

# National parks

Nov/Dec 88

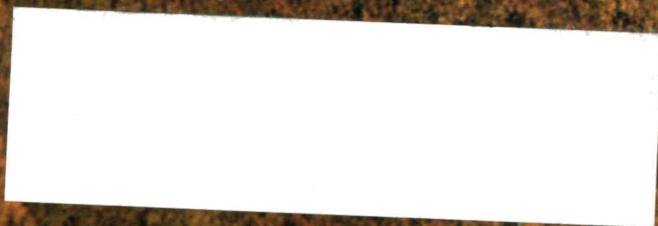
U.S.-Soviet Park Plan

Yellowstone Fires

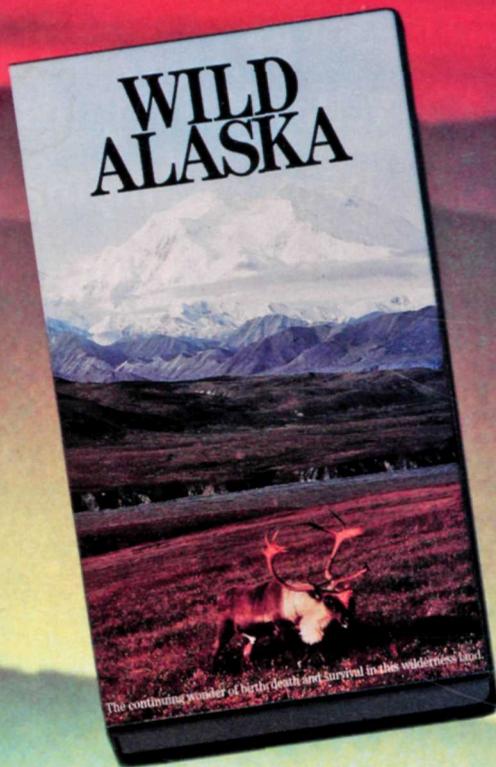
Winter Camping

Walrus

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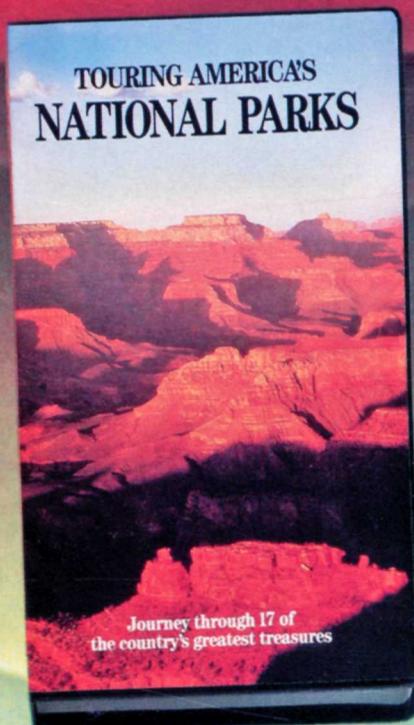


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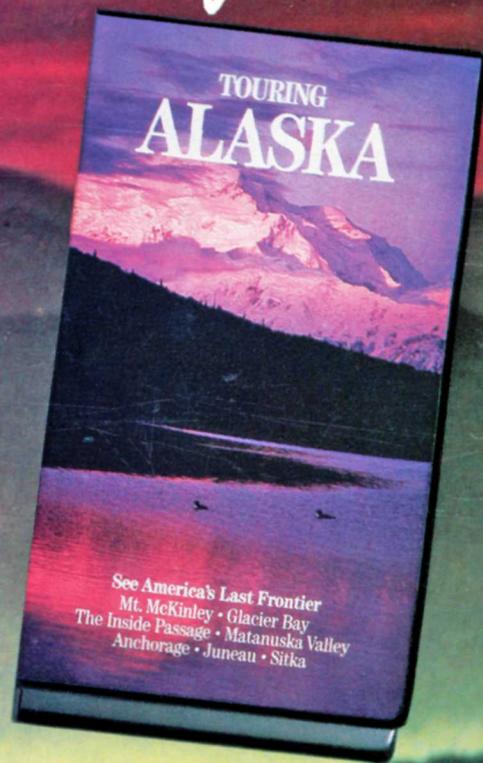


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Charles Monaghan, Video Review Magazine



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The magazine of the National Parks and Conservation Association

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**Cover:** Round Island, Alaska, by Jeff Foott  
Horned puffins share this protected island with the walrus.

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

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Robert W. Stevens

**Beringia, page 18**

**Editor's Note:** Now that the fire season is over—and the flames as well as the emotions they aroused have died down—the National Park Service, elected officials, conservationists, and others can rationally examine the results, both positive and negative.

We will never be able to totally control nature. Nor would we want to. But we can mimic natural forces, and the occasional cleansing sweeps of fire, rather than allow brush to build up to unnatural levels in our national parks.

Although new fire management policies have been in use at Yellowstone for more than a dozen years, because of fire suppression over the past hundred years, the park was like a munitions dump waiting to blow. No one wants cataclysmic fires to threaten historic buildings, gateway communities, and shrinking wildlife habitat. With thoughtful, long-term fire management policies, infernos need not occur.

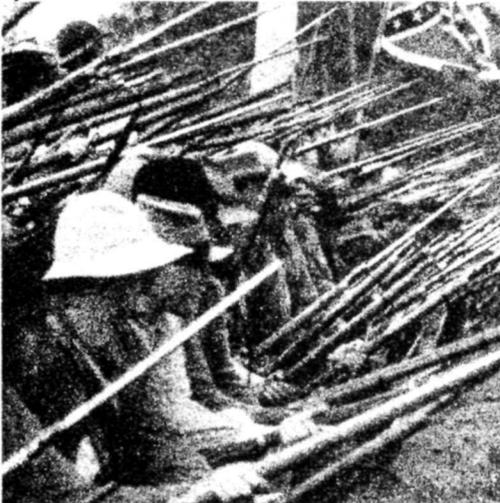
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## Award-winning video remembers the Blue and the Gray



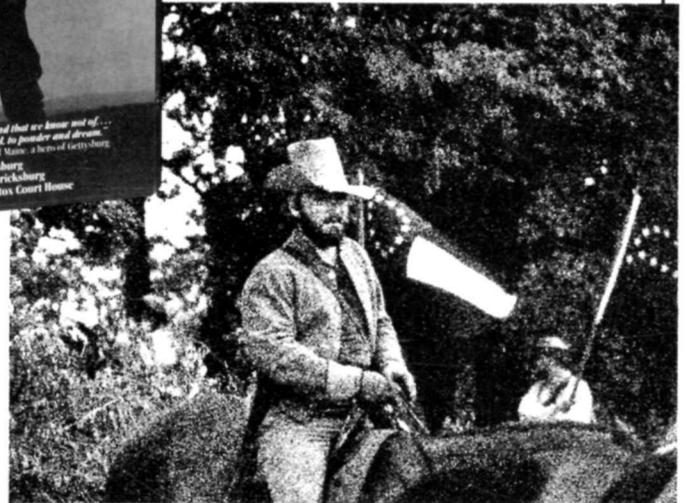
Manassas (Bull Run)



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**\$2.50 From each video will be donated to battlefield preservation.**

\*First Place, 1987 American Video Awards

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## Era of Challenge

This election marks the end of an era. Soon we will have a new administration, new administrators, a new Congress, and new expectations.

These past years have been an era of challenge for the parks. Secretary of Interior James Watt started with a strong sense of purpose and a team to carry out his goals, goals that often ran counter to the needs of the National Park System. His undersecretary, Donald Hodel, now occupies the chair of Interior secretary. He, too, has had his own agenda, but one considered very close to Mr. Watt's. Secretary William Clark served between Mr. Watt and Mr. Hodel. His style was more traditional, deferring to the National Park Service director and other bureau heads.

This eight-year period has produced a legacy of change, and the patterns have been both good and bad. Few new parks were added to the system; and more people than ever are cramming into existing parks. Park maintenance received increased funding through the Park Restoration and Improvement Program, a program we supported. But there has been a concentrated effort to place professional personnel under political control and bring political appointees into positions long filled by experienced professionals.

NPCA has grown during this period because of the concern of the American people for these and other threats to the parks. To help the park system, NPCA has added creative solutions—such as the National Park System Plan and the National Park Trust—to its legislative strength. NPCA has also strengthened the educational portion of its mission by distributing the books and other educational materials of the park cooperating associations, thus allowing them to reach more people.

Wherever there was a need, we sought to find a solution. The addition of Great Basin National Park to the park system is another example of our effort. Working with the Soviet Union and other nations on common heritage issues is still another.

But we must continue to look forward to new ideas and new solutions. We must ask ourselves what should be accomplished during the next administration. Both Vice President Bush and Governor Dukakis have called for more environmental concern and more attention to the parks. In order to help the new administration fill in environmental details, NPCA and other conservation organizations are preparing a *Blueprint for the Environment*. We cannot sit back and wait for public officials to call on us. We must be waiting in their offices both with this proposed agenda—this *Blueprint*—and with NPCA's National Park System Plan.

Each new administration affects the parks and park management according to its own vision. It is NPCA's role to help ensure that that vision will better the park system. And our efforts to protect the parks have always depended upon the concern of private citizens—our members.



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# Feedback

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We're interested in what you have to say. Write NPCA Feedback, 1015 Thirty-first St., NW, Washington, D.C. 20007. (Letters may be edited for space considerations.)

## What's the Count?

I would like to suggest that you regularly publish complete information on legislation concerning NPS units and affiliated areas. I see allusions to "337 units," then later "341 units" and so on, without any clarification in accompanying articles regarding legislation. I suspect there are other readers who would appreciate being kept up to date on this as it happens.

Ken Naigus  
Ortonville, Michigan

We have been planning a legislative chart to do just that.

—the Editors

## Chestnuts and the Blight

As one who remembers the American chestnut in its glory, I have followed with interest the efforts of scientists to develop a blight-resistant strain. I should like to suggest that now, in western Massachusetts at least, nature herself is taking care of the problem.

On the High Ledges Sanctuary of the Massachusetts Audubon Society there are a number of trees approximately 20 years old, bearing flowers and burrs that are completely free from blight. Two of these were raised from seed; others grew naturally. It is rare, now, to find a sapling that is blighted.

Unfortunately, it appears that cross-pollination is needed to produce mature nuts. At present, none of the flowering specimens are close enough to one another to bring this about. But there is absolutely no doubt in my mind that the American chestnut, by itself, is making a successful comeback.

Ellsworth Barnard  
Shelburne Falls, Massachusetts

Dr. Philip Rutter, president of the American Chestnut Foundation, re-

plies: *Although this is a common and consistent phenomenon, we are interested in receiving these reports. Because the number of chestnuts is so reduced, the number of blight spores is also reduced; and young trees can escape blight for as many as 30 years. But, in the end, chance turns against them and the blight spores find them.*

## Sharp-eyed Scientists

I read with interest (and some dismay) the article in the July/August issue, "The Blighted Chestnut." On page 15, the figure surely does *not* show virus, but the virulent strain of the fungus and the hv strain of the fungus. On page 17, the word "hypothesis" is correctly used; however, on the following page, the writer reverts to the unfortunate and incorrect "theory," which all too many writers confuse these days. Also, scions don't "think." The comparison of "the mild cold instead of polio" is inappropriate.

At a time when we, as a nation, deplore the lack of preparation of students in science, we need reliable materials more than ever.

I know articles from *National Parks* are used in teaching. Please watch for the kinds of misconceptions mentioned above.

Janice Coffey Swab  
Associate Professor of Biology  
St. Mary's College,  
North Carolina

Please note that *Spartina bakerii*, mentioned in NPCA Report [September/October] on the endangered species list is not the dusky seaside sparrow. Rather, it is a variety of marsh cordgrass found throughout the southeastern United States.

Michael A. Fleetwood  
Tybee Island, Georgia

*Whoops.* The correct Latin name of the dusky seaside sparrow is *Ammospiza maritima*.

—the Editors

## History: Part of the Package

I read with interest the list of candidates for the National Park System [July/August]. The National Park Service should concentrate on the natural sites and leave the houses to

historical societies. Because the NPS is short of funds it makes sense to me to let other organizations take over Anheuser Busch, Walt Disney, Walt Whitman, etc. I would leave Richard Nixon off the list entirely as I see no reason to promote the memory of a discredited president. In the meantime, more power to you all.

Linda Sturgis  
Sanibel Island, Florida

I enjoy your magazine very much. I pass it on to my friends and use the information in it when I write to my representatives. I also support your organization, but feel too much emphasis is placed on historical preservation and too little on improving the parks and expanding the park system and wilderness areas.

David Heep  
Truckee, California

*The NPS is responsible for preserving and protecting America's heritage. Our heritage includes not only large natural areas, but also events and people significant to our nation's history.*

—the Editors

## Yellowstone on Fire

As a member of NPCA I am very concerned about the current fire-fighting policy in Yellowstone National Park. The ravaging forest fires now devastating Yellowstone could have been minimized if the Forest Service and Yellowstone park officials took a realistic view of fighting both natural and arson fires.

I understand the policy about fires in Yellowstone as my wife and I worked in the park last summer. I feel that any forest fire in any national park should be fought to conclusion immediately upon discovery. It is a shame to see our first national park ruined for years by these terrible forest fires.

Edwin L. Koehler  
San Antonio, Texas

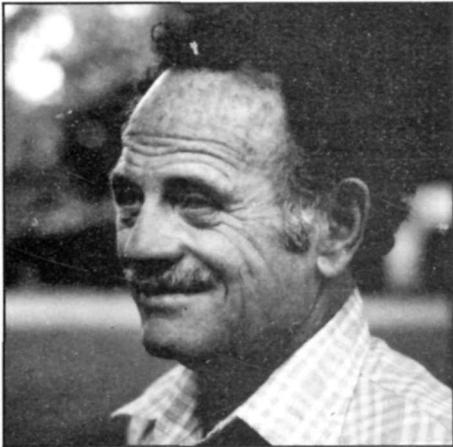
*When correctly implemented, NPCA believes the National Park Service policy of prescribed burning is ultimately beneficial to a park's ecosystem. For more on the burn policy, please see "The Long, Hot Summer" on page 26.*

—the Editors

# TRIBUTE TO EXCELLENCE

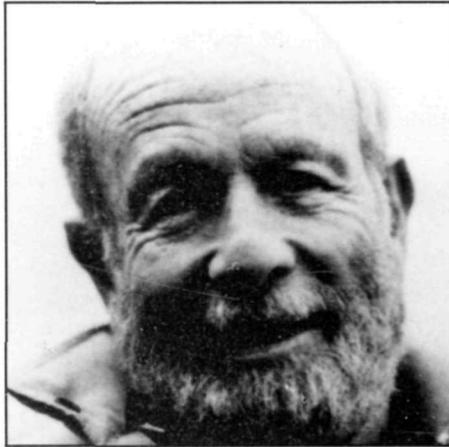
## Marjory Stoneman Douglas Award

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.



NPCA welcomes your suggestions for potential 1989 Douglas Award candidates. All nominations are due by December 31, 1988. Send to: NPCA Douglas Award, 1015 Thirty-First St., NW, Washington, D.C. 20007.

Nominator/Address: \_\_\_\_\_

Nominee/Reason for nominating: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# NPCA Report

## Manassas Tract Bulldozed Despite Bill to Block Mall

The Senate Subcommittee on Public Lands, National Parks and Forests held hearings on September 8 concerning H.R. 4526. This bill would allow the National Park Service to acquire the William Center tract adjacent to Manassas National Battlefield Park in Virginia's Prince William County.

The bill provides for a legislative taking of the tract, on which a builder plans to construct a 600-acre development—the William Center—to include a 1.2-million-square-foot regional shopping mall. Provisions in the bill enable the federal government to assume title to the site and justly compensate the owner, Virginia developer Hazel-Peterson Companies, later.

Proponents of the bill hope to invoke this seldom-used procedure to halt construction already begun on the site. The developer has ignored federal wetlands permit requirements. Roads are being bulldozed through the property and cement trucks have already poured drainage culverts.

Developers have refused an offer from preservationists to provide, free of charge, an archeologist to walk alongside bulldozers and ensure that any human remains unearthed are properly reburied. While it is unlikely that there are large concentrations of human remains on the tract, some remains may well exist on the site, and may already have been unearthed by the bulldozers' blades.

This highly controversial bill pits developers, county officials, and locals interested in economic growth against conservationists, historic preservationists, military enthusiasts, veterans' groups, and locals concerned over the area's quickly changing landscape. The controversy has attracted national attention over the past few months.

The House has already passed the measure by an overwhelming, bipartisan vote of 307 to 98. The bill's



Nick Clark, Save the Battlefield Coalition

**Bulldozers have already cleared roads through the William Center tract next to Manassas National Battlefield.**

passage through Congress is being championed by representatives Michael Andrews (D-Tex.), Robert Mrazek (D-N.Y.), and Frank Wolf (R-Va.), and by Senator Dale Bumpers (D-Ark.).

NPCA President Paul Pritchard gave lengthy testimony at the Senate hearing, averring the national significance of the tract. The site's inclusion in the park has been recommended again and again by various reports prepared by Park Service professional historians since the 1930s.

During the Battle of Second Manassas, General Robert E. Lee established his headquarters on ground that is now included in the William Center tract. The site was also the staging area for a massive assault by 30,000 Confederate troops during the conflict. Thousands of casualties of the fighting were treated at several field hospitals that were set up on the property.

Pritchard also testified to the appropriateness of a legislative taking, and the urgent need for a national strategy to protect national parks and historic places threatened by development around the country.

"We cannot continue to address the issues raised at Manassas on a case-by-case basis in the halls of Congress," said Pritchard. "Encroachment now threatens the integrity of national battlefield parks at Gettysburg, Richmond, Fredericksburg/Spotsylvania, and Harpers Ferry to name but a few."

## NPCA Honors Congressmen For Manassas Efforts

This year, NPCA's Conservationists of the Year Awards will be given to representatives Robert J. Mrazek (D-N.Y.), Frank R. Wolf (R-Va.), and Michael A. Andrews (D-Tex.) for their efforts to save the nationally significant lands abutting Manassas National Battlefield. The awards, framed citations, will be presented to the congressmen at the association's annual dinner on November 17 in Washington, D.C.

The three representatives have been extremely active in attempting to halt construction of a major shopping mall adjacent to Manassas National Battlefield. From the start of the nationwide controversy, the three have been searching for legislative methods to block it, and have drawn the attention of fellow legislators to the issue. Their recent efforts in marshalling support for H.R. 4526, a bill to incorporate the mall site into the park, have resulted in House endorsement.

NPCA presents this award to high-ranking officials who have made outstanding contributions toward protecting parks.

## Congress Increases NPS 1989 Budget

The House and Senate Interior Appropriations subcommittees have resolved the differences between their respective versions of the 1989 appropriations legislation. As in recent years, Congress has substantially increased the administration's proposed budget for the NPS.

The largest increases were for maintenance, land acquisition, and construction, which were increased by \$25 million, \$40 million, and \$145 million, respectively. Congress did not increase funds for resource management and interpretation as called for in recently passed fee legislation. NPCA will work to correct this problem in 1990 appropriations.

Congress added funds for certain studies advocated by NPCA, including studies for Colorado National Monument and the proposed Anasazi National Monument.

## Capitol Reef Reduces Cattle Grazing in Park

The National Park Service recently announced that it has purchased most of the grazing rights within Capitol Reef National Park, eliminating grazing on about 146,000 of the park's 244,000 acres.

The purchase of five entire allotments and portions of several others will eliminate about 60 percent of the grazing in the park. Park Superintendent Martin Ott said the purchases came from "willing-buyer, willing-seller" negotiations. Discussions on other allotments are ongoing.

Cattle ranchers have held permits to graze livestock on much of the park since before it was established in 1971. Enabling legislation called for a 20-year phase-out of all grazing in the park.

In the ensuing controversy, ranchers protested being forced to give up grazing permits. The NPS and environmentalists viewed grazing as damaging to the park's natural and aesthetic resources, and wanted it eliminated. NPCA has pushed for elimination from the start.

The phase-out was stalled for ten years because of unclear language in the enabling legislation. Then, in 1982, ranchers persuaded Utah senators Jake Garn (R) and Orrin Hatch (R) to introduce a bill blocking the phase-out. At that time, grazing levels were frozen, pending results of a

ten-year study on the effects of grazing livestock in the park.

This spring, facing the advent of the phase-out with the study's completion in 1992, many ranchers grew receptive to the buy-out offers of the NPS. Talks have continued ever since.

In a related development, Senator Garn recently tacked a provision concerning grazing in the national park onto 1989 appropriations measures, steering the provision around the normal committee review process. These appropriations will likely become law.

Garn's attendant provision guarantees present permit holders the

right to retain their grazing permits for the duration of their lives and the lives of one generation of immediate-family heirs.

This maneuvering elicited mixed reactions. Most ranchers view the plan more favorably than the original phase-out. Many environmentalists, however, are incensed by what they deem a perversion of the legislative process.

Terri Martin, NPCA Rocky Mountain regional representative, called it an "end run" around the conservation community. "We are very pleased, however, that such a large portion of grazing will be removed from the park," she said.



National Park Service

More grazing was permitted in Capitol Reef NP than in any other national park.

## Ocmulgee's Sylvia Flowers Wins Freeman Tilden Award

This year's Freeman Tilden Award is scheduled to be presented to Sylvia Flowers, of Ocmulgee National Monument, at the Ranger Rendezvous in Snowbird, Utah, on October 11. The award is given each year by NPCA and the NPS to honor outstanding interpretation by an NPS employee.

NPCA President Paul Pritchard, together with National Park Service Director William Penn Mott, Jr., is to present Flowers with a check for \$2,500, as well as a small bust of the late Freeman Tilden, who is considered the father of park interpreta-

tion. The award is funded by KC Publications of Nevada.

Flowers was chosen for the award in recognition of the excellent interpretive work she has done at Ocmulgee, in Georgia, over the past three years, and in particular for her role in developing the Dr. Charles H. Fairbanks Memorial Discovery Lab in the national monument's visitor center.

Flowers conceived of and planned the lab. Located in the center's basement, the lab is filled with exhibits designed to lead grade schoolers on a hands-on, self-guided learning tour, which interprets prehistoric Native and early-American cultures.

NPCA also recognized the support provided Flowers by Ocmulgee Superintendent Sibbald Smith and Southeast Regional Director Robert Baker.

Recognized as regional winners were Toni Cooper, Hot Springs, Southwest; Janice Killackey, Longfellow, North Atlantic; Robert J. Holden, George Rogers Clark, Midwest; Jay Shuler, Badlands, Rocky Mountain; Dan Sealy, Golden Gate, Western; Nancy C. Medlin, Denali, Alaska; David Smith, Rock Creek Park, National Capital; David Clark, Craters of the Moon, Pacific Northwest; and Douglas P. Thompson, Colonial, Mid-Atlantic.

## Maritime Sites: New and Expanded

In separate but related actions in early June, the 100th Congress passed two pieces of legislation affecting preservation of this country's maritime heritage. One establishes the San Francisco Maritime National Historical Park, the other expands the already-existing Salem Maritime National Historical Site in Salem, Massachusetts.

Public Law 100-349 expanded the Salem Maritime NHS to include the St. Joseph's Polish Roman Catholic Society building, located just opposite the park on Derby Street. The building is needed to house administrative staff and materials currently sharing space with interpretive programs in three of the park's most significant buildings.

More than 800,000 people visited the park last year, putting a strain on the park's facilities. This increased visitation has adversely affected the quality of the visitor experience, the efficiency of the park's operation, and the condition of the buildings themselves.

The Park Service will purchase the three-story, red brick building, now vacant, for approximately \$260,000. The building will provide Salem Maritime with 11,600 square feet of space, enabling the park to reserve the main historic buildings for visitor programs.

Salem Maritime NHS was established in 1938 to preserve and interpret early American maritime history. Salem merchants helped open up trade with the Orient and made the city a prominent port in the late 18th and early 19th centuries.

The establishment of San Francisco Maritime National Historical Park comes in response to growing concern over the deterioration of several significant historic ships.

The new area encompasses what was the San Francisco Maritime Museum and other sections of Golden Gate National Recreation Area. It comprises a wharf, an exhibition building, and seven historic sailing and early steam vessels that are in dire need of repair.

Members of the maritime preservation community, alarmed over the ships' condition, called for the NPS to take action to preserve the historic vessels. The park's collection has fallen into near-ruin through lack of maintenance funds.

Establishing the site as an independent NPS unit should help bring desperately needed federal funding and attention. The park's enabling legislation calls for the drafting of a general management plan to guide restoration of the historic ships and interpretation of the ships, artifacts, and historic documents.

Furthermore, the act establishes a commission composed of experts in maritime preservation. Commission members will be recommended by state and local governments, the NPS, and a private preservationist group. The commission will advise the NPS on management of the park.

The park's resources, highlighted by its historic ships, tell the story of early American Pacific seafaring.



NPS, Salem Maritime National Historical Site

Additions to Salem Maritime NHS will reduce overuse of the Customs House. This building now houses park office staff as well as visitor programs.

## NPCA Trustee Winks Honored by Interior

At a recent Department of Interior awards ceremony, Interior Secretary Donald Hodel presented NPCA Trustee Dr. Robin Winks with the department's Conservation Service Award, which is given annually to private citizens for their conservation efforts. Winks was selected for the award on the basis of his outstanding scholarship and advocacy for parklands. Dr. Winks, presently professor of history at Yale University, has had a lifelong interest in national parks. He is a past chairman of the National Park System Advisory Board.

# News Update

## House Action.

In August, the American Heritage Trust Act, a bill to provide increased and more stable funding for the acquisition of parkland and for historic preservation, was favorably reported to Congress by the House Interior and Insular Affairs Committee by a vote of 31 to 9.

In other action, the House passed H.R. 3964, a bill to establish a congressionally appointed body, the National Park System Review Board, to oversee the National Park Service. The bill would help free the NPS from the influence of Interior political appointees. At this writing, the Senate has yet to consider the measure.

**Omnibus Bill Creates Five New Parks.** Nearing adjournment, the 100th Congress has compiled an omnibus bill that contains 35 legislative items, several of which concern national parks. At this writing, the House has passed the bill.

Included in the bill are provisions to establish Zuni-Cibola National Historical Park, New Mexico; the National Park of American Samoa; Poverty Point National Monument, Louisiana; Natchez National Historical Park, Mississippi; Mississippi River National Recreation Area, Minnesota. It would also enlarge Congaree Swamp, Gaudalupe Mountains, and other park areas; and it would designate wilderness areas in Olympic, Mount Rainier, and North Cascades national parks.

**Climate Conference.** The Climate Institute will convene its Second North American Conference on *Preparing for Climate Change: A Cooperative Approach* in Washington, D.C., December 6-8. Involving some 500 scientists, public policy officials, environmental leaders, educators, business leaders, and media specialists, the conference's agenda is ambitious and far-reaching, and will include discussions of parks and conservation policy planning.

NPCA has played a vital role in sponsoring this important forum for the study of climate change. NPCA President Paul Pritchard has provided the institute with key leadership and was founding chairman of its board of directors. NPCA members are invited to attend the conference at a special rate of \$250 per person. For more information, call Sharon Fischlowitz, (202) 337-1502.

**Salt River Bay Agreement.** The NPS and the government of the U.S. Virgin Islands have signed a Memorandum of Agreement pledging to cooperatively manage the proposed five-acre Columbus Landing National Historic Site, located at Salt River Bay, St. Croix. The NPS will provide selected islanders with training in park management and interpretation.

Meanwhile, significant lands adjacent to the park are targeted for development. In August, the Virgin Islands District Court rejected a petition by conservationists to

rescind permits granted to Sugar Bay Land Development, Ltd. The firm presently has the go-ahead to begin construction of a major development project on a property abutting the park.

**Battlefield Conference.** Coinciding with the 125th anniversary year of the Battle of Gettysburg, *War and Peace: a Conference on Battlefield Preservation and Interpretation* will be held November 16-18, 1988, at Gettysburg National Military Park in Gettysburg, Pennsylvania. Sponsored by the NPS, NPCA, other preservation groups, and the Department of the Army, the conference is designed to aid administrators and specialists who are responsible for battlefield management and interpretation.

Topics will include natural resource management, pollution effects on monuments, interpretation of controversial topics, and recreational uses. The conference is approved as an NPS training course. To register, call NPCA's Bruce Craig at (202) 944-8530.

**Cape Lookout Overflights.** The Marine Corps wants to substantially increase low-level, high-speed training flights over Cape Lookout National Seashore, North Carolina. In findings released in September, the Council on Environmental Quality (CEQ) failed to uphold Interior Department objections to increased overflights. The CEQ is the governmental body set up to resolve interagency disputes concerning actions that may affect the environment. In lodging the complaint, Interior Secretary Donald Hodel cited the long-term, adverse impacts of noise levels that would be generated by the proposed flights.

In its ruling, the CEQ claimed that there is no reasonable, alternative air space available to the Marine Corps. It advised the NPS and the Marine Corps to "work together to mitigate the expected adverse noise impacts" on the seashore. The proposed flights may number as many as 42 per day, and some operations will require altitudes as low as 500 feet. The Federal Aviation Administration will be the final arbiter in the case.

**Native Memorial for Custer Battlefield.** NPS Director William Penn Mott, Jr., recently announced that he will appoint a committee of Native American spiritual and political leaders to aid the National Park Service in designing an official memorial to the Native Americans who died at the Battle of Little Big Horn. Although Custer Battlefield National Monument commemorates the deaths of U.S. Army soldiers in the conflict, there is presently no such recognition of Native American deaths. The official memorial will replace an unauthorized plaque placed at the monument last July 25 by Native American activists, who were protesting the lack of such a memorial. The plaque is now on display in the monument's visitor center.

Lieutenant Colonel George A. Custer, 270 U.S. Army soldiers, and an unknown number of Native Americans perished in the June 1876 conflict, in which Custer's cavalry engaged a large force of Sioux and Cheyenne.

## Military Overflights Pose Major Threat, Say Parks

Low-flying military aircraft have become a leading threat to the sanctity of our national parks, according to a recent National Park Service survey. Managers consistently ranked "military overflights" an immediate threat.

Around the country, park visitors and wildlife increasingly are being disturbed and frightened by the deafening roar that accompanies F-4 Phantom jets, A-6 Starfighters, F-14 Tomcats, and other military aircraft on low-flying training exercises.

Pilots of the aircraft often swoop over parks at an altitude of several hundred feet or less at hundreds of miles per hour. Though pilots may simply be ignorant of park boundaries, critics charge many overflights result from sightseeing diversions or displays of aerial bravado.

While the problem is not new, its increase in frequency is the result of changes in military strategy over recent years. These changes emphasize

the use of low-flying, high-speed jets that avoid radar detection.

Although the Federal Aviation Administration recommends that pilots not fly below 2,000 feet in national parks, the agency is powerless to enforce its advisory. The military itself has a policy barring flights of 3,000 feet or less, and yet NPS files are rife with reports of jets flying low over parks.

Military officials claim disciplinary action has been taken against some errant pilots. Park rangers, however, characterize the military as indifferent, arrogant, and irresponsible to requests to end the flights.

Officers claim there is nothing they can do unless park managers cite the identifying number from the offending plane's tail section—usually an impossible feat. Military officials have even, on occasion, denied flights below 3,000 feet ever occur over parks, despite evidence to the contrary.

In the meantime, the *Sacramento Bee* conducted an in-depth, nationwide investigation into the matter,

and published the results in a special report. According to the report, noise from jets has cracked the eggs of endangered birds in the Everglades and dislodged bricks from 142-year-old Fort Jefferson National Monument, a nearby island just off the coast of Florida.

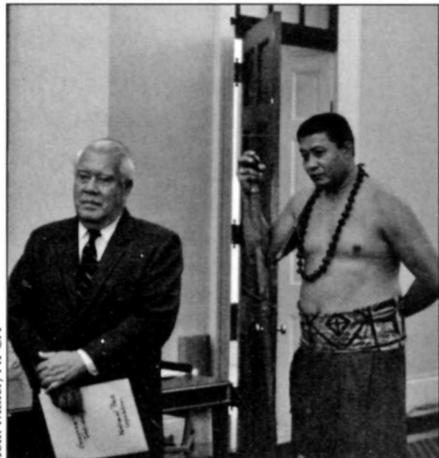
The same article detailed a near midair-collision over Sequoia National Park this summer between a helicopter carrying park supplies and an F-4 Phantom jet. Reports abound—from North Carolina's Cape Lookout to the desert parks of California—of visitors terrified by the sudden roar of military jets.

Russ Butcher, NPCA's California/Southwest regional representative, called the current situation at Grand Canyon a disaster waiting to happen. Low-flying military aircraft frequently barrel through the canyon in excess of 500 mph, cutting through the same airspace occupied by commercial air tours.

NPCA has long urged the FAA to end illegal flights over national parks around the country.

## House Passes Bill To Establish Samoan Park

On September 13, the House of Representatives passed H.R. 4818, a bill to establish a national park on American Samoa. Although a companion bill has been introduced in the Senate, passage is not likely before the 100th Congress adjourns.



Tom Miller, NPCA

Samoan chiefs testified before a House subcommittee, supporting the new National Park of American Samoa.

House passage, however, is an important first step for the legislation.

The National Park of American Samoa would protect from encroaching development about 8,170 acres of beach, coral reef, and rain forest—a quickly disappearing world resource—that are unique in the world. Located in the South Pacific about 2,300 miles from Hawaii, American Samoa is a Trust Territory comprised of five volcanic islands and two coral atolls.

The islands' lush forests are the only true paleotropical—Old World tropical—rain forests on American soil, and the largest remaining concentration of rain forests in all of Polynesia. The forests are home to an endangered species of large, diurnal fruit bat known as the flying fox. Many of the forest plants depend upon the fruit bats for pollination and seed dispersal.

The proposed park also encompasses several important archeological sites, many of which are directly connected to Samoan myth and legend. These include the only surviv-

ing pre-Christian temple in American Samoa, and a prehistoric fortified village. Samoa's archeological sites have only begun to be studied by scientists.

Samoa's Tutuila Island contains seven geological features recognized as national natural landmarks. These include Mt. Pioa (Rainmaker), and Matafao Peak, a pair of trachyte plugs—peaks of rough volcanic rock.

NPCA's Brien Culhane, in House hearings on the bill, affirmed the significance of the proposed areas: "The islands of American Samoa are a national treasure. This national park could become the only one in the world to contain both lowland rain forest and adjacent coral reefs, the two most ecologically complex and diverse ecosystems on the planet."

The potential park would encompass areas on two of Samoa's islands. It would be managed essentially as wilderness, with minimum development to be located outside the park. The area's rich natural resources, as well as the Samoan culture that is

## Mesa Verde Dropped as Site For New Indiana Jones Film

Lucasfilms Ltd. recently dropped plans to film a segment of its newest Indiana Jones adventure movie in Mesa Verde National Park. In reaching their decision in late August, company executives yielded to protest from NPCA, other conservationists, the park's chief archeologist, and elders of the Hopi Tribe.

"We discovered that this was holy ground to the Hopi Indians," said Frank Marshall, executive producer with the firm. "Based on that, we feel we have to respect their heritage and ancestors, and we have elected not to shoot there."

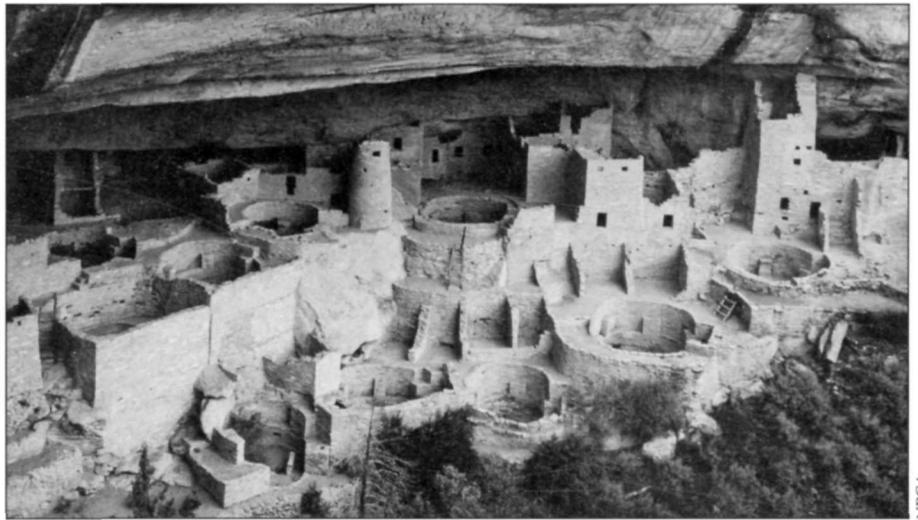
Filming of the segment, which includes a chase scene and reportedly depicts a group of looters digging up a jeweled cross in one of Mesa Verde's kivas, was approved by the NPS's Rocky Mountain regional office. Approval came despite a five-page report by the park's chief archeologist that detailed possible adverse effects to the site.

closely tied to them, would be preserved and interpreted.

Samoans would be permitted to continue to live by traditional subsistence agriculture. Samoan *matai*, or chiefs, from villages in the park, would advise the NPS on park management, and Samoans would be encouraged to lend expertise as park interpreters.

The Samoan people are extremely supportive of the proposed park, and sent a delegation of chiefs to testify at the House hearings. Traditional Samoan land ethics are remarkably similar to those of the National Park Service. Properties are owned communally by clans, led by chiefs who view themselves as stewards of the land.

If the Senate does not pass the bill before the 100th Congress adjourns, it will be reintroduced in the 101st Congress, and both houses must vote on it again. Recent House passage, however, lays valuable groundwork for the legislation and suggests favorable future consideration by Congress.



Mesa Verde's fragile ruins will not be investigated by Indiana Jones.

Terri Martin, NPCA's Rocky Mountain regional representative, led public protest, pointing out that the Park Service's own report argued against granting permission to film. Martin felt that, despite measures to offset impacts imposed by the NPS regional office after reviewing the report, film crews could damage the fragile, 700-year-old cliff dwellings.

Of particular concern to protesters was the possibility that depiction of artifact looting in a major motion picture could inadvertently encourage this activity, which is already a problem in the Southwest. Also cited was the fact that this area is sacred to local Native American

groups, including the Hopi, and so inappropriate for such activities.

In a letter to Lucasfilms, Terri Martin commended the firm for withdrawing its plans to film in the park: "It's this kind of sensitivity that will help assure the long-term protection of our parks and cultural resources," she wrote.

In the letter, Martin expressed lingering concern over the film's possible retention of the looting scene, however.

"The scene may still encourage people to search for historic treasure, and, in doing so, cause irreparable damage to irreplaceable archeological sites," she said.

## Bishop Wins Mather Award For Fighting for Wolves

This year, NPCA's Stephen T. Mather Award is scheduled to be presented to Norman Bishop of Yellowstone NP at the Ranger Rendezvous on October 11 in Snowbird, Utah. NPCA President Paul Pritchard is to present Bishop with a framed certificate and a check for \$2,500.

NPCA gives the Mather award annually to an NPS employee in the field of natural resource management and protection. The award seeks to honor individuals who have demonstrated initiative and resourcefulness in promoting environmental protection, and who have risked their jobs and careers for the principles of good stewardship.

Bishop, a research interpreter at Yellowstone, was selected for his outstanding efforts to educate the public about wolf reintroduction in the park—a highly volatile policy.

Bishop has had a significant impact on the public's understanding of the issue. He has authored several articles on the subject, and has developed an effective slide presentation that he has shown throughout Idaho, Montana, and Wyoming. He was instrumental in bringing to Yellowstone the highly successful *Wolves and Humans* exhibit, which depicts the history of the relationship between wolves and people.

Bishop was an active supporter of wolf reintroduction at a time when others remained silent.



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## Congress Moves Forward On Congaree Addition

At this writing, a Senate vote is imminent on S. 2018, a bill to expand the boundaries of Congaree Swamp National Monument in South Carolina, and to designate large portions of the monument as wilderness. The bill, though authored in the Senate, was amended and passed by the House; the Senate is now considering the amended version.

The proposed legislation would add approximately 7,000 more acres to the monument's 15,135 acres and would designate some 15,000 acres as wilderness. Wilderness designation would limit development in those areas, preserve their wilderness qualities, and underscore the purpose of the park—to protect and preserve a unique ecosystem.

The Congaree Swamp contains the largest remnant of an old-growth southern bottomland hardwood forest in the United States. It was designated a Biosphere Reserve by UNESCO in 1983.

The swamp contains large stands of tupelo and bald cypress, oaks, sweetgums, and loblolly pines; and several trees hold records for species size. Wildlife in the swamp includes alligators, bobcats, otters, feral hogs, and wild turkeys, as well as endangered red-cockaded woodpeckers and bald eagles.

## Home of Founding Father Designated Historic Site

On September 8, President Reagan signed Public Law 100-421, designating Snee Farm, an estate located on the outskirts of Charleston, South Carolina, a national historic site. The farm was home to Charles Pickney, an important American statesman in the colonial and early national periods.

The site, which was listed as a national historic landmark in 1973, was recently acquired by a local preservationist group, the Friends of Historic Snee Farm. The group plans to donate the site to the National Park Service after paying off the remaining debt on the property.

The move to protect Snee Farm as

The administration has opposed the legislation on the grounds that the NPS has not yet completed the planning process called for by Congress when the monument was established in 1976. At that time, Congress recognized that, by itself, the 15,000-acre Beidler tract—which is the cornerstone of the monument—would not be sufficient to protect swamp resources.

Congress directed the NPS to identify adjacent or related areas for eventual incorporation into the site, and charged the Park Service with preparing management plans for proposed areas. The NPS is in the final stages of that planning process, and has released its draft general management plan.

After considering about 11,000 acres for inclusion, the NPS boundary study released as part of the draft plan recommended that 2,464 acres be added to the monument. In response, a group of conservationists and local citizens proposed an alternative, somewhat larger boundary expansion, from which the present bill draws heavily.

Although the legislation is opposed by the administration, it is supported by the local county council, state agencies, South Carolina Governor Carroll Campbell, Jr. (R), and the state's entire congressional delegation. This kind of backing will greatly help the legislation.

a national historic site began in 1986, when a developer bought the house and the surrounding 25 acres and announced plans to build 42 luxury homes on the property. In response, the preservationist group was formed and began raising funds to acquire the site, while members of the South Carolina congressional delegation introduced bills to incorporate Snee Farm into the National Park System. Both efforts have been successful. The NPS will not begin managing and interpreting the site until it is donated.

Charles Pickney, the second-youngest signer of the Constitution, was one of the few individuals to serve his state as governor, senator, and representative.

# NPCA Fiscal Report

Effective January 1, 1988, National Parks and Conservation Association changed its fiscal year from the calendar year to July 1 through June 30. In order to accomplish this changeover, January 1 through June 30, 1988, was figured as a short, six-month fiscal year. (Please see the accompanying balance sheet.)

Within this six-month period, NPCA experienced significant progress in a number of areas. The Association completed its second Five-Year Plan—a blueprint for every part of the organization. The overview and specific points of this document, its goals and objectives, will lead the organization well into the next decade.

This six-month period also saw completion of NPCA's National Park System Plan. Three years in the making, it is the first comprehensive plan for the future of the National Park System. For the 70-plus years of its existence, the National Park Service has existed without such a plan. Yet, resource management and other park issues have become so complex that NPCA saw a comprehensive plan as a necessity.

The nine-volume plan, especially the volume concerned with recommendations for new parks, attracted much media attention. NPCA was featured prominently on NBC's *Today Show*, which aired nationally, in every major newspaper, on wire services, and in local newspapers around the country.

Other issues in which NPCA played a leading role include the national battle to halt encroaching development at Manassas Battlefield; the American Heritage Trust, legislation which would increase and stabilize the Land and Water Conservation Fund; expansion of Big Cypress National Preserve and Congaree Swamp National Monument, as well as dozens of other congressional bills.

Due to the efforts of NPCA's Na-

tional Park Trust in facilitating a land donation, Fort Laramie is now complete. NPCA's Science Advisory Commission, a 17-member board set up to examine the management policies and the broad needs of NPS science and research, first met during this fiscal period.

NPCA's Park Education Center also came into being during this period. The center helps educate park visitors by serving as a clearinghouse for a wide variety of park publications. The center's catalogue, first published in the May/June issue of *National Parks* and mentioned in major newspapers, brought a huge initial response.

*National Parks* published features on the most likely new parks, the Manassas controversy, new research

on chestnuts, and current park cave discoveries, among other important park issues. Our article on Lyme disease drew such a strong response that it was reprinted in numerous newspapers and journals.

NPCA could not have carried out all of its agenda without the help and concern of our members, contributors, volunteers, and friends. We thank you all for your support of the association and for your support of our country's natural and cultural heritage.

*For the complete financial statements for the six-month fiscal year ending June 30, 1988, please write to NPCA Accounting Department, 1015 Thirty-first St. NW, Washington, D.C. 20007.*

## Balance Sheet

For the Six-Month Fiscal Year Ended June 30, 1988 (With Comparative Totals for Calendar Year 1987)

	Operating Fund	Land Acquisition Revolving Fund	National Park Trust Properties	Endowment Fund	Total June 30 1988	Total December 31 1987
<b>ASSETS</b>						
Cash	\$ 369,378	\$ 161,153	\$ —	\$ 78,279	\$ 608,810	\$ 522,291
Accrued interest receivable	10,380	—	—	—	10,380	7,366
Other receivables	58,636	—	—	—	58,636	88,754
Accrued distribution from investment in partnership	9,936	—	—	—	9,936	9,936
Investments	534,929	124,252	—	57,797	716,978	673,013
Land, equipment & furniture at cost, net of accumulated depreciation	243,021	—	17,000	—	260,021	282,666
Other assets	114,383	—	—	—	114,383	135,560
<b>Total Assets</b>	<b>\$ 1,340,663</b>	<b>\$ 285,405</b>	<b>\$ 17,000</b>	<b>\$ 136,076</b>	<b>\$ 1,779,144</b>	<b>\$ 1,719,586</b>
<b>LIABILITIES AND FUND BALANCES</b>						
<b>Liabilities:</b>						
Accounts payable	\$ 182,193	\$ —	\$ —	\$ —	\$ 182,193	\$ 143,490
Payroll taxes withheld, accrued	11,577	—	—	—	11,577	3,603
Security deposit	346	—	—	—	346	346
Accrued expenses	126,621	—	—	—	126,621	129,390
Deferred amount:						
Restricted	207,290	—	—	—	207,290	361,826
Unrestricted	—	—	—	—	—	1,412
<b>Total Liabilities</b>	<b>528,027</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>528,027</b>	<b>640,067</b>
<b>Fund Balances:</b>						
Unrestricted	812,636	—	—	—	812,636	796,812
Restricted-nonexpendable	—	285,405	17,000	136,076	438,481	282,707
<b>Total Fund Balances</b>	<b>812,636</b>	<b>285,405</b>	<b>17,000</b>	<b>136,076</b>	<b>1,251,117</b>	<b>1,079,519</b>
<b>Total Liabilities and Fund Balances</b>	<b>\$ 1,340,663</b>	<b>\$ 285,405</b>	<b>\$ 17,000</b>	<b>\$ 136,076</b>	<b>\$ 1,779,144</b>	<b>\$ 1,719,586</b>

# The Soviet Experiment

## Creating a national park in the midst of Moscow

by **Vladislav A. Gorokhov**  
and **Svetlana S. Vishnevskaya**

**M**oose Island is a pioneer among the national parks of Russia. It will soon be five years old.

In the distant past, the more precious forestlands were called islands in Russia. And Moose Island is still a world of age-old woods adorned alternately with flowers and snow, a world of glades, meadows, and marshes inhabited by animals who, apparently, have no idea that they are living on the outskirts of a city with a population of ten million.

In the south, Moscow's neighborhoods come right up to the edge of the national park and sometimes elk stray into gardens and backyards. One day the residents of a multi-story apartment house found a wild boar on their third-floor landing.

Even areas farther from Moscow do not have such a variety of flora and fauna as Moose Island whose four thousand hectares (out of eleven) are on Moscow territory.

In the north, Moose Island Forest—with its elk, boar, deer, badger, squirrel, and chipmunk—borders on Yauza Marsh. The marsh serves as a sanctuary for beaver, muskrat, duck, heron, bittern, swan, and crane.

Across the marsh lies a developing industrial town with drainage, industrial waste, and pollution from kitchen gardens all on the fringe of the game preserve. In fact, looking at the national park from a helicopter one gets the impression that it is an island surrounded by a sea of concrete neighborhoods and industrial enterprises. Only in the northeast is it connected with forests that reach into the heart of Russia.

Another thing one sees from above is how vulnerable the region

is. Moose Island could have shared the fate of other forests that had surrounded Moscow, which were destroyed long ago. But Ivan the Terrible and the grand princes of Russia before him had decreed that Moose Island remain untouched because of its wealth of fauna.

The first mention of the forestland in Russian chronicles dates back to 1406. The forests had been a stone's throw from the Kremlin, but they kept retreating. Finally, they only came as far as Sokolniki, which had once been a suburb of Moscow but is now one of its central districts.

The status of royal hunting grounds, however, protected Moose Island better than the highest fences. If caught, a poacher was whipped, and then he and his whole family were exiled for life to the Azov Sea area.

The czars loved falconry more than any other pastime. The dedicated hunter and pilgrim Alexei Mikhailovich, the father of Peter the Great, would dress in a crimson hunter's caftan and soft morocco boots and hunt bear with a spear.

Yaroslavka, the historical road pilgrims from all of Russia traversed on their way to the Holy Trinity Monastery of St. Sergius and further on to Yaroslavl and the famous monasteries in the north, also passed through Moose Island. Pilgrims traveled on foot as custom demanded. Czars and czarinas, Catherine the Great included, were no exception. And ruins of some of their wayside palaces remain to this day.

In the 1812 patriotic war against Napoleon, Moose Island was the scene of action of famous Russian

partisans, Denis Davydov, Pushkin's friend, among them. Thanks to their courage, the French troops did not advance farther than Mytischki, in the north. (Mytischki, an old village in the suburbs of Moscow, is now a large town.)

Mytischki is important to the history of Moose Island in yet another way. The first Moscow water main was built from the famous Mytischki Springs to Moscow through what is now the park.

Vladimir Lenin, a great lover of nature, enjoyed strolling through the woods in Moose Island. These walks quickly dispersed his fatigue.

Clearly, there was every reason to turn Moose Island into a national park. Yet the idea did not seem acceptable to all.

"What do we need that American fad for?" some said. "Let them set up national parks. As for us, everything the country has belongs to the people anyway."

It is true that in the Soviet Union land is the property of the nation, yet we have to protect it from the ministries and departments who damage nature in their narrow, time-serving interests. The tragedy of the Sea of Aral, Lake Ladoga, Kara-Bogaz Bay and the pollution of the Baikal have shattered any illusions that the nation has had on this score. [The Sea of Aral, in central Asia, was once the world's fourth-largest inland sea, but it has shrunk to one-third its size because of water diversion. Lake Ladoga used to be Leningrad's principal source of drinking water, but now cannot be used because of contamination.]

The growing alarm of the people

made them search for ways of protecting nature against economic voluntarism. The wide network of nature preserves that have long existed in the country could no longer answer the demands of the times, which called for a new approach to nature protection and recreation. [Nature preserves are strictly scientific research areas, but they sometimes form the core areas of Soviet national parks, in which visitation and recreation play larger roles.] And that is how Moose Island National Park came into being.

The decision was grounded in world experience, the experience of the Soviet Baltic Republics [Lahemaa, the first Soviet national park, was established in Estonia in 1971], and also in its own history. There had been attempts to found a national park in Moose Island back in 1912, but WWI wrecked all plans.

Seventy years later we called Moose Island a national park again, but we had no experience in organizing and building a national park. There were heated discussions turning on the percentage of territory that should be a park and whether the trees were to be felled or not. If they were, what amount? What was the optimal number of animals? And so on.

It took five years of debates to finally produce a finished project. As before, there are voices maintaining that a national park cannot survive in such an agglomeration. These people say a park should be set up 200 or 300 kilometers from Moscow in an unpopulated area.

Others say that if the park does

not survive, neither will the people, so why argue about the matter? Moose Island is, in many ways, a reflection of our ecological hopes that concern, above all, the existence of our 20 national parks.

The founding of Moose Island National Park coincided with the beginning of *perestroika* [restructuring] and *glasnost* in our society. It is an illustration of the fact that *perestroika* has revived many aspects of our life and enabled people to join in restoring many lost values.



Illustration by Richard Thompson

### **Moose Island is inhabited by animals that have no idea they are on the outskirts of a city of ten million**

In the past autumn and winter alone, about 40,000 people worked gratis to restore the land in the national park. The banks of the Yauza River, which flows through the park, were cleared of waste and garbage. Next on the agenda is cleaning the riverbed and planting trees.

People of different ages and professions work in the park, but the majority are students. The young people are especially fond of the park, which they call "our park."

They are interested in the new

idea of national parks, but they know little about them. What they need is a good book. A joint Soviet-American publication would be just the thing. Our readers would like to get acquainted with America's vast experience in the area.

Among other connections between our countries [see "Beringia," page 18], our Moose Island and your Sitka National Historical Park have common pages in Russian Orthodox Church history. Ivan Veniaminov, the Russian Orthodox missionary in Alaska, subsequently became the Blessed Innokenty, attaining the highest ecclesiastical post—Metropolitan of Moscow.

These connections pave the way to further cooperation between the Soviet and American national parks, which would help to preserve nature and the memory of historical links between our two countries.

Perhaps it may sound utopian, yet if we are persistent in our efforts for the good of nature and the world, the entire earth may one day become a beautiful national park where all things thrive.

*Vladislav A. Gorokhov became director of Moose Island National Park in 1987. A specialist in landscape gardening and author of a number of books, including Parks of the World, he was part of the 1987 Soviet delegation that hosted U.S. park experts and was, in turn, hosted by the National Park Service in this country.*

*Svetlana S. Vishnevskaya, who lived in the United States during the 1960s, reports on ecology and culture for Komsomolskaya Pravda [circulation 18 million].*

*Beringia:*

# A Common Border

*Soviets and Americans work to create a joint park in the Bering Strait*

*by William Brown*

"We do not often think of the Soviet Union as a country that shares a border with us. It does, of course, and as a result . . . this is an area where there are rich and diverse possibilities for work that is of mutual benefit. In a larger context, it is reassuring to know that there are similar problems and that we can help each other with solutions. The shared problem-solving provides a basis for building trust and friendship. As we work our way through the project list there will be opportunities for more people to build such relationships. The word, I believe, is serendipity."

*Denis P. Galvin, NPS Deputy Director; Co-chair, U.S.-Soviet working group: "Conservation and Management of Natural and Cultural Heritage."*

**P**eriodically during ice ages of the recent geologic past, the lands and shallow seas of today's Bering Strait region formed a land bridge between Siberia and Alaska. For millennia at a time, what are now the United States and the Soviet Union were joined across the arctic north.

At its maximum, the Bering Land Bridge extended a thousand miles from north to south. Its hinterlands reached far into the unglaciated river

basins and plains of Alaska and Siberia.

Although the bridge has been broken, Alaska and Siberia lie only 50 miles apart. Each side a mirror of the other, these are lands of subtle and remote beauty, lands of dwarf forest and tundra, once a vast arctic steppe, hosting mammoths and giant bison. One hundred seventy species of birds migrate here from all seven continents, and the rich coastal waters attract 15 species of

sea mammals, including eight species of whale.

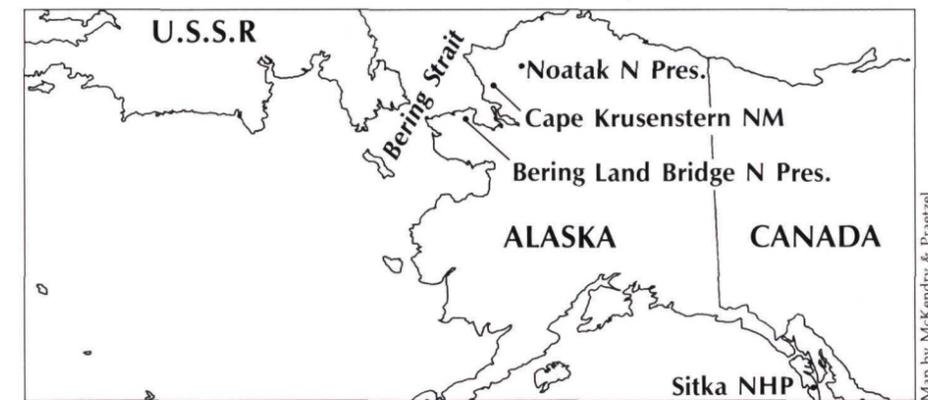
During the past two years, a different kind of Bering bridge has been formed. The United States and the Soviet Union have loosened the grip of the Cold War and entered upon a new era of cooperation. Joint efforts, ranging from arms control to technical and cultural exchanges, have benefited each of our countries and the world at large.

This cooperative spirit has

breathed new life into a bilateral environmental agreement signed in 1972 during an earlier detente. One of the new projects—entitled "Research, Conservation, and Management of the Beringian Heritage"—could lead to U.S.-Soviet cooperative management of the flora and fauna of that part of the arctic north. Ultimately, the project could lead to a jointly managed park.

The effects of the connection between Siberia and Alaska endure and are seen throughout Beringia: in fossils of plants and animals that lived in those daunting environments; in bear, wolf, lynx, and others of those species that flourish there today; in the artifacts of ancient peoples, whose descendants perpetuate the Beringian connection.

In the brief span of modern history—whatever political climates and boundaries might momentarily prevail—the old patterns persist. Birds, fish, and sea mammals still migrate across the lines on our maps.

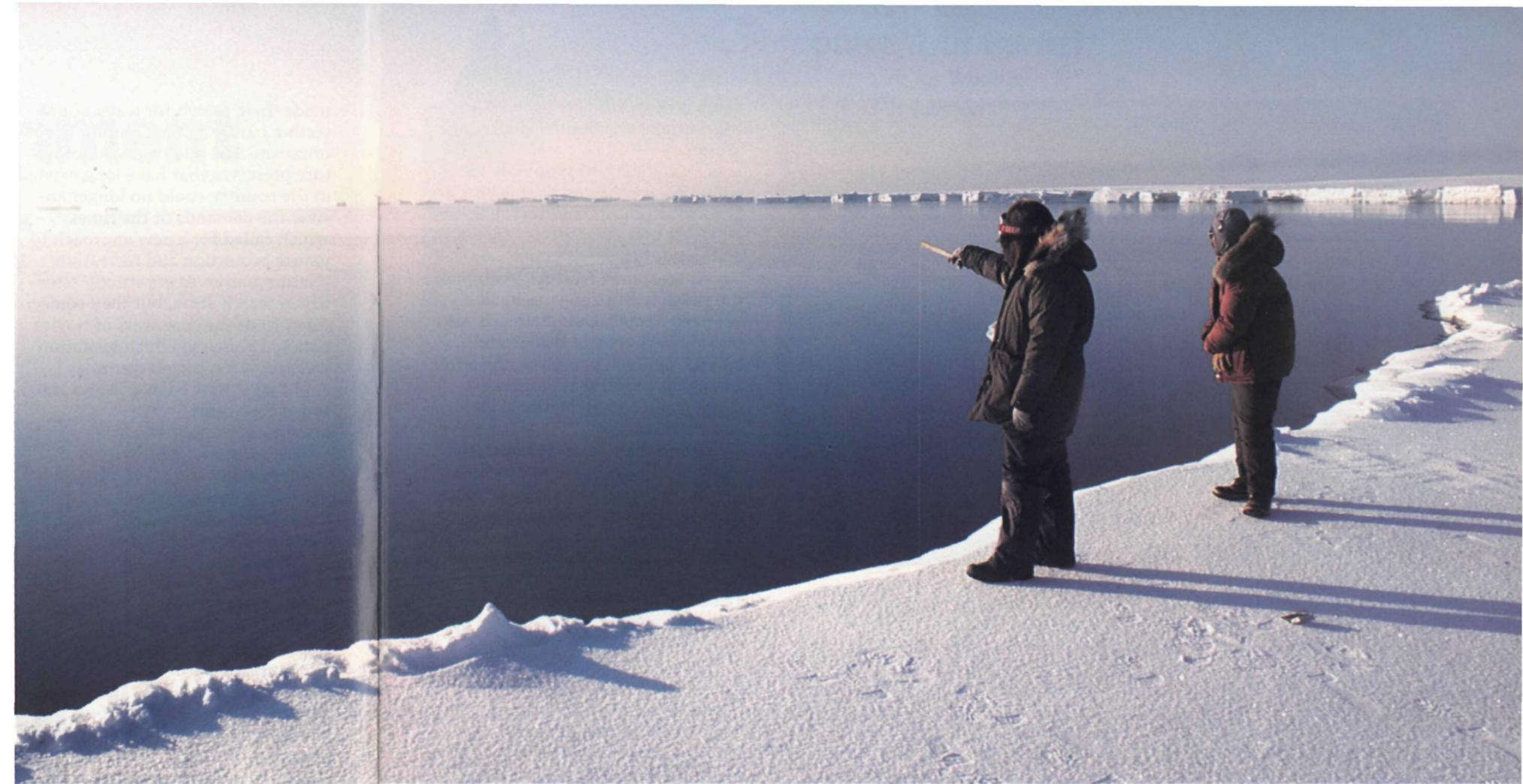


The migrants' destinations were genetically coded long before the arrival of humans, who, in their time, joined the procession across the bridge. We, the latecomers, make treaties that recognize the sanctity of ancient flyways, sea passes through the islands, hauling-out places, and rookeries. The older biological order pursues its course both despite and because of the human presence.

On either side of Bering Strait,

scientists drawn to these primeval dramas have reached out to their colleagues across seas and boundaries fogged by both weather and the international climate that ruled recent decades. Despite these difficulties, the scientists of both nations have managed joint expeditions, studies, and symposia that contributed to international stewardship.

In the 1920s and 1930s, for instance, Dr. Ales Hrdlicka did exten-



Nunivak Island, U.S.; Tom J. Ulrich



Art Wolfe

After raising its young in the grassy tundra of Beringia, the snowy owl heads south in the winter.

sive anthropological and archeological research in both Alaska and the Soviet Union. In the mid-1970s, the Soviet's A. P. Okladnikov and the University of Connecticut's William Laughlin conducted joint archeological studies of the Aleuts.

This urge of scientists and scholars to understand the past is noble work, transcending, like the subjects of their study, the lines on maps.

In the new openness that now moves both nations lies even greater promise. The tradition of bridges—terrestrial, historical, intellectual—spanning Bering Strait is due for renovation. The Beringian project can help provide the architecture.

The concept of the Beringian Heritage project was adopted in a 1987 protocol following reciprocal visits that year by U.S. and Soviet delegations. The natural and cultural affinities of eastern Siberia and Alaska struck a strong chord in both delegations; and the delegates explored a broad range of possibilities for preserving natural and cultural heritage.

Lead agency on the U.S. side is the National Park Service, which invited academic and conservation representatives—including T. Destry Jarvis, NPCA's vice president for con-

servation policy—to join the delegation. The Soviet delegation included representatives from historic preservation, environmental, and resource management ministries and institutions, as well as from several Soviet republics.

Topics at seminars and field visits in both countries ranged from architecture to zoology, from old-city restoration to wilderness preservation. At the heart of these discussions was the idea of cooperation.

Cooperative efforts would include sharing of technical and planning data; exchanges of scientific and technical experts; joint, multidisciplinary study teams; and student and volunteer exchanges.

**I**t is no accident that these new connections were made in Alaska. Besides the proximity of the two countries in the far north, the 1980 designation of more than 100 million acres of protected lands in Alaska makes the state a major focus of conservation efforts.

Many of these areas are so huge and remote that they constitute complete, protected ecosystems—rarities in today's world. Several of them have been or will be designated international biosphere reserves under the UNESCO Man and the Biosphere program. These biosphere reserves—whose scientific

value is of worldwide concern—complement the Beringian Heritage project.

In fact, if current proposals are approved, by the end of this year a U.S.-Soviet biosphere reserve team will have met in the Soviet Union to craft a two-year research program at paired biosphere reserves. Although the possible Russian sites have not yet been named, candidate U.S. sites include Bering Land Bridge and Noatak national preserves, the latter a biosphere reserve in northwest Alaska, and Denali National Park and Preserve.

Beyond the natural sciences, the interties of human history in the Beringian region have been constant from the time Early Man crossed the land bridge. Earliest dates postulated reach back 30,000 years. Ancestral Indian sites yield dates of about 12,000 years before present. The early Eskimos probably arrived by sea some 6,000 years ago.

These connections continued through Russian colonization of Alaska, which began in the late 1700s, to last summer's reunion of Siberian and Alaskan Eskimos in the celebrated flight from Nome to Provideniya. The hobbled progress of anthropological and historical studies is now being freed as joint projects gain momentum [see "The Living Bridge," page 23].

As important as cross-fertilization between U.S. and Soviet scholars is the strengthening of indigenous traditions. Such reinforcement would result from regular exchanges between Siberian and Alaskan Eskimos and others who share the circumpolar world. The cultural values of these traditions are paramount in a world where indigenes, like endangered species, face extinction.

Consider also the traditional science and technology embedded in the lifeways evolved by these cultures: knowledge of weather and sea, of animal and ice, of travel, food processing, clothing, and survival.

The lore and practices of these people may be on the brink, but they can be revived. They constitute the living library of evolved competence in environments that yet daunt and foil more recent arrivals.

With similar environments, shared migratory wildlife, and human histories intertwined from earliest times, the U.S. and Soviet segments of Beringia form a natural and cultural entity. While honoring the sovereignty and jurisdiction of each nation, the Beringian Heritage project would recognize that fundamental integration.

The project would open the way for joint scientific research, from which would come the knowledge to cooperatively preserve the region's many treasures. From this model could come larger visions of cooperation and interdependence—in a world needing both.

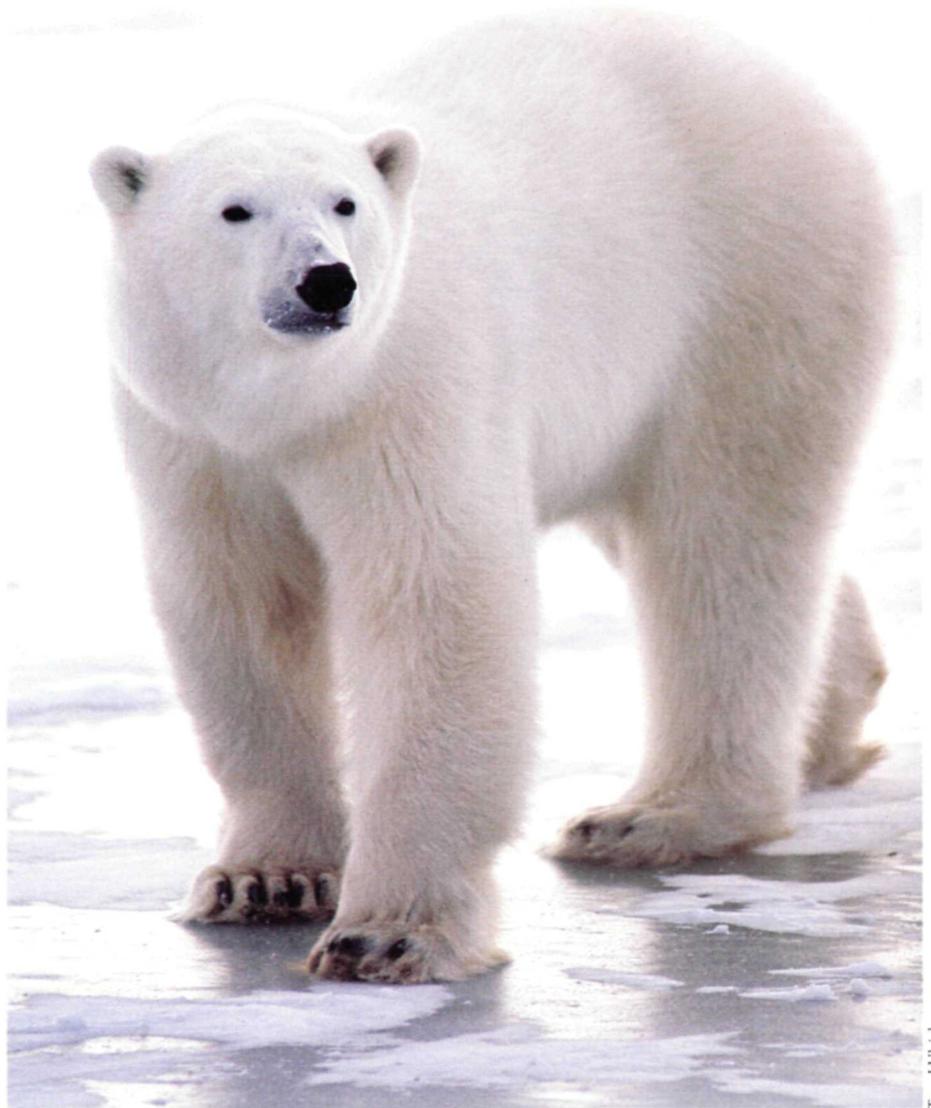
**B**ut to all things there must be a beginning. Currently, draft proposals for starting the Beringian Heritage project are being exchanged by the U.S. and Soviet delegations. The U.S. delegation has proposed an international heritage park along the lines of Glacier and Waterton Lakes national parks, which lie on the U.S.-Canada border.

In the words of the proposal, the paired protected areas "... would be a visible, symbolic recognition of the shared Beringian heritage."

Although each would be subject to the laws and procedures of its own nation, similar environments and resources would encourage close working relationships and communications. Cooperative management, joint training, coordinated research, and exchanges of staff could be the result.

The first step toward the international park—whatever its final designation—would be creation of a U.S.-Soviet planning team in 1989. This team of scientists and planners would visit existing and potential protected sites on both sides of Bering Strait, then report their recommendations to both governments.

The international park, with its implications for peace, would have potential as proving ground and model for broader fields of cooperation. It would offer a concrete project and a physical locale where scientists, technicians, and managers from U.S. and Soviet agencies and institutions could perfect working



Tom J. Ulrich

networks and procedures. The two nations could here mesh their respective strengths.

The Soviets bring to this work a distinguished record of scientific studies and balanced use of renewable resources. The U.S. approach to parklands stresses visitor education and wilderness preservation. The end result would benefit both.

A Beringian park could be a showcase, where the warmth of international cooperation offsets the arctic chill. It is an exciting prospect, as a stone cast into still water, of expanding effects and reverberations.

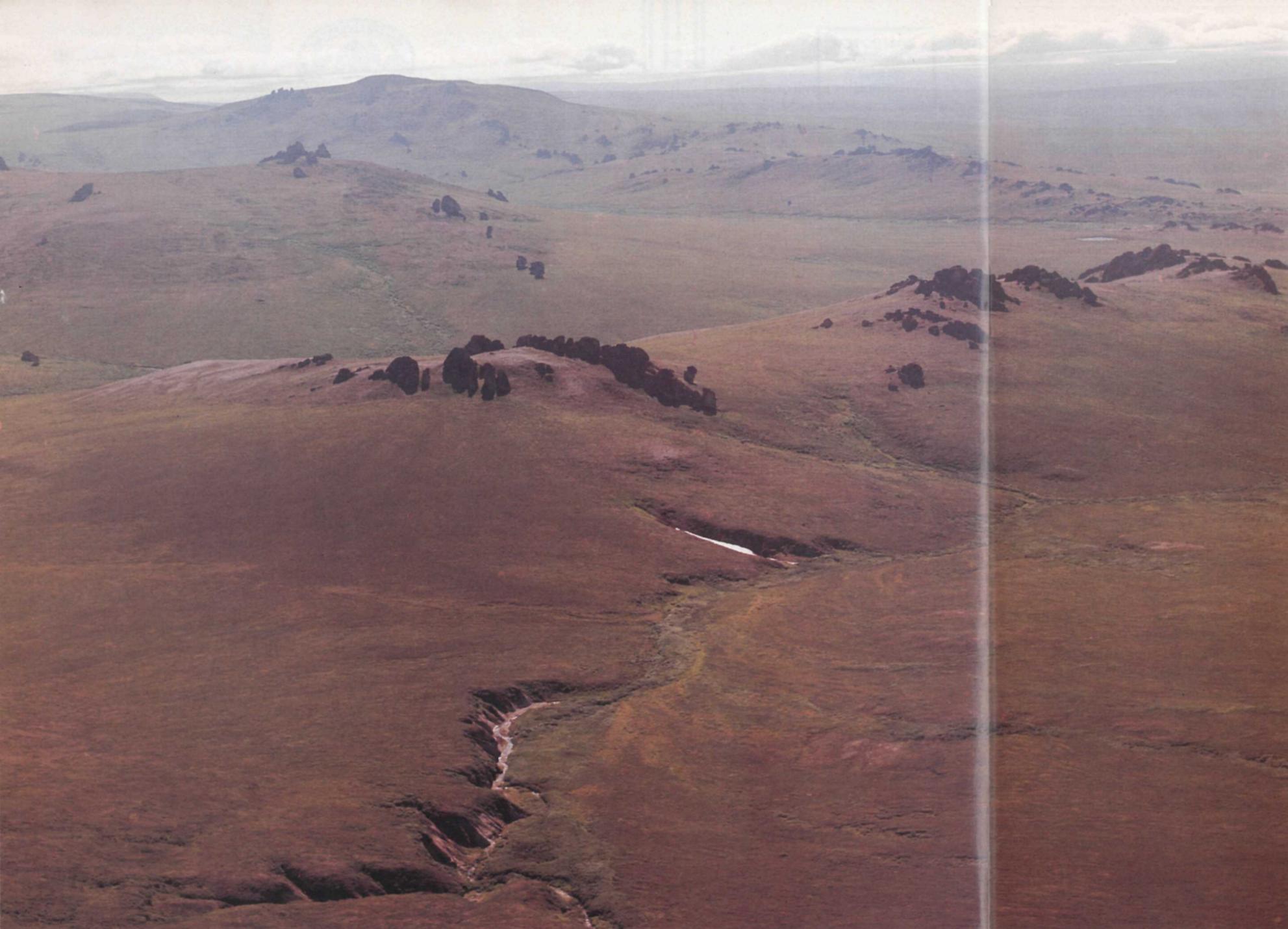
For these reasons President Reagan and Soviet General Secretary Gorbachev agreed in principle at the December 1987 Washington summit to "encourage expanded contacts

**Although Beringian polar bears are often inaccessible, they are a subject of extensive Soviet research.**

and cooperation on issues relating to the Arctic . . . including cooperation of scientific research and protection of the region's environment."

Directly and indirectly, the two nations have endorsed the Beringian Heritage project in many other ways. In the past year, U.S. and Soviet conservation, medical, cultural, and academic institutions and individuals have launched initiatives in their respective areas, creating instant networks to complement Beringian Heritage and biosphere reserve projects.

For years, both sides have waited for this moment. And the exchanges



Imuruk Lake region of Bering Land Bridge preserve has five distinct lava flows, covered by mats of lichens.

are already paying off. Soviet experts have given invaluable assistance to the National Park Service at Sitka National Historical Park with archival and historic-furnishings research. An invitation has been issued to a Soviet archeologist to join a U.S. archeological team at Bering Land Bridge National Preserve in

the summer of 1989. (Bering Land Bridge National Preserve lies directly across the strait from Siberia and is a primary candidate for the international park.)

These few examples can only hint at the ferment of seminars, field studies, and other exchanges unleashed by the ice-breaking political developments of the last two years.

Assuming ratification of current proposals, a Beringian international park, complemented by biosphere

reserve studies, will display the respective strengths of the two nations in protected area management. The sharing of these traditions should challenge the best talents the two nations can bring to the task.

The Beringian region is the meeting place of continents by both land and sea. It is the scene of momentous migrations, in ancient times as today. It is the terminus of Russia's eastward expansion and America's westward expansion. How fitting

that this crossroads should be marked by an international park. Here, at the geographic limits of the two nations, the expansion of their joint interests can take place.

*William Brown, author of Alaska: This Last Treasure as well as numerous other publications, is an NPS research historian for the Alaska region, based in Denali National Park. Brown was a member of the NPS-Soviet park delegations.*

NPS/Robert Belous

*Beringia:*

# *A Living Bridge*

*Exploring  
the Russian connection  
to Alaska's past*

*by Leslie Starr Hart*

At the October 1987 banquet that the National Park Service hosted for the Soviet's Heritage Conservation delegation, NPS Deputy Director Denis Galvin proposed a toast. He used the metaphor of an interrupted conversation between old friends.

The people of the two delegations had resumed in mid-sentence discussions begun the previous June in the Soviet Union. The interval of several months had left unbroken the trains of thought, the enthusiasm of the participants. And the finished protocol, with its list of jointly affirmed projects, neatly closed the circle.

While the two groups were formulating plans for joint projects, other interrupted conversations were about to resume. Mikhail Gorbachev's policy of *glasnost* provided the impetus to successfully launch an Alaska-Siberia medical exchange. Alaska's position as a staging area for state and federal ventures with the Soviets was revitalized. International wire services focused on the

June 1988 reunion of Alaskan and Siberian Eskimos made possible by the Nome-Provideniya flight.

Renewing a tradition of scholarly exchange that had begun in the early part of the century, Russian preservation experts met with their National Park Service counterparts last year. The Russians had come to Alaska to help refine the historic furnishings plan for the Russian Bishop's House in Sitka National Historical Park.

The working visit of Soviet specialists Nina V. Vernova and Aleksei S. Shchenkov came at the close of a 15-year NPS effort to acquire and restore one of the few remaining buildings of the Russian colonial period in Alaska. The Russian Bishop's House, a two-story log building constructed between 1841 and 1843, was the residence of Ivan Veniaminov, the great Russian religious leader and first bishop of Alaska.

The house also served as the administrative center for the Russian Orthodox Church's missionary and educational efforts among native



Meetings at Sitka included (left to right) Steve Peterson, NPS regional historian; Kathy Menz, NPS curator; Aleksei Shchenkov, Soviet architect; Nina Vernova, Soviet curator; and Julie de Sherbinin, translator.

Alaskan peoples. The NPS purchased this building from the Orthodox Church in 1973 in order to assure its preservation and to provide the public with an opportunity to explore this facet of America's past.

The goal was to restore the building to its mid-1840s appearance and to authentically refurnish the bishop's chapel and personal quarters on the second floor. On the first floor, exhibits would interpret aspects of the bishop's life and work, the character and construction of the building itself, and the larger colonial ef-

fort of which the Orthodox Church was a part.

The NPS has employed the skills of dozens of specialists—archeologists, architects, engineers, historians, linguists, curators, designers, and interpreters. Over the years it also sought to involve specialists from the Soviet Union, knowing that many aspects of this site can only be understood in the context of its Russian roots.

Some of this historical perspective was obtained through two conferences on Russian America held at Sitka in 1979 and 1987, in which Soviet scholars participated. Although the NPS request for help from Soviet decorative arts specialists languished in the early 1980s, the joint working group began anew in 1986.

Copies of the NPS furnishing plan

for the Russian Bishop's House were provided to the Soviet delegation for translation and review. This time the Soviets responded to the proposal for on-site assistance of a decorative arts specialist and an architectural historian. The protocol was signed in October 1987, and the Soviet response surpassed the greatest expectations of the NPS.

Nina Vernova, chief curator of the Peterhof Palace parks and museums in Leningrad, and Aleksei Shchenkov, an architect from the All-Soviet Science Research Institute in Moscow, provided detailed commentary on the Russian Bishop's House restoration and the selection and placement of objects within the house. They clarified fine points of historical accuracy, including procedures for making up a 19th-century bed.

They made presentations on 19th-century Russian architecture and interior design. These presentations were supplemented with donations of published materials that bear directly on restoration of the Russian Bishop's House.

The benefits of this exchange ranged beyond the scope of the Russian Bishop's House. Arrangements had been made for Vernova and Shchenkov to visit other sites with historical ties to Russia. With that special affinity that transcends language barriers, they provided insights, advice, and assistance to local historical societies and to individuals who own Russian-colonial national historic landmarks in Sitka and in Kodiak.

In one notable day they traveled by U.S. Coast Guard helicopter to Three Saints Bay, site of the first permanent Russian settlement in Alaska; had tea with the clergy of the Orthodox Diocese of Sitka and Alaska; and lunched on Big Macs in Kodiak. Feted at receptions in Anchorage, Vernova and Shchenkov spoke eloquently of their work in Leningrad and Moscow and of the commitment to the preservation ethic that they share with their American colleagues.

At the final work session, the continuation of this particular conversation was assured by both sides.

The first Russian Orthodox Church on Alaska's Pribilof Islands was built in 1819. Although Russia sold Alaska to the United States in 1867, native Aleuts still uphold Russian Orthodox traditions. St. George the Great Martyr (above) was built in 1936. St. Paul (below) is on another of the Pribilofs. They are both part of Seal Islands National Historic Landmark.

And topics of mutual concern were identified for future exchanges.

In support of the Beringian Heritage initiative, a proposal has been made for a Soviet archeologist to join a NPS archeological team at Bering Land Bridge National Preserve in summer 1989. At Cape Espenberg, following a venerable tradition of U.S.-Soviet archeological research, archeologists from both countries will track the Siberian origins of Alaskan Eskimos and earlier migrants of Beringia.

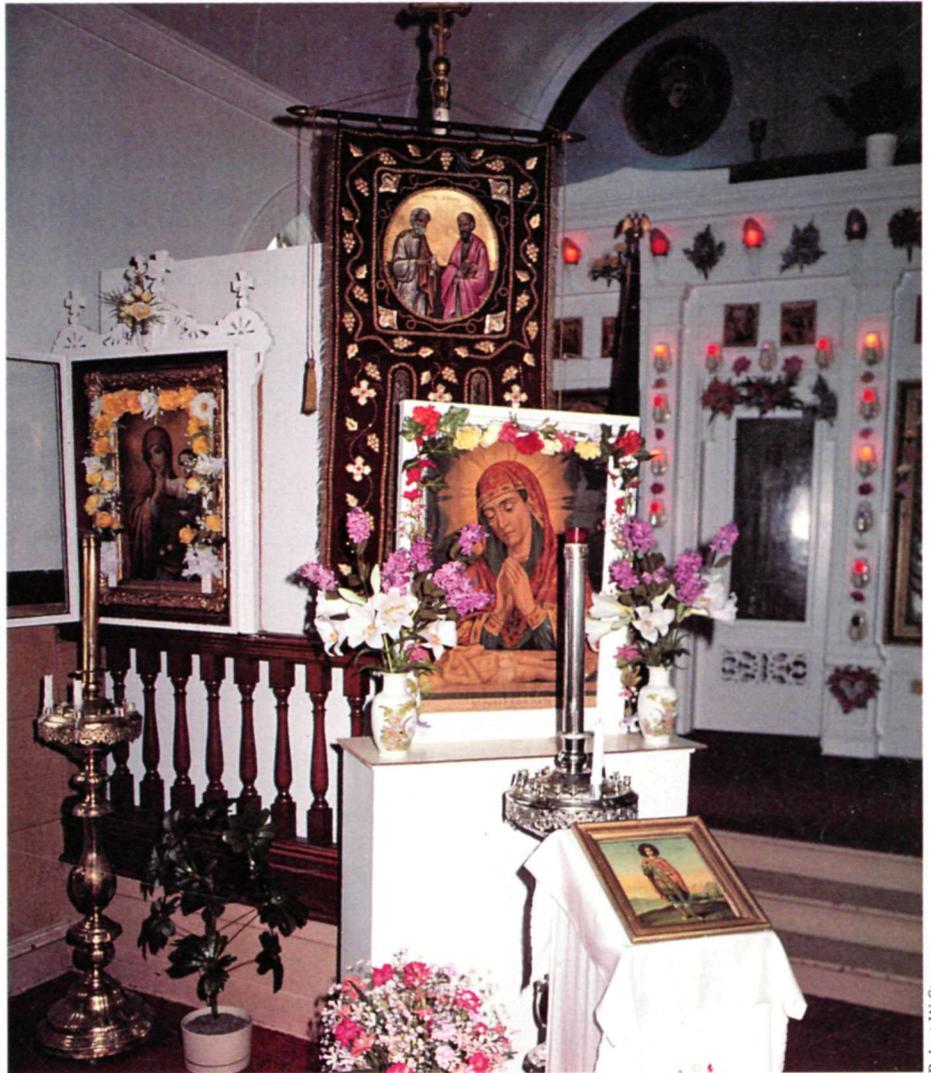
In the area of natural science, one proposal will provide an exchange with the Soviets on inventory and monitoring methodologies in the Arctic and subarctic.

Referring to the Alaska-Siberia border, William Laughlin, one of the deans of arctic archeology, wrote, "There is no place in the world where long-term events have conspired to create a more natural base for cooperative studies."

At the farewell dinner for our Soviet colleagues in June 1988, glasses were once more raised to work accomplished, friendships established, and conversations to be continued. It was solstice and, as we emerged from the restaurant near midnight, the sky was still bathed in deep golden light. We stood outside a while longer, sharing the bond of people of northern latitudes who are reluctant to see that light diminish.

Exactly one year earlier Denis Galvin and Bill Brown, along with other members of the U.S. delegation, had landed in Moscow and begun a dialogue with their Soviet colleagues that continued in Alaska on this midsummer's eve.

*Leslie Starr Hart is the chief of cultural resources for the Alaska region of the National Park Service.*



Robert W. Stevens



Robert W. Stevens

# The Long, Hot Summer

Rare conditions spark an inferno at Yellowstone and test park fire policy

by Michael Milstein



Diane Stratton

**H**igh in Yellowstone National Park's Absaroka Range, 1,200 U.S. Army troops relieved weary firefighters who had been battling a raging fire for weeks. Whipped by 70-mph winds in late August, the lightning-caused blaze had already devoured 150,000 acres of the park and was threatening neighboring towns.

More than 50 other fires during the summer have cut a swath of ash across the park, ranging through nearly half of Yellowstone's 2.2 million acres.

For a few days during the fires' peak virtually all of the park was closed, two of its largest tourist centers were hastily evacuated, and, in some areas, dense smoke reduced visibility to less than five yards.

"It's the worst fire season we've had in recorded history," National Park Service Chief Ranger Walt Dabney said, rattling off statistics of the struggle: more than 9,500 firefighters, 77 helicopters, 11 airplanes, a total cost of about \$100 million.

All the while, Yellowstone rangers explained to visitors who came

expecting placid, blue-skied scenes of grazing elk and bison that the inferno would greatly benefit the park. This was Mother Nature's way of cleaning house; the summer flames were actually sweeping out dead and dying vegetation and making way for much-needed, natural forest renewal.

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**This August, the North Fork fire near the Madison River became so intense that the nearby park campground was evacuated and all approaches to the area were temporarily closed.**

Dense woodland was being turned to meadows, allowing diverse shrubs and the animals that feed on them to flourish. It was, as Yellowstone's chief biologist John Varley says, "the ecological event of the century."

It was also no fluke. The stage for this summer's conflagration had been set over many decades by weather conditions, the ecosystem, and earlier NPS fire-control strategies. When those factors clicked, it was an awesome show, and one that will drastically alter the face of the world's first national park. It may also change the direction of NPS fire management in years to come.

Since Yellowstone was established in 1872, managers had extinguished all blazes—natural or human-caused—to keep them from "ruining" the scenery that so impressed tourists. Then, in 1972, rangers realized they were mistakenly derailing a vital process and began leaving natural fires alone as long as they adhered to a certain "prescription." This set of conditions included size, direction, weather, and proximity to park structures.

Since that management decision, Yellowstone has had 140 wildfires, most of them docile. Over a century's worth of volatile fuels remained, however, just waiting for a spark and apocalyptic conditions that come once every few hundred years.

"With the cyclical way the forest works and the history of fires, this was an inevitable event," says Norman Christensen, a Duke University forestry professor who advises the Park Service on fire management. "Yellowstone was like a volcano ready to explode."

Snow levels in the park had been below normal each of the last seven winters. This year the snowpack dropped to 16 percent of its average size.

Although the park received above-average rainfall in the early spring, through all of June, July, and August only about one-and-a-half inches of rain—a mere 32 percent of normal for the period—fell on Yellowstone.

Plants were so parched, Varley says, that treading through the woods was "like walking on cornflakes."

With the forest as dry as a tinderbox and filled with stagnant debris left from the days of strict fire suppression, lightning easily sparked huge blazes with walls of flame that stretched hundreds of feet up into the sky.

Most of the blazes hopscotched through the backcountry, torching some sections of the forest and leaving others intact. Initially, in June, while watching the blazes closely, rangers permitted those that started naturally in the park to burn.

By July, park officials realized that if the already-frightening fires got much worse, there would be no

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**"The primary reason these wildfires are so out of control is that man monkeyed with the ecological system to begin with."**

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way to stop them from ravaging buildings in the park and communities and commercial timberland next to it. So, in late July, Interior Secretary Donald Hodel decided to start fighting all the existing blazes and snuff out any new ones.

At the end of July, the charring of an American icon had become national news. Several park entrances, villages, and campgrounds were closed by the fires. One fire spurred a heralded effort to protect the historic buildings surrounding Old Faithful geyser, forcing evacuation of the village and gutting 17 outlying buildings. As yet another fire crept toward Yellowstone's northern boundary, more than 200 members of the Church Universal and Triumphant sect chanted to ward the blaze away from their ranch headquarters.

"We had never seen anything like it before," says Chief Naturalist

George Robinson. "It was a chapter that had not been written. We weren't eager to live it."

While most of Yellowstone's wildlife safely avoided the flames, a surprising number of tourists remained undaunted, considering the extent of the conflagration. Visitation for the season was down only about 15 percent. Those who did brave the smoke found rangers stationed at roadside overlooks explaining firefighting strategies and the many ecological benefits of fire.

The park plans to take further advantage of this summer's holocaust. Wayside exhibits will be set up in charred areas and rangers will lead walks through sections of the park that have burned both recently and in past years, to show visitors the rebirth fire can provoke.

Yellowstone's historic fires may also bring change to the Park Service itself. During the fires' peak, the Park Service and its fire management policy were subjected to a storm of reactionary criticism, and Wyoming Senators Alan Simpson and Malcolm Wallop called for the resignation of NPS Director William Penn Mott, Jr.

Although the Reagan administration brushed aside the senators' demands, congressional oversight hearings on the policy will almost certainly result. Scientists expect a careful examination of the summer's events, including public meetings and research, and this will likely result in more specific fire-control guidelines.

"One of the main questions we'll have to answer is how far can we allow natural processes to go when they get bigger than the park itself," says William Tweed, a longtime naturalist in Sequoia and Kings Canyon national parks, pioneers of fire management.

Officials hope to educate the public about the benefits of fire, avoiding a knee-jerk reaction against the Park Service position. There is some fear of such a backlash against the young NPS fire management policy.

"The primary reason these wild-

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*Continued on page 50*



# WALRUS

The welfare of this mysterious arctic sea creature will depend upon Soviet-American cooperation

by Christopher Baker

**T**he walrus is one of Poseidon's mystical creatures. Two-thirds of its life is spent in water, where it feeds, often sleeps, and even nurses its young. Most of the rest of its time is spent lying on the edges of the roving pack-ice of remote arctic realms. Like the ice-floes, which the pagolithic (ice-loving) marine mammal calls home, the walrus can be seen on the surface but pursues most of its life out of sight.

Much about the behavior of the walrus—largest of the arctic and subarctic pinnipeds—was shrouded in mystery until the early 1970s. Its life is still so private that walrus literature contains no first-hand account of observed mating.

Historically, it has been assumed that this denizen of the polar seas used its long tusks to dig up mollusks, which are the main staple of its diet. Recent sleuthing by scientists, however, has shown that instead of using its tusks to feed, the walrus roots in the sea bottom with its snout, much like a pig searching for truffles.

So strange is this sea beast that prior to the end of the nineteenth

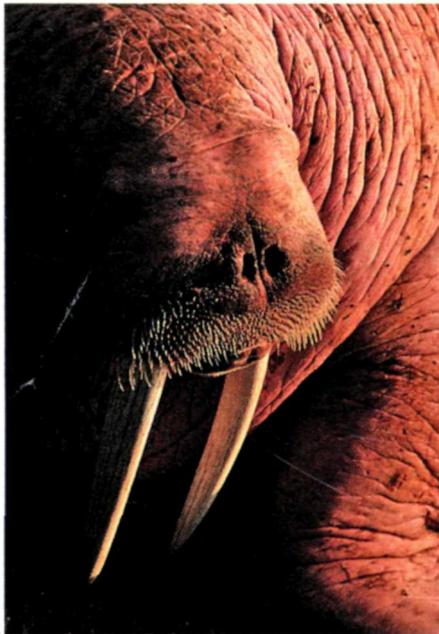
century when it was correctly classified as a family of Pinnipedia, the walrus was alternately grouped with cetaceans (whales and dolphins), sirenians (manatees and dugongs), and even monotremes (duckbills and echidnas), which would relate it to the Australian platypus.

In the wake of new research, scientists are clearing away myths and some of their earlier mistakes. Then they can piece together an accurate picture of the walrus that, given the current trends, may prove to be vital to the future well-being of *Odobenus rosmarus*, the "tooth-walking sea horse."

**B**y any account, the walrus is not one of the beauty-pageant contenders in the animal kingdom. Its blubberous bulk is squeezed inside a rough, warty hide that is heavily folded and creased. The walrus looks like it has no neck to speak of, just a small truncated head and a pug snout face with a bristly beard and tusks that may reach a length of 40 inches.

Walrus have no fur, but they do have hair, which dwindles with age

Pacific walrus on Round Island; by Art Wolfe



so that the hide of an old walrus is almost naked. Its small, bloodshot eyes give it an intoxicated, somnolent look.

The walrus' looks have captured European imagination since the early days of exploration. In 1521, Albrecht Dürer made the earliest known drawings of a walrus, which are now in the British Museum. Dürer's walrus looks evil enough to fit eighteenth-century sailors' descriptions of them as "unearthly and demonical" beasts.

Yet, the walrus, like that other symbol of the Arctic, the polar bear, is a highly adapted and remarkable creature. Although laboriously awkward on land, in water the supple and muscular animal propels itself with ponderous grace and agility. Walrus can dive down 300 feet and remain submerged for more than ten minutes at a time.

Nature borrowed from the blueprints of other pinnipeds when designing the walrus, but the walrus has a few distinct touches all its own. It is so dissimilar from its near relatives, the otariids (eared seals) and the phocids (earless seals), that the walrus is accorded sole membership of the taxonomic Odobenidae family.

Its ivory tusks are unique among pinnipeds, appearing on both males and females. These canines, which



Map by McKendry &amp; Fraetzel

Round Island and Penuk Island are the only two totally protected walrus sanctuaries within American territory.

resemble the tusks of prehistoric sabre-toothed tigers, are used by walrus to haul their huge frames up on the ice, as instruments of defense, and, for the males, to establish their dominance within the walrus social hierarchy.

Other unique characteristics include a thermoregulatory vascular system that conserves heat by moving blood away from its skin in the icy seas and back to the surface of the skin when the walrus hauls out of the water. In the walrus the system is so well evolved that the beast looks almost white after a series of dives.

After a few hours sunning on a rock or ice floe, the dilated blood vessels tint the skin pink, leading early observers to think walrus became sunburned as they lolled on the rocks.

Male walrus also have a unique pharyngeal air sac that, when inflated, allows them to sleep upright at sea. The air sac—which Eskimos use for making drums—also acts as a resonance chamber for mating calls. Instead of barking like seals, walrus communicate with knocks and whistles, as well as bell-like sounds and clicking noises that resemble castanets.

Scientists recognize two loosely related panarctic subspecies of walrus. There are 35,000 Atlantic walrus

distributed in discrete herds throughout the eastern Canadian Arctic, eastern Greenland, and around Spitzbergen and the Laptev Sea in the Soviet Union. Until virtually eliminated by three centuries of commercial hunting, the Atlantic walrus once ranged throughout Arctic Atlantic waters.

Fossil evidence suggests that the bulkier Pacific walrus, direct descendants of its smaller Atlantic cousin, has inhabited the Bering and Chukchi seas for up to 100,000 years. Today, 85 percent of the world's walrus belong to the Pacific subspecies.

**L**ess than 60 years ago, the Pacific walrus population was also severely depleted and in decline. By the mid-1920s, over 100 years of commercial hunting by rapacious American "Arctic traders" had reduced the population from more than 200,000 to perhaps no more than 40,000.

Although the United States banned commercial harvesting of walrus in Alaska in 1937 (reinforced by passage of the congressional "Walrus Act" of 1941), Soviet sealers and Eskimos took at least 140,000 walrus between 1931 and 1956, leaving the walrus population at its lowest ebb ever.

Leading walrus expert, Dr. Francis "Bud" Fay, of the University of Alaska's Institute of Marine Science in Fairbanks, states that when he began his lifelong study of the animals in 1951, "the Pacific walrus appeared to be on the road to extinction."

Since the late 1950s, limits on hunting have fostered rapid recovery. The Soviets phased out commercial hunting between 1956 and 1962, although limited commercial hunting was renewed in 1982.

During the same period, the State of Alaska regulated subsistence hunting by natives. The federal government took control of regulations governing the American walrus catch in 1972 and eliminated sport hunting.

Today, no commercial or sport hunting for walrus is allowed on the American side. The only exceptions are Alaskan natives, who are allowed to do subsistence harvesting.

Since the late 1950s, rigid regulations on hunting walrus by both the Alaska Department of Fish and Game and the Soviet Ministry of Fisheries have been set. These rules have been especially restrictive of harvesting females and young in a successful effort to enhance the population's productivity by increasing the proportion of females.

The Pacific walrus has made a remarkable comeback and these days is found throughout its former range. An aerial survey conducted in the autumn of 1980 by the U.S. Fish and Wildlife Service in cooperation with the Magadan Section of the Soviet Union's Pacific Institute of Fisheries and Oceanography estimated the Pacific walrus population at about 250,000.

During the days of mass hunting, walrus abandoned most of their traditional *uglit* (an Eskimo word describing sites where the gregarious walrus haul out to rest during migration and [in summering areas] where the ice has retreated). Only two *uglit* in Alaska—Round Island, part of the Walrus Islands State Game Sanctuary in Bristol Bay, and Penuk Island off the eastern end of St. Lawrence Island—and two or three sites on the Siberian coast remained in use on a regular annual basis.

Over the past decade, walrus have been reappearing at their traditional Alaskan *uglit* with increased frequency, although they haven't yet settled into a pattern reminiscent of pre-hunting days. Of the 33 former hauling out sites on the Siberian coast, most are again being used on a regular basis by groups ranging from a few hundred to several thousand walrus.

**E**ach year, Pacific walrus migrate with the seasons on a journey covering 2,000 miles. The uneven distribution of mollusks in the shallow shelf waters of the Bering and Chukchi seas and the seasonal movement of ice floes determine the walrus' movements.

It summers mainly in Russian waters and winters mainly in American waters, usually keeping to the edge of the moving pack ice. From there it



Steven Kaufman

dives to its sea-bottom food source, and hauls out to rest when it is not feeding.

The annual migration northward from the Bering Sea begins in April when the pack ice breaks up. Then females and most juvenile males pass through the Bering Strait for pasturage in the Chukchi or Beaufort seas. Most adult males remain in the Bering Sea for the summer, where they haul out at *uglit* and make open sea forays to feed.

When the ice begins to advance south in late autumn, the herds in the north funnel through the Strait to wintering grounds in the Bering Sea before the advancing pack ice closes the passage. By migrating with the retreat of the ice, walrus are continually transported to new feeding grounds and are thus able to feed off nearly the entire continental shelf of Beringia.

**Although mass killing and headhunting do occur, most Eskimo communities harvest only what they need.**

Even this free-flowing migration throughout a habitat of more than a million square miles seems inadequate to sustain the food requirements of the walrus, for the animal has a truly prodigious appetite. A mature male adult, with an average weight of 2,640 pounds, consumes well in excess of 100 pounds of invertebrates—mostly bivalve mollusks—daily.

Using its highly vaulted mouth and piston-action tongue like a vacuum cleaner, the walrus separates and ingests only the exposed soft siphons and feet of their prey, which form less than one-third of the weight of each clam.

Hence, says Fay, "the 2,200-pound walrus that consumes 135

pounds of mollusk feet and siphons per day actually will destroy about 400 to 530 pounds of those mollusks each day."

Taking into account the current population's size, age, and sex, Pacific walrus consume approximately 11,000 tons of clams daily. Although few studies exist to determine if the mollusk population has been severely depleted, the walrus has fared so well during the past 30 years that scientists believe it now faces the perils of overpopulation.

"The observed changes during the 1970s in feeding habits, blubber thickness, and age structure. . . are consistent with changes that would be expected when a population nears or exceeds the carrying capacity of its environment," says Fay.

The latest census and Fay's recent findings suggest that the walrus population is malnourished and may be in decline because of overpopulation. Walrus now weigh less than they did ten years ago; mean blubber thickness is much less than it recently was; and, instead of feeding primarily on mollusks, walrus are now eating greater quantities of alternate prey such as jelly fish, anemones, fishes, and seals.

As a result, population dynamics are changing. Female fecundity has decreased, the age at which females attain maturation has shifted upward, fewer calves are being born, and rates of reproductive failure have also increased. The mean age of the walrus population has, therefore, increased and—with fewer young walrus—the reproduction cycle is reduced further.

Clearly, the population explosion of recent decades hosts the seeds of the walrus' decline. And the problem is twofold. The walrus population has responded with natural curbs to reproduction.

At the same time, hunting pressure on both sides of the Bering Sea increased in the late 1970s. The annual kill of walrus by commercial fishermen and natives in Soviet waters and by Alaskan natives in American waters has risen from at least 4,000 in the 1960s to at least 15,000 a year in 1984-85. The kill is now estimated at 13,000 a year.

The annual kill has clearly been more than the population can replace throughout the current decade. Such excessive rates of kill may spell another bout of decline and an uncertain future for the highly vulnerable walrus. And, to make matters worse, new threats are emerging.

**A**s yet there is no binding international treaty for management of the walrus population or, perhaps more importantly, for the protection of the delicate benthos (flora and fauna that live on the sea floor) of their habitat, which is underlain with coveted oil and natural gas. Currently, all of the proposed offshore oil lease areas on the Bering-Chukchi shelf are within the range of the Pacific walrus.

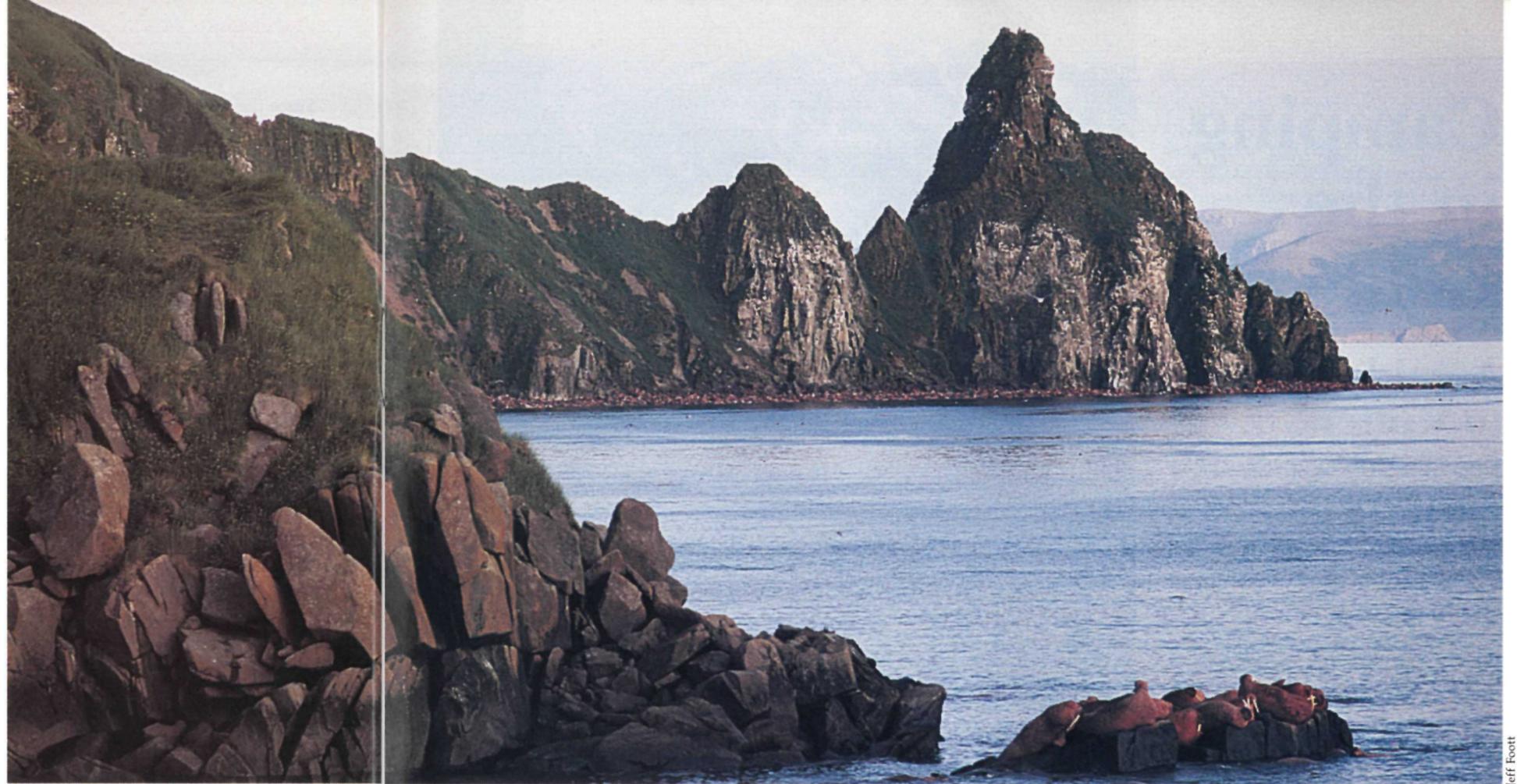
Although the effects that oil development may have on walrus are largely unknown, a substantial increase in oil tanker traffic and offshore oil field construction threatens to transform the walrus' icy homeland into a much busier and polluted environment.

As Fay suggests, "Drilling platform activity and support vessels could impinge on major mating areas in winter, calving areas and migration corridors in spring, nursery areas in summer, and feeding areas and migration corridors in autumn."

And oil spill contamination could easily have long-term, adverse effects on the food resources on which walrus depend. Geological researchers Hans Nelson and Kirk Johnson have shown that bivalve mollusks and other sea-bottom fauna of the Bering Sea are extremely susceptible to oil contamination and sea-bed disturbance. It would take many years for the benthos to recover from a major oil spill or disturbance.

Encroachment of commercial fishing fleets, however, poses a more immediate threat to the habitat of the highly specialized walrus, particularly in American waters.

"We're seeing increased encroachment on traditional resting grounds and a correspondingly adverse impact on the ecology of the inshore waters," says Ken Taylor, Bristol Bay biologist for the Alaska Department of Fish and Game.



Last year, the walrus population on Round Island, for example, suffered a dramatic decline when a fleet of more than 100 Soviet, Japanese, and Korean vessels trawled the waters close to the island for the first time. By the end of the season, only 6,000 walrus had hauled out at Round Island—a decline of 55 percent over 1986.

Walrus that traditionally hauled out on Cape Pierce, 30 miles west of Round Island, have also been scared away by fishing fleets in recent years. This is not surprising, for this area is fished by the 600-boat Togiak Bay herring fleet, the largest native fishing fleet in Alaska.

"Protecting the haul-outs is a *sine qua non* for long-term population stability," says Taylor.

The displaced Alaskan walrus may be coming ashore at Soviet haul-outs, where they enjoy fewer disturbances: a 12-mile limit on fishing fleets (compared to a two-mile limit at Round Island) and a 10,000-foot minimum ceiling for aircraft.

As the experience at Round Island suggests, the attempt to re-establish themselves at traditional hauling-out places is still a game of chance for walrus weary from days spent swimming in open sea.

**A**dd to the complex population picture the fact that Alaskan natives still enjoy a traditional right to unlimited subsistence hunting and fishing. The Marine Mammal Protection Act of 1972, which took jurisdiction over Pacific walrus away from the Alaska Department of Fish and Game and placed it in the hands of the U.S. Fish and Wildlife Service, did not include provisions for regulating native walrus hunts.

Nor does it include complete protection for the walrus, except at a few wildlife reserves. "Head hunting" for ivory is therefore still common. In 1979, natives could get more than \$30 a pound for raw ivory and up to \$260 a day carving ivory into sculpture or scrimshaw. Recently,

demand for ivory and scrimshaw has increased, promising even higher prices.

"Headless walrus carcasses washing up on Russian shores have placed Americans in an embarrassing light," says Dan Strickland of the Alaska Department of Fish and Game. The Soviet harvest is carried out under stricter regulations and in a less wasteful manner.

Currently, the United States and the Soviet Union manage the resources of Beringia on a unilateral basis within their own jurisdictional boundaries. Like other migrating arctic animals, such as polar bears and Canada geese, however, the boundaries of the Pacific walrus are not defined by limits of national sovereignty.

Although the two nations share walrus studies and information under the Marine Mammal Project of the 1972 Environmental Protection Agreement, the Soviet Union has been reluctant to enter into an international management agreement

**Round Island, part of the Walrus Islands Sanctuary, has been an annual walrus haul-out spot since time immemorial. It was one of the few that was not deserted during the massive walrus hunts of the last century.**

under current conditions. To the Soviets, the present state of walrus protection in the United States is "chaotic and uncontrolled," according to Fay.

Despite the remarkable comeback of the "tooth-walking sea horse," one thing has become clear: Until cooperative international management of this marine mammal and its supporting environment is assured, the future of the Pacific walrus is as obscure as the mysteries of the animal itself.

*Christopher Baker is a British-born, California-based geographer and travel journalist who has written for Newsweek, Discovery, Pacific Discovery, the Los Angeles Times, and many other publications.*

# Camping in the Cold

## A guide to winter in the parks

by John Kenney

**HUSHED, TRACKLESS SNOWFIELDS.** Icy lakes, stark landscapes, and deep, deep cold. These can be both the challenges and the rewards of winter camping in many of our National Park System areas.

In many parks, winter affords the adventurous camper a chance to observe nature at its most severe. Lying in a tent at night while a winter storm howls outside can be an exhilarating, if somewhat scary, experience. Also, the number of visitors drops considerably at most parks during winter, increasing the opportunity for solitude.

**GLACIER**  
WEST GLACIER, MT 59936  
(406) 888-5441

Winter lasts from mid-December through April in Glacier National Park in the northern Rocky Mountains. Snowshoeing and skiing trails wind through the park, the only routes of access to Glacier's mountain wilderness.

Although most of the park's

campgrounds close in September, Apgar, on Glacier's west side, and St. Mary, on its east, remain open as primitive sites (no running water) during the winter. Campsites are available on a first-come, first-served basis. But overcrowding is rarely a problem during winter.

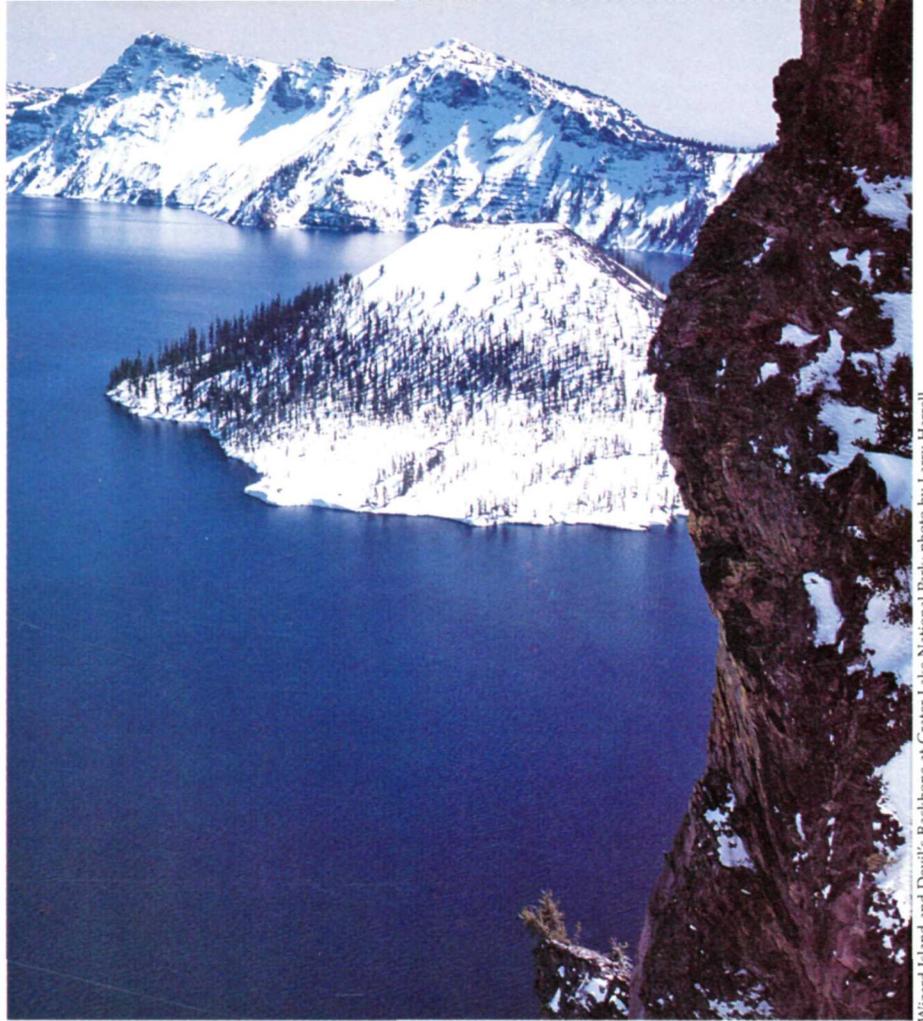
Backcountry camping is allowed throughout the park during winter. Permits are required, however, and are available at ranger stations, park headquarters, and at the Apgar Information Center. Park concessioners are also closed in winter, but campers can obtain plenty of supplies in towns outside the park.

Winter mountaineering, while permitted, is generally discouraged by rangers. High winds, quickly dropping temperatures, frequent avalanches, and almost constant cloud cover along the Continental Divide make winter expeditions into the high country extremely hazardous. Rangers should be consulted for information before even the shortest of backcountry trips.

**PICTURED ROCKS**  
P.O. BOX 40  
MUNISING, MI 49862  
(906) 307-3700

Winter arrives early and stays late on Michigan's Upper Peninsula, where Pictured Rocks National Lakeshore, a 40-mile stretch of high, forested sandstone cliffs, overlooks Lake Superior. Starting in November and lasting until mid-March, Upper Peninsula winters are legendary, especially for storms on the lake. Prepared winter campers, however, can enjoy the lakeshore at a time when few others see it.

Camping is permitted at Pictured Rocks campgrounds during the winter on a first-come, first-served basis, but running water is not available at campsites after mid-November. The park has three main campgrounds, Hurricane River, Little Beaver Lake, and Twelvemile Beach. In winter, park roads are usually closed due to snow, so these campsites may be accessible only by skis or snowshoes.



Wizard Island and Devil's Backbone at Crater Lake National Park; photo by Larry Harrell

Camping is also permitted in the park's 13 backcountry sites, and in the open country, provided camp is set one mile beyond any trail head and 100 feet off any trail. Backcountry permits are required and they can be obtained, free of charge, from national lakeshore headquarters or from the visitor information station in Munising.

Special winter programs at the park include ranger-led tours of the lakeshore and an annual snowshoe race. While most park offices close in winter, lakeshore headquarters, located at Sand Point in the Munising area, remain open year round, Monday through Friday, 8 a.m. to 4:30 p.m. Check the information station for winter hours.

**DENALI**  
P.O. BOX 9  
MC KINLEY PARK, AK 99755  
(907) 683-2294

For the truly adventurous, Denali in Alaska offers an extremely challenging and spectacular winter experience. In this remote park, average highs in the winter range between 8 and 17 degrees Fahrenheit, and daylight decreases to a mere 5 hours a day around the time of the winter solstice. Clouds dump an average of 80 inches of snow on the national park annually.

While bears, marmots, and arctic ground squirrels hibernate, moose, caribou, Dall sheep, and wolves continue to roam the park. The northern lights begin to appear in

the night sky around mid-August, and can be seen on clear nights throughout the winter. Denali's scenery is especially spectacular during the long winter twilight.

Riley Creek Campground, located just inside the entrance to the park, remains open throughout the winter, though it is without running water after mid-September. Park headquarters are open every day from 8:00 a.m. to 4:30 p.m.

Open camping is permitted in the backcountry, and free passes and maps are available from park headquarters. Visitors are strongly advised to check in and out with rangers and get the latest information on weather and avalanche conditions. During winter, backcountry access is

## Taking Good Care Of Yourself Outside

### CLOTHING

On a winter camping expedition, the key to staying warm is staying dry. Water next to the skin rapidly conducts heat away from the body.

So, waterproof boots, overmitts, parkas, and windproof shells are essential. Several layers of warm clothing, particularly if made of wool or high-pile synthetic fibers, insulate wearers by trapping air between layers.

Layering also allows the wearer to shed clothing when hot, so that the body will sweat as little as possible. Heavy sweating from skiing, snowshoeing, or climbing causes a quick chill-down afterward.

Layering footwear is also important. Start with a sturdy pair of water-resistant boots. Good leather does well in all but the wettest climates. When it is very cold, an insulating boot liner may be added, along with several layers of socks. Wearing too many pairs of socks, tight boots or liners, however, can cut off circulation, hampering the body's efforts to warm the feet.

### SHELTER

Tents best suited to winter camping are waterproof, condensation-resistant, with a sturdy design. Good



Shenandoah National Park, photo by Richard Frear/NPS

tents also allow good ventilation, which cuts down water condensation inside the tent. Two tent designs that are favored among the majority of winter campers are the hoop and the dome.

A good, thick sleeping bag is, of course, mandatory in winter. Depending on conditions, a down-filled bag or one that is insulated with some of the newer, high-tech materials is suitable.

Down provides the best insulation per carried pound, but it is ineffective insulation when wet. For that reason, down would be the wrong choice for wet climates. In addition, bring a thick foam pad to put underneath the bag.

### SAFETY

The two most common health hazards of winter camping are frostbite and hypothermia. Frostbite occurs when parts of the body—often the extremities—actually freeze. Frostbitten parts feel painful at first, then go numb; they can appear white or, in advanced stages, purplish. Bathe the affected areas in lukewarm water. Hot water, or heat from a fire, can easily damage tissue, adding a burn to the frozen area.

Hypothermia occurs when the body loses so much heat that it can no longer warm itself. If untreated, the body's core temperature will continue to drop until bodily functions cease.

Symptoms of the onset of hypothermia are shivering, clumsiness, and mental slowness. Physical and mental deterioration continue until, in advanced stages of hypothermia, the victim may experience physical collapse and unconsciousness.

Once detected, hypothermia should be treated immediately. In mild cases, replace wet clothing with plenty of warm, dry clothing, and give the victim warm liquids to drink.

In extreme cases, the victim should be kept awake, stripped, and put in a sleeping bag with one or two other naked persons. Skin-to-skin contact is the most effective way to transfer heat to a victim.

by ski, snowshoe, and dog sled; and rangers distribute maps of interesting, well-traveled routes.

Campers are advised to bring extra survival gear, such as food and clothing, even on short expeditions. The nearest facilities are ten miles north of the national park entrance on Highway 3.

**SHENANDOAH**  
**ROUTE 4, P.O. BOX 348**  
**LURAY, VA 22835**  
**(703) 999-2243**

Winters are relatively mild in the Blue Ridge Mountains. Located in western Virginia, Shenandoah winds along the wooded ridges and valleys of this branch of the Appalachian Range.

Along with an average of 48 inches of snow, winter brings low humidity to Shenandoah. This opens up clear and distant vistas that are shrouded by haze in other seasons—views of the Shenandoah Valley to the west of the park and the Piedmont and coastal plain to the east.

While Shenandoah's developed campgrounds close during the off season, camping in the backcountry is allowed all year. Backcountry permits must be obtained from the Byrd Visitor Center, located at milepost 51 on Skyline Drive. From January 5 through March 5, the center is only open Friday through Monday, 9 a.m. to 5 p.m.

The park has many miles of trails that open the backcountry up to campers and offer opportunities for crosscountry skiing when snow is suitable. Maps of established routes are available from the visitors center.

As snow cover is relatively light during a good portion of the winter, campers can often travel on foot, without the aid of snowshoes. Camps must be set at least a half-mile away from Skyline Drive and 250 yards from trails.

Printed guides to Shenandoah's nature trails are available from the visitors center. The center also offers evening interpretive programs on Saturday nights in December.

*John Kenney is assistant editor of National Parks magazine.*

## Gallery



The White House; Abbie Rowe

George Hartzog (left), at a bill-signing with President Lyndon Johnson, was Interior secretary from 1964 to 1972.

rector in 1964. During his nine years at the helm, more than 60 wilderness areas and parks were added to the system, the colossal effort to secure 40 million acres of Alaska parklands began, and significant organizational changes were introduced.

Ansel Adams called Hartzog "one of the finest and most imaginative directors of the NPS since Stephen Mather." Hartzog had an uncanny ability to work for the betterment of the national parks from behind the scenes. Through this book, readers get to know the players who have power over the national parks.

In a moving final chapter, the former director advances his belief that saving the national parks and passing these treasures on "unimpaired" is "an immutable obligation" of this generation. This book deserves a prominent place on this year's "must read" list.

*Battling for the National Parks*, Moyer Bell Limited, Mt. Kisco, New York, \$19.95 hardbound. You can also order your copy through NPCA.

—Bruce Craig

### AN INSIDER'S VIEW OF THE PARK SYSTEM

*Battling for the National Parks*, a personal memoir by George Hartzog, chronicles the life and political adventures of one of the toughest, most effective directors of the National Park Service. In intimate terms, this book reveals the inner workings of the Washington scene—the battles, compromises, and bureaucratic infighting that is the essence of life on Capitol Hill and within the halls of Interior.

George B. Hartzog, Jr., joined the NPS in 1946 and worked his way rapidly up to become its seventh di-

**FINAL NOTES:** The Rails-to-Trails Conservancy (RTC) is a stalwart organization that helps groups with the complex regulations required to convert abandoned railbeds to hiking, biking, horseback riding, and skiing trails. RTC's *Sampler of America's Rail Trails*—complete with maps, descriptions, lists of services, relevant publications and addresses—introduces readers to a dozen of the best trails created from abandoned railbeds. For a copy, send \$2.00 to RTC, 1400 Sixteenth St. NW, Washington, DC 20036. . . . The 1989 *Archaeological Fieldwork Opportunities Bulletin* will be available in January. This comprehensive directory lists archeological digs worldwide, including national parks. All of these projects accept volun-

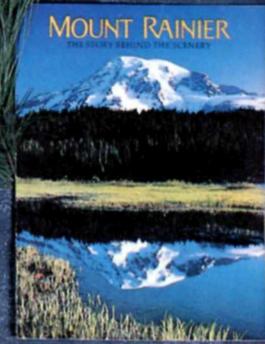
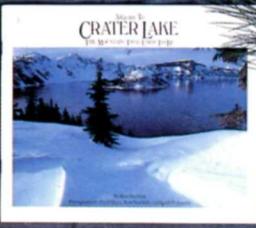
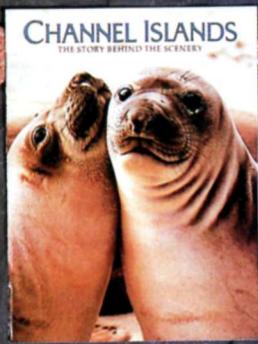
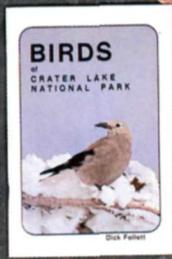
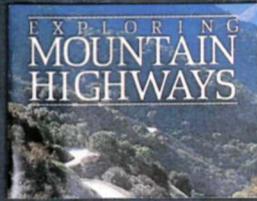
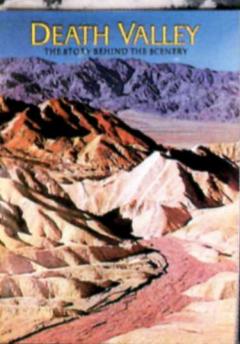
teers. Put out by the Archaeological Institute of America, 675 Commonwealth Ave, Boston, MA 02215, the directory costs \$4.00 for members and \$6.50 for nonmembers. . . . The Student Conservation Association (SCA) is looking for 1,200 high-school and college students and older adults who want to help with resource management or conservation at agencies such as the National Park Service and the U.S. Forest Service. These are volunteer positions, but some expenses are paid. Write SCA, P.O. Box 550, Charleston, NH 03603, or call (603) 826-5206. . . . For topographic maps of California's High Sierras, even more accurate than the U.S. Geological Survey's, try Wilderness Press, 2440 Bancroft Way, Berkeley, CA 94704.



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**Cover:**

**Canoeists** photo by Connie Toops  
**Grand Canyon** photo by Gary Ladd

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Guide to migration and feeding patterns, whale intelligence, and the history of whales and whaling.

### Channel Islands NP

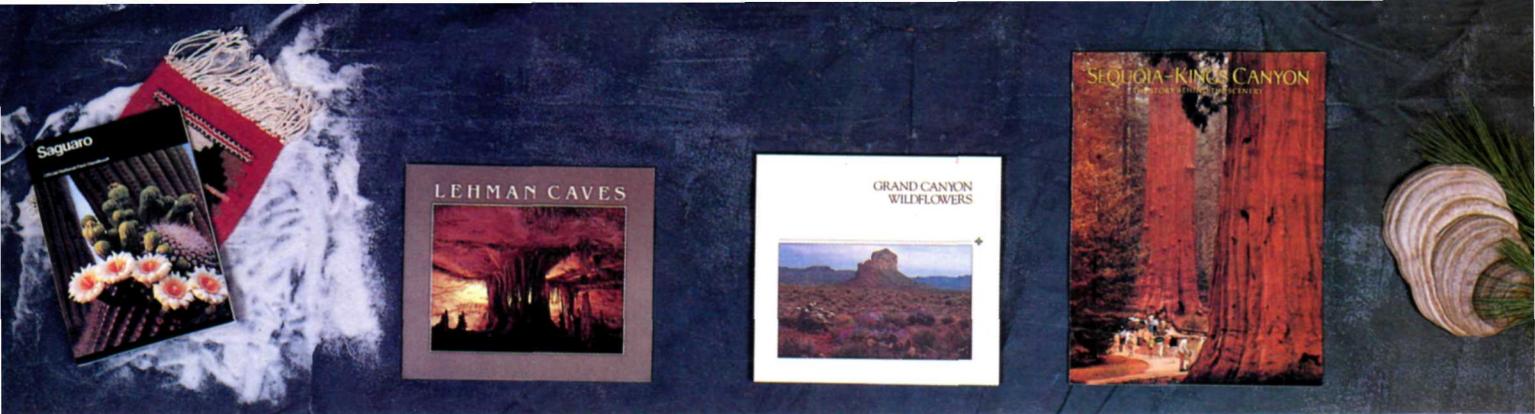
\***Channel Islands: The Story Behind the Scenery**, KC Publications; PB, *B104*, \$4.50

### Death Valley NM

**Death Valley: A Pictorial History**, James Cornett; 48 pp, color photos, map; PB, *B105*, \$6.95

\***Death Valley: The Story Behind the Scenery**, KC Publications; PB, *B106*, \$4.50

\***Scotty's Castle: The Story Behind the Scenery**, KC Publications; PB, *B107*, \$4.50



## Golden Gate NRA

\***Alcatraz Island: The Story Behind the Scenery**, KC Publications; PB, *B108*, \$4.50

**The Complete Guide to the Golden Gate National Recreation Area**, Karen Liberator; 120 pp, b&w photos, illustrations, map; PB, *B109*, \$7.95

A directory of each site within GGNRA, its address, fees, hours, facilities, and phone number.

**Official Map and Guide to Alcatraz**, Golden Gate National Park Association; folder with a color map and b&w photos; PB, *B110*, \$2.50

History of Alcatraz as fort, prison, and now, a park.

**Muir Woods National Monument**, Peter Jackson Holter; 20 pp, color photos, map; PB, *B111*, \$2.95

Picturesque look at Muir Woods of yesterday and today.

## Grand Canyon NP

\***Grand Canyon: The Story Behind the Scenery**, KC Publications; PB, *B112*, \$4.50

**In the House of Stone & Light: A Human History of the Grand Canyon**, J. Donald Hughes; 137 pp, recent and historic b&w photos; PB, *B113*, \$7.50; HB, *B114*, \$12.00

Examination of Indian, Spanish, and American influences in this region before and after the creation of Grand Canyon NP.

**Introduction to Grand Canyon Geology**, Michael Collier; 42 pp, color photos, illustrations; PB, *B115*, \$2.95

In-depth examination of the geologic history of Grand Canyon, written in nontechnical language.

**River Runners of the Grand Canyon**, David Lavender; 147 pp, b&w photos, map; PB, *B116*, \$12.95

Expertly woven history of river running on the Colorado River.

**Recollections of Phantom Ranch**, Elizabeth J. Simpson; pamphlet, *B117*, \$1.50

History of Phantom Ranch, located at the bottom of Grand Canyon. Includes day hikes in the surrounding countryside.

## Grand Canyon Guides

Hiking:

**A Guide to Hiking the Inner Canyon**, Scott Thybony; 43 pp, color and b&w photos, maps, charts; PB, *B118*, \$1.75

Information on permits, regulations, safety, and wilderness ethics.

Grand Canyon Trail Guides: Booklets with maps, photos, natural history.

**Grandview Trail and Horseshoe Mesa**, John Good; *B119*, \$2.00

**Bright Angel Trail**, Alan Berkowitz; *B120*, \$1.25

**South Kaibab Trail**, Rose Houk; *B121*, \$1.25

**North Kaibab Trail**, Alan Berkowitz; *B122*, \$1.25

BONUS: All four guides, *B123*, \$5.00

**A Guide to Grand Canyon Geology Along Bright Angel Trail**, David Thayer; 65 pp, detailed maps, illustrations, b&w photos; PB, *B124*, \$7.95

Other Guides:

**Along the Rim: A Road Guide to the South Rim**, Nancy Loving; 52 pp, color and b&w photos, illustrations, maps; PB, *B125*, \$2.95

**Grand Canyon Wildflowers**, Arthur M. Phillips, III; 145 pp, color photos; PB, *B126*, \$6.50

## Great Basin NP

**The Lehman Caves Story**, Orlynn J. Halladay, Varlynn Peacock; 28 pp, b&w photos; PB, *B127*, \$1.50

**Lehman Caves**, Jeremy Schmidt; 33 pp, exquisite color photos; PB, *B128*, \$2.95

**Wheeler Peak Trail Guide**, paper, *B129*, \$.50

A pocket folder containing a map, hiking information, and natural history.

## Haleakala NP

\***Haleakala: The Story Behind the Scenery**, KC Publications; PB, *B130*, \$4.50

## Hawaii Volcanoes NP

\***Hawaii Volcanoes: The Story Behind the Scenery**, KC Publications; PB, *B131*, \$4.50

**Volcano Watching**, Robert and Barbara Decker; 80 pp, color photos, maps, charts; PB, *B132*, \$5.95

An easy to read, detailed book on how volcanoes work.

## Joshua Tree NM

**Joshua Tree: Desert Reflections**, Stephen Trimble; 34 pp, color photos; PB, *B133*, \$2.00

A handsome book on the unique trees, plant and animal life of this area.

## Lake Mead NRA

\***Lake Mead & Hoover Dam: The Story Behind the Scenery**, KC Publications; PB, *B134*, \$4.50

## Lassen Volcanic NP

**Road Guide to Lassen Volcanic National Park**, Paul E. Schultz; 40 pp, color photos, maps; PB, *B135*, \$1.65

**These Happy Grounds: A History of the Lassen Region**, Douglas H. Strong; 101 pp, b&w photos; PB, *B136*, \$4.00

**Through Vulcan's Eye: The Geology and Geomorphology of Lassen Volcanic National Park**, Phillip S. Kane; 118 pp, photos, illustrations; PB, *B137*, \$5.25

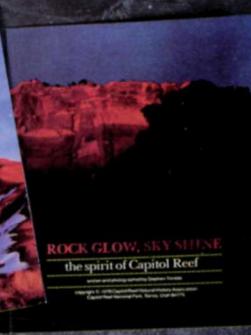
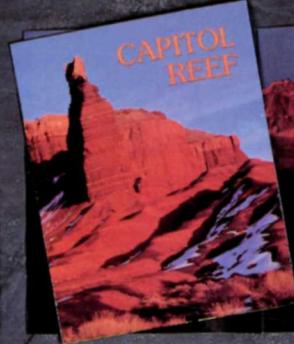
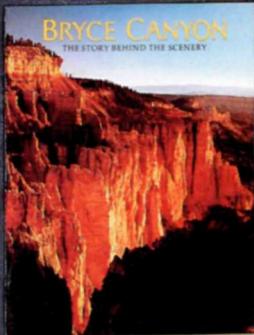
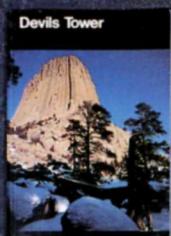
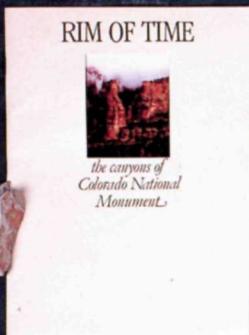
**Lassen Volcanic National Park: A Photo Essay**, Stephen C. Voorhees; PB, *B138*, \$4.00

An exquisitely photographed book capturing the ever-changing moods of Lassen.

## Montezuma Castle & Tuzigoot NM

**Montezuma Castle National Monument: Official Handbook**, Albert Schroeder, Homer Hasting; 44 pp, PB, *B139*, \$3.00

**Ruins Along the River: Montezuma Castle, Montezuma Well and Tuzigoot National Monuments**, Carle Hodge; 48 pp, color photos; PB, *B140*, \$4.95



### Petrified Forest NP

**Earth Journey: A Road Guide to Petrified Forest**, Stephen Trimble; 40 pp, color photos, maps; PB, *B141*, \$5.95

\***Petrified Forest: The Story Behind the Scenery**, KC Publications; PB, *B142*, \$4.50

### Point Reyes NS

**Point Reyes: The Enchanted Shore**, Stephen Trimble; 32 pp, color photos; PB, *B143*, \$2.50

### Redwood NP

**Monarchs of the Mist: The Story of Redwood National Park and the Coast Redwoods**, Joseph E. Brown; 44 pp, color and b&w photos; PB, *B144*, \$3.25

### Saguaro NM

**Saguaro: A View of Saguaro National Monument and the Tucson Basin**, Gary Paul Nabhan; 75 pp, color photos; PB, *B145*, \$6.95

**Saguaro: Official Handbook**, Napier Shelton, Natt Dodge; 104 pp, PB, *B146*, \$6.25

### Sequoia & Kings Canyon NPs

**Exploring Mountain Highways: A Road Guide to Sequoia and Kings Canyon National Parks**, William C. Tweed; 49 pp, color photos, maps, illustrations; PB, *B147*, \$3.75

**Giant Sequoias**, H. J. Harvey, et al; 79 pp, color and b&w photos, illustrations, map, chart; PB, *B148*, \$3.50

\***Sequoia & Kings Canyon: The Story Behind the Scenery**, KC Publications; PB, *B149*, \$4.50

**To Find the Biggest Tree**, Wendell D. Flint; 116 pp, color photos, b&w illustrations, graphs, charts; PB, *B150*, \$4.95

Tale of one man and his dogged search for the biggest tree in the country.

### Yosemite NP

**Discovering Sierra Birds**, Ted Beedy and Steve Granholm; 229 pp, color plates, pho-

tos, sketches; PB, *B151*, \$9.95

Field guide to the birds of this region with detailed descriptions.

**Discovering Sierra Trees**, Stephen Arno and Jane Gyer; 89 pp, b&w photos, sketches, charts; PB, *B152*, \$2.95

Excellent source of information on Sierran tree species.

**Waterfalls of Yosemite Valley**, Michael Osborne; 48 pp, color photos, sketches, map; PB, *B153*, \$5.95

How Yosemite's waterfalls were formed and how to reach them.

\***Yosemite: The Story Behind the Scenery**, KC Publications; PB, *B154*, \$4.50

### On the Western Region

These beautiful, large format, color books are published by KC Publications.

**Big Sur**, PB, *B155*, \$4.50; HB, *B156*, \$8.95

**Catalina Island**, PB, *B157*, \$4.50

**Grand Circle Adventure** (A tour of 14 parks and monuments in the Western Region), PB, *B158*, \$4.50

**Maui: The Romantic Island**, PB, *B159*, \$4.95

**Kaua'i**, PB, *B160*, \$4.95

**The Sonoran Desert**, PB, *B161*, \$4.50; HB, *B162*, \$8.95

**Nevada's Valley of Fire**, PB, *B163*, \$4.50

### Rocky Mountain Region

#### Arches NP

\***Arches: The Story Behind the Scenery**, KC Publications; PB, *C101*, \$4.50

#### Badlands NP

**This Curious Country**, Mike Harwood and Mary Durante; 64 pp, color photos, ink sketches; PB, *C102*, \$8.95

Depicts the plants and animals, natural and cultural history of this region.

#### Bent's Old Fort NHS

**Bent's Old Fort**, Thompson, et al; 180 pp, b&w photos, illustrations; PB, *C103*, \$6.95

Fascinating history of Bent's Old Fort from the 1830s to the present.

### Bryce Canyon NP

**The Bryce Canyon Auto & Hiking Guide**, Tully Stroud; 45 pp, color and b&w photos, maps; PB, *C104*, \$2.95

\***Bryce Canyon: The Story Behind the Scenery**, KC Publications; PB, *C105*, \$4.50

### Capitol Reef NP

\***Capitol Reef: The Story Behind the Scenery**, KC Publications; PB, *C106*, \$4.50

**Rock Glow, Sky Shine: The Spirit of Capitol Reef**, Stephen Trimble; 32 pp, color photos, map; PB, *C107*, \$2.95

### Colorado NM

**A Guide to the Rimrock Drive: Colorado National Monument**, Rose Houk; 49 pp, b&w and color photos; PB, *C108*, \$4.75

**Rim of Time: The Canyons of Colorado National Monument**, Stephen Trimble; 32 pp, b&w and color photos, illustrations; PB, *C109*, \$3.00

### Custer Battlefield NM

**Custer Battlefield: Official Handbook**, Robert Utley; 96 pp, PB, *C110*, \$5.00

### Devil's Tower NM

**Devil's Tower: Official Handbook**, Greg Beaumont; 80 pp, PB, *C111*, \$5.25

### Dinosaur NM

**Dinosaur: The Dinosaur National Monument and Quarry**, Linda West and Dan Chure; 41 pp, color photos, illustrations; PB, *C112*, \$4.95

**Dinosaurs and Dinosaur National Monument: A Resource Packet for Students and Teachers**, Linda West; 60 pp, PB, *C113*, \$4.95

A handy workbook including worksheets, quizzes, and class projects.

\***Dinosaur: The Story Behind the Scenery**, KC Publications; PB, *C114*, \$4.50



### Fort Laramie NHS

**Fort Laramie: Official Handbook**, David Lavender; 160 pp, PB, C115, \$8.00

**Fort Laramie and the Pageant of the West, 1834–1890**, LeRoy R. Hafen, Francis Marion Young; 427 pp, PB, C116, \$8.95

A colorful history of Fort Laramie and the Oregon Trail.

**The Queen of Bedlam**, Charles King; 277 pp, PB, C117, \$8.95

First published in 1889, this book presents life in Fort Laramie during the Black Hills gold rush.

### Fort Union Trading Post NHS

**Fort Union Trading Post: Fur Trade Empire on the Upper Mississippi**, Erwin N. Thompson; 111 pp, PB, C118, \$5.95

### Glen Canyon NRA

\***Glen Canyon—Lake Powell: The Story Behind the Scenery**, KC Publications; PB, C119, \$4.50

### Golden Spike NHS

**Golden Spike National Historic Site: Official Handbook**, Francis Ketterson, Jr.; 68 pp, PB, C120, \$3.75

### Glacier NP

\***Glacier: The Story Behind the Scenery**, KC Publications; PB, C121, \$4.50

**Hiker's Guide to Glacier National Park**, N. P. Nelson; 111 pp, trail maps, mileage, descriptions; PB, C122, \$5.95

**Many Storied Mountains: The Life of Glacier National Park, Official Handbook**; 144 pp, PB, C123, \$7.00

**Roads and Trails of Waterton-Glacier International Peace Park**, G. Ruhle; maps, photos; PB, C124, \$6.95

**Trains, Trails & Tin Lizzies**, G. McFarland; 72 pp, quadtone photos; HB, C125, \$29.95

Features the photography of George A. Grant documenting travel in Glacier in the

early 1930s. Text is excerpted from historical superintendent and ranger reports.

### Grand Teton NP

**Birds of Grand Teton National Park and the Surrounding Area**, Bert Raynes; 90 pp, color photos, maps; PB, C126, \$7.95

**The Early Days in Jackson Hole**, Virginia Huidekoper; 131 pp, historic and recent b&w photos; PB, C127, \$12.95; HB, C128, \$19.50

**Grand Teton: Official Handbook**, 96 pp, PB, C129, \$5.50

\***Grand Teton: The Story Behind the Scenery**, KC Publications; PB, C130, \$4.50

**Origins: Place Names of Grand Teton**, Cindy Nielson; 90 pp, historical photos; PB, C131, \$7.95

An historical account of why and how various features in Grand Teton were named.

**Teton Trails: A Guide to the Trails of Grand Teton National Park**, Bryan Harry; 56 pp, maps, photos; PB, C132, \$1.95

### Great Sand Dunes NM

**Great Sand Dunes: The Shape of the Wind**, Stephen Trimble; 33 pp, color photos; PB, C133, \$2.95

### Mesa Verde NP

**Flowers of the Mesa Verde National Park**, Stephen R. Wenger; 47 pp, color photos; PB, C134, \$2.50

**The Story of Mesa Verde National Park**, Gilbert R. Wenger; 79 pp, photos; PB, C135, \$4.95

**The Mesa Verde Story**, Set of 5 cards, paper, C136, \$1.00

Five cards depicting early Mesa Verde civilization from 1-1300 A.D. Historical notes on the back of each card. Each card measures 5.5 x 8.75 inches.

### Mount Rushmore NM

\***Mount Rushmore: The Story Behind the Scenery**, KC Publications; PB, C137, \$4.50

### Nez Perce NHP

**Nez Perce Country: Official Handbook**, Alvin Josephy; 224 pp, PB, C138, \$7.50

### Rocky Mountain NP

\***Rocky Mountain: The Story Behind the Scenery**, KC Publications; PB, C139, \$4.50

### Timpanogos Cave NM

**Timpanogos Cave: Window Into the Earth**, Stephen Trimble; 48 pp, color and b&w photos, map; PB, C140, \$3.50

### Theodore Roosevelt NP

**At the Open Margin: The NPS's Administration of Theodore Roosevelt National Park**, David Harmon; 299 pp, PB, C141, \$5.95

**Roosevelt in the Bad Lands**, Hermann Hagedorn; 475 pp, PB, C142, \$9.95

\***Theodore Roosevelt: The Story Behind the Scenery**, KC Publications; PB, C143, \$4.50

### Wind Cave NP

**Wind Cave: Official Handbook**, R. Woodward, G. Beaumont, W. Halladay, F. Tilden; 144 pp, PB, C144, \$8.00

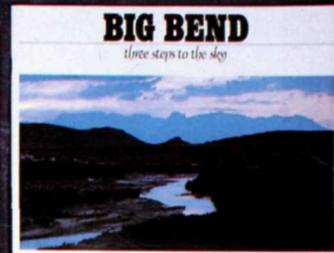
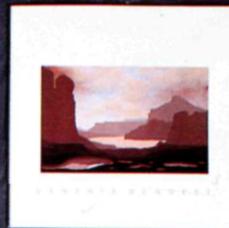
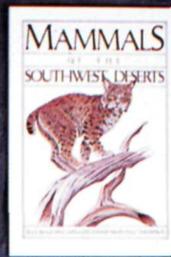
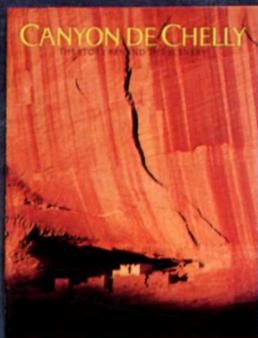
### Yellowstone NP

**Chief Joseph's People and Their War**, Alvin M. Josephy, Jr.; 22 pp, b&w photos, map; PB, C145, \$9.95

**Ferdinand Vandiveer Hayden and the Founding of Yellowstone National Park**, Department of Interior/Geologic Survey; 45 pp, b&w photos, maps; PB, C146, \$1.00

**The Geologic Story of Yellowstone National Park**, William R. Keefer; 92 pp, color and b&w photos, map, illustrations; PB, C147, \$3.95

\***Yellowstone: The Story Behind the Scenery**, KC Publications; PB, C149, \$4.50



### Zion NP

**The Sculpturing of Zion: Road Guide to the Geology of Zion National Park**, Wayne L. Hamilton; 132 pp, color photos, map; PB, *C150*, \$9.95

\***Zion: The Story Behind the Scenery**, KC Publications; PB, *C151*, \$4.50

**Zion Album: A Nostalgic History of Zion Canyon**, J. L. Crawford; 83 pp, historic photos; PB, *C152*, \$10.95; HB, *C153*, \$24.95

An exquisite book capturing the beauty of Zion country.

## The Southwest Region

### Big Bend NP

**Big Bend: History of the Last Texas Frontier, Official Handbook**, Ron Tyler; 300 pp, PB, *D101*, \$12.00

**Big Bend: Official Handbook**, Helen Moss; 128 pp, PB, *D102*, \$6.50

**Big Bend Country: A History of Big Bend National Park**, Ross A. Maxwell; 88 pp, photos; PB, *D103*, \$9.95

**Big Bend: Three Steps to the Sky**, Frank Deckert; 44 pp, color photos; PB, *D104*, \$3.95

An award-winning color publication on the Bend area, the Rio Grande river, desert life and the Chisos Mountains.

**Secret Places: Photos of Big Bend National Park**, Rome A. Hanks; 34 pp, b&w photos, PB, *D105*, \$2.95

### Big Bend Guides

Rivers:

**River Guide to the Rio Grande: General Information**, 24 pp, *D106*, \$1.00

Regulations, equipment needs, helpful hints.

**River Guide #1 to the Rio Grande: Colorado Canyon through Santa Elena Canyon**; 16 pp, photos, maps, natural history, waterproof paper, *D107*, \$3.00

**River Guide #2 to the Rio Grande: Mariscal Canyon through Boquillas Canyon**; 16 pp, photos, maps, natural history, waterproof paper, *D108*, \$3.00

**River Guide #3 to the Rio Grande: The**

**Lower Canyons**; 24 pp, photos, maps, natural history, waterproof paper, *D109*, \$4.50  
BONUS: All four guides, *D110*, \$10.00

Hiking:

**Chisos Mountain Trails**, Quad maps that include all of the trails in the Chisos Mountains, b&w photos, natural history. Paper folder, *D111*, \$5.00.

**Hiker's Guide to the Trails of Big Bend National Park**, 32 pp, b&w photos; *D112*, \$1.25

Road Guides:

**Road Guide to Backcountry Dirt Roads of Big Bend National Park**, 40 pp, b&w photos; PB, *D113*, \$1.25

Contains mileage logs, descriptions of historic sites, scenery, human and natural history.

**Road Guide to the Paved and Improved Roads of Big Bend National Park**, 48 pp, b&w photos; PB, *D114*, \$1.25

### Canyon de Chelly NM

**Canyon de Chelly: Official Handbook**, Zorro Bradley; 64 pp, PB, *D115*, \$4.00

\***Canyon de Chelly: The Story Behind the Scenery**, KC Publications; PB, *D116*, \$4.50

### Chaco Culture NHP

**Chaco Canyon: Center of a Culture**, Douglas and Barbara Anderson; 60 pp, color photos, illustrations; PB, *D117*, \$5.00

### Fort Davis NHS

**Fort Davis National Historic Site: Official Handbook**, Robert Utley; 68 pp, PB, *D118*, \$3.50

### Fort Union NM

**Fort Union: Official Handbook**, Robert Utley; 68 pp, PB, *D119*, \$3.25

### Lyndon B. Johnson NHS

**Heart's Home: Lyndon B. Johnson's Hill Country**, Rose Houk; 42 pp, color and b&w photos; PB, *D120*, \$4.95

A nostalgic look at the countryside LBJ called home.

### White Sands NM

**White Sands: Wind, Sand & Time**, Richard Atkinson; 44 pp, color photos, illustrations; PB, *D121*, \$3.95

### Wupatki & Sunset Crater NMs

**Fire & Stone: A Road Guide to Wupatki and Sunset Crater National Monuments**, Scott Thybony; 48 pp, color photos, map; PB, *D122*, \$4.95

### On the Southwest Region

**House in the Sun**, George Olin; 206 pp, color photos, charts, maps, illustrations; PB, *D123*, \$3.95

An easy to understand book about the desert habitat and how to keep yourself healthy when you visit it.

**Lightfall & Time: Fifteen Southwestern National Parks**, Paintings by Cynthia Bennett. Text by Susan Lamb; PB, *D124*, \$14.95; HB, *D125*, \$24.95

A collection of 15 paintings portraying the luminescence of the desert southwest.

**Those Who Came Before: Southwestern Archeology in the National Park System**, Robert and Florence Lister; 184 pp, b&w and color photos, graphs, charts, maps; PB, *D126*, \$12.95

An award-winning book about the priceless ancient ruins entrusted to the NPS for protection and interpretation.

**Voices in the Canyon**, Catherine W. Viele; 76 pp, color and b&w photos, sketches; PB, *D127*, \$4.95

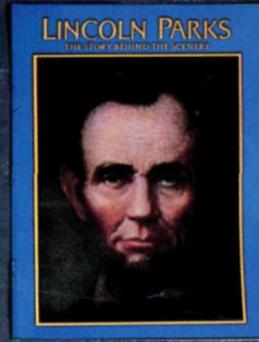
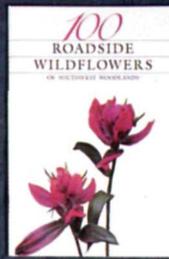
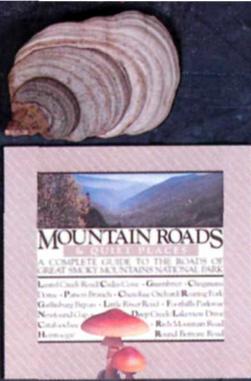
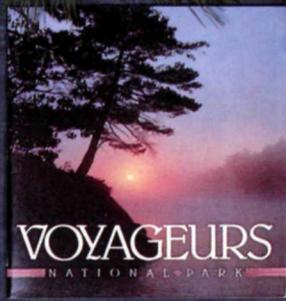
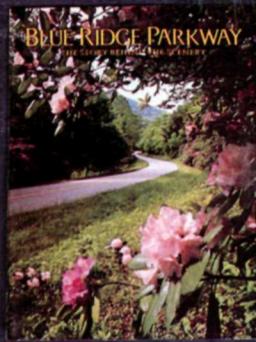
Insights into the Anasazi culture, cliff villages, and traditions within the Navajo tribe.

### Field Guides to the Southwest Region

**Flowers of the Southwest Deserts**, Natt N. Dodge; 136 pp, color photos, b&w illustrations, map; PB, *D128*, \$9.95

A color-coded, easy to use field guide to flowering desert plants.

**Mammals of the Southwest Deserts**, George Olin. Illustrated by Dale Thompson; 99 pp, b&w and color illustrations; PB, *D129*, \$5.95



**Flowers of the Southwest Mountains**, Leslie P. Arnberger; 139 pp, color photos, b&w illustrations; PB, *D130*, \$7.95

An easy-to-use guide to the evergreens, trees and flowers of this area.

**100 Roadside Flowers of the Southwest Woodlands**, Janice Emily Bowers; 28 pp, color photos; PB, *D131*, \$3.95

**Shrubs and Trees of the Southwest Uplands**, Francis H. Elmore; 214 pp, color photos, b&w illustrations, map, charts; PB, *D132*, \$9.95

A guide to common trees and shrubs.

### Indian Culture of the Southwest Region

**Southwestern Indian Arts & Crafts**, KC Publications; PB, *D133*, \$4.50; HB, *D134*, \$8.95

**Southwestern Indian Tribes**, KC Publications; PB, *D135*, \$4.50; HB, *D136*, \$8.95

**Southwestern Indian Ceremonials**, KC Publications; PB, *D137*, \$4.50; HB, *D138*, \$8.95

**Zuni Fetishes**, KC Publications; PB, *D139*, \$3.00

**Kiva Art of the Anasazi**, KC Publications; PB, *D140*, \$14.95; HB, *D141*, \$35.00

**The Rocks Begin to Speak**, KC Publications; HB, *D142*, \$17.50

**Navajo Treaty—1868**, KC Publications; PB, *D143*, \$1.00

### The Midwest Region

#### Apostle Islands NL

**Apostle Islands: Official Handbook**; 64 pp, PB, *E101*, \$3.25

#### George Washington Carver NM

**Carver in His Own Words**, Dr. Gary Kremer; 208 pp, HB, *E102*, \$25.00

The story of George Washington Carver.

**Carver of Tuskegee**, Ethel Edwards; 237 pp, PB, *E103*, \$2.75

This book follows Carver from his childhood days in Diamond Grove, Missouri, to his work as professor and scientist at Tuskegee Institute.

#### Isle Royale NP

**The Life of Isle Royale: Official Handbook**, Napier Shelton; 152 pp, PB, *E104*, \$7.00

#### Scotts Bluff NM

**Scott's Bluff: Official Handbook**, Merrill Mattes; 68 pp, PB, *E105*, \$3.50

#### Voyageurs NP

**Voyageurs National Park**, Greg Breining; 56 pp, color photos, b&w illustrations; PB, *E106*, \$8.95

### On the Midwest Region

\***Lincoln Parks: The Story Behind the Scenery**, KC Publications; PB, *E107*, \$4.50

### The Southeast Region

#### Blue Ridge Parkway

\***Blue Ridge Parkway: The Story Behind the Scenery**, KC Publications; PB, *F101*, \$4.50

#### Carl Sandburg Home NHS

**Carl Sandburg Home, Official Handbook**, Paula Steichen; 128 pp, PB, *F102*, \$7.50

#### Everglades NP

\***Everglades: The Story Behind the Scenery**, KC Publications; PB, *F103*, \$4.50

**Everglades Wildguide: Official Handbook**, Jean Craighead George; 116 pp, PB, *F104*, \$6.50

#### Fort Frederica NM

**Frederica, Colonial Fort and Town: Its Place in History**, Trevor R. Reese; 81 pp, illustrations, maps; PB, *F105*, \$3.00

**A Voyage to Georgia**, Francis Moore; 89 pp, PB, *F106*, \$3.50

Written in 1744, this book describes the settling of Frederica, Georgia, and the customs of the time.

#### Fort Pulaski NM

**Fort Pulaski: Official Handbook**, Ralston Lattimore; 60 pp, PB, *F107*, \$3.25

#### Fort Raleigh NHS

**Fort Raleigh: Adventurers to a New World, Official Handbook**, Charles Porter, III; 64 pp, PB, *F108*, \$4.00

#### Fort Sumter NM

**Fort Sumter: Official Handbook**, Frank Barnes; 64 pp, PB, *F109*, \$4.00

**Fort Moultrie: Official Handbook**, Jim Stokely; 80 pp, PB, *F110*, \$4.00

### Great Smoky Mountains NP

**At Home in the Smokies: Official Handbook**, Wilma Dykeman and Jim Stokely; 160 pp, PB, *F111*, \$7.00

**The Cades Cove Story**, A. Randolph Shields; 116 pp, PB, *F112*, \$3.50

A fascinating profile of the settlement, community life and individual families in this region.

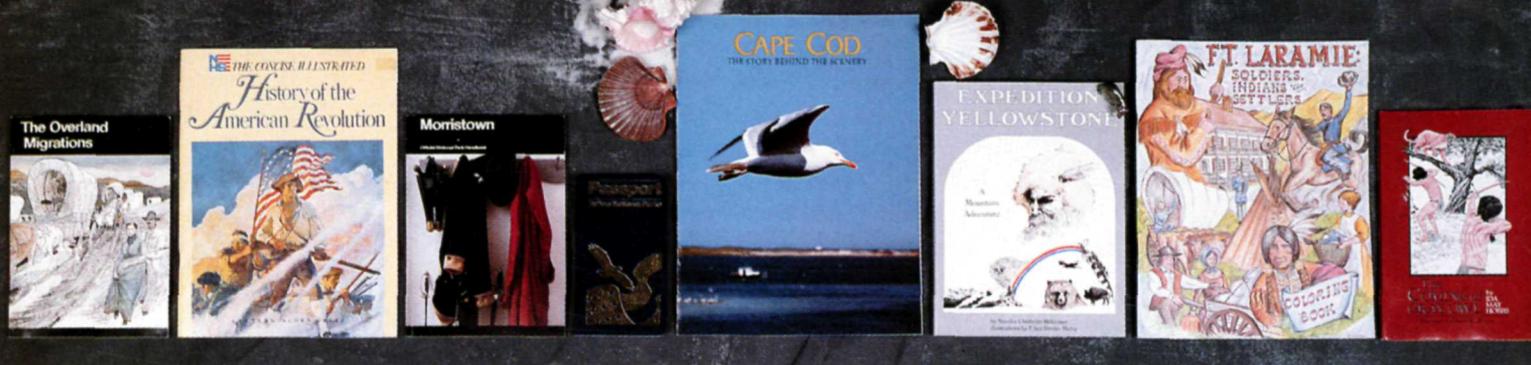
**Great Smoky Mountains National Park: Official Handbook**, Napier Shelton; 128 pp, PB, *F113*, \$7.00

\***Great Smoky Mountains: The Story Behind the Scenery**, KC Publications; PB, *F114*, \$4.50

**Mountain Roads and Quiet Places: A Complete Guide to the Roads of Great Smoky Mountains National Park**, Jerry DeLaughter; 96 pp, color photos, illustrations; PB, *F115*, \$5.95

**A Naturalist's Notebook: Great Smoky Mountains National Park**, Robert G. Johnson. Illustrated by John D. Dawson; 130 pp, large format, PB, *F116*, \$7.95

Lavish sketches and well-written text serve as an excellent introduction to the diverse plant and animal life in the Smokies.



### Ocmulgee NM

**Ocmulgee National Monument: Official Handbook**, G. D. Pope, Jr.; 64 pp, PB, *F117*, \$5.50

### Vicksburg NMP

**Vicksburg: Official Handbook**; 80 pp, PB, *F118*, \$4.50

**Vicksburg: U.S.S. Cairo: The Story of a Civil War Gunboat, Official Handbook**; Virgil Jones, Harold Peterson; 56 pp, PB, *F119*, \$3.50

### Virgin Islands NP

\***Virgin Islands: The Story Behind the Scenery**, KC Publications; PB, *F120*, \$4.50

### Wright Brothers NM

**Wright Brothers: Official Handbook**, Omega East; 68 pp, PB, *F121*, \$3.75

### On the Southeast Region

**U. S. Virgin Islands**, KC Publications; PB, *F122*, \$4.95

## The Mid-Atlantic & National Capital Regions

### Antietam NB

**Antietam National Battlefield: Official Handbook**, Frederick Tilberg; 64 pp, PB, *G101*, \$3.25

### Appomattox Court House NHP

**Appomattox Court House: Official Handbook**, J. Luvaas, J. Cullen; 64 pp, PB, *G102*, \$7.00

### Arlington House, the Robert E. Lee Memorial

**Arlington House: Official Handbook**, 48 pp, PB, *G103*, \$3.00

### Assateague Island NS

**Assateague Island: Official Handbook**, Wil-

liam Amos; 176 pp, PB, *G104*, \$7.00

### Clara Barton NHS

**Clara Barton: Official Handbook**, Elizabeth Pryor; 80 pp, PB, *G105*, \$6.50

### Ford's Theatre NHS

**Ford's Theatre: Official Handbook**, Stanley McClure; 48 pp, PB, *G106*, \$2.50

### Fredericksburg & Spotsylvania County Battlefields Memorial NMP

**Fredericksburg & Spotsylvania: Where a Hundred Thousand Fell, Official Handbook**, Joseph Cullen; 56 pp, PB, *G107*, \$4.50

### Gettysburg NMP

**Gettysburg National Military Park: Official Handbook**, Frederick Tilberg; 68 pp, PB, *G108*, \$3.00

\***Gettysburg: The Story Behind the Scenery**, KC Publications; PB, *G109*, \$4.50

### Harpers Ferry NHP

**Harpers Ferry: John Brown's Raid, Official Handbook**, W. Everhart, A. Sullivan; 76 pp, PB, *G110*, \$4.00

### Hopewell Furnace NHS

**Hopewell Furnace: Official Handbook**, Walter Huggins; 96 pp, PB, *G111*, \$3.75

### Independence NHP

**Independence: Benjamin Franklin's "Good House," Official Handbook**, Claude-Anne Lopez; 64 pp, PB, *G112*, \$4.25

**Independence: The Framing of the Federal Constitution, Official Handbook**, Richard Morris; 64 pp, PB, *G113*, \$5.75

**Independence: Official Handbook**, Richard Morris; 112 pp, PB, *G114*, \$4.25

### National Capital Parks

**Let Us Remember: The Vietnam Veterans**

**Memorial**, Louise Graves; 31 pp, color photos; PB, *G115*, \$3.00

**Lincoln Memorial: Official Handbook**, E. J. Applewhite, P. Angle; 48 pp, PB, *G116*, \$3.00

**Thoughts for All Times**, Frederick Douglass. Edited by Louise Graves; 32 pp, illustrations; PB, *G117*, \$1.50  
Selections from the speeches and writings of Frederick Douglass.

**Washington, D. C. : City of the Constitution. A Guide to Selected Sites**, Parks & History Association; 63 pp, photos, map, illustrations; PB, *G118*, \$3.95

### Petersburg NB

**Campaign for Petersburg, Official Handbook**, Richard Lykes; 76 pp, PB, *G119*, \$4.75

### Richmond NB

**Richmond National Battlefield: Official Handbook**, Joseph Cullen; 52 pp, PB, *G120*, \$3.50

### Shenandoah NP

**Guide to Skyline Drive and Shenandoah National Park**, Henry Heatwole; 226 pp, b&w photos, maps, charts; PB, *G121*, \$4.50

A complete hiking and road guide to the Shenandoah area.

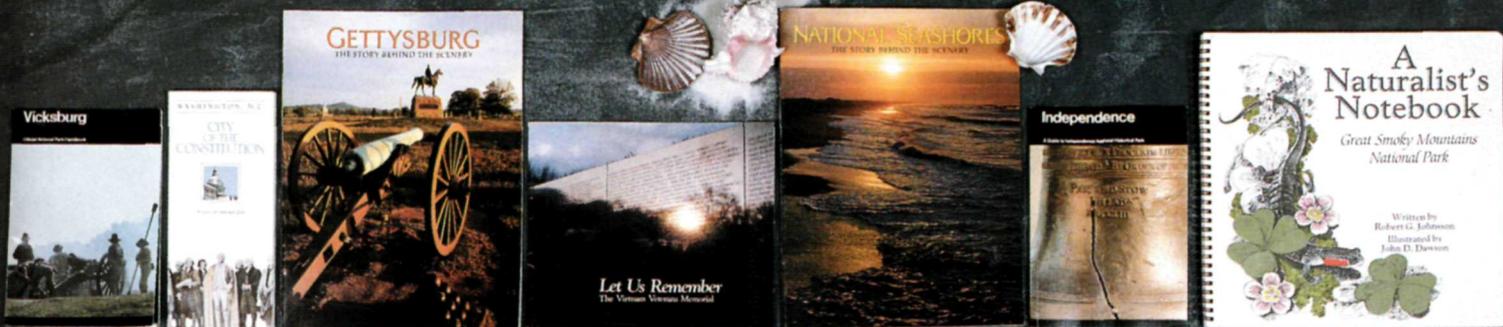
\***Shenandoah: The Story Behind the Scenery**, KC Publications; PB, *G122*, \$4.50

### On the Mid-Atlantic & National Capital Regions

\***Civil War Parks: The Story Behind the Scenery**, KC Publications; PB, *G123*, \$4.50

**Mid-Atlantic National Parks: Five Tour Guidebook**, Michael Frome; 142 pp, b&w photos, maps; PB, *G124*, \$4.95

The tours outlined in this book include: 1. Colonial and Revolutionary times, 2. rivers and wild nature, 3. industry and engineering, 4. Civil War scenes, and 5. great Americans tour.



## North Atlantic Region Acadia NP

\***Acadia: The Story Behind the Scenery**, KC Publications; PB, *H101*, \$4.50

## Cape Cod NS

\***Cape Cod: The Story Behind the Scenery**, KC Publications; PB, *H102*, \$4.50

## Morristown NHP

**Morristown: Official Handbook**, Russell F. Weigley; 112 pp, PB, *H103*, \$6.50

## Salem Maritime NHS

**Salem: Official Handbook**; 160 pp, PB, *H104*, \$6.00

## Vanderbilt Mansion NHS

**Vanderbilt Mansion: Official Handbook**, Charles Snell; 56 pp, PB, *H105*, \$3.00

## Kid Stuff

**Bent's Old Fort: Adventure Guide for Kids**, Doug Rudig; 30 pp, PB, *J101*, \$2.00  
History of Bent's Old Fort brought to life through text, illustrations, games, and activities.

**The Bloody Summer of 1742: A Colonial Boy's Journal**, Joyce Blackburn; 63 pp, PB, *J102*, \$4.25

The diary of a young boy that reveals the daily experiences, color, and activity at Fort Frederica, Georgia, at that time.

**The Coming of Gray Owl**, Ida May Hobbs; 96 pp, PB, *J103*, \$2.95

A book about Indian children's lives in the stone houses of Mesa Verde.

**Expedition Yellowstone: A Mountain Adventure**, Sandra Chisholm Robinson; 173 pp, ink sketches, b&w photos, map; PB, *J104*, \$7.95

An award-winning book about a fictional mountain man, Joshua Grimes, and his descendants. The land and the folklore of Yellowstone's settlers are skillfully interwoven into this tale.

Parents and Teachers: An educational curriculum, based on Robinson's book, for 4th, 5th, and 6th graders is available. Called **Expedition: Yellowstone!** this excellent teacher's workbook contains lessons and activities covering mathematics, science, social studies, and art. For more information, contact Jack de Golia, Program Coordinator, Expedition: Yellowstone! Yellowstone National Park, WY, 82190.

**Fort Laramie: Soldiers, Indians and Settlers: A Coloring Book**, Craig Sodaro; 32 pp, PB, *J105*, \$2.00

**Where Do I Look?**, Jacque Franklin and George Huey; 40 pp, b&w photos; PB, *J106*, \$6.95

A delightful tale of a child's search for the Grand Canyon.

## Special Titles of Interest

**An Army Wife's Cookbook**, Edited by Mary L. Williams; 71 pp, b&w illustrations; PB, *K101*, \$4.95

A nostalgic collection of recipes, household hints, and home remedies from the mid-1800s.

**Artillery Through the Ages: Official Handbook**, Albert Manucy; 96 pp, PB, *K102*, \$3.75

**The Concise History of the Civil War & The Concise History of the American Revolution**, James I. Robinson and Joseph P. Cullen; 2-volume set, 64 pp each, b&w photos, illustrations; PB, *K103*, \$4.95

**Construction of Hoover Dam**, KC Publications; PB, *K104*, \$1.50

**Exploring the American West, 1803–1879, Official Handbook**, R. A. Bartlett, W. H. Goetzmann; 128 pp, PB, *K105*, \$7.00

**The Interpreter's Handbook: Methods, Skills and Techniques**, Russell K. Grater; 129 pp, color photos; PB, *K106*, \$3.50  
A "must-have" for anyone involved in interpretive work in natural, historical, archeological and recreation parks, forests, and museums.

**Lewis and Clark: Voyage of Discovery**, KC Publications; PB, *K107*, \$4.50; HB, *K108*, \$8.95

\***National Park Service: The Story Behind the Scenery**, Albright, Dickenson, Mott; 96 pp; PB, *K109*, \$9.75; HB, *K110*, \$17.50.  
Beautiful photographs paired with text by current and former NPS directors.

\***National Parks: The Story Behind the Scenery Calendar**, 1989 Edition, color photos; *K111*, \$5.95

\***National Seashores: The Story Behind the Scenery**, KC Publications; PB, *K112*, \$4.50

**One Blanket & Ten-Days' Rations**, Charles and Jacqueline Meketa; 99 pp, b&w photos, illustrations, maps; PB, *K113*, \$3.50

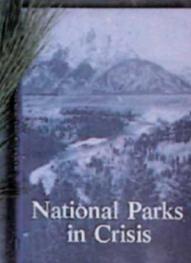
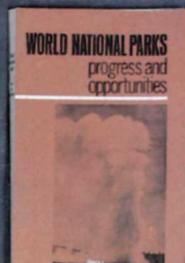
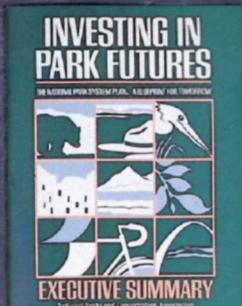
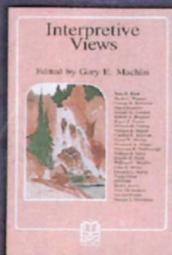
A detailed account of the First Infantry New Mexico Volunteers in Arizona from 1864 to 1866.

**Overland Migrations: Settlers to Oregon, California and Utah, Official Handbook**, David Lavender; 112 pp, PB, *K114*, \$6.00

**Passport to Your National Parks**, Eastern National Park & Monument Association; 104 pp, color photos, maps; PB, *K115*, \$2.95

A convenient pocket guide featuring maps, park listings, and other information. Park visitors can also buy commemorative stamps to put in the passport that can be "canceled" at the parks.

**Whales-Dolphins-Porpoises of the Pacific**, KC Publications; large format, color photos; PB, *K116*, \$4.95



## NPCA Publications

**Interpretive Views.** A diversity of views evaluating interpretation programs in the National Park System. 1986. PB, *L101*, \$9.95

**Investing in Park Futures. The National Park System Plan: A Blueprint for Tomorrow.** Executive Summary. Details NPCA's landmark three-year study of the National Park System. Includes discussions of nine major issues. 1988. PB, *L102*, \$9.95

Volume 1. **To Preserve Unimpaired: The Challenge of Protecting Park Resources.** Analyzes resource threats to parks and makes recommendations for preservation. PB, *L102a*, \$9.95

Volume 2. **Research in the Parks: An Assessment of Needs.** Justifies the need for a major new science and research initiative. PB, *L102b*, \$12.95

Volume 3. **Parks and People: A Natural Relationship.** Visitor use and recreation management of the parks, emphasis on carrying capacity, concessions, and tourism. PB, *L102c*, \$8.50

Volume 4. **Interpretation: Key to the Park Experience.** The need to enhance the role of interpretation and environmental education in the parks. PB, *L102d*, \$6.65

Volume 5. **Park Boundaries: Where We Draw the Line.** Summary of the process. PB, *L102e*, \$5.50

Volume 6. **Planning and Public Involvement: Constituency Building for the Parks.** NPS planning and public involvement processes, with recommendations on a new citizen involvement initiative and restructuring the NPS Denver Service Center. PB, *L102f*, \$4.50

Volume 7. **Land Acquisition: Completing the Parks.** Three key aspects of the NPS land acquisition program are analyzed. PB, *L102g*, \$4.95

Volume 8. **New Parks: New Promise.** Descriptions of 321 areas qualified for inclusion in the national park system, with special emphasis on 86 areas requiring immediate attention. PB, *L102h*, \$21.50

Volume 9. **The National Park Service: Its Organization and Employees.** An analysis of the organizational structure of the NPS that recommends that the NPS be made an independent agency. PB, *L102i*, \$6.95

Full 10-volume Set. PB, *L102j*, \$83.00

**Greenline Parks: Land Conservation Trends for the Eighties and Beyond.** Greenlining has emerged as an exciting conservation trend that can create a new

generation of national parks. 1984. PB, *L103*, \$9.95

**The Moore House.** The Moore House was the first historic structure that was renovated by the NPS. B&W photographs. 1981. HB, *L104*, \$8.45; PB, *L105*, \$4.20

**National Parks in Crisis.** Conservation leaders explore the problems of America's national parks. 1982. HB, *L106*, \$13.95

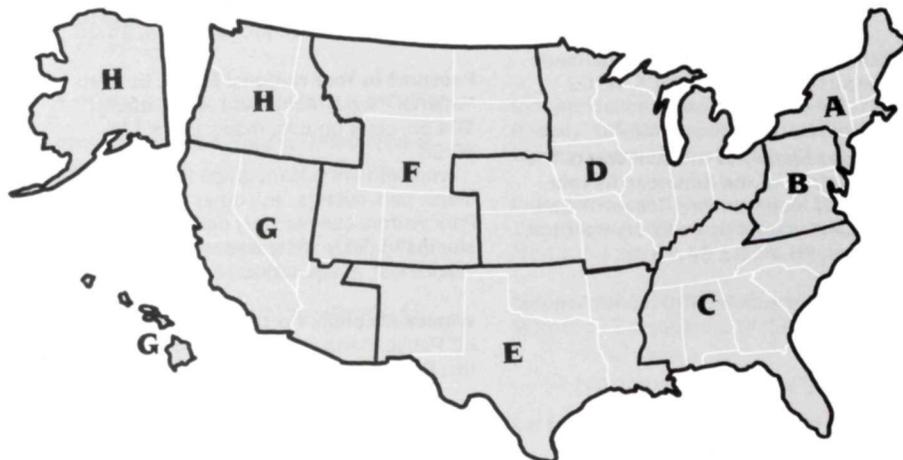
**Our Common Lands: Defending the National Parks.** Essays on the legal issues of protecting public lands. PB, *L107*, \$24.95; HB, *L108*, \$45.00

**Views of the Green.** Exploration of American and European conservation practices, including discussions of land availability, citizen participation, and philosophy. 1985. PB, *L109*, \$9.95

**World National Parks: Progress and Opportunities.** Published in Europe, this book offers thoughtful contributions from 21 nations on principles of conservation, history, marine parks, tourism, and more. 1972. PB, *L110*, \$9.95

## NPCA Regional Guides

An eight-volume set of guides on national and state parks. Includes information on facilities, trails, recreation opportunities, camping areas, visitor services, and more. Softcover, \$2.50 each.



**REGION A:** Maine, New Hampshire, Vermont, New York, Massachusetts, Rhode Island, Connecticut, New Jersey. *M101*.

**REGION B:** Pennsylvania, Delaware, Maryland, West Virginia, Virginia. *M102*.

**REGION C:** Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Alabama, Georgia, Florida. *M103*.

**REGION D:** Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska. *M104*.

**REGION E:** Arkansas, Louisiana, Oklahoma, Texas, New Mexico. *M105*.

**REGION F:** Colorado, Utah, Wyoming, Montana, South Dakota, North Dakota. *M106*.

**REGION G:** Arizona, Nevada, California, Hawaii. *M107*.

**REGION H:** Idaho, Oregon, Washington, Alaska. *M108*.

Complete set of 8 guides, *M109*, \$16.00

# Collectibles

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**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*

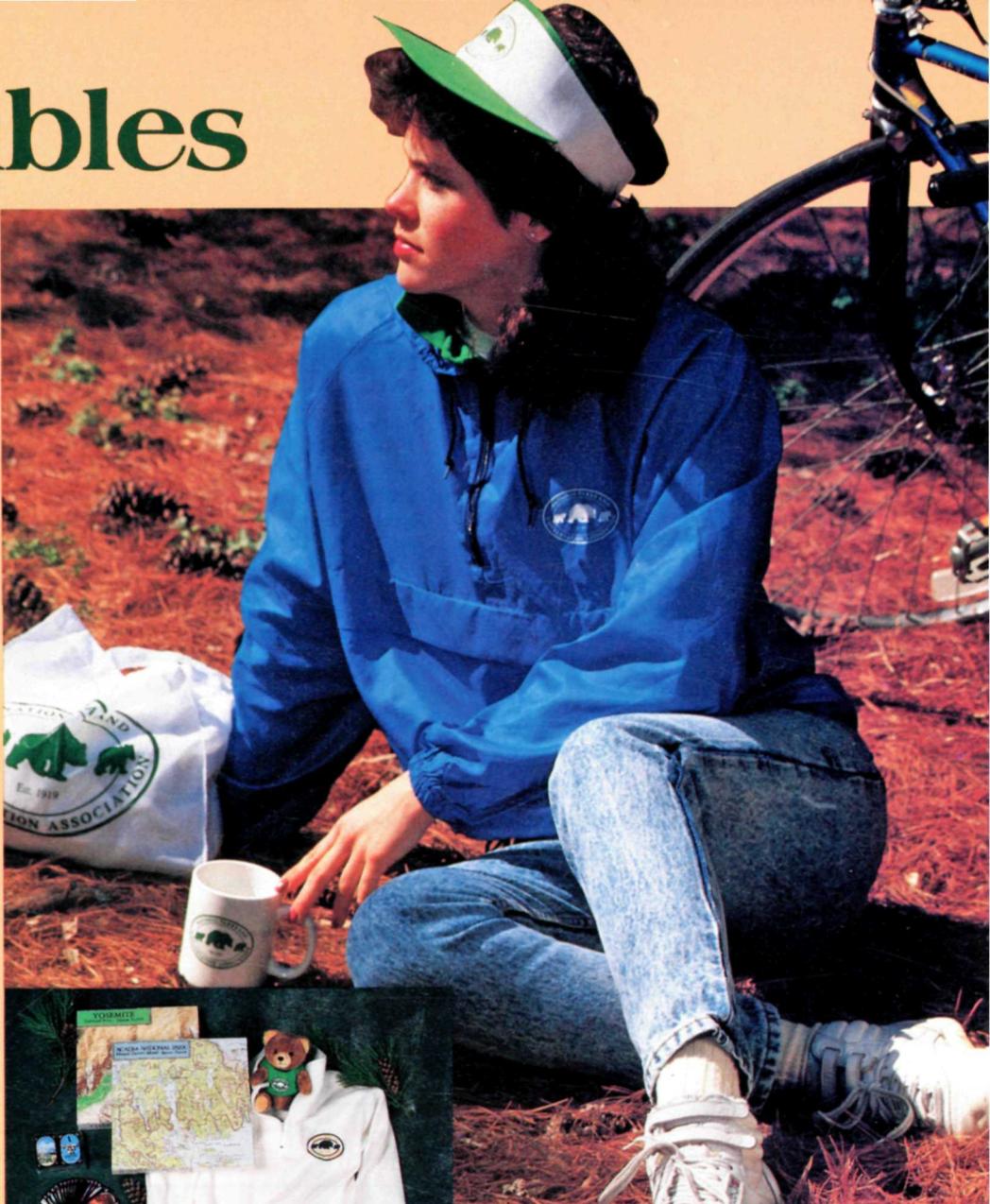
## Mind Teasers

**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.

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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.

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Mount McKinley, Denali National Park, *N123*.

Acadia National Park, *N124*.

Entire set of five puzzles, *N125*, \$45.00.

## Fun & Useful

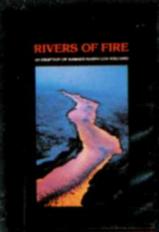
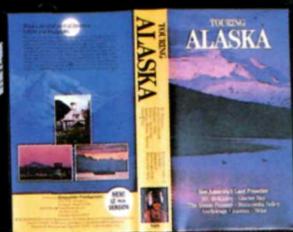
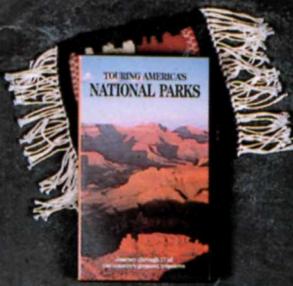
**NPCA Stuffed Bear.** Plush 8-inch toy made of safe, non-flammable synthetic material. *N126*, \$15.95



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

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**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

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## Members Corner

### A Dinner Invitation

Come join NPCA for dinner and dancing at our ninth annual Members Reception and Dinner on November 17.

To be held at the Capital Hilton Hotel in Washington, D.C., the event will honor congressmen Frank Wolf (R-Va.), Robert Mrazek (D-N.Y.), and Michael Andrews (D-Texas) as co-winners of our 1988 Conservationist of the Year Award. The dinner will also feature NPCA's silent auction, where you may place bids on original art, camping equipment, park trips, and other prize items. For details, contact Hilary Dick, NPCA, 1015 Thirty-first St., NW, Washington, D.C. 20007; (202) 944-8549.

### Speaking of Winners

In August, *National Parks* magazine received an award for excellence in

typographic design, layout, clarity, and readability. The award is granted annually by the National Composition Association.

### Adieux

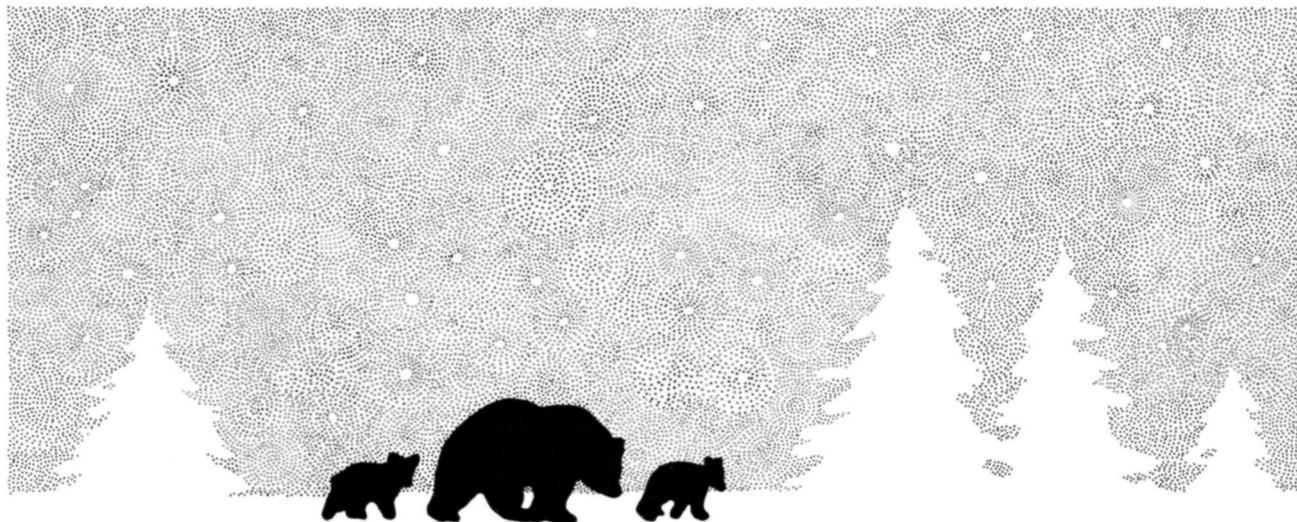
In September, NPCA bade a fond farewell to Vice President of Operations Karen Kress. Since her arrival at NPCA eight years ago, Kress' professionalism and integrity have been invaluable to the organization. Commented NPCA President Paul Pritchard, "Although people may come and go in an organization, I know we will always have a friend and ally in Karen."

### Holiday Wish List

Makin' a list, checkin' it twice. . . Your tax-deductible contribution to any of the following will help to improve programs NPCA has planned for 1989.

- NPCA National Park Trust matching grant for parkland purchases: \$150,000;
- National Historic Landmark Project: \$50,000;

- High school curriculum on national parks: \$22,000;
  - NPCA video public service announcement: \$20,000;
  - *National Parks* article fund: \$10,000;
  - Update and reprint NPCA's *Citizens' Park Action Guide*: \$7,000;
  - Update NPCA slide show, "More Than Just Parks": \$5,000;
  - Holland-Utley Award for outstanding National Park Service staff contribution to cultural resources: \$5,000;
  - Travel Scholarship for NPCA parkwatcher to attend Skills Exchange Workshop: \$750 per person;
  - NPCA gift membership for senator, representative, or other elected official: \$25;
  - Auction items for NPCA's Annual Member Reception and Dinner (actual item).
- Send your contribution to NPCA's Holiday Wish List, 1015 Thirty-first Street, NW, Washington, D.C. 20007. For more information, contact Elliot Gruber, (202) 944-8530.



*Please remember the National Parks and Conservation Association as you plan your holiday giving. We appreciate your support throughout the year and hope that you will continue that support with a special gift during this holiday season.*

# Classifieds

\$1.25 per word—minimum \$20.00. Send copy with check to Classified Advertising Manager, National Parks, 1015 Thirty-first St., N.W., Wash. D.C. 20007. Any ad not accompanied by check cannot be printed.

## Merchandise

U.S. NYLON FLAGS, 3'x5' \$29.95 4'x 6' \$39.95 includes delivery. Send check, VISA or MC. MASSCO, INC, 664 Pleasant St. Norwood, MA 02062. Send ad or mention National Parks for \$5.00 discount.

BAMBOO HIKING STAFFS - 12.95 postpaid. Free information and bamboo fact sheet. Bamboo Staffs - 6522 SW 53 Terrace, South Miami, FL 33155.

The makers of TRAIL TAGS introduce "NATIONAL PARKS TRIVIA GAME." Price \$9.95 or free info: LYMA ENTERPRISES, 1611 Crenshaw #179, Torrance, CA 90501.

## Publications

HOT SPRINGS ENTHUSIASTS! Our magazine has latest info, pics, maps & fun on springs, pristine to push. Published quarterly. Year subscription \$15. Join the fun NOW! Hot Springs Gazette, 12 S. Benton NP1, Helena, MT 59601.

FOR SALE: BACK ISSUES OF AUDUBON, SIERRA, OTHERS. 1960-1982. Excellent Condition. S.A.S.E. for List: 5376 Leprechaun Lane, S.L.C., UTAH 84118.

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"Fire," continued from page 27

fires are so out of control is that man monkeyed with the ecological system to begin with," says Russ Butcher, NPCA's Southwest and California representative. "The most important lesson that can come out of Yellowstone is how urgently we must reduce the unnatural organic fuels overload by reintroducing fire under very carefully prescribed conditions."

Butcher noted two facts crucial to the public's understanding of what occurred at Yellowstone. First, several fires affecting the park started on adjacent Forest Service lands and were fought unsuccessfully from day one; this indicates that fuel buildup, not National Park Service policy, was the major culprit. Second, 50 percent is the portion of Yellowstone's acreage through which the fires ranged, not the percentage of the park consumed. Forest fires moved through most areas leaving large portions of vegetation green and alive.

Only three weeks after fires far hotter than Yellowstone's boiling springs roared through forests of lodgepole pine, new green plant shoots were already sprouting three inches out of the ash, luring elk and deer. Many of the ravaged areas had been dense with 250- to 400-year-old trees that, near the end of their lives and vulnerable to disease and decay, created their own funeral pyre as flames swept past.

The absence of their shading canopy will now grant lower-growing flora, such as alder, serviceberry, and huckleberry, the sunshine they need to flourish. That's great for grizzly bears, who thrive on such plants. Biologists expect the populations of other rare species—mountain bluebirds and three-toed woodpeckers, for example—to explode with the changing habitat.

"As bleak as things look now, you have to temper that," Varley said. "There's life after fire, and it's all good news."

*Michael Milstein, a former ranger, is a reporter for the L. A. Times.*

# Index to National Parks

Vol. 62, 1988

## Abbreviations:

BLM:	Bureau of Land Management	NPCA:	National Parks and Conservation Association
LWCF:	Land and Water Conservation Fund	NPres:	National Preserve
NB:	National Battlefield	NPS:	National Park Service
NHP:	National Historical Park	NR:	National River
NL:	National Lakeshore	NRA:	National Recreation Area
NM:	National Monument	NS:	National Seashore
NP:	National Park		

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# Park Research: Assessing the Needs

*This issue highlights Volume Two of NPCA's National Park System Plan, the first comprehensive plan for the National Park System.*

MANY OF THE VISIONARIES who sought to establish national parks in the United States saw their value as being far beyond recreation or aesthetics. They envisioned vast outdoor laboratories for long-term studies of wildlife and natural phenomena essential to planning, management, and interpretation.

Yet, 116 years after the United States established the world's first national park, and 72 years after the founding of the National Park Service, the NPS research program is underfunded, understaffed, and struggling for an identity.

Few parks have established a comprehensive system to monitor the condition of natural and cultural resources. Most do not have inventories of their wildlife and plant species; and there are no servicewide ecological data bases. Parks with archeological sites have incomplete surveys. Even less is known about the impact of park visitors—a critical component of all parks.

In a 1980 "State of the Parks" report to Congress, the NPS acknowledged that its research and resource management programs were "completely inadequate to cope effectively with the broad spectrum of threats and problems" facing parks.

In 1985, NPCA began a review of the NPS research program as one component of our National Park System Plan. Published as Volume Two of the plan, "Research in the Parks: an Assessment of Needs" examines the NPS research program's organizational structure, function, and its relationship to resource management and decision-making.

We found that NPS commitment to research has been historically weak. Low commitment stems pri-



marily from the lack of a legislative mandate that recognizes the parks' scientific value and directs the NPS to conduct natural, cultural, and social research as an essential element of its mission. NPCA's plan recommends that Congress enact such a mandate and establish a Science Advisory Board to provide independent and expert assessment of NPS research needs and programs.

NPCA found that the NPS research program is fragmented into ten regional programs and has little policy guidance from Washington. A centrally directed independent research arm is needed to ensure objectivity, long-term continuity, and quality research.

Channel Islands and Sequoia are two parks with exemplary research programs. Unfortunately, inadequate funding and staffing make it difficult for most parks to carry out long-term research or inventory and monitoring programs. It is difficult for a park to anticipate problems when it does not even know which plants and animals—or how many of each—live within its borders. Inadequate staffing, in particular, forces the NPS into an immediate, "brush fire" approach to problems. Without long-term strategies, imbalances can become ecological time bombs.

In fact, few managers have been

trained to use research. Nor do NPS performance standards hold park managers accountable for applying research to decision-making. NPCA recommends that a natural or cultural resource background be a criterion in hiring and use of research should be a criterion in job accountability. Without a strong commitment to research, management decisions will continue to be made without knowing the consequences.

If recent Yellowstone fires are an example, NPS resource management decisions probably will be increasingly challenged in the courts, in Congress, and in the media. Without high-quality research, managers will lack necessary data to defend their decisions in court. Thus, park resources will be without adequate defense. Yet, our study found that—unlike the scientifically based NPS fire management policy—scientific information is not consistently used in park decision-making.

The NPCA plan also advises the NPS to request, and Congress to appropriate, research funds equivalent to ten percent of the NPS operating budget. A threefold increase in research staff is recommended.

Additional recommendations include: increased attendance of researchers at professional meetings; publication of research results in peer-reviewed scientific journals; and sabbaticals to allow researchers time to develop new skills and write major publications.

Each year, scientific management of our natural resources becomes more critical. National parks should provide the greatest outdoor scientific university in the world. The challenge to the National Park Service is to create an aggressive research program that carries this vision into the 21st century.

—Brien Culhane  
NPCA Natural  
Resources Coordinator

# Petrified Forest

The famous petrified forests protected in Petrified Forest National Park occur in a colorfully banded sequence of rocks called the Chinle Formation. This formation was deposited about 220 to 225 million years ago, near the end of the Triassic Period of the Mesozoic (middle life) Era, on still older rocks.

The Chinle Formation consists of a variety of sedimentary rock types, [such as] mudstone, siltstone, claystone, and some beds of harder, coarsely grained sandstone and conglomerate, as well as limestone.

Within the Petrified Forest, as in many other areas of the southwestern United States, the Chinle exhibits a striking range of pastel colors. This is a noticeable characteristic of the formation and usually makes it easily recognizable whenever it occurs.

Various combinations of minerals and other substances, such as decayed and fossilized plant and animal matter, provide tones that encompass the rainbow. For example, iron oxides are responsible for the wide range of reds; gypsum is responsible for white; whereas decayed plant and animal matter contributes gray.

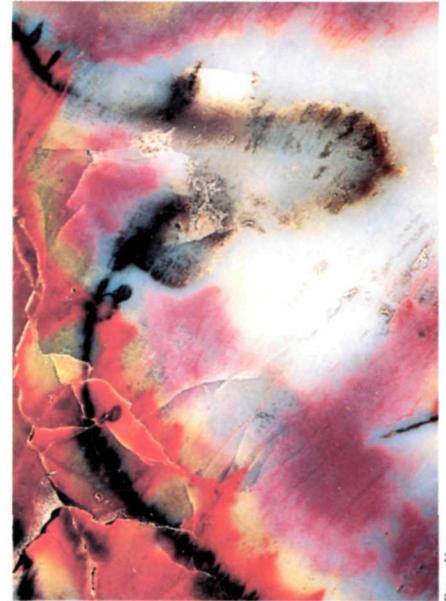
In the Petrified Forest, many or-

ganisms were fossilized. Most of the wood and bones were petrified, or turned to stone. Two types of petrification commonly occur in the park. In the first, all, or practically all, of the organic matter in the potential fossil is replaced by mineral matter. The resulting fossil has the external form of the object but little of the internal structure. Most of the logs have been replaced, at least in part, by mineral matter—especially varieties of quartz—and contain little of the original organic matter.

In the second type of petrification, the cells and other spaces in the potential fossil are filled with mineral matter, and much of the original organic matter remains unchanged. In this type of petrification, or permineralization, much of the cellular detail in the fossil can be observed with a microscope.

Only a small proportion of the logs, stumps, and the bones in the park have been permineralized. Many of the logs in the park have been partially permineralized and partially replaced.

*Excerpted from Petrified Forest: The Story Behind the Scenery, by Sidney Ash; KC Publications, Box 14883, Las Vegas, NV 89114; \$4.50.*



Peter Kresan



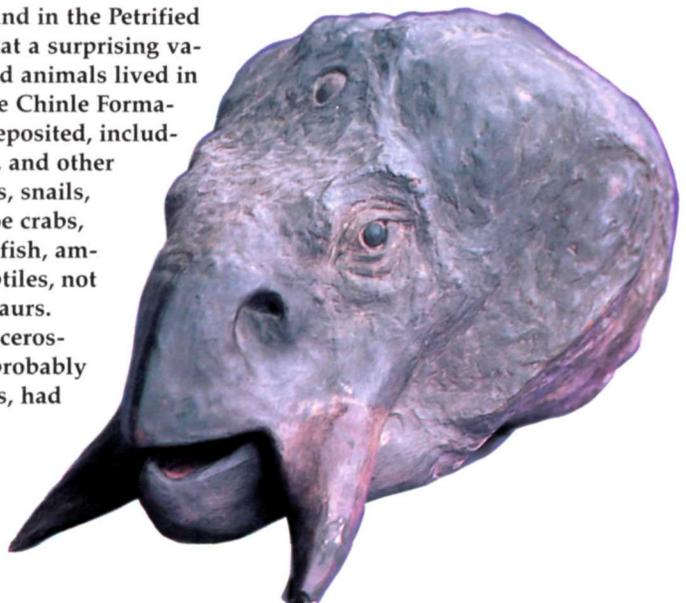
Sidney Ash

**Top:** Little of the original cell structure is preserved in this quartz-filled, polished section of petrified wood, an example of the replacement type of petrification. Petrified wood is surprisingly heavy; a cubic foot of petrified wood weighs about 168 pounds, and the intensities of the colors change with changes in the light.

**Above:** This fossilized cuticle of a *Dinophyton spinosus* leaf, a conifer that is common to the Petrified Forest, has been enlarged 1,000 times.

These permineralized cells are so well preserved that it is possible to see the internal structure of the leaf as well as the cell walls.

**Right:** Fossils found in the Petrified Forest indicate that a surprising variety of plants and animals lived in the area when the Chinle Formation was being deposited, including leaves, cones, and other plant parts, clams, snails, shrimp, horseshoe crabs, crayfish, insects, fish, amphibians, and reptiles, not to mention dinosaurs. *Placerias*, a rhinoceros-like reptile that probably weighed two tons, had two strong tusks although it only ate plants.



Jeff Kida



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