



NATIONAL Parks

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In This Issue

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& MODERN MEDICINE

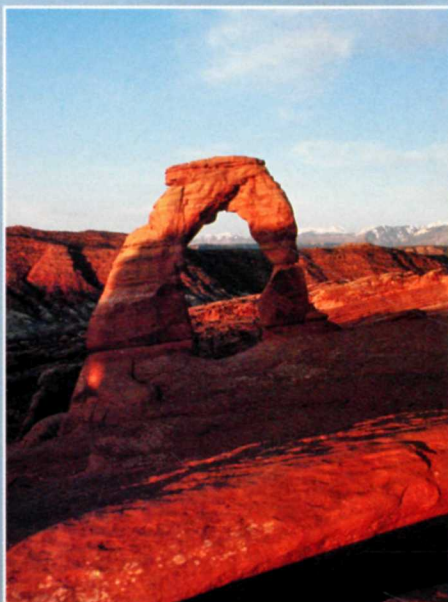
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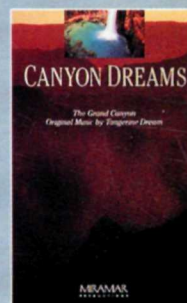
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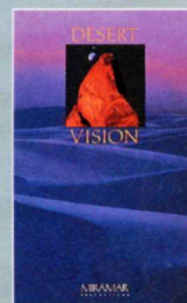
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ERWIN AND PEGGY BAUER

Park Poaching, page 18

EDITOR'S NOTE

Most people assume that if an animal—or a mountain, stream, or tree—exists within a national park it is safe. Not necessarily. For instance, some park areas allow oil and gas development. But that is a legal problem conservationists can work to control or eliminate through legislation.

Wildlife poaching and similar *illegal* threats are extremely difficult to control and, in some cases, so lucrative that getting caught may be only a small setback to offenders. At \$500 and more per ounce, bear gall bladder is comparable in price to low-purity cocaine.

To stop wildlife trafficking the National Park Service would have to hire hundreds more backcountry rangers. At the very least, however, poaching fines should be stiff enough to work as real deterrents and judges should view these actions as serious crimes.

NATIONAL PARKS

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National Parks is published bimonthly by NPCA. Single copies are \$2.50. Contributed manuscripts and photographs should be addressed to the Editor and should be accompanied by a stamped, self-addressed envelope. No responsibility can be assumed for unsolicited material. Articles are published for educational purposes and do not necessarily reflect the views of this Association. Title registered U.S. Pat. and TM Office. © 1989 by National Parks and Conservation Association. Printed in the United States. Second-class postage paid at Washington, D.C., and at additional offices.

NATIONAL Parks

THE MAGAZINE OF THE NATIONAL PARKS AND CONSERVATION ASSOCIATION

Vol. 63, No. 5-6

May/June 1989

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Cover: *Organ Pipe Cactus National Monument, by George H. H. Huey*
The organ pipe cacti population of the United States is concentrated in the park.

Established in 1919, the National Parks and Conservation Association is the only national, nonprofit, membership organization that focuses on defending, promoting, and improving our country's National Park System while educating the public about the parks.

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Award-winning video remembers the Blue and the Gray



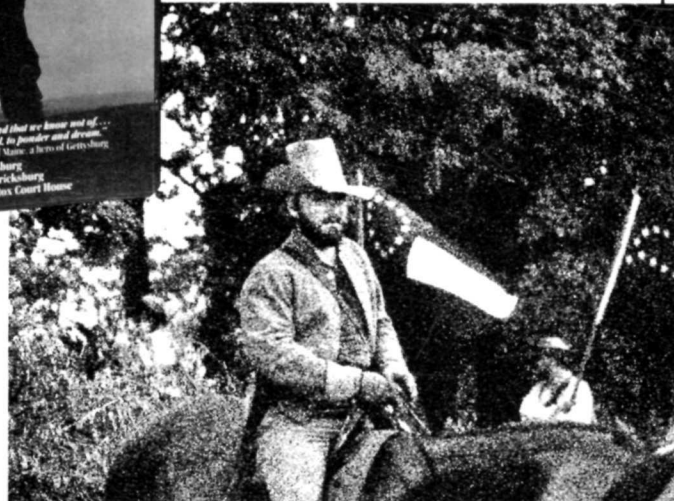
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Information Gap

THIS IS OUR 70th anniversary—70 years of work concentrated on improving and protecting the National Park System, a system replicated around the world by more than 120 nations. The park system is one of America's greatest inventions. Yet, our parks desperately need help if they are to survive as we know them; and, right now, the major form of help needed is good scientific research.

Why is research so important? Our concern is that in most parks, research is not integral to management decisions. Even if a park superintendent wants to base his or her management decisions on sound research, oftentimes the information does not exist. The information is lacking because the budget for a science and research program is lacking.

The ability to carefully collect facts, coordinate a systemwide data base, and analyze data to reach management conclusions is the basis of proper management. Without it, we, the public, cannot be confident that the Park Service is making the right decisions for our valuable—and shrinking—resources.

In the 1916 Organic Act that created the National Park System, Congress said the Park Service must “conserve the scenery and the natural and historical objects and the wildlife therein. . . . and provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for *future generations* [emphasis added].”

Research somehow got lost in the past 70 years. The roles of maintenance and law enforcement took pre-eminence over resource management, interpretation, and research.

Paul C. Pritchard

Working with the National Park Service, National Parks and Conservation Association formed an independent panel of eminent scientists and historians who looked at the condition of research in the national parks [see “Forum,” page 16].

In its impressive report, NPCA's Commission on Research and Resource Management Policy concluded, “The National Park Service cannot manage what it does not understand.” The Commission's detailed recommendations fall into four major areas:

- ▲ Develop and use ecosystem management concepts;
- ▲ Implement a strong research program for resources and visitor management;
- ▲ Adopt professional standards and improve expertise within the National Park Service;
- ▲ Undertake a broad educational mission to inform the American and world public how the parks fit into our search for a sustainable future.

How else can we hope to protect the parks? We have to know the facts, we have to understand them, and we have to respond based upon our knowledge. Park superintendents must have the support of research to stand firm against the pressures that impede their ability to protect the parks.

NPCA will continue to support this call for knowledge based on scientific and scholarly research, for proper decision-making based on facts. By itself, the cause of research-based management is worthy of our work for the next 70 years. The National Park System is threatened by many things, but by nothing so much as ignorance.



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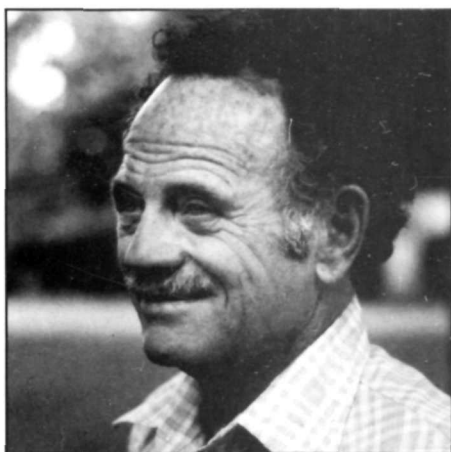
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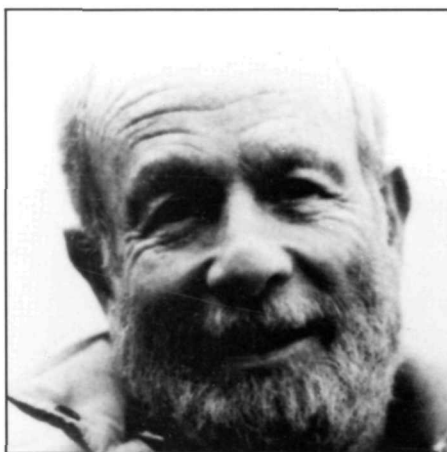
Marjory Stoneman Douglas Award

The Marjory Stoneman Douglas Award is presented by the National Parks and Conservation Association and the Bon Ami Co. to recognize an individual for an outstanding effort that results in protection of a unit or a proposed unit of the National Park System. The award is named in honor of Marjory Stoneman Douglas for her many years of dedication to preserving the fragile ecosystem of the Florida Everglades.



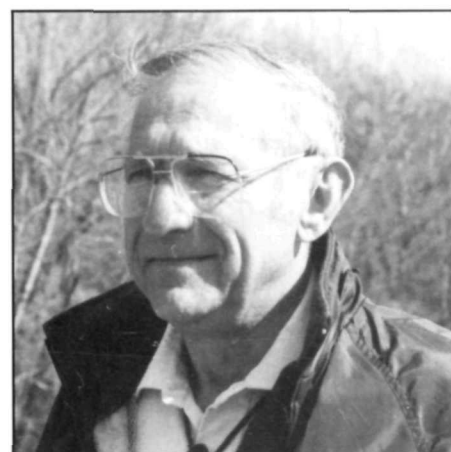
1986 RECIPIENT

MICHAEL FROME. Mr. Frome, a writer and an environmental scholar, has been a persistent advocate for our national parks and other public lands. Mr. Frome is the author of "The Promised Land" and is currently working on a book about the National Park System.



1987 RECIPIENT

DR. EDGAR WAYBURN. For forty years, Dr. Wayburn has been a leading environmentalist. He was the principal conservation architect for the establishment of Redwood National Park and Golden Gate National Recreation Area, and for the 1980 Alaska National Interest Lands Conservation Act.



1988 RECIPIENT

ROBERT CAHN. A Pulitzer-Prize winner for his Christian Science Monitor series on the state of the national parks, Mr. Cahn has also served on seminal environmental councils and, through numerous books and articles, furthered the cause of conservation.

The Faultless Starch/Bon Ami Co. wishes to congratulate the recipient of this award and thank them for the excellent contribution they have made to the protection of our environment.

The Bon Ami Co. has actively supported the efforts of organizations such as National Parks and Conservation Association for over 100 years and will continue to work toward the goal of preserving our natural resources for future generations.



More or Less Natural

As a frequent visitor to Isle Royale National Park, I commend you on your excellent story ["Wolves of Isle Royale," January/February 1989].

There has always been an aura of fascination associated with Isle Royale because of its wolves. Some think it would be a natural tragedy if the wolf population were to die out. Yet, would the place be any more or less natural because of their presence or absence, since they have been there for such a short time anyway? As your story indicates, it depends on how one defines the word "natural."

*Reverend Richard Thomas
Green Bay, Wisconsin*

Steven Nash's article was most interesting. As this has been a valuable ecological experiment, hopefully, the wolf pack can be saved.

The article states that wolves came to Isle Royale over an ice bridge in 1949. In 1947, I had the privilege of visiting with Aldo Leopold. He told me he had suggested transplanting 12 wolves to the island to control the moose population. If I recall correctly, it had already been done and was proving successful, so it may have been in operation for some time.

The relocation of wolves to Isle Royale by man detracts from its charm as a natural phenomenon, but makes human intervention to save them more acceptable at this time.

*Corrin H. Hodgson, M.D.
Rochester, Minnesota*

Four wolves were transplanted to the island from the Detroit Zoo in 1952. Raised around people, the wolves frequented visitor areas in search of food. They proved such a nuisance that all but one were recaptured; the last wolf remains a mystery. There is no documentation of Leopold's involvement in the reintroduction.

—the Editors

No Laughing Matter

I know: It's only a cartoon. Still, as a female park ranger, the illustration ["National Parks: Year 2000," January/February 1989] is a tad unnerving. Not only is the ranger a broad-chested, macho type, but the two hikers are male, as is the duck (ring around neck).

Females as well as males love and serve the parks; please don't leave us out of the picture.

*Lyndel Meikle, ranger
Grant-Kohrs Ranch NHS, Montana*



Still Smoldering

I enjoyed the Yellowstone Fires article ["The Long, Hot Summer," November/December 1988]. However, I was distressed by Russ Butcher's statement that previous fire exclusion in Yellowstone was partly responsible for last summer's fires and that prescribed fires should be used to restore "natural" conditions. This is a widespread misunderstanding.

Using prescribed fire to eliminate buildup in the Sierran parks has been a major Park Service success story in the 1970s and 1980s. However, surface fires were never important in Yellowstone.

When fires start in Rocky Mountain lodgepole forests in dry weather they "crown out," and may burn for miles until they hit a natural fire break. Stand-destroying fires recur in Yellowstone every few hundred years, while many areas in the Sierra have not been burned by crown fires since the birth of Christ.

Thus what happened in Yellowstone was entirely natural and probably had nothing to do with man's intervention; it would be unnatural if managers tried to introduce prescribed fires where they don't belong.

*Professor Douglas G. Sprugel
University of Washington, Seattle*

Space-Saver

I want to commend Ed Bruske for his excellent article ["Man in Space," January/February 1989]. But I wish to dispel the portrayal that both sides have mutually exclusive goals. Preservation of selected facilities will greatly enhance public support for NASA and will increase the pool of science and engineering students NASA's future depends on. Also, preservation will not, and must not, interfere with on-going operational needs.

Most of us at Apollo Society are engineers in the Air Force space program, so we understand operational needs and requirements. We've got to stop all this bickering between bureaucrats and get engineers involved who understand the needs of both sides. Private and government money can be raised to create America in Space National Historic Park. Is our space heritage so much less important than our war monuments and the Statue of Liberty?

*Joe Fury, president
Apollo Society
Lompoc, California*

Corrections

Regarding the January/February article on Lighthawk: At present, there is no evidence of radioactive runoff from mines adjacent to Grand Canyon National Park. There are three operating uranium mines, one mine ready to begin operations, and one mine site awaiting development. Although there are a number of high-grade uranium deposits, there are fewer than a handful of proposed mines in the area around the park.

The canoeing photograph on page 39 of the March/April issue should be credited to Les Blacklock.

Write "Letters," National Parks, 1015 Thirty-first St., NW, Washington, D.C. 20007. Letters may be edited for space.

NEWS

N P C A

PARK-QUALITY SEQUOIAS LOGGED

Between 1982 and 1987, the U.S. Forest Service quietly permitted logging within groves containing giant sequoia trees in California's Sequoia National Forest. Giant sequoias, also known as Sierra redwoods, are the largest—and among the oldest—trees on earth.

Though the practice has ceased for the time being, logging has occurred in six of the forest's 38 sequoia groves. Forest officials are drafting a new management plan, and logging in the groves may resume.

"Desecrating these irreplaceable national-park-quality groves is scandalous," said Russ Butcher, NPCA's Southwest/California representative.

If new management plans fail to protect the sequoias, NPCA and other conservation groups may recommend that the groves, which total some 13,200 acres of the 1.1-million-acre national forest, be transferred to the National Park System. The groves could be incorporated into nearby Sequoia National Park, or designated a separate national monument.

Present Forest Service policy allows loggers to virtually clear some areas, requiring only that the largest and oldest sequoias—those eight feet or greater in diameter or more than 150 years old—

are left remaining. These trees now stand alone in open swaths that were once dense, mixed-forest groves.

Located in central California, Sequoia National Forest contains about a third of the world's remaining virgin sequoia groves. Giant sequoias are the largest liv-

Present debate over Sequoia National Forest's management began in 1985, when environmentalists first learned of the logging. The Forest Service had begun the practice quietly, and, once underway, continued it in an almost covert manner, according to the agency's critics.

After several appeals to the Forest Service proved fruitless, the Sierra Club Legal Defense Fund filed suit against the agency in April 1987, and won a temporary halt to further logging in sequoia groves. Forest Supervisor Jim Crates agreed to maintain a logging ban until a new forest management plan could be drafted.

The Forest Service has retained a professional mediator to negotiate a new forest management plan with all parties concerned. Included are foresters, environmentalists, and timber companies. Discussions are under way.

Environmentalists charge that logging around giant sequoias, while sparing the oldest and biggest trees, nonetheless leaves these giants open to a number of grievous threats. In Sequoia's Black Mountain Grove, for example, several large roots were severed to clear the way for a road. And the Forest Service has admitted that at least one of the giant trees was accidentally felled.

Also, tractors and other heavy equipment used in logging inadvertently damage the trees' shallow root systems.



Logged, park-quality sequoia groves adjacent to Sequoia NP.

ing things on earth. Mature specimens reach higher than 300 feet and can be more than 20 feet thick. Some are more than 2,500 years old. The trees grow only in California's Sierra Nevada.

"We've probably slowed their growth some," said Sequoia silviculturist Bob Rogers, "but they won't suffer any substantial damage."

Critics predict that clearing and compacting the forest floor will cause rainwater to run off the soil, rather than seep into root systems.

Complete clearing of surrounding trees is considered unwise. This separates the giant trees from the integrated, living ecosystem of which they are a natural part. Limiting biological diversity in such a way is unhealthy for a forest.

The Forest Service, on the other hand, maintains that logging methods will encourage sequoia regeneration by leaving plenty of clear soil and permitting sunlight to reach seedlings. Foresters have reseeded some areas with pine and young sequoia.

Rogers concedes the Forest Service's experience to be relatively limited, however, and says the agency has met with only mixed results in reseeded areas.

STATE PARKS MANAGER TO LEAD PARK SERVICE

James M. Ridenour, a research coordinator at Purdue University, has been chosen by the Bush administration to be the next National Park Service director. Ridenour will replace William Penn Mott, Jr., as NPS chief.

"We have a professional we can work with," said NPCA President Paul Pritchard. "Bill Mott has left some big shoes to fill and James Ridenour seems ready to fill them."

The 47-year-old Ridenour has worked in the field of parks and natural resources for 17 years. He headed Indiana's Division of Natural Resources for eight years, from 1981 until 1989.

In that capacity, somewhat analogous to Interior secretary, Ridenour managed Indiana's state park system, as well as other state-owned areas, some with multi-use features. Previous to state directorship, he specialized in natural-resource management with the Council of State Governments.

The incoming NPS director says he favors research and the gathering of

baseline data to improve park management. He has said that he is a proponent of aggressive resource management.

NPCA greeted the incoming director with wishes for success and recommendations for the parks. These included suggestions to reduce political interference in the National Park Service, and improve park research.

"I think research is very important," Ridenour said. "Unless you know what you have, it's hard to tell what will happen down the road."

Most recently, Ridenour worked as research program coordinator with the Purdue University Natural Resources Research Institute in West Lafayette, Indiana. He holds a master's degree in parks and recreation and one in public administration.

TETON, YELLOWSTONE SNOWMOBILE ISSUE

National Park Service officials are drafting a plan to guide winter recreation at Yellowstone and Grand Teton national parks. Over the past 20 years, winter visitation has increased sharply at the two Wyoming parks.

Critical questions planners must con-



JACKSON HOLE NEWS

Snowmobiling in Teton's Potholes area.

sider include whether or not to expand accommodations, concessions, and staffing; whether or not to plow more roads; and whether snowmobile trail systems should be expanded.

NPS officials will first analyze research studies to assess the effects of various winter activities, such as snowmobiling and cross-country skiing, on park resources, and then develop guidelines for their regulation.

"NPCA has been calling for a winter use plan for these parks for some time," said Terri Martin, NPCA's Rocky Mountain regional representative. "Before the

NEWSUPDATE

▲ **Wilderness conference.** NPCA is cosponsoring a national conference celebrating the 25th anniversary of the Wilderness Act. Entitled Managing America's Enduring Wilderness Resource, the conference will take place September 11-14 on the Minneapolis campus of the University of Minnesota.

The meeting will focus on current and future management of wilderness and adjacent lands. For details, contact the University of Minnesota, College of Natural Resources, 110 Green Hall, St. Paul, MN 55108.

▲ **Cole House.** Representative Gerald Solomon (R-N.Y.) has introduced legislation (H.R. 379) to establish the

Thomas Cole House National Historic Site in Catskill, New York. The site is to preserve the home of Thomas Cole (1801-1848), one of America's foremost 19th-century landscape painters. Cole was one of the founders of the Hudson River School of Art.

A New York foundation has already offered to donate the two-and-a-half-story, Federalist-style house and surrounding property to the National Park Service.

The Cole house is among the sites recommended for inclusion in the National Park System by NPCA's *National Park System Plan*, which was released last year.

parks start pushing increased winter use, they should know more about its effects."

Possible effects include disturbance of wildlife species that are already struggling to survive the harsh season, and damage to vegetation from snow compaction.

Snowmobiling is a particularly touchy issue. The popularity of the winter activity has grown in the past few years, and proponents of the sport want to expand its range and facilities. According to Yellowstone figures, for example, the number of snowmobiles in the park in January and February reached more than 39,000 this year, a ten-percent increase over last year.

Particularly controversial is a proposal to establish a 340-mile snowmobile trail that would traverse Yellowstone and Grand Teton national parks and the John D. Rockefeller, Jr., Memorial Parkway. NPCA and other groups oppose the trail through Grand Teton as inappropriate and unnecessary.

The National Park Service generally allows snowmobiling only on existing roads that are left unplowed after snows. Establishing the Grand Teton segment of the trail would require expansion into areas that are now restricted, such as areas that include hiking trails. This would require special amendment to NPS regulations. Critics fear that allowing such exceptions will weaken environmentally sound rules.

The trail would also require some construction, such as bridge building and vegetation clearing, and could disrupt winter habitats for moose, eagle, trumpeter swan, and other wildlife. Also, the proposed route would impose added costs on the National Park Service for visitor protection and law enforcement.

Many local officials and some merchants and outfitters, however, support the plan, and stress the economic benefits of expanding recreational tourism in the area.

Officials hope to have options for the plan drafted by this fall. For information, or to send comments, write to the National Park Service, Rocky Mountain Regional Office, P.O. Box 25287, Denver, CO 80225.

DUMP PROPOSED NEAR NEW RIVER GORGE

The Garden Ground Environmental Corporation of West Virginia has proposed siting a 500-acre solid-waste landfill less than two miles from the New River Gorge National River in West Virginia's Fayette County.

The proposal, submitted in December, evoked an outcry from local residents and environmentalists, who consider the proposed dump a serious threat to the pristine area's environmental integrity. Locals were also concerned about the landfill's impact on the area's growing tourism industry. Critics cited a number of problems the landfill would cause, ranging from foul odors to groundwater pollution.

Joe Kennedy, NPS superintendent of New River Gorge, said the landfill proposal "raised serious concerns about spillage, odor, and traffic."

On March 9, Fayette County denied Garden Ground Environmental a special zoning change to accommodate the project. The company will likely seek to reverse the decision, possibly in court.

The landfill envisioned would be an extremely large one. It would accept approximately 250 truckloads of waste daily, an average of about one truck every two minutes over a nine-hour period, for a total of 50,000 to 70,000 tons of waste a month.

In a letter to the county, Superintendent Kennedy cited several shortcomings of the project proposal:

- ▲ Methods the company plans to use to control toxic leaching may be unsound and could allow the area's water table to become contaminated, tainting local drinking water. This would have serious, long-term effects on New River Gorge.
- ▲ The landfill would generate extremely foul odors that would pervade a large area, including portions of the park.
- ▲ The large volume of trucks visiting the site would greatly increase area traffic, especially along the routes visitors use to reach New River Gorge.
- ▲ Roadside and railside spillage could adversely affect both the park and visitors' experiences, especially along the scenic Dunloup Creek corridor.

A group of local residents have filed a formal complaint with the county. Besides opposing the landfill for environmental reasons, residents fear it will deter tourists from visiting the area, harming the local economy.

Several tourist centers are located near the proposed landfill site, including the new National Park Service headquarters, now under construction in Glen Jean, less than two miles away from the proposed dump site.

Locals voiced particular concern about the stench the landfill will generate and the numerous scavenger birds and vermin it will attract.

A 500-acre landfill has been proposed for a site near the scenic New River Gorge.



NATIONAL PARK SERVICE

BISON, ELK DEATHS HIGH IN YELLOWSTONE

With forage greatly reduced by last year's drought and further diminished by the summer's fires, large numbers of Yellowstone ungulates have perished during the past winter, raising questions about wildlife management in national parks.

This winter, as in winters past, bison, elk, bighorn sheep, and other park animals fell on lean times, and rangers stuck to a general NPS policy of interfering as little as possible with natural processes. The animals fended for themselves during the harshest winter in years, and many starved to death. Also, many elk and bison ranged across park boundaries in search of food and were shot by hunters, who may legally take bison and elk straying from the park.

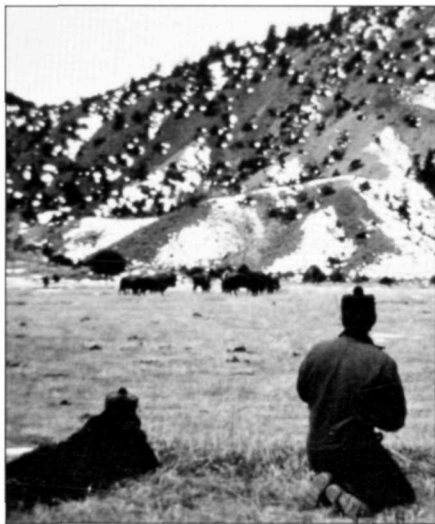
While Yellowstone does not yet have complete and accurate figures, recent counts of select elk populations put the likely mortality rate—from both starvation and hunting—of the northern elk herd at about 25 percent. Almost 75 percent of the northern bison herd has perished from the winter and the hunt. Park officials called these figures extremely high.

The park maintains, though, that sufficient animals remain to form viable populations. Officials pointed out that the high death rates are not unhealthy for the animal herds. Seven consecutive mild winters have allowed the herds to grow unusually large. Wildlife experts claim the winter kill provided a necessary curb on the number of animals, removing weaker individuals and reducing herds to a size the area can better support.

"There were some very old and weak animals surviving out there that, frankly, shouldn't have made it as long as they did," explained Joan Anzelmo, spokeswoman for the park.

According to some critics in the conservation community, however, the NPS faces problems when managing wildlands that are surrounded, more and more, by lands that are peopled, or that are managed by agencies with goals other than preservation.

Conservationists called for park man-



Hunters target bison at park borders.

agers to coordinate better with private landowners and the Forest Service to integrate management of the greater Yellowstone ecosystem. As the animals showed, natural processes such as herd migration do not recognize park bounds.

The NPS called this winter's migration of elk and bison out of the park unprecedented. It has responded with plans to work with state governments, the Forest Service, and private landowners to develop long-range wildlife management plans for the greater Yellowstone area. One idea the NPS is considering is leasing winter range from private landowners near the park to accommodate migrating animals. NPCA supports Yellowstone's movement toward integrated management of the entire greater Yellowstone area.

UTILITY TO TRADE COAL LEASES NEAR BRYCE

Nevada Power Company has announced its intent to trade its federal coal-mining leases in Utah's Alton coal field for leases in a less sensitive site. The action signals what may be the end of one of the longest-running park-protection battles in the West. The 28,000-acre Alton field is located near Bryce Canyon National Park in southern Utah.

Terri Martin, NPCA's Rocky Mountain regional representative, commended the company for its decision.

"It's a great idea. Ever since Alton was first proposed we've been saying there are more appropriate places to mine coal than next to a national park. This shows that conflicts between private enterprise and environmental concerns can be resolved."

Environmentalists and local ranchers have protested the strip mine since it was publicly proposed for the Alton site more than a decade ago.

Environmentalists were concerned that blasting and heavy trucking would create air and noise pollution in pristine Bryce Canyon, and that night lighting at the mine would diminish visitors' enjoyment of the park's spectacular night sky.

Local ranchers feared that the pumping of groundwater to slurry coal to distant power plants would dry up local springs. Environmentalists charged that water resources at Zion National Park, located to the southeast and "downstream" on the area's underground water table, could be harmed.

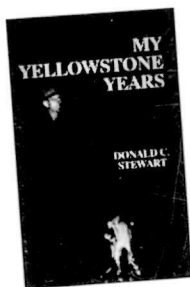
Nevada Power's Alton leases cover approximately 18,400 acres of land and contain an estimated 236 million tons of coal. It wants to trade these to the Bureau of Land Management (BLM) for leases covering some 10,000 acres with approximately 80 million tons of coal. The targeted site is adjacent to an existing coal mine owned by the utility.

"By moving the leases from Alton," said Charlie Vaughn, a vice president for the company, "the concerns over their proximity to national park lands are avoided. At the same time, Nevada Power's time and money in developing the Alton site is traded for leases adjacent to its other coal properties."

The leases the company wishes to acquire in the trade are located adjacent to its currently operating Genwal coal mine. The Genwal reserves, though smaller than Alton's, contain a better grade of coal. They also do not present environmental obstacles.

If the exchange is approved by Congress, the Alton coal leases will be returned to the BLM. Representative Howard Nielson (R-Utah), in whose district the Alton fields lie, supports the exchange and has said he will introduce legislation to effect it.

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101ST CONGRESS TACKLES PARK BILLS

More than 20 park-related bills have been introduced in the beginning months of the 101st Congress, addressing a range of park areas and resource-protection issues. Significant are bills covering the Arctic National Wildlife Refuge (ANWR), a public trust fund for acquiring open space and for historic preservation, and key expansions of the National Park System.

The question of whether to allow oil and gas development in ANWR is one of the most pressing environmental issues facing this Congress. The recent, disastrous oil spill in Alaska highlights the importance of protecting the wealth of wildlife on ANWR's coastal plain.

Bills on both sides of the issue have been introduced in the House and the Senate. Congressman Morris Udall (D-Ariz.) and Senator William Roth (R-Del.) sponsored legislation (H.R. 39 and S. 39, respectively) to designate ANWR's coastal plain as wilderness, which would preclude oil and gas development.

Representative Don Young (R-Alaska) and Senator J. Bennett Johnston (D-La.) have introduced H.R. 49 and S. 406, respectively, to open the arctic lands to private oil and gas leasing and development.

While Senator Johnston's bill has been reported favorably out of committee, no action has yet been taken on other ANWR legislation.

The 19-million-acre refuge is located in the extreme northeast corner of Alaska. The Interior Department supports oil and gas leasing on ANWR's 1.5-million-acre coastal plain. The oil industry views the coastal plain as possibly the last sizeable, undeveloped U.S. oil field. Other proponents of Johnston's bill see development as a way to relieve our country's dependence on foreign oil.

Conservation groups, including NPCA, oppose development in the area. The rich coastal plain is the premier portion of the refuge. It is home to many and varied species of wildlife, and is considered one of the world's last pristine arctic ecosystems.

Environmentalists hold that ANWR's

coastal plain should not be sacrificed as a short-term solution to our country's energy problems. In fact, many members of Congress say that a comprehensive energy plan should be formulated before ANWR leasing is even considered. Opponents also question the cost-effectiveness of development.

The American Heritage Trust Act, introduced in the House and Senate as H.R. 876 and S. 370, respectively, would help preserve open space and historical areas throughout the country. The bills were introduced by Representative Udall and Senator John Chafee (R-R.I.).

The act would revise the Land and Water Conservation Fund (LWCF) by providing *stable* funding for the acquisition of federal, state, and local parklands. Under the act, revenues generated by off-shore oil and gas leases would be set aside in a self-perpetuating trust. Interest accrued by the trust would fund acquisition of open space.

Under present LWCF provisions, congressional appropriations for acquiring parkland have declined substantially from peaks in the mid-1970s. In addition, funding has not kept pace with the loss of open space in urban and rural areas.

The American Heritage Trust Act would dedicate a similar trust to fund historic preservation. Monies from this trust would be used for the acquisition and preservation of historic areas throughout the country. The House version of the trust act is now being considered in committee.

Several bills have been introduced to create new park areas or expand existing ones. These include:

▲ H.R. 419, a bill authorizing the expansion of Harry S. Truman National Historic Site in Independence, Missouri. Introduced by Representative Alan Wheat (D-Mo.), the bill would authorize the NPS to buy or accept as donation three homes and additional land near the Truman House.

Addition of the three homes would allow the NPS to improve the park's operation and interpretation. The homes belong to Frank and George Wallace, the brothers of Truman's wife Bess, and to Margaret Nolan, Truman's aunt.

▲ S. 85, a bill that would add 40 acres to

May/June 1989

Harpers Ferry National Historical Park in West Virginia. Introduced by Senator Robert Byrd (D-W. Va.), the bill would allow private donations.

▲ H.R. 745 and S. 286 have been introduced in the House and Senate to create a new national monument to preserve pre-Columbian rock etchings, or petroglyphs, in the Southwest. The bills would establish Petroglyphs National Monument, encompassing 5,150 acres of the Mesa Volcanic Escarpment northwest of Albuquerque, New Mexico.

More than 15,000 petroglyphs have been found in the area. The ancient art is sacred to New Mexico's Pueblo Indians. The petroglyphs have become increasingly threatened by vandalism and the encroachment of nearby Albuquerque.

NEW NPS BUDGET SHOWS CUTS

Shortly before leaving office, the Reagan administration released its proposed National Park Service budget for Fiscal Year 1990.

As in previous years, the Reagan budget proposed significant reductions amounting to an overall cut of about 15 percent. Among the NPS accounts hardest hit were land acquisition and construction.

Under the new budget, construction was cut from \$160 million in 1989 to a proposed \$44 million. Budget authors proposed reducing land acquisition from its 1989 \$52-million appropriation to \$16 million. After the budget was submitted to Congress, however, the Bush administration revised the land acquisition allowances and proposed an increase over what the Reagan administration had proposed.

National Park Service land acquisition funds come from the Land and Water Conservation Fund (LWCF), which accrues funds from oil and gas leases on the outer continental shelf. The total LWCF appropriation for Fiscal Year 1989 was \$206 million. While conservationists are pleased with the new administration's proposal, NPCA will urge Congress to appropriate more in FY 1990.

GRAND CANYON URANIUM MINING ASSESSED

After six years of monitoring uranium mining on public lands surrounding Grand Canyon National Park, NPCA Southwest/California representative Russ Butcher says that the activity does not pose a threat to the park.

According to Dr. John W. McKlveen, director of Arizona State University's Radiation Measurements Facility, "Not only has there been no radiological impact from these mines upon Grand Canyon, there hasn't been any upon Bureau of Land Management lands in the immediate vicinity of the mines."

The university group monitors air, soil, and water for radioactive contamination at exploration and mine sites from before exploration begins, through mining, to final site restoration. Three former mine sites that have been restored now show no trace of additional radiation, says Dr. McKlveen.

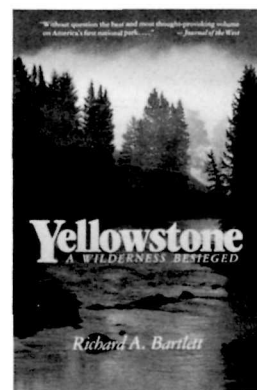
NPCA was initially alarmed at the prospect of mining near the Grand Canyon. In 1979, runoff from a spill at extensive uranium mining operations in New Mexico contaminated miles of the Rio Puerco with toxic fluids.

The Grand Canyon region's uranium-bearing formations are unlike New Mexico's, however, and contain virtually no water—often none at all. So, uranium-laced runoff does not pose a problem. Also, the canyon's ore is not reached by open-pit mining, as was New Mexico's, but by drilling shafts a thousand feet or more into the earth. At each mine, some 15 to 25 acres of surface area are used.

The rich ore deposits around the canyon occur in breccia pipe formations. These roughly cylindrical structures of fragmented rock, containing ore bodies generally no more than 600 feet deep by 120 feet wide, can usually be mined out within five years. Also, of the many pipes in the region, geologists have found that only a small percentage contains economically viable ore.

The only company now mining uranium in the region is Energy Fuels Nuclear, Inc. (EFN), of Denver. According to Butcher, the firm has been sensitive to environmental concerns.

Parks in Paperback



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The issue may be moot, however, because U.S. uranium mining is on the decline. The price of ore has plummeted from a 1970s high of more than \$40 per pound, to less than \$12 today.

CONGRESS INVESTIGATES PARK WILDLIFE

The House Subcommittee on National Parks and Public Lands held oversight hearings on March 16 on the state of wildlife in the National Park System. A number of witnesses spoke at the hearings, and revealed that park plants and animals are not adequately protected.

"We cannot hope to preserve park wildlife by focusing efforts only within park boundaries," testified Bill Lienesch, NPCA's director of Federal Activities, "Many animals' habitats range far beyond park borders."

In agreement, Thomas McNamee of

the Greater Yellowstone Coalition pointed to the deaths of great numbers of Yellowstone bison this past winter. Facing a scarcity of food, many park bison were shot by hunters when they roamed outside of the park—where they are legal game—searching for forage.

The subcommittee heard testimony from several conservation organizations, a coalition representing hunters and ranchers, and former National Park Service Director William Penn Mott, Jr.

Witnesses characterized park wildlife as generally threatened, and agreed that much more needs to be learned about wildlife populations and habitats.

An NPS report released in March 1988 noted "serious inadequacies in the data needed to make decisions about the management of natural resources." The report specified that less is known about the condition of park animals than any other resource found in the parks.

According to then-NPS Director Mott, major threats to park wildlife include invasion of habitat by non-native species, construction and development, pesticides, and poaching.

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MARINA PLANS THREATEN HISTORY, WETLANDS

The National Park Service, environmental groups, and local residents are battling against developers to preserve wetlands adjacent to Fort Frederica National Monument on St. Simons Island, Georgia.

A builder, Sea Palms Development Corporation, has applied to the Army Corps of Engineers and Georgia's Coastal Marshland Protection Committee for permits to build a marina just several hundred feet south of the national monument.

The development would cover at least 16 acres of riverbank and include a 1,100-foot dock, storage for 400 boats, condominiums, shops, parking lots, and a golf course.

Marina development would disrupt the monument's scenic character, which has remained virtually unchanged since the British built the fort in 1736. Britain built the fort during its struggle with Spain for control of what is now the southeastern United States.

The development would clutter Fort Frederica National Monument's southern view—now a largely natural vista of river and wetlands—with buildings, docks, boats, and cars. It would bring noise, crowds, and traffic, destroying the historical scene.

"And that's what the whole park is all about," said Jerry Belson, the monument's superintendent. "That's why people come here."

Also, conservationists and the National Park Service say development would have a negative effect on the fort's sensitive estuarine environment. The monument's air and water quality would suffer from automobile emissions and runoff from roads.

Opponents of the marina have requested an environmental impact statement (EIS) be prepared prior to granting permits. If the request is not met, conservationists threaten they will contest the issue in court.

The National Environmental Policy Act requires that an EIS be prepared if a project will cause significant change to an area.



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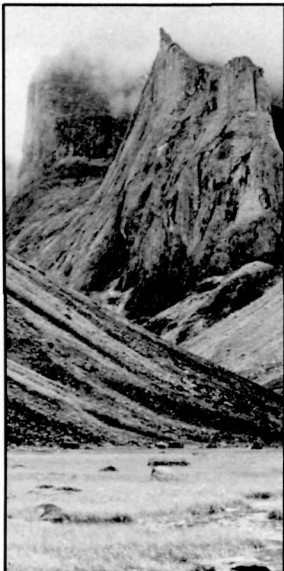
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The Scientific Method

***NPCA's ADVISORY COMMISSION FINDS
PARK RESEARCH NEGLECTED***

BY DR. JOHN C. GORDON

GIANT SAGUARO CACTI are struggling to reproduce in Saguaro National Monument and we do not know why. Fertilizers and pesticides are coursing through Everglades National Park, and we can only guess at the consequences. Almost 90 percent of the National Park System's 80 million acres has never been surveyed adequately for cultural resources.

To manage and protect a diverse system of more than 350 areas representing the best of our land and culture, the National Park Service employs only 75 field scientists and 56 historians in a workforce exceeding 14,000.

Not only is the number of scientists and researchers low, but some park researchers are so preoccupied fighting "brush fire" problems that they have not conducted pure research in years.

During the past year I served as chairman of the NPCA Commission on Research and Resource Management Policy in the National Park System—and these are but a few of the startling facts that were revealed to me.

Since April 1988, it has been my privilege to lead a panel of nationally recognized ecologists, anthropologists, historians, and conservationists [see list, next page] in a review of NPS goals and directions. We transmitted our report to NPCA, the secretary of the Interior, and

the director of the National Park Service this past March 19 in Washington, D.C.

But, above all, the message of our report is for the American people. Our natural ecosystems are shrinking; and, as a result, the importance of park research to preserving a liveable environment becomes ever more urgent.

As a specialist in forest physiology and ecosystems, the chance to work on a project of such potential import was an exciting challenge. Our work took us to more than 50 park areas—from Everglades to Glacier Bay, Alaska—and through in-depth discussions with NPS staff at all levels.

Preoccupied with 'brush fires,' some researchers haven't done research in years.

We set out to identify elements that are found in all National Park System areas and to develop an integrated approach for managing park resources. We recognized that among those resources are remnant ecosystems, rich gene pools, cultural benchmarks, and places for recreational and spiritual renewal.

Our conclusions? Although the National Park Service is heading in the right

direction, if the parks are to endure as safeguards for our cultural and natural heritage, the Park Service must effect a quantum leap forward in the quantity and quality of its research-based management.

Moreover, the NPS must implement a bold new educational mission so that the American public can understand the importance of our parks.

Our parks are not luxuries. They provide unique capsules of our cultural history, and they preserve the biological diversity of this nation. In the future, they may also provide invaluable baseline areas for monitoring global change.

With the future in mind, the commission's work began with a look at the past—a review of the now-famous Leopold Report [named for its chairman, Dr. A. Starker Leopold, son of legendary conservationist Aldo Leopold]. Issued in 1963, the Leopold Report is credited with setting the NPS on its present course. Like biologist George Wright and other park visionaries, Starker Leopold recognized that after years of placing priority on developing the parks for visitors, the NPS had to adopt an enlightened, science-based stewardship.

At the heart of the Leopold Report was the idea that "natural regulation" should dominate most ecosystems—except where we should intervene to prevent the spread of nonnative species or to restore native species and natural processes such as fire.

Many things have changed since 1963.

The parks are no longer insulated from pervasive human influences. Mining, drilling, and many other kinds of development increasingly crowd the borders of our parks. The National Park System has grown by 40 million acres—mostly vast Alaskan parklands that pose enormous challenges for managers. And visitors are now making almost 300 million trips to the parks each year.

Because our population is larger and more diverse and because our resources are dwindling, national park problems are knottier.

Should the NPS begin a captive breeding program for the endangered Florida panther? Move the Cape Hatteras lighthouse away from the battering ocean? Intervene to save a declining wolf population on Isle Royale? And what about the fires at Yellowstone National Park?

These questions are difficult to answer when less than 2 percent of the NPS operating budget is devoted to research. Inventory and monitoring systems are sketchy for most parks, nonexistent for others. The NPS has benefited little from new discoveries in genetics, population ecology, and ecosystem relationships, or from improvements in technology.

Historical research within the system must move beyond "charismatic" persons and episodes, but cultural resource managers lack adequate staffing and expertise. Educational programs still, for the most part, fail to link park issues to broader contexts.

For all of the above reasons, the National Park Service should focus on several major tasks.

▲ **Emphasizing the ecosystem concept.** An ecosystem is not a collection of discrete units—a tree here, an elk there. All of the parts interact to make the whole work. And that is the way the NPS should approach resource management. The NPS must also recognize transboundary effects.

More and more, problems arise that can best be solved using an interagency approach. This management technique applies both to natural and cultural areas: for instance, the interagency grizzly team in Greater Yellowstone and the regional planning efforts to protect Antietam National Battlefield.

▲ **Implementing an adequate NPS research program.** Congress should specifically mandate NPS research. Instead of lagging behind, the Park Service should lead in areas such as artifact conservation, educational programs, and ecosystem management.

An example of leadership in research strategies is Great Smoky Mountains National Park's recently negotiated agreement with five other federal, state, and local agencies to share data throughout the southern Appalachian region.

Recent NPS initiatives, such as the year-long focus on clean air in 1988, are reaching national park visitors, but more educational strategies must be employed. A new NPS project to develop a conservation education program for the Hawaiian islands may offer a model for the future.

The public is growing more aware of a threatened world biosphere. Our quality of life is increasingly at risk from global climate change, acid rain, nuclear waste disposal, species extinctions, and the loss

of irreplaceable buildings and artifacts that define our past.

Relatively unaltered park ecosystems can provide invaluable natural and cultural information and serve as early warning systems for many types of change. But, as the commission report details, park preservation requires real commitment to scientific and research skills.

Although the report of our short-lived commission is complete, the work is not over, nor should it ever cease. We all have a stake in the National Park System as the preeminent link between our past and our future.



▲ **Adopting professional standards.** Parks must be managed much more professionally. In addition, the professional abilities of all park employees must be upgraded.

The NPS resource management specialist training program, begun in 1982, and the Team Resources project are both valuable. Greater efforts are needed, however, to keep up with scientific knowledge and its application to parks. Increased cooperation with America's great universities may be one way to solve this problem.

▲ **Educating the public.** If the NPS adopts a broader role in educating the public about natural and cultural systems, park preservation could gain many more advocates.

Dr. John C. Gordon, Commission chairman, is dean of Yale University's School of Forestry and Environmental Studies.

NPCA Commission Members: Dr. Sarah Bishop, Partners in Parks; Dr. William Burch, Yale, Forestry/Environmental Studies; Mr. Russell Cahill, King County, WA, Dept. of Natural Resources/Parks; Mr. Robert Cahn, environmental journalist; Dr. Tim Clark, Northern Rockies Conservation Cooperative; Dr. Robert Dean, U. of FL, Coastal/Oceanographic Engineering; Dr. Jerry Franklin, U. of WA, Forest Resources; Dr. John Gordon, Commission chairman; Dr. George Gumerman, Southern IL U. Center for Archaeological Investigation; Dr. Barbara Howe, WV U., History; Dr. Benita Howell, U. of TN, Anthropology; Dr. Ralph Jones, Baltimore Dept. of Recreation/Parks; Mr. Douglas Latimer, Latimer and Assoc. Air Quality Consulting; Dr. Stephen Leatherman, U. of MD Lab. for Coastal Research; Dr. Harold Mooney, Stanford U., Biological Sciences; Dr. Victoria Wyatt, U. of WA, Art History; Dr. Ervin Zube, U. of AZ, Renewable Natural Resources. NPCA coordinators: Mr. T. Destry Jarvis, Mr. David J. Simon.

The Quiet Kill

*VIRTUALLY UNDETECTED, POACHERS STRIP
THE PARKS OF WILDLIFE*

BY MICHAEL MILSTEIN

A POWERFUL HOIST attached to the roof was used to lower corpses onto stainless steel tables in the basement. Electric

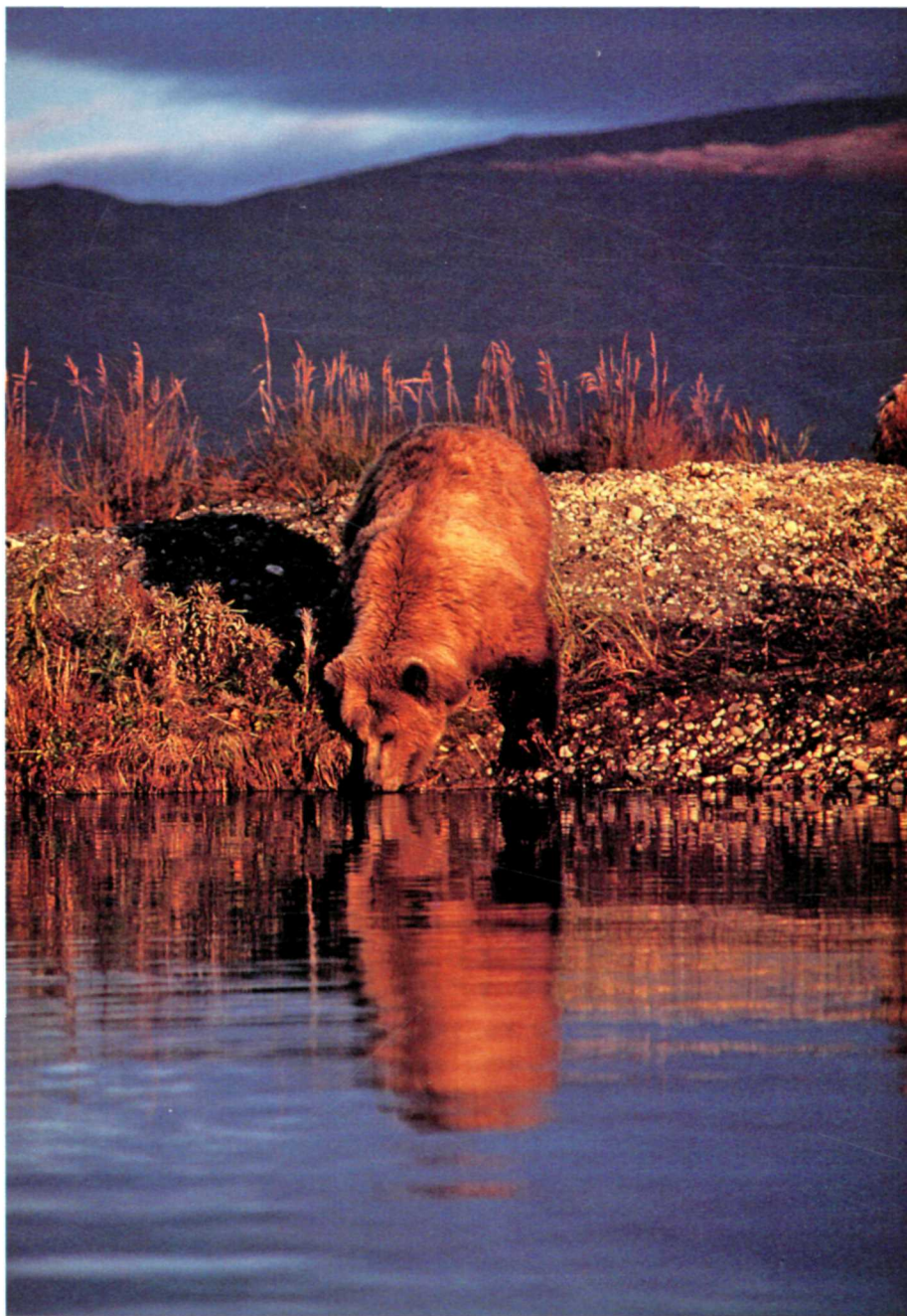
bone saws and heavy-duty cutlery were arrayed on rolling carts, ready to surgically skin and dismember the carcasses of victims. And giant refrigerators and freezers against one wall were packed with paws, claws, teeth, skins, meat, and heads of those victims—all black bears—packaged and ready for sale.

That 1982 discovery at the home of a North Carolina man suspected of hunting bears in Great Smoky Mountains National Park and along the Blue Ridge Parkway was just the prelude to a gruesome tale. Discoveries like this one alerted authorities to the scope of bear poaching in the region, and prompted National Park Service and U.S.



Poachers stalk trophy elk in the Tetons for their meat and antlers.





STEVEN C. KAUFMAN

In Alaska, outlaw guides in airplanes chase grizzlies toward waiting hunters.

Fish and Wildlife Service officials to initiate action.

In 1985, wildlife agents began "Operation Smoky," the largest sting investigation yet involving the National Park Service, and infiltrated a black bear poaching trade of staggering proportions. During the three-year probe, agents bought 385 bear claws, on their way to becoming jewelry; 77 feet, an exotic delicacy; 266 gall bladders, con-

sidered a panacea in the Orient; four heads; nine hides; and one live bear cub.

It was all grisly proof of the demise of many of the 500 bears thought to live in and around the largest true black bear sanctuary in the world.

As they had custom-designed the basement processing plant, modern poachers had also perfected their killing techniques. Some employed telemetry gear to zero in on dens and shoot at least eight bears wearing radio collars as part of scientific surveys.

Others trained their dogs with live

bears stolen from the park. The hunters would cripple a captured bear by shooting its front paws and cracking its jaw with a hatchet. Then they would sic their dogs on the defenseless quarry until it was torn to pieces.

"It's practically the most horrible, disgusting thing I've ever witnessed," sighs Ranger William Cook, a wildlife biologist involved in the probe that ended with the August arrests of more than 60 people. "It was pure greed. If they could make money killing the last bear around, they wouldn't have hesitated."

ONCE A MINOR, Old World offense, poaching today has evolved into a modern, deadly efficient, international racket. Poachers, hit men for insatiable hunters and traders, threaten the last elephants in Africa and the last grizzly bears in the contiguous United States. While decimating and sometimes destroying wildlife populations, illegal hunters sell off nature's wild creatures for millions of dollars a year.

And as the habitats and populations of the most wanted and valuable wildlife dwindle because of human development and exploitation, undaunted poachers are more often targeting those species' last refuges. Just as millions of visitors flock to America's national parks each year to admire protected plants and animals that sometimes exist nowhere else, poachers are also coming to the parks—to trap, take, and kill them.

"The pressure on our wildlife is increasing astronomically, so that national parks are the last major havens and quality life zones that exist," explains Terry Grosz, chief of the U.S. Fish and Wildlife Service's (FWS) Rocky Mountain region.

FWS agents often work with rangers to protect wildlife from poachers. Grosz's region covers several of America's premier national parks, including Yellowstone and Rocky Mountain.

"It doesn't take criminals long to realize that they can easily get the same booty in a national park that they would spend days or years looking for elsewhere."

At Saguaro and Organ Pipe Cactus national monuments and other south-

western parks, the booty is cacti and rare snakes and lizards. In Denali National Park in Alaska, hunters have buzzed over the snow in airplanes and gunned down packs of wolves for their valuable pelts.

At Yellowstone National Park they set cyanide booby traps for coyotes and hack the antlers off elk. In California's Redwood National Park people slice giant burls off the sides of trees with chainsaws to make clocks and coffee tables. At Shenandoah National Park in Virginia they kill at least 400 animals—virtually all black bears or deer—each year, while carting off ginseng, a threatened medicinal herb, by the sackload.

"We're finding that we're the managers of the last big-game supermarkets on the block and all our products are on display in the roadside meadows," says Dave Essex, chief ranger at Rocky Mountain National Park, where poachers target bighorn sheep, deer, and elk, and snatch young goshawks from their nests. "Hunting has become an enterprise, and it's only getting worse."

EXACTLY HOW BAD it is nobody knows for sure. In a Park Service appraisal last year, wildlife poaching ranked after exotic plants and encroaching development as the third most prevalent threat facing the nation's parks, based on the almost 50 parks that reported it as a menace. Alaska rangers consider illegal trophy hunting their worst problem.

In 1988, only the third year the NPS kept separate totals for poaching incidents, there were 2,079 "wildlife violations." Such statistics, though, are as much a function of the number of rangers on patrol as they are of the number of park animals being killed.

By its nature, poaching remains an invisible crime unless officers happen across a hunter's trail. To pinpoint how much poaching goes unchecked, Canadian wildlife officials in Alberta hired a man in 1987 to commit a variety of hunting offenses, including the illegal killing of wildlife, on Canadian lands. Of 762 crimes, just eight (1.1 percent) were ever reported. Shorthanded rangers agree that they are lucky to catch even a tiny fraction of the poachers that attack.

"It's like cash and carry," says Saguaro District Ranger Chuck Scott of cactus and reptile rustling in the national monument. "They have a buyer lined up, they know what they want, and they dig it up and are gone in seconds."

Worth hundreds or even thousands of dollars to collectors depending on the species' size and rarity, cacti have been stolen even from the garden in front of Saguaro National Monument's visitor center. At Organ Pipe Cactus National Monument in 1985, rangers caught a man with six different kinds of snakes and iguanas in his car.

GOING after poachers is a frustrating and dangerous game. Over the past decade, about 40 new areas have been added to the National Park System, and total yearly visitation has increased by 65 million. Yet, NPS staffing has failed, by a wide margin, to keep pace with these increases. There are less than 200 federal wildlife agents nationwide, a fraction of the number of officers on an average big-city police force. Yet, wildlife agents are eight times as likely to be assaulted on the job.

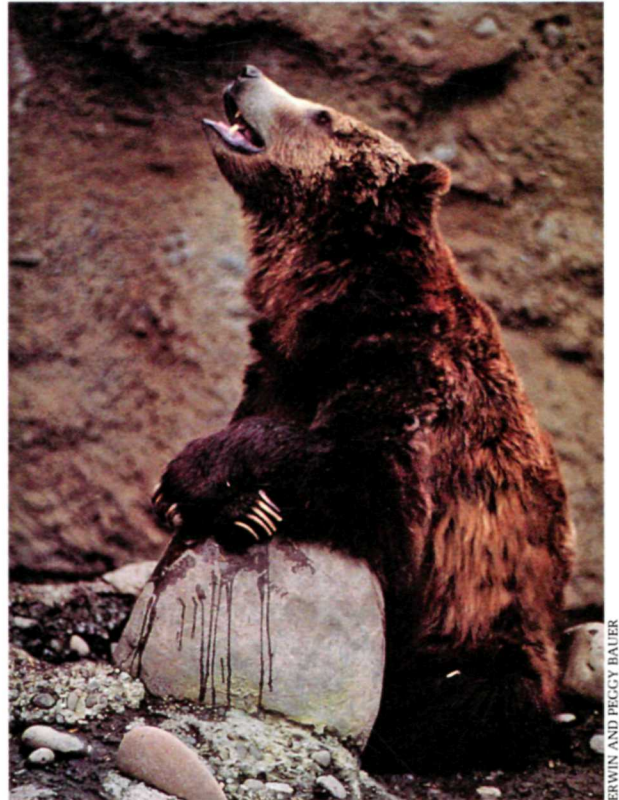
In fact, the only national park ranger ever shot and killed in the line of duty was slain while questioning a suspected poacher at Point Reyes National Seashore in California.

Professional poachers are routinely caught with two-way radios, helicopters, airplanes, four-wheel-drive trucks, sophisticated night vision devices, silencers, scanners—to listen in on police radio traffic—and often the most lethal weapons available.

"You're usually far away from help and you always come up against a person

who is armed—it's the nature of the beast," says Clayton Connor, law enforcement officer for the National Park Service's western region.

Olympic National Park Ranger Mike Butler can attest to that. During the fall hunting season, Butler was watching for hunters who sometimes follow elk into the well-marked park from adjacent clear-cut national forest land, when he heard what "sounded like a shootout." Two spooked elk fled past him out of the wooded park, followed by a line of five Cambodian men in camouflage.



ERWIN AND PEGGY BAUER



LAURANCE AUPPY

These grizzly bear paws were confiscated from a poacher in Yellowstone National Park.

Two leveled Soviet-made AK-47 assault rifles with nearly 200 rounds of ammunition and two more wielded small-caliber semiautomatic weapons. They also carried an automatic pistol, a bayonet, and a meat cleaver.

The band had shot a pair of elk—valuable for their meat and antlers—and hidden them under fern fronds while going after more. After they lowered their weapons, Butler discovered two of the men were wanted—one for assault and another for an earlier hunting charge that came only after he had killed more than 200 deer.

With many public lands depleted of game animals by America's 17 million licensed hunters, national parks are a logical new territory for those looking for an easy kill. In one night, for instance, six people tried to shoot a decoy deer standing next to a road in Utah's Zion National Park, while pet dogs have been snared in traps near the park's campgrounds.

Along the Blue Ridge Parkway, hunters used dogs to find dens where female black bears were hibernating and nursing their cubs so they could kill the bears and cubs for their meat and body parts. They also blinded herds of feeding deer in nearby Shenandoah with spotlights and gunned them down.

The deer and bear meat—taken in what one undercover agent described as “killing safaris”—was then sold as a delicacy to Asians living in nearby Washington and Virginia suburbs. Shenandoah rangers now close large sections of the main park road during hunting season to keep poachers at bay.

If any single motive is behind the most destructive hunting in national parks, it is big money. Dried bear gall bladder sells for \$500 and more an ounce in Oriental pharmacies; a mounted, record-sized bighorn sheep head can be worth up to \$50,000; and crooked guides with six-figure incomes commonly charge more than \$10,000 to guarantee that a hunter will kill a trophy brown bear, most easily found in some Alaskan parks, such as Katmai National Park.

Wildlife trade around the world, both legal and illegal, is worth a minimum of \$5 billion annually. As the largest consumer of wildlife products—everything



Wyoming game warden with poaching spoils held for use as evidence.

from plants to fur coats to laboratory animals—the United States accounts for at least \$1 billion of the revenue.

To poachers, it's a gainful market waiting to be cracked: "If I shoot a bear, why should I just let it rot in the woods?" asked Gerald "Jinks" Parker, one of those arrested in Operation Smoky for peddling illegally taken black bear parts. "Why can't I just sell it to feed my dogs, pay for gas?"

SINCE SCIENTISTS have little baseline data on park resources, it's hard to know just what damage poaching wreaks. Clearly, though, small and rare populations most valuable to hunters and collectors stand to suffer most from their venerated standing.

"If you're going to have an immediate effect, it's likely to be on the most fragile species that are close to being extirpated anyway," says Christine Schoenwald-Cox, a University of California-Davis researcher who examines small wildlife populations. "That type of assault can be

devastating no matter how many you take."

Some biologists have predicted that the yearly death of even two of the few remaining female grizzly bears in Yellowstone may determine whether the species recovers from its threatened status or declines to extinction. Past incidents, however, do not bode well: Between 1973 and 1985, illegal killings were the leading cause of female grizzly deaths in and around the park.

Rangers at Guadalupe Mountains National Park in west Texas kept a close watch on their insects three years ago after a journal mentioned an endangered beetle the size of a human thumb was found in the park.

"It was a case where there were so few around that anyone taking them could ensure their extinction," remembers former Chief Ranger Phil Koepp. "But we couldn't very well put armed guards next to every beetle." The nondescript bug's market value to collectors: \$2,500.

When demand is great, though, poaching can peril even stable populations. Appalachian black bear populations plummeted from severe overhunting in the early part of this century, but recovered once state officials realized the species was threatened and began to regulate bear hunts.

Scientists now estimate black bears can tolerate an annual hunting "harvest" of no more than 20 percent, biologist Cook says. Yet Operation Smoky evidence puts the recent kill rate there at closer to 50 percent.

Asian communities in the United States and abroad are the most lucrative marketplaces for animal parts seized in Operation Smoky and other sting operations at Shenandoah and Yellowstone. Following the advice of an ancient Chinese emperor, several Oriental cultures fervently believe that antlers, wild ginseng, and bear gall bladders, genitals, and eyes contain mystical healing powers that can cure illnesses by correcting spiritual imbalances in the body.

Next to a drawing of a grinning Tibetan bear—one of many Far Eastern mammals wiped out partly by medicinal trade—the curative guidebook, *Chinese Herbal Medicine*, describes the "func-

tions and clinical use" of *Xiong Dan*, bear gall bladder. "A substance to cool the blood," gall "clears Heat and detoxifies Fire Poison," the manual claims. With those virtues, it is also thought to be a leading cure for spasms, fevers, burns, sore eyes, sprains and fractures, cancer, heart disease, and hemorrhoids.

During Operation Smoky, agents found that Oriental purchasers were willing to pay extra for gall bladders taken from bears within the national park for one of the same reasons the



Mounted bighorn heads can fetch thousands of black-market dollars.

park was established. Because they were untainted by contaminants like pesticides, the traders said, those bears' gall bladders would be more potent and worth more to people seeking their curing effects.

Like today's street drugs, which are comparable in price, the cost of gall as a drug multiplies as it nears its consumers. Looking much like a flaccid, fist-sized rubber ball, a fresh gall bladder can bring a poacher roughly \$50. Shipped undetected to Korea, the same bladder might sell for \$500. Once it is dried, ground to a powder, and set openly on the shelf of an apothecary shop, it will literally be worth its weight in gold.

Elk antler, especially taken in the spring when it is velvety and rich in blood, can be worth more than \$400 an

ounce as an aphrodisiac. To meet the demand, poachers have chased Yellowstone elk into deep snow, sawed off their antlers, and left them to die.

EVEN ON A SMALLER scale, poaching can disturb normally healthy park ecosystems forever. As a rule, hunters aim to kill the biggest and best animals in a species, turning the notion of the survival of the fittest on its ear. Instead of surviving, the fittest animals are killed and removed from the gene pool, tossing herds into disarray and leaving only the younger and weaker individuals to propagate the species.

"Any animal removed from an ecosystem, philosophically, harms the makeup of the area," says Gary Gregory, a biologist at Glacier National Park in Montana. "But trophy hunters take the best and the most developed of a species. That's the animal you can least afford to lose."

Alaska's 13-million-acre Wrangell-St. Elias National Park and Preserve, the largest National Park System unit, is prime ground for trophy Dall sheep. The sheep are a cornerstone of hunting's coveted Grand Slam—the set of heads of the four sheep species native to North America. Together, the heads of the Dall, the desert bighorn, the Rocky Mountain bighorn, and the stone sheep can bring a black market price of \$50,000. The world record Dall sheep head—reputedly taken from the park—sold for about the same price.

With the largest sheep also likely to be the few dominant, breeding males of the herd, each hunting death can have a great impact on the population.

"Only the lesser animals are left, so pretty soon you're going to have more mediocre offspring," explains District Ranger Jim Hannah, the park's pilot. He's also one of just three full-time rangers available to police hunters. Each has about four million acres, nearly twice the area of Yellowstone, to patrol.

"These bandits are making a lot of money by taking something that belongs to everybody and permanently altering that resource," says Katmai National Park Superintendent Ray Bane, who runs the four-million-acre Alaska park.



ERWIN AND PEGGY BAUER

An Alaska wolf pack was destroyed by guns mounted on poachers' airplanes.

Katmai is home to elk, wolves, moose, and the world's largest protected population of brown bears, although how well they are protected is increasingly in doubt. Alaskan wildlife authorities have warned that the park is one of the most popular bear-hunting areas in the state. Longtime guides and outfitters declare Katmai's bears have visibly decreased in size in the last decade, Bane says, primarily because the largest bears have all been killed.

The accepted method of illegally bagging grizzlies is simple. Hunting guides, having already chosen a prime bear, fly their clients into the park and drop them off with a guide. A skilled pilot then uses the airplane to chase the bear toward the hunter, while directing the hunter toward the prey with a two-way radio. In this way, they can kill and skin a grizzly bear quicker than the national park's two law enforcement rangers could get to them, even if the rangers knew where to look.

"Those bears out there are not being hunted," Bane charges. "They're essentially being butchered."

Poachers have used similarly brutal tactics to hunt wolves and other park animals for their expensive pelts. In 1985, a pack of five gray wolves living in Denali National Park was wiped out

after being chased to exhaustion by hunters in an airplane. Rangers found only plane tracks and bloody, skinned carcasses in the snow. Last spring, three more wolves were killed there the same way, and were skinned on the floor of an unoccupied home nearby.

At Gates of the Arctic National Park, rangers sighted an airplane with shotguns mounted on its wing struts so the pilot, like a wartime flying ace, could strafe wolf packs with gunfire. Without catching the pilot in the act, however, authorities were helpless to stop him.

In Yellowstone, an area man who had been trapping park wildlife was nabbed only after he accidentally shot himself in the foot with a rifle and then hobbled to a nearby road seeking aid. The man had set at least 10 "coyote getters," devices that blast cyanide pellets into the faces of unwary park animals. Depending on size, coyote pelts can fetch up to \$100.

WHEN POACHERS *are* caught, justice is often haphazard. Only one federal charge, a petty offense described by a National Park Service law enforcement specialist as "obscure and arcane," applies specifically to taking park wildlife. It carries a maximum possible fine of \$5,000 and up to six months in jail. Tools of the crime—in many cases expensive equipment—can also be seized.

The actual sentence, however, is lev-

ied by federal magistrates, who routinely impose only a fraction of the available penalty, typically no more than a \$500 fine for the average park poaching offense.

A myriad of stiffer felony charges, both state and federal, with fines up to \$250,000 for one person and possible confiscation of hunters' equipment, can apply if rangers prove hunters or guides took endangered species or intended to transport or sell their kill. Again, though, the decreed fine may amount to no more than a business expense for the big-bucks poacher.

In fact, the cost of getting caught and convicted of illegal hunting may sometimes be cheaper than the price of a legitimate hunting license. Last year, the state of Montana auctioned its top big-horn sheep hunting permit for \$93,000.

"Sentencing in most cases is nothing more than a slap on the hand," says Dan Mason, a district ranger at Sequoia National Park in California. "It's a losing situation. The general public and the judicial system just don't consider poaching a serious crime."

In early 1988, the U.S. Fish and Wildlife Service finished a sting that uncovered a poaching network reaching from big game hunts in Alaska to bear parts trade at Shenandoah. Ron Hayes, an Alaskan guide who owns a hunting lodge

Hunters kill the biggest animals, turning the notion of survival of the fittest on its ear.

between Katmai and Lake Clark national parks and had been convicted of earlier hunting crimes, pled guilty and accepted a one-year sentence, a \$100,000 fine, and the forfeiture of three airplanes.

But a judge fined Bruce Loeb, who had paid Hayes \$7,500 to guide him on a hunt and admitted illegally killing and transporting a grizzly and caribou, to just \$500 for two felony counts.

"In my mind these offenses are no more serious than a moderate traffic offense, like speeding," U.S. District Court Judge H. Russel Holland said in deciding the case.

With courts bogged down by high-profile crimes, poaching cases can easily take a back seat.

"Many judges feel they only have time for major cases and can't be trifled with these little things," explains Peter R. Palermo, a senior United States magistrate who has heard Everglades National Park cases for 17 years. "The laws are there, if you get the right support. But without proper enforcement, you won't have any parks left."

Undercover operations and larger forces geared toward protecting wildlife rather than tourists are perhaps the most effective weapons. Centered on the area around Yellowstone, Operation Trophykill led in 1984 to \$128,138 in fines and 51 years in prison for 50 people, including a record 15-year sentence for a Montana man who had killed and sold golden eagles, bighorn sheep, bears, and other wildlife.

When Shenandoah rangers amassed a special anti-hunting strike team in 1983, they charged 35 poachers. The following year the park logged just one offense.

Unfortunately, because of tight park budgets, lengthy, expensive projects like these are rare. At Rocky Mountain National Park, rangers have resorted to photographing trophy deer, elk, and bighorn to prove the animals came from the park, if their heads are some day found in a taxidermy shop.

Public support is a key to turning the tide against poachers, as history has shown. In the Everglades, alligators were nearly wiped out decades ago, when it was legal to sell purses and shoes made from their hides. Once such sales were outlawed, though, poachers' paychecks stopped, and the alligator population rebounded.

Although cacti collecting is still a problem at accessible parks such as Saguaro, artificial propagation has dried up much of the demand for wild plants. As a result, rangers at Big Bend National Park in west Texas no longer find huge plots stripped of native cacti.



ERWIN AND PEGGY BAUER

Moose poaching is a problem at Grand Teton, and the trophy-sized animal above was eventually poached by an archer. Right: Deer poachers often stun deer with bright lights at night, then easily kill the disoriented animals. At Shenandoah, the Park Service broke up a poaching ring that ran down deer with vehicles.



STEVE RUEHL

Today's poaching—favoring wildlife and surreptitious trade—will be difficult to curb, but each step can make a difference. As part of a recent Washington State wilderness bill, Congress upped the maximum fine for wildlife crimes at Olympic National Park from \$500 to \$25,000.

Without such advances, the future of certain animals looks bleak. Many African national parks, for example, are under siege by poachers who have brought the rhinoceros and elephant to the brink of extinction in order to strip the animals of their precious horns and tusks. And the last few dozen northern white rhinos alive are guarded around the clock by rangers with orders to shoot poachers on sight.

Rapidly increasing in numbers, Asian peoples now make up more than half the world's population. Their medicinal demand has contributed to the decimation

of nearly all the bear and deer species in the Orient. North America's wildlife may be next.

As the pressure on wildlife around the world intensifies, national parks can only become more valuable both to those who cherish them and to those who plunder them like thieves rob banks. To save its national parks, America must put as high a price on park wildlife as the poachers do.

Michael Milstein, a seasonal park ranger, last wrote for National Parks about Yellowstone's fires.

National Audubon Society has produced an in-depth television documentary on poaching and illicit trade in the United States. *Greed, Guns, and Wildlife* will air throughout the summer on public television stations.



70 years of defending the parks

Established as National Parks Association (NPA) in May 1919 by Stephen Mather, the first Park Service director, Robert Sterling Yard, Park Service information officer and soon-to-be NPA's executive secretary, and 100 other businessmen, scientists, and scholars "... to defend the National Parks and Monuments fearlessly against assaults of private interests and aggressive commercialism." By the early 1920s, NPA was opposing dam-building in parks.

1920

1930

NPA blocked inappropriate additions to the National Park System and inappropriate development within the parks, such as the tunnel proposed for Rocky Mountain National Park. We helped establish a number of significant areas such as Mesa Verde and Olympic national parks. We also sent a special expedition to Everglades to determine its worth as a national park, and then lead the battle for its inclusion in the National Park System.

In the 1940s, hydroelectric and dam construction became important issues for the growing nation, and NPA worked against dam development at Glacier National Park and similar proposals for Mammoth Cave, Grand Canyon, and Kings Canyon national parks. We also concluded the long, but successful effort to include Big Bend in the National Park System. The acquisition of land for Everglades National Park was another important focus for NPA.

1940

1950

For five years NPA worked to protect Dinosaur National Monument from Echo Park Dam, which would have flooded scenic canyons and set a disturbing precedent for park protections. NPA asked Ulysses S. Grant III to talk with the secretary of Interior about the project and, in 1954, the dam was stopped. We also fought ski areas and other inappropriate development in national parks, and began the battle to create a wilderness act.

The 1960s saw dramatic additions to the National Park System. NPA championed establishment of North Cascades National Park, and Cape Cod and Assateague national seashores as well as many other units. Concerned about overdevelopment by park concessioners, NPA lead the effort to pass the Concessions Policy Act of 1965. We successfully opposed a jetport at Everglades and fostered the birth of the Student Conservation Association.

1960

1970

NPA was renamed National Parks and Conservation Association. We initiated the Everglades Coalition, a commitment that still stands. NPCA was a leader in the long battle to establish approximately 47 million acres of Alaskan parklands—more than doubling the park system. The National Recreation and Parks Act, which NPCA lead toward enactment, added numerous trails and rivers to the National Trails System and to the Wild and Scenic Rivers System.

Among many other actions to protect parks against threats and the politicization of the Park Service, NPCA spearheaded a lawsuit opposing the National Rifle Association's effort to hunt and trap in parks. We created a National Park Trust to acquire parkland for the system. NPCA's nine-volume *National Park System Plan* is the first comprehensive park plan, and its Science Commission Report points the way for park research and resources management.

1980



Flowers in the Wild

**BEYOND BEAUTY, WILDFLOWERS ARE CRITICAL
TO BOTH THE WILD AND MODERN MEDICINE**

BY MICHELE STRUTIN

DRIVING ALONG the Pacific Coast Highway, a recent emigre to California noticed a hillside lit up with orange-cupped poppies and blue spears of lupine. Who, he wondered, would have gone to the trouble of planting all of these flowers on a hillside so far from anywhere?

He was even more filled with wonder when he was told that these were wildflowers. He, after all, had come from the Midwest where plants have been hybridized and refined for decades in the agricultural departments of the great land-grant universities.

In the heart of the Midwest, endless rows of soy, wheat, and towering corn stretch to the horizon and beyond, and the few representatives of natural flora—

deciduous trees—are planted as windbreaks between the vast fields. A wild flower is an anomaly.

Wildflowers are an even rarer sight for the increasingly large percentage of the population living in cities and metropolitan areas. Dandelions and the occasional cornflower struggling in an empty lot are the wildest flowers we usually see.

Perhaps because we see them only occasionally, wildflowers do seem wondrous in their casual beauty: a clump of yellow-throated shooting stars on the floor of an eastern hardwood forest, the fluorescent brilliance of a red barrel cactus bloom in the searing heat of a southwestern desert, the delicate pink

flowers and soft green-grey foliage of a bed of moss campion sheltering between boulders in the high mountains.

Wildflowers, like the rest of our wild environment, are being pushed back and hemmed in by human development of every sort. Of course, wild roses, dandelions, and other flowering plants that flourish in disturbed environments are doing

quite well. But numerous species are struggling. And some of these species are integral to an environment. Without their presence, the ecosystem in which they exist could be threatened.

For example, giant saguaros, their sentinel arms seeming to guard the Sonoran



DRAWINGS BY ERNEST CLAYTON

**Paperflowers in Chihuahua Desert of
Big Bend National Park, Texas.**



GEORGE H. H. HUEY

Recently, scientists isolated the chemical etoposide from mayapples for use as an anticancer agent.

Desert, are in trouble at Saguaro National Monument, Arizona. The habitat of the long-nosed bat, which pollinates the saguaro cactus, is being encroached upon both in this country and across the border in Mexico.

With fewer bats to pollinate them, the number of saguaros declines. In turn, amino acids in the nectar of the plant are essential for body growth in the offspring of the bat, which bears only one offspring a year.

Less saguaros also means less nesting habitat for birds such as the desert wren and less shade for lizards, which cannot regulate their internal temperatures and can stew in their own internal juices without shade from the desert sun.

AN EVEN MORE complicated web of survival centers on the long-leaf pine, which used to be the dominant tree of the coastal plain from Virginia to Texas. In the 19th century the long-leaf pine was harvested in enormous numbers to provide pitch and tar for naval stocks.

At the same time, areas of the coastal plain were drained and timber companies planted the fast-growing loblolly pine. These intrusions completed the long-leaf's demise. It now covers only 1 percent of its former range. As a result, the herbaceous understory of the habitat was thrown into disarray, and now 21 percent of that layer of wildflowers and other plants are considered rare.

The loss of the long-leaf has also meant the loss of the red-cockaded woodpecker. Now on the list of endangered species, a program administered by the U.S. Fish and Wildlife Service (FWS), the red-cockaded woodpecker depends on a long-lived tree, not a short-term source of timber.

At about 40 years old, the long-leaf often develops red-heart disease, which rots the tree internally. The disease allows the woodpecker to peck out nests and search for food. The bird also requires the herbaceous understory for foraging; and, because of logging, the understory has shrunk.

Hedgehog cactus at Organ Pipe Cactus National Monument, Arizona.

IF THEIR BEAUTY or their importance to an ecosystem were not enough, wildflowers—because of their chemical secrets—are valuable as medicines. As primitive peoples knew better than we, plants can cure.

Buttercups, rabbitbrush, camomile, and ginseng are just a few of the hundreds of wildflowers and other herbaceous plants that were—and are still—used as folk medicines.

Although scientists can sometimes duplicate their chemical compositions, wildflowers still provide a tremendous pharmacological storehouse. Dr. Djaja Soejarto, associate professor of pharmacognosy at Chicago's College of Pharmacy, says that medical institutes and pharmaceutical companies are continually conducting research on the chemical compounds of plants.

Some of these plants will eventually be used to treat diseases. Most of these, however, are still a long way from being approved by the Federal Drug Administration.

Drugs derived from wildflowers are nothing new. The corrosive sap from the roots of the mayapple (*Podophyllum peltatum*) was originally used by Native Americans and early European settlers to treat warts. Recently, scientists isolated the active chemical compound etoposide and modified it slightly for use as an antitumor, anticancer agent.

The blue-flowered *Lobelia inflata* produces chemicals that stimulate respiration. Atropine, used to control nerve spasms, is derived from jimsonweed (*Datura stramonium*), whose wide, white flowers are found in the poorest of soils. And chemicals derived from the evening primrose (*Oenothera biennis*) help regulate blood pressure.

In fact, most of our medicines are derived from plant materials, and this pharmacological base is being lost at an increasingly rapid rate as floral species and numbers decline. Among those plants may be some that hold the cures for diseases that are on the horizon.

Right now, there are 203 plant species on the Endangered Species List and more than 2,000 other species are candidates.

John Fay, a botanist with the U.S. Fish

and Wildlife Service, which administers the endangered species program, estimates that at least 60 U.S. plant species have become extinct within the last 200 to 300 years. Most of these are Hawaiian species whose isolated environments were vulnerable to exotics and disturbance.

Although Fay says that scientists think the U.S. extinction rate has risen, no one can say for certain. The problem, of course, is that no one was keeping track of baseline data when Europeans first started colonizing the continent.

It is no surprise that many of these endangered plants exist in the national parks, the last bastion of whole, relatively wild ecosystems.

With the rate of extinction and endangerment rising, an obvious first priority for the National Park Service would be a cross-referenced, systemwide data base, detailing which plants and how many of each are found in each park area. Yet, that inventory does not exist.

Of the 148 park areas whose wild plants are part of a common computer data base, only 15 to 20 percent have adequate data. Fifty-two of those parks have little or only minimal data on the species they are required to protect.

The National Park Service says it is responding to this informational black hole. A year ago, the Division of Wildlife and Vegetation was recreated with Michael Ruggiero at its head.

Explaining that the division was recreated, in part, because natural resource programs had been scattered throughout the Park Service bureaucracy, Ruggiero said, "We had lost the ability to quickly respond to information needs."

What the division plans to do is consolidate a number of science and resource management functions that were spread around the Park Service. Under this umbrella is the exotic species pro-

gram, the pest management program, consumptive use, which handles hunting and fishing, and a new endangered species program.

The U.S. Fish and Wildlife Service, which is in charge of the Endangered Species List, identifies endangered species by counties. The NPS has used this information to create its own endangered list: 123 species in 143 parks.

Bob Gartner, who is in the middle of creating the proposal for the newly reorganized endangered species program, says the program is a priority for the new Wildlife and Vegetation Department.

"Until September," he says, "we never had a list of threatened and endangered species in the parks. There may be more, but this is the best information we have now."

He also points out that "Glamour species—grizzlies, bald eagles, peregrine falcons—get all the publicity, have the real marquee value." Wildflowers and plants

may have been given less attention in favor of these high-profile species.

The NPS has not said when it expects to approve and begin implementing this program. All that the agency will say at present is that it plans to focus on getting more visibility for endangered park species. Another priority is to hire an expert on plants.

One project already in the works is a publication for NPS personnel that will describe and picture each endangered and threatened species, present biological information, and detail protection plans for that species.

But Gary Waggoner, an NPS botanist and the manager of NPFlora, the NPS floral data base, admits, "We don't know much about the ecology of many of these species. Rarer species, particularly, have narrow ecological tolerances. Their habitats have to be quite precise."

Some species require particular hydrological patterns; others need distur-



bance, such as fire, in order to flourish; still others can grow only in the soils of specific geological strata.

In addition, wildflowers may be threatened by people who collect them from parks and by exotics. Exotics are species, such as kudzu vines, that have been introduced into an area by humans and then prove themselves rude guests by overcoming native species.

Endangered park species that fall into some of these categories include the following:

▲ The purple-flowered swamp pink (*Helonias bullata*) is a bog plant found along the Blue Ridge Parkway in Virginia. Once widespread from New York to Georgia, this species—the only one in its genus—has become increasingly rare because of projects that drained wetlands and other human-caused changes in hydrological patterns.

▲ Also found in the park is a purple relative of gayfeather, the columnar plant with small, tight flowers that is found in backyard perennial beds. Probably rare in the best of times, *Liatris helleri* lives in rocky outcrops in droughty, windswept areas dominated by heaths and scrub rhododendrons.

Seven or eight years ago, when the Blue Ridge Parkway staff built Rough Ridge Trail, they had no idea that the trail ran through the habitat of the endangered liatris. Since then, a boardwalk has been built to span the ground where these hundred or so plants survive.

To encourage the growth of wildflowers in general, the park has abandoned its practice of mowing strips of grass along the roadside. They now allow indigenous phlox and other wildflowers to bloom.

▲ The yellow-flowered Missouri bladderpod (*Lesquerella filiformis*), found at Wilson's Creek National Battlefield in Missouri, is a relatively recent discovery. Although it is plentiful within

its geographical area, that area is relatively small.

Park resource managers have also learned that the plant seems to thrive in areas that have been disturbed in one way or another.

For instance, they suspect that the bladderpod, a relative of the mustard, flourished in the park because of the Civil War battle at Bloody Hill. Park resource managers aim to protect both the

bladderpod and the historic scene. Because the plant, like the mustard, needs sunny, open ground, the park is also researching the role of fire as a part of the area's natural processes. To do this, the park is making some use of prescribed burns.

▲ In recent years, cacti have become sought-after collectibles. The rarer the cactus, the higher the demand. That demand and a limited range have put Brady's pincushion (*Pediocactus bradyi*) on the endangered list.

About the size of a small, round pincushion

with straw-colored flowers, the cactus grows on gravelly limestone terraces along the Colorado River, where Grand Canyon National Park and Glen Canyon National Recreation Area meet. The plant is limited to about 20 square kilometers because it thrives only in soil formed from the erosion of two particular geologic formations.

Besides being sought by individuals and commercial suppliers, the plant does not do much to help itself. It is short-lived and produces only 25 seeds a year. In order to protect Brady's pincushion, the National Park Service does not reveal its location, and it monitors cactus numbers annually.

IN ORDER to preserve the parks' wealth of wildflowers, NPCA has suggested some steps for management in volume nine of its *National Park System Plan*. Needed first is an overall plan for plant protection with a com-

plete, systemwide inventory. Regular monitoring and inventory updates would also be an essential part of any systemwide plan.

Each park would have specific, active protection plans. For endangered species, these might include redirecting trails or prohibiting visitors from certain areas, prohibiting the introduction of exotics, and educating the public through interpretation.

Although transplantation would seem an obvious solution for populating areas similar to an endangered species' original habitat, botanists now say not necessarily. Even if the transplantation succeeded—and many do not—such a program can be disruptive and even dangerous to native plants.

PUBLIC INTEREST is another force for wildflower protection, and active public interest is playing an ever-widening role.

Lady Bird Johnson, during her years as First Lady, gave flower visibility a huge push forward by lighting up Washington, D.C., parkways with thousands of daffodils, tulips, and other blooms. She went on to champion wildflower protection by founding the National Wildflower Research Center in 1982. The wildflower center, based in Austin, Texas, does propagation research and promotes the use of native wildflowers. They provide information to individuals and to highway departments alike.

Another important group is the Center for Plant Conservation in Massachusetts. The center was started in 1984 and is the first—and only—organization devoted exclusively to the conservation of endangered U.S. plants.

Working with 19 botanical gardens around the country (including one in Hawaii), the center coordinates information and plans research for these affiliates. The gardens, in turn, carry out research and store seeds of endangered plants. Most of the center's seed storage, however, is at the National Seed Storage Laboratory in Fort Collins, Colorado, a Department of Agriculture facility de-

Locoweed, goldflower, and paintbrush in high desert of the Southwest.





voted largely to preserving agricultural species.

From the research carried out by its affiliates, the Center for Plant Conservation can determine which species are most at risk and work with government agencies to establish living collections in the wild, thus preserving the gene pool.

Don Falk, cofounder and executive director of the center, says their research shows that 253 species may become extinct within five years. Close to 700 are in danger of extinction within ten years. Of those, 75 percent are found in four states and one territory: California, Texas, Florida, Hawaii, and Puerto Rico.

"When you're dealing with rare organisms," says Falk, "one of the biggest considerations is how fast you have to move to protect them."

Organizations such as the Center for Plant Protection may be at the forefront of plant protection, but the public is catching up. If the current interest in gardening and in native species is any indication, plant protection should have an expanding base of support.

Botanists from arboreta and federal and state agencies give seminars to packed audiences of weekend gardeners. Seed collections devoted to the wild ancestors of asters, cleomes, daisies, and others have sprouted across the country.

With an adequate National Park Service program plus the support of groups and individuals, it is possible that the sight of wild poppies and lupine brightening park hillsides will remain wondrous and not become rare.

Michele Strutin, editor of National Parks, is an avid gardener.

For more information on wildflowers, write:

National Wildflower Research Center, 2600 F.M. 973 North, Austin, Texas 78725. In addition, enclose \$1 for postage and a return mailing address.

Center for Plant Conservation, Botanic Garden Programs, 125 Arborway, Jamaica Plain, Massachusetts 02130.

Parks in Bloom

BY ANNE-MARIE PRAETZEL

WILDFLOWERS COLOR landscapes across the country, but are often best preserved in our national parks. Below is a sampling of flowers found in four widely varied habitats. Enthusiasts can discover how wildflowers have evolved within each unique environment. Please remember that picking even a few wildflowers can endanger a species' prosperity.

Mountain Flowers

The high country is known for its brilliant and abundant wildflowers. Come June, delicate blossoms are sprinkled over tiny meadow pockets among the rugged peaks. "Who could imagine beauty so fine in so savage a place," wrote John Muir.

Muir experienced the full charm of mountain flora. As a young sheepherder in 1869, he followed the snowmelt up the slope of California's Sierra Nevada. Crossing six vegetation zones, Muir watched the flowers change dramatically in shape and size.

Flowers can vary greatly in the mountains. For example, Yosemite's 25 species of lupine range from pale blue to magenta to yellow, and from barely an inch to three feet high.

Growing seasons also vary with eleva-

tion. Early in March, wildflowers begin their vernal parade up the Sierra, carpeting the foothills with lupine, poppies, and purple owl's clover. In May, creamy dogwood blossoms signal spring's arrival in Yosemite Valley.

By mid-summer, red paintbrush, blue penstemon, and pink aster float over the wide, yellowing grasses of Tuolumne

Meadows. Finally, dwarf alpine wildflowers cascade over the Sierra's crest in an intense burst of color when they break through the snowmelt in late July.

Wildflowers tell a landscape's history. The presence of wild iris indicates past grazing in an area. Livestock won't eat iris, so it flourishes while other wildflowers are eaten. The iris-covered meadow below El Capitan in Yosemite demonstrates this type of succession.

Another storyteller, fireweed, will blaze red across Yellowstone this spring to remind visitors

of last summer's fires. Fireweed excels in burnt areas, as do composites such as sunflowers and asters.

Composites rely on wind to transport their seeds to new areas, which are free of competitors after a fire. These and other post-fire flowers should make this a spectacular spring in Yellowstone.

Visitors to Montana's Glacier Na-



tional Park are struck by its dramatically different life zones, where, in a day's walk, you can see flora from prairie to alpine tundra to Pacific rainforest.

For an easier hike, the Logan Pass trail to Hidden Lake Overlook also reveals the park's contrasting floral zones. A boardwalk skips over flowering alpine meadows from the lofty heights of the Continental Divide. Late in spring, large, gracious glacier lilies highlight the meadows with splashes of yellow. Glacier's famous lily is a favorite food of the grizzly, who will dig up entire meadows in search of lily bulbs.

One cannot fully experience mountain wildflowers without a visit to Great Smoky Mountains National Park, in Tennessee. "Vegetation is to the Great Smokies what granite domes and waterfalls are to Yosemite," remarked a former Smokies naturalist.

Heavy rains and fertile soils produce over 1,500 kinds of flowering plants—the most diverse flora of any park. From mid-April to mid-May, the park is covered in a kaleidoscope of wildflowers that includes flowers rare outside the park, such as yellow Appalachian avens rose, and the endemic Rugel's ragwort. The Smokies blush pink with rhododendron blossoms in June and July.

In the park, you can still find a few members of subtropical families that hail back to preglacial times. Two species of tropical passion flower bloom from June to September, and yellow-blossoming tulip trees grow in sunny clearings.

Each April, the park hosts the Wildflower Pilgrimage, in which botanists guide participants through prime wildflower displays. For details, write the park naturalist, Sugarlands Visitor Center, Gatlinburg, Tennessee 37738.

Desert Flowers

Springtime sets the pale desert ablaze with color. A century plant's sky-scraping stalk of yellow blossoms, vibrant magenta cactus flowers, and the calico quilt of delicate annuals create a variety of blooming shapes and sizes across the Southwest.

Desert wildflowers have adapted to thrive in the parched, hot climate. Most annuals lie dormant as seeds, often for a



WILLARD CLAY

Columbine, here the blue-and-white variety found in the Rockies, means "dove" (*columbo* in Italian) because the flowers were thought to resemble doves.

few years at a time, until ideal moisture and temperature conditions occur. Immediately following rainfall, the seeds explode into golden poppies, blue lupine, and orange globemallow. Annuals grow rapidly, to bloom and develop seeds while the soil is still moist.

Visit Big Bend National Park, Texas, in April for excellent bluebonnet displays. In March, the Ajo Mountain Drive in Organ Pipe Cactus National Monument, Arizona, is excellent for viewing showy Mexican gold poppies in their northernmost appearance.

Flowering succulents store enough water during rainy periods to endure long droughts. A large barrel cactus can live up to a year without rainfall. Many of these juicy plants protect themselves from thirsty predators with spines or poison.

Some desert plants minimize water loss by taking care of critical functions during the cool, moist night hours. Cacti open their pore-like stomata to collect and store carbon dioxide, which they use for photosynthesis during the day. Many plants bloom at night, when they are pol-

linated by nocturnal moths or bats. The century plant actually emits a bat-like aroma to attract these tiny mammals.

If you visit at sundown between May and July, you may glimpse Organ Pipe Cactus National Monument's namesake opening its delicate lavender blossoms. Or stay a week and watch a 15- to 30-year-old century plant shoot out a stalk at the rate of ten inches a day until it bursts into a 20-foot-high, branched bouquet of yellow blossoms.

Another flowering giant of the Southwest is the Joshua tree, whose tufted arms twist and jut into the desert sky. An interesting symbiotic relationship exists between the Joshua tree and the yucca moth.

During the night the yucca moth lays its eggs in the ovaries of the tree's white, clustered flowers. Unlike the way most insects randomly pollinate plants, the female yucca moth carefully spreads her collected pollen over the receptive surface of the flower, thus ensuring that her offspring will have seeds to eat when they hatch.

Not surprisingly, Joshua Tree National Monument in southern California is the best place to find these bizarre trees, as well as many species of cactus with bright orange, magenta, and yellow blooms. Try the Lost Palms Oasis hike between March and April.

Some of the plants found in the park have been used historically in folk medicine and rituals. Jimsonweed, a sprawling, poisonous shrub with giant, trumpet-shaped flowers, was used by boys of the Cahuilla tribe to induce hallucinations as a rite of passage.

Coastal and Wetland Flowers

Fog-veiled ridges, dripping woodlands, dew-dampened meadows: You are not on a beach, but you must be near an ocean. Heavy precipitation and milder climates characterize our coastal parks. Wetland wildflowers use the favorable conditions to produce lavish flowers and leaves to attract pollinators.

Rhododendrons in California's Redwood National Park live in such a habitat. Theirs is a damp and patient forest. The tallest trees in the world tower over them, wrapped in mist and silence. Rhododendrons

start to bloom in mid-spring, building to a crescendo of pink blossoms in late May.

The park will offer courses on its plantlife this spring, including Spring Wildflowers of Redwood National Park, on May 6. Contact the park for more information: Redwood National Park, 1111 Second St., Crescent City, California 95531.

At Big Cypress National Preserve in Florida you enter a subtropical garden, where orchids and bromeliads float over mist-covered bogs. Rainfall drains slowly from the preserve's rich soil, creating an incredibly lush wetland community. Nearby, pink-grassed prairies overflow with blazing star, lilies, and orchids.

Acadia National Park, with its rocky beaches, lily ponds, and granite ridges, is another study in floral diversity. Technically an island off the coast of Maine, Acadia is so close to the continent that it better demonstrates a coastal habitat.

Pink roses and beach pea climb among coastal boulders. Farther inland, damp meadows and forests swell with trailing arbutus, pink lambkill, and white meadowsweet.

Acadia's meadows are also home to a few unusual floral characters: carnivores. Beneath its benign purple flowers, the pitcher plant traps and drowns insects in its cupped leaves. The sundew catches insects with sticky hairs in its small white flowers, which then fold around the prey.

In late summer, goldenrod and aster cloak the islands in shades of autumn, heralding its arrival. Visit the Wild Gardens of Acadia preserve for an excellent selection of exclusively native wildflowers.

Island Flowers

Island wildflowers develop exotic forms after being isolated from parent plants on the continent. When an immigrant flower arrives, it adapts whatever form or function is necessary to survive in island plant communities.

These isolated communities tend to be fragile. Populations rise and fall erratically and native species are vulnerable to exotic competitors.

All Hawaiian plants were once immi-

grants, transported to the island by wind or ocean currents, or by birds. Once established, many of these species were overtaken by human-transported exotics (nonnative flora). The National Park Service is presently trying to control exotics, so native flowers can prosper.

Ahinahina is a famous Hawaiian sunflower found in Haleakala National Park. Before blooming, ahinahina, or silversword, lives up to 20 years as a dome of silvery, blade-like leaves. Silver hairs help prevent water loss by reflecting sunlight.

The flower stalk can grow nine feet tall, bursting into hundreds of purple sunflower-like blossoms. It dies soon thereafter. This showy flower is best viewed during late summer at Silversword Enclosure at Kaluhaku Overlook.

Another unique islander from the sunflower family, giant coreopsis colors California's Channel Islands National Park yellow in springtime. This awkward giant stretches to become a nine-foot-tall, hairy tree, sprouting many daisy-like flowers.

Channel Islands' native flora has suffered the effects of grazing and farming. With park protection, the coreopsis and other native flowers are now making a comeback.

Michigan's Isle Royale National Park is unusual not only for its island ecology, but for many arctic plants not found elsewhere in the state. Devil's club and orange prickly saxifrage cower in cool, shady areas as if facing a chilly day in Alaska.

Lake Superior protects the island from rapid temperature changes, cooling it in hot summer months. Consequently, spring arrives as late as July on the islands, which then spill over with calypso orchids, yellow Clintonia, and bluebead lilies.

Travel by boat to Raspberry Island for excellent wildflower displays. For details, contact the ranger station at Isle Royale, 87 N. Ripley St., Houghton, Michigan 49931.

Anne-Marie Praetzel is editorial assistant for National Parks magazine. She last wrote about tracking animals in the parks.

Good Times: Summer of '89

*WHERE TO GO AND WHAT TO DO
IN THE NATIONAL PARKS*

BY MARTHA CRONIN

WHETHER YOU JUST plan to take short, weekend jaunts with home as your base camp or pick up stakes for awhile and explore different regions of the country, the National Park System offers a wide variety of fascinating activities to accommodate the "perfect vacation."

Since your vacation plans probably don't include the entire United States, this summer's calendar of events is conveniently organized by region. Wherever you plan to be, there will be a great variety of things to do within close proximity.

National Capital Region

Washington, D.C., is a city of monuments. The nation's capital is dense with history—and history in the making.

In addition to the well-known monuments and historical sites, the National Capital Region also maintains one of the largest urban parks in the world (Rock Creek Park) and two centers for the performing arts (Wolf Trap and the John F. Kennedy Center).

In fact, there is so much going on in Washington that the metropolitan area merits being a National Park System region in itself.

Wolf Trap Farm Park. Enjoy the symphony, opera, children's programs, and

the best talent of screen and stage. To receive a summer schedule, call (703) 255-1800.

Mid-Atlantic Region

The Mid-Atlantic Region is rich in history and beauty. The slopes of the Blue Ridge Mountains of Shenandoah Na-

tional Park are covered by lush, deciduous forest. Broad, sweeping vistas of beautiful green valleys can be seen from Skyline Drive, which winds along a ridge through the length of the park.

Remnants of the Civil War period are numerous throughout the region. History buffs will enjoy visiting the battlefields that were so significant to our nation.

Assateague Island. You will never be at a loss for things to do at Assateague Island National Seashore, Maryland. Go clamming, crabbing, fishing, canoeing, hiking, or bicycling. And, if you don't know the first thing about, say, fishing, you can participate anyway. Demonstrations throughout the week teach you the basics of the sport. Equipment is provided, so you won't have to invest in expensive gear to have a good time.

▲ Watch the famed Chincoteague ponies swim to Chincoteague where they are auctioned off for charity. July 26-July 27. (301) 641-1443.

Richmond Battlefield. Commemorate the 125th anniversary of the Battle of Cold Harbor at Richmond National Bat-

Bluffs frame Buffalo National River, a popular canoeing river in Arkansas.



CONNIE TOOPS

tlefield Park, Virginia. This battle cost the Union 7,000 casualties in 30 minutes and changed the course of the Civil War. Military demonstrations will be featured. June 3 and 4. (804) 226-1981.

Shenandoah. Celebrate Hoover Days—Herbert Hoover's birthday—by watching historical films at Shenandoah's Byrd Visitor Center. Then, take a free bus trip on Skyline Drive to Camp Hoover, his presidential retreat in Virginia. August 12 and 13. (703) 999-2243.

Valley Forge. Visit the historical park in Pennsylvania that is synonymous with America's struggle for independence. Living history programs demonstrate the harsh conditions the soldiers endured through the winter of 1777-78. May 27-May 28.

▲ Join the commemoration of the Continental Army, with a reenactment tent encampment. Watch a black-powder drill as interpreters demonstrate von Steuben's new (18th-century) manual of arms. June 18. (215) 783-1000.

North Atlantic Region

In the North Atlantic, travelers can still sense the experience of pioneers who first made their homes in this once untamed land. The still-primitive and rugged land of Acadia National Park in Maine makes a strong contrast with today's New York City, less than half a day's drive away. New York itself has many historic sites and planned events throughout the summer. Or travelers can join the festivities at the many national park historic and recreation sites located in New England's cities and villages.

Cape Cod. In spring, Cape Cod National Seashore, Massachusetts, becomes a prime location for whale-watching. Learn why the world's largest creatures congregate in these waters.

▲ Go on a guided eight-mile bike hike or take a Discovery Trip to explore park resources—their value and vulnerability. (617) 349-3785.

Lowell. For the third year in a row, Lowell National Historical Park, Massachusetts, will be the site of the 51st National

Folk Festival. This 51-year-old festival features performances, dance parties, parades, crafts, and concerts presented on outdoor stages in downtown Lowell. You won't want to miss out on the fun. July 28-July 30. (617) 459-1000.

Theodore Roosevelt Inaugural. Experience an Imagination Celebration at Theodore Roosevelt Inaugural NHS, New York. Buffalo residents will get together for an all-day event packed with things to do. May 13th.

▲ Hey kids, you and your teddy bears can enjoy a day of storytelling and a great lunch at the Theodore Roosevelt Inaugural Teddy Bear Picnic. August 16th.

▲ Fourth- through sixth-graders can have a great time exploring the Victorian period at Summer Interlude Camp. End of July. (716) 884-0093.

Women's Rights. Activities will abound at the 11th Annual Convention Days celebration at Women's Rights National Historical Park, New York, which will commemorate the first women's rights convention, held here in 1848. Park tours, bicycle rides, mimes, storytellers, concerts, and ballet performances will be featured. July 14-16. (315) 368-2991.

Southeast Region

As you travel through the ten states that compose this region, you will notice dramatic changes in scenery, from cypress swamps in the Everglades to the pine forests of the Gulf Coast, and the hardwood forests of the Appalachians. The region also has many national seashores, which were established as safe havens for migratory waterfowl and to preserve beaches, dunes, and salt marshes.

Some seashores allow swimming, fishing, surfing, and boating. Others limit recreational activity because of their delicate environments. The Southeast is also full of monuments and historical sites from the Civil War.

Cape Hatteras. Learn to fish, surf, or snorkel. And if none of these activities appeal, you're bound to find something else to excite you among the 200 programs offered each week at Cape Hatteras National Seashore, North Carolina.

▲ Known as the Graveyard of the Atlantic, the Outer Banks off Cape Hatteras have seen the destruction of more than 500 ships in 400 years. Witness a living history lifesaving drill at the Chicamacomico U.S. lifesaving station.

Whether you're an artist or you just like to play in the sand, participate in the 4th of July sand sculpture contest on Ocracoke Island. (919) 473-2111.

Everglades. For boating enthusiasts, Everglades National Park, Florida, is a haven of opportunities. But, if you prefer to leave the paddling to someone else, Everglades City area boat tours are given two or three times each day and concession-run boat tours are offered from Flamingo Lodge. If you like to keep your feet dry, concession-run tram tours will be more to your liking. Tram tours are offered four times a day from Shark Valley. (305) 247-6211.

Fort Raleigh. Hear the latest gossip even if it's somewhat outdated. You'll enjoy Fort Raleigh National Historic Site's Gossip Fest, an Elizabethan birthday party in honor of Virginia Dare, the first European to be born in America. Kids will have a great time dancing, playing games, and eating good food. August 18. North Carolina, (919) 473-5772.

Wright Brothers National Monument. At the place where Wilbur and Orville made the first sustained flight in a heavier-than-air machine, you can see how far we've gone in a mere 86 years on National Aviation Day. August 19. North Carolina, (919) 441-7430.

Midwestern Region

The woods and waters of this region provide excellent arenas for camping, hiking, and boating. In addition, these fertile and pastoral lands also have numerous historical sites.

The Homestead Act of 1863 and the resulting westward surge left in its wake many military posts and battlefields from Indian wars. The early 20th-century industrial centers along the shores of the Great Lakes also left their mark.

In addition, the Midwest has served as the early stomping grounds of some of



Big Bend, Texas, home to 400 bird species, is seldom crowded with visitors.

our nation's most prominent historical figures. You, too, can follow in the footsteps of Abraham Lincoln.

Jefferson Natl. Expansion Memorial. The ninth annual Veiled Prophet Fair will be held July 1 to July 4. It opens with a parade on Saturday morning, followed by nights of fireworks and days of food and educational booths and top name entertainment. (314) 425-4468.

Rocky Mountain Region

This massive collection of mountains and high desert boasts 13 national parks, including our country's first national park, Yellowstone. For those interested in paleontology, the Rocky Mountain Region has recently proven to be a hot bed of dinosaur fossil finds. In addition, this region is home to the nation's most extensive and well-preserved ancient Indian ruins—those of the Anasazi at Mesa Verde.

Badlands. This year marks the 50th anniversary of Badlands National Park, South Dakota. Explore the unique to-

pography of Badlands and join in the tribute to this beautiful land. The anniversary is scheduled to feature an outdoor Native American Arts and Crafts Fair, cultural celebrations, and a buffalo BBQ. June 3-June 4. (605) 433-5361.

Black Canyon of the Gunnison. If you are energetic, participate in the six-mile Black Canyon National Monument, Colorado, run on Hwy. 347. May 13.

▲ The sheer walls of this deep canyon offer challenging climbing. Climbing demonstrations are offered during the week; and, every Saturday, watch rappelling demonstrations from Gunnison Point. (303) 249-7036.

Bryce Canyon. Moonless nights present wonderful opportunities for stargazing at Bryce Canyon National Park, Utah. You'll have to stay up late to catch the show because these ranger-led programs are held when the star display is most spectacular. On nights of full moons, the columns and pinnacles are lit in an eerie way. Take a night walk with a ranger to experience this mysterious land. (801) 834-5322.

Canyonlands. Come and congratulate

Canyonlands in Utah on its 25th anniversary as a national park. September 12. (801) 259-7164.

Capitol Reef. Harvest Homecoming Days are celebrated with a variety of activities. Watch demonstrations of cattle-branding, sheep-shearing, and molasses-making to learn what life was like when Mormon pioneers first settled this area in Utah. (801) 425-3791.

Colorado National Monument. If you are an avid bicyclist you'll want to peddle on the 23-mile scenic Rim Rock Drive. From mid- to late May, interpretive programs include Friday evening talks and Saturday morning guided walks. Colorado, (303) 858-3617.

Devils Tower. The nation's first national monument, this 865-foot tower of columnar rock in Wyoming offers challenging rock climbing; demonstrations are given each day.

▲ Enjoy free entrance into the monument, bands, and many other activities on Hospitality Day. May 20. (307) 467-5370.

Dinosaur. Commemorate the discovery of the dinosaur quarry with a special evening program of historical films and an open house of the paleontology laboratory, which is normally closed to the public. August 17.

▲ Kids, learn about dinosaurs and other strange creatures. Fourth- through sixth-graders can participate in the Young Naturalist Program, which is offered each summer at Dinosaur National Monument, Colorado. (303) 374-2216.

Jewel Cave. Explore Jewel Cave National Monument, South Dakota, on a ranger's guided tour. Learn about low-impact caving, caving techniques, safety, and equipment on the half-mile, four-hour tour. This extremely strenuous tour is only available for visitors 16 years old and older. Advanced reservations are required. For less rigorous aspects of caving, the park offers an hour-and-a-quarter tour, highlighting a variety of features in the cave. A tour conducted by candlelight offers visitors the chance to see the



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cave as it was first seen by early explorers. (605) 673-2288.

Mesa Verde. Visit a Native American Arts and Crafts festival that will feature native costumes, traditional food, pueblo-style dancing, and the sale of crafts from many tribes. July 22-July 23.

▲ Hopi Indian dances are proposed for June 10-June 11. These events have not yet been confirmed, so call ahead before you plan your trip to this national park. Colorado, (303) 539-4465.

Rocky Mountain. Learn to fly-fish. This type of fishing takes particular skill, and trout know when you don't have it. Bring your own gear or borrow the ranger's.

▲ Learn to see nature by sketching natural objects. A ranger will guide you on an hour-and-a-half sketch walk. Materials will be provided.

▲ Visit a 1920s dude ranch and discover what life was like in the days when Rocky Mountain National Park, Colorado, was first established. (303) 586-2371.

Yellowstone. Register for field courses at the Yellowstone Institute, from alpine wildflowers to llama trekking. Yellowstone Institute, Box 117, Yellowstone National Park, Wyoming 82190.

▲ A full, daily schedule of ranger-led programs is also offered. Bring your binoculars for a ranger-led Wildlife Watch. (307) 344-7381.

Zion. Join the fun at the 13th annual Southern Utah Folklife Festival. This festival celebrates the strong traditions and customs of Utah's Mormon pioneers and those of the Southern Paiute Tribe. Sample regional favorites such as prickly pear jelly, dance the old-fashioned way, and enjoy folk music concerts. Traditional crafts such as saddle-making, water-witching, wart-charming, and loom-beading are just a few of the demonstrations at this event. September 7-9. (801) 772-3256.

Southwest Region

In this mostly desert terrain, the sun provides the key element to its dynamic landscapes. The play of shadows upon clefts and crevices highlights unusual for-

mations and multicolored layers in the rocks. There is nothing subtle about the Southwest. Its dramatic landscapes were forged from the action of bright sun, strong wind, and seasonally heavy rains.

Most of the historical sites found in this region display the archeological treasures of prehistoric Indians. In the days before this continent was even known to the Old World, the Indians of the Southwest built masonry houses and developed extensive irrigation systems that softened this harsh region.

Big Bend. Backpacking and hiking are especially popular at Big Bend National Park, Texas, because of the solitude this park offers. With only 250,000 visitors each year, the park is not crowded—with people, that is. More than 400 bird species, deer, javelina, grey fox, and more than a thousand species of plants can be found at Big Bend. (915) 477-2251.

Canyon de Chelly. Participate in the many interpretive programs offered at Canyon de Chelly National Monument, Arizona, from Memorial Day until Labor Day. Canyon Overlook, a schedule of programs, is available to visitors each summer. Events include craft demonstrations, such as basket-weaving and silverwork. (602) 674-5436.

Western Region

Splash into the refreshing Pacific waters off the coast of southern California. Explore recreation sites in and around beautiful San Francisco. Lose yourself among the trunks of giant redwoods. Climb the sheer face of El Capitan in the high Sierra Nevada. Then, plummet below sea level when you visit the deserts of Death Valley. For the ambitious, everything is possible in the West.

Casa Grande. Have a hot time at Casa Grande National Monument, Arizona, and congratulate rangers on their monument's 100th year as Casa Grande Ruin Reservation. (602) 723-3172.

Golden Gate. Visit Alcatraz and take a ranger-guided tour through the old military tunnels, which are usually not open to the public.

▲ If birds of prey fascinate you, try not to miss the hawk-watching and raptor-banding programs on hill 129 of the Marin Headlands, which is part of Golden Gate National Recreation Area, in northern California.

▲ Special demonstrations are offered aboard the tall ships in the harbor. (415) 556-0560.

Petrified Forest. Pre-Columbian Indians who inhabited this region in Arizona created impressive solar calendars to mark the summer solstice. View the movement of spring into summer by watching the sun cast shadows on ancient petroglyphs, or rock carvings. June 10-June 30.

▲ A paleontologist can be found in the national park's visitor center chipping rocks and explaining the significance of his finds. June 1-end of August. (602) 524-6228.

Point Reyes. Point Reyes National Seashore, California, is offering a symposium on biodiversity on the weekend of May 20-21.

▲ Attend Point Reyes' Big Time Native American Celebration, July 15. This date is tentative, so call to double-check. (415) 663-8522.

Yosemite. Join a professional photographer on a camera walk through the park and learn to work with Yosemite's unique lighting conditions.

▲ Enjoy Yosemite's theater and film programs at the visitor center auditorium and at Lower River Amphitheater. California, (209) 372-0200.

Pacific Northwest Region

Experience the grandeur of the Pacific Northwest with its ecological diversity. Examine tide-pool communities along the coast, then walk among 1,000 different species of plants as you pass into the lush, deep-green rainforests.

As you continue to travel inland, the snow-capped Cascade Mountains rise before you. The seasons will meet as the subalpine meadows, rich with their array of summer wildflowers, edge up against the barren snowfields of the mountain slopes. The Cascade Range provides

textbook examples of volcanism and glaciation, yet textbook learning has never been this spectacular.

Crater Lake. Bring lunch, a friend, and plenty of water, hike down to the lake, and take a boat ride. Seven tours are offered each day by concessioners. Oregon, (503) 594-2211.

Mount Rainier. Spend some time at Mount Rainier National Park, Washington, and participate in one of the many fine three-day field seminars that are offered throughout the summer. Learn about forests, glaciers, volcanoes, wildlife, and many other features. Seminar tuitions range from \$65 to \$100 a subject. (206) 569-2211.

Olympic. Visit Olympic National Park, Washington, and go on a variety of interpretive walks. Learn about tide pools in the seashore wilderness area. Walk through the rainforest and learn about the many plants that thrive in this saturated environment. Take a meadow walk and find yourself among waves of wildflowers. Learn about the interesting geological formations seen from Hurricane Ridge. (206) 452-4501.

Alaska Region

By far the wildest of all the regions, Alaska also contains more than half of the 79 million acres in the National Park System. From glacier-calving at Glacier Bay to the grizzlies, caribou herds, and giant peaks of Denali, Alaska has natural features to satisfy anyone's sense of the dramatic. Its cultural history is represented by the Russian colonial period at Sitka, Native American crafts, and the mines and sites of the Yukon Gold Rush.

Denali. Take a three- or four-hour Discovery Hike with a ranger and explore ridges, tundra, and rivers. These hikes offer your best opportunity to see the remarkable Alaskan wildlife, although bus tours are also available. During the summer, two hikes leave daily from different areas in the park. (907) 683-2294.

Martha Cronin wrote this article as part of her Oberlin College work-study program.

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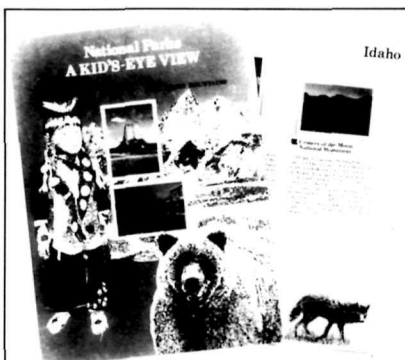
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NPCA extends its sincere appreciation to these companies for their commitment to community service. Their generosity helps NPCA continue to protect and promote the vast cultural and natural resources found in our country's national parks.

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REVIEWS

Parting Words

ON MARCH 14, Edward Abbey, author of *Desert Solitaire* and 18 other books, died of circulatory ailments in his home in Oracle, Arizona. He was 62. In the spring of 1988, University of Arizona Press published a beautifully illustrated 20th-anniversary edition of his book, *Desert Solitaire*. In the preface, Abbey addressed his readers:

"*Desert Solitaire*, I'm happy to add, contains no hidden meanings, no secret messages. It is no more than it appears to be, the plain and simple account of a long sweet season lived in one of the world's most splendid places.

"If some might object that the book deals too much with mere appearances, with the surface of things, and fails to engage and reveal true meanings of unifying relationships that many believe form the true and *underlying reality* of

existence, I can only reply that I am content with surfaces, with appearances.

"I know nothing about underlying reality, having never encountered any. I've looked and I've looked, tried fasting, drugs, meditation, religious experience, even self-mortification, but never seem to get any closer to basic reality than the lizard on a rock, a hawk in the sky, a dead pig in the sunshine.

"Beneath each stone I find more stone; under the skirts of beauty I find only her delicious thighs; peeling an onion to the core I end up with nothing but the perfect complement to my hot skillet of fried eggs, diced chilies, and hashbrowned turnips. Appearance is reality, I say, and more than most of us deserve.

"You whine and whimper after immortality beyond space-time? Come home for God's sake, and enjoy this gracious Earth of ours while you can. . . .

"Throw metaphysic to the dogs, I never heard a mountain lion bawling over the fate of his soul. . . . So long."

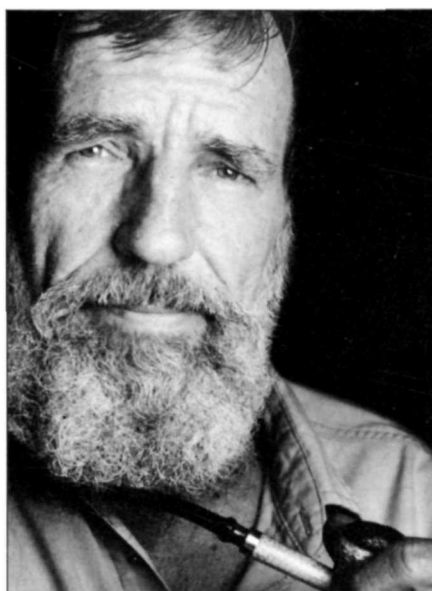
The 20th anniversary edition of *Desert Solitaire* is available through NPCA's Park Education Center, 1015 Thirty-first St., NW, Washington, D.C. 20007, for \$24.95 (hardbound) plus \$2.50 for postage and handling.

History of Commitment

Michael Frome and NPCA have been friends since both were young. His new book, *Conscience of a Conservationist*, is a collection of his best essays from the 1960s and 1970s, some from *National Parks* magazine.

Frome has traveled many places and fought many good fights, particularly in the Southern Highlands, the Appalachians. There, he not only confronted the local issues but also got to know

Edward Abbey
1926-1989



JACK W. DYKINGA

the people and their crafts. While he fought local battles, he also has been part of most national conservation battles.

His essays give the reader both a perspective and a feel for the immediacy of each situation. They also reveal how central his thinking has been to environmentalism. Protecting parks is a long and rigorous road, and Frome's book shows us where we have been and how we got there.

Conscience of a Conservationist, *University of Tennessee Press*, 350 pp, hard-bound, \$24.95.

Playing With Science

Here's a good idea—teach environmentalism through play. Ampersand Press specializes in card games that teach physical science. Its most recent edition, called "Predator," is a card game that teaches children and adults alike about the forest food chain.

This set of 40 cards can be played in a number of innovative ways, but it also can be used to play many old favorites, such as Fish, War, or Gin. And, with each hand, you learn a little bit more about how energy is transformed among microbes, plants, and animals and how the food chain functions in the temperate zone forest.

This game could be a perfect long-cartrip pastime. Available in English, French, and Spanish versions.

To order this game or to learn about other science games Ampersand has created, write Ampersand Press, 691 26th St., Oakland, California 94612.

Getting Out and About

The Park Service has become more attentive to the needs of handicapped people, but a new publication can help disabled people plan their trips to the parks more easily. *Access Yosemite National Park* is the first in a series of large-format, paperbound guides that will eventually cover 37 national parks.

These single books will also be gathered into a large edition called *Access America: An Atlas and Guide to the National Parks for Visitors with Disabilities*, which will be marketed as a general reference book to libraries, schools, and na-

tional parks. The publishers, Northern Cartographic, worked with 60 health and disability professionals to make sure that the book covered the most important issues for the disabled.

Although the emphasis is on wheelchair users, there is information available for most other types of disabilities. For instance, the text and maps are in large-sized type to help the visually impaired. The book also includes information about:

- ▲ road elevations as well as the width, gradient, and surface type of paths to parking areas, amphitheaters, and program locations;
- ▲ locations of tactile exhibits and availability of audio cassettes and telecommunication devices for blind visitors and the hearing impaired, and special programs for visitors with developmental disabilities;
- ▲ locations of hospitals and dialysis centers in proximity to the park.

Northern Cartographic, P.O. Box 133, Burlington, Vermont 05402; (802) 655-4321; \$7.95 plus \$2 for postage and handling.

Final notes: If you didn't get enough of the Arts in the Parks in the exhibit, catalogue, or Passport to the Parks stamps, you can also get a calendar to hang on your kitchen wall. Write NPCA Member Services, 1015 Thirty-first Street, NW, Washington, D.C. 20007; \$12.95, plus \$2 handling. . . . You can also get decorative prints of many of the 1988 Arts in the Parks prize-winners in a wide variety of sizes and prices. Write Voyageur Art, 2828 Anthony Lane South, Minneapolis, Minnesota 55418 for more information. . . . The 1989 guide to international American Youth Hostel trips is available to travelers. For your copy, write American Youth Hostel, Travel Department, P.O. Box 37613, Washington, D.C. 20013-7613. . . . The new issue of *Helping Out in the Outdoors* is out. A directory of volunteer work and internships on America's public lands, it is published twice a year by the American Hiking Society. A two-year subscription is \$12; a single issue is \$3. Write AHS, 1015 Thirty-first Street, NW, Washington, D.C. 20007.



Stephen Tyng Mather Society

The Stephen Tyng Mather Society was created to involve dedicated NPCA members and friends who by their annual contribution of \$1,000 or more continue to ensure the thoughtful stewardship of our nation's heritage—our National Park System.

Stephen Mather, the first director of the National Park Service and founding member of NPCA, believed that the American people should be responsible custodians of our natural and cultural resources. Today's Mather Society members are distinguished among the growing network of conservation-minded individuals who recognize the importance of preserving our natural heritage for future generations.

We gratefully acknowledge the following individuals who have recently joined the Mather Society:

New Members*

Eugene Brown
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Marcella H. Korff
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*joined or renewed December 1988-February 1989.

If you are interested in joining the Stephen Tyng Mather Society, please contact NPCA at 1-800-628-7275.

NOTICES

Happy Birthday NPCA

It's time to raise the champagne! This year, we celebrate the founding of NPCA 70 years ago, marking seven successful decades of defending and promoting our parks. See page 26 for a colorful tribute to NPCA's birthday.

Retiring in Style

Please join NPCA and its affiliate, the New York Parks and Conservation Association (NYPCA), in honoring Nash Castro, retiring executive director of the Palisade Interstate Park Commission, at a dinner to be held June 15 in Albany, New York. Castro has had a long and distinguished career with the parks.

The event will be chaired by Ladybird Johnson, Helen Hayes, and Laurance S. Rockefeller. Proceeds from the dinner

will benefit NPCA and NYPCA. For more information, contact NYPCA at (518) 434-1583.

Summer Reading List

What better way to start summer than with a visit to the parks? NPCA's new publications catalogue offers over 350 excellent guides, maps, books, essays, and videos that will enhance your park adventure. And, profits from your purchase benefit NPCA and park cooperating associations.

Start planning your park visit with one of five regional *Sierra Club Guides to the National Parks*, or one of many outdoor-activity guides offered in the catalogue. *Peterson's Field Guides* are classic companions for both the beginning and expert naturalist.

Backpackers needn't be frustrated any longer by faded, torn maps at trip's end; our new catalogue offers topographical maps that are waterproof and tearproof.

Once you reach that mountain stream, relax and indulge in the prose of *John Muir's Wilderness Essays* or *Thoreau's Naturalist Essays*.

The catalogue offers some of this season's best environmental publications, including a 20th-anniversary edition of the late Edward Abbey's *Desert Solitaire* (see Reviews, page 42), and a video on last summer's fires at Yellowstone National Park.

Not Even Footprints, one of many available children's books, shows kids how to read topographical maps. This creative and colorful book uses games, art, and maps to introduce kids to the ways of wilderness.

NPCA members will receive catalogues in mid-May. For more information, contact NPCA's Park Education Center at (202) 944-8549.

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GREAT BASIN SAFARIS offers scenic 1 day backcountry tours, June-Sept. \$9-\$48. Brochure. P.O. Box 1110, E. Ely, Nv. 89315. (702)289-8687.

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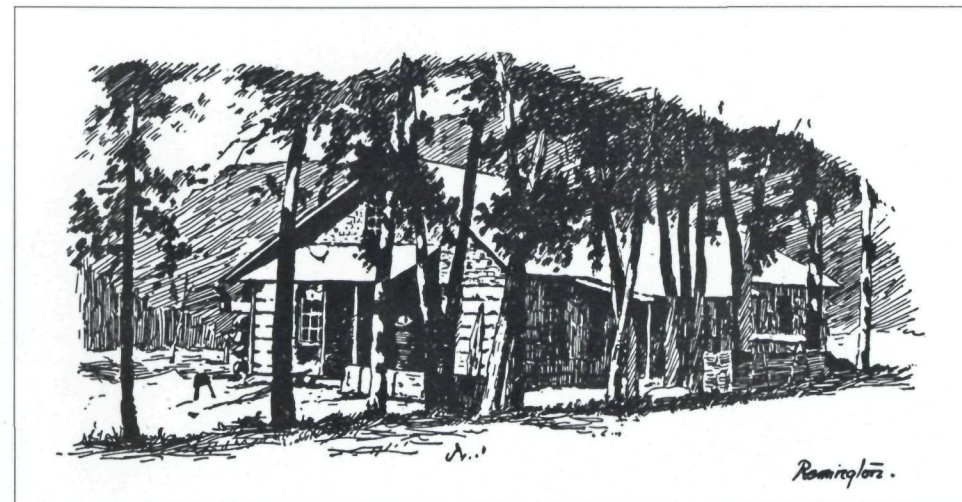
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Left: Streambed of the Little Missouri. Top: Sketches of Elkhorn, Roosevelt's second ranch, illustrated one of Roosevelt's many books. Above: Little Missouri Badlands.

Theodore Roosevelt National Park

THEODORE ROOSEVELT first came to the Badlands, North Dakota, in September 1883, to hunt buffalo. In the course of the hunt, which lasted nearly two weeks, Roosevelt, to all appearances a frail man, proved an enthusiastic outdoorsman.

Before he left for New York in late September, Roosevelt bought a partnership in the existing Maltese Cross Ranch.

In June 1884, dejected by a succession of family tragedies and political reverses at home, Roosevelt returned to the Bad-

lands, determined to make a career of ranching. In the next two years he built his herds to a total of perhaps 8,500 head—then the fourth largest outfit in the country.

Anything but a skilled cowboy, Roosevelt nevertheless eagerly joined in ranch activities, including several major roundups. In 1886, late spring frosts followed by a withering drought severely damaged emerging grasses; uncontrolled wildfires, aided by swarms of locusts, consumed much of the sparse seasonal growth.

As a result, the overstocked and overgrazed range was in poor condition by the time the first heavy snow fell. Roosevelt recognized the seriousness of the problem, but was powerless to do anything about it. He, like other ranchers in the area, suffered crippling losses during the harsh winter which followed. A disheartened Roosevelt left the Badlands in 1887 but returned periodically for visits until 1898.

Today, Theodore Roosevelt National Park occupies a portion of those lands. On April 25, 1947, an act of Congress

established Theodore Roosevelt National Memorial Park, which was redesignated as Theodore Roosevelt National Park in 1978.

The 72,000-acre park commemorates Roosevelt's adventures as a ranch man on America's last frontier—an experience that later influenced his thinking as this nation's first conservation-minded president.

Excerpted from Theodore Roosevelt National Park: The Story Behind the Scenery, by Henry Schoch; KC Publications, Box 1488, Las Vegas, NV 89114; \$4.50.

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Bon Ami has been demonstrating that you don't have to be tough on the environment to be tough on dirt.

But assuring our children

a worthwhile future requires more from each of us than merely doing no harm.

That's why we actively support organizations such as the National Parks and



Conservation Association.
And why we ask you to join us.

Thank you.
Faultless Starch/Bon Ami
Company, Kansas City,
Missouri 64101.

We'd like to clean up more than a few bathrooms.

