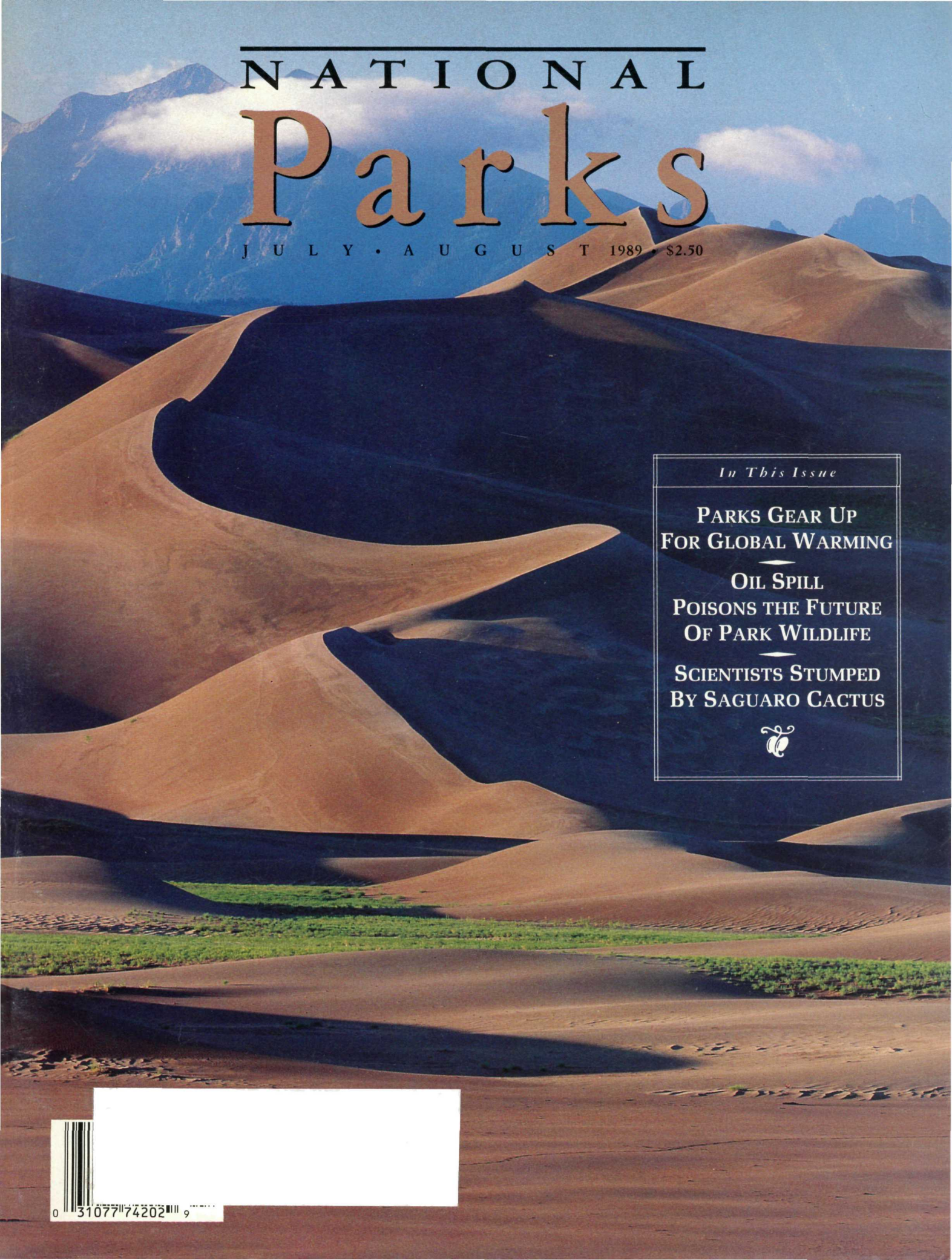

NATIONAL Parks

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In This Issue

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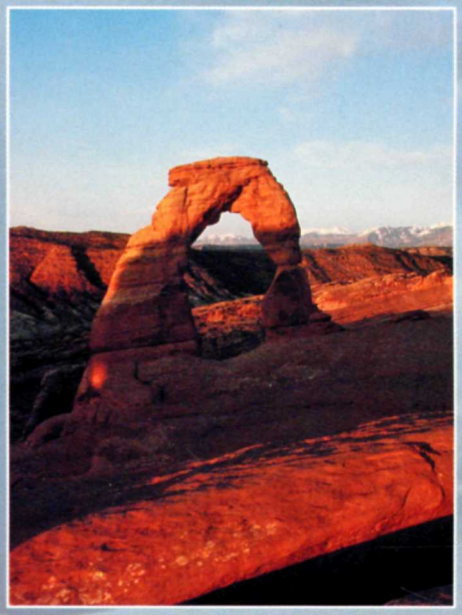
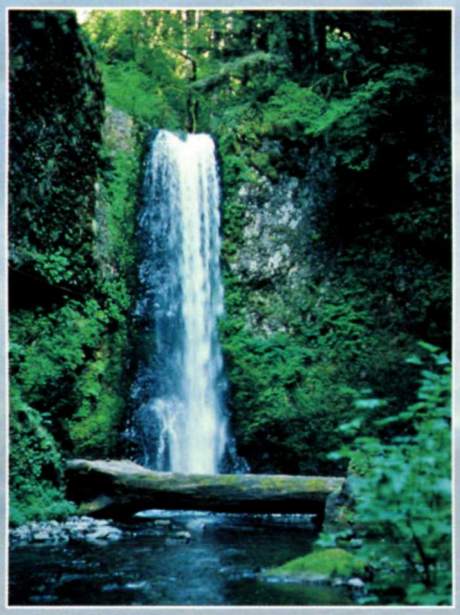


Desert Vision

The magical Southwest
Directed by Jan Nickman
Original music by
David Lanz and Paul Speer



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The lush Pacific Northwest
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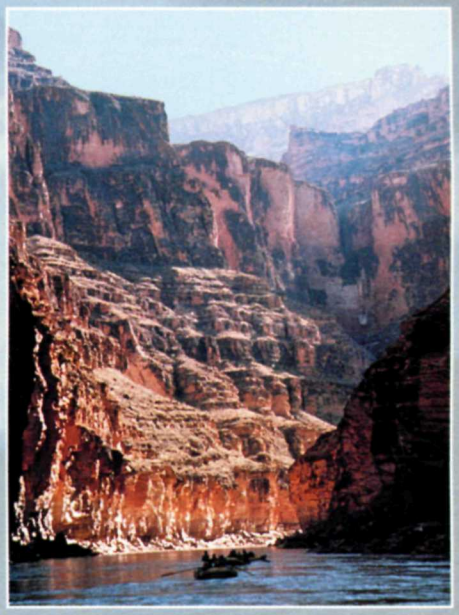

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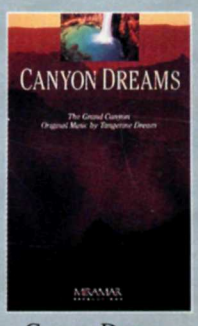
Natural States



Canyon Dreams

Desert Vision

Your purchase contributes to the protection and preservation of your national parks.

JEFF GNASS

Alaska Oil Spill, page 18

EDITOR'S NOTE

Most people notice environmental problems only when they are personally affected or when a newsworthy catastrophe occurs. The oil spill dominated headlines for a few weeks before the great news maw became hungry for something else, but the effects of the spill will be with us for years. Even less attention is paid to subtler problems. Toxic air, global warming, acid rain degrade the quality of our lives little by little. Nothing dramatic. By the time the warning lights go on, a few hundred thousand per year have quietly died from breathing-related disorders, and we've learned to stay in our air-conditioned homes on certain days. Conservationists are viewed as gloomy Cassandras—people would rather change the channel and doublecheck their profit margin. There are solutions, however, that can create jobs and profits. It just takes a longer viewpoint.

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NATIONAL
Parks

THE MAGAZINE OF THE NATIONAL PARKS AND CONSERVATION ASSOCIATION

Vol. 63, No. 7–8
July/August 1989

OUTLOOK

FEATURES

DEPARTMENTS

Cover: *Great Sand Dunes National Monument, Colorado, by Willard Clay*
Global warming will speed desertification in the middle section of the country.

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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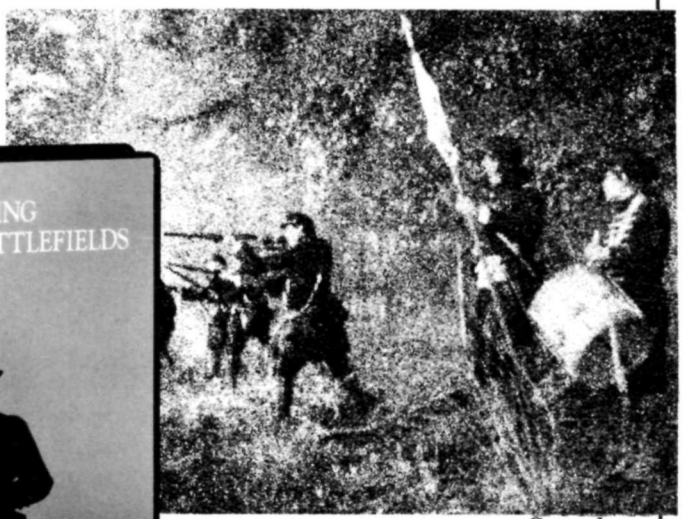
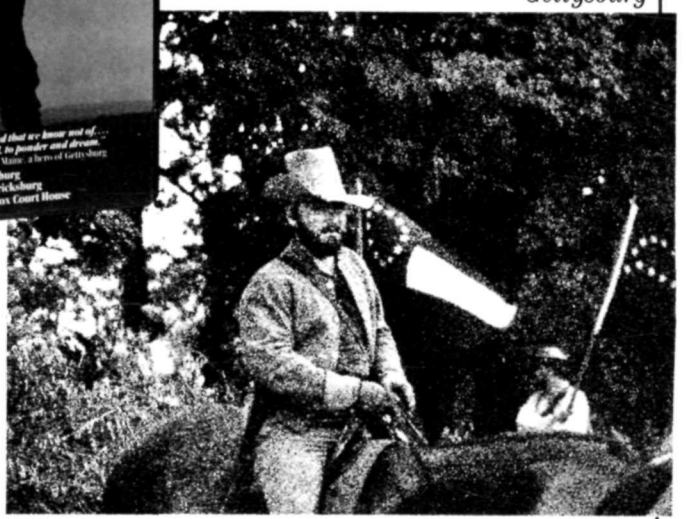
Award-winning video remembers the Blue and the Gray

Manassas (Bull Run)



Gettysburg

Fredericksburg



Antietam

TOURING CIVIL WAR BATTLEFIELDS

In honor of the 125th Anniversary of the Civil War, this award-winning video is an accurate portrayal of the heroic soldiers who fought for the Blue and the Gray. No battlefields have greater appeal than the meticulously preserved meadows and forests where four heroic encounters of the Civil War were decided: Manassas, Antietam, Fredericksburg and Gettysburg. Relive the story of each conflict as thousands recreate these battles. Visit the small village of Appomattox Court House, where the solemn surrender took place. Battlefield historians were consulted throughout for content and accuracy. This emotionally charged video combines action, information and insights. Most of all, this portrayal humanizes and brings to life names that appear in Civil War history, character weaknesses in military leaders, the plight of the lowly foot soldier, and bravery that every viewer will admire.

$2.50 From each video will be donated to battlefield preservation. *First Place, 1987 American Video Awards

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Sign of the Times

MY FRONT PORCH overlooks the Potomac River and the far banks of Virginia. It is a view worth watching as flowers blossom on both sides of the river and fully leafed trees spread their green summer canopy.

But there is a particular thrill that surpasses sunset colors on the river, the blossoming of trees, or even the wild grey clouds of a blustery spring afternoon.

That thrill is the sight of an eagle, appearing suddenly above the river. It danced effortlessly up and down to the clouds, flying along the course of the river, hovering, and then coming back into view. It was the first eagle I had ever seen in Washington, D.C.

This is a sign of the times, I thought, that one eagle should seem so remarkable. I remember when I saw eagles as a young boy hiking in Kansas. Even then they did not seem to exist in the numbers that my grandfather told me about, but they were there. I realized later that I was seeing a diminishing species.

Although eagles are now making a slow comeback, many species are not. Increasingly, they are found only in special places such as national parks. And these areas are, themselves, not wholly safe.

Global warming and the depletion of the ozone layer may make us face desertification and the loss of coastal areas. The oil spill that occurred in beautiful Valdez Harbor is a tragedy; it is affecting the parks, and it will affect generations to come.

We, as a nation, are becoming more and more sensitive to what we have, what we had, and what we want to save. And we are learning that these losses are immeasureable in terms of both time and dollars.

And we must measure these losses in terms of experience. We have lost something of great consequence when we can no longer find eagles dancing above the Potomac, no longer see salmon run in Prince William Sound, when, instead, we see the oil-wrapped bodies of seals that once wandered among the islands of the Gulf of Alaska.

This loss does not just result from the neglect of a few people, but from the lack of a national energy policy and the will to make that policy a reality.

A great religious philosopher once wrote that he lived in an age that was "between the times." We, too, are "between the times" when it comes to understanding how much we can produce without paying the price, how much we can enjoy without understanding the costs, how much we can lose without depriving our children.

These special places like Prince William Sound and the Potomac River are the classrooms in which we adults learn the costs of loss.

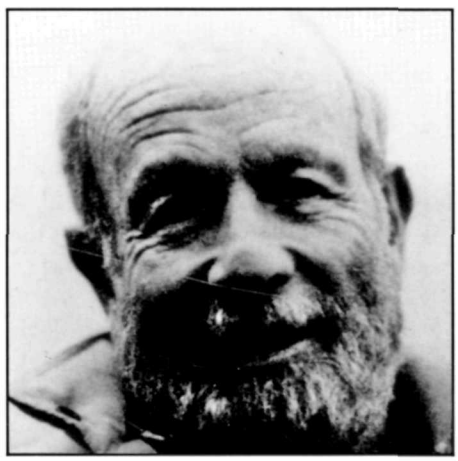
TRIBUTE TO EXCELLENCE

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.

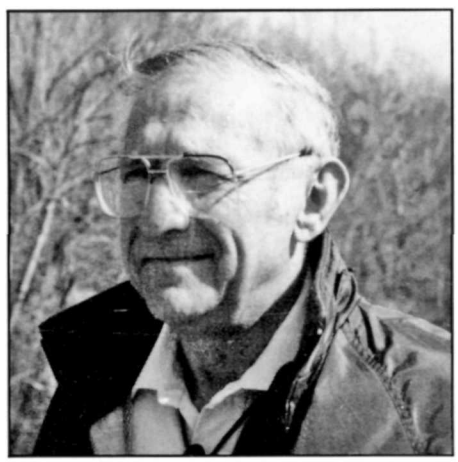
1986 RECIPIENT

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.

LETTERS

History Lesson

Edwin Rosenblum wrote a letter decrying the Park Service's plan to erect a memorial to Native Americans who died at the Battle of Little Big Horn ["Letters," March/April 1989].

In every conflict that Rosenblum cited, he was sarcastically advocating that the "oppressed" put up a monument in honor of their oppressor. Need I remind him that Native Americans were not the oppressors in the conflict between immigrants from Europe and themselves.

Brenda Stroud
Tigard, Oregon

Edwin Rosenblum tries to draw an analogy between the Native American victory at Little Big Horn and the Nazi Holocaust. Perhaps Mr. Rosenblum should study some history before he makes such sweeping statements.

Custer and his men were no innocent victims of a massacre; they were soldiers who went looking for a fight and got more than they bargained for. That they were outnumbered is a result of their own bad judgment. At least they were armed, which is more than can be said of the Cheyenne band massacred by Custer at Sand Creek some years earlier.

Remember also that Custer initiated the fighting at Little Big Horn. Can you blame the Sioux and Cheyenne braves for fighting back?

Dennis Kosterman
Madison, Wisconsin

I am so glad that Native Americans will be represented at Custer Battlefield by a memorial. They, too, lost many fine men on those grounds. It is only fitting that everybody who fought and died there should be remembered.

David DeRousse
Clearwater, Florida

Missing the Boat

Congratulations to Terry Kilpatrick on his excellent kayaking article ["Into the Breach," March/April 1989]. The photos are superb as is most of the information.

There is, however, one fundamental correction. World champion John Lugbill, Davie Hearn (front cover photo), and Elliot Weintraub are *canoeists,* not kayakers. True, they are in decked boats, but they kneel in the boat and use a single-bladed paddle. Kayakers sit with their legs out in front of them, and use a double-bladed paddle.

John Seabury Thomson
Chevy Chase, Maryland

Fighting Fire With Fire

When will articles stop glorifying an ominous national park policy? The article by Barbee ["Yellowstone: the Smoke Clears," March/April 1989] once again sidesteps prime issues involving National Park Service fire management practices.

The fact is, today fire management does not allow fires to go unchecked at any time, much less during the worst drought conditions.

Sure, Yellowstone and other parks will have a rebirth—perhaps in my lifetime if they are not mismanaged to allow a conflagration again. I only pray that lives and private property will not be lost before someone brings modern fire management to the Park Service.

David Cowardin
Twentynine Palms, California

Thank you for Yellowstone Superintendent Robert Barbee and Paul Schullery's "natural cycle" essay, along with Weiss' letter asserting that Yellowstone is an "unnatural" place.

Yellowstone National Park's fires could answer this question: Precisely how unnatural are fires that burn artificially high fuel accumulations in parks? It is a research opportunity and challenge that NPCA should ensure is not forsaken.

Eric Burr
Mazama, Washington

Where, Oh Where

I am planning a trip to the Northwest this summer and would like to visit the newly established City of Rocks National Reserve ["News," March/April 1989].

Would you please tell me where this area is located? I have now visited 313 national park areas, and I have found it a rewarding way of learning about this country.

D. Campbell
Bluemont, Virginia

City of Rocks is located in southern Idaho's Twin Falls. For information, contact the park at (208) 733-8398.

—the Editors

Corrections

Tom Till took the striking photograph of Old Faithful and the moon on page 26 of the May/June 1989 issue.

In our story on the Church Universal and Triumphant [September/October 1988], the greenhouse is not geothermally heated. Also, Elizabeth Clare Prophet does not call herself Mother of the Universe, but her followers do.

The telephone area code for Lowell National Historical Park ["Good Times: the Summer of '89," May/June 1989] is 508, not 617.

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

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NEWS
NPCA

New Areas Likely For Everglades

Testifying before a congressional subcommittee in mid-May, Florida's top elected officials expressed strong, bipartisan support for a bill to expand Everglades National Park by about 107,000 acres.

The acreage, located to the east and northeast of the park, is considered extremely important to the survival of the threatened Everglades ecosystem.

Witnesses at the hearing before the House Subcommittee on National Parks and Public Lands included Florida congressional delegates and state officials; NPS officials; NPCA, the Everglades Coalition, and other conservation groups; hydrologists; and representatives of hunters' organizations.

H.R. 1727 is cosponsored by the entire Florida congressional delegation and is supported by Florida Governor Bob Martinez (R). The bill would authorize expansion of the park's boundary, and acquisition of lands by donation, purchase, and exchange.

The state of Florida already owns 43,000 acres in the proposed expansion area, which it will turn over to the park if the measure is enacted. Under the bill's provisions, the state will provide 20 percent of the funding needed to acquire the remaining acreage, with the federal government to put up 80 percent.

"I am not exaggerating when I testify that Everglades National Park is at its ultimate crossroads," said Nathaniel Reed, former assistant secretary for Fish, Wildlife and Parks. "I am not crying wolf. I am telling you that time is running out for our Everglades."

Located 35 miles from Miami, 1.4-million-acre Everglades National Park is the nation's only subtropical wilderness. It is the second-largest national park in the lower 48 states. With 13 endangered species, Everglades is home to more endangered plants and animals than any other national park. And it has been designated a World Heritage Site by the United Nations.

TOM TILL

Dwarf cypress depend on an ecosystem being altered by man.

The park is now considered one of the most threatened units of the National Park System.

"Water flow to the park has often been too little or too much and has contributed to the loss of wildlife habitat and the decline in numbers and diversity of species within the park," said Elizabeth Fayad, NPCA's park threats coordinator, who testified in support of the bill. "Protection and management of these areas as part of the park would help normalize water flow."

Fayad objected, however, to provisions of the bill that would allow continued use of airboats in the new park areas. Airboats disturb wildlife and plants and are barred from the existing borders of the national park.

Fayad pointed out that plenty of public space is now available for airboating, including 1,000 square miles in water conservation areas immediately north of the proposed new boundary.

H.R. 1727 would expand the park's boundary to include portions of the Northeast Shark River Slough and the East Everglades, both located in western Dade County. These areas were recommended for inclusion in the park in an October 1988 report by Governor Martinez' East Everglades Task Force. The task force, which included federal, state, and local government officials, and independent experts, analyzed several areas for addition to the park, and recommended the Shark River Slough and East Everglades acreage.

The extremely sensitive balance of the Everglades ecosystem is based largely on the quality, quantity, and timing of water flow to the area. Historically, about half the park's water entered through the Northeast Shark River Slough.

The slough was unwisely left out of Everglades, though, when the park was established in 1947. The complexities of the region's hydrology were not fully understood at the time.

Canal projects in the 1960s and water management practices on lands nearby over the past few decades altered the original flow of water and struck a severe blow to the Everglades ecosystem.

Since the 1930s, the park has lost 90 percent of its wading-bird population. The roseate spoonbill has declined by 50 percent since 1980. The park's alligators have experienced reduced reproduction in the past few years, and, in the last two years, the endangered woodstork has failed to reproduce at all.

Inclusion of the new areas, and especially the Northeast Shark River Slough, would partly restore the natural flow of water in the park. Protection of the area would restore 35 percent of the woodstork's traditional feeding range, and would protect areas that are frequented by the park's last known male Florida panther.

A section of the bill also calls for an NPS study on expanding Fort Jefferson National Monument and redesignating it as a national park. Fort Jefferson is a Civil War-era, island military installation in the Florida keys. The historic fort is in need of increased funding for maintenance and repairs. Also, greater protection is needed because oil and gas development is being considered near the monument.

Railroad Returns To Grand Canyon

Grand Canyon Railway, a new and independent railroad company, announced plans to reintroduce passenger train service to Grand Canyon National Park. The service is expected to help reduce traffic congestion at the south rim of the canyon.

The first train is expected to run from Williams, Arizona, to the historic depot on the south rim in April 1990. Passenger trains have not used the Grand Canyon line for more than 20 years.

The rail company and the NPS predict that service will reduce the number of automobiles on the south rim by 18 to 20 percent, or about 1,000 vehicles. This will relieve some of the park's traffic congestion, which has grown severe.

GRAND CANYON NATIONAL PARK #2435

The first passenger train entered Grand Canyon National Park in September 1901.

Trains will be pulled by renovated steam engines refitted to burn diesel fuel instead of coal. The renovated engines will create far less pollution than would the large number of automobiles they will replace.

Besides the main line, the railroad will feature a branch spur to the Grand Canyon Airport near Tusayan, Arizona. Also included in plans are a hotel and a historic depot in Williams.

Russ Butcher, NPCA's Southwest and California regional representative, called the concept of the project a positive one.

NPCA has met with railway and NPS officials to discuss concerns. These are, chiefly, that there be shuttle service from

NEWSUPDATE

▲ **Colorado Monuments.** The NPS is currently studying whether Colorado and Black Canyon of the Gunnison national monuments, both located in western Colorado, should be expanded to include adjacent Bureau of Land Management lands. The NPS will also consider redesignating both areas as national parks.

One study is assessing the addition of a 74,000-acre wilderness study area to Colorado National Monument.

The NPS is also evaluating the addition of 61,000 acres of the Gunnison Gorge to the Black Canyon of the Gunnison. This would add another 13 miles of spectacular river canyon to the monument.

Drafts of these studies are due in late July.

▲ **Endangered Species.** The U.S. General Accounting Office released a report earlier this year criticizing the Fish and Wildlife Service's Endangered Species Recovery Program. The report claims that the agency has concentrated on a few high-profile species, to the detriment of species that are less well known, though these may need help more urgently.

FWS guidelines direct the agency to address the most threatened species first. However, the report found that, from 1982 to 1985, 12 species—only five percent of the total species in the program—received nearly half the available recovery funds. Only six of these were considered highly threatened; two were considered in relatively low danger.

the depot to points in the park, and that there be adequate parking at the Tusayan spur to encourage visitors to leave their cars outside the park.

Butcher says the railway is an important step, but that it will only solve part of the problem. He calls for long-term planning to reduce traffic congestion at the canyon's south rim.

Grand Canyon Railway has already purchased more than two dozen 1920s-vintage Pullman day coaches, which are now being authentically restored. The railroad is negotiating the purchase of four steam engines. Track renovation for the project began in March.

The passenger line, which first began operation in 1901, was discontinued in 1968 because of a lack of demand. Until World War II, the railroad served as the primary visitor access to the park.

Study Finds Source Of Canyon Haze

A recently released study confirms that the Navajo Generating Station, located near Page, Arizona, is the chief cause of reduced winter visibility at Grand Canyon National Park. Officials had suspected for some time that the plant was responsible for the park's substantial wintertime haze.

Results of the test may enable environmentalists to press the Environmental Protection Agency (EPA) to require that the Navajo Generating Station clean up its emissions.

The Winter Haze Intensive Tracer Experiment was conducted jointly by the National Park Service, EPA, the electric utility industry, and several academic groups. (Area industry members claim concern about environmental effects, but have resisted calls to put pollution controls in place.) Researchers gathered data over six weeks during January and February of 1987.

The study found that the Navajo station is the single greatest contributor to visibility-reducing haze in Grand Canyon during the winter. It accounted for an average of 40 to 50 percent of man-made haze particles in the canyon's atmosphere during the study period. On two of the three worst-visibility days over the period, the plant caused 60 to 75 percent of canyon haze.

Researchers distinguished the Navajo plant's emissions from those originating elsewhere by injecting a tracer chemical into the plant's stacks.

The study's conclusions give environmentalists leverage to induce EPA to take action against the utility. The law authorizes EPA to force polluters responsible for degrading visibility in such Class I areas to install pollution controls. (Class I areas are those areas that contain the nation's most pristine air, and they include larger national parks and wilderness areas.)

Grand Canyon's Class I status qualifies the park for EPA intervention on its behalf. The agency has balked at using its authority, however, claiming to have no clear evidence with which to nail primary polluters in Grand Canyon's case. The test's results now provide this evidence.

The NPS has documented the impairment of visibility by man-made pollution in every park in which it monitors visibility. Haze formed by minute particles has been identified as the main culprit. Sulfur dioxide, which is given off by coal-fired power plants, accounts for a large portion of this particulate haze.

The Navajo Generating Station's environmental statement (ES), published in 1972, pledged that the plant would install systems to reduce sulfur dioxide emissions by 50 percent. The plant has operated since its 1974 startup, however, without any sulfur dioxide controls.

Glen Canyon Airport Expansion Under Fire

A National Park Service proposal to relocate and improve an existing airstrip at Halls Crossing in Glen Canyon National Recreation Area has escalated into a major controversy. Utah state and county officials want to convert the strip to a destination airport serving commercial jets.

NPCA has challenged the legality and appropriateness of locating an airport in or immediately adjacent to the park. NPCA contends that the proposal would violate stringent legal protections for parks and would increase the serious problem of park overflights.

San Juan County and state officials

A clear day at Grand Canyon (left) and winter haze caused by pollution from a Page, Arizona, coal-fired power plant (right).

NPS

NPS

Utah officials want to expand Glen Canyon airstrip to handle commercial jets.

have promoted expanding the airstrip to accommodate small commercial jets and a full range of airport services, including refueling and repair facilities, flight instruction, and scenic overflight tours. Proponents argue that an airport is needed for visitor access and to increase tourist revenues.

Conservationists strongly disagree and contend that an airport in the park is not only unlawful, it is not needed.

"The area is already well served by modern highways and a regional network of airports," says Terri Martin, NPCA's Rocky Mountain regional representative.

"The real motive behind this airport proposal is to serve the governor's plan to acquire lands in Glen Canyon for a commercial resort and marina development."

Martin's comments refer to recent proposals by Utah's Governor Norm Bangerter (R) to acquire tracts in the recreation area on Lake Powell for resort development by trading state-held lands in other parts of Glen Canyon and in Capitol Reef National Park.

NPCA and other conservationists also oppose the airport because it will increase noise and other aircraft problems in southern Utah's park-rich region. The area already experiences extensive overflights. More than 800 flights per year originate from just one regional airport—near Glen Canyon's southwestern boundary.

In addition, as many as 12 low-level military training flights per day fly over Glen Canyon, while the NPS has counted as many as 20 overflights per day at Rainbow Bridge National Monument, located within Glen Canyon.

The NPS considers the existing airstrip at Halls Crossing to be unsafe and called for replacement of the strip several years ago in park development plans. The NPS, however, proposes a strip that is shorter and has fewer services than that sought by the county. Park officials acknowledge that aircraft overflights are an increasingly serious problem that must be addressed, and oppose staging overflight tours from the airport.

At the request of Utah Senators Jake Garn (R) and Orrin Hatch (R), Interior Secretary Manuel Lujan recently toured the area and met with San Juan County officials favoring the airport, as well as objecting NPS officials. During the tour, Lujan reportedly said that while he understands the state's interest in promoting tourism, he has a responsibility to protect park values.

Secretary Lujan will ultimately determine Interior's position on the airport proposal. NPCA legal advisors emphasize that the Secretary's role is constrained by strict legal limitations on any airport construction affecting national park areas. Certain of those legal constraints apply specifically to the Federal Aviation Agency (FAA), the agency from which airport proponents seek federal funding.

The FAA, as the funding source, must comply with the environmental analysis requirements of the National Environmental Policy Act. The FAA is presently completing a draft environmental impact statement to assess the potential impacts of alternative airport sites, both within Glen Canyon National Recreation Area and on nearby Bureau of Land Management lands. The draft environmental impact statement is due for public release in early summer.

NPCA members concerned about this issue should contact Terri Martin, NPCA Rocky Mountain regional representative, P.O. Box 1563, Salt Lake City, Utah 84110.

HEARING REVEALS POLITICIZED NPS

Witnesses at a congressional subcommittee hearing in May testified that the National Park Service is being hindered by growing interference from political appointees in the Interior Department.

At the House hearing on H.R. 1484, a bill to give the NPS greater autonomy, witnesses offered numerous accounts of Park Service professionals being kept from protecting the long-term welfare of the parks by politically appointed Interior officials with short-term agendas of their own.

Representative Bruce Vento (D-Minn.), chairman of the House Subcommittee on National Parks and Public Lands, and sponsor of the measure, said he is "convinced that enactment of the bill is essential, regardless of which administration is in power."

The legislation was prompted by NPCA's recommendations for a more independent Park Service in its *National Park System Plan*, released last year.

Under H.R. 1484, supervision of many NPS functions would be passed from the Interior Department to a three-member review board responsible to Congress.

Under the act, the NPS director would assume all park-related duties now performed by the Interior secretary, and would serve a five-year term, outlasting presidential changes. The Interior secretary would retain control over the NPS budget.

The president would appoint both the advisory board and the NPS director; and the director would be subject to Senate confirmation. Also, the president would be unable to fire the NPS director for reasons other than malfeasance or neglect of duty.

Witnesses, including Bruce Craig, NPCA's cultural resources coordinator, stressed the immediate need for the legislation.

"This bill is one of the most important pieces of legislation dealing with the future of the NPS since its inception in 1916," said Craig. "The experiences of the last eight years in particular underscore the need for it."

NPCA voiced particular concern about Interior moves to make top park superintendent positions part of the Senior Executive Service (SES). SES designation would further open these positions to political meddling, and may discourage qualified NPS professionals from taking them.

As SES posts, these superintendencies would be reviewed by Interior's assistant secretary for Fish, Wildlife, and Parks—a political appointee—rather than by the NPS director. As has happened in the past with SES positions at higher levels, employees may be pressed to respond to the assistant secretary's political agenda rather than to the needs of the park areas they oversee. (At present, only NPS officials at the regional director level and above are in the SES corps.)

Also, as SES members, holders of these jobs would lose certain Civil Service protections that guard employees in lower ranks of the NPS. Interior officials claim they want to give these positions, which include superintendencies at Yellowstone and Yosemite, the prestige and salary that they merit. Yet, salaries for these jobs would increase by a mere 1.5 percent.

The Interior Department has traditionally trusted day-to-day NPS affairs to career professionals in the Park Service. And, though Interior has at times overruled NPS decisions, park officials have generally been free to express their views without fear of Interior's disfavor.

With the advent of the Reagan administration and the tenures of secretaries James Watt and Donald Hodel, however, Interior took aggressive action to manage the Park Service and carry out a political agenda. NPS officials dedicated to protecting parks were forced, time and again, to reverse management decisions, and were pressured to refrain from speaking out.

New NPS Director James Ridenour, representing the Interior Department, testified against the legislation, calling it unsound management. Ridenour said the bill goes too far toward divorcing the NPS from Interior.

Witnesses representing conservation groups, including NPCA, strongly support the measure.

"To care for the long-term preservation of the resources entrusted to the National Park System, the director and other NPS officials must be as free as possible from political constraints and political interference," testified NPCA's Craig.

Representative Vento and witnesses presented numerous examples of NPS politicization:

▲ During his tenure, former NPS Director William Penn Mott, Jr., was often made to testify against additions to the National Park System that were fully supported by NPS professionals.

▲ In 1988, Interior forced then-Director Mott to downgrade the personnel evaluations of four regional directors for whom Mott had originally recommended extremely high ratings as well as salary increases.

▲ Last year, then-Assistant Secretary

William Horn reversed the judgments of professional National Park Service resource managers and approved a plan to conduct seismic testing in Florida's Big Cypress National Preserve. (NPCA and other conservation groups successfully challenged Horn's decision in court.)

▲ NPS officials were kept from testifying for the expansion of Congaree Swamp, a measure the NPS supported.

▲ Last December, Acting Assistant Secretary Becky Norton Dunlop demanded that all promotions, travel, and transfers of mid-level NPS employees and above be personally approved by her, a level of micromanagement unprecedented at the Department of Interior.

Looking for a Win On Clean Air Bills

Looking at Washington, D.C., air statistics, David Hawkins, senior attorney at Natural Resources Defense Council, said that ozone was so noxious in Washington one out of every three days last summer that, if the same air were measured in a factory, it would violate health and safety standards. Yet Congress still has not come up with a package of clean-air bills that it can pass.

Year after year, clean air and acid rain control bills are raised in Congress only to be shot down by special interest groups and by haggling over details. And, during the past eight years, the Reagan administration opposed acid rain legislation and answered all scientific evidence of acid rain with requests for more study.

With changes in the White House and changes in Congress, environmentalists are hoping for some progress.

When he was campaigning, President George Bush promised a breath of fresh air for environmental issues. The major environmental organizations in Washington, D.C., including NPCA, sent Bush a letter in early May detailing problems and possible solutions to three critical parts of the air issue: dirty air, acid rain, and toxic air.

Now environmentalists are waiting to see whether Bush meant what he said. His administration is expected to propose its own package of clean-air legislation within the next few weeks.

Environmentalists see Senate Majority Leader George Mitchell as a potential plus in the effort to pass stronger air legislation. Mitchell has shown consistent concern for the problem.

"Air pollution was identified as the number-one threat to the national parks from external sources in the 1980 *State of the Parks* report," said Elizabeth Fayad, NPCA's park threats coordinator. "I'm hopeful that this year Congress will finally do something meaningful toward solving the problem."

Right now Congress is considering various air-related bills. The acid rain control bill (H.R. 1470), introduced by representatives Gerry Sikorski (D-Minn.) and Silvio Conte (R-Mass.), has strong bipartisan support with its 141 cosponsors. Energy Committee Chairman John Dingell (D-Mich.) and others, however, present equally strong opposition. There is, as yet, no companion bill in the Senate, although one is expected in the next few weeks.

The House bill would reduce annual sulfur dioxide emissions ten million tons annually and nitrogen oxide emissions four million tons annually by 1998.

The Toxic Prevention Act (S. 816) would control more than 200 hazardous pollutants. At present, the Environmental Protection Agency controls only seven. A toxics bill is long overdue: EPA reported in April that at least 2.7 billion pounds of toxic chemicals were spewed into the nation's air in 1987 by power plants and the like.

Environmentalists say S. 816 is a start, but it does not go far enough. Strengthening amendments could include concrete deadlines for cleanup and control of toxics.

A third bill—a House bill to address the problem of areas that do not meet health standards for clean air—was introduced in May by Representative Henry Waxman (D-Calif.).

Make Your Gift Multiply!

In 1988 the companies listed below matched employee gifts to the National Parks and Conservation Association. These companies literally doubled the dollar value of each gift — and in some cases tripled it.

If you work for one of these companies, simply obtain a matching-gift form from your personnel department and send it along with your contribution. Your employer may have a matching-gift program even if they are not listed below. Just ask your personnel department.

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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Golden Gate to Get Presidio Army Base

Officials from the departments of Defense and Interior are presently negotiating the transfer of San Francisco's historic Presidio military base to Golden Gate National Recreation Area. More than 300 historic buildings are located on the base.

Last December, the Defense Commission on Base Realignment and Closure listed the Presidio among inactive domestic military bases to be closed. The commission, composed of private citizens, was created by the Base Closure Act, which Congress passed last year in an attempt to cut defense spending. Congress approved the list of military bases in April.

But the Presidio's fate differs from that of other listed bases. A 1972 bill ordered that the 14,000-acre base be transferred to Golden Gate National Recreation Area if it closed.

The transfer has met opposition from California congresswomen Nancy Pelosi (D) and Barbara Boxer (D), who fear that costs of the transfer will fall to the poorer Interior Department. Cost allocations are not outlined in the Base Closure Act.

The Presidio estimates that costs for the environmental survey and cleanup—which the Base Closure Act demands before a transfer can take place—will be about $8 million.

The Presidio, which overlooks the Golden Gate Bridge from hills above downtown San Francisco, is the oldest continuously active military installation in the United States. Its officers' club, which was built by the Spanish Empire in 1776, is possibly San Francisco's oldest building.

The Base Closure Act calls for the transfer of the Presidio to Golden Gate between 1991 and 1995. Some military functions may remain active during this period.

Michael Feinstein, Golden Gate public information officer, said the recreation area hopes to fill as many of the Presidio's 400 usable buildings as possible. He cites as a model Golden Gate's Fort Mason, which shares buildings with cultural and educational organizations including the Oceanic Society and Greenpeace.

The city of San Francisco would receive the Presidio's 36 acres that are not stipulated for transfer to Golden Gate National Recreation Area. That sizable parcel houses the base's Old Public Health Hospital, which the city hopes to use as an AIDS treatment facility.

The Presidio army base contains some of the oldest buildings in California. The base and its historic structures, such as this below, may be transferred to the NPS.

U.S. ARMY

NPCA Wins Appeal On Hovenweep Drilling

In mid-March, NPCA and other conservation groups won an appeal challenging the Bureau of Land Management's failure to adequately assess the impacts of oil and gas development around Hovenweep National Monument. Hovenweep's six small, scattered units span the high-desert plateaus of southeast Utah and southwest Colorado.

The Interior Board of Land Appeals (IBLA) ruled that the Bureau of Land Management (BLM) failed to assess the cumulative environmental impacts of oil and gas development when it approved drilling of an exploratory well a half-mile south of Hovenweep's Holly unit. The board ruled that this failure violated the National Environmental Policy Act.

Proposed oil and gas development around the monument threatens to harm important archeological sites not included in the monument, and to degrade Hovenweep's historic scene. Currently, the BLM manages lands surrounding Hovenweep under a cooperative agreement with the NPS that establishes a 5,000-acre "resource protection zone" around the monument.

NPCA and other conservationists believe the 745-acre Hovenweep National Monument should be expanded by at least 5,000 acres to include important archeological sites and to protect Hovenweep's historic scene. The NPS Advisory Board endorsed the expansion idea in 1986, and the Park Service has considered expansion in its draft general management plans for Hovenweep.

Conservationists consider cooperative management inadequate to protect the important historical and scenic values of Hovenweep and its environs.

Terri Martin, NPCA's Rocky Mountain regional representative, was pleased with the IBLA's decision.

"Oil and gas development on BLM lands around Hovenweep threatens not only to destroy the monument's natural setting and historic scene," said Martin. "It can also damage irreplaceable, nationally significant, archeological sites that are crucial to unraveling the mystery of Hovenweep."

Hovenweep National Monument protects impressive, well-preserved archeological ruins of the ancient Anasazi Indians. The monument represents only the climax stage of Anasazi culture, however, and important remnants of other cultural periods lie scattered in areas surrounding the monument. Archeologists consider these ruins important to fully understanding the Anasazi.

In its decision, the IBLA found that in granting its approval for the well, the BLM failed to assess the cumulative impacts of all existing, proposed, and potential oil and gas development. Potential impacts cited by the board include increased vandalism resulting from improved access, and destruction of the historical scene.

The company proposing the well already operates one producing well in the protection zone, and has expressed interest in drilling at three other sites.

In the future, all applications for development must be fully assessed prior to approval.

Milan Conference Focuses on Tourism

Bruce Craig, NPCA cultural resources coordinator, spoke on tourism and its effects on America's National Park System at a recent international conference. The conference on tourism and the environment, held in Milan, was hosted by Italy's Federation of Scientific and Technical Associations and by the Italian Touring Club.

Craig described Park Service efforts to spread visitation throughout the system to alleviate the burden at popular parks, such as the Grand Canyon. Also, he called for better visitor ethics in the parks.

"We believe that the impact of tourism on park resources can be lessened if visitors are well educated on what types of activities are permitted in and appropriate for national parks," Craig told the audience.

Approximately 125 environmentalists and tourism experts from Europe and the United States attended the two-day conference.

Thank You!

The National Parks and Conservation Association extends sincere thanks to our members and friends who have contributed to the success of our National Park Trust challenge grant campaign. With the help of thousands of donations, the Trust has reached its $1 million goal. We are pleased to acknowledge the following individuals and foundations who generously contributed $1,000 or more to this unique revolving fund for acquisition of private inholdings within the National Park System:

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Turning Down the Heat

A Plan to Check the Rate of Global Warming

By Representative Claudine Schneider

RECOUNTING HIS FIRST trip to Yosemite, legendary steward John Muir wrote, "Looking eastward from the summit of the Pacheco Pass one shining morning, a landscape was displayed that after all my wanderings still appears as the most beautiful I have ever beheld. At my feet lay the Great Central Valley of California . . . one rich furred garden of yellow Compositae.

"And from the eastern boundary of this vast golden flower bed rose the mighty Sierra, miles in height, and so gloriously colored and so radiant, it seemed not clothed with light, but wholly composed of it, like the wall of some celestial city."

In the century since then, that valley has been dramatically transformed—as has the entire world—by human development. The expansion of the world's population and, along with it, the expansion of agriculture, urban and suburban centers, factories, highways and vehicles, deforestation, and the burning of billions of tons of fossil fuels have irreversibly altered the face of the planet.

This planet-wide alteration has occurred in our quest for security and prosperity. The scientific community now warns us, however, that our actions are not sustainable, and are heading us into severe ecological consequences.

We are attempting to blunt these consequences with steps such as the 1988 Montreal Protocol to protect the ozone layer, and I propose even more commitment with the Global Warming Prevention Act (H.R. 1078).

Action is necessary now because global climate change is already occurring. The release of enormous amounts of chemicals are heating up the atmosphere and destroying the earth's protective ozone layer.

Of the several dozen so-called "greenhouse gases" and ozone-depleting aerosols, the main gases include carbon dioxide (CO_2), chlorinated fluorocarbons, methane (CH_4), and nitrous oxide (N_2O). The largest sources of these gases are the combustion of fossil fuels such as coal, oil, and natural gas; the burning of tropical forests; the use of fertilizers; production of cement, certain foams, and refrigerants; and gaseous releases and wastes from livestock.

The effects are becoming more noticeable. Last year, Americans witnessed the kinds of events that scientists say will occur with increasing frequency and severity as greenhouse gases increase.

These events included crop-destroying drought; forest fires that raged through our pristine wilderness areas; increased tropical storm activity, such as Hurricane Gilbert, which ravaged the Caribbean and our southeastern shores; the record heat wave, which intensified the effects of urban pollution; and the tragic flooding of Bangladesh.

According to the National Academy of Sciences, a doubling of CO_2 emissions could occur early in the next century. This increase would trigger a three-to-nine-degrees Fahrenheit increase in global temperature.

The impact of global warming on the United States was assessed in a recent Environmental Protection Agency (EPA) report to Congress. The report included the following predictions:

- Rising seas could destroy two-thirds of coastal wetlands—the nurseries of dozens of fish and shellfish species.
- Rising sea levels could mean the loss of 7,000 square miles of shoreline; and an estimated $100 billion for sea walls as partial protection against the encroaching seas.
- Significant dieback of southern forests could occur, which currently supply about half of the nation's timber.
- Heat waves will drive up electricity demand, eventually leading to the need for upwards of 400 large power plants at a total cost of $325 billion.
- If these power plants are powered with coal, acid rain pollutants would rise substantially, further stressing forests and ecosystems.

No one sees paper recycling as monumental, yet paper consumes half of all harvested wood.

The EPA did not study all possible consequences, and many scientists believe that a great many more changes—including profound and widespread biological disruption—are likely to occur in coming decades. This was the message delivered last fall by prominent biolo-

gists at the World Wildlife Fund Conference on "Consequences of the Greenhouse Effect on Biological Diversity."

Clearly, Mother Earth is developing a fever.

As Dr. Stephen Schneider of the National Center for Atmospheric Research noted at the conference, humans are changing the Earth's atmosphere from 10 to 40 times faster than natural climate changes have occurred in the past. The natural rate is approximately four degrees Fahrenheit in 1,000 years. Increasing greenhouse gases could warm the global climate about twice that amount within the next 100 years.

"Rapid change is the enemy of life," Dr. George Woodwell, director of the Woods Hole Research Center, told the convening ecologists. If the warming is not stopped, the changes will be "open-ended, rapid, and accelerating."

Trees, for example, can only migrate tens of miles per century, whereas the changing climate could force their survival range hundreds of miles northward. Even mobile species, such as bears, deer, and cougars, are likely to be blocked by cities and other manmade barriers. Climate change could thwart any plans to preserve endangered species.

Although global warming has already begun, changing our habits can head off worsening change. And, far from conflicting with the goals of security and economic prosperity, good stewardship is the basis for sustainable quality of life.

The 1987 Montreal Protocol is an exemplary model of sound stewardship. The protocol, which goes into effect this month, calls for industrial nations to reduce ozone-depleting chemicals 50 percent over the next decade.

New evidence, however, from a recent EPA report indicates a need to achieve at least an 85 percent reduction of such chemicals. Some companies, such as Dupont, have acknowledged the severity of the situation by announcing their decision to phase out all chlorofluorocarbon production.

Each month tropical forest land the size of Yellowstone National Park is being lost. As a result, animal and plant species are disappearing faster than during the great die-off that occurred 60 million years ago, when dinosaurs became extinct.

Last year, the U.S. government took a first step toward recognizing the global problems that are beginning to beset us. Congress unanimously passed, and President Reagan signed into law, a Joint Resolution that I proposed, which calls for an international treaty to conserve biological diversity.

The treaty could help preserve the planet's biological dowry in a number of critical ways. One benefit would be an enormous reduction in greenhouse gases that are now annually released from the burning of 30 million acres of tropical forests.

To facilitate such a treaty, the United States must get its own house in order. I recently introduced the Global Warming Prevention Act (H.R. 1078), cosponsored by more than 100 representatives, to limit global warming and the problems it causes.

For example, the legislation would protect America's last remaining temperate rain forest, the Tongass National Forest in southeastern Alaska. It also requires monitoring of U.S. forests in order to ensure sustainable reforestation rates.

In addition, the bill provides $100 million to help reforest urban communities and alleviate the "heat island" effect that many cities experience during the summer. This aspect of the global warming bill would work with projects such as the American Forestry Association's Global Releaf effort to encourage U.S. communities to plant more than 100 million trees over the next five years.

"HEY! THEY'RE REALLY FIXING THE OLD PLACE UP."

Shade trees can help consumers save several billion dollars per year in reduced air-conditioning bills, while removing tens of millions of tons of CO_2 from the air. Currently, the United States replants only one tree for every four that die in urban areas.

Equally far-reaching is the legislation's proposals to spur a "least-cost" national energy plan.

Since the 1973 Arab oil embargo, energy-efficiency improvements in buildings, appliances, factories, and vehicles have preserved approximately 14 million barrels of oil and gas per day. Efficiency gains have also reduced carbon dioxide, sulphur dioxide, and nitrogen oxide pollutants by 50 percent of what they would have been.

Improvements such as doubled auto fuel-efficiency standards are now saving American consumers $150 billion per year on their energy bills. But we have just scratched the surface.

A recently completed global energy study, *Energy for a Sustainable World* (Eastern Wiley Press, New Delhi 1988; World Resources Institute, Washington, D.C.), found that "least-cost" measures could prevent carbon emissions from tripling while eventually saving in excess of $500 billion per year.

No one would look upon paper recycling as monumental, yet paper con-

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ILLUSTRATION BY RICHARD THOMPSON

NATIONAL
Parks

Grave Waters

America's Worst Oil Spill Poisons Parks for Years to Come

By John Kenney

IN EARLY APRIL, Anne Castellina, superintendent of Kenai Fjords National Park in Alaska, was on a boat chugging through Thunder Bay, looking for oil. She was searching the park's rugged bays and coves for signs of a massive oil spill that had poured from a tanker into Prince William Sound more than two weeks before. But the shore looked untouched.

Then she noticed something odd. On the rocky beach, a bald eagle huddled, spreading and dragging its wings, clutching after prey in a manner unusual for the species.

Thinking the eagle might be ill, Castellina pulled into shore. She and her crew discovered that the bird was trying to pry an oil-soaked seabird corpse from a rocky crevice. Up close, the investigators now saw that, all along the shoreline, the beach's quartz and granite rocks, although clean on top, were nestled in a thick, greasy layer of Prudhoe Bay crude.

According to Castellina and other National Park Service (NPS) officials, many effects of the March oil spill are not immediately

OIL SLICKS IN BERGER BAY, KENAI FJORDS, ALASKA, BY JEFF GNASS; INSET: MURRE, BY KAREN JETTMAR

JEFF GNASS

Oil sludge washes up around Matushka Island coves and elsewhere at Kenai.

apparent. The ultimate effects on Prince William Sound and on nearby national parks will not be known for a long, long time.

Some of the immediate damage, however, has been obvious. Countless seabirds, sea otters, and young fish have perished from direct contact with the oil, and hundreds of miles of coastline have been blackened. State and federal officials say they can only guess, however, at what the indirect consequences of the spill might be.

"We just don't know what the long-term effects will be. It will be years before we know," said Ray Bane, superintendent of Katmai National Park and Preserve.

That effects will be far-reaching, though, is not in doubt.

Boyd Evison, director of the NPS Alaska regional office, testified before the House Subcommittee on National Parks and Public Lands on the spill. During the April 13 hearing, he said the NPS would need to do extensive, long-term monitoring to evaluate the damage to park ecosystems. He also said that neither the NPS nor any of the other federal agencies was prepared for a spill of the magnitude experienced.

The oil spill—the largest ever in American waters—occurred on March 24, when the tanker *Exxon Valdez* ran aground on a reef and discharged about 10.1 million gallons of crude oil into Prince William Sound. The accident occurred about 25 miles out of the port of Valdez, on the southern coast of Alaska.

That area—Prince William Sound and the Gulf of Alaska—contains five national park areas and near-pristine habitat for brown bears, grey whales, sea otters, and myriad other species. Because of the direction of ocean currents, Kenai Fjords and Katmai have been, and will continue to be, directly damaged by oil. Aniakchak National Monument, Lake Clark National Park, and Wrangell-St. Elias National Park and Preserve are also threatened by the spill.

Whether directly affected or not, all parks in the western gulf will inevitably feel its repercussions. The spill will have an impact on the entire western gulf ecosystem, integrated as it is by migrating animals, marine tides and currents, and interconnected food chains.

ALYESKA PIPELINE Services Company, the consortium that operates the Valdez terminal and handles terminal accidents, seriously bungled initial cleanup and containment of the spill. Exxon Shipping Company, the firm responsible for the spill, lagged far behind its projected schedule for subsequent cleanup.

In the days following the accident, as the spill spread throughout Prince William Sound and southward into the Gulf of Alaska, it broke into numerous slicks.

By April 2, oil covered about 1,000 square miles of water—an area roughly the size of Rhode Island—and fouled many hundreds of miles of shoreline.

Of national park areas, Kenai Fjords, located on the Kenai Peninsula about 110 miles southwest of the spill site, was the first to suffer. Oil reached the park about two weeks after the accident. Within a few days, the park's 400-mile coastline was awash in oil.

By April 15, Gulf of Alaska currents swept the oil farther southwest to the edge of Katmai National Park. Aniakchak and Lake Clark, still untouched at the time of this report, are threatened by the current-borne spill as well.

According to Evison, the spill caught the NPS unprepared. Park officials had to decide which areas were most in need of protection because there were only a limited number of oil-containment booms (absorbent drapes that hang into the water from buoy-supported beams). Since NPS officials have little baseline data on park resources, however, they were at a loss to set priorities.

"We've been trying to get a region-wide resource assessment done for years," said John Quinley, a spokesman for the Alaska region. "But funding for such programs has never been made available."

[The Alaska region is not unusual in this regard. The 1963 Leopold Report, on which NPS resource policies are purportedly based, called for a system-wide collection of baseline data. Yet, the NPS has gathered little or no comprehensive information on the wildlife resources of each park.]

The result was a last-ditch effort that included hurried wildlife counts, water sampling, and photographing of pre-oil conditions. The Alaska regional office quickly summoned a task force to aid the Kenai Fjords staff of six in gathering rudimentary baseline data and singling out Kenai Fjords' most sensitive areas for protection.

This Incident Command Team was headed by ten professionals from several federal and state agencies, and employed 150 people at its largest. Such teams generally handle large forest fires and other major disasters.

In cooperation with officials from the town of Seward, located next to the park, the team set some nine miles of oil-containment boom in place to guard these key areas against the spill. With limited equipment in high demand, officials considered themselves fortunate to muster even that number of booms.

BY THE TIME the oil hit Kenai Fjords, some of it had solidified into gooey "tarballs," while much of it had mixed with water to form an emulsion—often referred to as "mousse"—that resembles axle grease. Still more had become thick and asphaltic, like street macadam on a hot day.

In the latter state, oil absorbs dead birds, seaweed, and other matter to form black "rafts of debris," according to Castellina.

In all of these states, the oil's effect on some animal species has been disastrous. Though accurate mortality counts for park areas are not yet available, decimation among local animal populations is certain.

U. S. Fish and Wildlife Service figures provide some idea of the scope of animal deaths. At collection stations closest to park areas, a total of 2,526 seabirds were confirmed dead by the end of April. Officials said this number was likely a fraction of the true total, though.

"The sea otters sink like stones," said Kim Sundberg, a biologist with the Alaska Department of Fish and Game, "and so are difficult to count. But it's like you took an eraser and just rubbed otter populations from some coastal areas," he explained.

Oil mats the otters' fur, causing them to lose buoyancy and insulation until they freeze to death or drown. Total otter deaths probably number in the thousands, he said.

The effect of oil on seabirds is equally lethal. The birds become mired in the sticky substance and drown. Or, it coats their insulating feathers and, like otters, they freeze.

The oil is highly toxic to seals and sea lions, which absorb the substance through their skin. Cleanup workers have reported many cases of blindness, death, and spontaneous abortions among seals.

The substance is acutely poisonous to fish in the early stages of their life cycles. Sundberg said mortality was high among herring eggs and young herring in oil-clogged spawning areas. Also, countless halibut eggs, which float at the surface of the water, were certainly destroyed.

Dozens of dead bald eagles have been found within Alaskan park boundaries.

KAREN JETTMAR

A month after the spill, a tremendous amount of oil still floated offshore at Kenai Peninsula, coating beaches with each tide. Although Exxon and Coast Guard teams gradually relieved the Incident Command Team, skimming the slicks is slow going.

According to Castellina, it is difficult to know exactly how much coastline has

Exxon Crude

THE OIL INDUSTRY'S response to the massive *Exxon Valdez* spill in Alaska failed by a wide margin to live up to industry assurances—made 15 years ago—of rapid, ultramodern response to such an accident.

"The spill is a model of disaster," said NPCA President Paul Pritchard. "It cannot be minimized. And we will pay forever for Exxon's short-term benefits."

The poor response validates arguments put forth at that time against oil shipping in the area. The disaster has also affected the debate on oil development in Alaska's Arctic National Wildlife Refuge (ANWR).

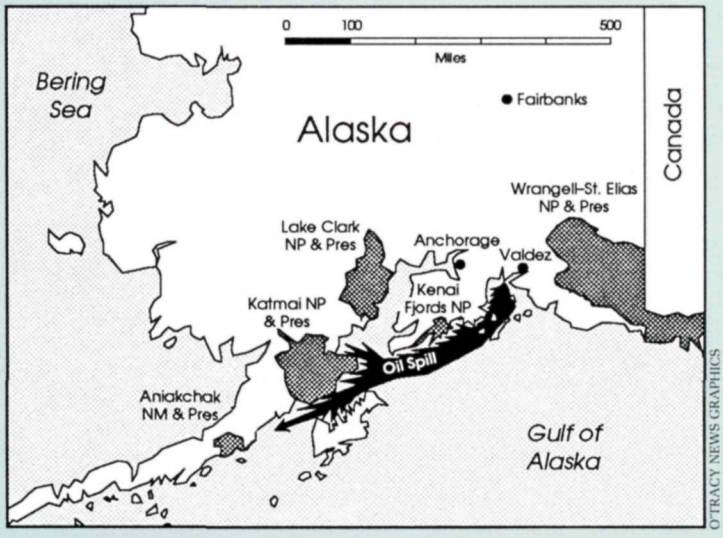
Alyeska Pipeline Service, which runs the Valdez terminal, submitted oil-spill contingency plans in the early 1970s. Several crucial discrepancies exist between the response promised in the plans and the actual response.

▲ Seven oil-skimming devices were to arrive on site no more than five hours after an accident. In fact, three oil skimmers arrived 12 hours after the mishap.

▲ Oil-containment booms—equipment for keeping oil slicks from spreading—were to arrive in five hours. Actually, booms did not arrive for 12 hours, and the ship was not completely encircled until 23 hours later.

▲ Contingency plans promised that thousands of barrels of oil a day could be removed from the water, even in stormy seas. In days following the spill, far less oil than predicted was removed from Prince William Sound, despite good weather. Three days after the spill, only about 3,000 barrels—one percent of the total spill—had been removed.

Also, according to John Devens, mayor of Valdez, local offers to help speed the response got no reply the first day of the spill.



Cleanup of ocean and beach areas by Exxon Shipping Company, the firm responsible for the spill, has been criticized by environmentalists, experts, and government officials as inadequate and disorganized. Dennis Kelso, chairman of Alaska's Department of Environmental Conservation, termed the cleanup a comedy of errors.

In some cases, beach-cleaning crews waited in boats for hours while officials debated approval of sites. Workers scrubbed oil off rocky beaches that were coated with oil again by the next tide. Vessels with containment booms collected oil in central locations for skimming, and skimmers never arrived.

Also, after reviewing Exxon's long-range cleanup plans, Coast Guard Commandant Paul Yost called them vague and poorly drafted. The agency had demanded the plans of Exxon in mid-April. Exxon had ignored a call for plans from the state of Alaska.

Two weeks after the accident, President Bush put the Coast Guard in charge of cleanup, while stipulating that the oil firm would not be excused from its liabilities. Commandant Yost has said he will see that cleanup is completed by summer's end. By mid-September, weather will prohibit further efforts.

The unpreparedness and inability of the oil industry to cope with the accident confirmed predictions made almost 20 years ago by environmentalists during the national debate over transporting Alaskan oil. Environmentalists considered the port unsafe for an oil terminal, since its harbor contains several reefs, and the region is prone to earthquakes and icebergs.

As a less-hazardous option, environmentalists advocated pumping the oil overland through Canada. Oil interests, however, wary of political and licensing difficulties, pushed for shipment through Valdez.

The final decision to allow shipment was made in 1973 when then-Vice President Spiro Agnew broke a Senate deadlock on the question. Although key Alaskan officials and local groups originally opposed the Valdez route, they supported the idea once oil-industry officials promised safe shipment and rapid, efficient cleanup in the event of a spill.

The industry's inability to fulfill its safety promises may be affecting the ANWR controversy. House and Senate bills that would open up ANWR's coastal plain to oil and gas exploration and development have been scrapped.

Public opinion on the issue seems to have shifted to oppose drilling. A *New York Times*-CBS poll taken two weeks after the spill found that 51 percent of Americans oppose drilling for oil in ANWR, while only 31 percent support development.

The administration, however, continues to push for the development of ANWR. —*J.K.*

Prince William Sound Rehabilitation Fund is working on cleanup relief and the Fund for Oil and Alaska's Future is concentrating on research that could forestall future spills. Contributions for either fund should be sent c/o National Outdoor Leadership School, P.O. Box AA, Lander, Wyoming 82520, (307) 332-6973.

been oiled. Though a large portion of Kenai's coast has been fouled, its rocky, jagged oceanfront has sheltered some areas from direct contact with the oil, creating haphazard patterns that make measurement difficult.

"We're working to get through phase one, damage control," said Castellina. "Phase two will be injury assessment."

THE SPILL HAS been even more damaging to Katmai National Park, according to Superintendent Ray Bane. As of early May, 75 percent to 90 percent of the park's 250-mile coastline had been hit by oil.

Again, in the absence of baseline data, the Incident Command Team and Katmai's staff hurriedly produced a list of nine highly sensitive, protectable sites. Booms will be deployed if oil menaces these areas, which include salmon spawning streams, salt marshes, and important archeological sites.

Mortality among sea mammals, sea birds, and young fish has been substantial at Katmai; but, as at Kenai Fjords, NPS officials have no accurate tally. At Hallo Bay, in the central part of Katmai, 2,000 to 3,000 dead seabirds washed ashore on six miles of beach. In many areas, however, counts are impeded by limited staff and difficult terrain.

Anticipating the oil, officials at Aniakchak and Lake Clark have assessed those areas' resources. At this writing oil has not yet reached Aniakchak or Lake Clark, though it seems likely that the former will be hit.

Aniakchak is located at the southwestern tip of the gulf coast. Lake Clark, though near the spill, is tucked inside Cook Inlet and afforded some protection by the Kenai Peninsula.

In the meantime, the oil remains. Skimmers and fishing boats with dredges and containment booms continue to work the waters of the western gulf. Cleanup is slow and increasingly difficult, however, because the larger slicks, like quicksilver, have broken into hundreds of smaller pieces. Also, age and cold temperatures have rendered the oil thicker and gummier, and so harder to remove from the water. In this state, the oil tends to clog skimmers.

The oil that is not removed may take years, even decades, to break down naturally, according to biologist Sundberg. Evaporation, dissolution, and microbial attack—the processes that break down oil—work especially slowly in the cold temperatures of Prince William Sound and the Gulf of Alaska.

Sundberg pointed to a similar spill off the Straits of Magellan 15 years ago. The spill occurred in a climate comparable to Prince William Sound's, but cleanup was not attempted.

A study done 12 years after the Straits of Magellan spill found beaches still blanketed with asphaltic oil, barely changed by natural processes.

PARK SERVICE officials are reticent about describing long-term effects of the spill. Also, they are not yet sure what steps they may take to alleviate damage.

To begin with, Superintendent Castellina said, rangers will pull oiled birds from the beaches to remove as many as possible from the food chain.

"Then we'll have to assess cleanup methods," she said, "and decide where we want to use them. Some sensitive archeological sites, for example, we'll just have to leave alone."

Biologist Sundberg pointed out the hazards of some types of beach cleanup. Although no course has yet been settled on for cleaning national park beaches, other areas are being steam-cleaned.

"In some places, they use high-pressure, very high-temperature water on the beaches," he explained. "This flushes out the oil, but kills everything else, leaving sterilized rocks, basically. It's probably better than leaving them covered with petroleum, but we're just going to have to rely on the natural fecundity of those areas for them to come back."

One cleanup method the NPS is considering entails dragging large clusters of absorbent material—like huge pompons—along beaches to mop up oil. The method was very successful when used on Olympic National Park beaches after a spill last year.

Castellina said the NPS will monitor the spill's effects at Kenai Fjords for months to come. Researchers, posted at

Continued on page 42

Rescue teams cleaned otters they recovered, but most otters drowned.

ALISSA CRANDALL

A Question of Degree

PARKS FORECAST THE EFFECTS OF GLOBAL WARMING

BY JAKE PAGE

WE ARE the only species that knows global warming is coming—unless there are angels. It may already have begun. After last summer's intense heat, floods, and multinational drought, James Hansen of NASA's Goddard Institute for Space Studies said flatly, "the greenhouse effect is here."

Other scientists are more cautious, waiting for the evidence to build. But most professionals are betting that the planet will warm up early in the next century. In fact, there has been a trackable, consistent trend—global temperature has risen an average of one degree Fahrenheit since 1982, while it rose only nine degrees between the last ice age, approximately 10,000 years ago, and 1980.

How much? How soon? Scientists don't know. Modern life has unwittingly created a new climate, and we don't know what it will be.

Nor can we stop its appearance. The best we can do is make the subsequent global changes less severe for future generations. Even if angels swooped down and took away all our fossil fuels and refrigerators, the amount of greenhouse gases (most notably, nitrous oxide, chlorinated fluorocarbons, and carbon dioxide) already in the atmosphere is bringing about the most rapid changes in climate known in history.

With the horses gone, as it were, we scurry to our computers to assess the damage to the barn.

Here is a worst-case scenario: a rise, on average, of five degrees Celsius (nine degrees Fahrenheit) by 2050 A. D., and a rise in sea level of four feet or more in the same time. Most likely—now that we are warned—humanity will invent ways to handle the stunning natural disruptions that will come about.

But plants and animals cannot be warned. And most wildlife and plants cannot adjust to rapid wrenchings of their environment.

The special places that have been set aside for survival of species, such as national parks, refuges, and wilderness areas, may become incompatible habitats for the species that now live there.

For instance, a park or refuge may gradually sink under water; or mountains such as the Sierra might become

MOSS LANDING, CA., NUCLEAR POWER PLANT: BY DAN SHERWOOD

desertified. Most projections show that the warming effects will be greatest at the poles (the high latitudes) and the interior of continents and least at the equator (the tropical latitudes).

So, it appears, arctic ice could melt, lifting sea levels around the world. In addition, the volume of water expands as it warms. In fact, scientists call sea level a dipstick of climate change because there is a direct relationship between water level and temperature.

It doesn't take a lot of guesswork to assess the effects of rising seas. In fact, the sea has already been rising worldwide for some time now. According to Stephen Leatherman, a coastal researcher at the University of Maryland, 70 percent of world beaches are eroding, as are 90 percent of those located in the United States. With some variation, the sea has risen about half a foot in the last century.

The Mid-Atlantic coast of America has seen a one-foot sea rise since 1900, with the water of the Mississippi Delta gaining a whopping five feet. A rise of one foot in sea level may translate into hundreds or thousands of feet of coastal retreat on land. Naturally enough, beaches have been eroded, buildings have been washed away, and tidal marshes have been inundated with standing water.

Blackwater National Wildlife Refuge on Chesapeake Bay has lost one third (5,000 acres) of its tidal marsh to a permanent pond, says Leatherman. As the globe warms, Blackwater Refuge will cease to be the astoundingly productive place that populates the oceans with shrimp and other fish fry.

Under ideal circumstances, marshes can colonize landward, but, these days, marsh grass would be stopped by homeowners, paved highways, and determined farmers. Therefore, a rapid rise in sea level would overwhelm the nomadic abilities of plants.

A rise of four feet could dramatically reduce coastal marshes on the list of ecosystems. Sealife in coral reefs could also disappear.

Coral thrives only at or near the surface of the ocean. The rising water temperatures and increased frequency of storms would make reefs unfit for their current inhabitants. Unless evolution creates turbocharged corals capable of much faster growth, the second-most biologically diverse ecosystems on the planet could become so many derelict undersea hulks.

Old photographs show even the casual visitor that things have changed at Cape Hatteras National Seashore, North Carolina, where a beautiful lighthouse once presided over a half-mile of beach between it and the sea. Now, there is but a thin corridor of sand and one frets for, among other things, the safety of the lighthouse.

"We're going to move some lighthouses [from these barrier islands], and let some go," said a Park Service official.

BARRIER ISLANDS, such as those that comprise Cape Hatteras National Seashore, have a bad habit, developed in league with the sea: they move. Real-estate owners hate this natural tendency and shout, "Act of God," to their insurance agents. They demand seawalls, groins, artificial dunes, and the expensive transport of sand.

The regrettable result of improving beaches, however, is more and faster erosion. But in a rapidly rising sea—who knows—maybe barrier islands will vanish, only to reappear some other time in a newly reconstituted Pamlico Sound outside North Carolina.

On the other hand, a reef island can go nowhere. The Florida Keys, in contrast, are stuck where they are and, as the sea rises, people who own valuable property there are sure to erect a variety of barriers to protect their investment.

Then, according to ecologist Larry Harris of the University of Florida in Gainesville, "the wrath of the rising sea" will simply take itself out elsewhere, such as the Key Deer Refuge which, he says, "will be scoured away." Intensified storms, also predicted as part of global climate change, are no friend of reefs and beaches.

Not so long ago, such greenhouse-inspired warnings were taken as the utterances of Chicken Littles. It didn't, however, take the threat of global warming for ecologists to realize that Everglades National Park in South Florida was too small. At this time, the parklands only represent six percent of the original Everglades ecosystem.

A century ago, the Everglades hosted one to three million wading birds a year. Today—55 years after the dedication of the park—the population, currently down to 16,000 nesting wading birds a year, keeps declining.

Enter the greenhouse effect. Everglades' main water source, Lake Okeechobee, is 15 feet above sea level and 150 miles from the coast. From the lake a sheet-flow of water drops one foot every ten miles on its way through the Everglades. That could mean ten miles of Everglades is lost for every one-foot rise of ocean.

Only the most muscular intervention, says Harris, will keep Everglades National Park from being "the first [park] to be lost from the face of the earth." With rising seas, the salt water will inexorably flow northward.

"If we can flush fresh waters south," says Harris, "we may be able to moderate the northward flow," and perhaps buy enough time for the subtropical ecosystem of the Everglades to march northward itself.

WHILE THE EFFECTS of rising sea levels on ecosystems are predictable, the effect of rapid rises in temperature is less predictable. Some things are known, but they are just bits and fragments of data that have not been combined into a global, even regional, perspective.

For example, alligators in the Everglades are critically affected by temperature. Eggs incubated at 30 degrees Celsius or below produce female alligators; at about 34 degrees, they produce only males.

Paleobotanists have also determined that at the end of the Pleistocene Era (10,000 years ago) beech forests followed the receding ice northward at a rate of 20 kilometers a century.

An analytical model, by Margaret Davis of the University of Minnesota, reveals that, if carbon dioxide in the atmosphere were to double in less than a century, beech forests would have to

Barrier islands, North Carolina: Global warming will cause more coastal storms, such as this 1978 blizzard.

STEVE LEATHERMAN

JEFF GNASS

Barry Glacier, Prince William Sound, Alaska: The northern latitudes will be the first affected by global warming.

move north 500 kilometers or more to find suitable climate—as would maple forests. Actually, ecosystems do not move; rather, they unravel. Species would be isolated, some species would be lost, and a new ecosystem would be born. For the most part, however, our great natural national parks preserve unique ecosystems.

Every ecosystem will react differently to a sudden surge of warming. With a rise of temperature at Mount Rainier, for example, the life zones that circle the mountain in tiers would move up vertically. Because mountains are conical, the higher a life zone moves, the smaller it becomes.

As an ecosystem becomes smaller, it supports fewer individuals. At some point, an increasingly small population becomes inbred—usually with lethal effects.

These effects will be felt in mountainous parks such as Yellowstone where, some say, even more devastating fires than last summer may be in store as the climate turns warmer and drier.

Most national parks are found in regions between 30 and 60 degrees of latitude. Prognosticators suggest that warming will be higher there than the global average because these are interior, more northerly areas—areas expected to be hardest hit by global warming.

How does a forest react to such change? Scientists assume that adult trees will manage better than saplings. Many forests could exist with warmer temperatures for 30 years or more, but they will stop regenerating.

Some greenhouse projections seem whimsical. The arid Southwest may get *wetter*. Last summer, while much of the country suffered a drought, the rains in the Southwest were heavy. More rain will bring more grass to such places as Organ Pipe and Saguaro national monuments. A thicker cover of grass means that, in the drier season, fires could start

and spread. Unlike hardwoods, organ pipe, saguaro, and other cacti are not fire resistant. Thus, more moisture would bring more destructive fires.

In any event, many ecologists now believe that the areas to watch for migration are the northern limits and higher altitudes of species' ranges. "Corridors are absolutely vital," said Robert Peters of the World Wildlife Fund at a meeting held last year in Washington, D.C. Many other scientists at this conference at the National Zoo on the greenhouse effect and wildlife agreed.

Corridors are open pathways that creatures might take to remain in a familiar climate. But, as Peters and others point out, northward of nearly everywhere lie farms, cities, industries, suburbs, shopping malls, and highways. And, since the globe is spherical, north ends.

If, as most forecasts suggest, the temperature rises most in the arctic regions —some predict a rise of 12 degrees Celsius (21.6 degrees Fahrenheit)—all hell could break loose. Melting glaciers will ramify global chaos, causing changed ocean currents, changed food chains, changed regularity of El Ninos—changed everything.

As the icecap melts, habitats for polar bears, walruses, ice-dwelling seals, and the like will shrink. More critically, the ice floes these animals ride to their hunting grounds will dissolve, leaving them stranded without food.

With less ice, less sunlight is reflected back into space, causing more warming. If the permafrost below the higher reaches of tundra in areas such as Alaska's Gates of the Arctic National Park melts, the tundra may cave in, opening up the vast fields of peat that underlie it. The peat, which already creates 26 percent of the world's carbon dioxide, will emit more.

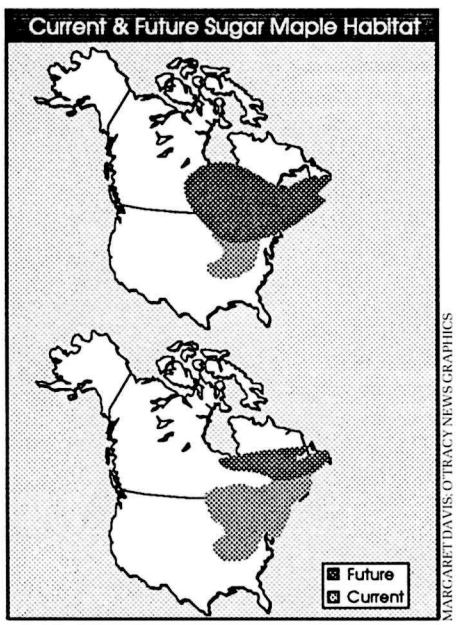
What, then, is the National Park Service doing about all these potential threats?

A major thrust in this early state of local, even regional, uncertainty is to focus on two of the many roles of the national parks—education and research.

In a year or so, the parks should be able to offer the public basic information about the probable causes and effects of global climate change. Interpretive projects on air pollution and acid rain, called Clearing the Air, and on biodiversity are being readied.

The National Park Service is also busy convincing other government agencies that the parks would be superb laboratories for monitoring life forms, ecosystems, and the effects of climate change. It is William Gregg's job, as the Park Service's representative on the Interior Department Working Group on Climate Change, to coordinate NPS participation in developing policy and research on the greenhouse effect.

What better place than parks, Gregg says, to study the early and ongoing effects of climatic change on the biosphere and cultural sites.



These maps are based on two different mathmatical models of changes in sugar maple habitat that may be caused by global warming.

"The National Park System contains many areas likely to be especially good bellwethers of global climate change. The system is rich in relict communities—holdovers from earlier times when a cooler climate prevailed.

"It has a particularly good representation on many of the regions likely to be most sensitive—Alaska, the midcontinent, and along the coasts," says Gregg.

Places such as Glacier and Yellowstone national parks can become working laboratories for the early trends in vegetational secession that are surely in store for the rest of the world, as ecosystems migrate north. Sensitive species will reveal themselves by their decline or demise.

But rather than trying to protect individual species, Gregg's primary concern is the maintenance of biodiversity—the fullness and variety of life. And, oddly enough, interest in the looming greenhouse effect might aid the National Park Service's ongoing concerns about biodiversity. An alert, even alarmed, citizenry can bring about rapid change in the form of a more generous budget for science research.

"We have to look outside park boundaries," Gregg says, "and manage biological diversity on a regional basis."

He looks to the United Nation's ongoing Man and the Biosphere (MAB) reserves—with 29 located in national parks—as a promising start. (The Man and the Biosphere program protects large areas of unique ecosystems that include human communities. The goal of the program is to study relationships between people, culture, and the biological processes of these ecosystems.)

As part of a broad range of agencies, the National Park Service is already participating in a regional MAB program for southern Appalachia. The program's goal is to maintain biodiversity in a landscape that includes people.

The National Park Service is also monitoring climate changes in places such as the archipelago of islands along the coast of northern Maine, the greater Yellowstone area, southern Florida, and southern Arizona.

These are regions where people seem particularly aware of the value of their unique landscapes. In fact, the NPS hopes that just these values may provide the necessary political base for sensible regionwide management. Parks and other government-owned lands could then be used as basecamps in the campaign against global warming.

Jake Page is author of the forthcoming book, Lords of the Air: The Smithsonian Book of Birds.

JEFF GNASS

THE REGENERATION GAP

GIANT SAGUAROS ARE VANISHING FROM THE SONORAN DESERT

BY JIM ERICKSON

IF YOU DRIVE a few miles west of downtown Tucson, Arizona, and up a winding road lined with creosote bushes, bursage, and palo verde trees, you will find yourself in the western unit, the Tucson Mountain District, of Saguaro National Monument. The park is named for its seemingly endless stands of towering saguaro cacti that rise up majestically from the lower slopes of dark volcanic peaks. These stands are so dense that they are known as saguaro "forests."

NPS/USGS

About 700,000 people visit the 83,574-acre monument each year to view the stately pillar-like cacti, which can grow to 40 feet in height and can live for more than 150 years. To most Americans, the saguaro is the most distinctive member of the Sonoran plant community, the symbol of the American desert.

In fact, these plants inspired President Herbert Hoover to preserve this region of "outstanding scientific interest" in 1933. The monument's other unit, the Rincon Mountain District, lies 30 miles to the east. It has remained a focus of keen scientific interest, though not for reasons its founders could have anticipated.

The "exceptional" Rincon saguaro stand of Hoover's time has been reduced by more than 50 percent since the late 1930s. Scientists predict that the remaining mature saguaros will all be gone by the year 2000.

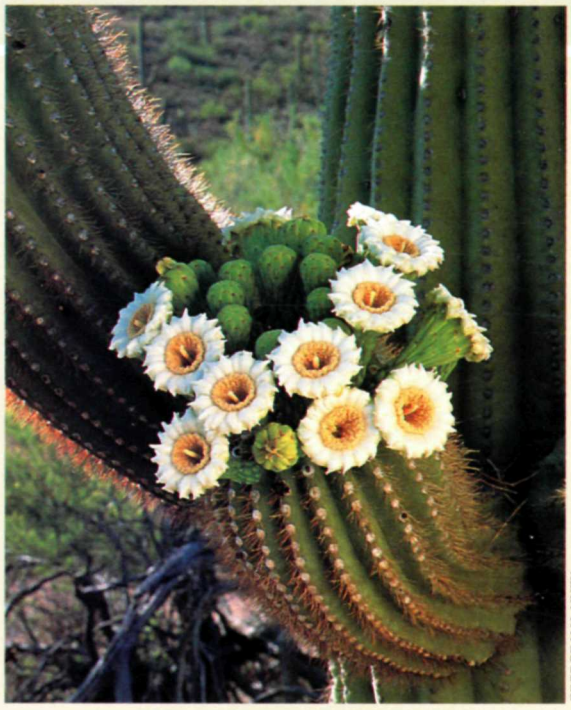
At this time, no one can explain the stand's decline. Killer freezes, erratic summer rains, cattle grazing, wood cutting, air pollution, and the decline in the number of saguaro pollinators have all been suggested as contributing factors.

Scientists first noticed Rincon saguaros weren't producing enough seedlings to maintain a steady population in the late 1930s. By the early

1960s, botanist Raymond Turner and his colleagues at the U.S. Geological Survey in Tucson had set up 20 saguaro monitoring plots throughout the 120,000 square miles of the species' range, which is in southwestern Arizona and Sonora, Mexico.

This spring, when Turner began monitoring these plots for the first time in more than a decade, the first site they visited was in the monument's Rincon District.

In 1961, the Rincon plot had contained 213 saguaros. Today, 42 of those plants remain and many of those are in "bad shape, with broken tops," according to Turner. These are the only survivors of a generation of Rincon saguaros established between 1870 and 1900.



GEORGE H.H. HUEY

Young saguaros can endure up to 80 percent water loss.

BUT, HAPPILY, researchers found 119 new plants, some two feet in height, that have sprung up in the Rincons since 1960. Researchers were heartened by the resurgence, although they know that saguaros, typical of desert plants, grow slowly in the harsh desert climate—often just six feet in the first 50 years.

These plants apparently represent a new population in the Rincons after a 60-year hiatus in the production of seedlings. This new generation of saguaros will, it is hoped, someday rise up and replace today's dying giants.

"[What] was predicted decades ago, that the big individuals at the base of the Rincons would be gone by 2000, is indeed happening," Turner said. "We didn't know whether they would come back, but now they are coming back in droves."

Rincon saguaros could make a comeback. But for decades, beginning at the turn of the century, there will be few large saguaros in the monument. Researchers cannot explain the 60-year gap in seedling establishment and that tempers their optimism about Rincon District's new generation of cacti.

One popular hypothesis is that increasingly frequent winter freezes killed off seedlings and older saguaros. Yet, Turner notes that the same 60-year gap exists in saguaro stands in the Pinacate Mountains of northern Sonora, where subfreezing temperatures are infrequent. He now suspects fluctuations in summer rainfall levels, not freezes, caused the saguaro's decline.

Saguaro seeds become available for germination in July and August; they remain viable for only a few weeks. Rainfall is critical to their development during this period.

Over the last year, Turner has reviewed precipitation records going back to 1868. He found that between 1870 and 1900, when today's mature Rincon saguaros were established, the Tucson area regularly received more than seven inches of rain in July and August. But from 1900 to the 1960s, summer rain exceeded those levels only once every 10 or 11 years.

Reliable summer rains returned in the 1960s and '70s, and Turner believes the 119 young saguaros on the Rincon plot sprouted during that period. Even if rainfall is the key to the 60-year gap, capricious watering does not explain why saguaros in the Rincon District appear so much worse than cacti in other stands.

Wood-cutting and livestock grazing, permitted in the monument until 1979, may be another culprit. Grazing cattle trample and eat the grasses that shelter tiny saguaros from temperature extremes.

Palo verde and mesquite trees, often referred to as "nurse plants," also shelter young cacti. But, according to Robert Hall, chief of resource management for Saguaro National Monument, many of these plants were cut down to fire lime kilns in this area from 1900 to 1920.

Overgrazed areas also attract ant colonies, which prefer to nest in barren, overgrazed ground. Ants then carry saguaro seeds underground. Even if the ants don't eat them, the seeds are left too deep in the earth to sprout.

SOME SCIENTISTS SUSPECT that air pollution is also accelerating the decline of Rincon saguaros. About 600,000 people live in the Tucson metropolitan area, the second-largest population center in Arizona. Every day urbanization creeps a little closer to monument boundaries.

"I have a problem believing this is all part of a natural cycle," NPS botanist Ken Stolte said recently as he looked out over the moribund Rincon saguaros. Stolte, who works for the agency's air-quality division in

Denver, was in Tucson to oversee the establishment of the first of 40 Park Service saguaro monitoring plots. This study will track the effect of chemicals in the tissue of 1,200 saguaros and the soil of the plots for the next 50 years.

THE MONITORING program is part of a Park Service "biological effects" study that has been underway for a little over a year. Twenty-five of the 40,000-square-foot plots will be set up in the monument's Rincon District, with 15 more in the monument's Tucson Mountain district to the west.

Its goal is to determine whether airborne pollutants—from copper smelters, acid rain, auto emissions, pesticides, herbicides, or lime kilns that once operated in the area—contributed to the decline of Rincon saguaros. As part of this study, researchers in New Mexico, California, and New York will analyze the composition of saguaro tissue and soil samples from the monument. In addition, young saguaros will be exposed to varying levels of acid rain in the laboratory.

Stolte's hypothesis is that an airborne pollutant, or a combination of pollutants, degrades the saguaro's protective outer coating, the cuticle. Damage to that layer speeds the spread of brown decline, reducing the plant's vigor and making it vulnerable to frost damage.

"I think that freeze is the Grim Reaper, but it appears that air pollution has first lowered [the saguaro's] winter heartiness, setting them up and predisposing them to that fate."

In addition to increased air pollution, the next generation of Rincon Mountain saguaros could be affected by the recent decline of one of the saguaro's primary pollinators. Sanborn's long-nosed bat, *Leptonycteris sanbornii,* was listed as endangered in October 1988.

Sanborn's bats feed at night on both the nectar and the pollen of agaves, saguaros, and organ pipe cacti. Through this mutually beneficial relationship, the bat feeds on nectar from these various cacti and pollinates the cacti at the same time.

Sanborn's bat, however, has declined in recent decades, and remaining populations are jeopardized by the loss of food sources, killing by humans, and by the disturbance of roosting sites.

Bats depend on caves, abandoned mines, and tunnels for roost sites. Sanborn's bats migrate southward in the fall and return to the Sonoran Desert in the spring, with groups occupying the same caves year after year.

In the 1950s, a single roosting colony at Colossal Cave, just south of the Saguaro National Monument's Rincon District, contained as many as 20,000 Sanborn's bats. But the bats vanished from the popular tourist attraction after a ventilation fan was installed at a cave entrance in 1966 to control odors. The resulting changes in air flow, temperature, and humidity apparently were not to the bat's liking.

Recently bat biologists petitioned the cave's leaseholders—Pima County—to remove the fan. In March, Pima County Parks and Recreation Commission, in an attempt to lure the bats back, approved a compromise plan that will move the fan to a different part of the cave.

"The loss of these bats doesn't necessarily mean the loss of saguaros, because there are other pollinators: honeybees, cactus wrens, white-winged doves," said Ronnie Sidner, a bat biologist at University of Arizona who led the petition drive against the fan.

"But what's to say that down the line we won't also lose white-winged doves?" said Sidner.

Sidner and other bat biologists are working with federal and state agencies and Arizona cavers to develop a recovery plan for Sanborn's bat. First, they will identify and protect roosting sites.

According to Forest Service biologist Randy Smith, the Forest Service—which controls four of five known southern Arizona roost areas—is designing metal gates. These devices will keep people out of the caves, while allowing bats to enter.

Federal officials also hope to work with Mexico to protect Sanborn's bats and their habitat in that country, said Fish and Wildlife Service biologist Lesley Fitzpatrick. "Because of vampire bats, found in Mexico, people there tend to think of all bats as bad," Fitzpatrick said.

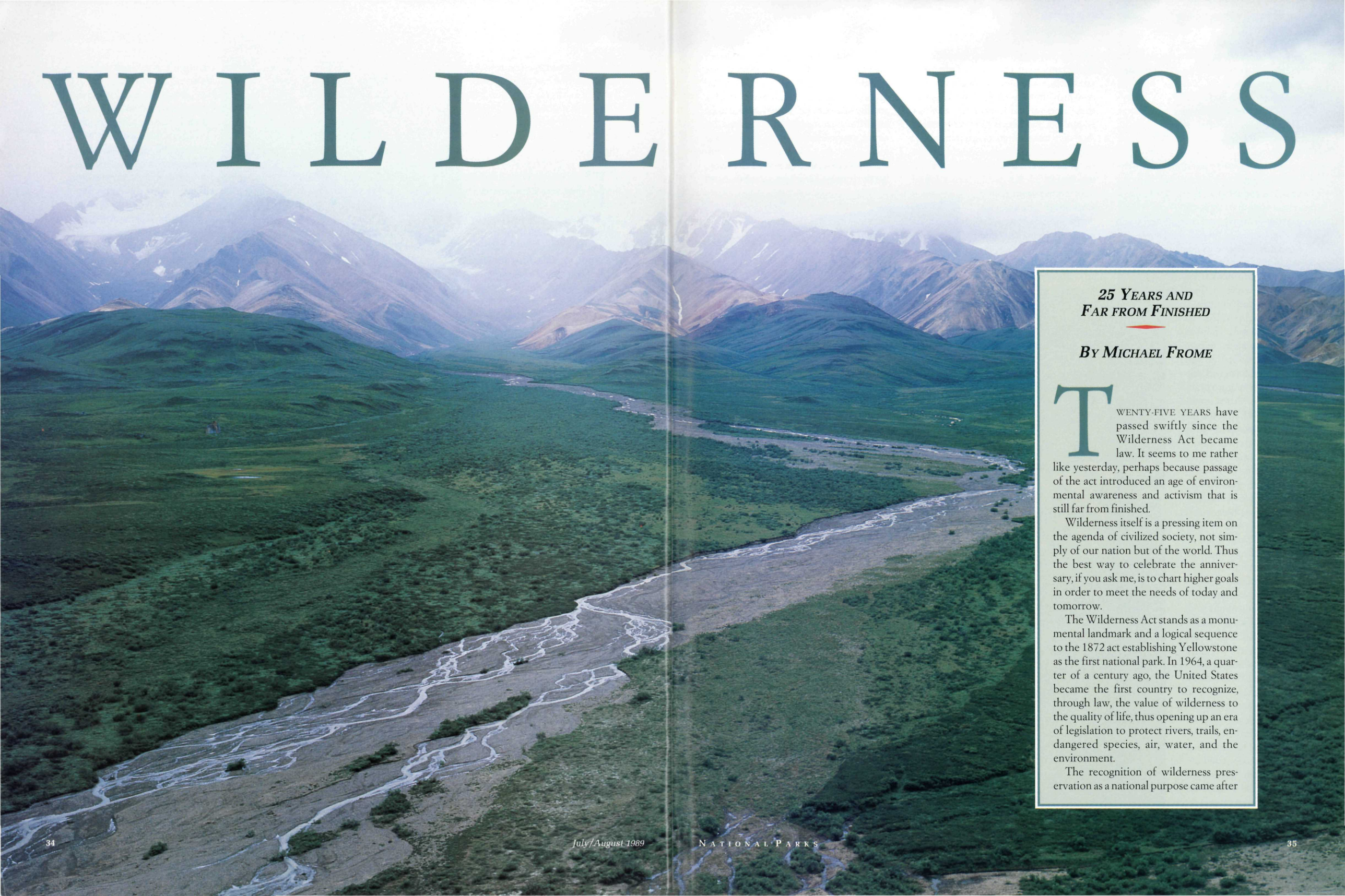
Bats are just part of a complex desert puzzle. As Sidner said, "Bit by bit we are tearing away the environment and changing what's going on out there, and the system can only handle so much."

Sanborn's bat has a wingspan of ten inches and a three-inch-long tongue.

BRUCE HAYWARD

Jim Erickson is a reporter for the Arizona Daily Star *in Tucson, Arizona.*

WILDERNESS



25 Years and Far from Finished

By Michael Frome

TWENTY-FIVE YEARS have passed swiftly since the Wilderness Act became law. It seems to me rather like yesterday, perhaps because passage of the act introduced an age of environmental awareness and activism that is still far from finished.

Wilderness itself is a pressing item on the agenda of civilized society, not simply of our nation but of the world. Thus the best way to celebrate the anniversary, if you ask me, is to chart higher goals in order to meet the needs of today and tomorrow.

The Wilderness Act stands as a monumental landmark and a logical sequence to the 1872 act establishing Yellowstone as the first national park. In 1964, a quarter of a century ago, the United States became the first country to recognize, through law, the value of wilderness to the quality of life, thus opening up an era of legislation to protect rivers, trails, endangered species, air, water, and the environment.

The recognition of wilderness preservation as a national purpose came after

eight hard years of discussion and debate in the Senate and House of Representatives, and after 18 separate hearings conducted by congressional committees in Washington and around the country. The bill was rewritten time and again, passed in the Senate, then bottled up in the House.

The very idea of legitimizing wilderness was aggressively opposed by commodity-producing industries—logging, mining, grazing—accustomed to having their way on public lands. Federal agencies opposed it, too, because administrators prefer to exercise their own prerogatives.

But the people, all kinds of people, rallied to the wilderness cause. Consequently, the National Wilderness Preservation System, established as the main provision of the act, assures that portions of the federal estate remain undefiled and free of exploitation.

In the quarter-century since passage of the Wilderness Act, however, I have observed wilderness steadily reduced in scale to virtual museum pieces. Somehow, we must equate the rights, or rather the responsibilities, of humankind with the right of wilderness to remain wild. That is the next step.

The philosophical promise of the act—to incorporate appreciation of wild nature as part of the American way—remains unfulfilled. The truth is that we still know very little about wilderness—how it functions or even the role it fills in society.

The Wilderness Act and National Wilderness Preservation System represent a beginning rather than an end. An entire new series of questions demands attention. We need to explore the values of wilderness—its ecology, economics, the effects of human impact. And we must explore mechanisms to protect small, relatively untouched tracts of wilderness that lie within or near urban areas.

The four federal agencies administering units of the Wilderness System (National Park Service, Bureau of Land Management, Fish and Wildlife Service, and Forest Service) have never caught on to the meaning of the Wilderness Act or its application to their responsibilities. They provide policy statements, manuals, plans, and promises proclaiming the future of wilderness; but this is all paperwork, with scant commitment or leadership behind it.

Specifically, protecting wilderness values has not been a priority in our national parks. Politicians have difficulty in understanding wilderness, for bears don't vote, and wilderness preserved doesn't bring in revenue to the federal treasury.

This attitude is reflected in the work of the NPS, which must justify itself over and over again in terms of the number of visitors it entertains and its contribution to local, commercial economy.

I realize that early leaders like Stephen Mather and Horace Albright established parks and saved wilderness, for which they deserve eternal gratitude. At the same time, they altered important aspects of the landscape.

For example, in 1935 Robert Marshall, the apostle of wilderness preservation, wrote a friend: "I need only point out the inexcusable, fake Hopi watch tower at the brink of the Grand Canyon, the luxurious developments on the floor of Yosemite Valley, which have ruined all primitive effect, the skyline drive in the Great Smokies and the elaborate tunnel system in the park through Newfound Gap, the tunnel system which is so boasted about in Zion National Park, and the general artificiality everywhere."

Artificiality is widely implanted throughout the national parks. It is common fare, despite the best intentions of well-intended people.

I recall the first national park proposal to designate wilderness under terms of the act. It was in 1966 in Great Smoky Mountains National Park of North Carolina-Tennessee. The official proposal (luckily ill-fated) included the following: a design of roads gutting roadless wild country; six small

Joshua Tree National Monument, California—designated wilderness in 1976.

CARR CLIFTON

OVERLEAF: DENALI NATIONAL PARK; BY JEFF GNASS

WILDERNESS

Books

FROM NATIVE AMERICAN chiefs to modern monkey wrenchers, American wilderness has inspired volumes of prose.

One of the earliest—and most eloquent—writings was an 1854 letter from Chief Seattle in response to the U.S. government's "offer" to buy prime Native land in the Northwest in exchange for reservations. Chief Seattle said, in part, "If we sell you land, you must teach your children that it is sacred, and that each ghostly reflection in the clear water tells of events in the life of my people."

John Muir left Thoreau and Emerson's civilized school of nature writing when, equipped with just bread rinds and black tea, he braved life in the wilderness. The mountains consumed him, and this passion is reflected in *My First Summer in the Sierra* (1911): "I only went out for a walk and finally concluded to stay out till sundown, for going out, I found, was really going in."

Ann Zwinger writes of rivers and deserts. *Run, River, Run* (1975) weaves a stark Utah river's geology and history into graceful, colorful prose. "When there is a river in your growing up, you probably always hear it."

Zwinger is joined by these fine scribes of the West and its waters: Charles Bowden (*Blue Desert*, 1986); Ed Abbey (*Down the River*, 1982); and Tim Palmer (*Stanislaus*, 1982).

Among landmarks in wilderness writing, Roderick Nash's *Wilderness and the American Mind* (1967) is an indispensable historical account of the conservation movement. In *Wildlife in America (1959)* Peter Matthiessen inventories three centuries of Euro-American impact upon American wilderness. Last, and perhaps best, is *The Sound of Mountain Waters*. Wallace Stegner contemplates the American West in a series of essays, including one on conservationists' darkest bruise, Glen Canyon Dam, and his discovery of the land that is left.

—Anne-Marie Praetzel

wilderness fragments covering no more than half the park; and massive campgrounds of up to 600 units that would only rob the camper of a true park experience.

Even today, more than 20 years later, a management decision at Voyageurs National Park, in northern Minnesota, will open snowmobile trails across the Kabetogama Peninsula, which provides the best and only opportunity to designate wilderness in that particular park.

And the management plan for North Cascades National Park, in Washington State, includes a few words about ecosystem protection as a generality—a token—without mentioning any of the many specific threats to the integrity of the ecosystem.

National parks cannot be all things and still be national parks—that should be clear. By the same token, wilderness designation, however, represents sensible restraint.

Nevertheless, the National Park Service in a task force report of May 28, 1985, conceded as follows:

"Management of individual wilderness areas of the National Park System is not carried out on a systematic, consistent basis Servicewide. This lack of consistency is true for designated, potential, proposed, and defacto wilderness areas."

Wild country deserves better treatment. I know competent, caring, wilderness-aware personnel in all the federal agencies, thoroughly frustrated by institutional focus on everything but the cause of saving wilderness. Those personnel deserve better treatment, too.

The time is at hand to establish a federal agency to be known as the United States Wilderness Service. Since we pay people in government to serve mining, oil and gas, electric power, grazing, logging, recreation and other resource-consumptive interests, why not underwrite a corps of men and women who will prove government responsive to the people's wilderness cause?

The Wilderness Service would undertake many missions now unmet:

▲ It would define the values of specific ecological types and report on threats to them. No bureau does this today.

▲ It would prepare and publish a periodic inventory of designated wilderness; and it would survey potential wilderness areas.

▲ It would, in fact, be responsible for a coordinated approach to wilderness designation and protection.

The Wilderness Act furnishes the means of preserving large tracts of federal lands. And some states have developed their own wilderness initiatives based on the act. Now there is also need to identify and to provide statutory protection for smaller tracts, tracts that lie in urban areas and are still relatively untouched. No bureau is doing this today.

Since passage of the Wilderness Act, I have observed wilderness reduced to virtual museum pieces. The time is at hand to establish a Wilderness Service.

The Wilderness Service would be deeply involved in research covering human impacts, ecology, economics, history, archeology, anthropology, philosophy, literature, and art—treating these creations of our culture as resources rather than commodities.

Federal land-management agencies cannot perform these functions. Their approaches are too narrow and their efforts too circumscribed. A new agency, with the concept of wilderness as its guiding force, vitalized with the energy and imagination of the good people in its fold, would be the ideal vehicle.

I do not conceive the Wilderness Service conflicting with the National Park Service or the other federal agencies. It would define appropriate uses and optimum numbers in wilderness areas. Until now, no agency has been willing or able to define these uses or numbers for themselves.

I feel confident that when professionals effectively communicate the needs of a wilderness area, Americans will accept the discipline of limited use. Education can help reverse the trend of deterioration and degradation that is affecting virtually every classified wilderness area.

The ultimate challenge for a Wilderness Service is to teach oncoming generations—as well as our own—to appreciate and respect the natural world.

"We deeply need the humility to know ourselves as the dependent members of a great community of life," declared Howard Zahniser, the late executive director of the Wilderness Society and the prime crusader for the Wilderness Act.

I see wilderness as a sanctuary of the spirit and the great reservoir of hope. Saving wilderness points to the essence of ethical living. It contributes to the search for a moral world, governed by peace and love.

We are overwhelmed with challenges: of war and peace, overpopulation, energy needs, food, respect for the impoverished and homeless. But the challenge to protect the shreds of wilderness that yet remain—not only in this country but everywhere in the world—is related and equally critical.

There can never be enough wild country. We must rescue everything that still remains of the original America and recapture and restore a lot more that has been lost. We can do this, but we must reorder our priorities and live within our means.

Otherwise, how shall we be remembered? By what we used and destroyed of this good earth, or by what we saved as a gift to the future?

A recommitment to saving these last shreds of wilderness—that to me is the way to commemorate the wilderness anniversary.

Michael Frome, 1986 winner of NPCA's Marjorie Stoneman Douglas Award, is professor of environmental journalism at Western Washington University. His most recent book is Conscience of a Conservationist.

WILDERNESS

JEFF GNASS

Lassen Volcanic Wilderness Area, designated in 1972, lies within the national park of the same name in California. It is one of the oldest wilderness areas. National park wilderness may sound redundant, but parks must sustain grazing, whole villages of lodges and concessions, even energy development. Wilderness designation protects a national park's primordial, trackless quality.

PHOTOGRAPHS PAGES 40-41 BY TOM TILL

Mount Rainier, also within a national park of the same name, is one of the newest wilderness areas. It is one of a number of wilderness areas designated last year as part of Washington State's wilderness act, which will protect approximately 1.7 million more wildlands in that state. Some states have lagged in presenting their wilderness proposals to Congress. That lag time allows development to make further inroads on the wildlands that are left. As writer Wallace Stegner has said, "Without any remaining wilderness, we are committed wholly, without chance for even momentary reflection and rest, to a headlong drive into our technological termite-life, the Brave New World of a completely man-controlled environment."

Everglades Wilderness Area, like the park, is the most threatened. It is an ecosystem based on complicated water movement through southern Florida, and development has destroyed that system.

Yellowstone National Park, amazingly enough, is without any wilderness designation, even though the majority of wilderness lands—38,502,565 acres—falls within the National Park System. Conservationists generally agree that Yellowstone is the national park area most in need of wilderness protection because of oil and gas development, geothermal exploration, subdivision, and numerous other pressures on the Greater Yellowstone ecosystem.

San Rafael Swell's Window-blind Peak (above) is part of Mexican Mountain Wilderness Study Area. The Colorado Plateau contains a number of areas that are in need of protection, and this one is a prime candidate. The San Rafael Swell, which lies in southern Utah, is a park-quality area not yet within the National Park System and a wilderness study area not yet within the wilderness system. NPCA believes it belongs in both.

ALASKA OIL SPILL

Continued from page 23

various points along the coast, will gather data all summer.

"No one can tell you for certain what the long-term effects will be," reiterated Superintendent Bane. "We need to research. We need to monitor."

Bane and others did express concern about the toxic oil entering the food chain, though. The spill reached park areas just in time to greet birds and whales returning from winter migrations, and brown bears emerging from dens.

Birds feed on oil-soaked snails and limpids, and bald eagles feed on carcasses of oiled seabirds. Eagles and other scavenger birds commonly die or become ill from ingesting tainted prey, and the eggs they lay are weakened.

Bears, who are actually attracted to the petroleum smell, eat oil-contaminated salmon and birds. Although bears and other large animals are somewhat more tolerant, they, too, may experience sickness and reduced reproductivity. Long-term effects on these animals, if any, are simply unknown.

Sue Libenson, executive director of the Alaska Center for the Environment, blasted attempts by the oil industry to belittle the extent of the damage. "In addition to the acute mortality we are witnessing now, numerous studies indicate serious, long-term impacts of oil on marine species resulting in reduced reproductive success and survival," she said.

For instance, an environmental impact statement prepared in September 1985, prior to oil development in the North Aleutian Basin, says that even at low concentrations petroleum causes dysfunctions in fish. Problems include increased incidence of tumors, reduced fecundity, decreased resistance to disease, and reduced growth.

The same report details similar effects on seabirds. Ingesting low levels of oil through tainted food results in reduced egg production, weakened eggs, increased deformities in young, and decreased growth of young. The effects are so widespread that the study warns that bird populations with naturally low reproductive rates may take 20 to 50 years to recover.

How long oil will remain in the western gulf ecosystem is unknown. As long as it does, though, it will have manifold, insidious impacts on marine and coastal life, causing marked changes in species' numbers and quality. How this will ultimately affect the balance of life in the region remains to be seen.

"A shock to an ecosystem like this can have cascading effects," said Erik Olson, an attorney with the National Wildlife Federation who specializes in oil spills.

"Not just the species immediately destroyed are harmed, but so are the animals that feed on those species. In this case, it may alter the face of the ecosystem for some time, changing the number of species and which species dominate."

With little data extant on the gulf ecosystem or the effects of oil in such an environment, Olson said it was very tough to predict what would happen.

"We've got beaches out there with oil up to two feet deep," said Castellina. "What does that mean? I don't know. I don't think any of us knows."

John Kenney is news editor for National Parks *magazine.*

FORUM: GLOBAL WARMING

Continued from page 17

sumes half of all harvested wood worldwide. Currently, only a small percentage of that paper is recycled.

The new, highly efficient compact fluorescent lamp will not only save the consumer more than $25 over an incandescent bulb, but also prevent the burning of 1,000 pounds of CO_2. Dozens of such individual options abound.

Perhaps never before in history have individual actions so greatly influenced the course of human events. Prevention pays, and it is incumbent upon all of us to capitalize on these opportunities. Failure to do so will squander our natural endowment.

Representative Claudine Schneider (R-R.I.) is the ranking minority member of the House Subcommittee on Natural Resources, Agriculture Research and Environment. Recently, she was the recipient of the Lorax Award for promoting sustainable development.

Story Behind the Fires

Last summer's forest fires in Yellowstone offer the Park Service a working laboratory for studying the effects of fire on nature. Currently, Yellowstone is offering an interpretive program on the role of the fire at the park, the area is being monitored by research projects, new books are being published, and a Landsat poster of the burnt terrain is available.

KC Publication's contribution to the subject is called *Fire, the Story Behind a Force of Nature*. This large-format, four-color book covers fire from historical, biological, and technical perspectives. This background is even more valuable now that the NPS prescribed burn policy has been stopped. *Fire, the Story Behind a Force of Nature,* by Jack de Golia, 48 pages, PB, $4.50. Available from the NPCA Park Education Center.*

The Landsat poster looks like an abstract mass of colors; but, actually, it offers a high-resolution overview of the entire fire area taken by satellite. A joint effort of the Earth Observation Satellite Company and the American Forestry Association, the poster comes with a number-coded key and a fire ecology education guide. Profits go to the Greater Yellowstone Area Recovery Fund. Send $12.95, plus $2 for postage and handling to the American Forestry Association, P.O. Box 2000, Washington, D.C. 20013 or call (202) 667-3300.

Summer of Fire, with photographs by Jeff Henry and Ted Wood, was written by Jim Carrier of the *Denver Post*. He gives readers a sense of the personal experiences of the people involved by using interviews with firefighters, park personnel, and tourists, as well as fire lookout journals and his own observations. *Summer of Fire*, Peregrine Smith Books, 112 pages, PB, $12.95.*

Pursuing Rights-of-Way

Preserving Abandoned Railroad Rights-of-Way for Public Use, by Charles Montage, will be a tremendous help to groups and individuals interested in preserving abandoned railroad corridors for recreation.

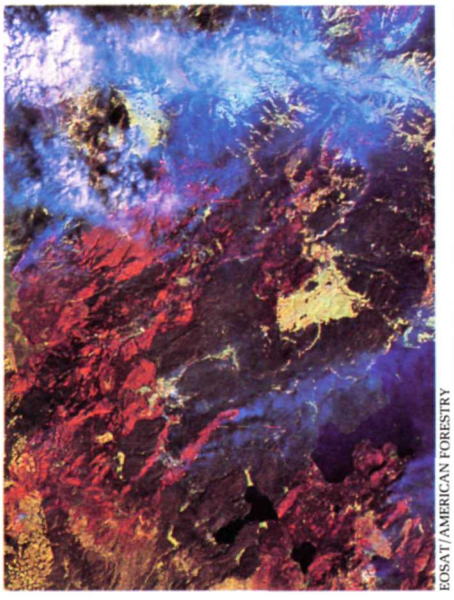
This legal guide concentrates on the more popular recreational aspects of rail corridor preservation. It is a manual intended for people who have little rail conversion experience. But it is also useful for the experienced. Great care is taken throughout the book to point out the common, often complicated, problems that surface following abandonment of rail corridors.

Montage, general counsel for the Rails-to-Trails Conservancy, is a legal authority on railbed conversions. Here, he offers legislative and administrative advice also.

Available from Rails-to-Trails Conservancy, 1400 16th St., NW, Suite 300, Washington, D.C. 20036, 156 pages, PB, $42.50 postpaid and $32.50 for Conservancy members.

—Tom Harvey, American Hiking Society

This satellite image covers more than one million acres of Yellowstone fires.



EOSAT/AMERICAN FORESTRY

The Line Stops Here

The growing interest in natural history tours and adventure travel attracts a widening range of Americans to parks and other natural areas—with both good and bad consequences.

Although Americans are becoming steadily more committed to protecting the environment, it is unfortunate that the lands, wildlife, and sites included in these trips sometimes suffer from the presence of too many visitors. Too often, litter clutters campgrounds, streams, and lakes; bird nesting areas are disrupted; animals are harassed; and local traditions are slighted.

The National Audubon Society, in order to counter this behavior, has written an ethics policy for environmentally responsible travel. They will no longer send groups with an outfitter or tour operator who does not subscribe to this conservation ethic, and they ask that other conservation groups do the same. Individuals can also refuse to take tours with outfitters who do not adhere to these standards.

For more information or a copy of the code, contact the National Audubon Society, 950 Third Avenue, New York, N.Y. 10022; (212) 832-3200.

Final Notes. The Water Resource Association of the Delaware River Basin will hold a conference on groundwater protection strategies October 22-24 in White Haven, Pennsylvania. Discussions include global warming and rising sea level. Contact: Bruce E. Styeward, WRA/DRB, Box 867, David Road, Valley Forge, PA 19481.... Take a book of postcards on your summer vacation. *Visions of the Colorado Plateau* is a glossy, eerie, yet lovely collection of postcards with photographs by John Telford and Tom Till. Available through NPCA Park Education Center.*

*NPCA Park Education Center: 1015 Thirty-first St., NW, Washington, DC 20007; 1-800-NAT-PARK

NOTICES

Million-Dollar Match

NPCA met its goal of $1,000,000, to be used for the National Park Trust. The Trust was established in 1982 to help the National Park Service acquire privately owned lands both in and adjacent to national parks.

The Trust operates as a revolving fund for purchasing parkland from willing sellers. At present, more than two million acres within the parks are privately owned. NPCA buys these lands when possible, and holds them until the Park Service can purchase them.

In addition, the Trust can fund work on park boundary legislation, and can buy land at private auctions—an option not available to the Park Service because of legal strictures.

Endangered species preservation is a high priority. The Trust targeted endangered species habitat for purchase, and completed a study of threatened and endangered species in National Park System areas.

In 1986 an anonymous donor presented NPCA with a substantial challenge. If NPCA could raise $500,000 in three years, the donor would match each donation to create a million-dollar Trust fund. Foundations, NPCA members, and board members rose to the occasion with generous contributions that created the million-dollar fund by its June 30, 1989, deadline.

Some of the Trust's previous accomplishments include:

- acquisition of popular riverfront land along the Rio Grande, which granted access to river runners;
- purchase of four acres of Mt. Desert Island in Maine's Acadia National Park. The property, which was threatened by developers, is being held for purchase by the National Park Service;
- preservation of a Florida cypress swamp, which is habitat for endangered Florida panthers;
- purchase of nearly 6,000 acres of land bordering Hawaii Volcanoes National Park, land that had been targeted for development;
- designation of five historic mine buildings in Alaska's Wrangell–St. Elias National Park as a national historic landmark; and,
- purchase of one of few remaining private properties along Wild and Scenic Alatna River in Gates of the Arctic National Park and Preserve, Alaska.

With this new million-dollar fund, NPCA hopes to assist the NPS in its much-needed completion of park system lands.

NPCA thanks everyone who contributed to the success of the Trust.

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ROY GIVEN

The Sculpturing of Zion

IT MAKES NO difference if you approach Zion National Park in Utah from east or west, the impression is that of an elevated tableland, a plateau incised by canyons.

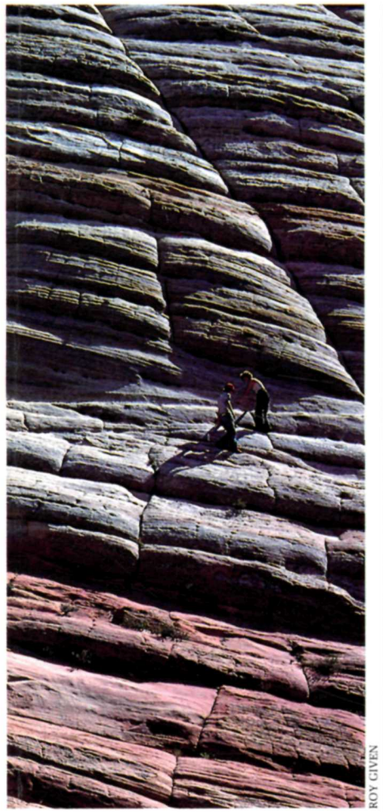
There are various levels of canyons, canyons intersecting canyons, canyons crossing canyons, and, most importantly, deep canyons, so that towering cathedrals of glowing rock stand out in splendid array. This sculpturesque terrain has been carved by erosion, the gnawing away of rock by everyday processes operating at the earth's surface.

It takes only a glance at the cross sections to see that Zion's canyons are neither fissures, gaping cracks, or rock crevasses. Nor are the towering canyon walls and isolated monoliths slabs of upthrust bedrock.

The sandstone bedrock cracks on exposure as it emerges from below the surface where confining pressure is greater than atmospheric pressure. The rock expands near the surface, usually in planes parallel to the exposed surface.

The elevated features of Zion are simply the parts of this plateau that have not yet been eroded away. They exist because streams have carved deep channels into the plateau. In fact, it is somehow more spectacular to see that ordinary processes—like flowing water, freezing, thawing, and a rock rolling downhill—have accomplished this task. One of the great lessons of geology is that given time, very weak forces can accomplish much.

Excerpted from The Sculpturing of Zion, *by Wayne Hamilton; Zion Natural History Assoc.; from NPCA Park Education Center, 1015 31st St., NW, Washington, D.C. 20007; 132 pp, PB, $7.95, $2.50 postage & handling.*



ROY GIVEN

ZION NATIONAL PARK

ALLEN HAGOOD

Left: Storms and the flash floods they cause are Zion National Park's primary agents of erosion. Above: Zion is said to have a "layer cake" geology. At Checkerboard Mesa this geology is crosshatched by shallow vertical fractures that dwarf hikers.

Above: A canyon south of Tabernacle Dome reveals columnar jointing, the result of volcanic flows that were exposed by erosion. Left: Shale rocks containing fossils, such as this *Metoposaurus* skeleton, are valuable markers of the environment during the late Triassic period.

ILLUSTRATION BY MRS. EDWIN COLBERT

Above: Rich coloration of the Navajo Sandstone formation, a white stone, is caused by ordinary minerals or simple plants such as lichen and algae. These red streaks are leeched from iron oxides in the red shale above. Dissolved iron deposited in fissures also created these glassy black patches, which reflect the blue color of the sky.

For over 100 years 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.