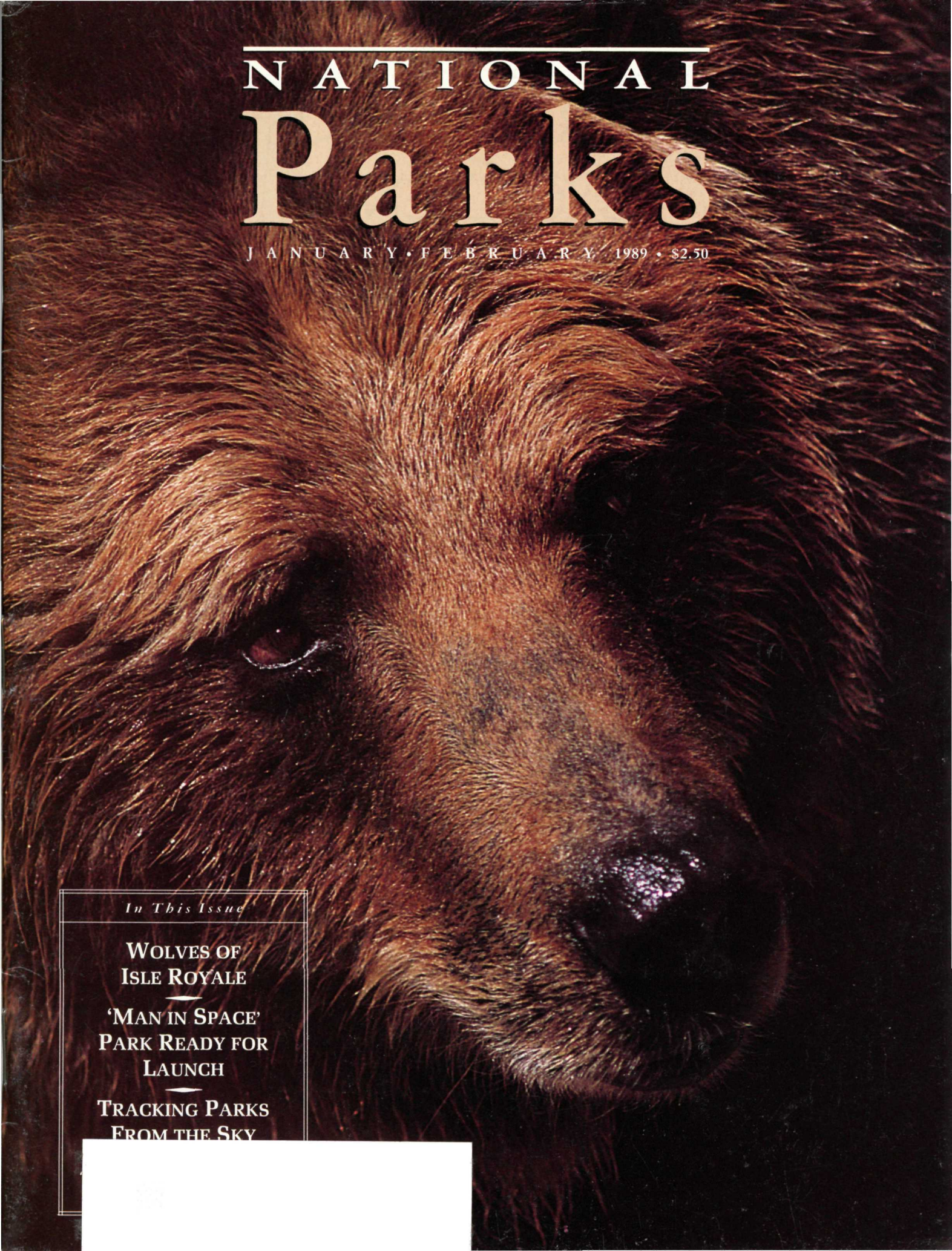


NATIONAL Parks

JANUARY • FEBRUARY 1989 • $2.50

In This Issue

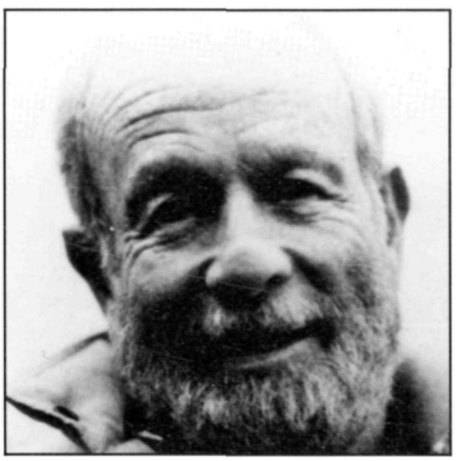
TRIBUTE TO EXCELLENCE

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.

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

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

ROLF O. PETERSON

ISLE ROYALE WOLVES, PAGE 20

EDITOR'S NOTE

The new year brings a new look to *National Parks*. We wanted something that reflected the longevity of NPCA—70 years old this year—as well as our need to look toward the future of park protection. Most important, we wanted a look that delighted the eye while reflecting the editorial content. Hans Teensma achieved that goal and we think you will be pleased with the result. Teensma, who has designed *Outside* and *New England Monthly* as well as numerous other books and periodicals, has created a look that is clean and classic, an elegant combination of new and old. The text type is Simoncini Garamond, from a type family created more than 400 years ago by Frenchman Claude Garamond. It should be noted that not only is Teensma a fine designer, but he is also the unofficial U.S. standard bearer for the Netherland's Werelddierendag—World Animal Day.

NATIONAL PARKS

Editor: Michele Strutin
Associate Editor: Judith Freeman
Assistant Editor: John Kenney
Editorial Assistant: Anne-Marie Praetzel
Design Consultant: Jane D'Alelio

National Advertising Office
Anne Kubek, Advertising Manager
1015 Thirty-first St., NW, Washington, D.C. 20007
(202) 944-8552

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

NATIONAL
Parks

THE MAGAZINE OF THE NATIONAL PARKS AND CONSERVATION ASSOCIATION

Vol. 63, No. 1–2
January/February 1989

OUTLOOK

FEATURES

DEPARTMENTS

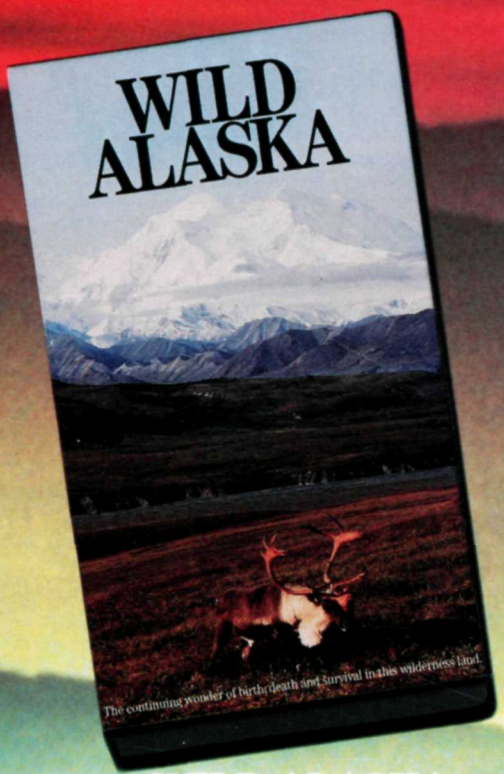
Cover: *Grizzly, by Jess Lee*
The grizzly—NPCA's symbol—faces an uncertain fate in the aftermath of Yellowstone fires.

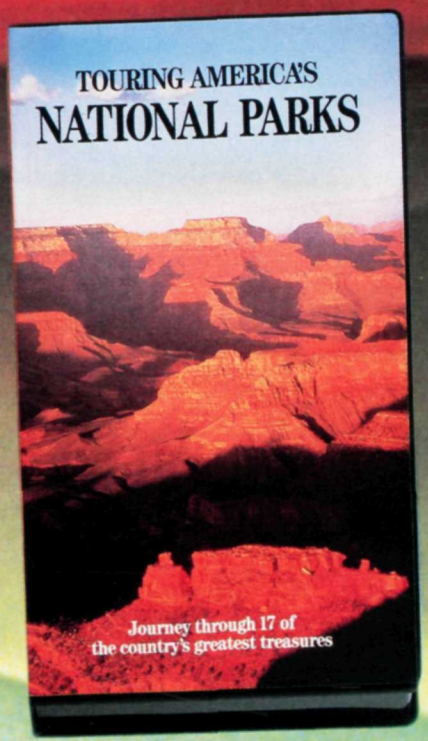
Established in 1919, the National Parks and Conservation Association is the only national, nonprofit, membership organization that focuses on defending, promoting, and improving our country's National Park System while educating the public about the parks.

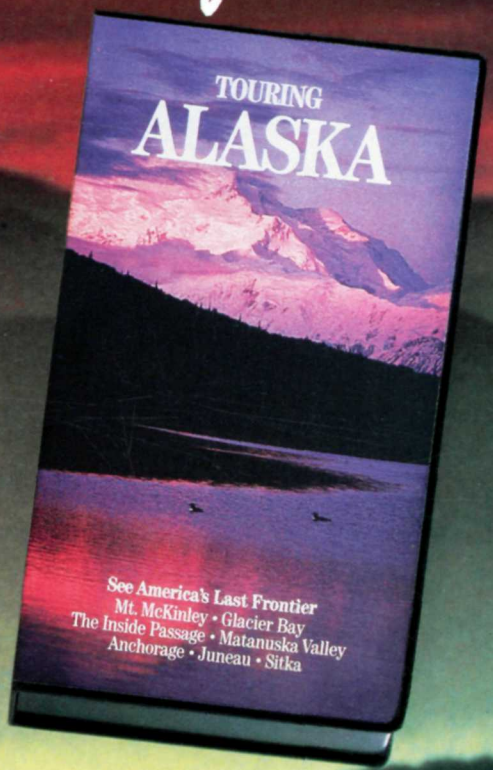
Life memberships are $1,000. Annual memberships: $250 Guarantor, $100 Supporter, $50 Defender, $35 Contributor, $25 Active, $22 Library, and $18 Student. Of membership dues, $7 covers a one-year subscription to *National Parks*. Dues and donations are deductible from federal taxable incomes; gifts and bequests are deductible for federal gift and estate tax purposes. Mail membership dues, contributions, and correspondence to address below. When changing address, please allow six weeks' advance notice and send address label from your latest issue plus new address. POSTMASTER: Send address changes and circulation inquiries to **National Parks, 1015 Thirty-first St., NW, Washington, D.C. 20007 / (202) 944-8530**

ISSN 0027-9870

See America The Beautiful
ON VIDEO







WILD ALASKA

View the enormous habitat of Alaskan wildlife!

Rare scenes, beautifully photographed, portray the challenge of Alaskan wildlife to exist through nature's four seasons. Filmed over three years, with occasional brushes with danger, Dale Johnson, who has filmed for National Geographic, BBC, Nova and NASA, takes you from the Alpine tundra to the broad expanse of the North Slope. The camera follows migrating caribou, musk ox, and a rare life and death struggle between a caribou and a grizzly bear. This video is a timeless scenario of the vital role each creature plays in nature's continuous chain of evolution.

New 1988 Release—60 minutes.

TOURING AMERICA'S NATIONAL PARKS

Enjoy Scenic Wonders Unsurpassed in All the World!

This video journey takes you through 17 of the nation's greatest national treasures. Explore the crown jewels of the Park system: Yellowstone, Grand Canyon, Grand Teton, and Yosemite. View the true natural grandeur of Acadia, Mt. Rainier, Olympic, Arches, Mesa Verde, and the eerie wilderness of the Everglades. Travel to the North Cascades, Crater Lake, Rocky Mountains, Carlsbad Caverns and, finally, marvel at the majestic Redwoods of California.

"This gets our top rating for the serene beauty of its photography, the overall intelligence of its script and the sheer bulk of information it packs into one hour."
Charles Monaghan, **Video Review Magazine**

TOURING ALASKA

Explore the Beauty of America's Last Frontier!

This fascinating video captures the rugged beauty of Alaska, from the wilderness of its great parks to the life of the people in the cities and countyside. Travel to the remote Eskimo lands in the Far North. Other wonders of Alaska included are Ketchikan, Juneau, Sitka, Skagway, Homer, Katmai National Park, Kotzebue, Gates of the Arctic National Park, the sternwheeler "Discovery," Alaskaland and Earthquake Park.

"Alaska is beautifully photographed, authoritatively narrated...you discover why every Alaskan trip is an adventure."
International Adventure Video News

$29.95 each, order 2 or more, save $5 each!

Please send me the following videos:

Complete Order Form and Mail. Allow 3-4 Weeks for Delivery.

TITLE	QTY	PRICE	VHS or BETA	SPECIAL	TOTAL
Wild Alaska—60 minutes		$29.95 ea.		Order 2 or more, save $5 each!	
National Parks—60 minutes		$29.95 ea.			
Touring Alaska—52 minutes		$29.95 ea.			
			D.C. residents add 6% sales tax		
			SHIPPING & HANDLING $3.50 for one video, $5.00 for two or more videos		
			TOTAL $		

Mail to: Member Services
National Parks and Conservation Assn.
1015 31st Street, N.W.
Washington, D.C. 20007

Please bill videos to my ☐ MasterCard ☐ VISA ☐ Check enclosed, payable to NPCA

Card No. _____

Expiration Date Month _____ Year _____

Signature _____
(Valid only with full signature of cardholder)

Ship to:

Name _____

Address _____

City _____ State _____ Zip _____

Guide for Transition

THIS WINTER is a time of budding optimism here in Washington—for the national parks and for the environment. It is cold, of course, and we can expect the usual January storm that buries all of us in the nation's capital under a snowy blanket.

But there is excitement every time we elect a new President. Federal employees form transition teams, which churn out pages of background and proposals from each agency. The Park Service is among this group, and it hopes for better support of its maintenance needs and for improved facilities.

The conservation community, with its roots in the firm bedding of environmental planning, also has prepared background and recommendations for the incoming administration. A number of organizations, including NPCA, examined every federal agency whose work affects the environment.

We worked for months and the result is the recently published *Blueprint for the Environment*, which includes NPCA's recommendations. The committee on the national parks, headed by NPCA, wrote approximately 40 recommendations, including:

▲ appropriating $150 million annually to acquire designated but unpurchased parklands;

▲ developing and supporting scientific research in the parks;

▲ establishing a Science Advisory Board of experts;

▲ acquiring habitat of threatened and endangered species endemic to parks;

▲ using interpretive programs to inform visitors about resource management problems facing parks;

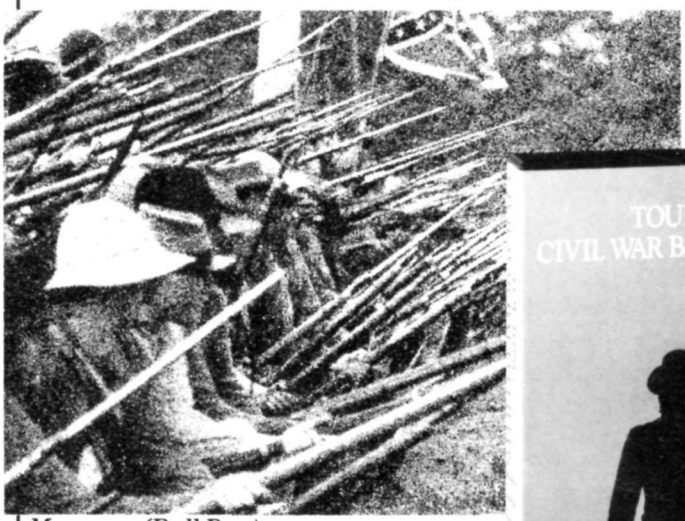
▲ locating park facilities away from fragile resources or, where appropriate, outside park boundaries

Our ideas regarding the parks germinated largely in the National Park System Plan prepared by NPCA with the input of many others. It is optimistic to think that we can do more for the parks in a time of declining federal budgets and overworked National Park Service employees. Yet, history has demonstrated that dreams of a better world led to the National Park System that we have today.

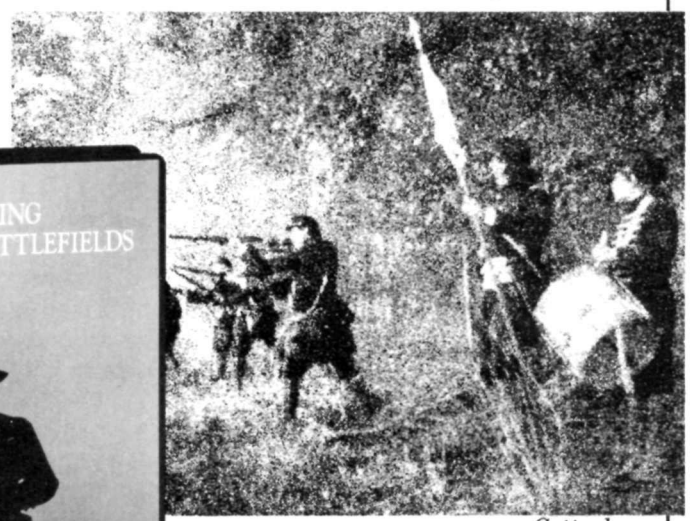
Tallgrass Prairie, Thomas Cole House, Mojave Desert, Florida Keys, Anasazi, Salt River Bay, Arctic Wildlife Refuge, Escalante Canyons, Calumet Mining District, and West Mesa Petroglyphs—these are but a few of the 86 parks we hope to see in the National Park System in the future. We hope these ideas—along with many others—will thrive in the fertile field of a new administration.

Paul C. Pritchard

Award-winning video remembers the Blue and the Gray

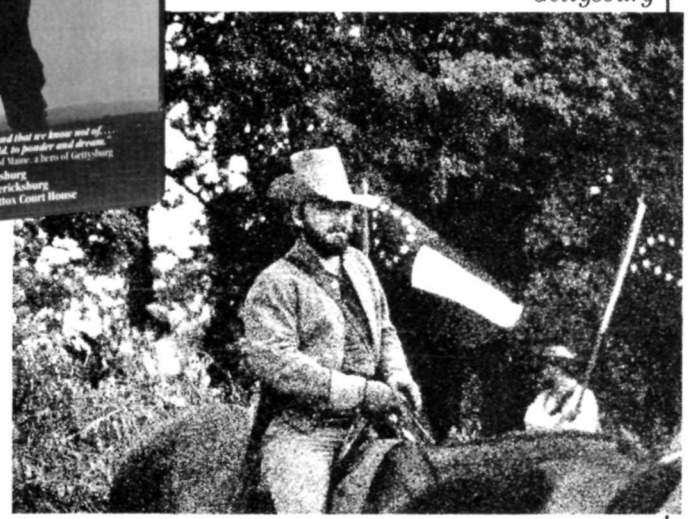


Manassas (Bull Run)



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

Please send me the following:

Complete order form and mail. Allow 3-4 weeks for delivery.

TITLE	QTY.	VHS/ BETA	PRICE	TOTAL
TOURING CIVIL WAR BATTLEFIELDS			$29.95	$
			DC Residents Add 6% Sales Tax	
			Shipping & Handling: $2.75 per video, $4.50 for 2 or more	
			TOTAL	$

Mail to:
Member Services
National Parks and Conservation Assn.
1015 31st Street, N.W.
Washington, D.C. 20007

Please bill videos to my ☐ MasterCard ☐ VISA ☐ Check enclosed, payable to NPCA

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Expiration Date Month_____ Year_____

Signature_____
(Valid only with full signature of cardholder)

Ship to:

Name_____

Address_____

City_____ State_____ Zip_____

LETTERS

Battlefields

In "Commentary," in the Sept/Oct *National Parks*, Paul C. Pritchard asked, "Why are those environmental issues so hard to win?"

I propose a two-fold explanation evolved from years of observation of numerous environmental causes:

First, *greed*. The operational credo for corporate America, realtors, developers, and the like is "growth at any price." Environmentalists are a bothersome impediment to developers and government officials who would be happy if the entire world could be like Los Angeles.

Second, the environmental movement seems to be comprised primarily of liberals, intellectuals, and, in the words of that great statesman, Spiro Agnew, "effete snobs." We have utterly failed to get our message out to middle America in a meaningful way.

Howard A. Pellett
Bothell, Washington

I am writing to request that NPCA use its lobbying power to oppose the unnecessary and unwanted development of Manassas Battlefield before it is destroyed and a precedent is established that would endanger all historical sites and parklands.

Elizabeth Wilson
Lititz, Pennsylvania

The outcry—by NPCA and numerous other groups and individuals—caused Congress to pass a bill that adds the land threatened by development to the park.

—the Editors

War & Peace

The "War and Peace" essay by Gary Machlis (Sept/Oct) overlooks a significant NPS commemoration of peace. In 1932, Congress and the Canadian Parliament designated Glacier National Park in Montana and Waterton Lakes National Park in Alberta as the first International Peace Park in the world.

It has been an ideal meeting place for the International Seminar on National Parks. An outgrowth of this park alliance is the International Days of Peace and Friendship, celebrated July 1-4 annually between Canada Day and our Independence Day.

Robert Haraden
Former Superintendent/Glacier
Bozeman, Montana

When Professor Machlis applauds peace, I find it in opposition to the concept of patriotism, of a citizen's willingness to sacrifice his life for his country, his family, or for his values.

Living under tyranny is peace; to revolt against tyranny is violence, which is the action that brought this country into existence. To give an audience a view without criticism is, if not an endorsement, then tolerance of the view.

Michael Warren
Belmar, New Jersey

Fired Up

I fully support the NPS let-burn policy on fires. I hope NPCA will go on record as strongly supporting it as well. Please do not let politicians formulate a misguided policy that is not based on what is best for the parks' wildlife.

Steve Christensen
Miami, Florida

Compromising Paradise

Gratified, pleased, and thankful do not adequately express our feelings upon reading "Religious Group Finds and Compromises Paradise," in your Sept/Oct issue. We lost a son to CUT for almost three years.

Not only did your reporting explore and expose the dangers that CUT imposes on this fragile environment, it also gave readers a rare insight into what a cult is and the devastating effects a cult can have.

Maurie and Meredith Mader
Parsippany, New Jersey

I, too, am greatly disturbed by the development of CUT. However, I am sorry your article was so tolerant of Malcomb Forbes, a man with more millions than he could ever spend. He could have demonstrated some character by donating this land to the park or to the Forest Service. Too bad.

S. O. Hondrom
Albuquerque, New Mexico

Wolf Watching

The NPCA annual report for 1987 mentioned an effort to reintroduce the wolf to Yellowstone. Was this successful?

Also, the July/August issue mentioned a study on the declining wolf population in Isle Royale National Park. Do you know if there is any further information?

Donald C. Caughey
Fort Bragg, North Carolina

Congress just appropriated $200,000 for the National Park Service to conduct a study on wolf reintroduction at Yellowstone. For more on Isle Royale wolves, see page 20.

—the Editors

Correction

The "Portfolio" photograph on page 55 of the November/December 1988 issue was taken by David Muench.

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

Statement of Ownership, Management, and Bimonthly Circulation of

NATIONAL PARKS

OWNER AND PUBLISHER: National Parks & Conservation Association EDITOR AND MANAGING EDITOR: Michele Strutin HEADQUARTERS OF PUBLISHER AND PUBLICATION: 1015 31st Street, N.W., Washington, D.C. 20007

STOCKHOLDERS, BONDHOLDERS, MORTGAGE, OTHER SECURITY HOLDERS: None

Average no. copies each issue during preceding 12 mos.	Nov/Dec '86 Sep/Oct '87	Single issue nearest filing date Sept/Oct '87
A. TOTAL COPIES PRINTED (Net Press Run)	59,453	62,768
B. PAID CIRCULATION		
1. Single Copy Sales	1,526	1,753
2. Mail subscriptions	53,414	55,486
C. TOTAL PAID CIRCULATION	54,940	57,239
D. FREE DISTRIBUTION (incl. samples): BY MAIL or OTHER MEANS (No News Agents)	568	588
E. TOTAL DISTRIBUTION (Sum of C & D)	55,508	57,827
F. OFFICE USE LEFT-OVER ETC.	3,945	4,941
G. TOTAL (Sum of E & F)	59,453	62,768

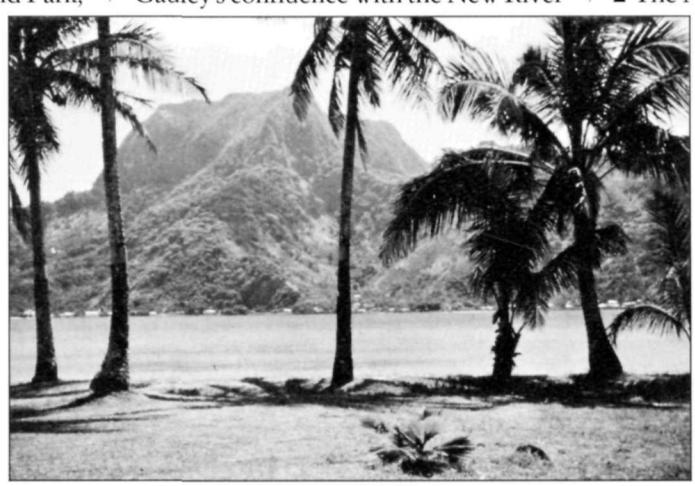
NPCA NEWS

100TH CONGRESS ADDS NEW PARKS

Last autumn, in a rush of final-hour business before adjournment, the 100th Congress acted on a great deal of legislation affecting the National Park System. Most issues were resolved to the benefit of the parks, and NPCA was involved in much of the last-minute action.

Notable victories for the parks included incorporation of the development-threatened William Center tract into Manassas National Battlefield Park, and establishment of the National Park of American Samoa. More new parks were added at this time than at any other during the Reagan administration, bringing the total number of National Park System areas to 354. Seven of these areas were on NPCA's new parks priority list, published in its *National Park System Plan.*

Congress failed to pass other legislation important for parks, however, despite the efforts of NPCA and other conservation groups.



ANNE B. KEISER

The National Park of American Samoa preserves rainforests.

Congress established the following new areas:

▲ The National Park of American Samoa, an 8,500-acre park that preserves unique beaches, coral reefs, and rain forests on American Samoa, an island trust territory in the South Pacific. Its forests are the only paleotropical—Old World tropical—rainforests on U.S. soil. The park also includes areas important to preserving Samoan culture.

▲ The Mississippi National River and Recreation Area, which will protect an 80-mile corridor of the Mississippi River in the Minneapolis-St.Paul area. Besides providing recreational opportunities for the area's 2.2 million residents, the designation will protect endangered peregrine falcons and bald eagles, and the Mississippi's only natural waterfall.

▲ The Gauley River National Recreation Area, a 24-mile stretch of the twisting, scenic Gauley River that cuts deeply into West Virginia's Allegheny Mountains. The area to be protected runs from Summersville Dam to the Gauley's confluence with the New River in the southern part of West Virginia.

▲ City of Rocks National Reserve, a 14,300-acre site in southern Idaho that preserves diverse species of animals and plants and a wealth of geological formations. The site's exposed rocks are the oldest known in the far West.

▲ Zuni-Cibola National Historical Park in western New Mexico, the first national park to be established on Indian trust lands. This site preserves remnants of Zuni culture, including ruins, kivas, and pictographs. The rich Zuni culture is one of the most durable native cultures in North America.

▲ Charles Pinckney National Historic Site, a 25-acre estate located near Charleston, South Carolina, preserves the home of Charles Pinckney, a Revolutionary leader and an important statesman in the early national period. Pinckney was one of the few persons to serve a state as governor, U.S. senator, and delegate to the U.S. House of Representatives.

▲ The Natchez National Historical Park, an 80-acre park anchoring the Natchez Trace Parkway to the town of Natchez, Mississippi. The site will preserve and interpret the history of Natchez, a city typical of the history of the American South.

▲ Poverty Point National Monument in West Carroll Parish, Louisiana. This 900-acre archeological site preserves the largest and most complex geometrical earthwork in North America. Artifacts uncovered suggest that a highly evolved culture occupied the area between about 1700 and 700 B.C.

▲ Hagerman Fossil Beds National Monument, a largely unexcavated archeological site that protects world-renowned fossils. This 4,400-acre area is situated on a 650-foot-high, four-mile-long bluff immediately west of Hagerman, in southern Idaho. Its 3.5-million-year-old fossils include remains of saber-toothed cats and mastodons.

In its final months, the 100th Congress

also authorized several important boundary expansions. It voted to incorporate an adjacent 600-acre tract into the Manassas National Battlefield Park, Virginia. A developer had planned to construct a major shopping mall on the property, which was the site of General Robert E. Lee's headquarters during the Battle of Second Manassas.

Congaree Swamp National Monument in South Carolina was expanded by about 7,000 acres. A significant portion of the park—about 15,000 acres—was designated as wilderness.

Minor boundary expansions were authorized at the following National Park System areas: John Muir National Historic Site, Aztec Ruins National Monument, Guadalupe Mountains National Park, New River Gorge National River, and Canaveral National Seashore.

Congress also designated as wilderness about 1,729,000 acres in Washington's three national parks—Olympic, North Cascades, and Mount Rainier. Wilderness status will limit the activities allowed in these areas, keeping them as pristine as possible.

In final-hour budget deliberations, Congress increased National Park Service funding considerably beyond administration requests. Maintenance, construction, and land acquisition were increased by $25 million, $145 million, and $40 million, respectively.

Congress failed to allocate revenues from National Park System visitor fees to resource management, research, and interpretation—a measure called for in recently passed legislation, and pressed for by NPCA.

Congress failed to pass the American Heritage Trust Act as well. This law would provide increased and more stable funding for parkland acquisition and for historic preservation. Monies would come from a trust fund based on revenues from offshore oil leases.

Though the House passed H.R. 3964, a bill to establish a presidentially appointed body to oversee the National Park Service, the Senate did not vote on the legislation. The measure would help free the NPS, to some extent, from the influence of Interior Department political appointees.

Medical Waste Just One Threat to Beaches

Last summer, the dumping of large volumes of medical waste off the East Coast fouled many miles of beaches and received extensive media coverage. Few national seashores were substantially affected by this particular problem, but the media attention paid to medical waste was not shared by other, more insidious threats washing up on these beaches.

Unusual levels of medical waste surfaced at only a few NPS areas, excepting Gateway NRA. Gateway, which lies in and around New York City, received high levels of medical waste resulting from several incidents of illegal dumping off-shore. Fire Island National Seashore on Long Island received sporadic deposits of syringes and a few vials of blood. Fire Island beaches were closed on only one occasion.

A heavy volume of medical waste, including blood and intravenous bags, surgical tubing, and surgical gloves, washed up on North Carolina's Cape Lookout National Seashore in early August. This was an isolated incident, however, and was traced to a Navy ship. The Navy admitted responsibility and sent personnel to clean the beach.

Gateway NRA was the hardest hit by medical waste. Several hundred individual items, including syringes, vials, bags of blood, and medical tubing surfaced at Gateway during July and August. The incidents forced the closing of most of Gateway's beaches on several occasions during the two months. Great Kills Beach, part of Gateway's Staten Island unit, was shut down for a total of 27 days.

NPS/DON RIEPE

Syringes on Gateway's beaches.

Yet, medical waste presents less of a threat to visitors and resources than other types of wastes that wash up on urban seashores, say park officials. According to Dr. John Tanacredi, natural resource management specialist at Gateway, readings taken at the recreation area after each of the medical waste inundations indicated that these barely af-

NEWSUPDATE

▲ **Wilderness.** This year marks the 25th anniversary of the passage of the Wilderness Act. NPCA and other conservation groups will be celebrating throughout the year. A special section of the magazine will be devoted to wilderness, and members will be kept informed of legislation affecting park wilderness. We hope members will mark this anniversary in the best way possible—by urging the support of wilderness bills in the coming 101st Congress.

▲ **Bush Gets Blueprint.** Last November 30, environmental leaders, representing more than 35 national environmental groups, met with President-elect George Bush and presented him with a *Blueprint for the Environment*. This document contains more than 700 recommendations on how the new president can address environmental problems.

▲ **Pritchard Awarded.** On December 8, NPCA President Paul Pritchard was given the Climate Institute Award for his outstanding service as the institute's founding chairman and convener of its first North American conference.

fected the actual bacterial level of the water.

Dr. Tanacredi attributes the public's reaction to understandable concern over the spread of the Acquired Immune Deficiency Syndrome (AIDS) virus. Some items that washed up on East Coast beaches were found to be tainted with the deadly virus.

Surges of other types of wastes in the area, such as polychlorinated biphenyls (PCBs), petroleum, and chlorinated hydrocarbons, are not uncommon and wreak havoc on the area's water quality. Such toxins leach into New York and New Jersey waters from garbage dumps, or are spewed into the atmosphere by automobiles and then returned to bodies of water through precipitation. Often, boaters illegally toss dirty engine oil overboard. These chemicals eventually find their way into Gateway's surf.

These materials are all toxic, and PCBs are thought by some experts to be carcinogenic. Their most immediate threat is to the area's fish. Recently observed precancerous conditions and malformed organs are being attributed to the chemicals. Although present levels do not harm humans, all of the substances bioaccumulate—build up in the food chain—and may pose a serious long-term threat. "The overall ecological health of the system is much more threatened by these insidious pollutants," said Dr. Tanacredi.

Similarly, Cape Cod National Seashore, which reported some half dozen items of medical waste over the entire summer, has a problem with illegally dumped trash washing up on beaches. Plastic materials, which do not disintegrate, prove a danger to fish, seabirds, and sea mammals. The animals can become entangled, often fatally, in plastic ropes, nets, and bags. Chief Ranger Tony Bonano called such fatalities, though occasional, a problem at Cape Cod.

The animals also ingest the material. The National Marine Fisheries Service estimates that 15 percent of dead seabirds collected in the Cape Cod area are found to have plastic in their digestive systems. Ingestion of plastics can cause ulcers and other problems, and can eventually lead to death.

SENATE HOLDS HEARINGS ON NPS FIRE POLICY

On September 29, two Senate subcommittees held a joint oversight hearing on the fire management policies of the National Park Service and the National Forest Service. The hearing was prompted by last summer's extensive fires in the greater Yellowstone area.

The hearing's purpose, declared then-Senator John Melcher (D-Mont.), was to determine "if there is a problem with the policy, if there is a problem with the policy's application, or both."

Melcher chaired the joint hearing of the Subcommittee on Public Lands, National Parks and Forests and the Subcommittee on Conservation and Natural Resources. The hearing's witness list was limited to senators from the Yellowstone area and government officials involved in fire policy.

During testimony, Secretary of Interior Donald Hodel announced plans to form a review team of experienced professionals to reevaluate current fire policy. The panel is to be set up in conjunction with the Department of Agriculture, which oversees the Forest Service. Hodel said its findings would be subject to public comment, and would be issued by December 15.

Present fire management policies regarding NPS natural areas are similar to those covering wilderness areas in the Forest Service. In the early 1970s, after many decades of strictly suppressing all fires, managers in the two agencies realized they were interrupting a natural process vital to the ecological health of a forest. Policy was amended to allow naturally caused blazes to burn, as long as they did not threaten people, structures, or lands outside park or forest.

Unusually hot, dry, and windy conditions last summer, combined with fuel loads built up during decades of fire suppression, sent 13 major fires blazing through 990,000 acres of the greater Yellowstone area.

In testimony, Secretary Hodel illustrated, with the aid of a map, the large portions of Yellowstone that were left untouched or only partially burned. Witnesses and senators commented that these portions seemed substantial, considering the extent of the summer's fires and accompanying media reports.

Hodel and Assistant Secretary of Agriculture George Dunlop lauded the efforts of the nearly 10,000 men and women who fought the fires. Both men defended decisions made by on-site managers about when to begin suppressing the closely monitored natural fires.

Blazes like the North Fork fire swept 700,000 acres—one-third—of Yellowstone NP.

CHRISTOPHER HODGES

Subcommittee members did not challenge the benefit of fire to the ecosystem, but did query witnesses closely on details of the fire policy and its application at Yellowstone.

Secretary Hodel, aided by NPS Director William Penn Mott, Jr., and Chief Ranger Walter Dabney, responded to an array of questions from subcommittee members, and particularly from senators Malcolm Wallop (R-Wyo.) and James McClure (R-Idaho). Questions covered the sequence of decisions and actions; the NPS's handling of the media; and allegations by local residents of hesitant fire suppression.

The senators also examined Yellowstone's conformity with standing NPS policy, which calls for reducing fuel loads caused by approximately 100 years of fire suppression.

Witnesses explained reasons for managers' actions and high-level decisions. Neither Hodel nor Dunlop would comment on actual policy changes, however, except to announce the formation of the review panel.

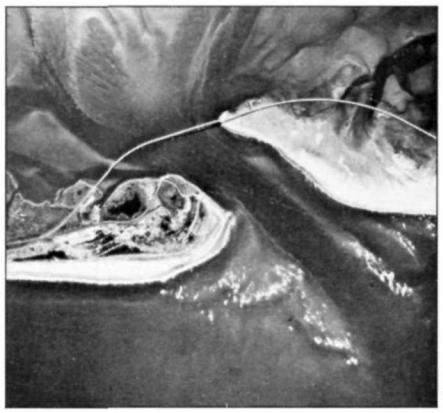
HATTERAS JETTY PLANS SET BACK, NOT HALTED

Maneuverings in the final weeks of the Reagan administration and of the 100th Congress may greatly affect long-standing plans for construction of a pair of massive rock jetties on either side of Oregon Inlet. The inlet lies toward the northern end of Cape Hatteras National Seashore, North Carolina.

President Reagan, by deciding to uphold an Interior Department ruling, has refused permits for the jetties. Reagan's September 12 decision was announced in a short statement issued by the Office of Management and Budget (OMB). The decision came despite a personal appeal from North Carolina Governor James Martin (R), who asked the President to clear the way for the project.

The statement said the President found "no basis for reversing the Department of the Interior's position."

Following Reagan's ruling, and in the flurry of activity before the close of the 100th Congress, North Carolina senators



NOAA

Jetties are planned for Oregon Inlet.

Jesse Helms (R) and Terry Sanford (D) tried unsuccessfully to tack a proposal to allow construction of the jetties onto the well-supported drug bill. Though the clause was not added to the bill, its backers won assurances of a Senate hearing on the project in the next Congress as a compromise.

Plans to build the pair of mile-long, rock jetties have been around for almost 20 years. In 1970, the Army Corps of Engineers, at the urging of state and local authorities, drew up plans for the structures in order to provide commercial fishermen with a permanent, safe channel through treacherous Oregon Inlet. The inlet is a dramatic, natural rift between the national seashore's Bodie Island and Pea Island National Wildlife Refuge.

The ensuing controversy set the Interior Department, the OMB, and conservationists against the area's influencial commercial fishing industry, and a host of North Carolina officials.

The Interior Department, which controls the land on both sides of the inlet, opposed the jetties and refused to grant necessary permits for the project. It contended that the jetties would cause harmful erosion to public beaches, and would detract from the area's aesthetic quality.

Critics also challenged the economic soundness of the Corps' proposal. An OMB analysis pointed out major problems with the proposal, and refused to sanction the $100-million project.

Despite such opposition, members of North Carolina's congressional delegation introduced legislation to override Interior's position in each of the last four Congresses. Such efforts, though nearly successful on one occasion, have been fruitless to date.

With a Senate hearing pending, the President's decision may not be the final word on the matter. Though the National Park Service supports the compromise of better dredging the inlet to make it safer for fishing boats, the commercial fishing industry continues to push for the jetties.

"As long as it's dangerous to go through the inlet," said Kent Turner, a natural resource specialist at Cape Hatteras National Seashore, "and there is a commercial need to go through it, this will continue to be an issue."

NPCA supports the compromise. Dredging over the past few years has improved navigability. Better dredging would further improve conditions.

INTERIOR LOOKING TO CONTRACT OUT PARK JOBS

The Interior Department is again trying to reduce its staff and shift some of its duties to private industry, according to a recently obtained Interior Department memorandum. Interior Secretary Donald Hodel proposes cutting the department's 69,000 jobs by about 2,000.

More than 500 of the cuts are targeted for the National Park Service. The proposal calls for transferring much NPS maintenance and some interpretive work to private interests. Under the plan, work would be contracted out by a bidding system.

The memo said Hodel proposed the measures "to utilize resources more effectively, provide managers with increased flexibility with respect to staffing, and make more effective use of the private sector in improving service to the public."

Such proposals have surfaced before at Interior during the Reagan administration. Former Secretary James Watt's attempts to contract out NPS maintenance programs provoked an outcry from conservationists and NPS professionals, who feared profit motives and park goals would conflict.

Opponents were concerned that contractors would be accountable not to park ideals, but to their contracts, and that standards would fall. Contracting out maintenance of historic structures, for example, could adversely affect these resources. Hired crews may not have the knowledge, experience, or dedication of NPS experts.

Opponents are now highly alarmed because recent plans target cuts for interpretation and publications in addition to maintenance. Distancing the National Park Service from the public in this way may adversely affect the quality of its work and its image.

The proposed cuts follow a standing administration policy calling for reduction of the federal bureaucracy and transferral of jobs to the private sector. In an October 22 report on the subject, however, the *New York Times* cited an anonymous source at Interior who claimed Hodel was under no pressure from the White House to make cuts of the magnitude proposed.

NPCA opposes Hodel's plan because, besides the inherent conflict between profit motive and park goals, it would hinder NPS operation and lessen valuable contact between the National Park Service and the public. Park managers now have the ability to respond to unexpected changes that may arise in maintenance or interpretation by allocating more or less resources to these areas.

Sudden increases in visitation during the summer months, for example, can be accommodated under the present set-up by hiring seasonal rangers to accommodate more visitors.

Similarly, park employees on maintenance detail can be used to deal with unexpected emergencies that may arise. Contracts with private concerns would not be so flexible.

"Excellent visitor services, through educational programs and the cleanliness of the parks, are the hallmarks of the National Park Service," said T. Destry Jarvis, NPCA's counselor for conservation policy. "Secretary Hodel's plan for personnel reductions would be devastating to these functions and to the agency's public image, and should be rejected by the administration."

NATIVE MARKER PLANNED AT CUSTER BATTLEFIELD

The National Park Service plans to install a memorial to the Native Americans who died in the Battle of the Little Bighorn at Custer Battlefield National Monument in southern Montana. No such official memorial is now in place.

NPS Director William Penn Mott, Jr., announced his approval of a memorial in early September. Custer Battlefield Superintendent Dennis Ditmanson says the NPS will consult with Native groups on design and placement of the memorial, and for help in raising funds.

Ditmanson hopes to inaugurate a design competition similar to the one that resulted in the Vietnam Veterans Memorial in Washington, D.C. The NPS is targeting final plans for 1990.

The National Park Service's decision came in response to the placement of an unnofficial memorial on the site during a June 25 rally by about 50 Sioux and Cheyenne. Participants in the rally, commemorating the 112th anniversary of the battle, laid a roughly made, four-foot-square metal plaque on the site. The inscribed plaque honors "our Indian patriots who fought and defeated the U.S. cavalry. . . ."

Superintendent Ditmanson moved the plaque into the visitors center, but kept it on display. The plaque had originally been placed next to a granite column marking the mass burial site of U.S. Army soldiers.

Ditmanson surveyed park visitors on the appropriateness of a memorial to Native Americans dead at the site. By the end of September, responses were running more than two to one in favor of the idea.

Ditmanson claims that, although there has never been an official memorial on the site, the NPS has moved, over the past several years, toward a much more even-handed interpretation of events.

Custer Battlefield National Monument was the site of the famous Battle of the Little Bighorn, or Custer's Last Stand, on June 25, 1876. The clash is known as the Battle of Greasy Grass Creek among the Native groups that were engaged.

In the battle, 261 U.S. Army soldiers, civilians, and Native scouts, led by Lt. Col. George A. Custer, were defeated by several thousand Sioux and Cheyenne, led by Sitting Bull and Crazy Horse. The battle was pivotal in the struggle for control of the Great Plains.

Sitting Bull led Sioux and Cheyenne warriors at the Battle of Little Bighorn.

NPS

INTERNATIONAL HEARINGS ON MINE NEAR GLACIER

Last September, the International Joint Commission (IJC) held field hearings on whether or not a large coal mine should be permitted at Cabin Creek, Canada, near Glacier/Waterton International Peace Park.

The IJC, which arbitrates water use disputes between the United States and Canada, will weigh testimony from the hearings along with a recent report from an IJC-appointed study group. Findings are expected within a few months. The commission's recommendations are not binding on British Columbia's provincial government, which has final say in the matter.

Because of its location, development of the mine would greatly affect Glacier National Park's water resources. Although the IJC is restricted to examining water issues, its enquiry has sparked debate on the broader ramifications of the mine.

Chief witnesses at the hearing included representatives of the British Columbia provincial government, recently retired Montana Governor Ted Schwinden (D), Glacier National Park Superintendent Gil Lusk, and concerned

HUNGRY HORSE NEWS/MEL RUDER

Canadian mine would deplete trout in the North Fork of the Flathead River.

conservationists from the United States and Canada. With the exception of Vic Farley, British Columbia's constitutional affairs advisor, all of the witnesses testified against the mine's development.

Farley reaffirmed his government's ultimate authority in the matter, though he did say the province would consider the IJC's advice in deciding whether to permit the mine.

Sage Creek Coal, Ltd., plans to build and operate an open-pit coal mine about six miles northwest of Glacier, upstream from the park on the North Fork of the Flathead River. The proposed mine, to be located on lands owned by the province of British Columbia, would be a relatively large operation. The project would turn two hills on either side of Cabin Creek—a tributary of the Flathead—into 1,000-foot-deep, mile-wide pits.

NPS officials strongly opposed the mine, arguing that it would seriously impair the Glacier ecosystem. They cited immediate impacts the mine would have on the Flathead River, which is vital to the ecological integrity of the park, and took issue with the scope of the study group's report.

Although the report did point out significant reductions in the river's trout population and an increase in the river's nitrate load—both resulting from the mine's operations—it did not detail the long-term consequences. Glacier National Park officials say the changes would affect the entire ecology of the river.

Officials also cited the failure of the study group to account for the impacts of the projected 41-year lifetime of the mine. Its report covered a span of only 21 years.

Glacier officials pointed to other concerns, including the degradation of air quality from coal-processing emissions, acid deposition, and the impact of increased human activity on the area. They also said this increased activity will have a direct, negative effect on both wolf and grizzly populations.

COLORADO PROPOSES PROTECTING VISTAS

Last September, Colorado's Air Pollution Control Division drafted recommendations for protecting visibility in the state's scenic vistas. The measures seek to identify important scenic vistas, establish visibility standards, and clean up polluting industries.

At present, significant scenic vistas in Colorado, many of them seen from national park areas, are frequently obscured by air pollution. The spectacular views seen looking south from Mesa Verde, for example, are often marred by a plume of smoke emitted, in part, by power plants in New Mexico.

The National Park Service says that emissions of sulfur oxides from power plants, smelters, refineries, and industrial boilers are largely responsible for visibility reduction in the area—and the problem is growing worse.

The Environmental Protection Agency projects that sulfur dioxide emissions from coal-fired power plants in the 17 western states will increase by 125 percent by the year 2010.

Yet, in 1985, Interior Secretary Donald Hodel scrapped a federal program designed to protect park vistas. The Clean Air Act, now the sole applicable federal legislation, requires visibility protection only in limited cases.

The law, as now interpreted, applies only to what are termed Class I areas, those views completely contained within larger national parks and wilderness areas. Not protected are national parks and wilderness areas established after 1977, most national monuments, smaller wilderness areas, and views outside of national park or wilderness boundaries.

The Pollution Control Division, which researches and prepares new policy proposals, submitted its recommendations to the Colorado Air Quality Control Commission, a governor-appointed body that sets policy for the state. Notable measures advised by the Air Pollution Control Division to protect vistas include:

▲ compiling a list of important scenic vistas—most of which are not protected—and requiring all new sources of pollution to analyze potential impacts on these vistas;

▲ establishing a visibility standard for Colorado's Class I vistas;

▲ seeking EPA assistance in requiring the Four Corners and San Juan power plants in New Mexico to reduce emissions;

▲ working with the National Park Service and the U.S. Forest Service to study Colorado's regional haze;

▲ establishing an informal committee to oversee the monitoring of air quality in Colorado's scenic vistas.

Conservation groups, including NPCA, support these measures, but advise that the division strengthen its rec-

ommendations and adopt several more. Chief recommendations prepared by conservationists are:

▲ extending protection to include all wilderness and national park areas;

▲ requiring new industries to consider alternative sites that will avoid affecting vistas;

▲ reducing emissions from existing Colorado pollution sources that are affecting vistas;

▲ monitoring existing conditions in significant scenic areas to determine the extent of visibility impairment.

Terri Martin, NPCA's Rocky Mountain regional representative, has submitted these recommendations to the Air Pollution Control Commission. The commission will consider the recommendations over the coming months, and resulting policy changes, if any, are expected early this year.

NEW NPCA LAW BOOK ON PARK PROTECTION

In early October, NPCA and Island Press released *Our Common Lands: Defending the National Parks*, an important new book on national park protection.

This 567-page collection of essays addresses the current state of park protection law in the United States. The book describes the effectiveness of federal environmental law, from the NPS Organic Act of 1916 to recent Clean Air Act amendments, in protecting parks.

Edited by David Simon, NPCA's resource policy specialist, *Our Common Lands* comprises 18 essays by such noted legal scholars as Joseph Sax, a professor at Berkeley's Boalt School of Law, and J. William Futrell, president of the Environmental Law Institute, based in Washington, D.C.

These authors explain and analyze such complex and crucial legislation as the National Environmental Policy Act, the Clean Water Act, and the Endangered Species Act. The book draws on actual cases to describe how these laws function, how they are interpreted, and how they defend the parks.

Former Secretary of the Interior Stewart Udall called the book first-rate and invaluable. "This superb book contains all of the elements of a battle plan to preserve the national parks," he said.

Our Common Lands is available in cloth or paperback for $45.00 or $24.95, plus postage and handling, from Island Press, P.O. Box 7, Covelo, CA 95428. Or, write NPCA, 1015 Thirty-first St., NW, Washington, D.C. 20007.

BLM TRADE FOR ARIZONA LANDS, MINERAL RIGHTS

In two separate deals completed in October, the Interior Department's Bureau of Land Management (BLM) acquired crucial conservation lands and mineral rights in Arizona by trading off lands and rights it held in less sensitive areas of the state.

The exchanges affected 12 wilderness study areas, three national wildlife refuges, and Grand Canyon national park. NPCA was instrumental in negotiating both agreements.

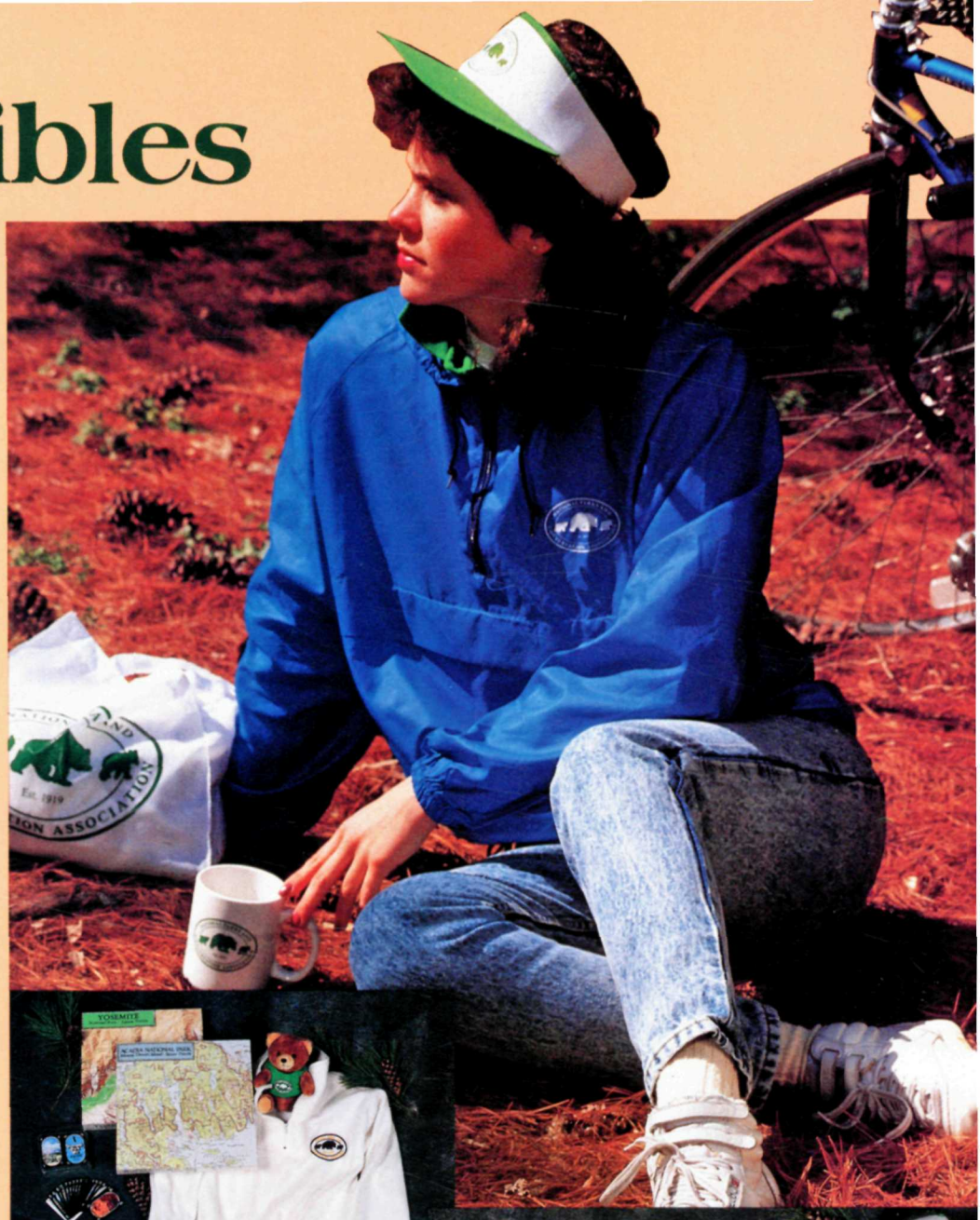
Congress authorized the first trade on October 20. Under the agreed exchange, approximately 200,000 acres of land were transferred between the BLM and several state and federal agencies. As a result, the BLM acquired 90,000 acres of land from the state of Arizona in the Buenos Aires National Wildlife Refuge southwest of Tucson. It also rescued 5,000-acre Catalina State Park near Tucson from urban development.

In addition, the agency acquired the remaining nonfederal lands in the archeologically rich Black Canyon area north of Phoenix, as well as mineral entry rights in the rugged and scenic Kofa National Wildlife Refuge, which lies in western Arizona.

The other exchange, completed on October 29 between the BLM and the Santa Fe Pacific Corporation, chiefly involved subsurface mineral rights on some 282,000 acres of land.

The trade secured from the railroad mineral rights for 25,000 acres in Grand Canyon National Park and 109,000 acres in 12 BLM wilderness study areas. The latter will free up about a half-million acres in western Arizona for possible addition to the wilderness system.

Collectibles



Clothing

NPCA Hamilton Bay Pullover. Heavyweight arctic fleece, tailored collar, set-in sleeves, pockets, knit cuffs and waistband, machine washable. Embroidered NPCA logo. 100% polyester. Made in the U.S. Sizes: S, M, L, XL. White or Gray. *N101,* $32.50

NPCA Popover Pouch Jacket. Drawstring hood, elastic cuffs. Folds into zippered pouch pocket. Royal blue with white NPCA logo. 100% ripstop nylon. Adult sizes: S, M, L, XL. *N102,* $20.95

NPCA Polo Shirts. Cotton/polyester knit with NPCA logo. Green or white. Made in the U.S. Adult Sizes: S, M, L, XL. *N103,* $16.95

NPCA T-Shirts. Machine washable cotton/polyester with NPCA logo. Made in the U.S. Kelly green or white. Adult sizes: S, M, L, XL. *N104,* $6.95

NPCA Baseball Cap. Kelly green NPCA logo on white cap with matching green bill and mesh. One size fits all. *N105,* $4.95

NPCA Suntamer Visor. Snap-back visor with green bill and NPCA logo in kelly green on white front. *N106,* $4.95

Pins & Patches

NPCA Lapel Pin. Green and gold enamel. *N107,* $3.50

NPCA Park Pins. Set of ten color pins featuring different park emblems and the NPCA logo. *N108,* $7.50

NPCA Patch. NPCA logo embroidered in green, gold, and brown on white. *N109,* $2.50

Dates and Notes

America's National Parks 1989 Calendar. Over 60 full-color photos of America's National Parks and Monuments with interesting facts and information. *N110,* $9.95

America's National Parks Notecards. Stunning scenic and wildlife color photos grace these high-quality notecards. Twelve cards of one design per box, $12.00. Cards also sold individually, $1.00 each.

- Grand Teton National Park, *N111*
- Great Smoky Mountains National Park, *N112*
- Yosemite National Park, *N113*
- Glacier National Park, *N114*

Mind Teasers

National "Park Wit" Discovery Games. Amass points by answering intriguing questions about our natural and historic parks. Four versions, each with 108 different cards. $7.95 each.

- National Park Wit, *N115*
- Yellowstone & Grand Teton Wit, *N116*
- Civil War Wit, *N117*

Northwest National Park & Forest Wit, *N118*

Entire set of 4 games, *N119,* (Deluxe gift set) $34.95.

National Park Jigsaw Puzzles. Full-color, 500-piece puzzles reproduced from U. S. Geological Survey maps, showing scenic routes, trails, elevations, contour lines, and points of interest. Five puzzles. $10.00 each.

- Grand Canyon National Park, *N120,*
- Yosemite National Park, *N121,*
- Yellowstone National Park, *N122*
- Mount McKinley, Denali National Park, *N123.*
- Acadia National Park, *N124.*
- Entire set of five puzzles, *N125,* $45.00.

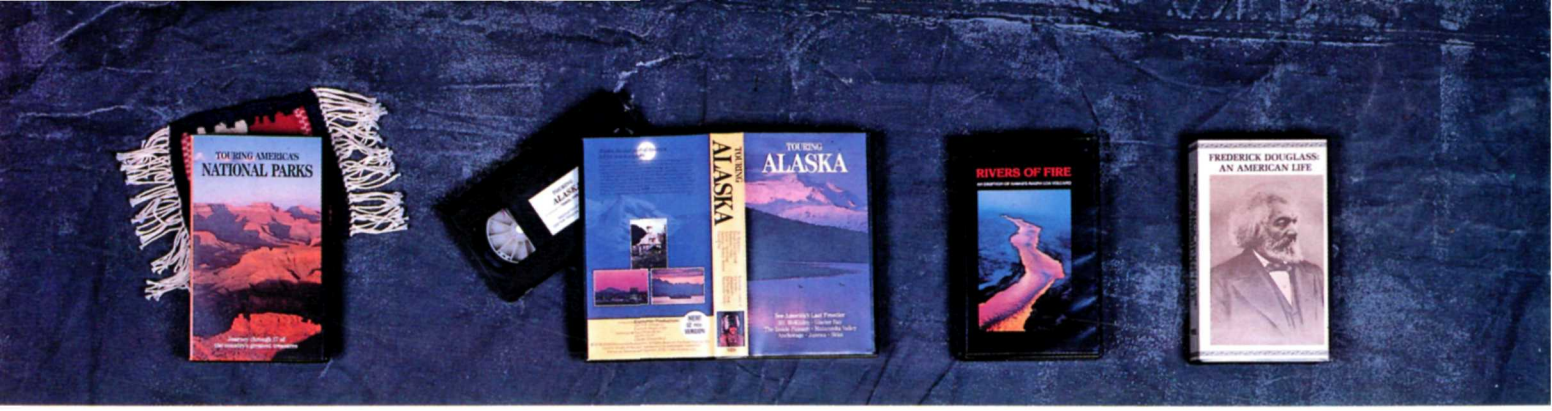
Fun & Useful

NPCA Stuffed Bear. Plush 8-inch toy made of safe, non-flammable synthetic material. *N126,* $15.95

NPCA Tote Bag. Made of sturdy 70 denier coated nylon, 13 by 11.5 by 3 inches. It folds into a handy carrying pouch. White with green NPCA logo. *N127,* $4.95

NPCA Coffee Mug. Handsome, 11-ounce stoneware coffee mug, dishwasher safe. Green NPCA logo on almond or white mug. *N128,* $5.50

Of course, all items come with our money-back guarantee.



Video Tapes

Produced with the visitor in mind, these video tapes are an entertaining and informative way to discover the landscapes and people that make America what it is.

Carver: Man of Vision. The life of George Washington Carver, the famous black agronomist. 30 minutes. VHS, *P101*. BETA, *P102*. $19.95

Castle on the Plains: They Came to Build. The story of Bent's Old Fort National Historic Site in Colorado. 25 minutes. VHS, *P103*. $29.95

A Day in the Life of Fort Laramie. A nostalgic glimpse at life in this historic fort on the plains of Wyoming. 26 minutes. VHS, *P104*. $32.00

Frederick Douglass: An American Life. Explore the life and times of this fugitive slave turned orator and statesman. 30 minutes. VHS, *P105*. $17.95

Rivers of Fire: An Eruption of Hawaii's Mauna Loa Volcano. Witness a volcano erupting. 30 minutes. VHS, *P106*. BETA, *P107*. $39.95

River Song: A Natural History of the Colorado River. Narrated by Richard Chamberlain. 40 minutes. VHS, *P108*. $29.95

Touring Alaska. Trek through Mt. McKinley, Glacier Bay, the Inside Passage, Matanuska Valley, Juneau, and Sitka. 52-minutes. VHS, *P109*. BETA, *P110*. $29.95

Touring America's National Parks. Journey through 17 of America's greatest treasures. 60 minutes. VHS, *P111*. BETA, *P112*. $29.95

Touring Civil War Battlefields. Visit Manassas, Antietam, Fredericksburg, Gettysburg, ending with the Surrender of Appomattox Court House. 60 minutes. VHS, *P113*. BETA, *P114*. $29.95

Wild Alaska! View Alaska's wildlife from the alpine tundra below Mt. McKinley to the vast expanse of the frozen north slope. 60 minutes. VHS, *P115*. BETA, *P116*. $29.95.

ORDER FORM

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Daytime phone number: ( )

Shipping address: _____

_____

_____

Gift from: _____

Order Number	Qty.	Price	Description	Size/Color	Total Price

Subtotal
D.C. residents add 6% tax
Postage & Handling (see chart)
TOTAL

Check ☐ VISA ☐ MASTERCARD ☐

Acc't No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Expiration Date ☐☐☐☐

Signature:

Postage & Handling: 1–3 items: $2.50
4–6 items: $3.00
7–10 items: $3.50
Over 10 items: $4.00

Please use the attached envelope.
Please allow 4–6 weeks for delivery.
Some items in your order may be sent separately.

Park Education Materials Center
National Parks and Conservation Association
1015 Thirty-first Street, NW
Washington, D.C. 20007
202/944-8588

Under the exchange, the BLM also acquired about 9,000 acres of mineral interests in Havasu National Wildlife Refuge, which lies along the lower Colorado River.

The BLM plans to turn lands and rights acquired over to the respective federal agencies within whose boundaries they lie. The National Park Service has already received title to mineral rights in Grand Canyon.

Russ Butcher, NPCA's Southwest and California regional representative, called the exchanges landmark, and cited the patience and persistence of negotiating parties.

Arizona Parks Council Works to Aid Saguaro

The Arizona Parks and Conservation Council held its fifth annual meeting October 21 to 23 at Rancho de la Osa near Sasabe, Arizona. Council members met to discuss a wide range of park and related public lands issues.

NPCA established the council five years ago. Its 25 volunteer members aid the association in defending Arizona's national and state parks.

Council members have represented NPCA at public meetings on issues such as management proposals for Saguaro National Monument and county zoning measures affecting development adjacent to parklands. Recently, members aided successful land exchange negotiations between the BLM and various corporations and governmental agencies (see preceding story).

Speakers at the October meeting included D. Dean Bibles, the BLM's Arizona state director, Grand Canyon Superintendent Richard Marks, and representatives of both the western and southwestern regional offices of the NPS. Bibles received the council's 1988 Conservationist of the Year Award for leadership in the land exchange and other projects.

Among the council's current projects are the reduction of traffic congestion at the south rim of the Grand Canyon, and the protection of a large property adjacent to Saguaro National Monument.

National Parks: Year 2000

Adapting to Older Visitors, Language Barriers, and a Worldwide Role

By William Penn Mott, Jr.

In this fast-paced world, it's easy to allow day-to-day problems to demand all of your time. But it is also critical to look ahead to the future in order to be truly effective.

My decision to accept the directorship of the National Park Service hinged on whether I felt that I would be able to make a *real* contribution. I wanted to make an impact, to effect change, to dramatically improve where improvement was necessary, the running of the National Park System.

I knew that the Park Service's mission of preserving the natural and cultural resources of the National Park System required my focusing not only on how best to manage the system for today, but also for the future.

Preparing for the future means preparing for possible change. And I have found over the years that, for the most part, people don't like change. Not only do people often attempt to resist it, but, in fact, many do everything they can to avoid it. For some, however, change is welcomed because it represents a new beginning as well as offering new opportunities.

In dealing with the future and the changes it will inevitably bring, the National Park Service faces a challenging dichotomy. On one hand, since the Park Service's beginning in 1916, we have been charged with preserving in perpetuity the many natural and cultural resources that are contained in the National Park System.

On the other hand, we must fulfill our responsibility to the visiting public by providing people with enjoyable experiences in the national parks.

In slightly more than ten years, we will be embarking on the 21st century. To assist the Park Service in identifying emerging trends and their implications, I have established the 21st Century Task Force.

The 21st Century Task Force includes members from all parts of the National Park Service, including Southeast Regional Director Robert Baker, who is chairman of the group, George Washington Memorial Parkway Superintendent John Byrne, Office of Policy Chief Carol Aten, Alaska Regional Historian William Brown, and approximately two dozen others.

Some of the questions the task force has been focusing on include: What changes do we foresee? How do we intend to cope with the upcoming changes?

Do we have the flexibility, creativity, and leadership necessary to handle the changes that will come and still be true to our mandate?

Perhaps one of the greatest pressures the Park Service will have to face will be this country's changing population. Just the sheer numbers of visitors that we anticipate during the next 15 to 25 years require the Park Service's immediate attention.

Right now the 354 units of the National Park System receive a total of 287.6 million recreation visits per year. At the current rate of population growth, it is expected that recreation visits to the parks will reach at least a third of a billion by the year 2015, a jump of 16 percent.

Along with the continuing increase in the number of national park visitors, we can also assume an increase in the number of automobiles, RVs, buses, and other vehicles.

In addition, the National Park Service may be required to accommodate special needs. For example, our country's population is aging.

Some have said that the impact of this phenomenon will be as significant as that of any economic or social movement of the past.

An older population could mean more people entering a period of their lives when they have more money to spend on nonessentials such as travel. Already, we are witnessing an increase in baby-boom visitors.

This generation, now entering their forties, is spending more time and money on leisure activities. With older visitors, the use of parks may change and the Park Service must be ready to create or adapt existing visitor services to meet new needs.

Where We Have Lost Park Species, We Must Seek to Replace Them

It is also reasonable to expect that we will be receiving greater numbers of non-English-speaking visitors. This will require that the National Park Service actively recruit employees and volunteers who are bilingual or even multilingual. In addition, more brochures, exhibits, and other interpretive materials will need to be provided in languages other than English.

As the numbers of visitors increase, the Park Service will have to initiate innovative management techniques. These techniques could include improving visitor circulation patterns and providing more group transportation so that all visitors will be able to enjoy the parks.

At the same time, the Park Service will have to protect natural and cultural resources from the increased numbers of park visitors.

The Park Service also must address critical resource management issues, such as biological diversity and the problems associated with acid rain, air pollution, the destruction of the world's ozone layer, and the continuing pollution of our oceans, rivers, and other waterways. These problems must be addressed both nationally and internationally.

What can the Park Service do to aid in the preservation of species near extinction and thus promote biological diversity? I think we can work actively to create and participate in an international conservation network.

The need for such a network becomes glaringly apparent when as much as 15 percent of the world's organisms—a rate amounting to an average of two to three species per hour—may become extinct in the next 30 years.

Further, at least two-thirds of the world's estimated four to five million species occur only in the tropics. And the world's band of tropical forests are being destroyed at a fairly alarming rate.

A response to this loss was Congress' recent designation of the National Park of American Samoa. Samoa, as part of the world's tropical belt, contains valuable and fast-disappearing Old-World tropical rain forest—rare habitat which is found only in the Far East and in the South Seas.

While we may not know for certain the kind of impact the increasing extinction of individual species will have on the complex web of ecological relationships, we certainly know enough about food chains and natural dependencies to realize the world is marching in a dangerous direction.

For some time, the Park Service has been analyzing what can be done to counter such negative trends in National Park System areas. Studies of the fast-disappearing Florida panthers and Yellowstone grizzlies are only two examples of the research projects we are currently supporting.

Preservation of healthy and well-distributed plants and wildlife is one of our goals. We must continue to do all that we can to prevent the further loss of National Park System species—both endangered and nonendangered flora and fauna.

Where we have lost species in a national park, we must seek to replace them, such as our efforts to reintroduce both wolves and bighorn sheep.

We also need to determine the best way to share what we learn with others, in order to help influence worldwide opinion on the importance of species preservation. Among recent exchanges are dialogues we have had with Caribbean countries on bird migrations and talks with visiting Soviet and Polish park experts.

Obviously, these are only a few of the areas that the 21st Century Task Force will be evaluating as the National Park Service focuses on the next century. I have no doubt that the Park Service organization that emerges from all this will be more responsive. But preparing for the future is a process we do not—and should not—enter alone.

The public as well as the Park Service must take on the role of good and wise stewards. As educators and interpreters, Park Service staff can help underline the importance of that stewardship.

Ultimately, a *partnership* between the National Park Service and the public will be required to ensure the continued preservation of this nation's natural and cultural heritage—a partnership facing today's challenges while preparing for the changes that the future inevitably will bring.

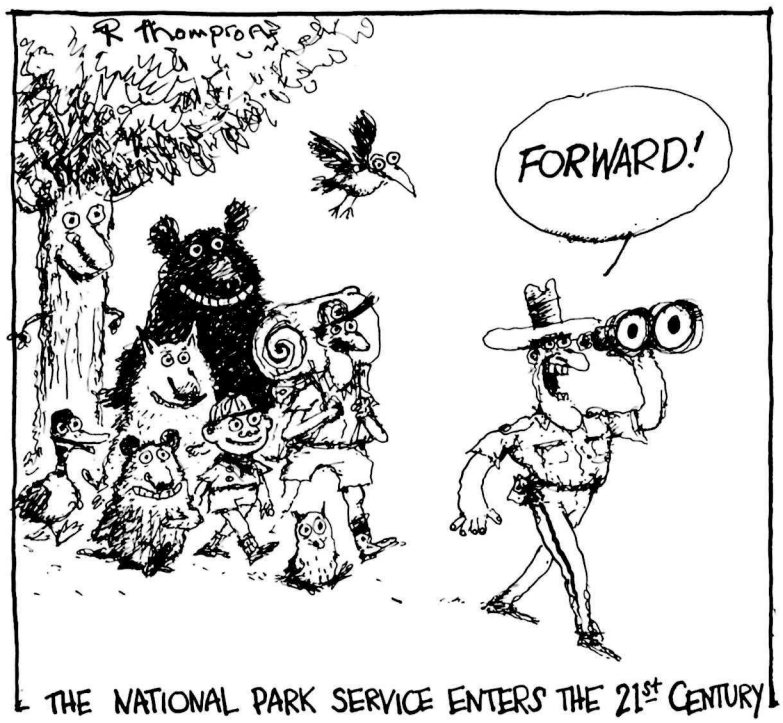
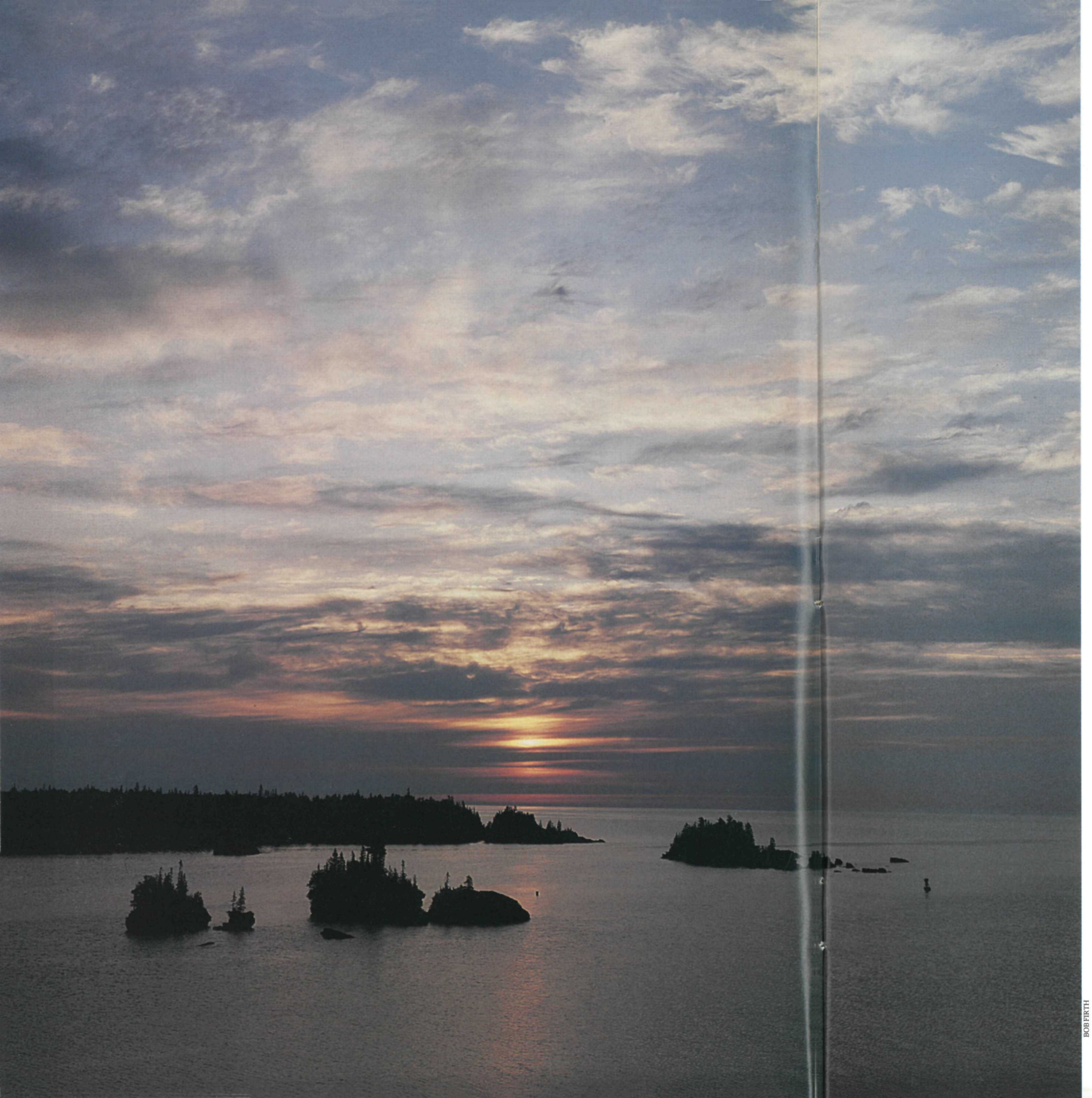


ILLUSTRATION BY RICHARD THOMPSON

William Penn Mott, Jr., has been the director of the National Park Service since 1985. Previously, he headed the California state park system. Mott's career in parks began as landscape architect in the National Park Service, where he worked on studies that were instrumental in creating Sequoia National Park and Death Valley National Monument.

In the 1930s, Mott was involved in a study that recommended creating a national park in the Great Basin region. Fifty years later, during his directorship, Great Basin National Park was finally designated.



BOB FIRTH

Wolves of Isle Royale

Scientists Test a Dying Population

By Stephen Nash

IT IS COLD this winter at Isle Royale National Park. Out on Lake Superior between Minnesota and northern Michigan, temperatures there can drop to 30 below. Snow, two feet deep in an average year, softens the contours of the ice-locked lakes, scarped ridges, and bone-white aspen. The eastern timber wolves that roam the island are well adapted for such extremes. Their thick winter pelage is proof against the cold, and moose kills are cooperative, efficient.

Only a few wolf tracks cross the snowfields now, however. The Isle Royale population, one of three that survive in the United States, has "crashed," as biologists put it, from a peak of 50 in 1980 to 12 last winter and probably fewer now. No one knows why.

An array of research projects is under way to probe the riddle of the wolves' decline, and national park administrators are weighing

their options. At least two of these scientific and management questions foreshadow situations that other national parks, and many natural preserves around the world, will face during the next decades.

▲ At times, the National Park Service and other resource-protection agencies encounter a conflict between protecting natural ecological processes and saving threatened wildlife populations. These conflicts revolve around an increasingly problematic paradox: What does "natural" mean?

▲ Protecting small populations of an endangered species may not suffice. If the species is to have a fighting chance for survival, some genetic variability must also be preserved.

Isle Royale, the serene backdrop for these difficult issues, is the kind of laboratory wildlife biologists dream of but seldom encounter. Its 210 square miles are isolated in the vastness of the world's largest body of fresh water.

The island's ecology is thus simpler and more self-contained than on the mainland, and predator-prey relationships unfold with greater clarity. Even more important, the impact of *Homo sapiens* has been extraordinarily restrained at Isle Royale during the last half-century. The park is roadless, and open to visitors only six and a half months a year.

Under these auspicious conditions, two generations of scientists have studied the lifeways of seven generations of wolves, and the wolves have enjoyed something akin to a state of grace.

Though a stream of articles and books have made them the most studied and most publicized of their kind, Isle Royale's wolves were the last known anywhere in the United States whose lives in the wilderness were not troubled by direct human contact.

Even the scientists took their notes from high above, during 30 winters of queasy circles in light planes. On the ground, they patiently collected and then analyzed moose carcasses and wolf scat, rather than the animals themselves.

The luxury of this scientific distance vanished during the past summer, however, after the wolf population's near-extinction had forced the issue. A team led by Dr. Rolf Peterson, a wildlife ecologist at Michigan Technological University, trapped and tranquilized four of the wolves, then released them after taking blood samples.

Also, for the first time, they fitted the wolves with radio collars. Mortality sensors in the collars will allow the scientists to retrieve—for autopsy—any of the four that die.

"A lot of us wish we didn't really have to do this, that we could allow the process to continue without our getting involved in it," said Robert Krumenaker, the park's resource management specialist, while the trapping effort was under way. "Many of us feel like we're losing something philosophically when we have to go in and handle the wolves—the symbols of wilderness out here."

Peterson has studied Isle Royale's wolves for 18 years, but because his research proposal reversed the long-standing park policy against direct contact, it was circulated among 20 administrators and scientists both within and outside of the National Park Service before it was funded and allowed to go forward. He had few doubts about the intervention.

Concerned that the island's entire wolf population would be wiped out, Peterson had few doubts about intervening. "When the specter of extinction is fully realized, you've got to push these minor concerns aside," he says.

"The greatest tragedy would be if they disappeared and we didn't even know why. Then you'd really be in the dark in terms of what to do next."

PETERSON IS SUPERVISING research that is a collaborative effort of scientists from Canada to California. The research is designed to investigate the three most likely reasons for the wolf population's sudden collapse: food scarcity, inbreeding, and disease. Two or even three of these possibilities may be interacting, and each is bound up with the relatively brief history of wolves and moose on the island.

Moose arrived from Canada soon after the turn of the century, though what caused their migration is unknown. They are strong swimmers, even in the forbidding chill of Lake Superior.

With no natural predators to control their numbers, the moose population may have reached 2,500 or more by the mid-1930s, far exceeding the island's capacity to support them. A typical moose consumes an estimated 3.65 tons of browse a year. Predictably, the uncontrolled moose population stripped the island of the available supply.

A catastrophic die-off claimed all but a few hundred of the animals, and observers speculated that even those might starve. Carcasses littered the island, and the smell reached park visitors arriving in the spring.

Instead, the remnant herd was spared, thanks to huge fires that burned nearly a

Wolves reached Isle Royale 40 years ago on an ice bridge from Ontario.

ROLF O. PETERSON

ROLF O. PETERSON

quarter of the island in 1936, clearing old growth and allowing new "moose salad" to grow. The moose population's slow buildup toward starvation began again.

Sometime during the winter of 1949, however, an ice bridge formed between the island and the mainland, and a pack of wolves made the crossing, probably from Ontario's Sibley Peninsula 15 miles away. They found a sanctuary free of their principal predators—men with guns—and a moose population ripe for harvest, and they prospered.

One of the most significant findings of the long-term Isle Royale wolf study has been the beneficial nature, for moose as well as wolves, of this predator-prey relationship. Thousands of hours of observation have confirmed that the wolves are masters at culling the old, the young, and the sickly from among the moose herd.

Indeed, though moose meat is 80 percent of their diet, the wolves must be extremely selective, or they court death. After it is a year old, the average, gentle-faced moose has no trouble deploying its hooves, antlers, and 900-pound bulk in formidable, and usually successful, self-defense. Wolves often face fractured ribs and worse in an encounter with a healthy moose.

The wolves limited the moose herd, the forage regenerated, and the herd became healthier. And both species were able to attain a higher population density than recorded anywhere else.

One theory on wolf dynamics had posed that, because of a strong sense of territory, wolves could not reach an average density greater than one per ten square miles. But, as Isle Royale's population grew to twice that number, it became apparent that food availability—more than territoriality—determines population density.

Given a stable environment, Peterson speculated, the cycle in which first prey, then predator, populations rise and fall on the island is roughly 30 to 40 years. Thus, under pressure from a burgeoning wolf population, the moose herd thinned by the late 1970s.

"In terms of their basic estate, the wolves spent the annual earnings of interest and were digging into the principal," wrote Durward Allen, the Purdue University biologist and self-described old-timer who founded the wolf study.

As wolves die off, scientists expect the number of moose to rise disasterously.

Vulnerable moose were increasingly rare. The wolves, numerous and hungry, began to turn on each other, yielding yet another significant finding. Wolves, it seems, have evolved social behavior that regulates their number when food becomes scarce. Deadly territorial conflict between packs increases, and reproduction decreases.

From 1980 to 1982, 50 wolves diminished to 14, and the moose population moved upward in the expected natural counterpoint. In two more years the wolves had rebounded to 24, about the average. But by the winter of 1987-88 the wolves had declined again to only a dozen, and scientists could not say why. Concern deepened that the wolves might all be gone before long. The research proposal was approved.

"If we find that the wolves' only problem is starvation," Peterson told a reporter, "the most common public response will be: 'Feed 'em.' "

Supplemental feeding would, of course, mean an even greater departure

BOB FIRTH

The island is remote, but that hasn't kept out parvovirus, a canine disease.

from the park's policy of noninterference with natural ecological processes. For these wolves, however, that issue may be moot.

The blood samples are being tested for levels of various nutrients, but the two males and two females Peterson trapped were larger than expected. Wolves are usually lean, he says, but "these guys were heavy."

Krumenaker described one as "an incredibly healthy-looking animal. She was beautiful. She had a fantastic coat, she seemed to be fit and have about the right amount of fat. She wasn't skin and bone. There was nothing visibly wrong with this animal. So food may or may not explain everything we're seeing."

Wolf watchers had wondered whether some factor other than the food supply might be at work, and Peterson had designed the research plan with that question in mind.

The blood samples were to be tested for several diseases, especially parvovirus. A disease that attacks canine digestive tracts, parvovirus has decimated populations of domestic dogs and captive wolves.

Isle Royale's isolation has been a partial barrier to mainland flora and fauna. But, as with the migrations of wolf and moose, chance and opportunity present the possibility for contamination.

Most human visitors to the island embark on boats at Houghton or Copper Harbor, on Michigan's upper peninsula, about 50 miles and four to six hours away. According to veterinarians there, parvo reached epidemic levels in Houghton in 1981, which coincides with the period of the wolves' most drastic decline. In that year, no wolf pups survived on the island.

"Parvo tends to kill pups really young, really fast," Krumenaker said. "Dogs, cats, and other mammals are prohibited from entering the park, but that doesn't mean

it doesn't happen. Every year we find a few. We insist that those people [with animals] leave the park, but the damage could conceivably be done."

Tests for parvo antibodies showed conclusively that the disease made it to the island at some time in the past, and thus cannot be ruled out as the cause of the wolves' decline. On the other hand, although an all-or-none result had been expected, only two of the four wolves tested positive for parvo. These signals were so enigmatic that the tests were run a second time, with identical results.

THE NEXT POSSIBILITY researchers are exploring involves the wolves' genetic predicament. Isle Royale's small contingent of *Canis lupus* is an island community in more than the obvious way. Its isolation cuts off the wolf pack from larger, ancestral gene pools in Minnesota and Canada.

As populations of countless other wild species are fragmented, isolated, and severely diminished by the competitive pressure of humans, these populations, too, will become genetic "islands."

If the members of these surviving groups are too closely related, chances increase that offspring will inherit maladaptive genes from both parents, a phenomenon called "inbreeding depression." Its most prominent symptoms are low reproductive capacity, high infant mortality, and low resistance to disease.

Cheetahs, for example, have always been difficult to breed in captivity. A series of experiments showed that the world's 20,000 remaining cheetahs are astonishingly homogenetic—almost as similar as siblings. This genetic similarity is evidence that, at one or at several times in the past, only a small number of cheetahs were alive to pass along their genetic legacy.

Sperm counts for tested cheetahs were extremely low, and 71 percent of the spermatozoa were misshapen, compared to about 29 percent in domestic cats. Cheetahs also seem to succumb to diseases that other related species are able to survive.

Condors, Asiatic elephants, black-footed ferrets, Florida panthers, and countless other "island" species may be vulnerable to the ill effects of inbreeding depression because of narrowed genetic variability. For that reason, the Isle Royale blood samples will be elaborately analyzed for clues to any genetic problems among the wolves—the first time such work has been done on this species.

On the other hand, Peterson notes, though the current work should add considerably to the fund of data, our knowledge of small population genetics is still largely theoretical.

"We know inbreeding's bad if you're a human," he says, "but the deleterious effects for wild populations are very controversial. It's not at all clear whether inbreeding is as much of a problem for some wild populations; and some vertebrates, like Japanese quail and wolves, regularly inbreed."

Peterson says there seems to be an optimum level of inbreeding for each species. For some, inbreeding can allow quick adaptation to change—a plus in a harsh environment.

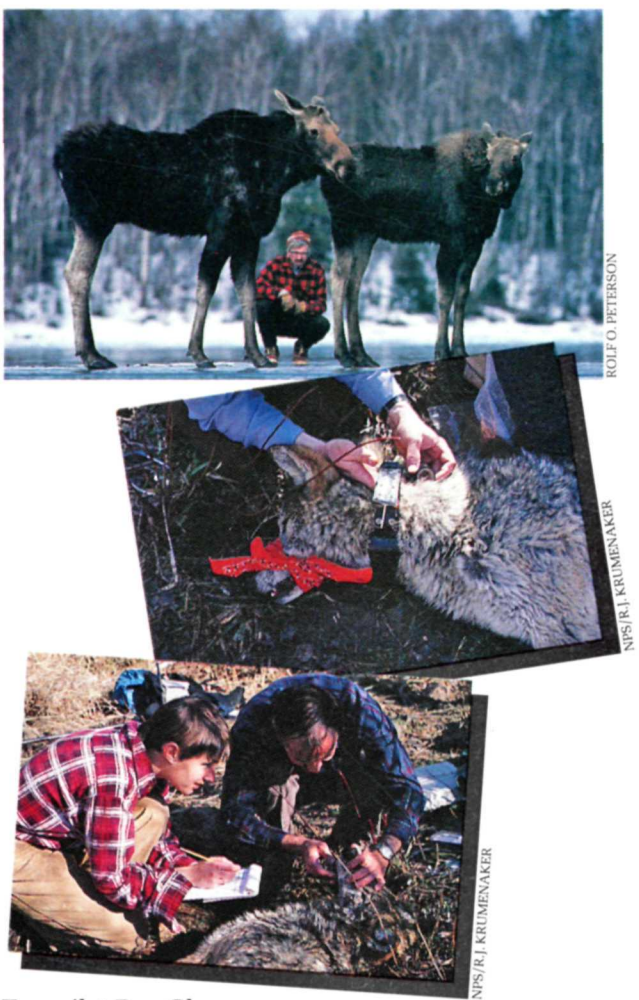
The highly organized structure of a wolf pack typically includes only one breeding male and female, dubbed the alpha pair. This structure ensures a genetic bottleneck. The worst-case scenario is this: as Peterson flies over his natural laboratory this winter, the wolves he sees, and every wolf born on Isle Royale since the colony was founded, may carry the genetic inheritance of just one pair of wolves.

Peterson's brief time with the four tranquilized wolves included a quick look into their mouths. Their teeth indicated that none of these wolves was past middle age—that is, two to six years old. The females, especially, looked young, perhaps even too young to mate. At least genetic problems, if there are any, have not led to total reproductive failure.

If researchers confirm a high degree of genetic uniformity and if the uniformity is a problem for the wolves, Peterson says that little can be done to alter the population's course toward extinction. Trying to augment the wolves' gene pool by importing some new wolves would be chancy, at best. The tight social structure of wolf packs does not allow for easy admixtures.

"If there's a pack without a female," Peterson says, "they would probably accept a female. Otherwise, we'd expect them just to kill the strangers."

In a larger territory, as the pack expands, individuals break away to form their own packs, thus enlarging the gene pool. At Isle Royale, the only new gene mix occurs when one of the alpha wolves dies.



ROLF O. PETERSON

NPS/R.J. KRUMENAKER

NPS/R.J. KRUMENAKER

Top: pilot Don Glaser with moose and calf; above: drawing blood for 1988 tests, the NPS handled the wolves for the first time.

Because the Isle Royale wolf population is probably the best-known in existence, its disappearance due to inbreeding would be an "instructive extinction." Peterson says, "There would be value in monitoring it to its logical outcome because it will serve as a test case for small-population viability in the face of genetic problems.

"It's a really tangible example of what's going to happen all through the world."

DR. ROBERT WAYNE'S laboratory at UCLA is not evocative of high technology, nor of ample funds. The desks are battered and the basement-level rooms are hospital green. Tiers of olive-drab cabinets store a collection of fossilized bones from the dinosaur period.

Wayne's business, however, is with species that are not extinct, not quite. With techniques developed only in the last two years, he can analyze the genetic "fingerprints" of individual animals to see how closely they are related.

He can discern genetic differences between groups of, say, Channel Island kit foxes, and recommend whether they should be protected as distinct subspecies. And he can tell a zoo in Nairobi whether its specimen is a side-striped jackal or the progeny of a domestic dog and a black-backed jackal.

One recent afternoon, Wayne took delivery of an ordinary-looking cardboard parcel and split it open, removing vials of dark, chilled wolf blood.

The samples were centrifuged and set aside in a refrigerator with others from Isle Royale and from Voyageurs National Park and Superior National Forest, both in Minnesota. More wolf-blood samples are expected from Denali and Gates of the Arctic national parks in Alaska, and from Vancouver Island, Manitoba, and northern Ontario.

Wayne's first task will be to answer some questions about the four Isle Royale wolves. Is there much variability in their genetic inheritance? How closely related are they? Have grandparents mated with grandchildren? Sibling with sibling?

Then come comparisons with the other, larger wolf populations. How much genetic variability do they show? How much is characteristic of the species? Which population is most closely related to the Isle Royale group?

Deciphering the signs of variation or uniformity encrypted along those famous double helixes takes several weeks of shrewd, patient work. DNA strings are made up of thousands of pairs of coded proteins, one-half of each pair inherited from each of the parents. Certain enzymes can be mixed in with the DNA, and these enzymes are able to recognize the chemical pattern of specific pairs.

The enzyme performs a useful trick, Wayne says: "When it hits that pattern, it makes a cut in the DNA."

After treatment with 20 different enzymes, the chopped-up strings of DNA from different wolves can be compared. The more closely the segments match, the more closely related the wolves are.

By this spring, Wayne's tests should be near completion. The National Park Service is an atypical client, he says. It is paying for the job. Most of his work on behalf of exotic and fast-disappearing vertebrates is not funded, and he has to do it on the side.

The government and foundation sources that academics usually turn to are not eager to finance these investigations, because they are viewed as applied, rather than theoretical, research. Industry, often the financial engine for applied research at universities, has no current interest in the genetics of endangered species, either.

WAYNE IS PART of an upstart and ill-defined field called conservation biology, which has arisen from scientific concern for threatened species. One of the field's preoccupations is "minimum viable populations," (MVP)—the number of animals necessary to ensure a given species' survival. The gene pool is only one facet of that problem.

Other MVP issues include:

▲ How long do we want to plan for a species to endure? Ten years, 10,000?

▲ At what level of certainty do we want to try to guarantee a species' survival: 75 percent, 100?

▲ Is it better to establish one large preserve or several smaller ones? A large one offers more isolation from outside effects. On the other hand, greater numbers of preserves help limit catastrophe—say, disease or climate change—by containing the risk.

Since these questions don't arise in a political or an economic vacuum, we can all too easily imagine a range of Solomonic choices. Say there is will and funding enough to prolong the survival of either the snow leopard or the panda at an 80 percent level of certainty. If the resources are divided among the two, they will both become extinct. What's the best decision?

"The world faces an impending crisis of species extinctions," writes the U.S. Fish and Wildlife Service's Mark Shaffer in *Viable Populations for Conservation.* "With estimates ranging up to 20 percent of all species becoming extinct by the beginning of the 21st century, this [species extinction] could rank as one of the major biological perturbations in Earth's history."

Even without famine, disease, or inbreeding depression, the wolves of Isle Royale are so few that they could all perish, just with a slight rise of the death rate over the birth rate. Peterson and Tom Drummer, a mathematician also at Michigan Technical University, used a modifed version of an MVP model to project the Isle Royale wolf population's viability. From the model they concluded that a population of a dozen wolves faces a one-in-three chance of extinction during the next century. If their number drops to ten, the wolves have only a 50- to 65-percent chance of survival.

"We create wolves," Barry Lopez writes in *Of Wolves and Men.* "The methodology of science creates a wolf just as surely as does the metaphysical vision of a native American. . . ."

There have been "at different times in history, different places for the wolf to fit; and, at the same moment in history, different ideas of the wolf's place in the universe have existed side by side, even in the same culture."

Continued on page 42

Lighthawk

Exposing Park Threats From the Air

By Daniel Wood

In May 1987, Michael Stewartt took ten of his colleagues to one of his favorite spots in the mountains. They met in Seattle, scrambled aboard two small Cessna 210s and flew 45 minutes to a remote airstrip on the edge of Mount Rainier National Park.

Disembarking, the men wandered among some very old trees, craning their necks to look up—25 stories by city standards—to where old-growth green spruce ended and pristine blue sky began. It took all ten men to circle one particular tree, arms outstretched.

"This is what's being cut down at the rate of 1,000 acres a week in Oregon and Washington alone," said Stewartt. "At that rate, there will be none left in the national forests of Washington and Oregon by the year 2000."

On the flight back to Seattle, Stewartt flew his colleagues over a hundred-square-mile stretch of mountains in the Olympic National Forest. What they saw looked like a crazed haircut: entire mountainsides shaved down to stubble, parted by the switchback ruts of logging roads.

The ten men represented the Group of Ten, the largest and most influential conservation organizations in the country: Environmental Defense Fund, Environmental Policy Institute, Friends of the Earth, National Audubon Society, National Parks and Conservation Association, National Wildlife Federation, Natural Resources Defense Council, Sierra Club, Sierra Club Legal Defense Fund, and Wilderness Society.

DUCKY KNOWLTON

Lighthawk's Michael Stewartt (left) and Bruce Gordon with their aircraft.

These groups responded to their overview of old-growth clearcutting with an unprecedented barrage of public consciousness-raising: newsletter mailings to hundreds of thousands of members; local newspaper and broadcast media blitzes; conferences; as well as stepped-up lobbying efforts from the local government offices to the halls of Congress.

Opening people's eyes to the ravages of clearcutting is typical of Project Lighthawk. Aerial crusaders in the cause of conservation, Lighthawk is a Santa Fe-based group of pilots, and volunteers who have named themselves after a mythical bird "whose purpose is to shed light," says Stewartt.

The key point Michael Stewartt and company want to make is that you can read statistics and see bits and pieces in two dimensions, but you can't get the full impact of our effect on the environment unless you view it from the air. And "you can't come from Washington, D.C., and have Delta Airlines take you into the Ranger Creek State Air Park," says Stewartt, "which is where we took the Group of Ten."

"As a park advocate," says Terry Martin, NPCA's Rocky Mountain regional representative, "I often find myself saying, 'If decision-makers could actually see this place, the land could speak for its own protection.'

"One of the greatest things about Lighthawk is it gives a voice to the land by making it possible for elected officials, conservation leaders, and agency decision-makers to see first hand the spectacular landscapes of the West, and the threats they face."

Flying with Lighthawk gives you a sense of perspective. Bruce Gordon, who is based in Aspen and is Lighthawk's other full-time pilot, says, "I recently went up to the Arctic to look at polar bears.

"Flying a hundred feet over railroad tracks for hundreds of miles, the immen-

PHOTOGRAPHS BY MICHAEL M. STEWARTT

URANIUM MINING, BORDERING GRAND CANYON NATIONAL PARK, IS CONTROVERSIAL. FIVE MINES EXIST NOW, BUT THE VEINS ARE SO RICH THAT THERE ARE PLANS FOR APPROXIMATELY 40 MORE.

sity of the land really becomes apparent. It sort of preys on your mind, that if you went down there would be no civilization for hundreds of miles."

Flying with Lighthawk in the front passenger seat of a miniscule Cessna 185 leaves you with little space to move. Taking photographs can be tricky. You have to pry open the small, hinged window against the rushing wind outside and hold the camera out as the plane zooms up and down hillsides, often dropping to what looked like a bare 50 feet above the trees. It's an aerial rollercoaster ride with a lot of one-handed photography.

"We're not stunt pilots," says Stewartt, "but we're skilled at doing the things many pilots don't want to—or can't—do, like stop on a dime, fly slowly, and fly very low."

It was an interest in national park preservation that gave birth to Lighthawk. Michael Stewartt had been flying for commuter airlines in Colorado and the Caribbean, and also working as a bush pilot based in Nome, Alaska. In 1974, he offered to help a Santa Fe environmental group in their efforts to block construction of a massive, coal-fired power plant on the Kaiparowits Plateau in southern Utah.

Power-plant emissions can spread hazy layers of pollution hundreds of miles across the desert, and this one would have spoiled the scenery of nearby Grand Canyon and other southwestern parks. So Stewartt, a native of Tucson, decided to organize planes and pilots in order to show the press corps what was at stake. The effort paid off. Officials of the proposed plan abandoned the entire project after media coverage caused an enormous public outcry.

Although Stewartt wasn't immediately able to coalesce support for his

TONGASS NATIONAL FOREST IN ALASKA IS, BY FAR, THE NATION'S LARGEST. YET, BECAUSE ITS TIMBER IS LEASED TO PRIVATE COMPANIES SO CHEAPLY, IT SHOWS A MULTIMILLION-DOLLAR LOSS EACH YEAR.

new idea—aerial environmentalism—the seed was planted. Four years later, in 1978, Lighthawk was off the ground.

Lighthawk's finances, however, have always been down to earth. Charging only about $40 to smaller environmental organizations, it depends on donations.

In 1979, the organization was lent a Helio Courier bush airplane and 150 hours worth of fuel. This allowed Lighthawk to show its first clients a proposed dam site on Colorado's Gunnison River, a dam which would have flooded valuable archeological digs. The dam was never built.

Stewartt started with a single plane. Today, two planes, two staff pilots, and more than ten volunteer owners/pilots log hundreds of thousands of miles per year, putting about 400 hours of flying time on each plane.

The group also has dozens of major projects and hundreds of smaller ones under its belt. A large portion of these has averted significant environmental threats to national parks and adjacent lands:

▲ GRAND CANYON NATIONAL PARK. In 1980, Lighthawk pilots began flying journalists, concerned citizens, and legislators over the proposed site of the peaking power project—a power dam, whose intermittent rushes of water would have destroyed mile upon mile of riparian habitat. "We also got all the right people in and out of Park Service meetings on the subject when they had no other way of getting there," adds Stewartt. The peaking power project has been stopped—for now.

Ongoing work with a group called Canyon Under Siege to stop uranium mining on the north rim of Grand Canyon has not been as successful—yet. But Lighthawk is helping to document the number and proximity of mines, the ra-

CLEARCUTTING SEVERELY ERODES THE THIN SOIL OF STEEP SLOPES (MT. RAINIER IN BACKGROUND). EPA STUDIES SAY RESULTING SEDIMENTATION CAN KILL UP TO 80 PERCENT OF SALMON IN LOCAL STREAMS.

dioactive runoff into the park, the dust generated by huge trucks, and the additional congestion on North Rim roads.

▲ CANYONLANDS NATIONAL PARK. "When you fly," says Terri Martin, "it becomes very clear that park boundaries are often drawn arbitrarily and often across natural geologic features. A prime example of this is in Canyonlands National Park.

"Lighthawk helped us show people two different projects. One, a proposed nuclear waste dump site on the east side of the park within a mile of the park boundary. And two, a tar sands development site on the west side of the park, three miles from the boundary. The park is literally sandwiched between them.

"And when you fly you can see that Canyonlands' boundaries are very arbitrary, that it's a huge basin like the Grand Canyon and basically a rim-to-rim park. Congress made a mistake by making it an hourglass shape, leaving out huge chunks that are really integral."

To the south of Canyonlands, Lighthawk has helped document environmental threats caused by "chaining." Chaining is a technique used by developers in which a chain is stretched between two bulldozers to help wipe out shrubbery, juniper, and other brush.

▲ GREATER YELLOWSTONE. Wyoming's Shoshone National Forest, adjacent to Yellowstone National Park: Back in 1981, when then-Interior Secretary James Watt was trying to sell off wilderness lands to oil and gas interests, the Washakie Wilderness, which touches Yellowstone National Park, was slated for sale.

"We contacted Lighthawk to take us all over the area for photo documentation," says Bruce Hamilton, director of Sierra Club field offices. "The photos showed both media and Congress this is

PHOTOGRAPHS BY MICHAEL M. STEWART

PATCHWORK CLEARCUTS (MT. HOOD NATIONAL FOREST) ARE DONE TO ENCOURAGE RESEEDING. BUT STANDS CAN DIE FROM DEHYDRATION AND 'BLOWDOWN' WITHOUT PROTECTION OF A SURROUNDING FOREST.

classic American wilderness—herds of elk, steep slopes, unstable soil—and people got outraged and stopped it."

Bruce Gordon recently took a *Los Angeles Times* reporter over Yellowstone to observe the results of the fires. Gordon says, "I was happy to find for myself that [the park] is not destroyed at all, as was previously reported."

▲ GLACIER NATIONAL PARK. Lighthawk has done much work with research teams studying grizzly bear populations as well as working with a wolf-recovery project team. They have also worked with the Montana Wilderness Association in documenting data that support legislation to designate more wilderness areas in lands surrounding the park. "This is necessary to create more buffer zones to protect the actual parklands," says Stewartt.

In January of 1987, Lighthawk helped to shut down the Phelps-Dodge copper smelting plant in Douglas, Arizona. For 40 years, Phelps-Dodge was the largest single source of sulfur-dioxide emissions in the United States.

This year, because its volunteer corps has expanded, Lighthawk is flying twice as much as in 1987. The newest tack for Lighthawk is publicizing the conservation threats it has discovered. It has just produced a short video, *The Ancient Forests*, on clearcutting in the Pacific Northwest. The video will be available to conservationists, but it was made so legislators can see what Lighthawk sees without taking time for a trip.

"We've become an educational tool for informing constituencies what is really taking place," says Gordon. "Once people become aware of what is going on, they usually galvanize into action."

Daniel Wood, a reporter for the Christian Science Monitor, *is based in Los Angeles.*

Man in Space

NASA, the Park Service, and Historians Face Off Over Preserving Relics of the Space Program

By Edward Bruske

THE SCENE HAS BEEN etched in the memories of generations of television viewers: A steely voice in a remote control room ends his terse countdown with the word, "Liftoff." A deafening roar and a blinding ball of fire erupt from the tail of a huge rocket.

As the giant vehicle slowly pushes skyward off its concrete pad, the cables, hoses, and supports from a stationary launch tower fall away in rolling clouds of smoke and steam. Engines crackle to a million pounds of thrust, technicians cheer, and the camera follows the arcing craft to a flaming pinpoint in the upper atmosphere.

Such heart-stopping events repeatedly have held the nation in thrall since the 1950s. With each launch of an American space craft there was an added list of heroes and historic events: men and women orbiting earth, men and women walking in space, the first humans to set foot on the moon.

Then, with the loss of the space shuttle *Challenger* in 1986, the history-making launches stopped. While Americans tried to absorb the shock of that tragedy, the space program was painfully reevaluated and restructured.

This year, at a time when the space program has once again captured American imagination, some historians wonder whether unique aspects of the space program are in danger of being lost forever.

What, for instance, ever became of the launch towers, those massive 360-foot assemblages of steel and life-supporting gadgetry without which no Mercury, Gemini, or Apollo mission ever would have gotten off the ground?

The tower that launched John Glenn, the first American to orbit the globe, was cut into pieces and sold for scrap; other towers, while still standing, are rusting in the salt-laden breezes of Cape Canaveral. One tower is in such bad shape that authorities have built a fence around it to protect bystanders from rotting metal fragments that periodically break off in the wind.

For some ardent fans of the space program, the neglect of objects that once were essential to successful space exploration borders on a national tragedy. At

Left: Mercury launch, Kennedy Space Center, 1961. Below: Abandoned launch pad from Mercury missions.

NASA

HANS TEENSMA

stake are not just the launch towers, but also numerous facilities that played key roles in the development of space technology—from wind tunnels, zero gravity pools, and magnetic chambers to rocket engine test stands and a space-rendezvous docking simulator.

Twenty-six of these sites, which are scattered across the country, have already been designated as national historic landmarks. To date, though, there is no comprehensive plan to ensure their future protection and maintenance, to interpret their role in this nation's space program, or to make them fully accessible to the public.

The impetus for protection of significant parts of the space program originated in Congress. In 1980, there was enough interest for former Representative John Seiberling (D-Ohio), as chairman of the Public Lands and National Parks subcommittee, to direct the National Park Service to inventory the space-related facilities nationwide and to propose ways in which designated historic sites might be preserved.

After years of research and study—at times conducted jointly with the National Aeronautics and Space Administration (NASA), the U. S. Air Force, and other agencies and state preservationists—NPS drafted a report that presents alternatives for preservation, including a proposal to create a Man in Space national park.

Such a park would be centered on facilities at Cape Canaveral, which lies adjacent to Canaveral National Seashore, and the Kennedy Space Center in Florida. Anywhere from six to 18 other space-related facilities around the country could be designated as affiliated park sites.

These include the Neutral Buoyancy Space Simulator in Huntsville, Alabama, which allowed astronauts to become familiar with the sensations of weightlessness; Launch Complex 33 at White Sands Missile Range in New Mexico, where the V-2 rocket was tested in the mid-1940s; and Marshall Space Flight Center and the Space and Rocket Center in Alabama, which already have a visitors' center, a museum, and an interpretive program.

NASA

The crawler transporter, here at the Kennedy Space Center, carried the Challenger shuttle from the assembly building area to the launch pad at approximately a half mile an hour.

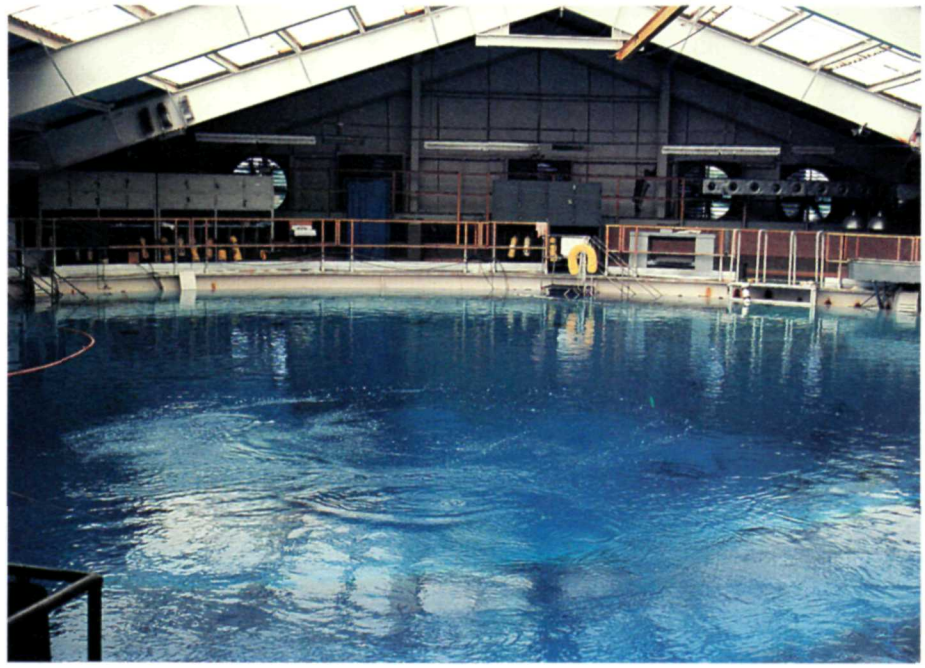
Where enthusiasts see a noble vision of a space program memorial, however, NASA officials fear a potential nightmare. Already, NASA officials contend, planners involved in the ongoing space program have locked horns with National Park Service and state historic preservationists.

AT THIS POINT, the two federal agencies are at cross-purposes. While the NPS has studied the possibilities of designating a Man in Space park, NASA questions how a functioning scientific agency will be able to modernize active space facilities in ways that do not compromise their landmark status.

NASA officials express a sense of deep betrayal, a feeling that a Man in Space park, supposedly designed to enshrine space program history, could handcuff the agency's ability to move into the future. Some NASA officials say that they knew this park would be a problem from the first. They would be just as happy if the whole idea dried up and blew away.

HANS TEENSMA

NPS



NPS

Top: Japanese tourists visit the Rocket Garden at Kennedy Space Center. Above: An armored personnel carrier has been converted into an escape vehicle for the astronauts. Right: Neutral Buoyancy Space Simulator at Marshall Space Flight Center, where the astronauts trained for zero gravity. This pool was built in the mid-1950s by Wernher von Braun, long before most people even considered space travel.

"It's a Pandora's box right now," said Ted Ankrum, deputy assistant to NASA's associate administrator for facilities management. "The Park Service has been less than understanding so far of our operational needs.... We've been compromised at every stage."

The Park Service's report, written in conjunction with the Federal Advisory Council on Historic Preservation and state preservationists, was submitted to Congress in fall 1987. It, as yet, has not emerged from review at the U.S. Office of Management and Budget (OMB), the agency chiefly responsible for analyzing government proposals for the president.

theme study had been a matter of subcommittee interest at one time.

"Obviously, we haven't had the administration come forth with recommendations for any new parks. Generally, they are reacting to things more than initiating them," Vento said. But Vento added that he has an open mind to the proposal, saying:

"If there is an educational role that it can play in terms of people visiting these sites, it certainly would be a valid thing for the Park Service to do."

One of those most disappointed by government inertia on the space park proposal is Park Service historian Harry

'We Can't Afford a New Control Center in Order to Preserve the Old One.'

There appears to be little pressure to move the proposal forward in Congress, where the Man in Space proposal originated and has received sporadic outbursts of support.

Representative Bruce Vento (D-Minn.), chairman of the House Subcommittee on National Parks and Public Lands, said he was unaware that such a park study was pending review at OMB. He did, however, recall that the space

Butowski, the man who wrote the NPS study. Butowski has devoted much of his professional career in the last seven years to cataloging resources involved in the manned space program.

He was charged with analyzing the importance of the national historic landmark sites to the nation's effort to place man on the moon. He also supplied the data necessary to designate these installations as national historic landmarks

and as potential elements of the proposed park.

Butowski, a space buff who also teaches a course on NASA and space flight history at the George Mason University outside Washington, D.C., was charged with no simple task.

Butowski was to select the sites whose importance had been most critical to the task of putting men into space. The sites were to include not only those associated with the launches, but also, other, less well-known sites and technological bits of history.

For instance, Butowski had to determine which objects were critical to the development of new fuels and engines that provided the thrust for giant rockets, space-simulation chambers, astronaut training facilities, and the plants where the rockets and thousands of other essential components were manufactured and tested.

The job required a thorough reading of space literature, followed by months on the road. Butowski crisscrossed the country, visiting dozens of sites and interviewing scores of engineers, technicians, and officials associated with the space program.

"Man in Space represents a unique challenge because it didn't happen in one place," Butowski said. "It happened in all 50 states."

NASA OFFICIALS INSIST that they are keenly aware of their history. "NASA is proud of its heritage and its accomplishments," Ankrum said. "We have a man here who worked with Orville Wright. He's now working on planning a mission to Mars."

But, he said, budgetary constraints leave little room for preservation. Their highest priority must be current space missions.

"We've consistently been of the opinion that if we're going to do a manned space program, that's got to be our top priority for funding. We're not funded to be a conservation agency," Ankrum said.

This attitude was difficult for Butowski, who said he often encountered indifference to the preservation concept among the higher-ups at NASA.

He did, however, find an audience among many of the space program's technicians, who shared Butowski's notion that the journey to the moon was more than a series of highly publicized rocket launches. They felt it had been a meticulously organized project with a thousand behind-the-scenes facets, and each part was inextricably linked to the success of the whole.

"Many of the people I talked to saw them simply as yesterday's relics. It wasn't the new toy," Butowski said. "But I was greatly helped by the people in the

ERIC DE LONY

The 360-foot-high mobile service unit used for repairs on the launch pad.

HANS TEENSMA

The American public remains avidly interested in the history of the space program. For instance, the Rocket Garden, like similar displays in Alabama and Arizona, is one of Kennedy Space Center's most popular attractions.

field centers. They felt they hadn't gotten their due recognition."

From the Hugh L. Dryden Flight Research Center in the Mojave Desert northeast of Los Angeles—where researchers plumbed the mysteries of physical forces on aircraft—to the old mission control center at Cape Canaveral, where display terminals flashed the fateful facts of the program's earliest flight, Butowski's catalogue of the nation's history in space grew.

The result was the *Man in Space, Study of Alternatives*, which he hoped would serve Congress as the foundation for further analysis.

One thing that the survey made clear was that many of the "relics" Butowski had so painstakingly documented were no museum pieces, but rather outdoor monuments waging their own battle with time. Apollo astronaut Walter Schirra, Jr., who participated in the original survey, described in a preface to the document his chagrin at the decay he found on a visit to Cape Canaveral.

"I felt crumbling rust on the Gemini erector and avoided walking under the remaining structure where the exciting Gemini launches took place," Schirra wrote. "I felt remorse when I saw the flaking painted sign that commemorated my Apollo 7 launch—a sign that did not note that Gus Grissom, Ed White, and Roger Chaffee died there." (A memorial has since been erected.)

The survey languished in the congressional bureaucracy for two years before Congress again acted in 1983, asking then-Secretary of Interior James Watt to formulate specific means of preserving some of the space program resources. Meanwhile, others independent of the national park study were becoming increasingly concerned about the neglect that was overtaking the space program monuments.

At Cape Canaveral, for instance, a group of Air Force officers, acting like a typical "friends" group, looked on with dismay as NASA proceeded with plans to junk the last of three mobile Apollo

launch towers. They formed a group called Save the Apollo Launch Tower, Inc., better known as the Apollo Society, and began lobbying Congress to save the last tower with hopes of turning it into a monument and tourist attraction. The society envisions a tower twinned with a mock version of a Saturn rocket topped by an authentic space capsule. The monument would permit tourists to experience firsthand what the moments before lift-off were like.

"Until recently people didn't look at space hardware and facilities as historical structures. They looked at space as something very new, not something that needs to be preserved," said Air Force Major Joe Fury, one of the group's founders and now supervisor of engineering and operations for Titan missile launches at Vandenburg Air Force Base in California.

The group's lobbying in Washington was successful. NASA agreed to dismantle and store the 400-foot launch tower rather than junk it. It now lies in pieces overgrown with weeds near the Kennedy Space Center. Society members are confident that a restored tower and simulated rocket open for visitors would have enormous public appeal. Currently, with no funds, the project is on hold.

There is no doubt that the public is interested. Already, the visitors' center at the Kennedy Space Center entertains more than two million people a year and other space-oriented facilities also attract an eager public.

More than 400,000 people each year tour the Alabama Space and Rocket Center in Huntsville, Alabama, where Saturn V rockets were tested for launch. Several rockets are on display in an outdoor park, called the Rocket Garden. At the center of the complex is a museum that displays an Apollo command module, a Mercury spacecraft, and a lunar-landing training vehicle.

THE POTENTIAL FOR visitation is only one of the important elements in the Park Service's *Study of Alternatives* that was completed in June 1987. And it was completed only after persistent nagging by Congress and meetings among officials from the Park Service, NASA, the Air Force, and the Army.

The first alternative essentially would retain the status quo, leaving the custody, maintenance, preservation, and interpretation of the 26 sites with the agencies that now control them. Of those 26, ten are active facilities and 16 are inactive. NASA manages the vast majority, 21. This alternative would provide no additional funds for restoration and preservation. Thus, the agencies involved would probably place little priority on preservation activities.

The second alternative would place greater emphasis on interpretation of the Man in Space theme, mostly through off-site media. Congress would be asked for funds to hire additional personnel to develop programs for visitors. Preservation of sites would also remain at a minimum.

The third alternative, which makes the most sense to NPCA, would create a private foundation or government commission for preservation and use of the 26 sites as loose affiliates of the National Park System, but not as a national park. Congress would provide some funding and the Smithsonian Institution and the NPS would offer technical assistance for interpretation and preservation.

The final alternative proposes two options. The first would create a separate unit of the National Park System called the America in Space National Historical Park, with elements of Cape Canaveral and the Apollo launch tower at Kennedy Space Center as its hub and other Man in Space landmarks as affiliated sites.

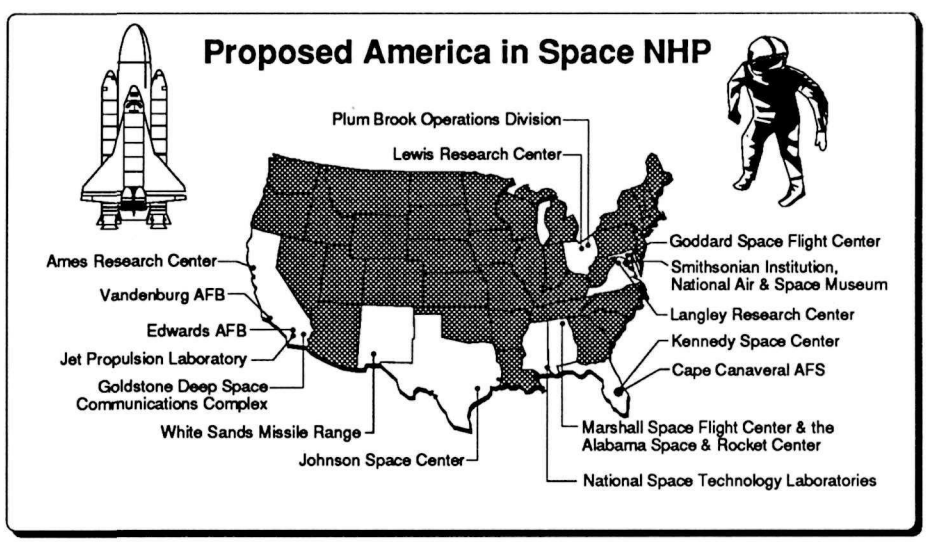
For the second option, the National Park Service would provide some of the technical, interpretive, and funding assistance for all 26 sites, but no direct management.

'I Don't Think We Want the NPS to Take Over a Financial Nightmare.'

Interior Department's Allan Fitzsimmons, special assistant to the associate secretary of Fish, Wildlife, and Parks, acknowledges that there are challenges in attempting to balance the needs of preservation with those of an ongoing space program.

Fitzsimmons said NASA has raised legitimate concerns. "These guys have a mission that is tomorrow and not yesterday," he said.

"I don't think America would stand still for another agency trundling down and saying, 'NASA, you can't launch today. We've got to give an interpretive tour.' "



MAP BY R. TRACY GRAPHICS

AS FAR AS NASA officials are concerned, though, precisely that kind of interference has already taken place, and it has soured their opinion of the space park proposal. According to Ankrum, at least twice NASA has tried and failed to reach an agreement with preservationists that landmark designation of its facilities would not be a barrier to necessary upgrades.

In both cases, he said, NASA was ignored, once by the National Park Service and again by the Advisory Council for Historic Preservation. More recently, NASA asked that its operational facilities be undesignated as historic landmarks, a request Ankrum said was refused by Interior Secretary Donald Hodel.

"I've got a letter back from 1982 showing the Park Service and Interior have consistently ignored our entreaties that, as they make these historic landmarks, they make allowances for our operational needs," Ankrum said. "They never responded. They just ignored us, every single time."

As a result of the landmark designations, Ankrum said, NASA has had several time-consuming confrontations with state preservationists over modernization efforts that NASA thought were essential to the current space program. Ankrum cited one instance at the Jet Propulsion Laboratory in California where engineers deemed it essential to replace an old vacuum pump in a space simulator.

The old pumps, he said, excreted an oil residue that fouled the sensitive measurement devices on new satellites. He said the agency was locked in bureaucratic battle for two months with the state preservationist before approval of new pumps was granted.

Ankrum points to a second case where the agency has been battling for two years with preservationists in Texas over NASA's plans to replace outdated computer consoles in the Johnson Space Center control room in Houston.

"We're trying to find a middle ground," he said. "We can't afford to build a new control center in order to preserve the old one."

Edwin Bearss, chief historian of the National Park Service said that NASA as a government agency has no right to contest the designation of its space facilities as historic landmarks and that landmarks, once designated, cannot be "de-designated," unless they have lost their historical significance. Even so, the last correspondence between the two agencies, dated March 11, 1988, is an offer from the NPS to explain the procedures for de-designation to NASA.

Don Klime, director of the advisory council's eastern Office of Project Review acknowleged that NASA and the council have been at loggerheads over the role of state preservationists in overseeing space facilities. Right now Klime sees little movement toward a solution.

"It has not been a very productive exercise to date. I don't fault their position because they feel the need to proceed without any kind of encumberances. But," he adds, "NASA officials simply have refused to discuss ways of resolving their conflicts with officials in various states."

In fact, NASA, like all government agencies, is required to work out a Memorandum of Understanding with the advisory council on how it intends to protect its historic resources. So far, after many requests from the council, it has refused to comply.

"There are many ways that state preservationists can be folded into the process," says Klime. "The council is not trying to come and find clever ways to interfere with NASA activities."

Ankrum notes that, so far, the congressional committee that oversees NASA has not been involved in debating the space park proposal. But he vows that the agency will make its views known to representatives sympathetic to NASA if and when Congress has hearings on the alternatives study.

At that time, Congress would also be expected to take up another serious question: how to fund a space park when the nation is already facing massive budget deficits.

"I don't think we want the Park Service to take over a financial nightmare," said Representative Vento.

According to Butowski, the Park Service made little effort to estimate the potential cost of its various alternatives. The original reconnaissance survey had estimated that it would cost $605,000 to make repairs at two launch facilities at Cape Canaveral, plus maintenance of the NASA Space Museum and the Air Force Space Museum there. Since then, the advisory council has agreed that NASA can take down one of the launch towers, which would lower the cost of the program considerably.

Estimates for other proposals, such as the Apollo Society's vision of a launch mock-up, run much higher, at around $20 million for the entire plan to $3.5 million for partial restoration. In any case, funding is nowhere in sight.

"Such figures," said Bruce Craig, NPCA's cultural resources coordinator, "raise some basic issues regarding what should be preserved as part of the National Park System. The NPS can't do it alone. If these sites are to be preserved, there must be a commitment of funds by state, local, and private organizations. The NPS then would only be a coordinator or facilitator.

"But first, Congress needs to hold hearings on the different proposed park alternatives."

MAJOR FURY said the Apollo Society envisions a public fundraising effort to meet that cost similar to the one that restored the Statue of Liberty. An original campaign to solicit donations through the mail, however, was overly optimistic, he said, and fell dismally flat. But Fury believes that such a campaign could succeed, if managed properly.

For Butowski, the alternatives boil down to a simple question. "The American people had great vision in going to the moon and great technical expertise. But after we accomplished that, we sort of abandoned it," he said. "So far, the NPS spent over $100,000 for a study that we haven't been able to give anyone. The question is, are we going to preserve that history, or are we going to let it go?"

Ed Bruske, a reporter for the Washington Post, *wrote about Lyme Disease in the March/April issue of* National Parks.

Signs of Life

TRACKING WILDLIFE IN THE NATIONAL PARKS

BY ANNE-MARIE PRAETZEL

AT FIRST, THE FOREST seems a tranquil world—almost lifeless. Then, you see a sliver of an imprint on the snow. You look more carefully and see more prints, leading into the distance. Slowly, you are seduced along, print by print, until you find yourself wondering whose woods you've entered. Almost unknowingly, you've become a tracker.

Nearly anyone can track, in any season, in any environment, and with a minimum of materials. That is the beauty of the sport. You may, however, find a ruler and a tracking guidebook helpful in identifying tracks you find.

For those who choose to follow, an animal's trail is a path into the mysteries of the wild. The joys of tracking are in what you learn about animal behavior, not in finding the animal. In fact, using tracking to locate a wild animal can both endanger the tracker and disrupt the animal's critical behavior patterns.

Getting Started

An animal reveals itself by the variety of clues it leaves behind, the most obvious of which are its footprints. But often the most informative signs for the tracker are less obvious, such as a bear's claw marks on a tree trunk, the scat of a fox, or a skunk's diggings in a meadow. All of these clues can be used to ascertain the identity, behavior, and habitat of the animals around you.

The habitat where you track will eliminate a number of animal possibilities, even before you've examined any tracks. You should know beforehand which animals are found in the region you are exploring. What do the basic characteristics of the habitat—climate, food and water availability, terrain, and vegetation— indicate about the animals it supports? For instance, you wouldn't expect to find an elk in the desert.

Select a locale that has a ground surface that can hold the impression of an animal's foot, such as snow, sand, mud, or dust. You can follow an animal over a long distance in snow, particularly if the covering is slightly moist and a few inches deep. Although mud is an excellent source for tracks of aquatic animals, muddy areas usually only span a short distance.

Dust, which offers the most detailed impressions, can record the tracks of animals as small as insects. Sand allows long-distance tracking of a variety of land and offshore animals and birds.

When you come across an animal's trail, it is best to start by classifying it. There are three major track patterns:

▲ An alternating track pattern resembles a human's; one track is made on the right, one is made farther along on the left. These suggest that an animal has walked or trotted through the area.

▲ A two-print pattern, the result of a hop, bound, and sometimes a trot is created

For your own safety, bear tracks, scat, and signs are better admired than followed.

RUTH KIRK

by a gait in which two feet land so closely together that they create a set of two prints, followed by a distinct space, then a second set of prints.

▲ A four-print pattern is created when an animal gallops, lopes, or jumps, and its hind feet land in or near the prints of its front feet. The result is a group of four prints, followed by a space and another four prints.

Individual tracks can be easily identified with a guidebook key by noting the size, shape, number of toes, and the presence or absence of claw marks in the print. Tracks are often not clear, however, so that you must pursue other clues for identification.

Although a track pattern may not immediately identify the species of the animal, it can indicate the animal's size and family, as well as its gait at the time. For instance, an alternate track pattern with large prints suggests an ungulate, or a member of the bear, dog, or cat family.

Members of the rodent and rabbit orders have larger hind than front feet. They will usually create a four-print track pattern; members of the badger and skunk order usually leave a two-print pattern.

Associated Signs

It is exciting to find animal signs because they will always reveal something about the animal's behavior: where and how it lives, travels, and eats. Some of the more obvious signs you'll find are constructed nests, dens, lodges, or dams; scats and droppings; injury to trees and shrubs; trails, runways, or tunnels; and other disturbances to the land.

Most animal signs are more subtle, however, requiring a perceptive eye to identify them. Watch for food remains and caches—such as a pile of nut shells or a carcass. Natural cavities in rocks or under fallen logs often host a variety of animals. Again, it is vital that the animal and its habitat remain undisturbed by your interest.

Some Animals to Track

Whether tracking the common jackrabbit or the endangered panther, here are some facts to acquaint you with your subjects:

Carnivora: Carnivores are generally the biggest and most exciting animals to track. Although, secondary consumers (at the top of the food chain) are less prevalent than primary consumers, the signs they leave are larger and more obvious. So, don't let their scarcity discourage you. Again, do not try to contact the animal; many carnivores are dangerous, and you could flush an animal out of its own territory.

Cat Family: Mysterious and secretive, felines protect their solitude. Their low profile and nocturnal schedule frustrate even the most skilled trackers. Consequently, research on wild cats is limited.

A cat leaves a round print with four toes and no claw marks. Cats usually walk, making an alternate track pattern in a straight line, although a four-print pattern is created when they gallop after their prey.

Cat scat can be as large as a big dog's, but knobbier, and usually it contains fur and animal parts. Cats will mark their territory with urine, scent marks, and post scratchings. Smaller cats, however, will sometimes attempt to cover their scats and prey with dirt.

Lynx and bobcat are fairly widespread, ranging throughout the northern United States and Canada. The largest North American cat, the cougar or mountain lion, has been reduced in range to the western states, including many western national parks, such as Kings Canyon, Yosemite, and Olympic.

Although the endangered Florida panther is nearly impossible to find, trackers have found occasional tracks and scats in Everglades National Park and Big Cypress National Preserve in southeastern Florida.

Look for a beaver's tail print overlaying its clawed, five-toed footprints.

LEONARD LEE RUE III

Dog Family: Compared to the solitary cat, the canine makes its presence known. Its bold and boisterous nature spills a variety of signs in its trail. Although similar in size and foot structure to the cat's, the canine's print is oval and capped with claws.

While the wolf is known for its intelligence, the coyote, a generalist, has better adapted to the encroachment of mankind. Consequently, this canine flourishes throughout North America; an estimated few thousand live within the Los Angeles city limits. The red fox also enjoys a wide and growing range and is found in nearly all of the United States and Canada.

By contrast, the grey wolf has been pushed out of most of the United States, managing to survive only in less populated states such as Alaska. Canines tend to walk and trot in an alternating track pattern. Their trail will be sporadic and meandering. Species that travel in packs will leave a web of tracks.

You might hear a canine before you see signs of one. Once it has revealed its presence, look for scats that resemble a domestic dog's but contain vegetable matter, hair, and bone pieces. A canine urinates at scent markers and can leave piles of dirt where it has tried to dig up a rodent; some canines leave resting beds and dens.

DRAWINGS FROM 'GUIDE TO THE MAMMALS OF PENNSYLVANIA,' JOSEPH MERRITT, 1987, U. OF PITTSBURGH PRESS.

Bear Family: If you're only interested in tracking the glamorous, bears present stiff competition to mountain lions and wolves. As the largest four-footed carnivore, the bear is not difficult to track, or sight, when it is in your vicinity. In fact, you should immediately leave the territory of a grizzly or any mother bear with her cubs.

The bear track is distinctive for its large size, oval shape, and claw marks capping the toes. Look for an alternating track pattern. Claw marks on trees and broken logs, a leaf-covered carcass, and dens all suggest the presence of a bear. Bear scats often vary greatly in shape and size. They can resemble scats of other, more common animals, including those of cows, deer, or dogs.

The grizzly, an unsuccessful competitor with man for resources, has been squeezed to remnant populations in the western United States, Canada, and Alaska. It is extremely unsafe to track a grizzly.

Hunting and development in the Arctic have caused a serious decline in the polar bear population, but it can still be sighted and tracked in the southern edge of the Arctic. Trackers find that polar bears often track each other in search of a kill, a mate, or to chase off competing bears.

The black bear, with its cunning, adaptability, and omnivorous diet, survives where the other bears have not. In fact, in bear territory it is necessary to protect your food supply from the black bear's often persistent attacks. The black bear is found throughout most of North America.

Ungulates: Some of the more commonly seen large mammals, the even-toed ungulates, include elk, caribou, sheep, moose, deer, antelope, bison, and musk ox. Look for a two-toed hoof print usually found in an alternating track pattern. Ungulates, known for their speed and endurance, leave a four-print pattern when chased into a gallop. Additional signs characteristic of this order are frequent pellet piles, large oval depressions in the ground, which were used as beds, dropped horns and antlers, and branches stripped of leaves.

Smaller Animals

Let's turn to a few animals whose tracks you are most likely to find. Because the behavior and signs of smaller animals are so varied, you will find a good tracking guide especially useful.

Weasels: The weasel, or mustelid, family includes martins, fishers, weasels, minks, ferrets, wolverines, badgers, skunks, and otters. Members of this family are identified by their two anal scent glands, most well developed in the skunk.

In fact, wafting skunk perfume often serves as a telling clue for trackers. Other signs identifying this small black and white, nocturnal animal are digging spots; small, cylindrical scats; and a five-toed, claw-tipped print. Skunks lumber in alternating track patterns, or they clumsily lope in a four-print pattern.

Rodents: Rodents are the most numerous mammals on earth, exhibiting extraordinary evolutionary diversity. Gnawing marks on a tree or log indicate one of the major characteristics of this order—the four incisor front teeth, which are most prominent in beavers.

With the exception of man, no mammal has as much ability to alter its environment as the beaver. Its dam constructions and tree cuttings can change a landscape. Also look for a hand-like front foot, followed by a long, five-toed print with claws. Beavers leave a short-stepped, alternating track pattern that's followed by a flat tail track. Beavers are found throughout North America.

Red fox tracks (actual size) are typically canine.

Endless Possibilities

If your tracking tastes lean more toward the eccentric, you will not be disappointed. You can follow the rippling trails of the sidewinder rattlesnake through the sand of Death Valley.

Or, the alligator can provide an adventurous afternoon if your tracking efforts in Everglades National Park are successful. You may need climbing shoes to track the chuckwalla lizard in Joshua Tree National Monument, or a magnifying hand lens to trace the tracks of the circus beetle in Great Sand Dunes National Park.

Whatever your preference, tracking is a wonderful way to uncover the layers of life in the wilderness.

Guidebooks to get you started might include *Nature Guide to Animal Tracking*, by Donald Stokes (Little, Brown and Company; Boston: 1986) or *A Field Guide to Animal Tracks*, by O. J. Murie (Houghton Mifflin Company; Boston 1975).

Anne-Marie Praetzel is editorial assistant for National Parks.

Wolves of Isle Royale

Continued from page 26

The wolf's current place in the conservationists' universe as a rare species needing protection seems clear. But wolves also symbolize our sometimes catastrophic interference with natural processes such as predator-prey interaction. The two ideas are deceptively similar. For policy-making purposes, they can be flatly at odds.

ALTHOUGH ISLE ROYALE is part of Michigan, it is much closer—ecologically and geographically—to Minnesota. Wolves are not an endangered species in Minnesota.

" The [U.S. Fish and Wildlife Service] recovery plans for the eastern timber wolf, a new draft of which just came out, say that we should continue to protect the population," Krumenaker says. "But they haven't even dealt with the idea of what to do if it starts to decline. It's something nobody ever anticipated.

"Then you run up against Park Service policy, which does not say you have to keep your hands off all native populations. What it does say is that, whenever possible, we want all natural ecological processes to continue unimpeded."

Officially, the National Park Service tries to occupy an uncomfortable and shifting middle ground. Human-caused problems, such as a parvo epidemic, tend to justify intervention. If the wolves are threatened by inbreeding or food availability, these "natural" causes argue against intervention. Think of a virus as "unnatural" and you sense the dilemma.

"Where is our best management strategy in terms of preserving what we can of the natural processes?" Krumenaker asks. "Everybody's going to call that a little bit differently."

The wolves, after all, only appeared 40 years ago. Maybe the island is more natural, not less, without them. It could be argued that the arrival of moose on the island wasn't natural because it was stimulated by settlement on the mainland in the 19th century. Eradicating all the moose to turn back the clock would thus be a logical, though extreme, plan.

"Maybe the real logical extreme," Krumenaker says, "is to bring back the glaciers."

Much of Wayne's work on the genetics of wolf populations in the region sets the stage for another logic to operate: If all of the island's current wolves died, a whole new pack could be introduced. Would Peterson favor such a move?

"Based on what I know now, and the philosophical perspective I come from, yes," he says. But the National Park Service, he believes, is "nowhere near" making such a decision.

Krumenaker, observing that the decision isn't his to make, says reintroduction is a "conceivable alternative," but there are other views to consider. One was articulated by a Duluth, Minnesota, resident, who wrote to the editor of her local newspaper.

"I am thoroughly convinced that nature is wiser than we are in such matters. Often well-intentioned repopulation efforts cause more harm than good because there are so many variables. . . .

"Nature's balancing process takes time and trust, and does not always work out as we'd like. . . . Wolves are just one chapter in Isle Royale's rich history. Don't edit the book before it's finished."

Krumenaker and others in the National Park Service hold out some hope for having it both ways. "One of the things I think we have to look at in debating whether or not to reintroduce wolves, if they declined to zero, would be the condition of the wolf population in Ontario right now," he says.

"I would argue that that's really important to a decision whether to introduce or not. Is the likelihood of natural immigration the same as it was 40 years ago or is it less? Maybe it's greater. We just don't know."

PETERSON IS SKEPTICAL that another trip across the ice could occur. The growth of population centers on the Ontario shoreline opposite Isle Royale presents a new barrier to migration.

"Even if it was, I think you still have to ask whether that is the most proper use for that island. Is it really so important, philosophically, to allow natural colonization that we'd sit back and suffer through what is going to be an ecological nightmare when those moose cut loose? What we would see is a repeat of the 1930s, which was a disaster," Peterson warns.

As recent controversies over California condors and Yellowstone grizzlies have shown, however, mistrust of the judgments of both science and wildlife managers runs deep.

"In Africa I've run into trouble," Wayne says, "with people who believe a hands-off attitude is important—don't touch the animals! The cape hunting dog, for instance. The most endangered carnivore in all of East Africa. There are only 200 of them left. No one's doing anything about them."

Wayne has not been permitted to handle these wolf-like animals to check for the effects of inbreeding.

"We should get in there and do something. I think people don't realize that we manipulate everything else.

"We're responsible for many things in nature. We should be responsible for endangered species in the same way, because we're manipulating them indirectly. We're destroying their habitat. We're destroying their prey base."

It's cold at Isle Royale National Park this winter, but who knows? Two years ago the winter weather was odd, with high temperatures and the thinnest snow cover in 20 years.

Last April, Peterson worried about the unseasonable heat. The four wolves did well during and after their brief captivity, but they could not pant while tranquilized.

"They were wearing a winter coat. We were wearing shorts," he said. "So they all got hot and thirsty."

This past year—the first noticeable year of the ozone hole and the greenhouse effect—summer came early. It was the hottest anyone could remember.

At the west end of the island single tracks were seen, but no sign of a wolf pack. And for the first summer in a long, long while, no howls were heard.

Steve Nash, a freelance writer and coordinator of the journalism program at the University of Richmond, last wrote for National Parks *on chestnuts.*

Hot off the Presses

NPCA is proud to announce its new publication, *Our Common Lands: Defending the National Parks*. A compilation of essays by 18 highly respected environmental and legal scholars, the book explains the complexities of many environmental issues. In addition, it suggests ways both professionals and concerned citizens can use federal laws to defend the national parks. For more information contact Kirstin Bevinetto Artman, NPCA, (202) 944-8530.

NPCA Fete

NPCA ushered in the holiday season with its ninth annual members' dinner, held on November 17, at the Capital Hilton in Washington.

At the dinner, NPCA presented its Conservationist of the Year Award to

LOIS ANNE LONG

Congressmen Michael Andrews (D-Tex.), Robert Mrazek (D-N.Y.), and Frank Wolf (R-Va.) for their successful efforts to stop development adjacent to Manassas Battlefield. Representative Mrazek (above, left) accepted the award from Stephen M. McPherson, chairman of NPCA's Board of Trustees. Mrazek's witty speech entertained the audience with illuminating, little-known facts about the Civil War period.

Science Conference

NPCA will hold a conference, "National Park Science and Management Policy into the Next Century," on March 19, 1989, at the Omni Shoreham Hotel in Washington, D.C.

The event will be held in conjunction with the National American Wildlife Conference. Findings of a year-long study on the role of science in the national parks will be discussed by NPCA's panel of leading scientists, anthropologists, and historians.

The panel will then present its report to Interior Secretary Donald Hodel and NPS Director William P. Mott, Jr. This conference offers NPCA members the opportunity to hear interesting and current ideas on park management. For more information, call David Simon, NPCA, (202) 944-8575.

Blurring the Boundaries

DIVIDED TWINS, Alaska and Siberia is a collaboration between Russian poet Yevgeny Yevtushenko, a Siberian native, and American photographer Boyd Norton. Yevtushenko wrote and took most of the photographs of Siberia in the book; the photographs of Alaska were taken by Boyd Norton. This large, full-color book is printed with Russian and English on facing pages, a telling format.

The point of this effort is to celebrate the commonality shared by Americans and Soviets in the lands bordering the Bering Sea. Here, the United States and the Soviet Union are less than 100 miles apart and share a common border, history, people, and environment. (For more, see "Berengia: a Common Border," *National Parks*, November/December 1988.)

This thoughtful book juxtaposes photographs as well as text to show how close our relationship with the Soviets really is. As Yevtushenko says, "By inventing borders and then honoring them, we betray nature. Inventing state borders is a violation of moral borders."

A Viking Studio Book, hardcover, full color, 224 pages, $40.00.

Portable Dialysis

For many retirees, just when they finally have time to travel, their bodies start demanding attention. Happily, current medical advances have moved many medical procedures into the home where people, with the help of their families, can be more responsible for their own health care. This trend has allowed many older people to lead more active lives despite serious health problems.

For instance, Virginia Flynn, 67, suffers from kidney failure. She needs kidney dialysis twice a week. Her doctor told her that she could travel as long as she could take a dialysis machine with her. Home dialysis is supported by most medical insurance companies, because it is safer and less expensive.

She and a national company called Home Intensive Care, Inc., which specializes in in-home dialysis, were able to adapt a smaller, lighter dialysis machine to the Flynns' 23-foot trailer.

A year ago, the Flynns left Chicago for a three-month trip through the national parks. They stopped at campgrounds where they could plug in the dialysis equipment.

Winning Interpreters

When Sylvia Flowers, park ranger at Ocmulgee National Monument, won NPCA's 1988 Freeman Tilden Award as Interpreter of the Year (*National Parks*, November/December 1988), she was chosen from a field of nine other interpreters who were nominated within their regions and deserve recognition. Because of space limitations, we can list only some of each interpreter's many accomplishments.

Siberian grandmothers, from the book *Divided Twins, Alaska and Siberia.*

YEVGENY YEVTUSHENKO

NANCY MEDLIN, Alaska. Medlin, lead interpretive supervisor of Denali National Park, organized a very successful essay contest for a "Take Pride in America" project.

DOUGLAS THOMPSON, Mid-Atlantic. At Colonial National Historical Park, Supervisory Park Ranger Thompson developed aids for new employees that included an interpreters' handbook, and Yorktown and battlefield research guides. He also created an educational program for the Newport News schools; a site bulletin for visitors to the battlefield; a museum exhibits design class; and an interpretive skills course.

ROBERT HOLDEN, Midwest. As chief for interpretation and resource management at George Rogers Clark National Historical Park, Holden organized a Bicentennial of the Northwest Ordinance. The celebration included a teachers' guide, a series of Ordinance Bicentennial moments for radio stations, and a series of newspaper articles on the history of the nearby city of Vincennes.

DAVID SMITH, National Capital. At Rock Creek Park, Ranger Smith researched and created, for the first time, a library of information on the cultural and architectural history of Rock Creek Park. Smith also organized a speakers series for the Bicentennial of the Constitution that covered a wide range of topics, from cultural archeology to the role of 18th- and 19th-century milling.

JANICE KILLACKEY, North Atlantic. As park ranger at Longfellow National Historic Site, Killackey developed an outreach program with poetry at its center. The activities included poetry readings at the site, a poetry program for nursing home residents, and a program that taught children how to write poetry.

DAVID CLARK, Pacific Northwest. Clark thought that reaching students should be a major emphasis of the interpretative program at Craters of the Moon National Monument. So, he created teachers' workshops through Idaho State University to train teachers in interpretation, inspired the faculty of the Boise State University to publish a comprehensive book about the Snake River

Plain, and recatalogued more than 2,000 items of Craters of the Moon National Monument's museum collection.

JAMES SHULER, Rocky Mountain. As chief interpreter at Badlands National Park, Shuler's pragmatic and innovative approach to interpretation resulted in plans for 39 wayside exhibits for both Badlands and Pipe Spring national monuments, a marathon race that became the permanent Medicine Root Loop Trail, the remodeling of the park's amphitheater, production of a 15-minute park video, and editing and design of the park newspaper.

TONI COOPER, Southwest. At Hot Springs National Park, Cooper was honored for her "front line work." Through her work with volunteers on the information desk, tours, and with seasonals planning their programs, Cooper has shown a consistent ability to involve herself with others and to help others involve themselves with the park.

DAN SEALY, West. Sealy was recognized for the quality of his imagination. At Golden Gate National Recreation Area, he designed a display using cartoons to explain the roles of national park rangers. In another exhibit, Sealy worked with local college art students to create fantastic papier-mache creatures in order to explain animal adaptations in the nearby Marin headlands.

Final Notes: Because of the intense forest fires this summer, Yellowstone National Park has offered information on forest fires for teachers subscribing to the Expedition Yellowstone program. A regular forest fire curriculum should be available by spring of 1989. Contact Expedition Yellowstone, Yellowstone NP, P.O. Box 168, Wyoming 82190. . . . If you make feature-length films or videos about nature or recreation, you may want to enter the North American Outdoor Film and Video Awards, sponsored by the Outdoor Writers Association and Chevron. Cash awards total $7,500. Entries must be received by January 20, 1989. For information, write: Lorna Momke, c/o Missouri Department of Conservation, 2901 W. Truman Blvd., Jefferson City, MO 65102.

National Seashores

THE BEACH—the narrow strip of sand that fronts the sea—is in continual motion. All around you, patterns and landforms tell the story of the dynamic coast.

A short distance offshore, breakers plunge into lathers of foaming surf. Water rushes up the beach in thin, transparent sheets of *swash,* or splashing water. Each wave carries a load of suspended sand particles.

When the swash finally loses its forward momentum, the sand is dropped on the sloping foreshore. The *bern crest*, an elevated ridge of sand, marks the highest point on the beach that normal waves reach.

Take a few steps toward the water, and you will probably notice a *scarp*—a steeply sloped drop-off a foot or so in height. Beyond the scarp lies the *runnel*, a submerged depression parallel to the shore. If you wade into the runnel, you will be about knee deep in water.

Beginning with this runnel, the nearshore sea bottom consists of a series of undulating mounds and depressions. Wade out a few more paces and you may be surprised to step up onto a ridge of coarse sand.

Catch a wave as it begins to break and allow it to wash you toward shore. The same energy that rolls you through the surf is also rolling innumerable grains of sand. They may not travel far with each wave, but consider that 8,000 to 12,000

RICHARD KELSEY

DAVID MUENCH

Left: Cape Cod, Massachusetts. Above: Cumberland Island, Georgia.

CONNIE TOOPS

Cape Hatteras, North Carolina.

JEFF GNASS

Old Harbor Lifesaving Station, Cape Cod, Massachusetts.

waves come ashore each day. If a given grain of sand moves a tenth of an inch with every wave, it could migrate up to 100 feet by the end of the day.

At the seashore the wind blows much of the time. Breezes of 12 miles an hour or more are able to roll grains of sand across the beach. The harder the wind blows, the more sand it drives along. Vegetation and driftwood slow the wind and sand builds up around these obstacles.

Beach plants respond to being buried with new growth spurts. As more vegetation obstructs the wind, more sand is dropped. Eventually dunes rise along the former drift line.

Heavier grains of sediment are not transported as far on the wind. Thus, the backshores of the beach and edges of the dunes accumulate material the wind drops first. This includes shell fragments, coarse sand, and dense minerals such as ilmenite, garnet, magnetite, and tourmaline. Layers of these heavy storm-deposited minerals create dark banks in the white quartz sand.

Subsequently, when the deposits are eroded by wind or waves from a new direction, striking patterns are revealed in the contrasting layers.

Excerpted from National Seashores: the Story Behind the Scenery, *by Connie Toops; KC Publications, Box 14883, Las Vegas, NV 89114; $4.50.*

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

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.