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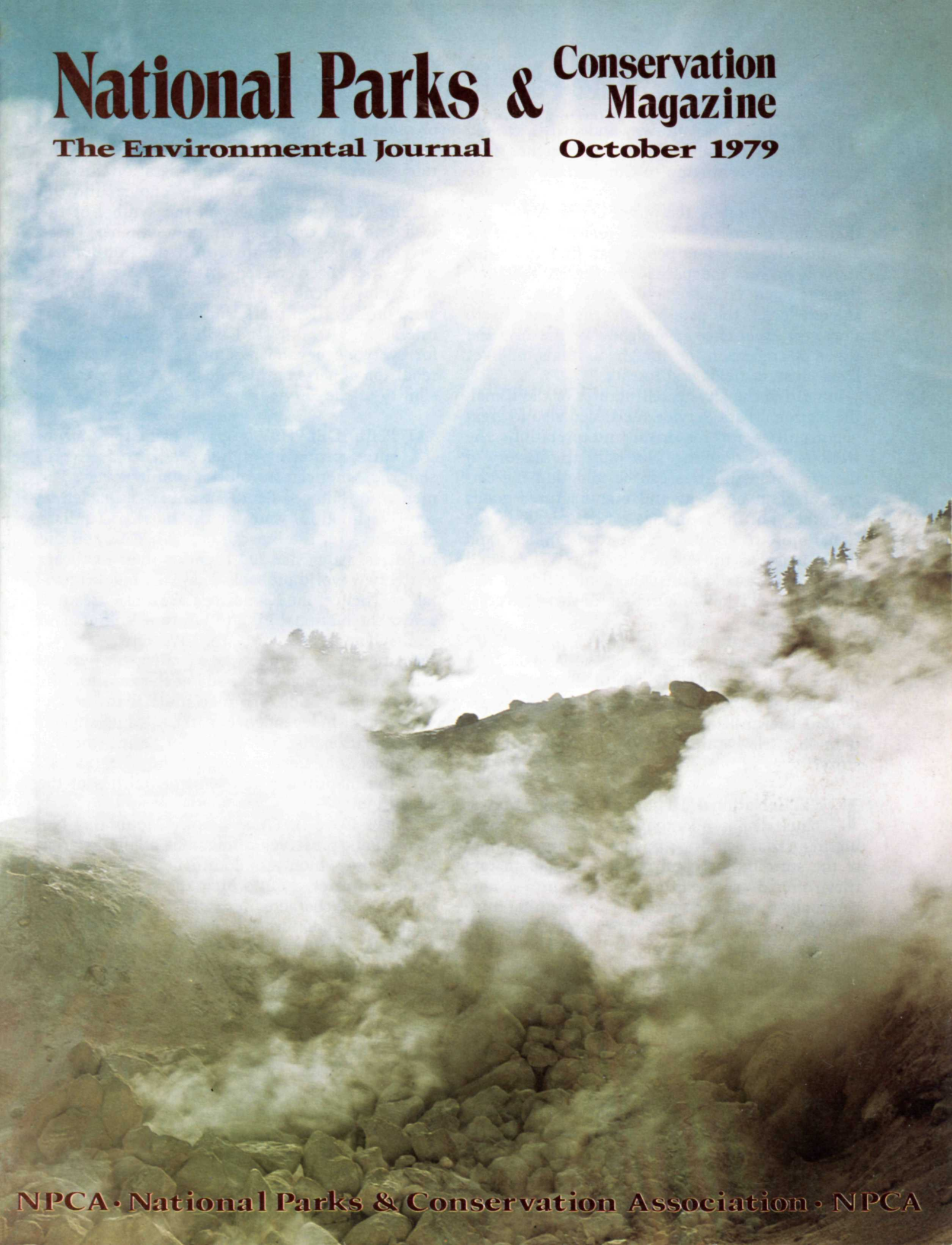

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The Parks and History

A PLACID, shady waterway under trees, the old Chesapeake and Ohio Canal stretches from the heart of Washington to Cumberland over the mountains.

Its towpath offers the out-of-doors to families that come down to it by side-roads all along its 180-mile length. Here people can find the birds, the wild flowers, the space for movement that have become such rarities in the cities. And in the ancient locks, the gate-houses, the Canal itself, they may experience an age gone by, the days and times of craftsmen, of draught animals, of lives lived close to fields and forests.

Inheriting the physical structures of the Canal, the National Park Service succeeded also to great opportunities for historical interpretation; the work is just beginning. Not only the history of the early iron smelters can be told, and the cargoes of grain one way and manufactured goods the other, but the twin sagas of the rescue of the Canal more recently from the road builders, and the defense of the entire Potomac Valley (and with it the Canal) against the dam builders. The NPCA played a key role in both of these successful campaigns.

The old Canal, in history and prophecy, takes us from the leafy canopies of the Appalachian frontier past the railroads, out to the steel mills, through the days of the auto and the highways, around the multi-purpose dams, into an age of reunion with nature. Can the Service tell this story?

LOWELL National Historical Park in Massachusetts has a parallel theme. The burgeoning industrial age drew upon the young women of the surrounding countryside for labor in textiles; offered escape from the farm into a new paternalism; and then received the teeming multitudes from Europe. The story should be told with its sequels, the textile and shoe factories of New England in the present century, the escape of the textile industry to the South, the labor movement, the decline of industrial New England, and now a return to the preservation and adaptive use of the old structures, freighted with the human story.

Within the harbor of New York the Service cares for Ellis Island and the Statue of Liberty; and what a great historical episode they represent! Can that account ever be adequately rendered? All of us are immigrants (even the Indians); but it was to Ellis Island, early this century, that the tidal waves of European immigration arrived, dispersing, melting, settling by choice into the culture. And the Statue was the symbol of the welcome and the freedom they sought. Those days are gone, never to return; the frontier has long since been closed; America's generosity must now extend to the lands of origin, to help stem proliferation there, and not to limitless immigration, else our land will soon be burdened for everyone beyond redemption. The sensitive rendition of parts of this tale must be the responsibility of the Service.

AT PHILADELPHIA, a group of historic structures, centering at Independence Hall present the American Revolution and its times. The men who followed Penn: Paine, Franklin, Jefferson, Washington, were for the most part pillars of society; yet the breadth of the oceans and the impulses which had led them or their forebears to the new world probably made the revolt inevitable. Thence the Conestoga wagons streamed across the National Pike to Western Virginia and Pennsylvania and into the Western Reserve, bringing the craftsmen, the yeomen, the settlers who eventually broke the sod of the prairies. The Liberty Bell stands for much more than the Declaration of Independence. After it, came support for the nationalist movements of Latin America; and indeed for freedom around the world, whatever the ineptitudes and sentimentalities of the execution.

Cade's Cove in Great Smoky Mountains National Park preserves a fragment of the agrarian way of life which was dominant in America for three centuries, from which the self-reliance of our national character derived. There the farming continues undisturbed, and many of the old methods, within the framework of mountains and verdure which were the birthright of most people in that world so recently gone by. Such treasures should be displayed for what they have been and what they are, but also for what they must be again if this society is to be remodeled closer to the heart's desire. With similar communities inside or outside the System they stand for that ultimate reunion of man with nature in the open countryside which must ensue if the present centuries of turmoil can be survived.

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COVERS Bumpass Hell, Lassen Volcanic Park, by Ed Cooper
The strange thermal wonders of Lassen Volcanic National Park are threatened by a possible geothermal energy development. In addition, proposals to expand ski facilities in the park would also cause environmental destruction. (See page 4.)

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Lassen's strange volcanic wonders
and fresh mountain scenery
fascinate visitors—
but they also attract pressure
for destructive developments

by STEPHEN HALSEY MATTESON

Boiling point at Lassen

MANY PEOPLE who travel within forty miles of Lassen Volcanic National Park remain totally unaware of the presence of the only recently active volcano in the lower 48 states as well as the surreal volcanic wonders, evergreen forests, and mountain lakes in the park. Lassen wasn't always out of the spotlight, however.

Between 1914 and 1917, a series of spectacular volcanic eruptions of Lassen Peak focused national attention on this wilderness at the south end of the lofty Cascade Mountains in California. The eruptions blanketed the land with incandescent lava, fiery hot steam, and ash. Had the area been populated, the mud flow of May 1915 and the hot blast that followed it would have been a disaster. Instead, Lassen Peak soon gained a different kind of distinction: Congress passed an act in 1916 making a national park out of Lassen Peak and Cinder Cone national monuments.

With the excitement over Lassen's eruptions long subsided, today the park attracts fewer visitors than many other national parks. Yet those who discover its unusual haunts understand why they have inspired such dream-like names as Fantastic Lava Beds, Juniper Lake, Painted Dunes, Boiling Springs Lake, and Chaos Crags.

The landscape is still alive with reminders of its volcanic nature. Boiling water or subterranean steam hiss and rise from sulfur vents, fumaroles, and hot springs in the park. Bubbling mud pots splatter passing shapes of fantasy into the air: castles and cobras and collapsing mountains. In fact, Lassen contains the greatest variety of volcanic remnants of any area in the Lower Forty-eight states. Remains of all four types of volcanoes—plug, shield, cinder cone, and composite—are found along with features such as a huge caldera, a huge rock slide, and the largest hot lake in the world.

Although geologists believe Lassen Peak will erupt again, no one is able, with any accuracy, to say when. For now Lassen is a wilderness where the starkness of volcanic remains, lava flows, mud flows, and craters is softened by forests, lakes, and meadows filled with wildflowers.

Most of the park's features can be observed from the park road, and good trails go near to all of them. From the south entrance to the park, the road winds up for nine miles through the caldera of the extinct Mount Tehama. According to some researchers, this caldera was formed when the peak erupted, lava underneath it drained away and created a huge void, and the top of the mountain caved in. Left in the wake of the eruption was an enormous crater—or caldera—four miles across. The sides of the collapsed mountain remained as a ring of smaller peaks. Other researchers believe that glacial action formed the Mount Tehema caldera.

STEPHEN H. MATTESON

Would nearby geothermal development destroy Bumpass Hell in Lassen Volcanic National Park?

VISITORS to Lassen follow footpaths rich in history. Four local Indian tribes hunted and fished in the area during the summers. Ishi, of the Yahi tribe, became a living legend in his old age as the last survivor of his tribe. During the mid-1800s, several thousand emigrants and gold seekers used trails passing through what is now the park. Peter Lassen—after whom the park was named—and William Nobles developed trails into the northern Sacramento Valley from the Applegate Trail, which then turned northward into Oregon.

Modern tourists enter the park by automobile via Redding or Red Bluff from the west, or Susanville or Reno from the east. Because the thirty-mile park road shows off most of Lassen's best features, visitors can learn much just by passing through and using the *Road Guide to Lassen Volcanic National Park*. However, spending more time and using the trails will provide a much more intimate experience of the park. Lassen boasts more than 155 miles of trails, most of which are described in the *Lassen Trails* guidebook. Any one of them can be covered in a day, but by combining trails good two- or three-day backpacking trips can be enjoyed.

For the hardy and adventuresome, winter is a great time to visit Lassen. Snow is deep, usually from December to late April, with twenty-foot depths being common at higher elevations. A number of trails are marked for cross-country snow travel, and special permission for snow camping may be obtained from the National Park Service. A ski lift and chalet are near the south entrance.

Although Lassen's hundred thousand acres don't match the grand size of a Yosemite or a Glacier park, those who invest the time to become acquainted with Lassen will surely discover its special beauty and uncommon geological fascinations.

WHAT THE casual visitor may not learn is that Lassen's beauty and its special attributes could lead to its undoing. A thermal feature inside park boundaries has already attracted geothermal exploration, and Lassen's ideal snow conditions and scenic setting have touched off a battle over downhill ski development.

Because Lassen is less well known than some other parks, it is all the more vulnerable to these outside pressures. For instance, with no fanfare and without notifying the Park Service, Phillips Petroleum drilled an exploratory hole on an inholding in the park in search of the geothermal power

NATIONAL PARK SERVICE PHOTOS

Without notifying the Park Service first, Phillips Petroleum cleared an area the size of a football field on an inholding in Lassen park, drilled a 4,000-foot-deep exploratory hole, capped it, then moved out. Nobody knows for sure whether extracting steam underground from Terminal Geyser (foreground, left) might kill some of the park's intriguing thermal features. The Park Service could have condemned the land nine months beforehand but did not do so.

that fuels Lassen's thermal features.

Although the activity is occurring in a remote section of the park seldom visited by tourists, the drilling, bulldozing, and tree-cutting caused stream sedimentation and erosion in the park. Future activity could dry up the hot springs or otherwise damage the park's geothermal wonders.

The presence of the Terminal Geyser (actually a large continuous steam vent) in this area indicates that there may be sufficient amounts of thermal energy in the region for profitable electrical generation. Phillips Petroleum claims that any damage to the park will be minimal, adding that the geyser is not in a particularly scenic area and few people ever visit it anyway.

Legally, the National Park Service does not have title to the land because the area containing the geyser is one of a number of private tracts left within the park boundaries—section 36. It is owned by a number of individuals and corporations and leased to Phillips for exploration.

For years little attention was paid to the area. In 1962 the Park Service was appalled to find exploratory well drilling operations near the geyser. Soon afterward the well was capped, and the littered area and the project were abandoned. The Park Service opened negotiations with the land owners to purchase the tract; but one of them strongly objected, and the matter was dropped. Nothing was done to prevent future commercial incursions into the area. In October 1977, Phillips Petroleum obtained permission from Plumas County to reopen the old well and to drill it to 4,000 feet. At a public hearing the park superintendent warned that the action might violate federal regulations on inholdings. By January 1978 the Park Service had requested and obtained an approved "declaration in taking" from two congressional committees in order to condemn the land to prevent any future drilling or road building; but for unknown reasons the hierarchy failed to follow through and support use of that power.

Then in September 1978 park staff made a shocking discovery: a bulldozer at work on the site. In no time Phillips had widened the road and hauled in a large drilling rig. Soon the plot of ground leveled for the equipment was large enough for a football field. Within a few weeks the drilling was completed, the well capped, and the equipment moved out.

Yet throughout this drilling operation and to this very day the company has never made a report to the Park Service—despite the fact that the drilling area is only one and a half miles from Boiling Springs Lake, the largest hot lake in the world. It is possible that extracting steam from under Terminal Geyser would adversely affect the lake, where hot vapors puff up from the opaque, pastel-colored surface of the water. Geologists speculate that there are large steam reservoirs connecting the various thermal features at Lassen, so the geyser may not be the only area to dry out if the steam is extracted.

No one knows whether the Devil's Kitchen or Bumpass Hell, popular hydrothermal areas of the park, would also be endangered. In any case geothermal development would almost certainly pollute the atmosphere to the detriment of vegetation and wildlife in the park. It would also totally destroy the wilderness character of the Pacific Crest Trail in the vicinity, which passes within a quarter mile of the geyser and hot lake.

The situation at Lassen is similar to that at Yellowstone National Park, where geothermal leasing has been proposed on private, state, and national forest land near the park's Old Faithful Geyser. But far fewer people are aware of the crisis at Lassen, and the project is already well underway before the public has had a chance to do anything about it. If Lassen is sacrificed in a mindless rush for speculative energy resources, can Yellowstone and other parks be far behind? NPS officials and Congress must act to acquire the Terminal Geyser tract to prevent this destruction.

LASSEN'S abundant snowfall accounts for the pressure for the expansion of downhill skiing facilities at the park. Use of the area for downhill skiing and modest facilities (a rope tow and warming hut) were encouraged by the Park Service since the sport started becoming popular in the 1930s. There was little objection to construction in the 1960s of a poma lift on an open slope above the park road, a chalet, and a parking area.

By the early 1970s the area was attracting a larger number of skiers and was becoming overcrowded. To alleviate this situation a committee of skiers was formed to promote further development. They agreed on a plan to expand present facilities to include a chair lift that allegedly would accommodate more people and eliminate the half-hour waits at the foot of the present surface tow. The committee members claim that any damage to the park would be minimal.

But others protested that construction of the chair lift would necessitate construction of eleven towers and a new building, removal of 150 mature red fir trees, and creation of a "clearcut" erosion channel down the slope. In addition, it would attract an even higher concentration of visitors to that area of the park, creating pressure for expanding parking lots and other facilities. It also would require expenditure of approximately $6 million of taxpayers' dollars and would divert park staff from interpretation and preservation into activities such as directing traffic.

Many conservationists have come to the conclusion that mechanized ski facilities, however desirable for other public lands, are inappropriate developments in our national parks, intended as they are for preservation in a natural condition, rather than for mechanized, facility-based recreation.

In its general management plan for Lassen, issued in 1978, the Park Service recommends keeping the ski area as is with a few minor

changes for safety purposes. But the ski committee and its friends have refused to accept the plan and have renewed their efforts to include the building of a chair lift in a revision of the plan. Rep. Harold T. (Bizz) Johnson (D-Calif.) has been advocating and working for added ski facilities at Lassen for many years and has urged the Park Service to include the facilities in the final plan.

Not only would the proposal to expand ski facilities at Lassen park be expensive and environmentally destructive; but many skiers using the park prefer the present small-scale, family-type operation to the crowds an enlarged operation would attract.

NATIONAL PARK SERVICE PHOTOS BY FRED MANG, JR.

IN THE ACT of 1916 establishing the National Park Service, Congress declared the purpose of the parks to be "to conserve the scenery and the natural and historic objects, and the wildlife therein, and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Enlarging ski facilities at the expense of the environment for the benefit of a vocal minority does not fit in with the mandate of the Park Service. An even greater insult to the park will result if geothermal exploration is allowed to continue or if a thermal energy plant is constructed within its boundaries or nearby. Lassen's uncommon treasures belong to all the American people—not to exploiters. ■

Stephen Matteson's deep commitment to national park conservation dates back to high school days, when he became interested in a project to protect Indiana Dunes fifty years before the area became a national lakeshore. As a biology teacher, camper, and later a seasonal ranger, Matteson became well acquainted with Glacier National Park. He joined the summer staff at Lassen in 1953 and spent eight seasons at an entrance station and eight seasons as a naturalist there. Matteson and his family came to know Lassen's trails intimately. While at the park he wrote the popular guidebook *Lassen Trails*, which his wife Dorothy illustrated.

Message to Members

PUT THE HEAT ON FOR LASSEN

The final general management plan for Lassen was ready in May but reportedly was delayed by NPS Director Whalen until an NPS advisory subcommittee could visit the park and make a report. The report was expected to be submitted in September, so the plan could be released at any time. NPCA members are urged to write the Park Service right away to ask them, preferably, to remove ski facilities from Lassen, but at least not to expand them. Even more important, protest the failure to protect Lassen from geothermal exploration before damage occurred, and urge NPS Director Whalen and your elected representatives to support immediate acquisition of the inholding containing Terminal Geyser so that Lassen's wonders can be preserved from further damage.

William Whalen, Director
National Park Service
U.S. Department of Interior
Washington, D.C. 20240

article & photographs by ROBERT W. MEINHARD

Unchecked urban sprawl threatens to overwhelm the special character of our Civil War battlefield parks

BATTLEFIELDS UNDER FIRE

THE JULY AFTERNOON seemed to shimmer with heat as I marched with Brigadier General Lewis Armistead's Virginians across the rolling fields of Pennsylvania toward the distant ridge. Through the drifting smoke from the artillery bombardment, we could see the clump of trees and the line of blue-coated men that were our objectives. Suddenly that motionless blue line erupted in a roar, spewing forth a sheet of flame and shot. Great bloody gaps were torn through our line and hundreds fell around me, but the gallant Armistead, holding his hat aloft on the tip of his sword, steadily urged us forward.

As we pressed on through the confusion of smoke and shot, abruptly, in an instant, all vanished—the men and boys of Pickett's brigade, the rattle of muskets, the acrid smoke, the shouts and groans. Before me loomed not the Union line, but the reality of twentieth century commercialism. There, towering three hundred feet over the battlefield, stood the glittering steel framework of the National Gettysburg Tower.

Built on top of Cemetery Ridge, just a few hundred yards from the boundary of Gettysburg National Military Park, this privately owned observation tower symbolizes the most serious threat to our Civil War battlefield parks—urban encroachment accompanied by obtrusive commercial development.

MY VISIT to Gettysburg in 1978 was just one of many such visits I have made during the past four years. From Wilson's Creek to Cedar Creek, from Vicksburg to Gettysburg, from Nashville to Chancellorsville, I have traveled more than 20,000 miles to visit all of our Civil War battlefield sites and parks, most of them twice, some of them three times. In the summer of 1978, I *revisited* the eastern battlefield parks for the specific purpose of identifying their most urgent problems.

As a result of these visits and interviews with park officials, I have become acutely aware of the problems that confront these parks and of the widening gap between the ideal battlefield park of my imagination and the grim reality we are facing today.

Ideally, a battlefield park should have as much territorial integrity as possible—that is, most of the original site should be contained within park boundaries and park property should be contiguous.

Second, the park should have historical integrity. It should resemble as closely as possible its appearance at the time of the Civil War. Original structures and vegetation should be preserved or restored and nonhistoric buildings and vegetation, such as tree growth, should be removed.

Third, multiple use—particularly such general recreational uses as horseback riding, field sports, and swimming, for example—should be carefully controlled or in some cases banned altogether. Like the wilderness parks, the Civil War parks were established to protect distinctive and vulnerable resources. Thus, some recreational uses are incompatible with the primary purpose of these parks—namely, preservation of the sites and interpretation of what happened on them.

Fourth, there should be as little nonhistoric development as possible within the park or immediately outside the park's boundaries. Such developments include roads, monuments, visitors' centers within the parks, and commercial and residential development along park boundaries.

Do any of the existing battlefield parks measure up to these standards? Unfortunately, only two that I visited even come close to doing so—Pea Ridge National Military Park in Arkansas and Shiloh National Military Park in Tennessee, but both parks offer the visitor a most satisfying experience.

UNFORTUNATELY, the reality of the remaining Civil War battlefield parks stands in stark contrast to my ideal conception. Because many of them are within or near urban areas, the sites are chopped up into bits and pieces that are often separated or bordered by intrusive commercial or residential development, roads,

The gaudy commercialism typified by Gettysburg's Steinwehr Avenue mars visitor experiences at many battlefield parks.

and highways and are subject to heavy visitation. Most contain structures and earthworks that are deteriorating from overuse and lack of funds to preserve them, and for the same reason, few have been maintained as they originally must have appeared on the day of battle. Few visitors to Gettysburg can easily erase from their minds the impression made by the gaudy commercial strip of wax museums, motels, and fast food outlets along Steinwehr Avenue, or the inescapable presence of the Tower. And just when visitors think they have finally found a quiet refuge from these distractions, they may be startled by a new kind of auditory and visual pollution of the historic setting—helicopter flights over the battlefield.

As the President's Advisory Council on the Historic Preservation of Gettysburg declared in its 1977 report, "Unless something is done . . ., the Gettysburg area will lose its sense of place, and the things that made it very special will disappear—diminished, eroded, and erased by density, modernity, and sameness."

In like manner, the exploding Washington, D.C., metropolitan area is rapidly engulfing Manassas National Battlefield Park in Virginia. Commercial development—typified by the string of motels, gas stations, and shopping centers that accompany Interstate 66 along its southern border—crowd the park's boundaries. Even more appalling are plans for amusement parks, race tracks, shopping centers, and highways around the present park and on nearby lands of great historical significance, such as Brawner Farm, the site of the bloody encounter of August 28, 1862, in which the Union's Iron Brigade more than earned its name.

Perhaps the most glaring damage to historic Civil War sites, however, has been inflicted on areas in Richmond, Virginia. Interstate 295, a six-lane beltway, already either cuts a swath right through or otherwise impinges on most of the battlefield sites. Here, in 1978, I watched gigantic earthmovers ruin the site of one of the historic Seven Days Battles—Savage's Station—where Lee struck at McClellan and his Army of the Potomac on June 29, 1862. The Fair Oaks-Seven Pines Battlefield nearby is now the site of the Richmond airport. At Cold Harbor, where Grant lost 7,000 men in a tragic assault upon Lee's lines on June 3, 1864, a housing development sprawls over the battlefield adjacent to the visitors' center at the park.

THE PROBLEM is by no means confined to the eastern battlefields. At Vicksburg National Military Park in Mississippi, for example, commercial operations just outside the park boundary intrude on the battlefield as do the gardens of private houses that back right up to the park boundary line.

Likewise, Kennesaw Mountain National Battlefield in Georgia is rapidly being swallowed by metropolitan Atlanta; and Stones River National Battlefield and Fort Donelson National Military Park in Tennessee are threatened by the expansion of neighboring communities. Unfortunately, the battle against urban sprawl has already been lost at Chickamauga-Chattanooga National Military Park (Georgia and Tennessee), where such historic spots as Lookout Mountain, Missionary Ridge, and Orchard Knob are small islands in a sea of commercial and residential development.

THE INTRUSION of the automobile and the roads that carry it is surprisingly pervasive. Some parks, such as Manassas and Gettysburg, are even bisected by heavily traveled trunk highways. These highways and their traffic not only violate the historical atmosphere but also endanger the

Intact, and free from crowds and urban sprawl, Pea Ridge in Arkansas comes close to being the ideal battlefield park.

safety of the park visitor. At some of the battlefields, tour roads specifically designed to enable visitors to reach the significant sites of the battlefield without ever stirring from their cars have only served to spoil the visitors' experience of these places.

As more and more people each year seek the open green space of the parks, the battlefields' fragile resources suffer from the onslaught. Heavy visitor traffic is seriously damaging or destroying entrenchments and earthworks along with the historic ambiance cherished by Civil War buffs at Richmond, Petersburg, Fredericksburg, and Kennesaw Mountain.

On one spring day in 1978, so many visitors arrived at Petersburg National Battlefield, Virginia, that the park's gates had to be closed. In fact, the visitor explosion has become a critical problem for the Park Service. Chronically short of funds, it lacks the means either to prevent or repair the damages caused by heavy visitation.

WE MUST ACT NOW to meet this emergency head-on, to arrest the corrosive effects of urban sprawl and to restore and preserve our historic parks. Together, citizens and the National Park Service should formulate plans and initiate action not only for the parks but also for the surrounding areas.

Doesn't the bravery of those men and boys in blue and grey deserve more fitting commemoration than I-295s, observation towers, and shopping centers? Surely our sense of national identity needs these physical reminders of our past for nourishment. As the late Justice Felix Frankfurter said, "Unless we keep the stream of the past with living significance for the present, we not only have no past, but we have no present." ■

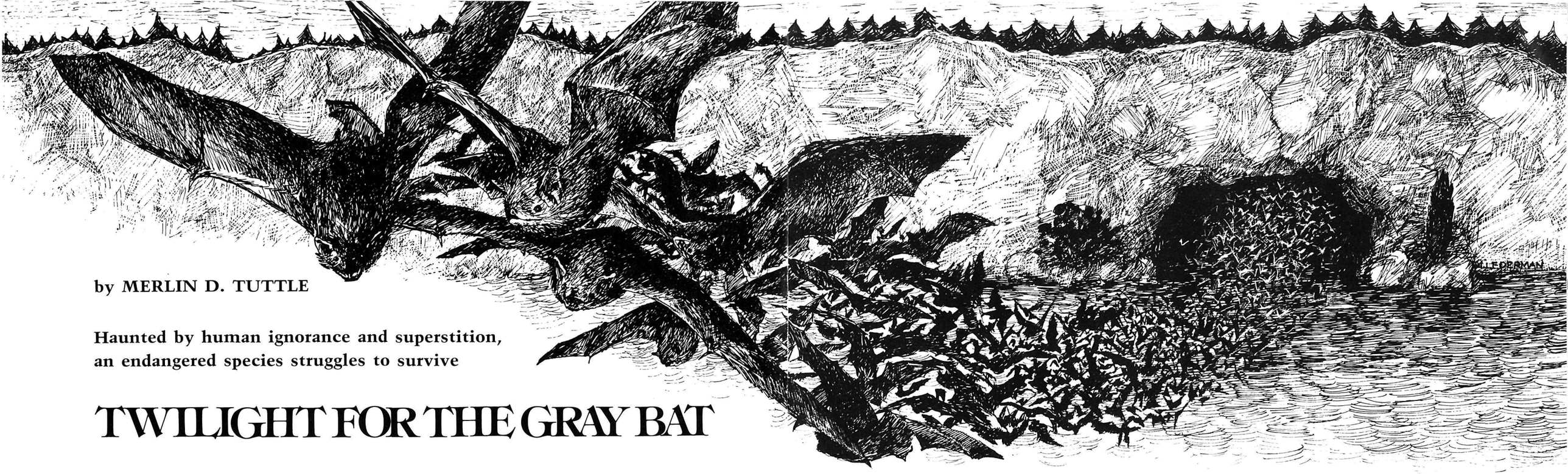
Professor of History at Winona State University, Minnesota, Dr. Robert Meinhard is chairman of National Battlefield Preservation for the Civil War Round Table Associates. A speaker at the annual National Congress of Civil War Round Tables since its inception in 1975, Dr. Meinhard has visited twenty of the twenty-one national Civil War battlefield parks.

Message to Members

Help Defend the Battlefield Parks

NPCA members concerned about threats to our national battlefield parks, such as the development of shopping centers and high-rises along park boundaries, over-commercialization, inappropriate recreational uses, and neglect, should get involved in local zoning and planning decisions affecting the parks in their areas. Express your concern to local officials and to your representatives in Congress. Write to the Director of the National Park Service, Department of the Interior, Washington, D.C. 20240, urging increased emphasis on proper preservation of the battlefield parks.

General management plans for seven battlefield parks will be available from the Park Service for public review during 1979–1980. For detailed information about how you can participate in the park planning process, send for NPCA's free booklet, *How to Help Plan Parks* and order NPCA's *Citizen's Action Guide to the National Park System* ($1.50 postpaid). Ask to be put on the NPCA CONTACT List so you can receive alerts about specific park protection problems. You can obtain additional information about the national Civil War battlefields by writing to Civil War Round Table Associates, Box 7388, Little Rock, Arkansas 73317. The Associates publish a monthly bulletin featuring news and action alerts about the battlefields.



by MERLIN D. TUTTLE

Haunted by human ignorance and superstition, an endangered species struggles to survive

TWILIGHT FOR THE GRAY BAT

AS THE SUN set and the twilight shadows deepened around our boat, my wife, Diane, and I waited expectantly at the mouth of Hambrick Cave. At last Diane was going to share the thrilling sight I had first seen six years before in the summer of 1970. Then, each summer evening emerging gray bats had poured from the mouth of the cave and out over the Guntersville Reservoir in a column averaging sixty feet wide and thirty feet high stretching as far as the eye could see. The spectacular emergence lasted at least three-quarters of an hour and people came from miles around just to watch. Despite my long acquaintance with bats, I never tired of the amazing sight.

On this August night in 1976, however, the bats were behind schedule. Half an hour after the time when tens of thousands of gray bats should have emerged from the cave, we had seen fewer than a dozen. Another half an hour later Diane and I sat in stunned silence, realizing that there would be no emergence.

THE GRAY BAT *(Myotis grisescens)*, was once one of the most abundant mammals of the southeastern United States, ranging from the Appalachian Mountains to Oklahoma and from southern Indiana to Florida. Single caves in Alabama housed maternity colonies of half a million or more of these bats in summer and one wintering cave contained a hibernating population that must have numbered in the millions.

Even as recently as 1970, just two Alabama caves, Sauta and Hambrick, contained a combined population of nearly half a million bats. Evening emergences were spectacular, often rivaling those of the better-known Mexican free-tailed bats at Carlsbad Caverns, New Mexico.

Gray bats have highly specialized habitat and roost requirements. They are restricted to living in caves year-round. For hibernation, the temperature in the caves or at roost sites in the caves must fall markedly below the mean annual surface temperature. Exceptionally warm caves are required for rearing young. Fewer than 5 percent of caves meet these requirements at any season and gray bats concentrate in these in very large numbers. A single summer colony in Sauta Cave, Alabama, accounts for nearly a quarter of all known remaining gray bats, and approximately 95 percent of the entire known species population hibernates each winter in only nine caves, with nearly two-thirds of these bats using a single cave.

Gray bats, like most other bat species, reproduce very slowly. Following fall breeding in their wintering caves, females hibernate for as long as six months, emerging to travel to summer roosts in warmer caves in spring. As a result of delayed fertilization, pregnancy occurs at the time of emergence, and bats travel from a few miles to hundreds of miles to reach their maternity roosts. There, in late May or early June, each female will bear but one young. The young must develop and learn to fly in only about three weeks in order to learn to feed and store sufficient fat to survive the coming winter. Some gray bats actually double their weight with fat reserves by September or October, when they return to traditional hibernating caves.

Concerned only with survival, young bats do not breed in their first year. Though exact numbers are not available, fewer than half are believed to survive to become reproductive adults in their second year. Thus from time of birth, an average female bat requires five years to produce just two surviving offspring. Clearly then, major population losses cannot quickly be replaced.

High roost temperatures are essential to rapid growth, and the larger a gray bat colony is, the easier it is for their combined body heat to warm the roost. My studies of preflight growth have demonstrated that, when other factors are equal, growth rates are directly proportional to colony size. In one colony where human disturbance had caused the bats to split into several smaller groups, I found that the young grew very slowly, and most died. Thus it is quite possible that if summer colony sizes fall below a certain minimum—determined by temperatures and roost conditions in each cave—efforts to rear young will be unsuccessful.

Unfortunately, because most people are sadly misinformed about bats, by far the most important factor in their decline is human disturbance of roosts in caves used by bats.

Few colonies can long survive disturbance of any kind. Mother gray bats often panic and drop their young at the mere appearance of lights near their roosts and few dropped young survive, even in dry caves. Roosts are often over deep water in stream passages, where the light from a caver's headlamp can cause the panic and drowning of thousands of bats as too many try to fly at once. In addition, disturbed colonies are often forced to secondary roosts that are farther from cave entrances and therefore colder and more demanding on the bats' energy reserves.

In winter when gray bats are hibernating, disturbance is still more damaging. Each human entry arouses all bats within hearing or sight. Arousal from hibernation, no matter how brief, depletes from ten to thirty days of the bats' stored energy reserves; prolonged disturbance can cost much more. Though most bats enter hibernation with at least some fat reserves, and though occasional arousal is natural and necessary, fat supplies are limited and cannot be replenished for periods of from five to six months. Clearly, repeated or prolonged disturbance can exhaust these supplies, and tens of thousands of bats have been lost as a result. Even research must be carefully timed and of limited duration if gray bats are to survive.

ALL BATS native to the United States are highly beneficial to people. For example, an individual gray bat may catch as many as 3,000 or more insects in a single night, so that even comparatively small colonies eat literally millions of insects nightly. A colony as large as the one that formerly lived in Hambrick Cave may have consumed up to a ton of insects

each night, including many mosquitos.

Who then would want to kill a gray bat? Perhaps a better question is, who wouldn't? After all, most people "know" that bats are supposed to be primary reservoirs for rabies, that they attack people, or at least get tangled in women's hair, and that they are blind, filthy animals that pose a serious health hazard to other wildlife, as well as to people.

Despite such myths to the contrary, these small, sophisticated mammals are actually gentle and harmless. Not only do bats never become tangled in women's hair, but claimed "attacks" usually occur when someone who is convinced that bats attack people runs in panic from a bat hunting insects nearby. The hysterically frightened person, scratched on a bush en route to the house, often mistakenly concludes that he or she has been bitten. In fact, in twenty years of studying bats, especially the gray bat, I have never known of even one aggressive bat.

Healthy bats never attack people and the fewer than 1 percent of bats that contract rabies rarely even attack other animals. The relatively few people exposed to rabies by bats usually are bitten when they carelessly handle a sick bat found on the ground. True, researchers once hypothesized that migratory bats were responsible for rabies outbreaks in the United States, and that they acted as major reservoirs of this dreaded disease, but subsequent studies have demonstrated that this is not true. In fact several major studies, carried out from Georgia to Canada, have concluded that rabies in other species of wildlife is *least* common in areas where bats are most abundant. Early claims of a nonsymptomatic carrier state in bats resulted from misidentification of a harmless virus—small wonder that the "carriers" showed no symptoms of rabies!

Since 1946, when records were first kept in the United States, a total of only ten people are believed by health officials to have died of rabies contracted from bats. This is an extremely small number when compared with deaths caused by dogs, honeybees, or, indeed, other humans. Dogs alone bite more than a million Americans *annually*, severely injuring many, and killing an average of ten or more.

THE GRAY BAT [Myotis grisescens] BY DIANE E. STEVENSON

A female gray bat rests in the entrance of her maternity cave. Ammonia fumes generated by the summer colony at the roost will fade her characteristic slate-gray winter coat to russet. One of the largest species of North American cave bats, gray bats have a wingspan of about 12 inches, although their weight averages only 8 or 9 grams—less than that of a fifty-cent piece.

ALTHOUGH gray bats seldom come into conflict with human interests and could survive in large numbers in many areas if simply left alone, by 1974 the species was in serious trouble throughout much of its range. Finally, on April 28, 1976, the gray bat was officially listed as endangered by the U.S. Fish & Wildlife Service. In order to ascertain the extent and causes of this decline and to evaluate various possible management options, I decided in 1976 to conduct a new census of twenty-two gray bat colonies in Alabama and Tennessee that, based on my previous observations, seemed least likely to have declined. Such a census would provide a conservative estimate of losses since 1970.

Because of its large size and its apparently secure status when last studied, the colony in Hambrick Cave was included in my 1976 census. The bats of Hambrick Cave had lived there in peace for decades and although numerous other colonies had gone extinct as a result of human disturbance and vandalism at their cave roosts, I was convinced that this colony was safe. The cave was small, largely flooded by the adjacent reservoir, oppressively hot, and stunk of tons of rotting guano dropped by the bats into stagnant pools of water. For obvious reasons, even spelunkers rarely entered it.

Thus on that August night in 1976, Diane and I were astounded when only a handful of bats emerged where there once had been tens of thousands. Equipped with hard hats and lights, we waded into the cave to seek clues to the probable fate of one of the largest gray bat colonies that ever lived. We found them at our feet where the once-huge piles of guano had been trampled almost flat. In the compacted guano were the remnants of fireworks and fires, as well as sticks and stones.

Several possibilities exist to explain what might have happened.

Fireworks remains suggest that local children may have added to their Fourth of July fireworks excitement by throwing them into the cave. Thousands of panicked bats flushed from their roosts only a few feet inside the cave would have been an impressive sight, but loud blasts in the small cave could have severely damaged the hearing of the whole colony. Sticks and stones under the roost may have been thrown simply to flush bats into view, but many thousands of panicked bats may have drowned in the deep water below the roost. Fires in the entrance may have been built for the same purpose, but because of the small size and shape of the cave, smoke from even one such fire could have killed the entire colony of gray bats.

Though deliberate vandalism is a distinct possibility in this case, Hambrick's bats also could have been killed unintentionally by curious visitors ignorant of the harm they might be causing.

Whatever the reasons, local residents reported that these bats disappeared from Hambrick Cave rather abruptly in 1973. Many of them were banded and their failure to appear at their hibernation cave in following winters indicated that they had not just switched summer caves—a slim possibility in any case because other suitable caves were not available locally and because gray bats are extremely loyal to their home caves.

Disturbances such as those in Hambrick Cave are widespread, and all unprotected colonies are vulnerable. The mere closure of one cave entrance could kill nearly two-thirds of the remaining population in a single winter. Though a number of large gray bat colonies still exist, they are disappearing rapidly. Our 1976 survey of just the colonies previously believed most likely to survive, revealed a loss of 54 percent in only six years. Though these twenty-two caves still contained a combined population of 294,000 in 1976, losses just since 1970 had amounted to 342,000. At past peak populations, these caves are believed to have sheltered more than a million bats.

An informed public is essential to gray bat survival. Because gray bats occupy relatively few caves, and rarely are able to live in a single cave year round, the public—cavers in particular—must be educated not to enter gray bat caves when the bats are present.

Caves containing summer colonies should be avoided from the first of April until the bats leave, often in late July or August, though many colonies need their caves well into September or October. Winter caves must be avoided from the first of September at least through April and preferably until mid-May. In most caves human entry in off-seasons is not harmful. Some caves are needed only during migration or only in July or August. When in doubt about such a cave simply watch carefully at the cave entrance at dusk, and if no bats exit within an hour of sundown the cave is not in use. This, of course, does not apply in the case of winter caves.

Though much remains to be done if gray bats are to be saved, some progress is being made. In Missouri several important colonies are now protected as a result of the state-sponsored studies of management needs by Dr. Richard LaVal and his wife Margaret. The Tennessee Valley Authority (TVA), the U.S. Army Corps of Engineers, and the National Park Service have recently funded major investigations of gray bat needs and several gray bat caves owned by TVA—including Hambrick Cave—will be protected in the near future. Special efforts are being made in the case of Hambrick Cave where rebuilding of a major colony is a good possibility because of its ideal environment for gray bats.

The large summer colony located in Sauta Cave was nearly destroyed by a commercial venture in 1977, but major cooperative efforts of TVA and the U.S. Fish & Wildlife Service succeeded in saving the cave and its bats. Sauta Cave, now owned by the Fish & Wildlife Service and renamed Blowing Wind Cave, contains the largest remaining summer colony of gray bats. With protection, it is hoped that the colony will soon grow to equal or even surpass the famous Mexican free-tailed bat colony of Carlsbad Caverns. Even with its still reduced numbers, evening emergence at Sauta is impressive and certainly the best to be seen in eastern North America. Many thousands of bats emerge from either one or both of the cave's upper and lower entrances each evening from April through September, with the best flights occurring in July and August from the lower entrance.

HOPE EXISTS therefore that future generations may once again thrill to the twilight spectacle of tens of thousands of gray bats emerging, not just from Blowing Wind Cave, but from Hambrick Cave and others like it as well. Much remains to be done, however. The public must be educated. Critical cave roosts, especially in hibernating caves, must be protected soon. And finally, we must protect our environment from chemical contamination. Increasingly, the waterways over which gray bats feed are being polluted by toxic industrial wastes and pesticides. Declines in gray bat populations caused by such pollution should alert us to our own danger. For gray bats require little that we should not ask for ourselves, and as our demonstrated allies, they deserve our understanding and protection. ■

For the past twenty years Dr. Merlin Tuttle has studied and published on the gray bat and was instrumental in having the species declared endangered in 1976. A frequent lecturer on bats and the need for bat conservation, Dr. Tuttle has traveled extensively abroad to study bat behavior and ecology. He is Curator of Mammals and chairman of the scientific staff at the Milwaukee Public Museum, Milwaukee, Wisconsin, and Adjunct Associate Professor of Biology at both Marquette University and the University of Wisconsin–Milwaukee.

by LESTER R. BROWN

The earth's major ecological systems will collapse unless world population growth is halted quickly

Reassessing population policy in a world of scarcities

THE BASIC FRAME of reference for formulating population policy is changing. During the past few decades the desire to more quickly achieve basic social goals, such as higher incomes or better diets, led to policies to slow population growth. Now the deterioration of biological systems and oil scarcities call for policies to *stabilize* population size. Without a concerted effort to stabilize population size at a level far lower than currently projected, the earth's ecosystems and the living standards of more and more of the world's people will deteriorate.

As of early 1979, there are some 4.2 billion people in the world. Our numbers are increasing by some 70 million per year, or 192,000 per day. Although the *rate* of world population growth has begun to slow, the reported year-to-year additions continue to increase. On a finite globe, population growth cannot continue indefinitely. Population growth will eventually halt; but the level at which this will occur is not known, nor the mechanism that will bring it about. Will stabilization come as a result of rational policies and planning, or through famines and worldwide armed conflicts over scarce resources?

United Nations population projections show population expanding to some 12 billion before eventually stabilizing a century or more hence. These projections are based on country-by-country assumptions about future fertility levels, sex ratios, life expectancies, and numerous other demographic variables. They also assume that the basic energy, food, and other natural resources required to support human life are going to be as available in the future as they have been in the past. It has become clear that the latter assumptions are invalid; therefore, governmental population policies are going to have to be reevaluated.

AS WORLD POPULATION has moved toward 4 billion and beyond, human needs have begun to outstrip the productive capacity of many local biological systems as currently managed. At the global level, these excessive pressures can be seen most clearly for oceanic fisheries. Throughout most of human existence, there were more fish in the oceans than humans could ever hope to catch or consume. As world population expanded following World War II, so did the fish catch and the investment in fishing fleets. The catch increased along with world population until the latter reached 3.6 billion in 1970. At this point, population continued to grow, but the fish catch did not. Since 1970, investment in fishing fleets and fish farming has increased markedly, but the annual catch has remained around 70 million metric tons. With the catch leveling off since 1970, the fish supply per person has fallen by 13 percent.

Grasslands are also under mounting pressure. Although data are not so complete as for fisheries, the signs of excessive stress are evident in the deteriorating condition of grasslands in vast areas of the world and in the production trends of livestock products. Human intervention can sometimes increase the productivity of grasslands, and productivity can always be reduced through mismanagement; but the resource base itself cannot be significantly expanded. Indeed, as world population has expanded since mid-century, the area of grassland per person has diminished steadily.

The trends in world mutton and wool production are similar to those in the fish catch. Whereas the per capita fish catch peaked in 1970, the per capita production of mutton peaked in 1972. The worldwide decline of some 7 percent since then reflects both short supplies in many developing countries and a strong consumer preference for beef in some industrial countries. Wool production per capita peaked in 1959. The 28 percent fall in per capita production since then is due to a combination of production constraints and strong competition from synthetic fibers.

World production of beef has nearly doubled during the past two decades, leading to substantial gains in per capita consumption. But if world population continues to expand, a point will eventually be reached where it will no longer be possible for beef production to keep pace. Since 1976, in fact, it has been declining. Projections for 1979 indicate a fall in world beef production per person of 9 percent since 1976. World beef production can undoubtedly expand further, but overgrazing and the growing

WORLD BANK PHOTO BY PAUL CONKLIN

Per capita production of cereals—the world's most important food product—leveled off after 1971 and is likely to decline by the end of the century.

demand for cereals for direct human consumption raise doubts as to whether per capita beef production will ever resume the strong upward trend of the previous two decades.

The world's forests are also under mounting pressure. Although the demand for forest products is spiraling, the area in forests is shrinking by some 40,000 square miles each year. Deforestation as a result of excessive demand for wood is not an entirely new problem. What *is* new is the global scale. By the time world population passed the three billion mark in 1961, national populations were outstripping the sustainable yield of forests in most Third World countries. Worldwide, wood production per capita peaked in the mid-sixties, then fell by an estimated 9 percent.

The demand for firewood, the principal fuel in the countries with the fastest growing populations, is also outstripping the sustainable yield of local forests. In *Losing Ground*, Erik Eckholm pointed out that as the forests recede, villagers are often forced to use dried cow dung for fuel. This use in turn deprives soils of nutrients and humus, leading to a decline in soil fertility. As the process continues, the downward spiral acquires a momentum of its own, closing the poverty circle ever more tightly. This syndrome, now commonplace in the Third World, illustrates how excessive pressures on one biological system can affect another.

Although the use of firewood declines as countries become more

World Production Per Capita of Key Commodities of Biological Origin, 1960–78, With Peak Year Italicized

Year	Forests	Fisheries	Grasslands			Croplands
	Wood	Fish	Beef	Mutton	Wool	Cereals
	Cubic meters			Kilograms		
1960	..	13.4	9.43	1.91	*0.86*	287
1961	0.65	14.3	9.67	1.91	0.85	278
1962	0.66	14.5	9.90	1.90	0.85	292
1963	0.66	14.7	10.25	1.89	0.83	286
1964	0.67	16.1	10.12	1.84	0.81	297
1965	0.67	16.2	10.09	1.82	0.79	288
1966	0.67	17.1	10.39	1.80	0.80	308
1967	*0.67*	17.7	10.59	1.92	0.79	308
1968	0.66	18.4	10.86	1.92	0.80	318
1969	0.66	17.7	10.90	1.88	0.79	316
1970	0.66	*19.5*	10.80	1.90	0.76	314
1971	0.66	19.2	10.57	1.91	0.74	335
1972	0.65	17.6	10.75	*1.92*	0.73	319
1973	0.66	17.5	10.63	1.83	0.67	337
1974	0.65	18.1	11.16	1.80	0.65	322
1975	0.62	17.6	11.49	1.80	0.67	321
1976	0.62	18.2	*11.81*	1.79	0.65	*342*
1977	0.62	17.4	11.53	1.78	0.63	333
1978*	0.61	16.6	11.21	1.77	0.64	340

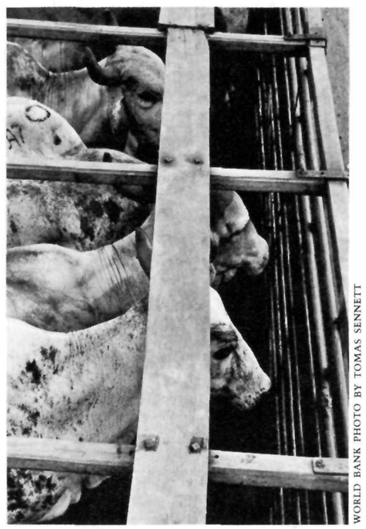
*Preliminary estimates.
Source: Food and Agriculture Organization and U.S. Department of Agriculture.

UN PHOTO, ISSUED BY FAO

Since 1970 the world's fisheries have been unable to keep pace with world population growth. Although world beef production per person greatly increased for twenty years, it began declining in 1979 and is unlikely to be able to resume increasing enough to keep up with population growth.

developed, the use of forest products for newsprint, packaging, and other purposes soars. The net result of modernization is a steady, continuing strong demand for wood products.

In terms of human well-being and survival, the single most important product from a biological system is cereals—the grain crops that occupy some 70 percent of the world's agricultural lands. Together, wheat, rice, corn, and other cereals supply well over half our food energy supply when consumed directly and a sizable part of the remainder when consumed indirectly in the form of livestock products and alcoholic beverages. Between 1950 and 1971, world cereal production nearly doubled, and production per capita climbed from 251 kilograms to 335 kilograms, an increase of more than 30 percent. Since 1971, however, cereal production per person has leveled off.



WORLD BANK PHOTO BY TOMAS SENNETT

This leveling off can be traced to a lack of new land to bring under the plow, rising energy prices, rigid agrarian structures, the conversion of cropland to nonfarm uses, soil erosion, and other forms of soil degradation. Expanding the area under irrigation is becoming much more difficult. Diminishing returns on the use of additional fertilizer in the agriculturally advanced countries is also slowing the growth in food production.

The pressures on croplands are mounting as population growth simultaneously expands the demand for cropland while accelerating the conversion of cropland to nonfarm uses. Although the total cropland area expanded somewhat between 1950 and 1975, the area per person shrank by an estimated 24 percent. During the final quarter of this century it could fall by another 30 percent if projected increases in population materialize.

Over time, it is becoming more difficult to offset the shrinkage in cropland area with rises in land productivity. Compounding the shrinkage in cropland per capita is the growing erosion and degradation of soil as a result of demand pressures and mismanagement. According to a United Nations survey, fully one-fifth of the world's cropland is losing topsoil or being otherwise degraded at a rate that will undermine productivity over the long run. In some countries, this loss of topsoil is being masked in the short run by the heavy use of chemical fertilizer.

Even more discouraging than the leveling off in cereal output per person is the possibility that the same pressures will lead to a gradual decline in the years ahead. All the principal forces that have led to the stagnation of per capita grain output during the seventies will be at least as strong, if not stronger, during the eighties and nineties. Short of an abrupt slowdown in world population growth, the prospect of a further decline in per capita food production between now and the end of the century must at least be considered. A more equitable distribution of food supplies could ameliorate the impact of this decline, but the rationing of scarce supplies through rising prices in the world market may leave some people unable to get enough food while others enjoy a surfeit.

THE USE OF OIL and of products derived from it has figured prominently in the economic evolution of the third quarter of this century. The substitution of synthetic materials produced by the petrochemical industry for commodities of biological origin has become widespread. This substitution has eased the pressures on many biological systems, but whether it can continue depends on future petroleum supplies and prices. If this process is reversed, either because of changing price relationships, or because of absolute shortages as petroleum supplies dwindle, pressure on the earth's basic biological systems will intensify. In the absence of some revolutionary new technologies and energy sources, future population growth may well be strongly influenced by the supply and price of oil.

The world of the foreseeable future promises to be one where petroleum or its equivalent is scarce and costly and where the supply is growing slowly, if at all. Such a situation will contrast sharply with the time when oil was cheap and the supply was growing several percent per year.

The Iranian revolution in 1979 is directly affecting oil production and export trends in that country—until recently the world's second ranking exporter. But even more importantly, the Iranian revolution is triggering a reassessment of oil pricing and production policies in exporting countries that may have an effect on world oil production trends second only to that of the late 1973 OPEC price increase. To the extent that world population projections have implicitly assumed that the rise in per capita petroleum production would continue, they must now be reconsidered.

If projected population growth materializes, a 1 percent growth rate in oil production would lead to a steady per capita decline. Between 1978 and 1990 overall production would increase by some 12 percent, but production per person would fall from 5.23 barrels to 4.66 barrels. As oil reserves dwindle and more countries try to stretch out

WORLD BANK PHOTO BY RAY WITLIN

A Proposed Population Stabilization Timetable

Year	World Population	Annual Growth Rate	Annual Increase
	Billion	Percent	Million
1970	3.6	1.9	69
1975	3.9	1.8	70
1985	4.5	1.1	50
2000	5.3	1.0	52
2005	5.5	0.9	49
2015	5.8	0	0

Source: Worldwatch Institute.

their remaining reserves, total oil production is likely to turn downward around 1990, declining slowly from that point onward. As overall output declines, production per person falls rapidly, dropping from 4.66 barrels in 1990 to 3.55 barrels in 2000. Whether world oil production follows the exact path projected here is not of overriding importance. What *is* important is not only that the period of rapid growth in per capita oil output has ended, but that the oil produced per person at the end of the century will be far less than it is today.

GIVEN what is now known about the carrying capacity of the earth's natural systems and the reserves of nonrenewable resources, particularly oil, at what level should world population be stabilized? Avoiding a decline in the per capita fish catch would have been possible if world population growth had come to a halt at 3.6 billion in 1970. If population had stopped growing at 3.8 billion, grain output per person might still be increasing. And if it had topped off at four billion, there would be much more time to develop alternatives to oil.

Unfortunately, the advantages of stabilizing population growth are matched by the difficulties of doing so. Demographers are quick to point out that even if fertility rates were to fall immediately to replacement level, population would continue to grow for several decades in those countries with a disproportionately large number of young people. In some societies, fertility may have to drop well *below* replacement, with one-child families becoming commonplace. Chinese leaders are already urging couples in urban communities to hold the line at one child.

The great difficulty in bringing population to a halt quickly must be weighed against the social costs of failing to do so in time to avoid collapse of the earth's major ecological systems. On balance, the sum of the social stresses on both sides might be minimized if world population growth were halted around six billion. The preceding analysis suggests that even six billion people would be excessive for some key resources, but it would be exceedingly difficult to stabilize at a lower level given the great momentum of population growth inherent in the large number of young people coming into their reproductive years. Adequately supporting even six billion people will not be possible without greatly improved management of biological systems, widespread rationing, stringent energy conservation measures, recycling programs, and a more equitable distribution of vital resources such as food, land, and petroleum.

For the developing world, population stabilization should be thought of in two stages. The first would involve reducing the birth rate from current high levels to 25 per thousand by 1985. From then until 2005, birth rates in most developing countries would remain at about the level of Soviet, U.S., and West German birth rates during the early sixties (20 to 25 per thousand). Between 2005 and 2015, when markedly smaller age-groups would be entering their reproductive years, it should be possible to take the final step of bringing the birth rate into balance with the death rate. At that stage, the developing countries would essentially be repeating the population stabilization path suggested for the industrial countries between now and 1985—bringing moderate growth down to zero.

BRINGING population growth to a halt is not in itself likely to solve many of humanity's pressing problems. In many cases, however, it is a necessary prerequisite. If the demographic brakes are not applied soon, overfishing, overgrazing, deforestation, overplowing, and their associated economic stresses are certain to grow worse. The rapidly expanding demand for basic energy and food supplies is driving humanity up a rising cost curve. An immediate slowdown of world population growth will buy time to make needed adjustments and to develop new technologies and alternative energy sources. ■

Lester R. Brown is a researcher with Worldwatch Institute and author of *The Twenty-Ninth Day: Accommodating Human Needs and Numbers to the Earth's Resources* (W.W. Norton, 1978). This article is drawn from his recent Worldwatch Paper 29, *Resource Trends and Population Policy: A Time for Reassessment* (May 1979), published by Worldwatch Institute, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036.

NPCA at work

GRAND CANYON

NPS moves to eliminate motors on Colorado River

In August Park Service Director William Whalen announced long-awaited plans to eliminate motors on the stretch of the Colorado River through Grand Canyon over a five-year phaseout period beginning in 1980.

Whalen emphasized that the action is necessary in order to preserve a real "wilderness experience" on what is probably the most sought-after whitewater trip in the western United States. He made the decision after personally taking both oar and motor trips on the river.

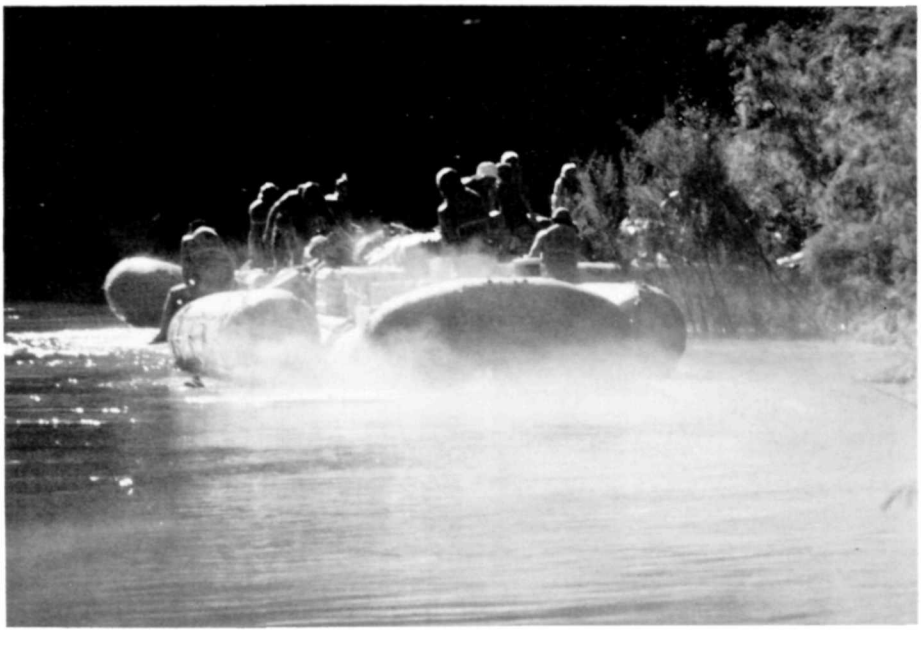
Twenty out of twenty-two concessioners on the river are putting up stiff opposition to the NPS decision. But NPCA and other conservationists have commended the NPS stand and urge citizen support for it (see page 30).

The decision was released for public review in a final environmental impact statement on the Colorado River Management Plan. The phaseout applies to the popular stretch of the river from Lees Ferry to Separation Canyon. By 1973 thousands of people were taking river running and camping trips there and the Park Service had to restrict use in order to control the pollution and protect beaches, trails, and archeological sites in the canyon. At that time the agency initiated various studies of the extent and nature of impacts of use on the river. These studies have now been completed and the public has participated in NPS planning for the river through thirteen public meetings and more than 3,000 letters. The final environmental impact statement and subsequent river management plan are the culmination of this planning process.

Park Service planners determined that eliminating motors will be critical to providing "a wilderness river-running experience in which the natural sounds, silence, sights, and full beauty of the canyon can be experienced, relaxed conversation is possible, and the river is experienced on its own terms."

The five-year motor phaseout will be accomplished by gradually increasing the months designated for rowing craft only while reducing periods during which motors will be allowed.

Motorized craft such as these baloney boats on the Colorado River through Grand Canyon leave noxious exhaust fumes in their wake and are noisy intrusions in the wilderness. NPS has decided to eliminate motorized use from the river over a period of five years.



JOHN BLAUSTEIN

NPS also is establishing use levels and redistributing launches so that river running will have the minimal environmental effect on the soils, vegetation, and wildlife within the riparian zone of the river and side canyons. By spacing use out over the year, the plan will enable total user days to increase. In particular, the number of

Continued on page 30

INDIANA DUNES

Dunes in danger

NPCA has supported legislation to expand the boundaries of Indiana Dunes National Lakeshore on the southern tip of Lake Michigan but called for some amendments.

In the midst of one of the most highly industrialized and heavily populated regions in the nation, this National Park System unit is a wild oasis of ancient dunes and of beaches, woodlands, and marshlands that support a variety of plant and animal life. It attracts many visitors seeking a respite from urban life. But residential and power plant development outside its boundaries are among the many threats to the national lakeshore and have made the need to expand boundaries all the more urgent.

HR 2742, introduced by Rep. Floyd Fithian, would expand the NPS unit to include several threatened areas. In testimony before the House Subcommittee on National Parks & Insular Affairs, NPCA gave strong endorsement to HR 2742 while urging that the bill be enlarged to include two areas in the lakeshore region. One of these areas is the beautiful Dune Acres, which has resources of equal or greater value than other areas being considered.

NPCA also recommended inclusion of a site owned by the Northern Indiana Public Service Company (NIPSCO) and used in the past as a fly ash settling basin area for its coal-fired plant. Although NIPSCO is no longer dumping there, the site should be acquired to protect the lakeshore from pollutants leaching from it.

Continued on page 24

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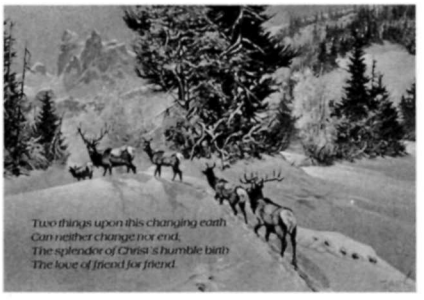
3175 "Nature is the living, Visible garment of God." from Goethe "May Peace be your Gift at Christmas and your Treasure through all the Year" painting by John Clymer

3173 "All day thy wings have fann'd, At that far height... Yet stoop not, weary, to the welcome land...Soon shalt thou find...rest...o'er thy sheltered nest." from Bryant "Merry Christmas and a Happy New Year" by Keith Fay



3164 "Two things upon this changing earth can neither change nor end; The splendor of Christ's humble birth, The love of friend for friend." "Wishing you a Blessed Christmas And Happiness throughout the New Year" by Garé Barks

1142 A Christmas Morning Handout "Never too cold for kindness, Never too deep the snow, To wish you the Merriest Christmas our good Lord can bestow!" painting by Bernard P. Thomas

1151 "To one who has been long in city pent, 'Tis very sweet to look into the fair, And open face of heaven,..." from Keats "May every happiness be yours at Christmas and throughout the New Year" by Wayne Lowdermilk

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NPCA 16 YEARS AGO

Justice Douglas Raps Dam Proposal

Supreme Court Justice Willia O. Douglas charged last night that construction of a high dam on the Potomac would "inundate some of the loveliest lands in America and substitute in their place a group of stinking mud banks."

Douglas, speaking at the Smithsonian Auditorium under the auspices of the National Parks Association, took strong exception to the Army Corps of Engineers recommendation that a high dam be built at Seneca, Md.

He characterized an "a discredit to responsible Governmental agencies" the public hearings scheduled by the Corps of Engineers for this week. The hearings, Douglas said, would be held without the Engineers having made public any estimates on the damage that dam construction would cause to homes, farms and historical sites.

Douglas conceded that the Washington metropolitan area would have need of a stable water supply in the future. But, he maintained, "an abundance of potable water would be available if we cleaned up the Potomac rather than built dams to flush sewage out of it."

He said this clean-up could be accomplished by better methods of sewage treatment and stricter laws against dumping raw sewage into the river. In addition, he continued, new methods of converting salt water into fresh could be used to get drinking water out of the saline part of the lower Potomac estuary.

"I am confident that a nation that can put a man on the moon can also find a way to clean up the Potomac," Douglas said.

"The Corps of Engineers knows how to build dams better than anyone else," he said. "But it is not the guardian of the good life. The people are, and they are becoming increasingly concerned about America's natural beauty and our ability to destroy it..."

The Washington Post 5/27/62

Hearings Asked on Potomac Basin Plans

By Morton Mintz
Staff Reporter

The 26,000-member National Parks Association yesterday asked for new hearings on the Potomac River Basin's water supply and pollution abatement problems.

Association President Anthony Wayne Smith said that the hearings held a year ago by the Corps of Engineers were not in accord with administrative due process of law, employed procedures that withheld essential facts from the public and were "a farce."

The request for "full and open public hearings" was made to Maj. Gen. Robert G. MacDonnell, chairman of the Board of Engineers for Rivers and Harbors.

Sent with the request were copies of the Association's analysis, concurred in by eight conservationist organizations, contends that the Basin's needs can be met through an intensive water purification program.

The Corps of Engineers answer was the proposed construction of 16 major reservoirs in the period ending in the year 2010. This is the "big-dam" approach that the Association termed "archaic, outmoded, destructive and unnecessary."

The Association's analysis estimated the capital cost to Washington of a purification system at $193.5 million, or $97.7 million less than the metropolis would invest in the big-dam system. Annual operating costs were put at zero to $4.9 million for a purification system, $3.2 million for the big-dam system.

The big-dam system, the Association concluded, "would be contrary to the public interest . . . the Board should recommend to the Chief of Engineers that the Report be rejected..."

The Washington Post 6/26/63

NPCA at work

POPULATION

Illegal immigration battle

After almost a year of effort, NPCA has won a tough battle to ensure that U.S. taxpayers' money is not used for illegal aliens in deportation hearings.

The issue first surfaced in September 1978, when Commissioner Castillo of the Immigration and Naturalization Service (who recently resigned) proposed regulations to provide free legal counsel for these illegal aliens with money to come from the Legal Services Corporation.

NPCA argued that this constitutes a clear violation of the provisions of the Immigration and Nationality Act, which allows legal representation but "at no expense to the government." (Money for the LSC flows from taxpayer to Congress to LSC to LSC grantees.) Nevertheless, the final regulations issued in January called for use

Continued on page 29

Indiana Dunes—from page 21

This Association called for amending certain other key sections of the bill. First, NPCA recommended that the acquisition language be amended so it gives property owners at Indiana Dunes the same rights as owners in most other units of the System.

A second amendment, NPCA noted, is needed to deal with a requirement in HR 2742 for preparation of an extensive and costly transportation study. NPCA recommended that the bill be amended to link this study to mass transit studies and programs already required by the Department of Transportation and that DOT and NPS share the cost. Third, NPCA urged deletion from the bill of a rigid provision for federally establishing a local community council. Although we support the concept of a council of local governments working in cooperation with NPS, there is no need to federally establish such a commission.

At press time the House parks subcommittee planned to mark up the bill after returning from August recess, and the Senate parks subcommittee planned September 20 hearings on a companion bill introduced by Senators Birch Bayh and Richard Lugar. ■

Parks versus power plants?

Pollution from rapid, unchecked coal development threatens to draw a curtain over the best scenery in the country

National Park Service Director William Whalen recently told a group of conservation leaders meeting at the National Parks & Conservation Association (NPCA) offices that dealing with clean air threats to the national parks is the biggest problem facing the Park Service.

In a 1978 NPCA survey, 36 percent of NPS superintendents reported air pollution in their park units from identifiable adjacent land uses. NPS has identified at least seventy-five scenic vistas in parks from Shenandoah to Redwoods where pollution traced to specific power plants or other major sources is marring visibility. At the Grand Canyon, a haze largely due to pollution very often shrinks visibility—sometimes to fifteen miles or less.

Even more ominous is the fact that we do not know how and to what extent these same pollutants are affecting plant and animal life in the parks.

Coal-burning power plants, for example, could have particularly destructive impacts on park ecosystems. The President's Council on Environmental Quality has warned that many parks and wildernesses are vulnerable to damage from the acid rain linked to sulfur oxides released from these plants. In his recent environmental message, Carter called for accelerating research on acid rain's effects. On the other hand, the President is committed to tripling national coal use by 1995; and just months before his environmental announcement the Administration had weakened regulations governing how much sulfur dioxide must be removed from a new power plant's emissions. That is, EPA Administrator Douglas Costle issued "New Source Performance Standards" requiring only 70 to 90 percent removal even though over 90 percent can be removed with best available technology.

Meanwhile, the energy crisis provides a favorable climate for industry to try to emasculate both the Clean Air Act Amendments of 1977 and the various regulations that EPA issues under the law. As a matter of fact, the battle over clean air for the parks will be in the forefront of the entire struggle for clean air, because the standards applied to parks are the strictest and may affect the location of new plants.

The stakes are particularly high in the Southwest because of its concentration of parks, power plants, and coal fields. Most notorious of the region's existing power plants is the Four Corners plant at Farmington, New Mexico. Its enormous smoke plume—"the Angel of Death"—was one of the few manmade objects visible to Gemini astronauts orbiting the Earth in 1966. Currently the plant has no equipment specifically designed to control sulfur dioxide so that less than 10 percent of this pollutant is removed from emissions. Thus, Four Corners customarily spews 75,000 to 80,000 tons of sulfur dioxide a year into this region containing the "Golden Circle" of parklands.

Proposals for an additional 21,300 megawatts of new generating capacity in the Southwest—the equivalent of twenty-five large plants or ten huge ones the size of Four Corners—are now in the works. An example of the kind of environmental devastation such massive energy development would cause is Utah's proposed Allen-Warner Valley energy system. It would include an 8,300-acre strip mine—visible from Yovimpa Point at Bryce Canyon National Park—and a large power plant near Zion National Park that would dump tons of pollutants into the Zion airshed daily. ◊

The drastic contrast between a day of good visibility and a bad day *is evident from the Green River overlook in Canyonlands National Park, Utah. The haze can be traced to power plants lacking in pollution control equipment. For instance, the Navajo plant has no scrubbers to control sulfur oxides and emits about 50,000 tons of them per year. Regulators must clamp down on these plants.*

PHOTOS BY GORDON ANDERSON

UNDER THE CLEAN Air Act Amendments of 1977, the National Park Service is responsible for reviewing both existing and proposed new power plants that could affect the parks.

Many NPS units are covered under the "prevention of significant deterioration" provision of the 1977 law. This provision calls for keeping clean-air areas clean and requires regulations for three classes of such areas. The air quality in the most protected areas—those designated Class I—must remain virtually free of new industrial pollution, whereas progressively more pollution is allowed in Class II and Class III.

The law requires mandatory Class I protection for the larger (almost all) national parks, international parks, and wilderness areas. It requires the Interior Department to study smaller parks and national monuments, primitive areas, and preserves—now classified Class II—and make recommendations to states and Congress about which of these areas should be redesignated as Class I. These recommendations—calling for Class I protection of thirty-seven additional NPS areas and ten BLM areas—were published in early September.

The law empowers the Park Service to protect its Class I areas by vetoing construction permits for new power plants and other projects that would "significantly deteriorate" air quality by exceeding the allowable pollution increments established by the Act for these areas.

Nor does the responsibility of the Park Service end there. Recognizing that parks and wildernesses could be harmed even when pollution increment standards are not violated, the Act provides a second layer of protection: an *affirmative* responsibility to "protect the air-quality-related values (including visibility) . . . within a Class I area." If NPS determines that park resources will be adversely affected even though the increments will not be exceeded, it must demonstrate such to EPA or the state, and oppose the permit. Then, even if the permit is issued, the Interior Secretary is empowered to use other means to protect parks—such as refusing rights-of-way.

The law also declares as a national goal both the prevention of any future impairment of visibility and the remedying of any existing impairment of visibility in Class I areas. Congress had problems such as Four Corners in mind when it put this hard-won provision into the Act. So the law requires that major existing sources impairing visibility of Class I areas install pollution controls representing the "best available retrofit technology."

Four Corners and about six other plants in the Southwest are among prime candidates for retrofitting because NPS surveys indicate power plants are degrading visibility in eleven NPS units in that region: Arches, Bryce Canyon, Canyonlands, Capitol Reef, Chaco Canyon, Glen Canyon, Grand Canyon, Mesa Verde, Natural Bridges, Navajo, and Petrified Forest.

ANOTHER REASON these provisions of the Act are so important is that some of the same pollutants that impair visibility can also have broader ecological effects. Sulfur dioxide, for instance, can damage vegetation. Moreover, the combination of sulfur and nitrogen oxides with atmospheric moisture can result in corrosive acid rains that harm lakes and fisheries, soils, crops, and forest ecosystems.

Some regions are especially vulnerable to acid rain damage because their lakes and soils have little capacity to neutralize the acids. Unfortunately, a high proportion of parks and wildernesses are found in these very regions. For instance, Minnesota's Voyageurs National Park is located in a region of lakes shown in a recent EPA study to be already dangerously acidified.

A number of parks and wildernesses occur in mountainous areas, where lakes and streams are perhaps the most vulnerable of all. The potential for damage to these areas has been demonstrated by scientific studies in the Adirondack Mountains of New York, where ninety high-altitude lakes already are devoid of fish because of acid rain and many other area lakes are becoming affected.

The Park Service has begun monitoring for acid rain at Shenandoah National Park in the mountains of Virginia. The agency has initiated an acid rain research program to include both additional future monitoring projects and meteorological studies of long-range transport of pollutants. Future studies may target other vulnerable parks such as Great Smoky Mountains in Tennessee and North Carolina, Acadia in Maine, and the parks in the Sierra and Cascade mountains in the West.

This threat to parks is one of the topics to be explored at an international citizens' action conference on acid rain scheduled for November 2 and 3 in Toronto, Ontario. NPCA is one of the lead sponsors. For details on the conference, write Betsy Agle, U.S. Coordinator–ASAP, National Clean Air Coalition, 530 Seventh St., S.E., Washington, D.C. 20003 (202-543-4312).

CERTAINLY the Clean Air Act needs tightening to protect our environment from acid rain and the pollutants that cause it. But even though acid rain is not directly covered under current law, federal land managing agencies such as the Park Service do have a responsibility to protect the "air-quality related values" of Class I areas from *any* form of pollutants and to remedy visibility problems.

Within the next few months EPA should publish for public comment its proposal for regulations to implement the visibility/retrofit section of the Act. Within five years plants such as Four Corners would be required to install pollution controls to meet what these regulations define as the "best available retrofit technology."

Citizen support for strong regulations and NPS efforts will be critical because EPA may be under great pressure to weaken the regulations. Attacks can be expected not only from the utility industry and its scores of lawyers and lobbyists, but also from the President's own Council of Economic Advisors and his Regulatory Analysis Review Group and from the Department of Energy.

Future generations will have no difficulty in measuring our commitment to protecting our national parks and wildernesses. They will need only stand and look out from the South Rim of the Grand Canyon or go fishing in the lake country up North.

You Can Help: NPCA members are urged to write to EPA in support of the strongest visibility/retrofit technology possible, which could provide up to 90 percent sulfur dioxide removal and also combustion modification techniques to reduce emissions of nitrogen oxides. If you believe that the air should be clean in at least some areas of our nation—that at least our parks and wildernesses should be spared from pollution—register your support for "*no perceptible changes*" in visibility in these areas. Note your support for preserving those outside panoramic vistas which are viewed from within a park as integral parts of the park experience. Send your letter today to Douglas Costle, Administrator, EPA, 401 M Street, S.W., Washington, D.C. 20460. Then send a copy or write to your representative and senators. (U.S. House of Representatives: Washington, D.C. 20515; U.S. Senate: Washington, D.C. 20510). ■

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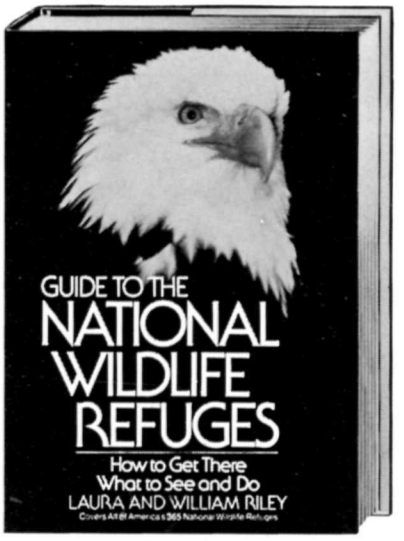

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conservation docket

Tellico gets go-ahead

All summer Congress wrestled with amendments that would permit completion of the infamous Tellico dam project. Long opposed by environmentalists, the Tellico project, if completed, would inundate the last remaining natural habitat of the endangered snail darter fish as well as nearly a hundred Indian historic sites and thousands of acres of prime agricultural land. A cabinet-level committee already has ruled against exempting Tellico from the Endangered Species Act and noted that the project's benefits would not even justify the economic cost of completing it.

Nevertheless, in June Sen. Howard Baker (R-Tenn.) tried to attach an amendment authorizing the completion of Tellico onto legislation reauthorizing the Endangered Species Act. The amendment was narrowly defeated on the Senate floor.

Rep. John Duncan (R-Tenn.) then made a more successful (though highly questionable) move. With less than twenty representatives on the House floor, Duncan managed to slip onto the Energy and Water Development Appropriations bill an amendment exempting the project from all applicable laws. Although adding such an amendment onto an appropriations bill is in violation of House Rule No. 21, no one on the floor challenged the motion.

During Senate consideration of the appropriations bill, the Tellico amendment was rejected. The Senate also refused to compromise during the House-Senate conference on the legislation, forcing the amendment back to the House floor for another vote. But the House again voted for the exemption just before Congress recessed for August.

At press time, the Senate had finally caved in to pressure to support Tellico. Confirming environmentalists' fears that the narrow margin by which the amendment had been defeated in two previous votes could not hold up, it voted 48 to 44 to order completion of the Tellico Dam.

It remained to be seen at press time whether President Carter would stick to his guns and veto the amended Energy and Water Development Act.

Antarctic preservation

Rep. Phillip Burton (D-Calif.), chairman of the House parks subcommittee, has introduced the Antarctic Preservation Act calling on the Secretary of Interior to design a plan for how the natural resources of the South Polar region could be protected as a preserve. The proposal is timely because at press time the nations belonging to the Antarctic Treaty were scheduled to meet in September to debate issues such as oil drilling on the Antarctic continental shelf and krill harvesting. Protection of the values of Antarctica is crucial to world climate and to preserving rich marine ecosystems that may become critical food sources for a hungry world.

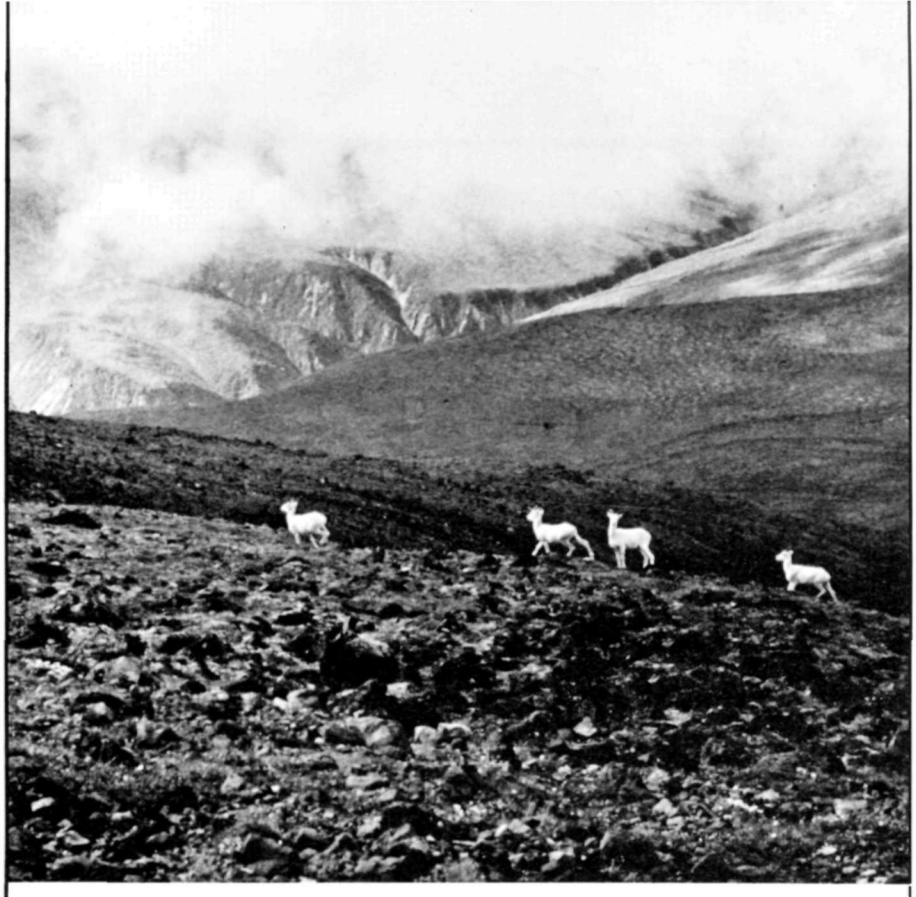
At the Second World Conference on National Parks in 1972, a unanimous resolution called for protection of Antarctica as an international park under United Nations administration. ■

NPCA at work

Illegal Immigration—from page 24

of the LSC funds for illegal aliens. NPCA then concentrated on the appropriations process in Congress. Gerda Bikales, NPCA staff specialist on illegal immigration, was able to win enough support to obtain a rider to the LSC appropriations bill. The rider prohibits use of LSC funds on behalf of individuals known to be in the country in violation of U.S. immigration law.

At the same time, NPCA urged that the savings from cutting such use of funds be used to increase the underfunded U.S. Border Patrol in order to combat the flow of illegal immigrants. Congress brought the border patrol up to the level recommended by NPCA. NPCA hopes that these efforts will be a step toward easing the escalation of illegal immigration (now up to more than a million persons per year) that is posing serious implications for population growth in the nation. ■



NPCA at work

Grand Canyon—from page 21

private river runners will increase substantially while the number of commercial river runners allowed will remain about the same. Thus instead of maintaining the present [status quo] use allocation of 92 percent commercial/8 percent private, the Park Service will allocate user days on a 70/30 percent basis. Altogether, almost 14,000 people will be able to run the river each year, as compared to the 11,000 limit in effect.

Other regulations aimed at protecting the environment include limitations on the use of fires and a requirement for carrying out ashes and human waste.

You Can Help: Although the official comment period for the final environmental impact statement closes October 3, you can still help combat the stiff opposition from vocal commercial outfitters. They will be heading for the Interior Department and Capitol Hill. NPCA members are urged to write, call, or telegraph Secretary of Interior Andrus and the Arizona delegation in Congress to register support for eliminating motorized craft on the Colorado River in Grand Canyon National Park and to urge that the phaseout be as expeditious as possible.

Hon. Cecil B. Andrus, Secretary
U.S. Department of Interior
Washington, D.C. 20240

Hon. Barry M. Goldwater
Hon. Dennis DeConcini
U.S. Senate
Washington, D.C. 20510

Hon. John J. Rhodes
Hon. Morris K. Udall
Hon. Bob Stump
Hon. Eldon Rudd
U.S. House of Representatives
Washington, D.C. 20515 ■

T. DESTRY JARVIS

***Amos Hawkins, outgoing superintendent of Mammoth Cave** National Park, was presented a distinguished service certificate by Mrs. W. L. Lyons Brown, NPCA trustee and Executive Committee member, on July 29 in Glasgow, Kentucky. The NPCA award recognizes Hawkins' courage in supporting a strong master plan and calling for relocation of a Job Corps Center, now in the park, that has led to damage to cave systems. He acted despite pressure from politicians and the concessioner.*

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Continued from page 2

Looking farther west, we have told the story in these pages of Hubbell Trading Post. There the white man and red man met for a short time in a fruitful productive exchange, contrasting with armed conflict. The new San Antonio Missions National Historical Park preserves the record of settlement from another direction, the south, by a different European culture. Chaco Canyon and Mesa Verde display the lives of the aboriginal settlers in their amazing cliff dwellings; only now, using advanced sensing techniques has the Service revealed the extent of the road systems reaching out from these centers toward an extended economy. These sequences are spectacular.

A MAJORITY of the units of the National Park System are historical or archeological. While the Service was established to protect the great National Primeval Parks and most conservationists have concentrated their attention upon them, the historic sites and monuments have been of public concern since the Antiquities Act of 1906, and a structural part of the System since the Historic Sites Act of 1935. Over the years, conservationists paid comparatively little attention to the historic and cultural units; historic preservationists focused their attention mainly on sites outside the System; the historic and cultural aspects of the System fell into neglect. The NPCA proposes to help rectify this unfortunate situation; specialized staff have been assigned to the problem; constructive working relationships have been established with the Service; independent criticism will be offered.

THE INTERMINABLE problems of staffing and finance for this vital public work continue to plague us. The current Park Service budget falls far short of needs, and short of previous years, which were bad enough. A serious deterioration of public property will inevitably result. The history which the sites were established to preserve cannot be interpreted adequately to the public; the necessary research cannot be carried out. Even the public safety will be difficult to provide for. All the conservation organizations and the historic preservation organizations as well should be working together to put an end to this intolerable budgetary situation; there are plenty of places where money can be saved in the Federal budget without letting the public property in the parks run down.

As with the scenic parks, the historic units face dangers from outside. Real estate developments are creeping up to the edges, bringing traffic, smog, noise, and uninterested crowds. The same air and water pollution that impairs the natural parks threatens the historic units; ancient artifacts and memorials crumble in acid winds and rains; priceless documents disintegrate.

IN WHAT HISTORICAL perspective are the scattered episodes of these parks to be set? We begin with the migrations across the Bering Strait, or perhaps the Pacific islands, longer ago than was supposed. We see the rise and fall of the cultures of the southwest before the white man came. We record the European conquest from both the east and south. We see the frontier with its hunting, trapping, mining, and forest devastation, give way to farming, railroads, cities, super-cities, highways, and factories, and to the structuring of human life into huge business and governmental bureaucracies which constrain us to the production of gadgetry and weapons at the expense of leisure and learning.

We remember how a whole civilization was seated in quietude, silence, and darkness at night beneath the canopy of stars, within the music of birds by day, and of the wind and the rain. We sense the flow of the migrations; the frontier as opportunity, adventure, liberty, livelihood (not empire-building, as the boiler-plate would have it); the demand for religious liberty, the powerful religious motivation that moved Puritan and Mormon alike; the inventiveness and ingenuity that framed the technological foundations of the new order; the natural setting within which the events occurred.

CAN THIS TALE be told without sentimentality? Can it be told with relevance to the future which men must make, beginning here and now in America—a future released from the compulsions of the traffic, the assembly line, the computer, the chattering idiocy of the endless race for armaments? The Service will have great responsibilities in presenting its part of this history and prophecy. We hope to do our part in NPCA, not only in helping to guide the work of the Service, but in our own interpretive efforts in the years ahead.

—Anthony Wayne Smith

A survey by NPCA revealed myriad threats to the national parks from outside their borders. Many parks are threatened from within as well. You can help fight destructive activities that threaten your national parks by sending your tax deductible contribution today—so NPCA can continue its work.

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