visitors. Under present NPS policies, our resource management activities by design are more

monitoring than manipulation. Where human activities disturb park resources, we are directed to, wherever possible, **manage the human activities rather than manipulate the resource.**

Thus, when research from 1984–86 indicated that hikers displaced grizzly bears from prime habitat in Yellowstone's Pelican Valley, modifications were made in the permitted hours of human use. We are using results from a recently completed study on the effects of winter recreationists on elk behavior and physiology to reconsider placement of skier trails in elk winter range, and to suggest limits on how close recreationists may approach ungulates. Research is currently underway to test aversive conditioning on grizzly bears that frequent undesirable sites, such as park roadside and developed areas. This may give us a new management tool to use on the animals when managing the human activity is insufficient or impractical. And we have used data from long-term monitoring and research of Yellowstone Lake trout populations to develop and modify fishing regulations that promote angling and yet allow natural predators first crack at fish at critical areas and times.

Maintenance is the second traditional branch of park operations. Some people think this is only critical for visitor service and convenience. Indeed, the maintenance staff cares for the superstructure of the parks, but they also play an ongoing and understated role in resource management in these types of ways: a) maintaining and stabilizing historic structures, such as at Fort Yellowstone; b) inspecting and maintaining water and sewerage

systems, storing fuel, and treating or removing solid waste; and c) directing ground-disturbing activities such as road-building, laying powerlines, building trail waterbars, and bulldozing firelines.

Few of us are involved with research relating to maintenance operations, because generally industries develop and refine techniques related to construction and engineering activities. However, park research has assessed the effects on park flora of leaching from treated and untreated wood, providing recommendations for future boardwalk path construction. Our fishery research indicates that certain kinds of road culverts allow for unimpeded fish migrations, and we need to apply this knowledge to modifying existing structures that block spawning trout from suitable habitats. Research and monitoring in park geyser basins indicates that laying new plumbing pipes affected thermal activity. This information is used in planning additions and revisions to park development areas. And, research tells us that the northern entrance road to Yellowstone was constructed in an area that always will be subject to natural slumping. In considering where to relocate the road in a more geologically suitable area, we also will make use of wildlife research and monitoring in order to minimize disturbance to the adjacent bighorn sheep winter range.

And finally, there is the **Interpretive** branch of park operations, whose aim, according to Freeman Tilden's classic work (1957), is: "through interpretation, understanding; through understanding, appreciation; through appreciation, protection"—the same goal to

which the Resource Management branch aspires.

Interpreters typically use research to acquire new information for campfire and other educational programs. We rely on current facts and implications to use in printed information, museum displays, and wayside exhibits, such as those newly designed to help interpret Yellowstone's fires of 1988. But parks are also using research to investigate visitor characteristics and preferences; results from such studies will help interpreters evaluate their programs' effectiveness, and help them tailor future activities to meet both park management objectives and visitor needs.

Improving the Connections

These are some of the ways research has benefitted park resource management operations. But we must also admit to experiencing in Yellowstone the same gap that can exist anywhere between research and management—a gap characterized by managers who fail to apply research recommendations, or, sometimes, even to be aware of them, and by researchers who are frustrated because their work goes unused by the managers they hoped to benefit. Are the people who need to hear and use the results getting them? As an example, the translation of those most basic facts and research results to the park staff: the Chief Scientist of the Park Service's Southwest Region suggested, in a keynote speech to the George Wright Society (1988), that it takes an average of 8 years for research completed in a park to get into its interpretive programs.

The diverse agencies managing lands in the Greater Yellowstone Ecosystem (GYE) and their inter-

ested publics have recently emphasized the need for more and better coordination between different jurisdictions. This has resulted in establishment of the Greater Yellowstone Coordination Committee, the Interagency Grizzly Bear Committee, and other such interagency working groups to discuss common interests in species such as elk, trumpeter swans, and bald eagles. We have the same need for improved coordination at the operational level, among the 700+ employees working at the height of the season in Yellowstone, and between rangers, interpreters, engineers, and researchers in the state and federal agencies throughout the ecosystem.

Can we improve these connections between scientists and management, so that research is used to its optimum degree in park operations? I think we can, and to do so we must ask: What can researchers provide management that we are not yet getting enough of? What can management provide researchers to better the chances that scientific results and recommendations will be applied in the park? I think areas for improvement fall into three categories, which are defined in the following paragraphs.

Building a Sense of Shared Mission

Peters and Waterman (1982), in their bestseller *In Search of Excellence*, mention how successful organizations are characterized by a staff that has a "shared mission." To do so, managers and scientists must begin by defining a clear statement of goals, which should be available to park staff prior to initiation of the research. This is usually stated in the research pro-

ject plan. Ironical as it may seem, one of the daily challenges we face in Yellowstone is getting park staff to understand and thus support research, when often they are unaware of what's going on, let alone its potential value. Study plans must be consistently prepared and available so that interested park staff can use them to understand the "whats and whys" of park research projects.

Parks are required to have a **Resource Management Plan (RMP)** that addresses management issues and related programmatic needs—including research. Research must be tied to issues identified in the RMP. This document should be a critical reference for park staff wanting to place research into a management context, and for researchers seeking to develop meaningful study projects. Both researchers and resource managers must be involved in the planning to identify and develop projects related to protection of park resources. This can contribute to the feeling of "shared mission" among the participants.

Management must help researchers place their work in a meaningful **policy context** prior to initiation of a study project. This is not to say that management should prevent researchers from considering or experimenting with changes from current management policies. However, researchers who may be specialists in their field need also to understand the basic premises that guide current national park management. Traditional definitions of habitat "carrying capacity," which typically implies a particular state of health for the grazing species, may need refinement when applied

to wildlife management in a park context. In Yellowstone, a plant scientist charged with studying this century's apparent decline in aspen and willow communities should not necessarily expect that park management has a goal of increasing or "improving" such communities. Agee and Johnson (1988) address the difficulty in defining this term and setting management objectives within its context. Both park managers and researchers, typically used to a **species orientation**, struggle to move toward an **ecosystem orientation**. However, as we do so, the discussion can improve our sense of "shared mission."

Speaking the Same Language

Managers and scientists must build on having a shared mission, by improving the abilities of its staff to understand research and apply it, where appropriate, in parks. The State of the Parks Report (1980) and the more recent NPCA report (1989) stress the need for more specialized training for park resource management personnel. The "generalist" ranger, they suggested, no longer has the time or the technical knowledge to apply scientific principles to monitoring or restoring park resources. Yellowstone has tried to bridge that gap by creating a position in each of its four districts for a Resource Management Coordinator—a full-time person who works with the Resource Management Specialist in headquarters and his support staff (which includes three "new" Management Biologist positions) to apply research recommendations and sound methodologies where appropriate in resource protection, mitigation, and monitoring activities. Whether by increasing the number of specialists on staff, or by

upgrading the training of park rangers, we must teach managers to speak the scientists' language when talking about park resources and research projects.

To improve in-park communications, we established a resource management newsletter for the park staff, a code-a-phone employees can dial for timely resource news updates during the busy summer, and monthly "brown bag" seminars between the Research and Resource Management staffs. We have one full-time position designated as a "Research Interpreter," who presents research results to staff and the public in "layman's terms." We need even more support, in times of scarce dollars, for resource managers and park scientists to attend scientific meetings. Even with these efforts, a constant complaint is that employees "don't know what's going on in their park, or in their discipline."

Upon completion, all research reports and projects should conclude with: a) recommendations for a realistic **monitoring program** (this is often left for management to develop without the specialized expertise that a scientist can provide); and b) an oral or written presentation for the non-specialists on the park staff, including clear applications for resource protection, management, maintenance, and interpretation. On several of our recently completed research projects, we had a "wrap-up" meeting with the primary investigator and interested park staff. This kind of positive, informal exchange can do much to help bridge the gap that often appears between scientists and operations staff.

The effective transfer of information is a constant challenge. Many of these suggestions are a repeat of the basics, but I believe the basics always need working on.

Recognizing the Audience Reality

Both scientists and managers must constantly re-evaluate their effectiveness at communications. Are we getting through to our audiences, be they park resource management staff or the typical park visitor? Is the science getting translated into the public knowledge base? I believe that recent events suggest, unfortunately, not.

Fire history studies of the dominant forest types in Yellowstone indicate a fire regime characterized by large, infrequent fires followed by long periods of little or no fire. Yet, 1988 caught everyone by surprise—including much of the park staff. Our "scientific, rational" approach to land management today in general simply does not convey any message other than that humans can and should control their environment. The public doesn't believe that a nation "capable of landing men on the moon could not stop the wildfires in Yellowstone." This led to great frustration among the public, land managers, and firefighters, who saw that thousands of humans and millions of dollars had little noticeable effect on suppressing fires until the first snowfall of the season quieted their rage in one night.

In the 1960s, grizzly bear researchers recommended weaning park bears away from human garbage, along roadsides and at park dumps. Twenty years later, the public largely perceives bears as 1) having been taken entirely out of

the park, because "no one sees them anymore"; or 2) starving, because we're not feeding them. Sadly, the message we are probably tired of giving is not received as we intend it—that the animals are wild and most of all need habitat protection, a continuing, long-term effort to adapt our activities to minimally affect this threatened species.

Following the 1988 fires, but not primarily as a result of them, Yellowstone experienced its first major winterkill of wildlife in a decade. During and after a bitter arctic cold front, hundreds of ungulates died of malnutrition and/or winter stress, including up to 25 percent of the Northern Yellowstone elk herd. This herd has been the topic of controversy for at least 75 years (and may be for the next 75). And despite many persons' contention that the herd is too large for its range, a primary voice heard in the height of winter was the fear that the herd would be decimated. Would there even be enough elk left the following summer for visitors to enjoy? Scientific facts and figures may get lost in the emotional reactions of an audience more familiar with zoos and their cooperative captives than with a wild and ever fluctuating natural environment.

Thomas Dunlap, in *Saving America's Wildlife*, suggests that increasing numbers of Americans recognize the land and its wildness as basic to environmental conservation. Perhaps this is true, relative to earlier in this century. But I'm concerned that large numbers of park visitors and critics do not. If the message we've been hearing this last year is representative, most still envision Yellowstone as a static place—someplace to visit again and again without seeing change, whether

that be in the time intervals between Old Faithful's eruptions, or in the forests it desires to be perpetually green. The public doesn't like pine beetle epidemics, they don't like not seeing bears, and they didn't like burnt trees. They don't like change. Perhaps the best way research can help improve management is by studying, not plant succession or animal behavior, but better techniques for effective communication!

By improving our sense of shared mission, by speaking the same language, and by addressing the wide gap between our scientific knowledge about park resources and the reality of public perception and understanding of those resources, we can build even stronger programs of applied research in Yellowstone. I think it behooves persons in both disciplines to help see that good science contributes toward better operations of park maintenance, interpretation, and resource management.

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A Future for the Everglades

Robert L. Arnberger

Assistant Superintendent
Everglades National Park
P. O. Box 279
Homestead, Florida 33030

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Presented before the
Governor's Commission on the
Future of Florida's Environment,
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(Ed. note: The Commission was convened to assess the status of Florida's environment, identify threats to it, and recommend ways to protect and manage the state's resources. The Commission's final report was issued in March 1990.)

IN EARLY 1907, JOHN T. STEWART, drainage engineer, U.S. department of Agriculture, traveled in the Everglades conducting a survey of the region. His objective was to select canal routes and determine priority lands for drainage. His diary has provided us details of what this vast area was like before those canals were constructed. His description is instructive, mentioning that "low ridges of sawgrass, myrtle and bay bushes lay between open grassy lakes through which would run a crooked narrow land. Sand can be seen in the bottom of the deeper holes in the channels, these holes being full of fish."

He continues his diary with interviews of citizens regarding his project. "Many in the vicinity of Miami do not want the Glades drained. They think there is land enough for the present. If too much land is improved there will be danger of over production. They are also afraid it will cause the climate to be a few degrees cooler and will cause the coast strip to become drier in the dry season, as they have the impression that the Glades temper the Northwest wind and sub-irrigate the land to the east. What they want is enough drainage to prevent flooding in the rainy season. The general opinion is that the lower Glades are not of much value. . . ."

Only twenty-three years later another view of this area was offered to Congress when the Secretary of the Interior proposed a large National Park. "Its primary value would lie in the opportunities

offered for conservation of the tropical flora and wildlife—particularly the endless varieties of birds and fishes. The area is of national and not merely local interest. The tropical plant and animal life, the excellent fishing, and the bird life, which is remarkable both for the numbers of species and for the abundance of birds . . . are sufficient to give the area a national interest."

In a special report issued in 1932 by the National Park Association the following is illustrative: "No one who has been fortunate enough as we were during our visit to see the thousands upon thousands of Ibis and Herons or various species flocking in at sunset . . . or who has seen the more widely scattered birds on their feeding grounds at a favorable time, such as often occurs along the Tamiami trail . . . can fail to have received an impression of sheer beauty and of the multitudinous vastness of nature as exhibited in these great flocks of birds. . . ."

No one has yet surpassed the eloquence and vision of Marjorie Stoneman Douglas, whose book *Rivers of Grass* gave form and content to the swell of public interest to preserve this majestic area known as the Everglades. These statements I have repeated, and others too numerous to repeat, reflect the values represented and the *promise* of preserving this priceless natural heritage for those yet unborn. This promise was manifested most strongly by the citizens of the State of Florida who gathered themselves together and expressed a collective will. The people of the State of Florida donated over 850,000 acres and two million dollars to fulfill the promise of an Everglades National Park. On

December 6, 1947, President Harry Truman formally dedicated the park, establishing its purpose of preserving the "unique flora and fauna" and the "essential primitive natural conditions."

Since that time, various events have combined to seriously affect the health and productivity of the system. The natural resources in the Glades are now in jeopardy due to the accelerated growth in Dade, Broward, and Palm Beach counties. Large-scale conversion or expansion of agricultural lands have combined to form an urban-agricultural interface which is exerting tremendous pressures on the natural systems of the Everglades and particularly Everglades National Park.

The reality of the promise made in those earlier years now is expressed differently:

- The great flocks of wading birds have been reduced to remnants, experiencing over a 90% decline since the 1930s. Since 1980, fewer than 1,000 pairs of great egrets and 500 pairs of snowy egrets have nested in mainland colonies of Everglades in most years.
- The endangered wood stork has declined from 2,370 nesting pairs within the park in the 1950s, to 1,930 in the 1960s, to 375 in the 1980s. In the last two years, the colony experienced nesting failure.
- In 1988 we learned from National Audubon researchers that the roseate spoonbill population has crashed by over 50% since the last census in 1980.
- The Everglades panther is near extinction with perhaps only five or six left within the park, and maybe only 30 in all of south Florida.

- Water management practices last year flooded out alligator nests and reduced nesting by 50%.

- A massive seagrass die-off in Florida has affected 66,000 acres, of which 12,000-15,000 already have died.

- Fishing success is in a downward spiral relative to fishing effort. Freshwater fish have been found to have dangerous levels of mercury contamination.

The natural ecosystems of Everglades National Park have been severely impacted by past and present water management practices. Water quality, quantity, timing, and distribution are critical to the survival of the park and its unique flora and fauna.

Water coming from the Everglades Agricultural Area and coursing through the canals to Loxahatchee National Wildlife Refuge and Everglades National Park is laden with excessive levels of phosphates and nitrates. Experiments have shown that these nutrients forever change the character of the sawgrass ecosystem. In Water Conservation Area 1, nutrient-rich water has converted over 20,000 acres to cattails. As we sit here today, five to six acres are being similarly converted—and tomorrow, five to six acres more. And next week. . . .

Everglades National Park is a gift we, as a people, gave ourselves. It is to be used lightly and maintained in trust for our children. A healthy Everglades is of inestimable value for Florida. Reflect upon the economic benefits of tourism and recreation. The National Park will host more than one million visitors this year.

A recent survey profiled the visitor to Everglades National Park. Sixty-five percent of visitors were in family groups. Fifty-four percent were on their first visit to the park. Floridians composed 24% of the visitation. Forty-five percent of foreign visitors came from Germany. The average *visitor group* expenditure inside the park for the day was \$35; *per capita* was \$15. The average *visitor group* expenditure outside the park for the day was \$88; *per capita* was \$38. The positive impact upon Florida's economy is obvious.

Just as significant as tourism benefits are the economic benefits that the commercial and recreational seafood industries accrue from the park. The mangrove estuaries and Florida Bay are major nurseries for several species highly prized for seafood.

- Lobster is a \$13-million fishery.

- Stone crab is an \$8-million fishery.

- The pink shrimp fishery is worth \$40 million.

- A sport fishing industry within the park is valued at \$9 million per year.

The values of the park—as a source of recharge for the Biscayne Aquifer, a source of a sustained-yield commercial fishery, a source of recreational fishing, and a "priceless piece of original Florida"—are all at risk.

This commission has been charged to develop recommendations for the protection and restoration of Florida's environment into the next century. Toward that end, let me offer you a few thoughts and recommendations.

1. We must undertake increasingly effective strategic management of our natural resources through more careful integration of goals and objectives, the successful meshing of often-contradictory programs, and the clear visualization of what the one common mission must be. Governor Martinez made that charge clear in Executive Order 88-526, where he declared that "the environment and natural resources are the basis of Florida's quality of life and economic vitality" and that "it shall be the policy of the state to conserve and protect its natural resources and scenic beauty" Within the simplicity of the statement lies all measure of success and accomplishment. Within that same simplicity is a drama of difficulties that can only be overcome by boldness. The threats that face our common resources in the Everglades are too varied and the risks too great to take an uncoordinated, haphazard, and custodial approach to their management. We must not cling to management principles that constitute too narrow an image of our responsibilities—no matter what limitations our charters and mission statements might imply. As we seek to carry out the Executive Order and to fulfill the mandates provided by Congress and the Legislature, we must imagine the appropriate conception of each program, giving it broad, integrated programmatic outlines, reformulating it into more concrete tasks and goals. We must be bold, daring, and visionary in exploiting new opportunities and departing from actions that never did and never will provide solutions. We must manage the resources in the *public* interest of today and form the values and chart the course of public policy tomorrow.

Protection of the Everglades requires common vision, integration of effort, decision making, and risk taking. It is not a task that can wait for the future to provide an orderly process. The future is now. The process of protection is not fully charted and never will be; yet we can't wait and must acknowledge the risk and undertake bold actions with what we already know.

2. We must continue and accelerate the acquisition of land to provide the optimum measure of protection for those natural resources in danger. Within the next decade the *final* opportunities will be realized or lost depending on our vision and resolve. Costs must be measured against the yardstick of the long-term future. The strategy must be realized by perceptive, quick-witted, and daring tactical purchases that might be viewed by the less-informed as, perhaps, sporadic and even arbitrary. The objective is to purchase key segments of land that form the "heart" of a particular resource protection issue. This proactive approach could even encumber the subsequent purchase of large tracts by potential buyers who envision land uses that might be destructive. This may be politically unfeasible, at times necessitating successful partnerships with land trusts and conservation organizations. The last chances for the southern Everglades are still before us. Governor Martinez exercised the vision and foresight to set in motion the authorization to add the East Everglades to Everglades National Park and to undertake the restoration of the Northeast Shark River Slough. Still before us are the lands within the C-111 basin, and those lands which stretch from Highway 1 across the Card Sound Road to

southern Biscayne Bay. This area holds the potential for restoring and enhancing one of the last great wetland-estuarine areas left, binding it in spirit, purpose, or operation to Everglades National Park, Biscayne National Park, and the Crocodile Lakes National Wildlife Refuge.

3. We must place at equal priority the mitigation and restoration of habitats. The nation learned much when it undertook the restoration of the Blue Ridge Mountains of the east. These mountains had been logged to near-destruction by the 1930s and 1940s. Today, wonderful wild vignettes of natural and cultural history have been restored by second- and third-growth forest lands. National forests and parks now grace these restored areas and are the focus of the most intense recreational use in the United States, founding a new economy and vitality. Shenandoah National Park, Great Smoky Mountains National Park, and the Blue Ridge Parkway are all successful restoration projects of decades past. Their success paves the way for a bright future and underscores the successes possible when opportunity, vision, and risk-taking become the agenda for providing a future for generations to come. We must do more to actively restore lands to past biological productivity. We must be imaginative in mitigating losses that are a by-product of a growing society and assure that development and growth pays its way in restoring wetlands and protecting them.

4. We must curb the headlong and unrestrained growth that is destroying those special qualities of south Florida we cherish. It is unrealistic to assume growth can be

stopped. But it can be managed consistent with a clear set of goals that seek to preserve wildlife habitat, water systems, and open areas for recreation as the fundamental cornerstone in the foundation of the quality of life in south Florida. We have to cease the invasion of the remaining Everglades by homes, agriculture, and industry. **What we have left is more precious than what could be gained by their destruction.** The comprehensive land management planning process must be further refined. The reality that, one day, a demarcation line must be drawn, past which no further intrusion is allowed, will require political courage by our leaders. That day is upon us now.

5. It is impossible to separate the land of south Florida—and the people who occupy that land—from water . . . water—one leg of the triad that sustains life for us and those other occupants of the land. I think that all our actions in the Everglades must somehow have their philosophic and practical origins within the water system that originates in the Kissimmee, flows to Okeechobee, and then is canaled, leveed, pumped, and diked to its final destination in the Atlantic or Gulf. As we grow, as we mitigate and restore, as we acquire lands, as we manage growth, it is imperative we acknowledge that water is really the controller of it all. That water is the key to the survival of the Everglades; that water and the land it covers in its annual cycles *is* the habitat; that water defines the Everglades and the successful lives of the plants, animals, and humans that occupy it. **How can we treat this basic and most fundamental necessity in**

such a casual manner? Why do we treat it as a commodity so cheap and valueless that is traded for less-valued things? Why is it so hard to treasure this water for what it is—the basis of life? Without question, the Everglades will cease to exist without the proper amounts of water, timed to recreate natural cycles, and distributed in natural sheet flow. Without question, water loaded with pesticides, phosphates, nitrates, and other residue from agricultural and urban areas is killing the Everglades and substituting a foreign ecosystem. Shortsightedness can only be combatted by dramatic and bold action resolved to correct the problem.

Agriculture and urban entities must clean their water before it is released into the aquifer. The growing threat before us will be storm water drainage, septic proliferation, and groundwater pollution by hazardous toxic waste. We must deal with these issues *now*—while we still can.

The preservation of the Everglades depends upon water quantity and quality. The two are inextricably intertwined. Until now, the debate was often centered around the agricultural industry; the future debate will rage around urbanization. The demand for new well fields, saltwater intrusion issues, etc., are all precursors of a greater problem. Perhaps it may be the marketplace or even public policy makers who will look at the cost-benefit ratios of water needs between urbanization and agriculture. A recent Miami *Herald* article stated that "to offset drought, the water management district sent 235,000 acre-feet of water through Miami Canal to protect the

Biscayne Aquifer—about 76 billion gallons, enough for every person in Dade, Broward, and Palm Beach counties to fill a bath tub four times a day. Yet a 1984 U.S.G.S. study estimated that agriculture uses three times that quantity for irrigation."

6. Water conservation programs must be more quickly and effectively instituted. We must undertake massive public education programs, landscaping practices that are conducive to low water use, building construction standards, appliance features, and recycling programs. This must be a coordinated program linking county, city, state, and federal governments, as well as educational institutions and civic organizations. Those programs now underway must be expanded and more players added to the field.

7. Environmental education in our public schools and state institutions must be perceived as the method through which we effect change and assure a steady constituency for that change. The issues before us today will be with our successors forever and the continuing process of assuring that we can meet challenges in the future will rest on how we educate our young people and those new arrivals to the area. Everglades National Park manages an environmental education program that seeks to solve long-term resource protection issues through the education of those youth who will inherit what we leave them and will face the crises yet to come. We manage two overnight camps where in 1987 we offered 173 day trips involving over 102 schools for 8,149 youngsters; 62 overnight camps involving 50 schools for 4,786 youngsters; two camp workshops for over 100 schools and 229 teachers. In to-

tal, our environmental education staff ministered to over 14,820 students in 1986-87. Our effort is but a drop in the bucket of actual need. The state must better encourage school districts to develop an environmental education curriculum that meets required state education criteria.

This commission is seeking to better understand the environmental problems facing this state and to undertake charting a course of action for the future. Education is one key tool—perhaps the most important of all. We are responsible for our world—or, at least, that small space we occupy. Responsibility requires stewardship. **A sense of stewardship is not an inborn emotion—it is taught.** One role we must undertake is to preserve our resources through creating and sustaining public value systems. Values and resources are indissolubly linked. Simply put, value systems determine acts, acts determine consequences, and consequences determine the kind of world we live in. In the broadest sense, environmental education is society's principal instrument to bridge the chasm between destructive practice and solutions. We realize that times are accelerating. Yesterday's Florida is hard to find. We must teach an understanding that as we are the future of the past, we will soon be the past of yet another future.

The immediacy of it all is brought home daily when we learn of thousands of new arrivals to Florida who move to the state seeking a future. We learn of immigrants and refugees who leave behind a future already squandered to begin anew. They arrive with little knowledge and understanding—and

yet they will set the course for this state and the future of the Everglades. The media can play a tremendous and positive role. News and informative educational features should be continually updated and resurrected. We are all aware of great news feature articles done in the past on the Everglades issues. Those features need to be re-run repeatedly. The continual population turnover in south Florida necessitates repetition in order to educate new citizens.

8. Basic resource data obtained through increased science and research are needed. There is already a tremendous body of knowledge and data that exists at a variety of institutions. However, the more we learn the more we find we do not know. What I see as a problem is the lack of coordination and integration of this data into a solid and cohesive body of science that provides the foundation for effective action. Literally, dozens of institutions are involved in science in the Everglades system. What we need is a different type of Everglades Coalition—a coalition that seeks as its goal the coordination and consolidation of research and information into a single body of knowledge easily used by the variety of agencies that need it. Perhaps the Florida university system could fulfill the role. One of the greatest and most complex ecosystems on Earth exists here in Florida. What an opportunity for the state educational system to undertake the coordination of research, of data collection—to serve as a clearinghouse for this greatest of outdoor laboratories. Indeed, it is a laboratory where we can learn from past mistakes, make adjustments in present management schemes, and deal

with urbanization, agricultural, and wildlands interests.

9. Immediate problems beyond just hydrological or urbanization issues are now facing us. The invasion of exotic trees and other vegetation as a result of disruptive hydrological practices and urbanization landscaping presents the largest threat. The major exotics that we are all familiar with—*Melaleuca* (paper bark tree), *Casuarina* (Australian pine), and *Shinus* (Brazilian pepper)—are threatening to overwhelm the natural ecosystem we are trying to protect. The proliferation of these exotics far outstrips our meager efforts to control them. Not only more money has to be dedicated to the problem, but more science and risk taking. Currently, it appears that the best solution is the introduction of insects that offer natural controls. We must accelerate the scientific evaluation of insect control and, perhaps, not wait for the final conclusions that may be long in coming.

The fisheries in the Everglades and the estuarine areas Everglades water enters are showing signs of depletion. In Everglades National Park, we are finding that catch numbers are steadily decreasing and fishing effort increasing. Before we are presented with the crisis we know is coming, I believe we need to evaluate and undertake reduction of limits and sizes. A high-quality fishery is totally dependent upon how we manage it and how we provide for recruitment. We cannot continue to look at our fisheries as an unlimited resource. The increase in boating recreation and the use of jet skis, along with increasing safety considerations brought on by recreational use, must be dealt with.

People and manatees are being cut up and killed. Seagrass beds are being destroyed. Areas are being overfished. Everglades National Park has taken one important step in prohibiting the use of jet skis in the park. We found significant disruption and derogation of the values and purposes for which the park was authorized and established and took the necessary regulatory step. We are now involved in a major analysis of boat-manatee conflicts in an attempt to try to better understand the problem so we can take the appropriate action to better preserve and perpetuate that endangered species. I am incredulous that we allow the use of boats and other watercraft without licensing, competency testing, and age limitations. All of you, I am sure, have had some type of experience on our waterways that reinforces the need to tackle this issue head on.

Solid waste disposal problems threaten the Everglades and the Florida Keys. How we handle solid waste disposal holds inherent problems for the region. If we burn it, we perhaps will be degrading a Class I air quality airshed over Everglades National Park. If we bury it, what do we do to that valuable aquifer that lies a scant few feet beneath the surface? If we inject it into deep wells, are we eliminating a future water source? Both short- and long-term solutions must now be implemented. Short-term solutions will involve the development and support of recycling programs, container return incentives, use of biodegradable plastics, and hazardous-waste facilities. The State, through law, can actually create the industry to handle the problem. The economic incentive springs forth from regulation.

The difficulty of managing the Everglades as a whole is a task to challenge this State and the nation. The challenge of protecting and managing Everglades National Park within the broader system will only be possible through protection of the greater Everglades. The National Park is not ecologically integral in any respect. It does not encompass entire habitats for its animals, nor whole watersheds—to say nothing of the airshed that lies above the park. Even the very symbol of the Everglades—the long-legged wading bird—does not have sufficient water and land within the park to survive.

Professor Joseph L. Sax of Berkeley, California, a frequent writer on the plight of parks, says it better than I. "From the perspective of preserving biological and genetic integrity, by which contemporary environmental opinion measures success, the parks (for all their wonders) are seriously deficient. If our parklands are to provide, in any degree, what we are now asking of them, far-reaching changes will have to be made. A great deal of land, both public and private, the use of which affects the parks and their resources, is going to have to be managed sensitively. Traditional boundaries, between park and national forest, or between park and private land, must become less important, and 'resource boundaries' must loom larger." So far, the challenge of moving to resource-based, natural-system management from the traditional enclave management system has not been met. It's not difficult to trace the reasons for reluctance. Many people, agencies, and interest groups with competing or contradicting missions have a lot invested

in traditional boundary lines. Protecting their piece of the turf is more important than protecting the whole of which their turf is part. Connections between all the turf must be better understood and administered for the whole—or each of us will, in the end, lose that small kingdom we administer.

In conclusion, I have made more than an appeal for Everglades National Park today. I have tried to link the future of this great park to the larger Everglades region. I have deliberately avoided dealing exclusively with problems and issues that affect just the park. In fact, I have dealt with a broader spectrum of analysis that truly underscores the profound connection that this national park has with south Florida and the greater Everglades. So goes the future of the greater Everglades and south Florida, so too goes the future of Everglades National Park. The two are unalterably linked.

However, one major difference exists. It is the State, the South Florida Water Management District, U.S. Army Corps of Engineers, Dade County, and agricultural and urban entities that, in fact, control the destiny of this park. The park can claim and even legally assert its rights to protection and perpetuation. But it is an indisputable fact that the park is at the downstream end of the plumbing system and is the "edge" to which the cities can now grow.

Everglades National Park is a special place, part of a special, greater system. Only through protection of the greater system can Everglades National Park be assured its rightful place in the future. Bill Brown, an employee in

the National Park Service, says it best. "Parks are dedicated lands—lands dedicated to something more than the daily grind of doing to others and being done to. They are neutral, sanctified ground. They are an exercise in civilization, a kind of refuge for people in a world growing less kind to people. It is because these values are embodied in landscapes—in actual physical places—that they have such power. Anyone can go to a park and see how that power works, on one's self and on others. That is why the land base comes first, then the visitors, then—to the extent our energies can stretch—other things."

Citizen Mobilization in the Fight to Save the Golden Gate Eucalyptus

Judd A. Howell

**Wildlife Ecologist
Golden Gate National Recreation
Area
San Francisco, California 94123**

INCREASINGLY OVER THE LAST two decades, natural resource managers and administrators have been confronted with opposition to agency resource management plans and proposals. Because of the environmental conflicts of the 1970s and 1980s, both state and federal governments' abilities to effectively manage natural resources have been questioned at almost every turn. The fact that groups form in opposition to established authority in natural resources management was and is looked upon by the agencies as irrational. Traditional sociological views about movements, beyond the belief that they were irrational, included ideas that people's participation in movements was rare, their discontent was transitory, and the actions of the move-

ment and institutions were sharply distinct (Jenkins 1983). Agency personnel often seemed surprised and dismayed by the resistance they encountered.

The sociological theory of resource mobilization deals with aspects of the process of group formation and action. Resource mobilization is a social process that occurs over time. It involves the interaction of people in the context of a group exchanging ideas and developing strategies and methods of problem solving. Resource mobilization can be thought of as collecting and using the tools needed by people to perform a specific task. Here, tools are analogous to resources such as labor, capital, expertise, or access to the legal system. Resources in this context should not be confused with the fact that many interesting conflicts, including the one described in this paper, are about access to, and management of, natural resources.

Current social theory recognizes alternative explanations about why people mobilize. Jenkins (1983) provided four perspectives about resource mobilization theory: 1) movement actions are rational; 2) goals are defined by conflicts of interest which are built into institutionalized power relations; 3) grievances are ubiquitous, that is, they apply to a wide range of issues; and 4) centralized formally structured movement organizations are more typical of modern social movements and are more effective than decentralized informal movement structures.

Another element of resource mobilization theory is that often movement entrepreneurs organize and focus the energy of newly form-

ing groups (McCarthy and Zald 1977). Group success was often tied to group size with smaller groups being more successful. Olson (1965) considered optimum group size to be five to six people. If groups form and mobilize into social movement organizations their success rests on their ability to produce tangible benefits that meet the goals of the group and on formal acceptance of the group by the main antagonist as a valid representative of legitimate interests (Jenkins 1983). The theoretical framework provides a series of hypotheses to evaluate in light of this case study.

Purpose of this Paper

The purpose of this paper was to explore the formation and mobilization of Marin County citizens into a group named POET, "Protect Our Eucalyptus Trees." POET opposed National Park Service (NPS) and California Department of Parks and Recreation (CDPR) proposals to remove the Australian Blue Gum, *Eucalyptus globulis*, from 16 locations within Golden Gate National Recreation Area (GGNRA) and Angel Island State Park in San Francisco. The parks planned to remove eucalyptus because of its status as an exotic plant, invasion into native plant communities, and fire hazard in the wildland-urban interface (Howell 1982a, Howell 1982b). POET's opposition was unexpected by the agencies. Ironically, the newspaper announced the controversial NPS removal proposal on Arbor Day 1986. Subsequently, POET brought considerable pressure, halting all removal of eucalyptus except for containment of specific groves.

The research described here examined the natural resource values of the broader community and roles

of key individuals in POET and the agencies, NPS and CDPR. This more traditional method focused on the members of the group, which McCarthy and Zald (1977, p. 3) called the "hearts and minds of the people" approach, and was coupled with current resource mobilization theory to examine the "link between collective action and pooling of resources" (Jenkins 1983, p. 549). Finally, Zald and Useem's (1982) theory of movement and counter-movement was examined in the context of this micro-debate.

Methodology

Primary data were collected using two methods. The first was to randomly select a sample ($n=40$) from 290 letters sent to NPS by the public in response to the 1986 Arbor Day announcement. This method included review of two public hearing transcripts (June 5 and Oct. 16, 1986) to establish the ideological and value context of the conflict. The letters were stratified into two categories, for and against the removal of eucalyptus. Using a random numbers table, 20 letters were selected from each stratum without replacement. Data from each were coded using a coding sheet and stored in a computer data base system. Data analysis followed non-parametric techniques set forth in Zar (1974), Lehmann (1975), and Norusis (1988). Issues and values were identified and pooled with the letter data.

The second method was to interview 10 individuals with knowledge of the events, five each from POET and the agencies, to address questions about the process of mobilization (Kerlinger 1973, Baum 1987). An interview schedule was developed to evaluate the roles of

the individuals and draw out details of group formation and resources mobilization.

Results: Community Values

The sample letters came from seven California counties: Alameda, Contra Costa, Los Angeles, Marin, San Francisco, San Mateo, and Solano. The primary origin was Marin County (58%), the location of the proposed tree removal project, and secondarily from San Francisco County. Support and opposition tended to be evenly distributed among each county. Of the Marin County letters, 91.3% were from individuals and 8.7% were from organizations (n=23). Three letter writers offered their credentials to support their position about tree removal. All letters were written by adults: 10 male, 12 female, and one unidentified.

The 290 letters were stratified into two groups, 149 in favor and 141 opposed. The 40 randomly selected letters had nine categories of values. A tenth value, water quality, was raised in public testimony but not reflected in the letter sample. Each time a letter contained a topic it was tallied as indicating a value of interest to the letter writer. The values presented in the letters were: 1) protection of native plants (Natv); 2) inherent value of trees, regardless of origin (Tree); 3) individual's personal history about the tree's origin (Hist); 4) shelter from wind (Wind); 5) fire danger (Fire); 6) soil erosion from logging operations (Soil); 7) water quality (Watr); 8) wildlife habitat (Wldl); 9) aesthetics (Aest). The three most important values were trees, fire hazard, and aesthetics (Figure 1). Individuals who favored eucalyptus removal stressed native plants, fire hazard, and aesthetics,

while individuals who opposed eucalyptus removal stressed trees, personal history, wildlife habitat, and aesthetics. An examination of values by gender indicated females tended to stress the value of trees, while males stressed native plants, fire hazard, and wildlife (Figure 2). Letters from females tended to oppose eucalyptus removal while letters from males tended to favor removal. A chi-square test of the hypothesis (H_0) of no difference between females and males failed to reject (H_0) ($\chi^2=2.1267$; $DF=1$; $0.25>p>0.10$ (Figure 2). No sample letters provided hard evidence such as cited literature to support their arguments.

During the first public hearing before the GGNRA Citizens Advisory Commission (an unpaid group of local citizens appointed by the Secretary of the Interior which acts as a vehicle for public input to management of GGNRA) on June 5, 1986, 38 people testified about the NPS proposal; 20 favored and 18 opposed the removal. Among the individuals testifying, eight organizations were represented; six favored and two opposed removal. One group in opposition was a community group adjacent to a specific location of groves. During the Oct. 16, 1986, hearing, NPS presented a limited demonstration removal project; 27 people testified or had letters read into the record, with 13 favoring and 14 opposing removal.

Among the individuals testifying, five organizations were represented; four favored and one opposed removal. The four organizations that favored the NPS proposal were the California Native Plant Society, Marin Audubon Society, Tamalpais Conservation

Club, and People for a Natural and Wild Bay Area. The one organization in opposition was the Marin View Homeowners Association. This last group tentatively supported a removal test site but not in the location adjacent to their viewshed. The final vote of the Citizens Advisory Commission was unanimously for removal at a test site.

Ten interviews were attempted but only six were completed. Four interviews were completed with NPS personnel representing the following positions: 1) Superintendent; 2) Chief of Planning and Technical Services Division; 3) Plant Ecologist; and 4) Environmental Specialist. The NPS personnel ranged in age from 35 to 51; there were two males and two females. Only two POET members were interviewed, both males, aged 42 and 45. Two POET members did not return calls and one recommended that I talk to a third party.

Results: Case Study

On March 3, 1986, the NPS issued a press release announcing a plan to remove all eucalyptus from GGNRA and requesting public input. The San Francisco *Chronicle* published the press release on Arbor Day. By March 20, 1986, 290 letters were received expressing support or opposition and a number of natural resource values. On June 5, 1986, public testimony was taken by the Citizens Advisory Commission. At this time two individuals who would later become central to POET testified against the NPS plan. They were a National Aeronautics and Space Administration (NASA) scientist, Tom (not his real name), and a consulting forester, John (not his real name). During this period POET did not exist. The CDPR sup-

ported the NPS plan during the hearing and began formulating their eucalyptus removal plan for Angel Island. The NPS began to counter the opposition to tree removal by redesigning the plan. The new plan was designed as a pilot project to demonstrate the feasibility of removal and eradication of eucalyptus without long-term effects.

The new plan was released to the public and testimony was taken at a hearing on Oct. 16, 1986. Again support and opposition were evenly divided. Charles (not his real name) testified in strong opposition. At the end of the meeting a small group formed outside, talking to Charles about the NPS plan. The group which coalesced after the second public hearing exchanged phone numbers and organized meetings at participants' homes. Charles' wife christened the group POET and by March 1987 Charles was writing letters to NPS as the Coordinator of POET. The group grew to as large as 20 people. John became associated with the group at this time, providing forestry expertise, while Tom provided expertise but did not formally join the group. Charles mobilized the Marin View citizens with fliers and meetings. POET organized formal presentations to the Marin Conservation League, Environmental Action Committee of West Marin, Marin Audubon Society, and Marin Sierra Club. Communication among members of POET was extensive. They had numerous meetings and communicated frequently by telephone.

During internal meetings the NPS planned to put the project on hold, expending its resources on other issues. After repeated discussions with POET, the park chose to

pursue containment of certain eucalyptus groves. The CDPR aggressively pursued its Angel Island plan but was taken to court. The state agreed to halt action and write and Environmental Impact Report. At this writing, neither agency has removed eucalyptus as planned in their original proposals or the NPS demonstration proposal.

POET's basic goal as articulated during interviews was to stop removal of eucalyptus and hold the agencies responsible and accountable for planning and implementing timber harvest in a national park. The underlying issue was perceived as logging on public lands with all the negative values associated with it, the aesthetics of clearcutting, logging impacts, and private profit at public expense. At issue were federal forest management policies and practices. Strong feelings about U.S. Forest Service management were transferred to the eucalyptus situation. Frustration at not being able to influence the larger picture surfaced.

POET emphasized the credentials of Tom and John to refute NPS statements. Tom provided journal literature to support arguments about native plants and invasiveness of eucalyptus. Attacks on NPS credibility were made to the point of calling individuals "stupid." Through John's association with an attorney, two people were able to halt the state park plan.

Agency personnel were well-educated, represented by four Bachelor's and one Master's degrees in natural resource science and landscape architecture. No agency personnel belonged to national professional organizations of their peers. Two belonged to state professional

organizations. The two POET members represented a Ph.D. in Silviculture and a Master's in Fine Arts. The forester belonged to two national professional natural resource organizations. Charles belonged to more confrontational organizations such as Earth First and Greenpeace. The two POET members had fundamentally different values systems. One believed in the value of science, while the other was strongly influenced by aesthetics and a belief in the religious interconnectedness of all life on Earth.

Leadership of POET changed over time. At the beginning, Charles was seen as the leader even though he did not think of himself as such. During subsequent meetings power was transferred to a second party because of internal conflict. The NPS clearly believed that Charles and Tom were the leaders of POET. Some agency personnel believed Tom used POET to exercise control, although he repeatedly disavowed membership in POET. The second party was also seen as a leader of the group.

Discussion

Pierce and Lovrich (1980, p. 260) stressed the relevance of the analysis of environmental beliefs. By studying environmental beliefs, four factors could be evaluated: 1) the extent of coherent structure of thinking; 2) the degree to which beliefs are tied to ideological or partisan patterns; 3) the effect on communication between the public and policy makers, given the increased demand for public involvement; and 4) information about sophistication, coherence, and consistency of public thinking. They pointed out that people will be more likely to trust and admit in-

formation from sources whose orientation to the belief domain is consistent with their own. In the environmental policy domain, the core dimension is related to the emphasis given to preservation or development. The POET study showed that people did not trust agency information. Since agency personnel wanted to remove eucalyptus, their information was perceived as biased. Communication was affected between opponents and proponents because their beliefs differed. Removal of eucalyptus was identified with timber industry logging rather than as a native plant protection project.

With the elevation of ecological knowledge and public awareness of ecological issues, a social movement of grand proportions began in the 1970s and 1980s. This movement was extremely broad-based, as illustrated by the 1986-87 edition of *The Harbinger File*, which listed hundreds of groups concerned with California environmental issues (Harbinger Communications 1987). Social movement organizations (SMOs) formed in response to an equally wide range of issues and problems related to development and preservation. POET was an example of one SMO which formed in response to a perceived threat to natural resources the members wanted preserved.

After the second hearing, POET formed. It was not entirely spontaneous; it took a concerted effort by Charles to establish the first communication links. This action was consistent with McCarthy and Zald's (1977) entrepreneurial model of social movement development. The group mobilized: 1) a communication network, primarily by telephone; 2) expertise in forestry and

ecology to counter agency expertise; 3) labor to contact other groups, write letters, and prepare reports; 4) other groups with similar values and grievances; 5) organizational skills; and 6) access to the legal system.

In light of Jenkins' (1983) resource mobilization theory, POET was successful. Eucalyptus removal was halted and the group was formally recognized by the agencies and the courts as a valid representative of legitimate interests. From the beginning, POET had a clearly defined goal which transcended the tenure of individuals in the group. The individuals acted rationally (although some behavior was extreme) and were not among Olson's (1965) "lunatic fringe." The two POET members had grievances beyond the specific issue of eucalyptus removal. They saw this as a case in point reflecting problems observed elsewhere. Olson (1965) considered six individuals to be the most efficient group size. POET's group size varied from two to twenty, and was most successful at its smallest, when bringing suit against the state. This contradicts Olson's view that for people to protect collective goods, large numbers must contribute (Mitchell 1979).

In the case of Three Mile Island, Walsh (1981) recognized three important variables in resource mobilization theory: 1) individuals of higher socioeconomic status are more likely to mobilize because they have access to more resources; 2) mobilization is more likely when an organized protest ideology is available; and 3) the public hearing process can become an instrument of mobilization. POET fits Walsh's model very well. First, POET members tended to be well-educated,

indicating higher socioeconomic status. Second, they had a background of natural resource or environmental organization participation. Finally, POET was formed by participants who came to a public hearing as individuals but recognized grievances in common with others. By the second hearing, NPS had significantly revised its original plan in order to counter opposition. This can be seen as a countermovement to opposition before a formal opponent was recognized. As the arena shifted away from NPS to the CDPR, so did the focus of POET's energies.

Clawson (1975) wrote that in private land use planning it is usually a small group that does the planning with the plans benefitting some people more than others. It is important to ask who benefits more, and who is in control. The question of local versus government control is exceedingly important (Geisler 1980). It is at this point that the sources of conflicts may be recognized. Sabatier et al. (1987) described the "devil shift" as the amount of distorted perception individuals have about opponents. Opponents are seen as stronger and more "evil" than they actually are. Reactions to agency personnel reflected this pattern. Another factor is that civil servants are less willing to question the legitimacy of people with different beliefs (Sabatier et al. 1987, p. 471).

Mechanisms that recognize and use local control over natural resources need not be traditional (Fortmann and Bruce 1988). Local committees such as the Citizens Advisory Commission—but with a more specific planning focus, such as forest management—could facilitate creative planning and management rather than hinder it. Agencies

must recognize that they are perceived as an elite with exclusive access to specific natural resources knowledge. Involvement in agency affairs as a professional endeavor goes beyond mere practice. Involvement with peers from other agencies, academia, and the private sector is critical for maintaining a broad perspective. Knowledge shared in joint planning can result in cooperation and help maintain the trust in information developed by agency planning groups. Both agency and POET members expended considerable time, energy, and resources on this conflict. Conflict resolution is costly, not only to the individuals but to society, since valuable resources are diverted. During the planning stages of natural resource projects, *a priori* social research about community values, local control, and consideration for global issues could repay itself in conflict avoidance.

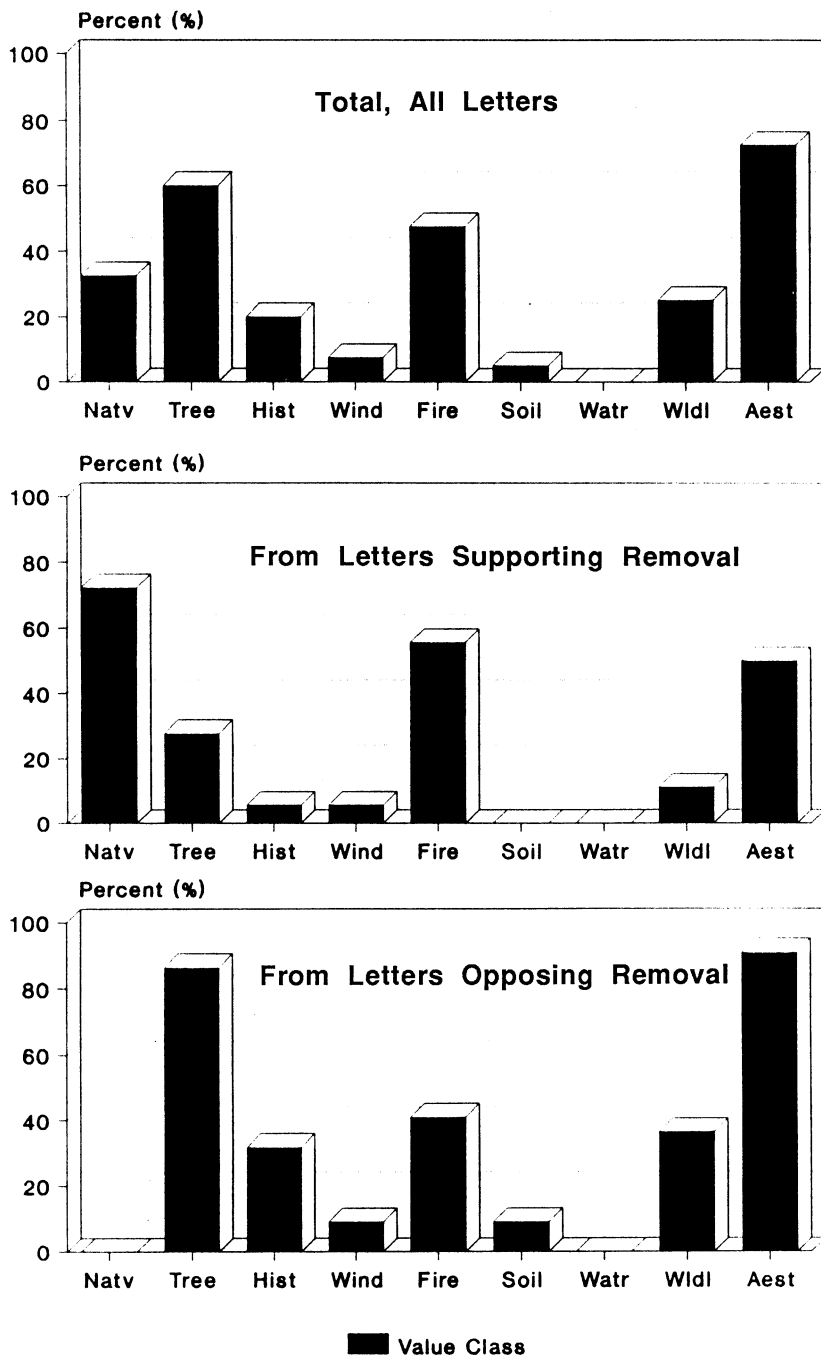
In closing, one point above all others rung true to me during the interviews. John stated that his disillusionment had its origin in the realization that people seemed to believe that scientific knowledge sprang out of the democratic process of open debate rather than through the exactitude of the scientific process. Too often in the public arena scientific information was misrepresented for purposes of persuasion.

C. S. Holling (1980) recognized degrees of uncertainty and that management decisions must be made without all the facts. Still, the facts must withstand the rigors of science. At some point in this process we must say: "Persuade me not; before you lies the truth, bloodied but unaltered by the battle."

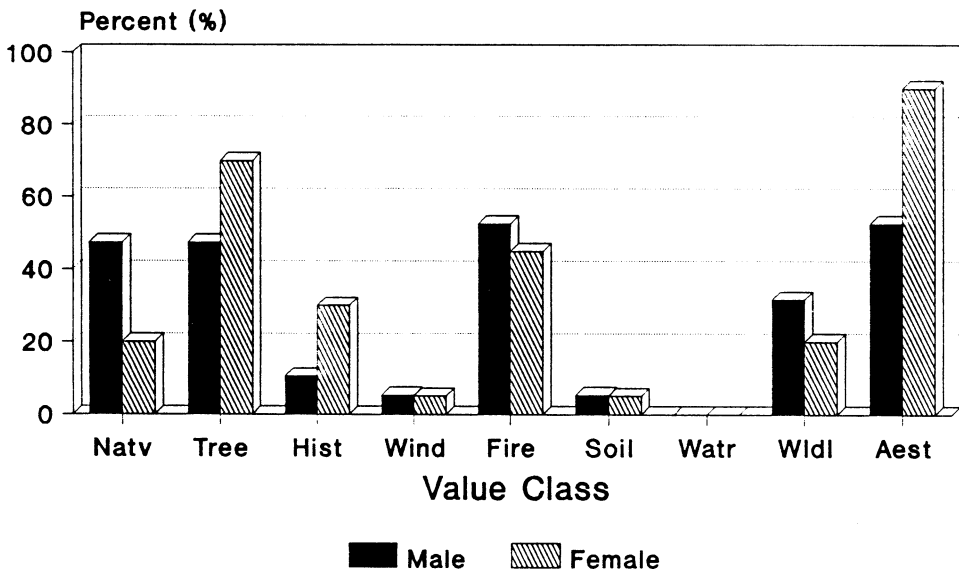
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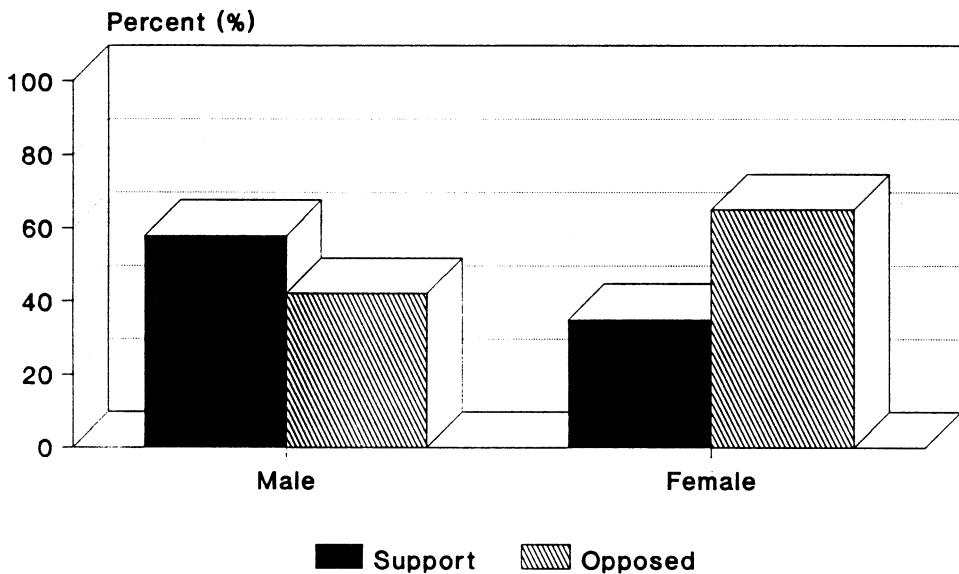
Figure 1. Proportion of Values Mentioned in Letters



**Figure 2a. Total Proportion of Values Mentioned in Letters
(by Gender)**



**Figure 2b. Backing for Eucalyptus Removal Project
(by Gender)**



Hunting in the National Park System

Al Lovaas

Chief Scientist
Alaska Regional Office
U.S. National Park Service
2525 Gambell Street
Anchorage, Alaska 99503

HUNTING IN AREAS OF THE NATIONAL Park System is often considered an aberration. Various vigorous attempts to open the System generally to hunting have not succeeded and the National Park Service (NPS) by policy continues to allow hunting only where specifically authorized by law. But while most of us had our backs turned, figuratively, hunting snuck up on us. It is now authorized in about two-thirds of the acreage within the System. In Alaska alone, sport and subsistence hunting are permitted on acreages equal to more than half of the total of 80 million acres in the System, and many areas in the "South-48," primarily national preserves, lakeshores, seashores, riverways, and recreation areas, are also open to hunting. A seeming

anomaly for an agency usually perceived as strictly protectionist.

Accommodating hunting requires wider dimensions of resource management by NPS, dimensions many employees would probably just as soon not have to deal with. But, as federal employees, we must administer laws regardless of personal biases about them. While individually we don't necessarily have to enthusiastically support hunting, collectively we must accommodate it where legal—and we must do it in good humor, safely, with minimal impact to other resources and more benign visitors, and without jeopardizing wildlife population integrity. Our fundamental responsibility, however, remains protection of the resources. But, while nationally hunting per se is becoming more controversial, what is to one person only a bloody, mangled, lifeless carcass, is to another the ingredients for rabbit liver mousse tureen!

Easy for him to say, must think those who know me, because I am a very enthusiastic hunter. But, for the record, I have never personally supported hunting in national parks and monuments—not that this matters, since I am employed to help administer the law, not to write it. National preserves and the various types of recreation areas established by Congress (partly to maintain hunting opportunities in a crowded world) are a different matter, as is subsistence in Alaska. But opportunities to observe and study wildlife in protected areas are of inestimable value. And any necessary population reductions in those areas can be made in ways that do not hamper those opportunities. Resorting to hordes of red coats for the job would do so.

You may wonder why a nice guy like me so enjoys hunting. I am of an earlier generation than the majority of today's employees, a generation that was closer to the earth. In my Lake Wobegon eastern South Dakota home, when we wanted a chicken dinner I caught a member of our flock with a wire leg hook, lopped off its head on the old chopping block, and, after the last flops and quivers, proceeded with the plucking and gutting. I neither enjoyed nor was upset at the bloodshed. It was just a chore, not nearly as onerous as cleaning the poop out of the chicken house, but also not fun, as was gathering the eggs or anticipating the success of the setting hens. I doubt, on the other hand, that my son has ever touched a live chicken. The pallid, insipid, cellophane-wrapped poultry products in the supermarket, from animals killed and bled by unknown hired assassins, inspire no thoughts of nature or the earth in him.

On our little acre on the edge of town (we were really only gentlemen farmers, primarily during the food rationing of World War II) we also raised two pigs each year and kept a cow. The pigs were as much pets as barnyard pigs can be, but, as a matter of course, they were eventually bopped between the eyes with a .22 and turned into succulent pork. I can only recall one time when that bothered me: I observed my dad hurrying toward the kitchen with a dishpan of blood from a freshly slashed pig throat, the raw material for my favorite Norwegian blood sausage. That scene turned me off the sausage for at least a week, until its fragrant aroma in the frying pan lured me back. He had to hurry because of something I'd just as soon not know

about working with the blood before it clotted (uff da, that older generation was made of stern stuff, and tempered by the Depression). I'm not sure my son has even seen a live pig since visiting my sister's Minnesota farm when he was about four years old. My sister's family and I shared a prime beef from the farm's acreage each year for a number of years.

And, I doubt the kid has ever touched a cow, to say nothing of planting his head into one's flank twice a day while filling a pail with milk the old-fashioned way, squirting a warm stream into the inevitable cat's mouth at intervals. I'm positive he never did anything as gross as clean the manure out of a barn. The chores, the milking and feeding, *had* to be done every day come drought or blizzard, and developed in countless youngsters a sense of responsibility that stood them in good stead when they entered the labor market following failure of the family farms.

(Incidentally, the sweet, unadulterated, unpasteurized cream led to my first inkling that life isn't necessarily fair. My mother and I, both prone to gaining weight, enviously watched my father who, after devouring a meal based on such things as fried sidepork or pork roast and plenty of home-churned butter (and remember the eggs from our chickens), would have a piece or two of pie and then turn to his favorite food: two or three helpings of homemade bread covered with thick, sweet cream and slathered with maple syrup. He never gained an ounce.)

The reason for this rambling discourse is an attempt to illustrate the realization we had, although

we didn't stop to contemplate it, that all life comes from the earth. The pasture across the road nurtured our cow in summer; the vast farm fields surrounding the town (which afforded summertime jobs) and our little alfalfa patch provided the livestock feed, and our huge garden (I *hate* weeds!), berry patches, and the asparagus growing wild in a nearby ditch provided fresh food. We eagerly pursued some of the millions of pheasants found in South Dakota in those days (now largely gone around our town, victims of clean farming, herbicides, and roadside mowing) and the waterfowl that streamed noisily overhead all day and all night during migration.

I wouldn't have traded that hunting for anything. Ah, the whisper of feathers and cupping of wings before the decoys, and the smell of fresh shotgun shell powder smoke in the pre-dawn of a crisp fall morning. I lived to hunt, as manifested in my choice of a dubious career in wildlife management and research. Besides, there wasn't that much else to do at our idyllic little house on the prairie. I did often wonder what a mountain really looked like and dreamed, while reading *Outdoor Life* magazine, about how I would love to chase a deer or elk around one.

I recently heard the noted author Richard Nelson, in an interview with public radio, say that he was anti-hunting until he lived with Eskimos and came to realize we are all products of the land. Then he gladly participated. I believe hunting is a completely natural way of cropping the earth, and a lot more fun than any other. As someone said, "walking in the woods without a gun is like taking

your sister to a dance." Which is to say, there is a vital difference between becoming a part of the changing kaleidoscope of nature and merely observing it. And my son is not all bad: He did contribute a couple of caribou and a few ducks to the family larder. But his tastes range more to boom boxes, motorcycles, and girls; no Lawrence Welk champagne music or lutefisk and lefse for that young man!

Contemplating nature, there is nothing like a South Dakota blizzard to emphasize its power. As long as I am inside, warm and snug, I love a blizzard. When the radio announced our town's school had to be closed, euphoria swept over us youngsters as we relaxed for a free day of reading and games. I'm sure TV would ruin the mood of isolation. I could watch for hours as the snow blew past horizontally, propelled by a howling wind out of the arctic wastelands that are North Dakota. At times the sheets of white would blot out even nearby trees and buildings, filtering into and out of huge drifts, piling up against the doors and increasing the sense of isolation and helplessness. If you dared to venture out, even for a bit, the wind seemed to suck the breath right out of your lungs.

One winter after I left the area, rotary snowplows all the way from Yellowstone were drafted to help open the roads. On the other hand, I'm scared to death of tornados, enjoy thunderstorms if the lightning doesn't come too close, and am entertained by *mild* earthquakes. But while hunting provides a sense of *participation*, storms and earthquakes illustrate our *subservience* to nature.

To my vegetarian friends I want to note that I don't dine only on venison, salmon, and halibut; I also eat and enjoy little embryos (plants, that is). But, I'll admit tearing apart a living, breathing leaf of lettuce or wrenching a quivering carrot or terrified turnip from from the very bowels of the earth of my garden leaves me queasy. After all, lettuce, carrots, and turnips can't run and can't hide.

So, be charitable. Remember, hunters, trappers, and fisherpersons are legal park visitors and, like other visitors, they usually have a deep appreciation for wildlife and fish, and for the natural conditions that support these resources.

Conservation Foundation's report to the National Park Service in 1972, which was part of the centennial celebration of Yellowstone National Park. Our purpose for presenting them is to give a historical perspective on advanced thinking about parks as expressed at that time, and to compare that with contemporary thoughts.

Insights from Stanley A. Cain

In early 1972, Dr. Stanley A. Cain submitted several papers to George Hartzog, who was then the Director of the National Park Service. In his cover letter, Dr. Cain said: "The attached papers of mine are related to and written because of the Conservation Foundation study and the Centennial development. . . . I don't expect you to have time to read all this, but there is an occasional useful thought about values, research, etc. . . ."

Dr. Cain, a plant scientist and ecologist, has had a long career as an academician, researcher, and supporter of the national parks in many and varied ways. As early as 1929 and 1930, he did extensive work in the Great Smoky Mountains on heath balds, as well as other plant ecology studies. He chaired the Secretary's Advisory Board on National Parks, Monuments, and Historic Sites from 1960 to 1965, and was the only person to serve on both the "Leopold Committee" and the "Robbins Committee." In 1965, Dr. Cain was appointed by Secretary Udall to serve as Assistant Secretary of the Interior for Fish, Wildlife, and Parks. (This was the first time that parks were included with fish and wildlife—at Dr. Cain's insistence.)

The two papers that follow were used in deliberations leading to the

Of Museums, Parks, and the Many Interests of the Public

Stanley A. Cain

THE DEVELOPMENT OF PUBLIC museums is essentially a phenomenon of the last hundred years in Western nations. Their development in the areas of art, archeology and anthropology, the natural sciences, historical artifacts, and engineering and technology are a vast departure from earlier centuries when the collections of paintings, sculptural pieces, and other art objects were the private occupation of the very wealthy and aristocratic, some of whom, fortunately, had taste that commands respect today.

What has come about comparatively recently is a social, cultural, political revolution—perhaps basically a democratization; a sharing. Whereas we are greatly indebted to the earlier collectors of art to enhance their private residences and palaces, we remain today indebted to them not only for the fact that they have cared for them, but that one way or another many collections have become public property—national treasures, whatever the country.

Public museums are expensive—the housing, custodial care, and research are all large continuing costs while the acquisition of individual pieces sometimes runs to six or even seven figures. The visiting public may contribute a small fraction of operating costs, and memberships somewhat more, but the burden (or opportunity) still falls largely on persons of wealth for sustaining and expanding museum collections and providing a public opportunity for pleasure and enhanced understanding, values, and taste.

Governments have also moved to develop and support museums of many kinds. In the United States this movement runs the gamut from towns and cities, counties and states, to Congress at the federal level. Even with such basic support, derived from taxes, there is a remaining need for the help of wealthy patrons and for the hundreds and thousands of persons who band together as "Friends of the Museum."

This historically recent democratic social phenomenon is still growing, not because everyone believes that museums meet a public need or that they are for everyone, but because of a conviction of many

that the "tone of society" can be improved and that it would somehow be good if it were. For a government to receive a gift in the public interest is one thing, but for it to appropriate public funds to support the array of museum needs is quite another matter. Cesar Graña, in his recent book *Fact and Symbol*, quotes William Cobbett's remarks made in the House of Commons in 1833: "Why should a tradesman or farmer be called upon to pay for the support of a place which was intended only for the amusement of the curious or the rich, and not for the benefit or instruction of the poor?" As Graña says in his sociological critique:

Museums . . . have ideologies. Some of them have been solemn, elegant, elitist; others evangelistically democratic or piously utilitarian. And, from the social scientists . . . one might conclude that museum-going is one of the rituals of contemporary, post-traditional civilization. These contentions and disparities, however, will become understandable if we look into the fabric of ambiguity and paradox which lies behind museums and their history.

These same hundred years are the time during which there have been created public botanical gardens, zoological parks, and wildlife reserves. They all represent the museum impulse. It is the same hundred years, of course, during which the Yellowstone idea has caught on and become a multinational development. The connection is not a loose one because many proponents and defenders of our national parks view them as living museums, where the National Park Service

strives to protect and exhibit what Starker Leopold once called vignettes of the American landscape—comparable, if one pushes the museum analogy hard enough, to the stuffed animal and plastic plants of museum habitat groups.

It is also clear that many units of our national park system have the same ambiguities and hence problems problems as those dead museums often housed in bastard gothic buildings. What are the public values to be protected and transmitted? How is the visiting public to find its pleasure? What can the visitor do or not be allowed to do? What are the solutions of management problems arising from sheer numbers of visitors? What is the responsibility to guide visitors so as to increase their understanding of what they see? How can the public participate in the opportunity from broadened experience? How can the boor be separated from the contemplative person? How can irrelevant actions be limited or prevented? In sum, how can the public interests and the visitor purposes be brought into congruence?

If one uses the word *re-creation*, the museum and the park purposes are broadly identical. When one uses the word *recreation*, however, park problems are very much more complex than museum problems.

You will find in the report of Task Force I, *Preservation of National Park Values*, that some of these questions have been commented on and, as we have made recommendations, answered to the best of our ability. This is not unique. The other Task Forces have encountered the same array of questions and their recommendations are not always the same as ours. So it goes. It

is the nature of social-cultural disparities which, in the long run, are to be welcomed in an egalitarian society. There is a caveat, however. The units of the National Park Service number nearly 300 and their diversity is great, as Congress in act after act has recognized not one but several public values, purposes, and needs of our society.

The residual problem is the one now so familiar to the U.S. Forest Service as its devotion to multiple-use has become statutory. Among the several proper uses of park properties, some are incompatible. Those that are must be separated in place and/or time if they are not to become mutually destructive. This is a central problem for the National Park Service that museums do not experience. At first blush, it would seem to be a planning and management problem. Behind this, however, is a basic research and educational challenge. The public must be helped to understand what are the purposes of the different units in the array, from the great wilderness and historical parks to the more recent urban-related recreation areas.

—Yosemite, April 13, 1972

Some Research Needs of the National Park Service

Stanley A. Cain

THE HONORABLE MEN WHO PROPOSED the preservation of the Yellowstone area and its geysers and thermal pools, its canyons and mountains, its forests and spectacular wildlife, and the men in Congress who enacted the law creating the world's first national park around the concept of perpetual protection for the pleasure of the people, wrought more than they could have anticipated. Who could have foretold that this idea would ultimately sweep the world and that nation after nation would commence its own national park system based on what was precious in its own territory? And who in the United States expected that our system, after the slow and difficult addition of other national parks, would ultimately expand to consist of nearly 300 separate units distributed over the 50 states, Puerto Rico, and the Virgin Islands?

The great expansion of the System has occurred since the National Park Service Act of 1916, and it has been spectacular during the last decade. Now the units include not only national wilderness parks and national monuments—some of which like Glacier Bay are fully as grand as the earlier parks—but also seashores, lakeshores, linear parkways and trails running for hundreds of miles, wild and scenic rivers, and various kinds of recreation areas. Another cluster of units includes historic and archaeological structures and sites, battle grounds, and great monuments such as the Lincoln Memorial in Washington, D.C. There are battlefields and a system of natural, historic, and environmental education landmarks. Most recent is the recognition of the great and growing need for urban or urban-related units and the seemingly insatiable public demand for opportunities for outdoor recreation. The frontiersmen who gathered around a campfire in Yellowstone and debated an alternative to the private development for practical human uses of the natural resources of the Western frontier—an alternative that would save intact the grand landscape, the magnificent forests, the clear fish-laden streams, and the wildlife of black and grizzly bear, mountain lions and lynx, beaver and badger, moose, elk, and antelope—planted an idea that continues to capture the imagination of the devotion of millions of people around the world.

At this date there is no need to debate the concept of preservation of landscape and its great natural features and human artifacts as a perpetual source of pleasure for the people, but there are problems in

doing this and I would address myself to two of them.

In the early years of Yellowstone the language of the 1872 act could only be read to mean that the enjoyment of the people would be found in their experience with the natural values being preserved. The outdoor recreation explosion as we know it today was not even on the horizon a century ago. Mechanized travel was scarcely dreamed of—the auto, motorcycle, airplane, outboard motors, off-road carts and snow-mobiles—giving most families an almost fantastic mobility. The bedroll and tarpaulin have been replaced by seemingly endless thousands of "campers" and completely modernized mobile homes, each with heavy demands for space and services within the parks.

There are many thousands of people who never question taking their pleasure in the national parks in the full panoply of such private mechanical conveniences. It is not that park visitors fail to find some pleasure in natural wonders. The rub is that the numbers of visitors and their encumberments are threatening the parks by over-use and inappropriate use. Even when the physical destruction is not generally extensive, it is where the people are, for the vast majority never leave their personal means of transportation. The noise and the self-distracting masses of people carry the stresses of the city into the wilderness. As has been so well said, the more than two hundred million park visits a year are by people who are "loving the parks to death."

Here, then, is one important and unresolved problem: how to distinguish between park visitors who

come to take pleasure in the great wildland parks, in archaeological ruins, and historic sites, and that large number of visitors who find their pleasure as a by-product of touring or in the excitement of mechanized sport that should be satisfied elsewhere in ordinary places. This is not in any way to denigrate such kinds of outdoor recreation, it is simply that the National Park Service has yet to learn the differences between a wildland park and a recreation unit. Wildland parks should be used by persons whose objectives are compatible with the values for which Congress established them.

This leads us to a second point. With millions of acres of magnificent public land under its management, worth untold billions of dollars, and servicing hundreds of millions of visitors, the National Park Service knows even less about its public-clients or customers—than it does in scientific detail about the nature it protects. The reason for both areas of vast ignorance is that neither the Service nor Congress has yet fully appreciated the importance of this lack of information and that the voids can only be filled by a large and continuing research program. The failure to have met this research need by such a far-ranging, important, and otherwise successful federal agency is difficult to understand when the U.S. Forest Service and most other units of government that manage property and serve the people have long-established and distinguished research programs.

There have been sporadic and essentially isolated pieces of valuable natural science research by Service employees that were contributory to understanding the ecol-

ogy of wildland properties and large mammals, and the effort by archaeologists has been sustained. More numerous botanical and zoological studies have been done on park lands by scientists from universities. Basic geological studies have been made by a sister agency, the Geological Survey, but the Service itself has never had a well-funded, intensive, broad, and continuous research program. Since the Robbins Report, made by a committee of the National Academy of Sciences National Research Council less than a decade ago, and with the interest of the present Director, George Hartzog, there has been a considerable increase in research effort, but it still is on an austerity budget incommensurate with the need.

Major research needs include vegetation cover-type maps, which today can be obtained from airborne multispectral remote sensing equipment, refined by ecological and plant sociological ground studies of the plant-animal communities. Other pressing needs include studies on the dynamics of the important ecosystems, on the ecological requirements of rare and endangered species, and the nesting and denning requirements of shy species, as well as fuller knowledge of the systematics of all groups, not just conspicuous birds, pretty flowering herbs, trees, and the like. Such information is indispensable to park management and would enrich visitors' appreciation.

As great as such needs are, there is much less known about the park visitors. Who are they? Where did they come from to a given park? Why did they make the visit? What were their expectations? Their disappointments? Their unex-

pressed satisfactions? What is their understanding or misunderstanding of the purposes for which Congress established the various units of the System? What activities are appropriate and inappropriate in a given unit or sector of a park, and how much of this is understood and accepted? The National Park Service needs to embark on a series of information surveys of its visitors. In the light of the data such studies would provide, it can be anticipated that the Service would need an augmented training program for its personnel.

The Service seems to be embarking on a program that will drastically discriminate among park visitor activities and the intensity of park usage. This would include an effort to limit entrance to the predetermined carrying capacity of each unit. In turn, carrying capacity has three aspects: the physical capacity to stand wear and tear, the biological capacity of communities to resist deterioration, and the psychological capacity as illustrated by the number of users that diminishes a sense of wilderness or produces the discomforts of crowding. If such a program is undertaken seriously, a visitor quota system will lead to some form of prereservation, for a camping opportunity, for example. If the use of private autos is drastically reduced or eliminated in park units, with some form of public transport where needed, it would be a shocking curtailment of the customary freedom of park uses. The Service is currently unprepared to execute such park-saving measures and the public is unprepared to accept them. All these matters and many others call for well-designed and effective research if serious mistakes are to

be avoided and difficult confrontations with the public are not to be disruptive. A small cadre of sociologists is not enough to get such a job done.

The research needed in these two complex areas—the natural history of the parks and the human characteristics of park visitors—must be complemented by even more adequate studies of specific historic and archaeological features of the System. And finally, many studies need to be directed toward personnel and management problems such as the possibilities of moving visitor services outside unit boundaries, and the refinement of planning techniques in the light of research data. The latter would include unit planning in relation to the surroundings in terms of other public lands, private developments, and the political arenas involved.

This essay should not be confined to expostulation. Obviously, the need is for the increased financing for a much wider scope of research. This appears to mean a minimum of two million dollars more a year for research. This would be a small percentage of the present budget and a minute amount in relation to the investment in research of fast-moving agencies and industries, especially in relation to such extremely valuable properties and public services.

The National Park Service in its annual budget preparation must make a much stronger case for research, and the Department of the Interior must support it before Congress. Such agency effort will need to be backed by a strong expression of support by the public. Sometimes the friends of the Park Service have been more character-

ized by their well-intentioned criticism of what they see as failures than they have been in giving the Service strong backing for what it needs. I would recommend to the several citizens' organizations that have a strong interest in the welfare of America's great national park system that they unite the strength of their hundreds of thousands of members in a collaborative effort to aid in the persuasion of Congress to recognize this important need. What about a council of such organizations directed to this end? Our government works to a considerable extent by responding to clear and strong pressure, to an organized expression of the citizens' right of petition.

Such a movement would augur well for the early years of the second century since Yellowstone. What is great can become greater. What should be enduring can be helped to endure in fact. What was a worthy goal a century ago is more vital now.

—February 7, 1972

The George Wright Society

Sixth Conference
on Research and Resource Management
in the National Parks and Equivalent Reserves

The Westin Paso Del Norte
El Paso, Texas • November 12–17, 1990

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Conference News

• *Needed—more posters!* To date, only 13 poster set-ups have been registered for the 1990 El Paso Conference. There's room for quite a few more—so it's not too late to get your ideas in for this. If you'd like to present a poster in El Paso, please contact:

Tom Gavin
Western Region NPS–Ranger Services
450 Golden Gate Ave., Box 36063
San Francisco, CA 94102

• *Have you registered?* If you're planning on joining us in El Paso (and we hope you are), please make sure to get your registration, field trip, and hotel accommodations taken care of early. All the information you'll need is on the conference registration form; a tear-out copy is included at the back of this issue of the *Forum* for your convenience.

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Tentative Agenda

Monday • November 12, 1990

8:00–11:45 a.m. REGISTRATION & POSTER SET UP

PLENARY SESSION A • A Focus for the Conference

1:00–1:15 p.m. Welcome. *Melody Webb*, President of The George Wright Society

1:15–1:45 p.m. A Tribute to George Wright and Family. *Melody Webb & Mrs. Sherry Wright Brichetto*

1:45–3:00 p.m. "A Society Platform for the Next Decade." *Tom Gavin & Frank Smith*, Conference Co-Chairs

3:00–3:30 p.m. BREAK & POSTERS

3:30–5:00 p.m. Considerations for Threats Identification: Institutional Barriers and Instructional Needs. *John C. Freemuth*, Moderator
[Panel Members—*BA* (being arranged)]

5:00 p.m. ADJOURN

6:00–7:30 p.m. Welcoming Reception; Cash Bar/Hors d'oeuvres

7:30–8:30 p.m. Concurrent Workshop Moderators Meeting. *Tom Gavin*, Moderator

Tuesday • November 13, 1990

7:45–8:45 a.m. Directors' Breakfast and Reception

8:45–10:00 a.m. A Directors Panel on Managing Threats. *Ted Sudia*, Moderator
Russell Dickenson, Gary Everhart, George B. Hartzog, Jr., William Penn Mott, Jr., and William Whelan

10:00 a.m. BREAK/POSTERS

10:30–11:45 a.m. A Regional Approach to Managing Threats.
Bruce Kilgore, Moderator (Speakers BA)

11:45am–1:00pm LUNCH

CONCURRENT SESSIONS •
Workshops on Platform Development—THREATS

Concurrent Session A:
CONTAMINATION OF OUR LAND, AIR & WATER

A 1 1:00 p.m. Workshop 1: Deteriorating Air Quality—A Universal Legacy. (Moderator *BA*).

1:00–2:30 p.m. A Panel Report from Denver. *John P. Christiano*,
Facilitator

2:30–2:50 p.m. Evaluation of the Effectiveness of the USNPS Air Quality
Program as it Relates to Great Smoky Mountains National
Park. *John Peine*

2:50–3:10 p.m. Protecting Visibility in the National Parks: The View from
the Grand Canyon. *Polly Hays*

3:10–3:40 p.m. BREAK

3:40–4:00 p.m. Ranking Parks for Air Pollution Vulnerability:
Methodology and Applications. *James P. Bennett*

4:00–4:45 p.m. THREAT RESOLUTION

A 2 1:00 p.m. Workshop 2: Toxins in Our Preserves. (Moderator
BA)

1:00–1:20 p.m. Pesticide Levels in Selected National Park Areas.
Milford R. Fletcher

1:20–1:40 p.m. Mercury, Wildlife, and Humans: Threats to Public Health
and Resources in Everglades National Park. *William F.*
Loftus and Oron L. Bass

1:40–2:00 p.m. THREAT RESOLUTION

A 3 2:00 p.m. Workshop 3: Global Impacts. *Steve Veirs*, Moderator

2:00–2:20 p.m. Potential Impacts of Ozone on Plants in the Great Smoky
Mountains NP. *Howard S. Neufeld and Jim Renfro*

- 2:20-2:40 p.m. Effects of Air Pollutants on Cold Desert Cyanobacterial-Lichen Crusts and Rock Lichens: Chlorophyll Degradation, Electrolyte Leakage and Nitrogenase Activity. *Jayne Belnap*
- 2:40-3:00 p.m. Effects of Acid Deposition on the Colorado Plateau: Acidification of Potholes Near Arches National Park, Utah. *Tim B. Graham*
- 3:00-3:30 p.m. BREAK
- 3:30-3:50 p.m. Chemical Analysis of Selected Pothole Water Sources in Grand County, Utah. *Ernest S. Gladney and Tim B. Graham*
- 3:50-4:10 p.m. Dry Deposition of Atmospheric Acids on a Bronze Statue at Gettysburg, PA. *Yee-Lin Wu, Cliff I. Davidson, Donald A. Dolske, and Susan I. Sherwood.*
- 4:10-5:00 p.m. THREAT RESOLUTION
- 5:00 p.m. ADJOURN
- 6:00 p.m. Barbeque/Theatre Program

Wednesday • November 14, 1990

Concurrent Session B • A FOCUS ON FLORA & FAUNA

- B 1 8:00 a.m. Workshop 1. Fauna: Population Dynamics and Management.**
David Graber, Moderator
- 8:00-8:15 a.m. Response of Black Bears to Gypsy Moth Infestation in Shenandoah NP, VA. *John W. Kasbohn*
- 8:15-8:30 a.m. Peregrine Falcon Recovery Program and Status in the Rocky Mountain Region. *Bob Schiller.*
- 8:30-8:45 a.m. Habitat Fragmentation and Long Distance Land Bird Migrants in the St. Croix River Valley. *A. R. Weisbrod*
- 8:45-9:00 a.m. Population Genetics of Brook Trout in Stocked and Unstocked Streams in Great Smoky Mountains National Park. *Charles R. Parker*
- 9:00-9:15 a.m. Yellowstone Bison Population Increases in Relation to Human Activity. *Mary Meagher*
- 9:15-9:30 a.m. Reintroduction of Montezuma Quail at Guadalupe Mountains National Park, Texas: A Status Report. *Vidal Davila, Jr.*

- 9:30–9:45 a.m. Responses of Elk to the Large Fires of 1988 in Yellowstone National Park. *Francis Singer*
- 9:45–10:00 a.m. A Backcountry Survey of Great Gray Owls in Yosemite National Park. *Charles van Riper III*
- 10:00–10:30 a.m. BREAK
- 10:30–10:45 a.m. A Method of Counting Wildlife Utilizing Video Tape and Computers. *Milford R. Fletcher*
- 10:45–11:00 a.m. Mountain Lions in High Visitor Use Areas of Big Bend National Park. *Jane M. Packard*
- 11:00–11:45 a.m. THREAT RESOLUTION
- 12 noon LUNCH
- B 2 8:00 a.m. Workshop 2. Flora: Disturbances to and Successional Patterns of Selected, Native North American Plant Assemblages.**
(Moderator *BA*)
- 8:00–8:20 a.m. Effects of Prescribed Burning on Oak Savanna and a Relict Prairie at Indiana Dunes National Lakeshore. *Kenneth L. Cole & Pamela K. Benjamin*
- 8:20–8:40 a.m. Paleoecological Analyses of Historical Vegetation Changes Accompanying Nineteenth Century Grazing. *Kenneth L. Cole & Pamela K. Benjamin*
- 8:40–9:00 a.m. An Assessment of Exotic Plants within Selected Parks of the Midwest Region. *Teresa R. Hessner and James Stubbendieck*
- 9:00–9:20 a.m. Monitoring Population Dynamics of Invasive Alien Organisms and Their Effects on Native Plants and Animals in Haleakala National Park. *Lloyd L. Loope and Arthur C. Medeiros*
- 9:20–9:40 a.m. Paradoxical Effects of Anthropogenic Disturbance on Successional Plant Populations: Flame Flower as an Example. *Noel B. Pavlovic*
- 9:40–10:00 a.m. Implications of South Florida Fire Management: Are We Really Maintaining Pineland Endemics? *Lisa P. Spier and James R. Snyder*
- 10:00–10:30 a.m. BREAK/POSTERS
- 10:30–10:50 a.m. Spatial Patterns of Giant Sequoia on a Landscape Scale. *Thomas J. Stohlgren*

10:50–11:10 a.m. A Comparison of Past, Present and Potential Future Vegetation Changes in Great Lakes Parks. *Kenneth L. Cole*

11:10–12:00 Noon THREAT RESOLUTION

12 noon LUNCH

Concurrent Session C • THE NEED FOR AND LACK OF DATA

C1 8:00 a.m. Workshop 1. Geographic Information System (GIS) in Our Work Place. (Moderator BA)

8:00–8:15 a.m. Spatial Delineation of Critical Park Resource Areas. *Ronald C. Sundell*

8:15–8:30 a.m. The Application of GIS to the Management of Lake Chelan National Recreation Area. *Jon Jarvis*

8:30–8:45 a.m. The Use of Landscape Ecology and GIS in the Interpretation of Mammal Distributions at Indiana Dunes National Lakeshore. *Daniel B. Fagre, Julie A. Magnuson & Chip L. Jenkins*

8:45–9:00 a.m. Landscape Change and Resource Threats In and Around Bandelier National Monument: A Call for Landscape Management. *Craig D. Allen*

9:00–9:15 a.m. Protecting Park Resources within a Developing Landscape. *David A. Haskell*

9:15–10:00 a.m. THREAT RESOLUTION

C2 8:00 a.m. Workshop 2. Monitoring Needs, Principles and Techniques. (Moderator BA)

8:00–8:20 a.m. Development of Inventory and Monitoring Techniques for Furbearer Populations in Big Thicket National Preserve. *Daniel B. Fagre*

8:20–8:40 a.m. The US National Park Service Western Region Fire Monitoring Program. *Tom Gavin*

8:40–9:00 a.m. Long Term Vegetation Change at Large Spatial Scales: National Park Management's Roles, Responsibilities and Challenges in the 1990s. *Thomas J. Stohlgren & Stephen D. Veirs, Jr.*

9:00–9:20 a.m. Methods for Monitoring Building Exterior Microclimate Variability and Its Influence on Pollutant Deposition. *Donald A. Dolske and Susan I. Sherwood.*

9:20–10:00 a.m. THREAT RESOLUTION

C3 8:00 a.m. Workshop 3. Measuring and Maintaining Watershed Integrity: A Key in Predicting Ecosystem Demise.

Raymond Herrmann, Moderator

8:00–8:15 a.m. Development of Practical Ecological Tools for Long Term Monitoring of Ecosystem Processes. *R. Stottlemeyer and C. A. Troendle*

8:15–8:30 a.m. Alternatives in Water Quality Monitoring. *Richard L. Whitman*

8:30–8:45 a.m. Water Quality of the Mammoth Cave Karst Aquifer, Mammoth Cave National Park. *Joe Meiman*

8:45–9:00 a.m. Erosion Processes—A Critical Threat to Resources. *Mary Ann Madej*

9:00–9:15 a.m. OPEN

9:15–10:00 a.m. THREAT RESOLUTION

10:00–10:30 a.m. BREAK/POSTERS

Concurrent Session D • COMMUNICATING THREATS

D110:30 a.m. Workshop 1. Considerations for Success.

Dick Cunningham, Moderator

10:30–10:45 a.m. Environmental Glasnost: America's Cultural Revolution. *Malcolm Ross, Jr.*

10:45–11:00 a.m. A Strategy on How National Parks Can become More Effective in Communicating Threats to Natural and Cultural Resources. *John Peine*

11:00–11:15 a.m. Response to Environmental Despair, or an Invitation to Revolution. *Rita Cantu, et al.*

11:15–12 noon THREAT RESOLUTION

D210:30 a.m. Workshop 2. Dispelling Apathy. (Moderator BA)

10:30–11:15 a.m. I Don't Know and I Don't Care: Dual Demons Threatening Resource Protection and Preservation. *Len Brown, Moderator (Panel Members BA)*

11:15–12 noon THREAT RESOLUTION

12 noon LUNCH

D3 10:30 a.m. Workshop 3. The Columbus Quincentenary: A Medium for Intercultural Exchange and Understanding.

Arthur R. Gomez, Moderator (Speakers BA)

11:15–12 noon THREAT RESOLUTION

12 noon LUNCH

Field 1:00 p.m. DEPART FOR FIELD TRIPS (Option A, B or C)

FIELD TRIPS—AFTERNOON OF WEDNESDAY, NOVEMBER 14

White Sands National Monument (6.5 hours)

The tour will begin with a stop at Headquarters, White Sands Missile Range, for a discussion of the interaction between a military installation, with some highly classified activities, and a national monument with high visibility and visitation. Proceed to Lake Lucero, the immediate source of the gypsum sands which constitute the Monument, the Monument proper and return to El Paso.

Mission Trails Tour (4.5 hours)

The three mission sites southeast of El Paso are the oldest in Texas (from as early as 1680); existing structures date from the 19th century. Also includes visit to an earlier (17th century) site and the Tigua Indian Center in Ysleta. Guided tour includes notes on the Camino Real and other aspects of local cultural resources. Dinner at Tigua Restaurant may be an option.

Walking Tour, El Paso/Ciudad Juárez (Paseo de Las Luces, 3.5–4 hours)

From Westin Paso del Norte, walking tour to note the architectural and other cultural resources surrounding the Paso del Norte, and the walk down S. El Paso Street, along the "Promenade of Lights" to 16th of September Avenue, Ciudad Juárez. Guadalupe Cathedral (1598), with notes on urban cultural resources and interaction with commercial needs. Dinner options in Ciudad Juárez or return to Westin. Wear comfortable shoes; about a 2.5 mile walk on pavement.

**Concurrent Session E • PRESERVATION AND PEOPLE:
CONFLICTING MANDATES?**

**E 1 8:00 a.m. Workshop 1. External Influences and
Considerations for Ecosystem and Political
Boundary Management.**

Jerry Rodgers, Moderator

8:00–8:15 a.m. Neighbors of Parks: Local Participation in Protection.
Jane M. Packard, Fred J. Miller and William P. Stewart

8:15–8:30 a.m. The Adirondacks: A Park Still in the Making. *Thomas L. Cobb*

8:30–9:00 a.m. A Study of the Impacts of External Development on the
Economic and Aesthetic Values of Theodore Roosevelt
National Park. *George N. Wallace*

9:00–9:15 a.m. Addressing "Related Lands" Issue through Cooperative
Conservation Efforts. *Jim Coleman*

9:15–9:30 a.m. The Effects of Changing Land Uses on Park Resources.
William B. Reed

9:30–9:45 a.m. Assessment of Global Climate Change Impacts and
National Park Units of the Southeastern United States.
Stephen C. Nodvin

9:45–10:00 a.m. Yellowstone: Vision for an Ecosystem, Interagency Style.
Sandra Hellickson-Key

10:00–10:30 a.m. BREAK/POSTER JUDGING

10:30–10:45 a.m. Geographic Description of the Greater Mount Mazana
Ecosystem. *James Milestone*

10:45–11:00 a.m. The Importance of Natural Landscape Dynamism in
Preservation of Rare Plant Habitat within Pictured Rocks
National Lakeshore. *Walter Loope*

11:00–Noon THREAT RESOLUTION

Noon–1:00 p.m. LUNCH

**E 2 8:00 a.m. Workshop 2. Internal Ramifications: Use or
Abuse?**

(Moderator *BA*)

- 8:00–8:15 a.m. Incorporating Cultural Resource Inventories and Interpretation into Recreational Carrying Capacity Planning. *David Foster*
- 8:15–8:30 a.m. Recreational Impacts to Park Resources. *Jeffrey L. Marion*
- 8:30–8:45 a.m. Developing Recreation Monitoring Systems to Protect Quality Environmental Settings. *David Foster*
- 8:45–9:00 a.m. Managing Tree Hazards—One Approach. *Tom Gavin*
- 9:00–9:15 a.m. The Rock Climbing Management Program—A Case Study from Pinnacles National Monument. *Steve DeBenedetti*
- 9:15–9:30 a.m. Tourism and Commercialization and Their Implications to Management of Threats to National Parks. *Steve Martin*
- 9:30–9:45 a.m. Defining the Effects of Aircraft Overflights on Parks and Wilderness Areas. *Richard Evenenwen*
- 9:45–10:00 a.m. Aircraft Flights Over National Parks—An Overview of the Grand Canyon Aircraft Management Issue. *Linda Mazzu*
- 10:00–10:30 a.m. BREAK/POSTER JUDGING
- 10:30–10:45 a.m. The Radio Free Zone. *R. G. Littlefield*
- 10:45–11:45 a.m. THREAT RESOLUTION
- 11:45–1:00 p.m. LUNCH

Concurrent Session F • RESTORATION AND PROTECTION: CUTTING OUR LOSSES

F1 8:00 a.m. Workshop 1. Restoration Successes and Failures. (moderator BA)

- 8:00–8:15 a.m. Revegetation of Disturbed Sites in the Colorado Plateau Region: A Study in Glen Canyon National Recreation Area. *Richard L. Harris*
- 8:15–8:30 a.m. Evaluation of Revegetation Techniques Related to Highway Reconstruction in Grand Teton National Park. *Bob Schiller*
- 8:30–8:45 a.m. Restoration of a Placer-Mined Riparian Ecosystem. *Roseann Densmore*
- 8:45–9:00 a.m. Restoration of the Natural Hydrolic Condition in the Turner River Basin. *Don Weeks and Lindsay D. Nakashima*

- 9:00–9:15 a.m. Removing Roads for Wildland Enhancement. *Terry Sprieter*
- 9:15–9:30 a.m. Abandoned Mineral Lands in US National Parks: A Problem that Will Not Go Away. *Robert D. Higgins*
- 9:30–10:00 a.m. THREAT RESOLUTION
- 10:00–10:30 a.m. BREAK/POSTER JUDGING
- F210:30 a.m. Workshop 2. An Examination of Policy.**
Lamar Alexander, Moderator
- 10:30–11:30 a.m. The US National Park Service and the Human Remains Issue.
- 11:30–12 noon THREAT RESOLUTION
- 12 noon–1:00 p.m. LUNCH
- F310:30 a.m. Workshop 3. Let's Talk Non-Renewable Resources.** (Moderator *BA*)
- 10:30–10:45 a.m. The Importance of our Non-existent Cultural Resources Database. *Leslie Hart*
- 10:45–11:00 a.m. Emergency Funding for Cultural Resource Protection. *John Hunter*
- 11:00–11:15 a.m. Maintenance and Storage of Collections. *Ann Hitchcock*
- 11:15–11:30 a.m. Law Enforcement and Cultural Archeological Resources. *Walt Dabney*
- 11:30–12 noon THREAT RESOLUTION

Concurrent Session G • POLICY, POLITICS, PROBLEMS & PROGRESS

G1 8:00 a.m. Workshop 1. Issues & Roadblocks *Richard Briceland, Moderator*

- 8:00–8:15 a.m. Private Foundation Support for Research in the National Parks. *David S. Silverberg*
- 8:15–8:30 a.m. Is Biodiversity a Realistic Management Goal for Parks? *Dan E. Huff*
- 8:30–8:45 a.m. Managing for Natural Processes in Park Ecosystems. *Stephen D. Veirs & Thomas J. Stohlgren*
- 8:45–9:00 a.m. A Solution for Resource Management Conflicts Resulting from Discordance between Policy, Objectives and Landscape Components. *Richard Keigley*

9:00–9:15 a.m. Professionalism in National Parks. *Ted Sudia*

9:15–10:00 a.m. THREAT RESOLUTION

10:00–10:30 a.m. BREAK/POSTER JUDGING

G210:30 a.m. Workshop 2. Progress Reports

10:30–10:45 a.m. Science in the Parks. (Speaker *BA*)

10:45–11:00 a.m. The Leopold Report in Review. *Bob Linn*

11:00–11:15 a.m. A "Threats" Report Card for the Last Decade.
Keith Yarborough

11:15–12 noon THREATS RESOLUTION

12 noon–1:00 p.m. LUNCH

G3 8:00 a.m. Workshop 3. International Developments.
(Moderator *BA*)

8:00–8:20 a.m. Status of the US/USSR International Park. *Dale L. Taylor*

8:20–8:40 a.m. Approaches to Managing Transboundary Impacts for Two
Canadian National Parks. *W. R. Stephenson*

8:40–9:00 a.m. Siberian Archaeology—A Report on an International
Conference. *Ken Schoenberg*

9:00–9:20 a.m. National Parks of Poland. *Merph Kolipinski*

9:20–10:00 a.m. THREATS RESOLUTION

11:45–1:00 p.m. LUNCH

PLENARY SESSION B • Society Business at Hand

1:00–3:00 p.m. "A Society Platform for the Next Decade."
Reports from Workshop Moderators. *Tom Gavin*,
Facilitator.

3:00–3:30 p.m. BREAK

3:30–4:30 p.m. A Briefing from the President, The George Wright
Society. *Melody Webb*

4:30 p.m. ADJOURN

6:00–7:00 p.m. Directors' Reception (no host bar)

- ◆ Awards Ceremony (Master of Ceremonies *BA*)
- ◆ GAIA Calling—A Performance of Poetry, Stories, Drama, Sound and Song About the Issue of the Earth. Performed by *Rita Cantu, Ron Kerbo, and Mark Flippo*
- ◆ Banquet Speaker (Keynote *BA*)

Friday • November 16, 1990

PLENARY SESSION B (continued)

- 8:00–9:00 a.m. **"A Society Platform for the Next Decade"**
—Outcome of Balloting. *Melody Webb*
- 9:00–9:30 a.m. The Platform in Review—Initial Reactions. (Speaker *BA*)
- 9:30–10:00 a.m. **Wrap-Up and Adjournment of Conference.**
Melody Webb, Moderator
- 10:15–11:30 a.m. **Organizational Meeting: The George Wright Society Section for Resource Management.**
Tom Gavin, Facilitator.
- 11:30–1:00 p.m. **Hotel Check Out/LUNCH**
- 1:00 p.m. **Depart for Field Trips.**

**FIELD TRIP OPTIONS FOR
FRIDAY AND SATURDAY,
NOVEMBER 16-17, 1990**

November 16–17: Guadalupe Mountains and Carlsbad Caverns National Parks

Overnight. Visit to Guadalupe Mountains, overview and discussion of Cultural and Natural Resources Problems; overnight at White's City (Housing and food extra). Evening program on the political and public input regarding cave preserves vs. public accessibility; visit to Carlsbad Caverns on November 17, return to El Paso.

November 16–17: Fort Davis National Historic Site (Cuihuahuan Desert Research Center)

Overnight. Fort Davis is among the best preserved of the post-Civil War western forts; setting and interpretation are exemplary. Discussions on standards of preservation/restoration/recreation of this cultural resource. Overnight Fort Davis and/or Davis Mountains State Park; return via Alpine Chihuahuan Desert Center, or McDonald Observatory, University of Texas. Food and lodging extra.

November 17:

Casas Grandes (Paquime)

Special trips may be arranged to Casas Grandes, Chihuahua, after the meetings. Check at Registration desk for further information.

Rail Trip, Barranca Del Cobre, Topolobampo

Check at Registration Desk—from four days to one week, depending on individual decisions.

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Society News, Notes & Mail

The George Wright Society • 1990

The GWS Opens Office

The GWS fulfilled a long-time need in May when it opened a publishing and business office in downtown Hancock, Michigan. For its first ten years the Society operated out of the Hancock home of Bob Linn, one of the co-founders. The move to the three-room office will enable the Society's affairs to be carried out more efficiently. Our mailing address remains the same, but now the Society has its own

phone number: (906) 487-9722. You can usually reach Bob or his assistant, Dave Harmon, at this number between 9 am and 5 pm Eastern Time, Monday through Friday. If there's no answer, please leave a message on the answering machine (which picks up on the fourth or fifth ring).

Canadian Conference on Science and Management of Protected Areas Slated for May 1991

An International Conference on Science and the Management of Protected Areas will be held May 14-19, 1991, at Acadia University in Wolfville, Nova Scotia. The conference will serve as a forum for presenting and discussing current perspectives on the role of science in managing protected areas and the role of protected areas in the conduct, support, and promotion of scientific research. It will also serve as a lead-up to the World Conservation Union (formerly IUCN) World Parks Conference in 1992.

Proposed plenary sessions for the Wolfville conference include:

- A Global Perspective
- Communicating Science
- The Role of Science in Managing Protected Areas
- The Role of Protected Areas as Scientific Benchmarks

- Partnerships in Accomplishing Objectives for Protected Areas
- Technology and Resource Management
- Integrated Land Use Management

Some workshops and paper sessions being considered are: approaches to designating and managing protected areas; parks, science, and tourism; cultural and social impacts of protected areas; cultural resource management; managing visitor impact; protecting biological diversity; genetic resources and the protection of rare and endangered species; science education and protected areas; research and long-term monitoring; and the opportunities and limitations associated with technology.

Other suggested topic areas include: establishing protected areas; the effectiveness of protected areas

for preserving resource values; putting values on protected areas; cultural and social values of protected areas; information management systems; fish, wildlife, water, and vegetation research; jurisdiction and protected areas; science and management of protected areas; the planning and design of protected areas; buffer zone management; and transboundary pollution research and management.

Classic NPS Fauna Series Book Available

The National Park Service's *Fauna of the National Parks* series is recognized as a landmark collection of texts on wildlife management in the United States. The second book in the series, published in 1933, was George Wright and Ben Thompson's *Wildlife Management in the National Parks*. The Society has a fairly large supply of the original edition of this book, which has long since gone out of print. We would like to make our remaining copies available to GWS members (and other *Forum* readers) for a nominal fee—and we mean *nominal*. For just \$1.00, to cover the costs of handling and book-rate postage, we'll send you this 142-page paperbound classic.

The book is divided into two sections. Under Part 1, "Perpetuation and Utilization of Primitive Wildlife Values," there are chapters on "Men and Birds in Joint Occupation of National Parks," "Men and Mammals in Joint Occupation," the bird life of Yellowstone, "A Wilderness-Use Technique," and "National Parks and Wilderness Use."

The conference will include poster sessions, equipment demonstrations, and field trips. Submissions for papers will be received up to September 30. For information, write to: Neil Munro; Director, Policy Planning & Research; Canadian Parks Service, Atlantic Region; Environment Canada; Historic Properties; Halifax, Nova Scotia, Canada B3J 1S9.

Part 2, "Present Status of National Park Wildlife and the Restoration Program," has reports on the winter range of Yellowstone elk, wildlife management at Grand Canyon (both the National Park and the National Monument), wildlife restoration at Mesa Verde, the "Guadalupe extension" of Carlsbad Caverns, overgrazing as a landscape problem, buffer areas, and research directions at Great Smoky Mountains. The book is well-illustrated with black-and-white photos, and Wright and Thompson's prose is always lively.

We offer this fascinating glimpse into the early years of NPS wildlife research as long as our supply lasts. Send your check for \$1.00, made payable to "The George Wright Society," to GWS, P. O. Box 65, Hancock, MI 49930. Please note "Fauna Series #2" on your check, and allow three or four weeks for delivery.

The George Wright Society
Sixth Conference on Research and Resource Management
in the National Parks and Equivalent Reserves

Westin Paso del Norte Hotel
El Paso, Texas • November 12-17, 1990

CONFERENCE REGISTRATION FORM

Name _____ Date _____
Address (to which correspondence and other materials should be sent)
Institution _____
Street or Box _____
City _____
State/Province _____
ZIP/Postal Code _____ Country _____
Telephone _____ (days) _____ (eves)

Activity	Paid	Cost	Remarks
Registration Fee, GWS members	_____	\$ 50.00	
Registration Fee, non-members	_____	60.00	
Directors' Breakfast	_____	11.00	Honoring Five Former USNPS Directors
* Wednesday Field Trips [A]	_____	15.00	White Sands Nat'l Monument
[B]	_____	13.00	Lower Valley Missions
[C] ____Ø__	No Cost		South El Paso Street Walk
Barbeque & Theatre Presentation ____Ø__	No Cost		Covered in Registration Fee
GWS Awards Banquet	_____	18.00	Check one: ____ Chicken ____ Beef
* Friday Field Trips [A]	_____	13.00	Guadalupe Mountains- Carlsbad Caverns

(continued on other side)

Fort Davis-
Chihuahuan
Research Center

\$ [•]

- ROOM CHARGES: Single: \$55 per night (with tax exempt form available at Front Desk)
Double: \$68 per night (with tax exempt form available at Front Desk)
- Room reservations must be guaranteed, in advance, via credit card no later than October 20, 1990. [Advance payment by check or money order for the first night of reservation period will also guarantee your arrival; reservations without guaranteed arrival will be reserved only until 6:00 pm of reservation date.] **CONFERENCE ATTENDEES MUST MAKE THEIR OWN LODGING RESERVATIONS AND TRAVEL ARRANGEMENTS.**
- Logistical questions should be brought to the attention of Thomas Gavin, 1990 GWS Conference Co-Chair, at 415-556-1866.

Membership in the Society

The George Wright Society was founded August 18, 1980. It is chartered in the State of Delaware, in accordance with the laws of the State of Delaware and of the United States of America, as a nonprofit educational and scientific organization dedicated to the protection, preservation, and maintenance of cultural and natural parks and reserves through research and education.

Membership is open to those who are "interested in promoting the application of knowledge, understanding, and wisdom to the management of the resources of natural and cultural parks, sites, and equivalent reserves." Annual dues are: Regular Member, \$25; Student Member, \$15; Sustaining Member, \$500. Life Memberships are \$250. Annual subscription rates to The George Wright *Forum* only (without membership in the Society) are: Libraries, \$25; Individuals, \$20. Dues, contributions, and subscriptions are tax-deductible for US citizens.

Materials Submitted for Publication

The editorial board welcomes articles that bear importantly on the objectives of the Society—promoting the application of knowledge, understanding, and wisdom to policy making, planning, management, and interpretation of the resources of natural and cultural parks, sites, and equivalent reserves around the world. The *Forum* is distributed internationally; submissions should minimize provincialism and aim to broaden international aspects and application.

Language of Submission Current readership is primarily English-speaking, but submissions in other languages will be considered; in such cases an English summary should be prepared.

Form of Submission We strongly urge authors to submit their articles on computer disk. This eliminates troublesome re-keying. Almost any Apple Macintosh disk can be read in its original format (please indicate the version of the software). Otherwise, send an ASCII-file disk; both 3.5" and 5.25" formats are acceptable. A double-spaced manuscript must accompany all submissions in case there are compatibility problems.

Style The *Forum* contains articles in varied fields: history, geology, botany, zoology, archeology, management, etc. Please follow your field's conventions for citations, bibliographies, and so on. Normally these various styles will be retained in the *Forum*.

Illustrations Submit line drawings, charts, and graphs as nearly "camera-ready" as possible. If submitted in a size that exceeds the *Forum's* page dimensions, please make sure the reduction will still be legible. The preferable form for photographs is black-and-white (matte or glossy) prints. Medium contrast makes for better reproduction. Color prints and slides may not reproduce as well, but are acceptable. Half-tones from newspapers and magazines should be avoided if at all possible. Please secure copyright permissions as needed.

Correspondence

All correspondence, requests for information, and *Forum* submissions should be sent to:

THE GEORGE WRIGHT SOCIETY
P. O. BOX 65
HANCOCK, MI 49930-0065
USA

The telephone number of the Hancock office is (906) 487-9722.