

# National PARKS



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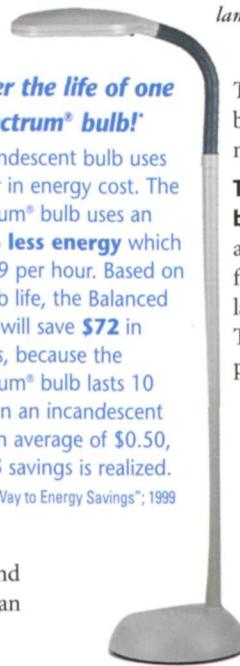
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\*Source: "Lighting the Way to Energy Savings"; 1999



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Donna E. Scranton, PA

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## FEATURES

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The Park Service is working hard to guarantee a meaningful experience for visitors facing physical limitations.

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Now is the perfect time to take in New York's historic and natural sights. (Yes, there's nature here, too.)



**20**

**EACH WINTER**, thousands of elk from Yellowstone and Grand Teton National Parks migrate to the National Elk Refuge in Jackson Hole, Wyoming, where wildlife managers have been feeding the parks' herds since 1910.

NATIONAL ELK REFUGE © FLORIAN SCHULZ.

**COVER PHOTO:** Elk in Yellowstone  
© BY ART WOLFE/GETTY IMAGES.

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WINTER 2007

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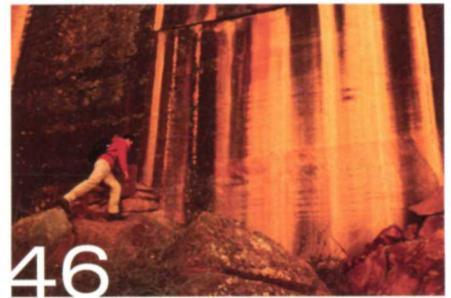
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## ON THE WEB

NPCA's newest campaign "Five Ways to Fix Our Parks" is gathering momentum. Visit [www.npca.org/fixourparks](http://www.npca.org/fixourparks) to learn about the effort and join thousands who have already signed a petition urging political leaders to take action. Then saddle up and take a ride with park rangers and pack animals hard at work in North Cascades National Park. View the slide show at [www.npca.org/cascades](http://www.npca.org/cascades).



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# A Pledge for the Centennial

Hard to believe another year has passed, and even harder to believe that it brings us one step closer to the 100th anniversary of the National Park System. We are just nine-and-a-half years away from that incredible milestone and our vision to restore the faded glory of our American heritage.

In November, Mary Bomar was named as director of the Park Service. Among her first duties will be oversight of the president's ten-year Centennial Challenge to restore the parks. This month a new Congress also arrives in Washington, D.C., and our hope is that its members will work with Bomar, Interior Secretary Dirk Kempthorne, and President Bush to support the initiative.

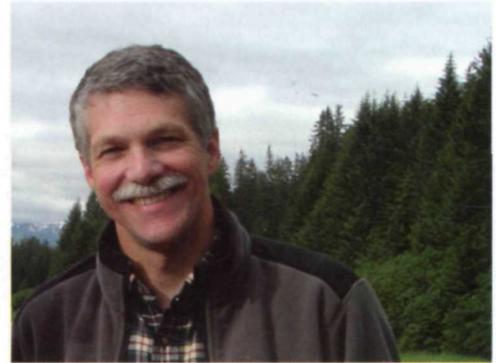
The National Park Service is among the most popular federal agencies in the country, a fact that attracts solid bipartisan support. In an extremely tight budgetary climate with competing priorities, this singular fact will be very important in our push to bring much needed support to our national parks.

America's national parks are in crisis—underfunding, traffic congestion, and pollution are all taking a toll. But NPCA has launched a major campaign to fix these problems before the National Park System's 100th birthday. The first steps of our plan start with you.

We want you to sign a pledge to help us fix the parks. More than 10,000 people have already done so. The purpose of the pledge is to ask the American people and their elected representatives to renew a commitment to our national parks: to restore the health of the parks; reinvest in them; reinvigorate their management capacity; ensure that the parks have active research and current science to inform decisions; and ensure that the park system continues to grow and evolve to represent nationally significant landscapes and the full range and diversity of American history. If you haven't yet signed the pledge, please visit [www.npca.org/fixourparks](http://www.npca.org/fixourparks) and find out what you can do help.

We cannot do this alone. This is a task for the Administration, Congress, philanthropists, communities, families, and individuals to undertake together, in the common cause of showcasing American pride, vision, and community.

We need your help. Please sign the pledge and let your elected officials know how you feel about the parks and the importance of caring for them now and for the future.



LAURA ATCHISON/NPCA

THOMAS C. KIERNAN

# National PARKS

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NATIONAL PARKS

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National Parks Conservation Association®  
Protecting Our National Parks for Future Generations®

## WHO WE ARE

Established in 1919, the National Parks Conservation Association is America's only private, nonprofit advocacy organization dedicated solely to protecting, preserving, and enhancing the U.S. National Park System.

## WHAT WE DO

NPCA protects national parks by identifying problems and generating support to resolve them.

## WHAT WE STAND FOR

The mission of NPCA is to protect and enhance America's National Park System for present and future generations.

## EDITORIAL MISSION

*National Parks* magazine fosters an appreciation of the natural and historic treasures found in the parks, educates readers about the need to preserve those resources, and illustrates how member contributions drive our organization's park-protection efforts. The magazine uses the power of imagery and language to forge a lasting bond between NPCA and its members, while inspiring new readers to join the cause.

## MAKE A DIFFERENCE

Members can help defend America's natural and cultural heritage. Activists alert Congress and the administration to park threats; comment on park planning and adjacent land-use decisions; assist NPCA in developing partnerships; and educate the public and the media. Please sign up to receive Park Lines, our biweekly e-mail newsletter. Go to [www.npca.org](http://www.npca.org) to sign up.

## HOW TO DONATE

For more information on Partners for the Parks, contact our Membership Department, extension 213. For information about Trustees for the Parks, bequests, planned gifts, and matching gifts, call our Development Department, extension 145 or 146.

## QUESTIONS?

If you have any questions about your membership, call Member Services at 1-800-628-7275. *National Parks* magazine is among a member's chief benefits. Of the \$25 membership dues, \$6 covers a one-year subscription to the magazine.

## HOW TO REACH US

National Parks Conservation Association, 1300 19th Street, N.W., Suite 300, Washington, DC 20036; by phone: 1-800-NAT-PARK; by e-mail: [npca@npca.org](mailto:npca@npca.org); and [www.npca.org](http://www.npca.org).

## The Next Evolution

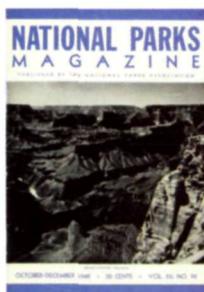
A dry summer and an early winter led a blossoming elk population to wander beyond Yellowstone's boundaries in search of food. Starving elk were quickly slaughtered by hunters waiting along the park boundary, to the horror of wildlife lovers and park advocates alike. The park superintendent purchased additional hay for the elk by using money that had been set aside for spring road improvements. Meanwhile, our organization asked the governor of Montana to suspend the hunting season (a request that was refused), and later solicited donations to purchase additional food—the only other practical option. All of this was detailed in a December 1919 news bulletin issued by the National Parks Association, now known as NPCA. The story's author was Robert Sterling Yard, a skilled writer and editor who helped launch the organization and served as one of its leaders for 26 years.

Nearly a century later, our organization's membership has increased from 833 to more than 330,000. Those occasional news bulletins have evolved into *National Parks* magazine. And this issue's cover article focuses on the feeding of elk herds that spend most of the year in Yellowstone and Grand Teton National Parks. What is it they say about "the more things change...?"

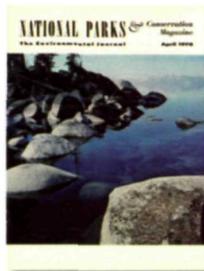
Speaking of changes, we've introduced a few with this issue. We've updated the look to make sure the magazine's design truly reflects the grandeur of the subject matter. The content remains nearly identical, with two small exceptions: The first few pages now contain several shorter articles that help illustrate NPCA's impact in the parks, and the final page focuses more explicitly on the work of our talented photographers.

I look forward to hearing your thoughts about the new design and the articles contained in this and every issue. Send an e-mail to [npmag@npca.org](mailto:npmag@npca.org) or mail a letter to the address that appears on this page, and let us know what you think.

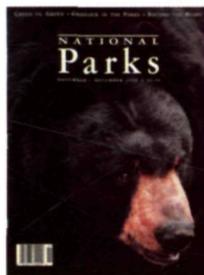
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1970



1992



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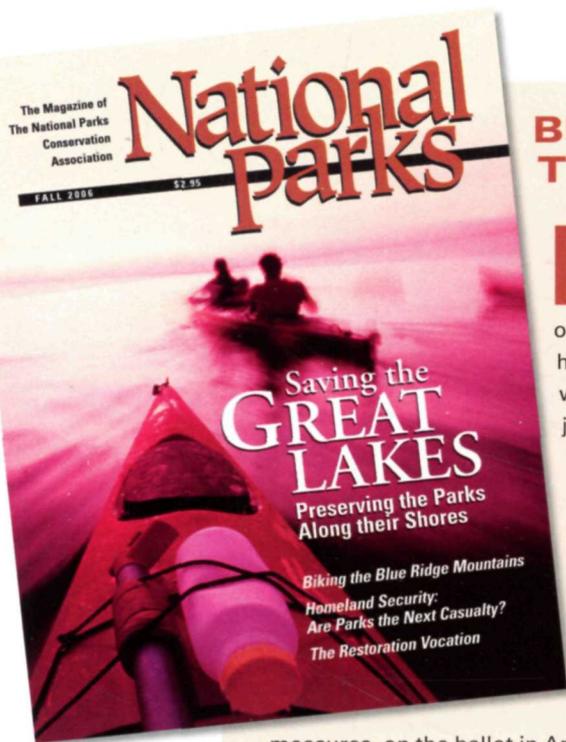
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## BUT WAIT, THERE'S MORE

I just finished reading "Accidents Waiting to Happen" in the Fall issue of the magazine [focusing on developers' propensity to build homes near national parks prone to wildfire]. If there is a problem now, just wait until some, or all, of the "takings" ballot measures in Western states pass in November.

These measures are a reaction to the recent Supreme Court ruling that allows government entities to use eminent domain to take perfectly sound family homes and sell the land to developers to create higher tax revenues. The

measures, on the ballot in Arizona, California, Idaho, and Washington State, are modeled after Oregon's disastrous Measure 37, and are designed to eliminate government land-use regulations. Although they will have some effect in cities, most of the impact will be on exurban and rural areas.

As an example, someone owns 20 acres next to a national park and the small town just outside the park boundary. The landowner decides a motocross track would be a real moneymaker on that land. The government entity (be it the town, county, or state) that regulates land use says "no way." The landowner then sues for loss of revenue from the land. The government entity cannot pay for the loss, and so the motocross track—with its noise and air pollution—is built. The landowner could build condos or a shopping mall; the list of possibilities is endless. The damage to the National Park System and the surrounding communities could be tremendous.

Voters who educate themselves on the true impact of ballot measures are all that stand between our beloved parks and these scenarios.

**CARLA YAMAUCHI**

*Tucson, AZ*

**UPDATE:** Ballot proposals in California, Idaho, and Washington were defeated. Voters in Arizona approved that state's proposal, but the measure is likely to be challenged in court.

**Send letters** to National Parks Magazine, 1300 19th Street, NW #300, Washington, DC 20036 or **e-mail** [npmag@npca.org](mailto:npmag@npca.org). Include your name, city, and state. Published letters may be edited for length and clarity.

## CRYING WOLF

I was exceptionally concerned with Scott Kirkwood's article "Too Much of a Good Thing?" in the Fall 2006 issue [focusing on elk overpopulation in Rocky Mountain National Park]. Although he notes that wolf reintroduction *might* occur in the latter stages of a 20-year program, this is truly the only way that this ecosystem will become healthy again. Like many members of the public, I do not believe that wildlife should be shot, but the lack of predators has made it a necessity. Although wolves would not provide an immediate solution to the problem (as noted in the article), delaying reintroduction will simply require even more culls until a healthy predator population is achieved. The far better answer would be to reintroduce wolves now and provide for a single cull to get elk numbers down to a reasonable level. Delaying the former simply means that more of the latter will be required. For wildlife lovers everywhere, that will become more and more unacceptable [once people recognize that] other alternatives could have been tried—we were simply not intelligent enough to make them work.

**HEATHER PAYNE**

*Chapel Hill, NC*

## SOMETHING FOR NOTHING

Although much of the hunting that occurs today is categorized as "sport hunting," hunting is still a viable, controllable, and cost-effective wildlife management tool. Managers can set bag limits, boundaries, and season dates for hunters that cannot be set for wolves. Perhaps some hunters would prefer to harvest a "trophy" six-point bull, but there is a large faction of hunters that are more than willing to pay for the opportunity to harvest antlerless animals. It seems foolish to award a multi-million dollar contract to sharpshooters to accomplish what hunters would be willing to pay the Park Service to do.

In all situations where hunting is used as a wildlife management tool there are some risks and complications. Hunters can and will make some mistakes. Some animals

may be wounded and lost, members of the non-hunting public may be shocked and offended to see a "cute little baby elk" harvested by a hunter. So a hunting program in a national park should require some additional regulations and educational components for hunters. But by allowing hunters to manage elk populations in Rocky Mountain National Park, more members of the general public will benefit and have opportunity to enjoy the resource. Hunters will have opportunities they did not previously have. The general public will not have to foot the bill for a costly program that could be self-sufficient. And finally, the resulting reduction in the elk population will help bring the entire park back into ecological balance. Everyone wins—the hunter, the taxpayer, and the conservationist.

**DAX MANGUS**

*MS Student, Wildlife Biology  
Utah State University  
Logan, UT*

## AND THE WINNER IS...

*National Parks* magazine was honored with two awards in recent months. The Society of National Association Publications gave a silver award to Heidi Ridgley's Fall 2005 article "Maine Woods," focusing on the quest to designate 3.2 million acres of forest land as a national park—a unit that would be larger than Yellowstone and Yosemite combined.

In October 2006, the Society of American Travel Writers Foundation announced the bronze award for Environmental Tourism went to Scott Kirkwood's, "Wolf & Consequence," a Winter 2006 article that focused on the impact of wolf reintroduc-



tion to Yellowstone. The list of winners, determined by faculty at the University of Missouri School of Journalism, was dominated by familiar names like *Outside*, *National Geographic*, *Conde Nast Traveler*, and major metropolitan newspapers.

If you missed either of the articles when they appeared in print, you can read them online at [www.npca.org/magazine](http://www.npca.org/magazine).

## CORRECTIONS

A caption in the article "The Changing of the Guard" [Fall 2006] incorrectly states that the Chisos Mountains are in Mexico rather than Big Bend National Park. The opening image in the same article was photographed in the Tohono O'odham Reservation, not on the Pasqua-Yaqui Reserve. "Accidents Waiting to Happen," page 20, implies that Saguaro National Park is on the outskirts of Phoenix; Tucson is the nearest city. The Blue Ridge Parkway map on page 45 misspelled Mt. Pisgah. We regret the errors.

## Statement of Ownership, Management and Quarterly Circulation of National Parks

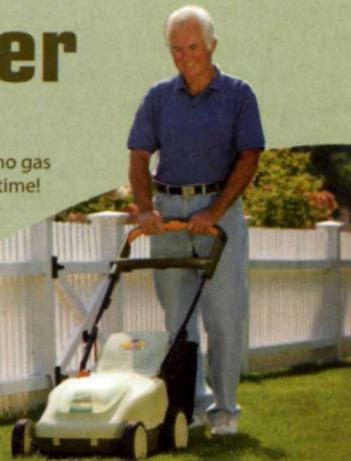
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UPDATE

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## The Future of the Mall

In October, the National Park Service announced a major initiative to improve how visitors experience the National Mall. Twenty-five million people visit the park unit each year, more than Yellowstone, Yosemite, and Grand Canyon National Parks combined. All those footprints have an impact, and so do the exhaustive security measures put in place in recent years [see *National Parks* Spring 2005, Summer 2005]. So the Park Service is giving the American public a chance to weigh in on the use, appearance, and landscape of the capital's showpiece. To learn more about the effort, and to make your voice heard, visit [www.nps.gov/nationalmallplan](http://www.nps.gov/nationalmallplan).

# A DREAM NEARLY REALIZED

## Monument to Martin Luther King Becoming a Reality

**A**walk along the National Mall in Washington, D.C., provides an expansive view of our nation's history, from the words of the Gettysburg Address carved into the walls of Lincoln's memorial to the monuments dedicated to veterans who are still in our midst. But the figures that emerge from tons of white marble and limestone are almost exclusively presidential figures or military heroes.

That's about to change.

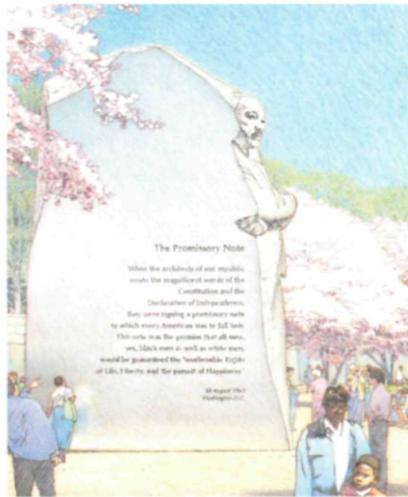
In November, a ceremonial groundbreaking was held for a monument to the Rev. Martin Luther King, Jr., ten years to the day that President Bill Clinton signed legislation proposing the memorial. Congress designated the site in 1998, just a few years before placing a moratorium on future memorials along the Mall. Discussions with the King family and funding setbacks delayed the project, but construction is expected to begin, in earnest, in 2007. Former President Clinton joined President Bush, Oprah Winfrey, Maya Angelou, and other notable figures at the ceremony.

The monument will be located on the edge of the Tidal Basin, between the Korean War Veterans Memorial and the FDR Memorial. The Lincoln Monument, where King delivered his most famous speech in 1963, looms in the distance. The monument's design draws inspiration from King's "I Have a Dream" speech: An enormous rock appears to have been cleaved into three distinct shapes, carving a passage through the "mountain of despair" and leading to "a stone of hope"—the center piece, which has been moved apart from the others. From that third stone emerges the profile of Dr. King (*above*).

Like the FDR Memorial nearby, the crescent-shaped plot of land sprawls about the edge of the Tidal Basin. Quotes from King's writings and speeches will be carved out of a stone wall set amidst lush landscaping and fountains—a setting designed to prompt reflection and introspection.

To learn more, take a virtual tour of the site, or donate to the cause, visit [www.mlkmemorial.org](http://www.mlkmemorial.org) or call 888-484-3373.

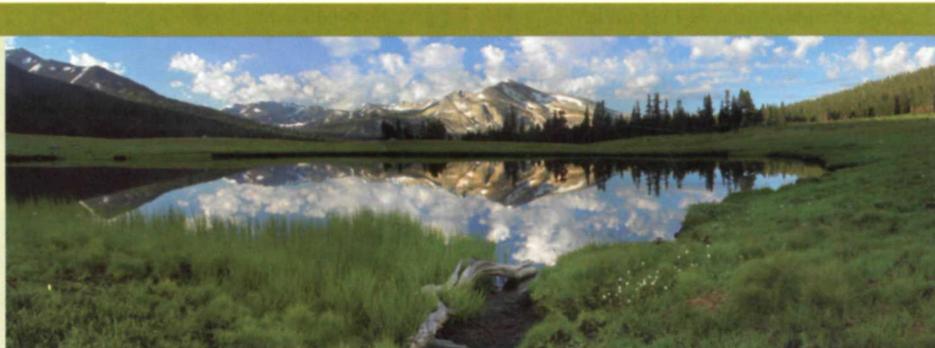
—Scott Kirkwood



THE MARTIN LUTHER KING, JR. NATIONAL MEMORIAL PROJECT FOUNDATION

## EYE-OPENER

A contributor to *National Parks* magazine and a columnist for *Popular Photography* magazine, Tim Fitzharris has published a new collection of images titled **Big Sky: Wild West Panorama**. Stunning western landscapes from Arches, Badlands, Grand Teton, Yellowstone (*right*), and other iconic parks are sprawled across 150 pages, \$45, Firefly Books.



©TIM FITZHARRIS

## POINT & CLICK



[www.pearlharborstories.org](http://www.pearlharborstories.org)

A project of the Pearl Harbor Memorial Fund, this site archives more than 450 interviews of survivors taken over the past 20 years. As more survivors enter their final years, organizers hope to honor the brave men and women who witnessed the events of December 7, 1941, before their stories are lost. Want to contribute to the effort? Write your own account on the site, upload pictures and letters, or record your experiences by calling toll-free, 866-PHSTORY.

COURTESY OF THE NATIONAL ARCHIVES

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## New "America the Beautiful" Pass Introduced in January

**T**hat little piece of plastic that buys you 365 days of access to hundreds of national parks for the bargain-rate price of only \$50 is about to be replaced.

Since 2000, thousands of people have handed their National Parks Pass to rangers at park entrances in exchange for a wave, a map, and a schedule of nature talks. But in 2004, Congress passed legislation to combine the fee-collection process for lands managed by the federal government. Beginning in January, the new "America the Beautiful: National Parks and Federal Recreational Lands Pass," will provide access to all participating federal sites where entrance or standard amenity fees are charged. The price had not been determined when this issue went to press.

The new pass will provide entrance to lands managed by the National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, Bureau of Reclamation, and the Forest Service. At least 80 percent of the revenue will help fund facilities and services where the pass was purchased, and the remaining amount will be dispersed by the government agency that oversees that site; although many NPS sites collect no fees, those units would still be able to benefit from revenue generated by the program.

Passes will be available for purchase at entrance points, ranger stations, visitor centers, and some agency offices, and will be valid for one year from the date of purchase. If you purchased a parks pass in the last few months, no need to worry—all previously issued passes will remain valid until their expiration date. And if you're 62 or older, you'll still be able to purchase a \$10 lifetime pass similar to the Golden Age Passport. For more information, visit <http://store.usgs.gov/pass> or call 888-ASK-USGS. —Scott Kirkwood



## ECHOES



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*There is a great hush over this park in the winter. It would be a travesty to fire howitzers into the heart of one of our wildest natural lands.*

**STEVE THOMPSON**, NPCA's Glacier program manager, quoted in a Washington Post article regarding the potential use of artillery shells to manage avalanche risk facing trains passing through Glacier National Park, Montana (above).

*Interior officials must send a clear message that such deliberate illegal actions will not be tolerated on lands held in trust for all Americans.*

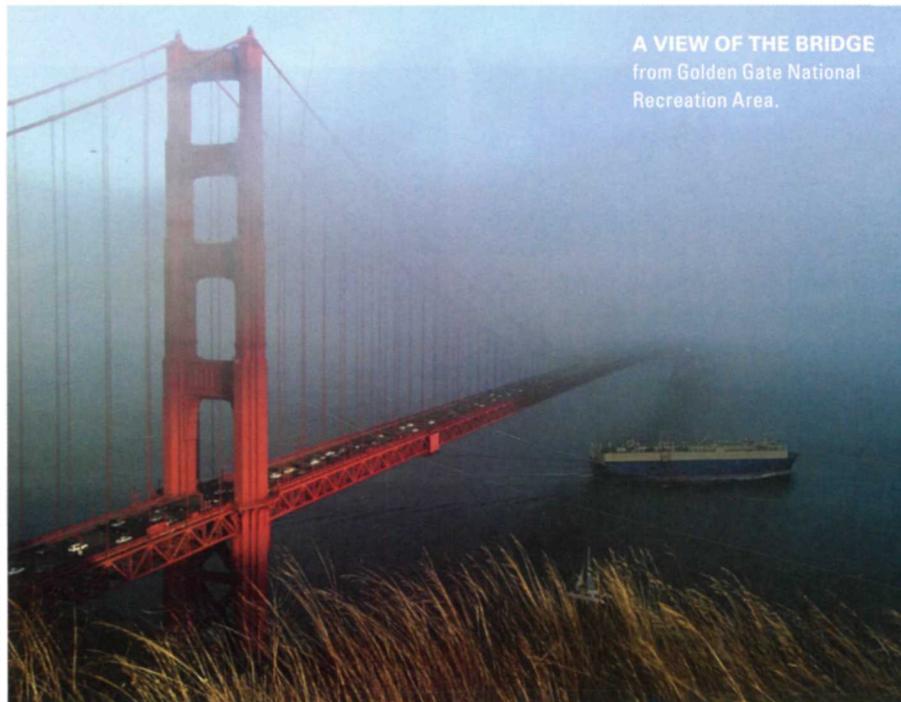
**JOY OAKES**, Senior Director of NPCA's Mid-Atlantic region, quoted by the Associated Press in response to a developer who dug a 2,000-foot-long trench in Harpers Ferry National Historical Park without a permit, then installed utility lines for subdivisions proposed nearby. The Department of Justice is now considering legal recourse.

*As national parks across the country are working to relieve traffic congestion... this example at Grand Teton could easily serve as a model nationwide.*

**TOM KIERNAN**, NPCA president, quoted in an Associated Press article regarding a proposed system of multi-use pathways for bikers and hikers.

# 100

**NUMBER OF NEW YORK-AREA RESIDENTS** who took the Oath of Allegiance at Ellis Island in a ceremony last fall, part of a partnership between the Park Service and U.S. Citizenship and Immigration Services to host more naturalization ceremonies at national parks.



A VIEW OF THE BRIDGE from Golden Gate National Recreation Area.

© STAS VOLIK/BIGSTOCKPHOTOS.COM

## Q&A

# THE GATEKEEPERS

Amy Meyer is one of a handful of citizens and politicians who devoted years to the creation of the Golden Gate National Recreation Area, a story told in her book, *New Guardians for the Golden Gate*.

**Q. When most people think of the Golden Gate, they think of the bridge itself, but the park encompasses much more. Talk a bit about its scope.**

**A.** The Golden Gate Bridge itself is an engineering marvel, but it's owned and operated by the local transportation agencies. Many people recognize that the park includes the hills on both sides and the various military forts [constructed soon after the Gold Rush, and all deactivated in recent decades], including The Presidio. But the people of San Francisco take a much bigger view of the Golden Gate. The bridge is at the center, but the park stretches from the northern end of Marin County, down the San Francisco coastline, and continues half way into San Mateo County—it's now 80,000 acres and 85 miles long.

**Q. How did the process of land preservation begin?**

**A.** San Francisco mayors started plotting open space shortly after the Gold Rush, and by 1870 they were already setting aside land on the coast. In 1906, the area we now call Muir Woods National Monument was being threatened with condemnation by a developer who wanted to dam Redwood Creek and provide a water supply for Sausalito—the canyon was too deep to make Redwood logging practical. But the owner, William Kent, who would eventually serve in Congress, donated the land to the federal government under the Antiquities Act, and insisted that Teddy Roosevelt name the land for John Muir, the great explorer of Yosemite and the West. That was the beginning of it all.

**Q. What prompted your involvement?**

**A.** In March, 1970, there was a plan to put a branch of the National Archives two blocks from my house; the building of a freeway had pushed the facility out of San Francisco. I first heard about it at a community meeting [and got involved immediately]. The building was to be located on a designated greenbelt, the old "parkland is cheap, let's use it for real estate" idea. We protested loudly and applied political pressure, and in the end, the construction was moved to San Bruno. This was all done on a bipartisan basis. Our Republican Congressman Bill Mailliard and a fiery Democrat Phil Burton were both behind us; eventually President Nixon supported us as well. When you have two parties working together, you can really get something done.

**Q. The book details plenty of lessons for conservation activists—talk about a few of them.**

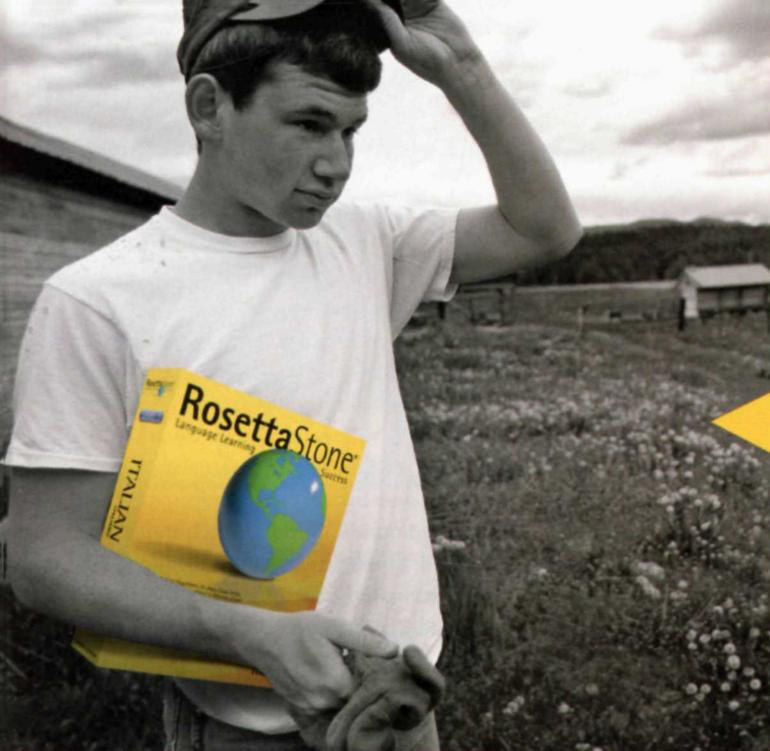
**A.** First off, the ability to see ahead is crucial, to think about protecting the land before it gets too expensive. You want to take action before [developers] wake up and recognize the financial value. The Peninsula Open Space Trust has always known this, just like The Nature Conservancy, Sierra Club, and NPCA.

The second lesson is government can do good. The force behind the designation of Point Reyes was Congressman Clem Miller. Senator Barbara Boxer (D) and Congresswoman Nancy Pelosi (D), now the Speaker of the House, were also major factors.

Lastly, don't ever give up. You haven't lost until they've actually built something on the land, so up until that moment, don't stop fighting.

**Q. After all your work, what do these parks mean to the people of California today?**

**A.** I can't describe to you the amount of pride people take in these parks. I joke that back East if you have \$10 million, you buy a very good painting and give it to one of the major art museums. Here, if you have \$10 million, you buy a nice ranch and give it to a conservation organization—it's just the way people think out here. NP



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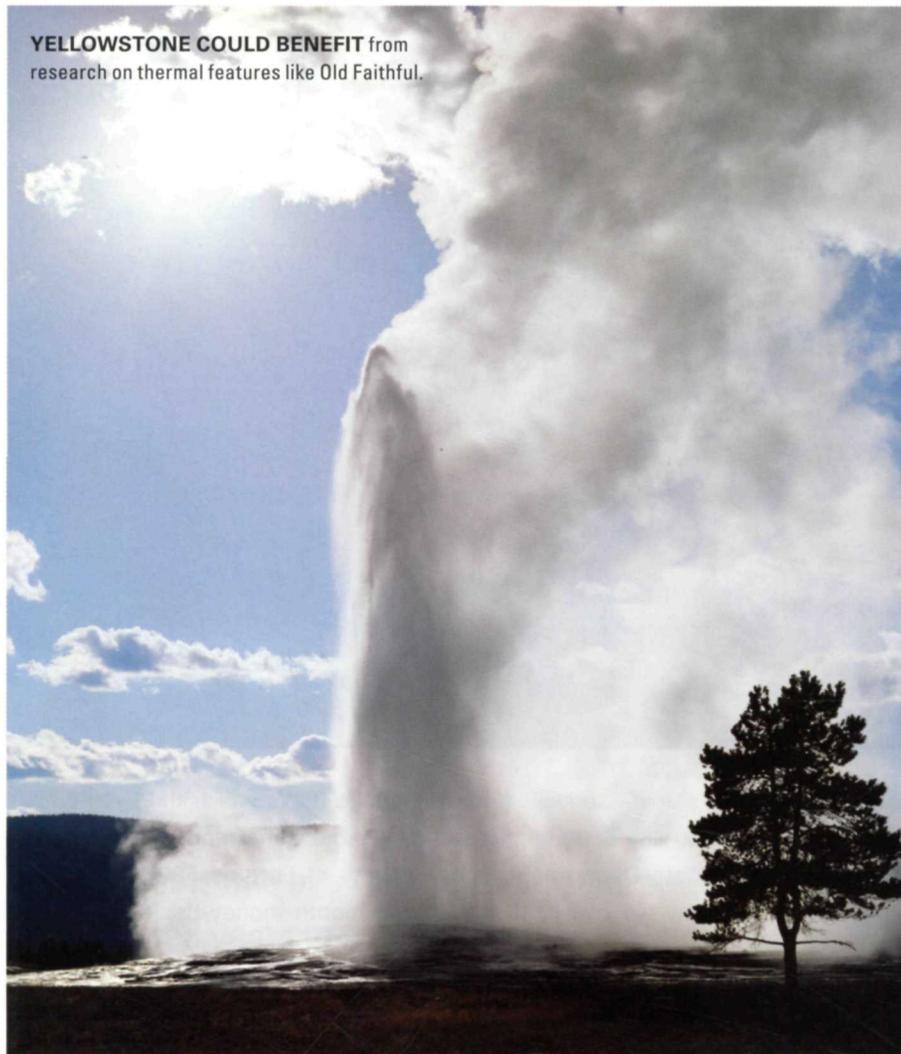
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## SPREADING THE WEALTH

Scientists are making groundbreaking discoveries in the national parks—but what’s in it for the parks?

**N**o one could have guessed how much money a thermal pool in Yellowstone National Park was worth when Thomas Brock took a tiny sampling in 1966 that yielded the microbe *Thermus aquaticus*. More than a decade later, scientists extracted an enzyme from that microbe that revolutionized DNA analysis; applications ranged from aiding criminal investigations to diagnosis and treatment of genetic diseases [see “Getting into Hot

Water,” Fall 2006]. A Swiss pharmaceutical company named Hoffman LaRoche recognized its potential and bought the patent for the process.

It was a smart move. Hoffman LaRoche has since made hundreds of millions of dollars from that patent. Yellowstone, on the other hand, hasn’t seen a penny. But if it had, how would the National Park Service (NPS) ensure that such lucrative commercial interests wouldn’t outweigh resource

protection? Or is it in the Park Service’s best interest to form partnerships with so-called “bioprospecters”?

This issue has raised eyebrows in a number of circles in recent years. In 1998, three nonprofit groups sued NPS over a potentially commercial relationship blooming in Yellowstone: The Diversa Corporation, a California-based biotechnology firm, was taking samples from thermal pools and conducting research that could benefit the park. The plaintiffs argued that the relationship broke the law, but a federal judge ruled in favor of the benefits-sharing agreement, stating that it was consistent with the Park Service’s mission to conserve resources; that bioprospecting was not a consumptive use (researchers only collected small samples); and that bioprospecting did not constitute a sale or commercial use of park resources.

And indeed, Yellowstone reaped benefits from that partnership—scientists discovered six new microbial species from a Diversa sampling. But such a level of collaboration between the Park Service and Diversa was not routine.

“Most researchers don’t have the time or incentive to share in-depth information with parks,” says Sue Mills, a project manager with the NPS Benefits-Sharing Team in Yellowstone.

That could change. The federal judge that reaffirmed Yellowstone’s authority to pursue the Diversa relationship tasked the Park Service with drafting an Environmental Impact Statement (EIS) on the effects of benefits sharing in the parks, system-wide; the document was released last September, and at the time this issue went to print, NPS was seeking to extend the public comment period into late January. The draft suggests that all researchers should share profits or other benefits derived from their research on park property—and those benefits would be used to protect park resources.

Opponents to benefits sharing want NPS to prohibit specimen collection for research involving any potential commercial applications. But there’s a flaw in this argument, says Tim Stevens, NPCA’s Yellowstone Program Manager. “Whether or not research specimen collection happens

*continued on page 14*



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continued from page 12

at all is a completely separate permitting process from whether or not NPS shares in the benefits from research results," he says. "And they're separate processes for a reason: to help the Park Service avoid approving benefit-motivated research that

from looking in the one spot on the planet that holds the cure, simply because it's in a national park. "Parks play a critical role in research and making the world a better place, and that work can be done while continuing to protect the critical resources

details of these arrangements unavailable to the public. This, in NPCA's view, is the plan's biggest flaw. NPCA urges the Park Service to adopt the following policy:

- Agreements with private companies will be available to the public in their entirety, to the fullest extent allowed by law. The only way the Park Service can alleviate skepticism and concerns about commercialization is to ensure that this is an open process and all details of agreements are available for public review.

- All park resources will remain unimpaired for future generations. No negative impacts to park resources will occur as a result of research, or production process. Further, research and collection activities cannot diminish visitor experience.

- Revenue generated as a result of these agreements will be dedicated to the conservation of resources in parks, as opposed to other park needs or other federal government budget items.

- NPS will develop sound standards that prevent park managers from being

## The act of forbidding researchers to use their results ultimately stifles science in the parks.

could adversely impact park resources or the visitor experience. Opponents questioning whether private interests should even be conducting research in the parks are shooting at the wrong target."

Besides, scientists can't always predict whether or not their research will result in commercial applications, and consequently, some will simply decide to avoid parks. The act of forbidding scientists to use those results ultimately stifles science in the parks.

Under that scenario, a researcher seeking a cure for cancer could be discouraged

and visitor experiences that make parks unique," Stevens says.

Moreover, most research projects involve taking tiny samples of park resources—say, a teaspoon of mud or a beaker-full of water—and companies must go through a separate, rigorous evaluation process before they even begin research within park boundaries.

NPCA is confident that the Park Service's plan won't impact park resources and the visitor experience, but is concerned that the current draft proposes to keep the



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tempted to enter into agreements based on park financial needs in other operational areas. Agreements must provide a fair and equitable return to the park and the American public.

- No benefits-sharing agreement will be developed that results in resources being used for commercial purposes—only the *results derived* from the research may be considered for commercial gains.

The Park Service will review public comments this winter; a final decision is expected by spring.

“Our parks contain natural resources found nowhere else in the world,” Stevens says. “Yellowstone was designated a national park primarily because of those natural resources, and yet 99 percent of the microbes found there have yet to be studied or even named. By allowing researchers to carefully examine those resources, while upholding resource protection and the visitor experience, we’re only going to make people appreciate these special places even more.” —Amy Leinbach Marquis

**UPDATE**



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**Seeing the Forest for the Trees**

In September, a federal judge ruled that the Bush administration acted illegally in reversing the 2001 roadless rule and opening tens of millions of acres of national forest to logging and road construction, much of it on land adjacent to national parks [see *National Parks*, Spring 2005]. The administration had repealed the Clinton-era rule and instituted a process that would have required state governors to request protection on a case-by-case basis.

“This ruling takes management of these public lands out of the hands of special interests and gives it back to the public, who made it resoundingly clear that these lands should remain intact,” said Robert Vandermark, Director of the Heritage Forests Campaign.

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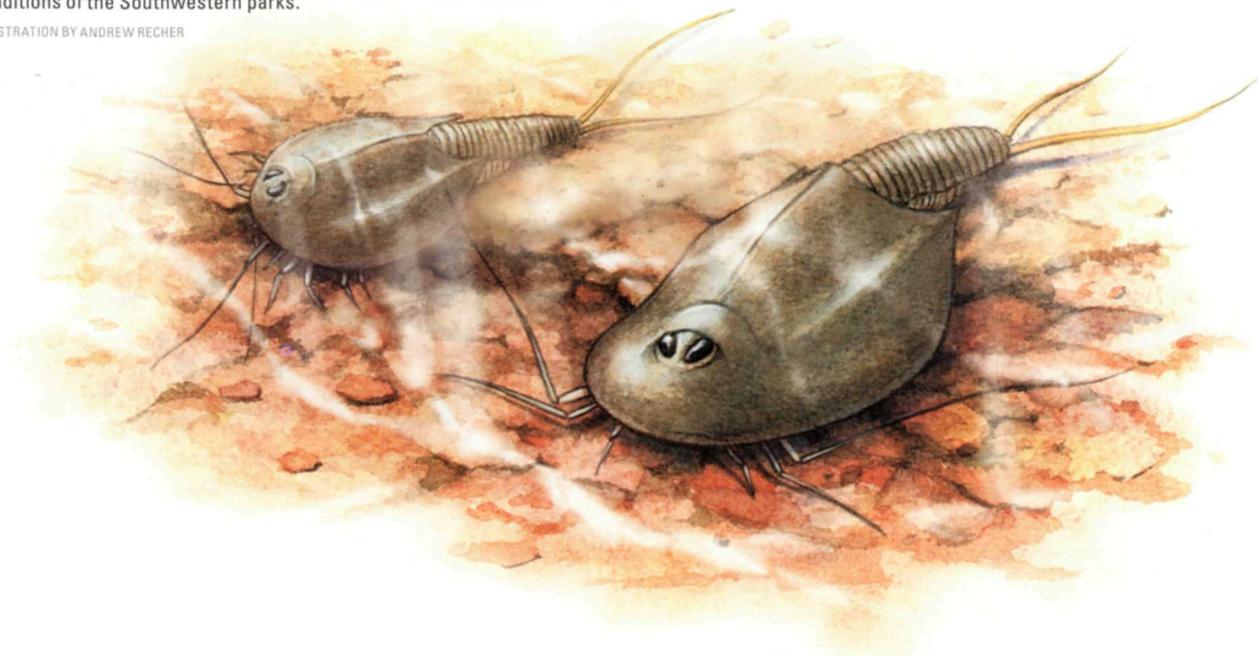
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**TADPOLE SHRIMP**, one of several branchiopods that thrive in the harsh conditions of the Southwestern parks.

ILLUSTRATION BY ANDREW RECHER



# Instant Life: Just Add Water

In the harsh arid landscape of Canyonlands National Park, some peculiar organisms spring to life after only a few inches of rainfall.

**P**eer into any fleeting water hole in the desert Southwest, and you're likely to find it teeming with all kinds of critters. That might come as quite a surprise, since the same hole was bone dry just days before.

Water comes and goes quickly in the Southwest, so the region is dotted with temporary, or ephemeral, water sources. The weather's extremes yield potholes in sandstone and other rock surfaces—shallow impressions just a few feet across. Scoured by wind in drier days, those potholes often fill with water and dry out several times during the summer monsoons common in the Southwest.

Temperatures can swing from 140 degrees Fahrenheit in summer to below freezing in winter. And in this setting, a whole host of critters seem to come and go as quickly as storm clouds. Is it magic? Not quite. It's actually a finely tuned biological adaptation achieved by some of the oldest creatures on Earth. Fairy shrimp, tadpole shrimp, and clam shrimp are all capable of this impressive feat, a skill not uncommon among a category of animals called branchiopods.

As a group, branchiopods are united by the presence of gills on their legs and various appendages used for swimming. But each of the shrimp-like members of the group looks a little different. Tadpole shrimp have a carapace—the part of the shell that covers the head—and fairy shrimp (including brine shrimp) lack it. The clam shrimp carapace is doubled over so it resembles a little clam, as its name suggests.

All the shrimp-like branchiopods feed themselves by filtering algae and detritus out of the water. Their eggs can survive years of drought and hatch within days of rain. Most are less than half an inch long, but at least one species of fairy shrimp can grow to six inches—big enough to eat its smaller kin.

Tim Graham, a research ecologist with the U.S. Geological Survey in Canyonlands National Park, has been studying the park's fairy shrimp, tadpole shrimp, and clam shrimp since the late 1980s. Although he doesn't play in these miniature "desert tide-pools" as much as he'd like, he's spent more than a few hours staring into the water and recording as many species as he can find. All that experience has shaped his understanding of their tenuous existence, and the likelihood they'll survive a future that may include drastic climate change.

Evolution has not been especially kind to branchiopods to this point. Newer species—including predators such as fish and aquatic insects—have evolved to live in the same habitats. Simultaneously, branchiopod populations have declined. Some studies show this can happen in short order: Introduce fish, and the shrimp quickly disappear.

These days, branchiopods fare best in pools that periodically dry up, making it harder for those predatory aquatic insects to get established. "The insects have to get up and leave," Graham explains. "They can fly

from pool to pool, but they can't run around on the bottom of a hot, dry sandy pothole."

Indeed, generations of branchiopods never have to leave the pool at all, which means they've got the home-court advantage. Their eggs can lose up to 92 percent of their water content and still survive. As a sort of evolutionary hedge against unpredictable weather, each female lays eggs that hatch according to different plans: some after a first rain, others after subsequent showers. And they lay a lot of eggs—up to 200 per day. One generation of branchiopods can hatch, grow, and lay the next generation before their predators have even matured. By then, they've already learned to avoid predators quite effectively.

Branchiopods' hardiness serves them in some extreme—and unlikely—conditions. In 1980, one researcher glued brine shrimp cysts to a spacecraft and retrieved them after the space flight; they hatched into living brine shrimp a short time later. Scientists are still working to discover all the factors that trigger hatching. Some species respond best to warm water, and won't hatch after a cold rain. Other mysteries remain unsolved.

"The community we see after a particular rain event is not as predictable as we would like," says Graham "There are some situations where you might find only one species [even though] there are cysts from both species in the same pothole."

Until ecologists can tease out the reasons, it's not clear how branchiopods are likely to fare in the face of climate change. Christopher Rogers, an invertebrate ecologist with the consulting firm EcoAnalysts in Woodland, California, points to recent findings that increased ultraviolet light may cause more mutations in such animals, possibly speeding their ability to adapt to different habitats.

"If temperatures are going up and more things are going dry, it's just going to mean more temporary wetlands for them," says Rogers. "On the flip side, the Ice Ages pushed many species further south," which means global warming might push these species north. And that means branchiopods will need to continue evolving or face a uncertain future. **NP**

**Anne Minard** is a freelance writer and journalism teacher who lives in Flagstaff, Arizona.



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**A PAIR OF HARBOR SEALS**  
on an ice floe in Glacier Bay National  
Park & Preserve, Alaska.



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## On Thin Ice

Harbor seals in Alaska's Glacier Bay have seen a dramatic decline in recent years, and biologists aren't sure why.

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Glacier Bay National Park & Preserve is the site of a unique collaboration among the Park Service, Alaska's Department of Fish & Game, National Marine Fisheries Services, and graduate programs of several universities. Equipped with global positioning systems, time-depth recorders, and radio transmitters, researchers track seals from boats, kayaks, and floatplanes. And they need every single tool they've got. When seals aren't lounging

about on glacial haul-outs, they're diving deep into ice-cold water, or swimming hundreds of miles over the course of days.

It took ten years to prove suspicions that harbor seals in the region had been declining precipitously, and that was just the start. To figure out why, researchers have surgically implanted radio transmitters into about 150 harbor seals, in the blubber just below the fur. These electronic devices, about the size of a roll of pennies, transmit a signal for four hours a day during mid-day, when seals are most likely to be hauled out and more easily located; they last about five years.

"When we capture the animals, we take a full suite of biological samples that assess their general health, their organ function, their contaminant level, their disease exposure, their stress-hormone level, their diet, and their nutritional physiology," says Gail Blundell, principal investigator with the Alaska Department of Fish & Game. "We then follow these animals over time to see what's different between those who survive and those who don't."

"We've been looking at a number of different hypotheses associated with this decline with the understanding that we're not likely to come up with a 'smoking gun,' because so few population studies ever do," says Scott Gende, a Park Service ecologist. "But we hope to examine some factors that could relate to potential management decisions, to make sure that those aren't necessarily contributing to a decline or hindering the population's growth rate."

One of the first questions they examined was whether seals were being displaced from optimal foraging habitat by cruise ships, which had increased well over 30 percent during the period that harbor seals had declined by 70 percent. But the early evidence reveals that seals are foraging on herring, sand lance, and capelin in shallow, near-shore areas that cruise ships avoid.

Of course, private boaters go much closer to the shore, and kayakers even use the same areas that harbor seals use to haul out. So a graduate student from San Jose State is now working to quantify the cost of those disturbances from a biological standpoint, de-

termining, for example, how far seals swim from the haul-out, how deep they dive, and how long it takes them to return—all of which may affect their energy reserves and hint at broader threats to survival.

Technology helps answer some of these questions but not all of them. Radio transmissions travel only so far, and you've got to have a pretty good idea where the seals might be before shelling out \$400 an hour for a plane. So researchers jump into kayaks and use spotting scopes to record the number of vessels entering the area and the seals' response. Once the animals dive underwater, time-depth recorders (TDRs) attached to the animals track their depth; when the animals shed the TDRs with their summer molt, they're recovered in the water, and the information is synched with written observations. Data are then compared to studies in other areas where seal populations are either stable or increasing.

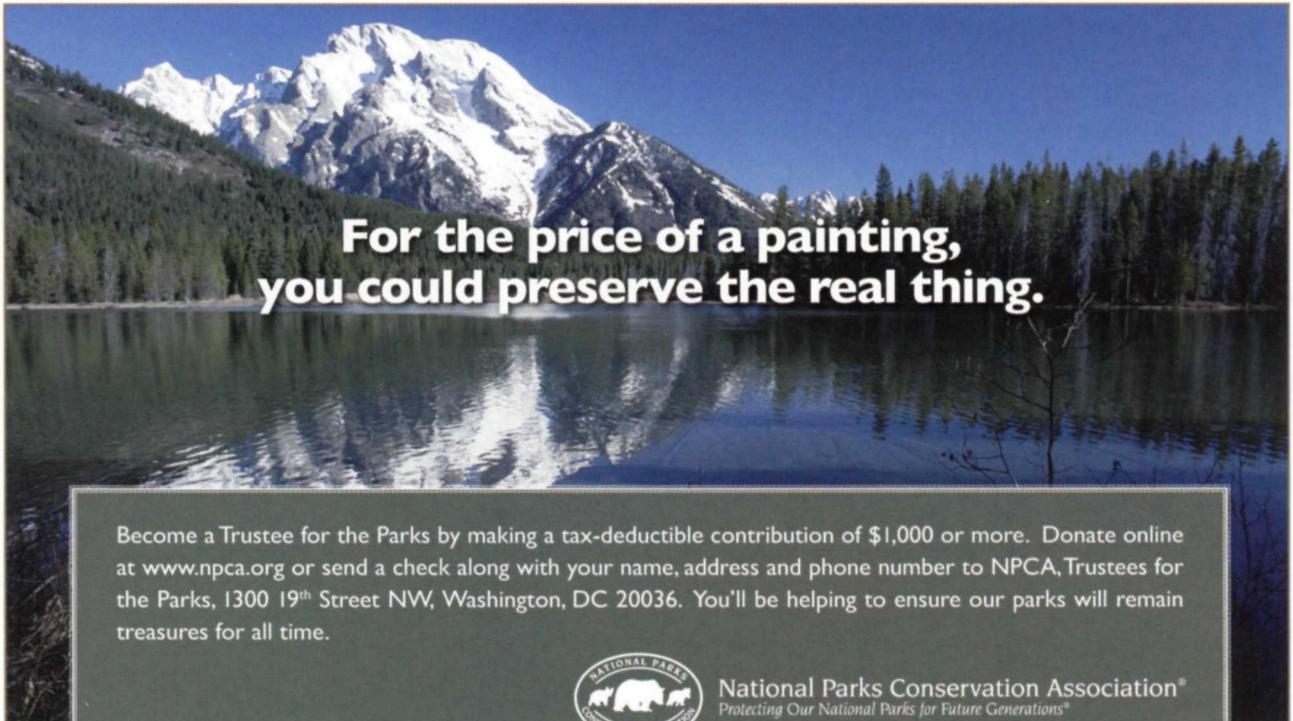
Biologists are also taking a closer look at the food web, to determine whether harbor seals are getting their necessary nutrients. Blubber samples reveal long-term trends in diet,

whereas scat collected from glacial haul-outs yields more short-term data. Studies of captive seals at Alaska's Sea Life Center are also yielding some clues to the impact of a diet without plenty of fat—a reality that may emerge in nature if competition for prey heats up.

Researchers are starting to look more closely at the population's genetic makeup, too. Although there are thousands of harbor seals scattered throughout coastal Alaska, the preliminary results suggest that Glacier Bay's seals may be genetically unique, which may afford them extra protection. And that may buy some extra time. For now, the cause of the harbor seals' decline still eludes biologists, but the hope is they'll find some answers before it's too late.

"A lot of people look at marine mammals and see these cute, warm and fuzzy animals, but I'm drawn to the challenge they present," says Gende. "It requires a certain degree of imagination and ingenuity, combining grunt work with high-technology, then putting all the pieces together." NP

Scott Kirkwood is editor of *National Parks* magazine.



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AS MANY AS 8,000 ELK migrate to the National Elk Refuge each year—the largest wintertime concentration of elk in the world.

BY SUSAN J. TWEIT  
Photography by Florian Schulz

The National Elk Refuge—in the shadow of Grand Teton and Yellowstone National Parks—may be doing more to harm elk than anyone would ever expect.

# THE REFUGE



**D**awn comes late to Jackson Hole, Wyoming, on winter mornings. When the sun finally edges over the high ridges that crowd the town of Jackson and paints the Tetons pink, the huddled mounds studying the snow-covered meadows along Flat Creek finally come into focus as thousands of sleeping elk. They stir, shaking the hoarfrost from thick pelts with a clatter of antlers and flapping of ears. Plumes of breath rise from thousands of black nostrils, forming a shimmering cloud in the frigid air as the elk wait for breakfast to be served.

And soon it is: The growl of engines in low gear accompanies the sunlight as rubber-tracked crawler tractors appear, pulling trailers loaded with 20 to 30 tons of alfalfa pellets across the snow. As a tractor approaches a group of elk, the driver opens a gate in the underside of the trailer, releasing a stream of green pellets.

The elk crowd flank to flank like so many dairy cows, lipping the pellets from the snow and pawing for more. When the pellets are eaten, some elk drift away to forage in the snow-covered landscape. Others hang out in groups, digesting their meal. As the first of the day's horse-drawn sleigh tours thread their way through the crowd of animals, a few bulls pick fights with each other, clashing racks while cameras record the scene.

# THE REFUGE



**HERDS CROWD TOGETHER** to gorge on compressed alfalfa pellets (*above*); a group of bulls rests together, digesting their meal (*top*).

This is the National Elk Refuge, nearly 25,000 acres of wet meadow, willow, and sagebrush flats, and aspen-studded foothills that are home to the largest winter concentration of elk in the world—up to 8,000 animals—along with some 1,000 bison. In summer, these same elk spread out into Grand Teton and Yellowstone National Parks as well as adjacent national forest lands. In fact, nearly all of Grand Teton's estimated 3,200 head of elk are completely dependent on this refuge every winter. When the refuge was established in 1912, the Jackson Hole elk herd was one of the few sizable herds left. Descendants of that herd helped restock habitat across the continent.

But this refuge is a landscape in crisis, according to Tim Young, former director of NPCA's field office in Jackson Hole. The winter feeding program has had serious unintended consequences, causing elk and bison herds to balloon beyond the size the landscape can naturally sustain. Their browsing has severely degraded the refuge's riparian and aspen habitat. Worse yet, the unnatural

crowding essentially guarantees disease outbreaks. Chronic wasting disease, a fatal neurological disease in elk and deer, was recently found within 90 miles of the refuge, making it, in Young's words, "a nuclear bomb that could go off at any time."

How did the National Elk Refuge and Grand Teton National Park evolve from a safe harbor for the nation's largest remaining herd of elk to a threat to their descendants' survival? Slowly, over nearly a century of shifting wildlife management, land use, and public opinion.

By the early 1900s, ranch development at lower elevations had shifted winter elk migration patterns, leaving herds marooned in Jackson Hole's deep snows, where some elk began poaching hay from local ranches and many others starved to death. In 1910, the Wyoming legislature appropriated \$5,000 to purchase elk feed, and in 1911, Washington, D.C., was asked to pitch in. Congress appropriated money for emergency feeding, and in 1912, additional funds to acquire land that would provide habitat for elk and

other wildlife. By the late 1930s, the refuge had reached its present size of 24,700 acres, but the elk herd was still growing. Although Grand Teton encompasses more than 300,000 acres, very little of this area is suitable winter range, which means the annual migration to the refuge is crucial to the herd's existence.

Today, the refuge serves up compressed alfalfa pellets trucked in by the semi-trailer load. Refuge Manager Barry Reiswig says one elk consumes eight to ten pounds, or the equivalent of two coffee cans full of pellets

it's the crowding-induced threat of epidemics like chronic wasting disease that has biologists really alarmed, a threat that could devastate Grand Teton's elk herd and transmit fatal disease to Yellowstone National Park.

First observed in the late 1960s at Colorado State University's wildlife research pens, chronic wasting disease is the elk version of mad cow disease, scrapie in sheep, or Creutzfeldt-Jakob disease in humans. All are transmissible spongiform encephalopathies, named for the sponge-like pattern of holes that consume affected animals' brains when

## Elk herds have ballooned beyond the size the landscape can naturally sustain.

a day, while bison eat 20 to 28 pounds. The crawler-tractor rigs haul 25 tons apiece—a semi-trailer load of feed—and dole out around two semi-loads of pellets each day for about 70 days a year. That's 2,100 to 3,500 tons of alfalfa pellets each winter, depending on the number of animals and length of the feeding season. What began as an emergency response is now the norm: Elk have been fed

typical protein molecules are altered into misshapen prions, which destroy the cells, alter other proteins, and spread the disease. Chronic wasting disease does just what its name suggests: Affected animals lose weight, become listless, and eventually waste to death. It's an ugly process, and there is no cure. Infected deer and elk are slaughtered—entire herds are destroyed when necessary.

**DOWNTOWN JACKSON**, decorated for the holidays, greets the estimated 800,000 yearly visitors seeking the refuge experience.



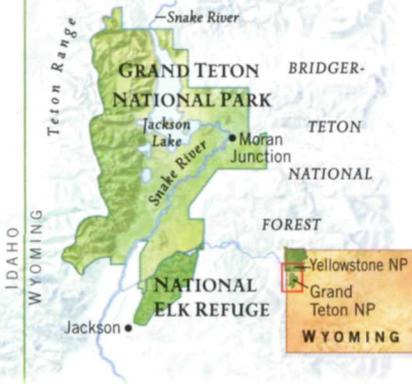
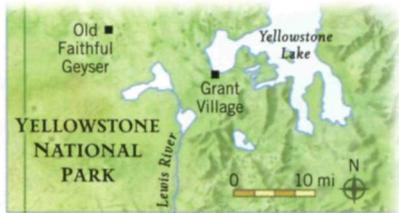
in all but nine winters since the program was initiated in 1910.

The herds drawn to the chow lines are a popular tourist attraction, one of the sights that bring an estimated 800,000 visitors to the National Elk Refuge each year, making it one of the most heavily-visited units of the National Wildlife Refuge system. Some 25,000 of these visitors take the daily sleigh rides to ogle elk and bison up close.

Maintaining a wildlife feed-ground hemmed in by a pricey resort town has serious drawbacks, including the cost of feed and the degradation of habitat for other species. But



# THE REFUGE



© Karen Minot

Much about chronic wasting disease remains unclear, including whether the prions actually cause the disease or are simply by-products of other disease agents. But new research shows that the disease is passed around through saliva and blood, most likely when animals nuzzle or groom one another.

predators such as wolves might disperse the herd and help control the disease, says Dr. Margaret Wild, wildlife veterinarian with the National Park Service; chronic wasting disease is not present in ecosystems like Yellowstone National Park, which reintroduced wolves more than ten years ago. This natu-

## Biologists agree it's not a question of *if* the disease will reach the refuge but *when*.

According to Dr. Tom Roffe, wildlife veterinarian for the U.S. Fish and Wildlife Service, it's also clear that the disease is linked to the density of animal populations. Rates of infection in elk soar over 90 percent when animals are crowded into game farms and decline to single digits in free-ranging populations. Decreasing animal density to natural levels and allowing natural roaming patterns, Roffe and other biologists argue, is the best tool for reducing the impact of the disease. It's possible that the presence of

ral system of predators may even be starting to work in Grand Teton: Five wolf packs in and around the park are helping to restore a natural balance while providing magnificent wildlife viewing for park visitors.

The National Elk Refuge's winter feeding program has already experienced outbreaks of other density-dependent diseases, such as foot rot and brucellosis, a bacterial disease that results in spontaneous abortions in elk, bison, and cattle. This disease (first contracted from cattle) has already infected a portion



**SLEIGH RIDES** allow visitors to ogle elk and bison up close.

of Grand Teton's elk herd. As with chronic wasting disease, brucellosis infection rates are low in free-ranging elk and much higher when the animals are crowded.

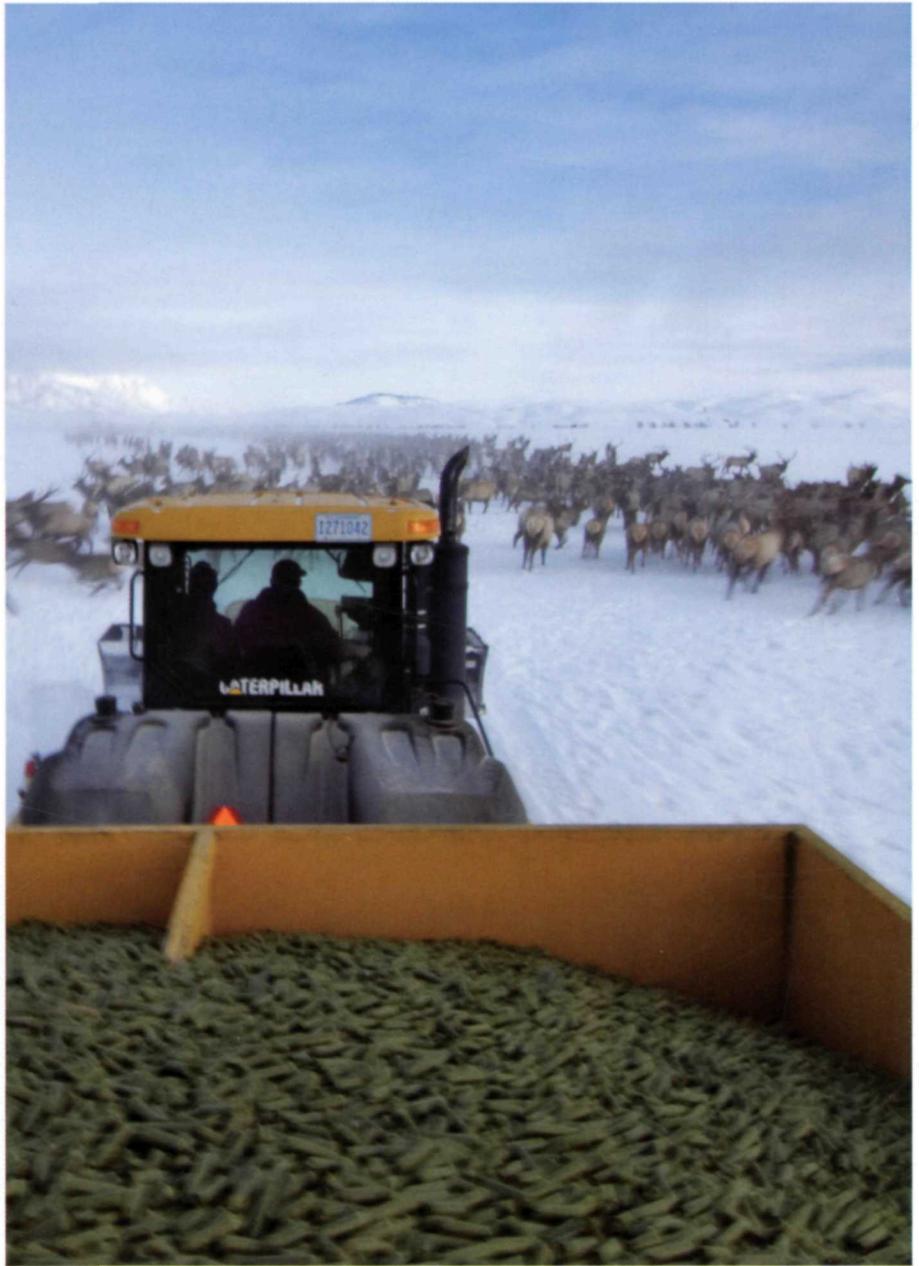
Because chronic wasting disease has been found in areas where elk often migrate after leaving the refuge, biologists agree that it's not a question of *if* the disease will reach the refuge but *when*. The scenario is not a pretty one. On the winter feed-grounds, elk begin to sicken and grow listless. They become gaunt and emaciated and eventually die—perhaps only a handful the first year. Within a few years, sick and dying elk are everywhere, scattered across Grand Teton and Yellowstone, for millions of visitors to see. And once that happens, the land will be contaminated indefinitely: Altered prions persist for generations; the pens where the disease was first discovered 40 years ago are still fatal to deer confined there.

The U.S. Fish and Wildlife Service, the National Park Service, and the Wyoming Game and Fish Department cooperatively manage the Jackson Hole elk and bison herds, and the two federal agencies are fin-



ishing the environmental analysis of a 15-year management plan. The thousand-page Environmental Impact Statement identifies the winter feeding program as the main cause of the refuge's biological issues, including habitat degradation, unnaturally large elk and bison herds, high levels of brucellosis infection, and the threat of deadly disease.

Despite detailed analysis based on eight years of research and comments from biologists and the public, the draft of the agencies' preferred alternative, slated to be formalized this winter, is a compromise that sidesteps rather than solves the problems. It would



continue the winter feeding program and expand hay farming on the refuge, while maintaining elk and bison numbers at about twice what can be sustained by the natural habitat. It would "protect" a small portion of the most degraded habitat by erecting expensive bison- and elk-proof fencing around 1,000 acres of aspen and several hundred acres of riparian habitat. And it would leave the elk herd vulnerable to chronic wasting disease.

If the biological issues that have turned the National Elk Refuge from a sanctuary to a landscape potentially fatal to elk, why not simply stop the winter feeding program?

**A REFUGE WORKER** educates visitors about elk and operations at the refuge (*left*). A crawler-tractor rig (*above*) doles out 25 tons of feed every day for about 70 days each year.

# THE REFUGE



**UNTIL WILDLIFE MANAGERS** can find a way to restore the natural environment in and around the Elk Refuge, the risk of chronic wasting disease will continue to threaten the herd.



## WHAT'S OUR POSITION?

**The National Parks Conservation Association (NPCA) proposes returning the Jackson Hole elk and bison herds to natural population levels and habits by:**

- Phasing out winter feeding within five years.
  - Cutting elk numbers wintering on the refuge to a sustainable level of around 3,000 animals, and bison to around 500 to 800.
  - Restoring native habitat in Grand Teton and on the refuge to provide more winter browse.
  - Cultivating existing fields on the refuge more efficiently to increase available forage.
  - Encouraging natural populations of predators.
  - Working to restore traditional migration routes to other wintering areas.
- NPCA believes the agencies' preferred alternative must meet their legal obligation to manage wildlife and habitat in a way that leaves both healthy and "unimpaired for future generations."

Because there is strong pressure to continue, says Tim Young. Pressure from ranchers, who fear that if elk aren't corralled by the feeding program, they will spread out, eat the ranchers' hay, and infect their cattle.

the draft Environmental Impact Statement, supported by NPCA's members and activists, strongly favors a shift to a more natural disease-resistant management regime. There is hope that the imminent decision from the

**It is apparently easier to condemn the elk herd to the possibility of disease than to restore their natural habitat.**

(Wyoming's cattle industry lost its brucellosis-free status in 2004.) Pressure from sportsmen and outfitters, who don't want to see elk numbers reduced. Pressure from the public, which doesn't want to see elk starve during a harsh winter.

It is apparently easier to condemn the nation's greatest elk herd to months on a reservation where they may be decimated by disease than it is to find ways to restore their natural habits and environment the way we have in Yellowstone, where elk, bison, and wolves co-exist and chronic wasting disease does not.

But change is coming, thanks in part to NPCA (see sidebar). Public comment on

Park Service and Fish and Wildlife Service will heed the public's concern and improve the final record of decision. It's also encouraging that a few visionary ranchers have participated in the dialogue, in recognition of the fact that the occasional inconvenience of a plundered bale of hay is a small price to pay for the long-term consequences of a healthy livestock, and a viable elk herd that can thrive in the shadow of the Grand Tetons. **NP**

**Susan J. Tweit** began her career as a field ecologist studying sagebrush and grizzly bear habitat in the Greater Yellowstone Ecosystem. She now writes for *Audubon*, *Popular Mechanics*, and *Martha Stewart Living Radio*.



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**WHEN:** Wednesday, March 28, 2007, 6:00 p.m.

BY CONNIE TOOPS  
Illustration by Diane Fenster

# WAR BELOW THE CANOPY

Park Service managers throughout the East are finding new ways to fend off the hemlock woolly adelgid.

If you're hiking the Albright Grove trail through Great Smoky Mountains National Park, Tennessee, the massive hemlock trees towering above probably appear quite stately and serene. There's scant evidence of a life-and-death struggle overhead. Yet on the lacy boughs, greedy beetles native to Japan are methodically seeking victims.

A pinhead-sized beetle encounters a tiny ball of fluff on a hemlock branch. Like an attack dog, the beetle bites and shakes its head, shredding the woolly cocoon. Within moments it devours half a dozen orange eggs and munches the mother as well. Still ravenous, the assassin scuttles along the branch, ripping more sacs and slurping delicious eggs.

Nutrients in these eggs send the beetles into sexual overdrive. Within days, egg-laden females tuck their spawn into crevices on the hemlock branches. In two months, well-fed beetles can double in number.

**A JAPANESE BEETLE** (one of the "good guys") crawls across the page. Thousands have been unleashed in the Great Smokies and other Eastern parks.





Rapid reproduction of forest insects and disease vectors usually signals trouble. A decade ago, sudden oak death made the journey from Europe to California via nursery stock, spreading to Muir Woods National Monument, Golden Gate National Recreation Area, and Point Reyes National Seashore. White pine blister rust—a fungal pathogen accidentally introduced from Asia—now attacks whitebark, sugar, and white pines at Crater Lake National Park in Oregon. And mountain pine beetles create epidemic infestations, killing ponderosa, lodgepole, and limber pines throughout the Rocky Mountains.

But the murderous melodrama taking place in the Great Smokies is a little different. The parks' resource managers are actually hoping that *Sasajiscymnus tsugae*—predator beetles wearing shiny black shells—can defeat hemlock woolly adelgids, which hide under white shrouds.

Both combatants hail from the forests of Japan, where trees similar to eastern and Carolina hemlocks grow. The cause of all the troubles, woolly adelgids (pronounced “ah-DEL-jidz”) do little harm to Asian trees, but in 1951 they were discovered near Richmond, Virginia, delivered via nursery plants. With no natural predators, the pests' numbers increased exponentially. One adelgid can produce enough offspring to kill a hemlock tree in five years. Hiding in potted plants, hitching rides on migrating birds, and sailing on strong winds, they've spread from Maine to Georgia. Ghost forests of dead hemlocks, such as those at Delaware Water Gap National Recreation Area and Shenandoah National Park, mark their wake.



**OLD-GROWTH EASTERN HEMLOCKS**, like this tree in the Great Smoky Mountains, have a fighting chance against the invasive woolly adelgid thanks to the introduction of the adelgid's natural predator—a beetle from Japan.

© Bill Lea

Perhaps the saddest demise is Shenandoah's Limberlost, a magnificent stand of hemlocks with trees as old as 350 years. In their prime, the beautiful, ancient trees mirrored the look of the Pacific Northwest, according to Shenandoah biologist Rolf Gubler.

Gubler began working at Shenandoah in 1988, the same year hemlock woolly adelgids appeared in the park. While Shenandoah's forest health team was busy battling gypsy moths—another invasive species whose caterpillars defoliate oaks—adelgids slipped unchecked into pristine hemlock sites including Rapidan Camp, Hemlock Springs, and the Limberlost. By

the mid-1990s, hemlocks were dying. Resource technicians began the only treatment available, spraying horticultural oil or insecticidal soap on selected trees. These garden-safe substances, made from fatty acids, kill existing adelgids but cannot prevent new invasions.

Workers reached as many infested hemlocks as they could from the park's administrative roads. Treatments were effective, but there was no budget to conduct further work on a frequent basis, so reinfestation from trees in adjacent areas was pervasive, according to Gubler. Because cold winters inhibited the spread of hemlock woolly adelgids and Limberlost's 3,500-

foot elevation made it one of the cooler areas of the park, there was hope the altitude would protect the trees. Indeed, Limberlost was one of the last remaining hemlock stands, but droughts in 2000, 2002, and 2003 provided a “knock-out punch” for the shallow-rooted sentinels.

Dead hemlocks are messy—branches fall, chunks drop from their tops, and trunks shatter, posing a costly maintenance challenge. Hemlock forests generally resist exotic invasive plants because they create such dense shade, but after adelgids denuded the branches, invaders including garlic mustard, Asian lady’s thumb, tree-of-heaven, and Paulownia sprouted alongside native black birch, tulip poplar, and red maple. Environmentally sensitive large purple-fringed orchids that once thrived in the shade struggled to compete. Preliminary surveys suggest conifer-dwelling birds—including breathtaking Blackburnian warblers and tiny winter wrens—have all but disappeared, replaced by robins and goldfinches.

About 1,200 chemically treated hemlocks survive at Shenandoah. “People may wonder why resource managers didn’t do more to save the hemlocks, but back then we didn’t know what worked well,” says Gubler. “Our techniques, access, and budget were limited, and biocontrols weren’t available. What happened at Shenandoah is a shame, but it served as an important early warning for others.”

And it’s not just the sprawling natural parks that heeded the warning. Forestry technician Irene Van Hoff discovered the pests on hemlocks at Carl Sandburg Home National Historic Site in western North Carolina in 2001. The park unit preserves a 263-acre farm owned by the noted writer, including graceful hemlocks along the entrance road and behind the plantation house. “The park’s grounds without hemlocks would be like the Sandburg Home without

books—the void would be immense,” says Superintendent Connie Backlund. “We’re dedicated to doing everything possible to keep that from happening.”

Resource personnel donned Tyvek safety suits and employed a special pumping system and platform lift to coat the tall trees with insecticidal soap. The hemlocks’ location along the main visitor walkway and around the historic home posed several challenges, and ongoing maintenance required the skills of half of the small park’s staff. Even though the pests were temporarily vanquished, there is no ongoing funding

for hemlock woolly adelgid control of this magnitude.

Fortunately, Van Hoff consulted nearby Forest Service experts and obtained emergency funds to inject an insecticide into the soil, which is then absorbed into the trees’ twigs and needles. Adelgid nymphs the size and color of black pepper flakes generally crawl to areas of new needle growth, attach themselves to the tree, and suck the life from their hosts; if hemlocks are treated with insecticide, adelgids ingest it and die.

Residual insecticides persist at least two years, making soil injection less costly than



**ONE WOOLLY ADELGID** can produce enough offspring to kill a hemlock in five years (see *infestation*, top left). But focused pesticide treatments (far right) have proven effective in preserving hemlocks.

CLOCKWISE FROM TOP LEFT: © Bill Lea, © Connie Toops (2)



**TOWERING HEMLOCKS** keep the forest's understory cool and shaded, allowing a unique ecosystem to thrive, including the rosebay rhododendron, red eft salamander, and various fungi.



CLOCKWISE FROM LEFT: © Connie Toops, © Bill Lea, © Pat and Chuck Blackley

repeated foliar spraying. For a thousand dollars' worth of chemicals and several weeks of her time, Van Hoff can treat half the park's 800 hemlocks annually, keeping adelgids at bay. As she strolls through the allée of trees that Lilian Sandburg planted decades ago, she is encouraged by healthy new growth. Personnel at the Sandburg home also provide expertise to those who live adjacent to the park, fielding hundreds of phone calls, demonstrating techniques to private-property managers, and organizing workshops so community residents are better able to preserve their hemlocks.

Meanwhile, 100 miles away in the Great Smoky Mountains of Tennessee, hemlocks blanket some 4,000 acres of the largest wilderness in the eastern United States. Virgin hemlocks include the national champion—165 feet tall—and numerous behemoths

exceeding 400 years old. Here, hemlocks grow quite widely, along cool streams as well as mountain slopes, creating a stable forest ecosystem. Little light penetrates mature trees, and decades of decomposing needles produce acidic soils. Certain specialized plants, including pink lady's slipper orchids, downy rattlesnake plantain, and polypody ferns, survive well in these conditions. Distinctive songs of scarlet tanagers, black-throated green warblers, and solitary vireos reverberate in the cathedral-like forests. Smoky shrews, southern red-backed voles, hoary bats, and several species of salamanders also dwell there.

More than a decade ago, Smokies resource managers realized that hemlock woolly adelgids would eventually assault the park. They began collecting baseline data on healthy forests, preparing to meet the enemy

head-on. When adelgids appeared in 2002, they were met by an emergency response team with backpack sprayers ready to fend off the threat. Within months, workers upgraded to motorized rigs, spraying accessible trees at Cades Cove, Elkmont, and along roadsides. As expected, adelgids continued to stream into the park from surrounding forests and private property. Most hemlocks are now under siege. In 2006, the park spent nearly \$850,000 to keep hemlock woolly adelgids in check.

"Foliar treatments are very effective," says Smokies forester Tom Remaley. "The spray kills every adelgid it reaches. And soil drenches work great on old-growth trees: We dig a shallow trench, pour in the proper amount of insecticide, and cover it. Effectiveness depends upon individual tree health, rainfall, and soil condition, so we

monitor annually.” Most trees drenched three years ago are still protected. As of August 2006, some 40,000 hemlocks have been treated.

Managers learned from the Limberlost incident and want to keep Smokies hemlocks alive for aesthetic as well as practical reasons. It costs \$19 to drench a mature hemlock, versus \$150 to clear it when dead. Biologically, it’s imperative to keep old-growth hemlock forests intact. Irreplaceable trees in Albright Grove, Ramsey Cascades, Greenbriar Pinnacle, and Boogerman Loop have been doctored. In the past decade, the Forest Service and several universities have tested the impact of the release of predatory beetles from Japan and the Pacific Northwest, revealing no unwanted side effects, and reduced hemlock woolly adelgid populations in Virginia and Connecticut. Nearly 175,000 shiny black *Sasajiscymnus tsugae* predator beetles have been unleashed

in Great Smokies hemlock stands; *Laricobius* beetles, another promising predator, are also being tested.

“We’ll be living with hemlock woolly adelgids forever,” says Remaley. “We want to keep the backcountry trees alive until beetles reach them. Our goal is to limit tree mortality as predators come into equilibrium with adelgids. Research shows positive results from biocontrols, but we need a lot more beetles.”

Funding from the Park Service, Forest Service, and Friends of the Smokies supports a beneficial insect lab at the University of Tennessee, where predators are raised. On the retail market, these tiny creatures are worth more than their weight in gold. Even so, private landowners are purchasing the few available beetles to release in their own hemlock groves. Some Appalachian residents are old enough to remember the

demise of the American chestnut, and many fear losing another important component of the Eastern forests.

For anyone who loves hemlock-shaded mountainsides where orchids, trilliums, ferns, and salamanders flourish, where the sweet song of the winter wren splashes down mossy streams, the loss of eastern and Carolina hemlocks is unthinkable. Thus we pin our hopes on tiny beetles, hungrily seeking adelgids, and try to keep enough trees alive to achieve the natural balance required for hemlock ecosystems to survive. NP

Former park ranger **Connie Toops** lives in forestland near Marshall, North Carolina, where she recently released predator beetles to combat hemlock woolly adelgids on her own property.



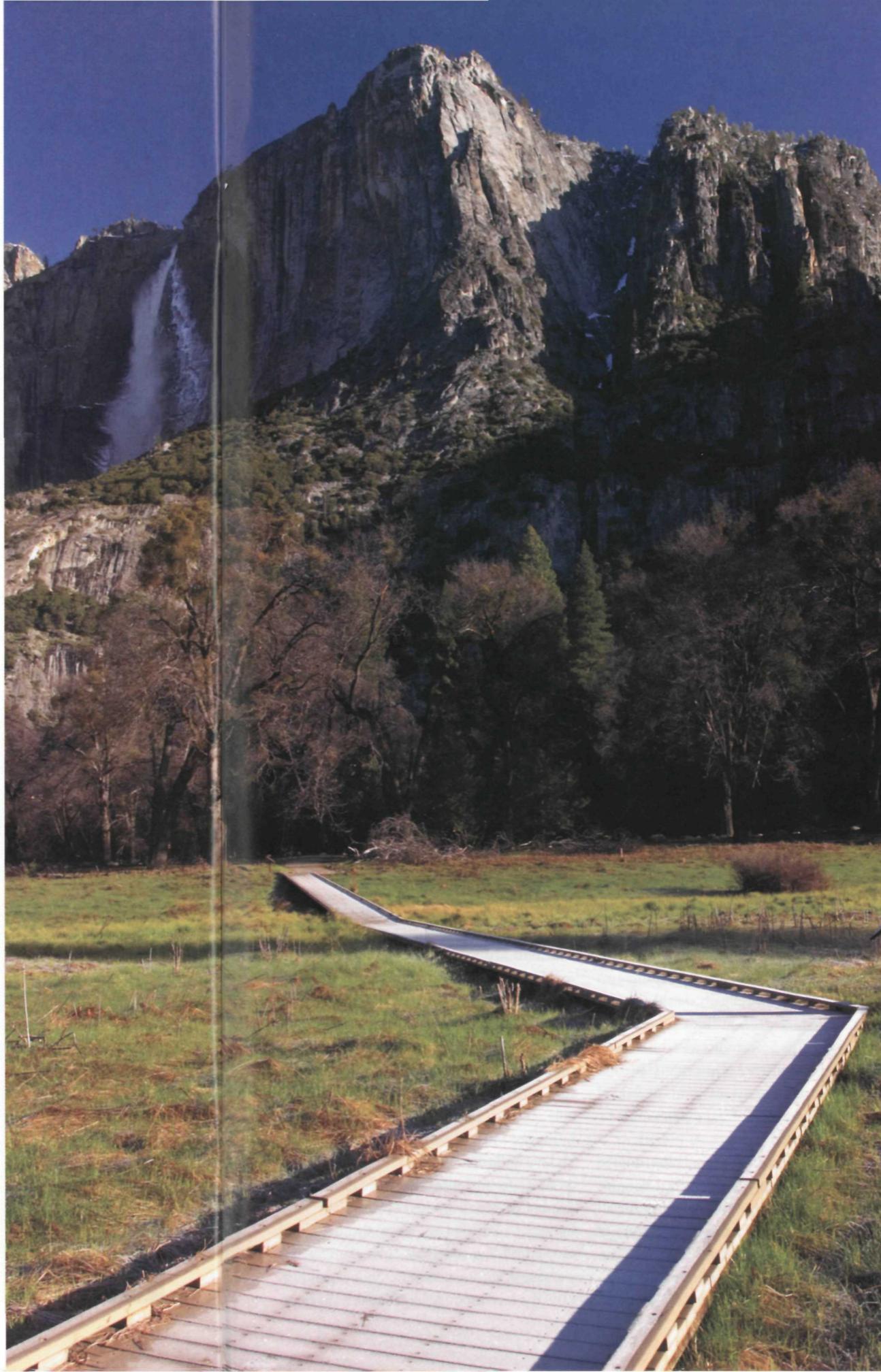
**THE TREATMENT OF HEMLOCKS** around the Carl Sandburg home in North Carolina is important not only for the preservation of nature, but also for the preservation of history.

© Connie Toops

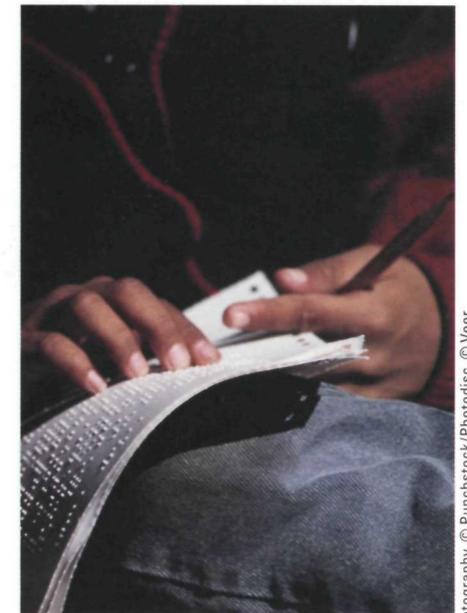
BY SETH SHTEIR

# Open TO INTERPRETATION

The National Park Service is making a concerted effort to share all of the nation's treasures with all of America—including those with disabilities.



**UNIVERSAL DESIGN** is making parks more accessible to people with disabilities. The wheelchair-friendly boardwalk that cuts through Yosemite Valley (*left*) is just one result.



CLOCKWISE LEFT TO RIGHT: © Gary Crabb/Enlightened Images Photography, © Punchstock/Photodisc, © Veer

One challenge is the tension between the Park Service mandate to leave park resources “unimpaired for future generations” and its obligation to provide access to all.



© Fotostudio FMZefa/Corbis

**R**oxanne Patin’s excited middle school students touch the bark of a giant sequoia, marvel at fresh mountain snow, and try to create a rope circle large enough to hold the entire class. They are spending the week as residential campers at the Yosemite Institute, located in Yosemite National Park. But 30 years ago, such a trip would have been nearly impossible for this group of children who have one thing in common—a host of physical and learning disabilities.

When planning facilities and programming for people with disabilities, the National Park Service is getting better at providing access for people with hearing loss and those who are deaf, but making sites accessible for the blind remains a challenge. “Programmatically we have barely scratched the surface,” says Ray Bloomer, director of technical assistance and education for the National Center on Accessibility and an accessibility specialist for the National Park Service.

Much of the progress made in recent decades was spurred by three important pieces of legislation: the Architectural Barriers Act of 1968, the 1973 Rehabilitation Act, and the 1990 Americans with Disabilities Act. The Architectural Barriers Act requires that buildings be made accessible for people with mobility limitations. Section 504 of the 1973 Rehabilitation Act mandates programs for people who are physically disabled, visually impaired, or deaf, but doesn’t stipulate how they are to be conducted. The Americans with Disabilities Act goes a step further and requires that any state, local, or federal project that receives federal dollars must be made accessible.

Recent park planning is being guided by a principle known as “universal design,” which seeks to increase accessibility for all visitors. For example, a bronze sculpture of Yosemite Falls serves people who are visually impaired, but also gives all visitors a tactile experience. The rangers at Yosemite

frequently pour a cup of water on this sculpture to demonstrate how water moves over Yosemite’s glaciated landscape.

Although the National Park Service has shown interest in improving accessibility, a recent panel of park visitors who are disabled gave critical testimony about their experiences before the U.S. House Subcommittee on National Parks, Recreation, and Public Lands. One witness complained that her daughter, who has a hearing loss, was unable to obtain audio aides at any of the national parks they visited. Another reported that people with physical disabilities were prohibited from using Segway scooters at the Jefferson Memorial and Zion National Park because they were considered motorized vehicles.

According to Karl Pierce, chief interpretive ranger at Cabrillo National Monument near San Diego, the greatest challenges to making parks more accessible are adequate funding, staffing, time, and technological limitations. Another challenge is the tension between the National Park Service mandate to leave park resources “unimpaired for future generations” and its obligation to provide access to all. These dual goals can create hard choices for the management of historic and natural resources.

Changes to Independence Hall in Philadelphia provide a good example. The Park Service had hoped to make the first level of the building accessible from the rear but was faced with a dilemma. Should workers raise the land around the original staircase to



© Ruairdh Stewart/ZUMA/Corbis

provide access to the first level or should they maintain the original character of the historic landmark? They finally opted for a creative solution: They built a ramp to the first level and preserved the original staircase.

Programming is another way to extend the park experience for people with disabilities. It might be impossible to provide universal access to tide pools or cliff dwellings at the bottom of a steep canyon. One solution would be to screen a film about tide pools in a visitor's center or display a model of an ancestral Puebloan village in an accessible area. Tactile exhibits, models, virtual tours, and films with audio description are all examples of accessible programming that can help people with disabilities gain better access to park resources.

On the West Coast, Yosemite National Park placed a special guide on its Web site that highlights accessible park facilities and services including parking, food service, shuttle buses, environmental education, trails, campsites, and service animals. Additionally, many of the new renovations in the Yosemite Valley will be accessible. A recent park survey shows that 66 percent of Yosemite's visitors rate access for people with disabilities as extremely important.

Rangers at the visitor centers provide temporary disability placards to those who request them, with few questions asked. The sign permits the driver to use service roads that are not available to most tourists. Roxanne Patin, a disability coordinator for the Pittsburg Schools who brings her students

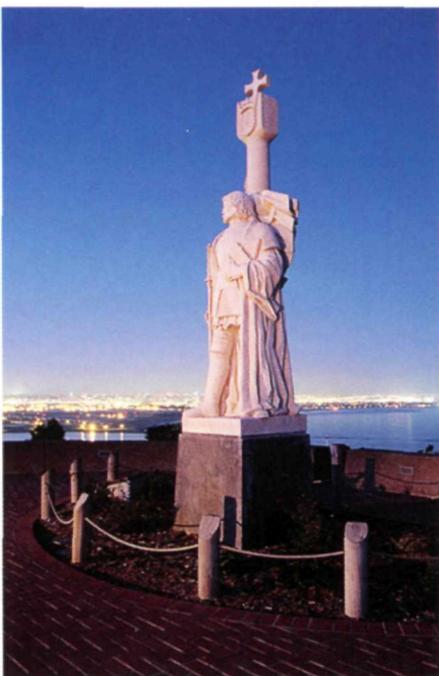
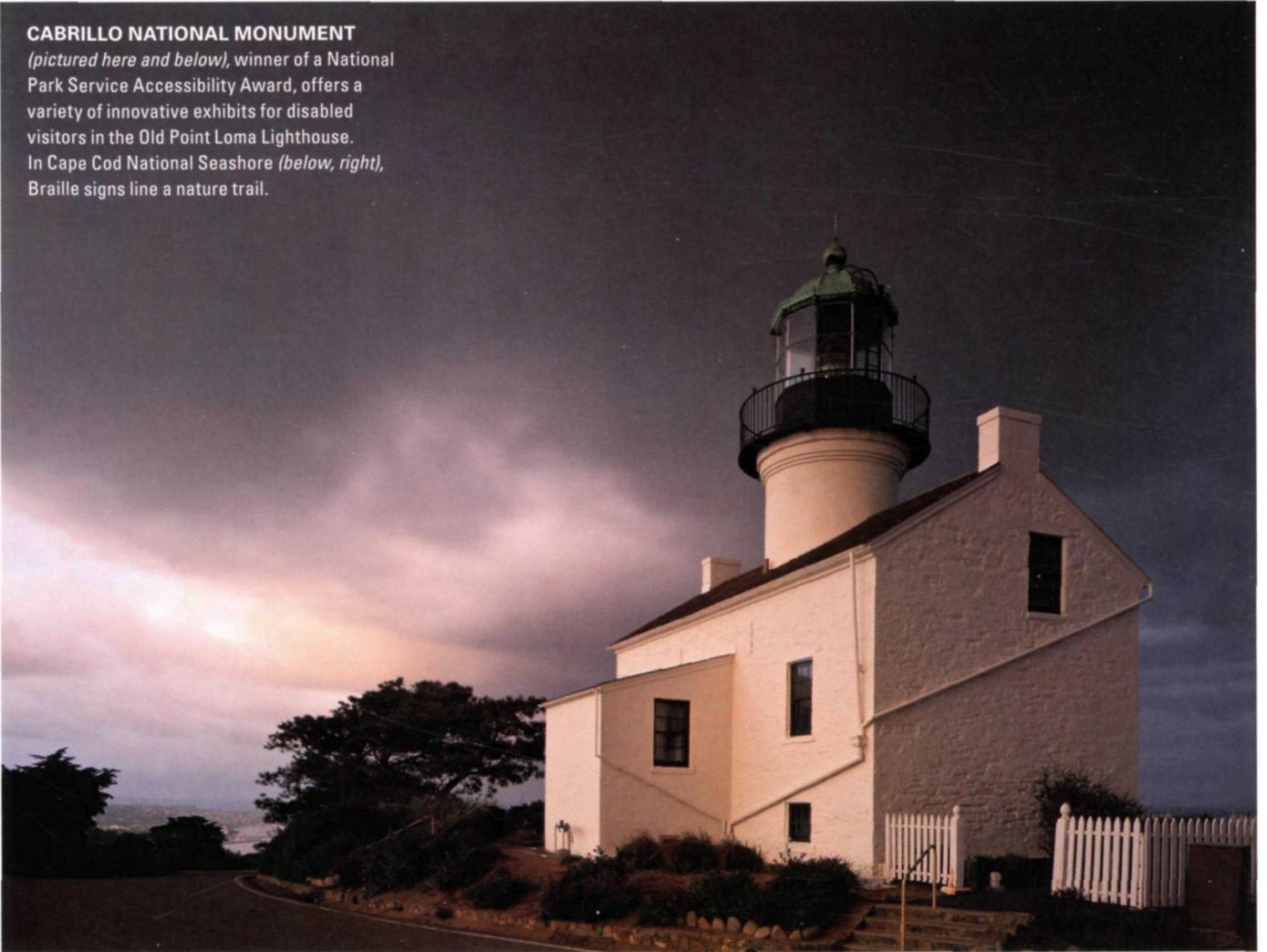
**BY OFFERING ACCESSIBLE BUSES** and constructing signs that can be easily read by people in wheelchairs, Yosemite National Park has expanded the visitor experience to those with special needs.

to the Yosemite Institute, has found the disability placards invaluable. A bone disease limits her mobility, and she's frequently accompanied by a service dog. "I can drive within 40 yards of Mirror Lake," she says. "Otherwise, I'd be walking one-and-a-half-miles with a steep grade."

Yosemite's new fleet of comfortable hybrid buses is designed to accommodate wheelchairs, and the principle of universal design is guiding renovations in the Yosemite Valley. The east side of the Yosemite Falls Trail is

**CABRILLO NATIONAL MONUMENT**

*(pictured here and below)*, winner of a National Park Service Accessibility Award, offers a variety of innovative exhibits for disabled visitors in the Old Point Loma Lighthouse. In Cape Cod National Seashore *(below, right)*, Braille signs line a nature trail.



CLOCKWISE FROM TOP: © Laurence Parent, © Pat and Chuck Blackley, © Richard Cummins

accessible, as are some of the bathrooms and picnic areas. Wheelchair-accessible boardwalks are under construction in the Yosemite Valley meadows. The new facilities are designed to accommodate not only people with disabilities, but also people of a variety of ages, says Adrienne Freeman, a public information officer at the park.

Nanette Oswald, a seasonal ranger at Yosemite and the coordinator of services for the deaf, provides signing interpretation for visitors with hearing loss and those who are deaf. She has conducted programs in Wawona, Glacier Point, and Tuolumne Meadows. "Families with hearing-impaired children are thrilled to have an interpreter that signs," says Oswald. When she's not working in the park, she conducts public outreach, encouraging members of the deaf community to visit Yosemite.

Hundreds of miles away, at the southern tip of California, lies Cabrillo National Monument, winner of the 2005 National Design Project Achievement Merit Award and a 2006 National Park Service Accessibility Award for its Lighthouses of Point Loma exhibit. The monument celebrates the voyage of Juan Rodriguez Cabrillo, a 16th-century Spanish explorer. It is also the site of the 19th-century Old Point Loma Lighthouse, tide pools, and rare coastal sage scrub habitat.

"We've been working hard over the last several years to improve accessibility," says Karl Pierce. Entrance fees have provided the park with revenue to build accessible parking spaces, routes to the visitor center with curb cuts, signs that direct wheelchair users to the most accessible paths, and an accessible auditorium. Just as they can at Yosemite, visitors with mobility limitations can get a one-day placard that permits them to drive right up to the Old Point Loma Lighthouse, where ramps and pathways lead to the Assistant Keepers Interpretive Shelter. Visitors who might have trouble negotiating the lighthouse stairs can view a floor plan and a photo exhibit of rooms within the Old Point Loma Lighthouse; an audio tour is also available.

But the innovations at Cabrillo National Monument go beyond making facilities accessible to people with mobility limitations. Two interpretive movies, *In Search*

*of Cabrillo* and *Tide Pools: On the Edge of Land and Sea*, are captioned for people with hearing loss. In the coming years, the park plans to add voiceover narration that describes scenes in the film for those who are visually impaired. Two sculptures allow visitors to feel the form of a gray whale and the buildings associated with the Old Point Loma Lighthouse. In past years, the park has staged a play titled *Voyage of Cabrillo* with American Sign Language translation.

The use of universal design isn't restricted to the West Coast. Natchez Historical Park, located in Mississippi, was the winner of the 2005 National Park Service Accessibility Achievement Award. The park interprets the history of the antebellum South and includes the William Johnson House, the home of a former slave who went on to become a successful African-American businessman and diarist.

The home's exhibits include a talking tactile model of historic buildings and a narrated digital diary-touch screen program that cues to hand-held MP3 players. The large tactile model shows three of the buildings in the Johnson complex. Visitors can activate an interpretive recording by touching the buildings. While the audio recording plays, a monitor shows the narration so visitors with hearing loss can learn about the buildings' history; visitors can also view more than 70 exhibit panels and artifact cases with text interpretation.

The audio stations, which are wheelchair accessible, contain two tracks depicting life in the antebellum South. One highlights the Main Street Barbershop, one of Johnson's businesses, with audio programming that recreates the sounds of white Southerners discussing politics and business while they get their hair cut. Another track reproduces sounds that might typically be heard in the William Johnson house, including dogs barking, children playing, and family members talking.

In addition to audio tracks, three large etched-glass panels contain pages reproduced from Johnson's diary and sketches. Visitors can trace Johnson's original penmanship and feel the outlines of people and objects Johnson writes about in his diary.

Some of the Park Service's groundbreaking exhibits have served as a model for state and local parks as well.

"In many ways [the exhibits] are groundbreaking," says James Heaney, chief interpretive ranger at Natchez Historical Park. "The tactile exhibit has served as a model not only for the national parks, but for state and local parks as well."

Natchez Historical Park, Cabrillo National Monument, and Yosemite National Park show that making parks more accessible benefits all visitors. Although much more needs to be accomplished to create equal access for visitors who are disabled, the National Park Service is making significant progress. From the snow-capped Sierras to the historic buildings of the antebellum South, the concept of universal design is creating a road map for the planning of accessible facilities and programs. The challenge of the park planning process is, in the words of Ray Bloomer, "taking every opportunity to incorporate the needs of people." NP

For information about travel opportunities catered to those with disabilities, visit Environmental Traveling Companions at [www.etctrips.org](http://www.etctrips.org) or the Society for Accessible Travel and Hospitality at [www.sath.org](http://www.sath.org).

Seth Shteir is a teacher and conservation chair of the San Fernando Valley Audubon Society.

BY JEANINE BARONE

# Winter wonderland

**From herons to heroes, New York City's national parks have plenty to offer at the dawn of the new year.**

**N**ew York City pulses with energy, even in the dead of winter when icy breezes sweep across the Hudson and East Rivers and gust down the canyons of Wall Street. Even as the occasional blizzard blankets thoroughfares once bustling with yellow cabs, silencing the cacophony of car horns, New Yorkers are a plucky bunch—known to cross-country ski through virgin snow on Madison Avenue before the snowplows get in gear.

Those who visit New York in January will have plenty to write home about: Astronomical hotel rates are at their most affordable, and you're more likely to find a table at Gramercy Tavern, a room

EXCURSIONS



**IN THE MIDDLE OF WINTER** snowstorms, New York City manages to keep its charm.  
© Marvin Koner/Corbis

© Steven Weinberg/Getty Images, © Bob Krist/Corbis



© Buliary-Lomto/Getty Images

**WEARY TRAVELERS** can take a break from the national parks and find refuge in the wilderness of Manhattan's Central Park or ice-skating at Rockefeller Plaza (below).



© Stefano Amantini/Corbis

with a view of Central Park, or tickets to *Wicked* and other plum Broadway shows. But visitors who pry themselves from New York's shopping, art, and culinary delights discover that Gotham is home to one of the most varied collections of national park sites in the country. As you would expect from a city that's a model of superlatives, New York has everything from icons such as the Statue of Liberty, to historic sites like the African Burial Ground and Ellis Island, to one of the largest bird sanctuaries in the Northeast. And, in the winter, you'll have these and other venues almost to yourself.

### **General Grant National Memorial**

Touring a tomb sounds like an activity best suited to those interested in the macabre. But General Grant National Monument—commonly known as Grant's Tomb—is sure to fascinate history and architecture aficionados alike. Exit the #1 train at 116th Street and Broadway and you'll find yourself in the

“Acropolis of America,” a rich cultural area with noted seminaries, churches, Columbia and Barnard Colleges, and the grand homage to General Ulysses S. Grant. Just a few blocks west, on Riverside Drive, this majestic 150-foot high neoclassical monument is dedicated to the 18th U.S. President and Civil War commander who led the Union army to victory. The majestic building sits atop a hill overlooking Riverside Park and the Hudson River. Its classical design references two famous burial edifices: the tomb of King Mausolus—one of the Seven Wonders of the ancient world, so sumptuous it coined the Latin word *mausoleum*—and the Invalides in Paris, Napoleon's final resting place. Inside, the vaulted walls of the marble rotunda depict Grant's life in allegories in relief, illustrating his three greatest military victories in mosaic lunettes. In the sunken crypt's twin sarcophagi, Grant and his wife, Julia, lie beneath the structure's colossal dome. The Park Service offers three guided tours of the monument each day

and special programs, such as the Life of the Soldier with costumed interpreters demonstrating musket firing. For more information, visit [www.nps.gov/gegr](http://www.nps.gov/gegr).

### Gateway National Recreation Area: Jamaica Bay Wildlife Refuge

Wilderness in New York may seem a foreign concept to anyone who flies into John F. Kennedy International Airport. But this congested landing strip sits adjacent to the Jamaica Bay Wildlife Refuge, a stopover along a heavily traveled air lane of a different type: the Atlantic Flyway. In the past 25 years, some 330 bird species have been recorded in the refuge's 9,000-acre urban oasis of wetlands and woods.

From Manhattan, the A train drops you in Queens at Broad Channel, a 15-minute walk to the refuge's new visitor center. Cold weather shouldn't dissuade you from exploring this peaceful refuge where rangers lead walking programs, such as a hawk watch or identification of winter waterfowl. If you walk the nearly two-mile West Pond Trail and the pond isn't frozen, brant, snow geese, a great number of ducks, and, during mild winters, great blue herons may appear. Don't miss the wooded North and South gardens planted with cedars, gray birches and cottonwoods. (The Upland Trail Guide points out the flora.) Check the cedars for saw-whet owls. Across six-lane Cross Bay Boulevard is an even more off-the-beaten-track plot around Big John's Pond, a hub for a series of short trails. At the bird blind, visitors may hear a goldfinch's call or spy a sharp-shinned hawk cruising through the woods. Binoculars are a must-have for your visit. For information, visit [www.nps.gov/gate/jbu/jbu\\_home.htm](http://www.nps.gov/gate/jbu/jbu_home.htm).

### Statue of Liberty National Monument

Throughout the world, even a glimpse of the Statue of Liberty immediately brings to mind New York. Since 1886, the grand dame of freedom designed by Frenchman Frederic-Auguste Bartholdi has greeted visitors, immigrants, and native New Yorkers alike as they enter New York Harbor

or fly above lower Manhattan. Although the top of the statue has been closed since 9/11, crowds regularly pack the ferries from Battery Park to tour the interior and the fabulous museum at the statue's base. (Make a reservation for a pass at least 48 hours in advance.) In January, you'll notice that visitation thins out dramatically as you stroll the exterior of the monument with a ranger or audio guide or wander through the museum. There, exhibits feature an illustration of the ancient repoussée technique used to build the statue, a photo of Bartholdi's mother, reputed to have inspired Liberty's face, and the original iron armature



CLOCKWISE FROM LEFT: © Mattie E. Hewitt/Corbis, © Rebecca Steele/realstill.com, © Johann Schumacher Design

bars that Alexandre Gustave Eiffel—of later Eiffel Tower fame—developed to support the 310 panels that make up Liberty's thin copper skin. Later, take the elevator to the observatory where visitors gaze up through a glass panel into the statue's innards with their famed double helix stairs. No matter how you tour the monument, you'll be treated to sweeping views of New York's emblematic sites, including Governors Island, the Brooklyn Bridge, and the Empire State



**MUST-SEE PARK SITES** include (clockwise from left) Teddy Roosevelt's birthplace (photographed in 1923), General Grant's Tomb (featuring a bust of a fellow Union general), and Jamaica Bay Wildlife Refuge, a prime birding location.

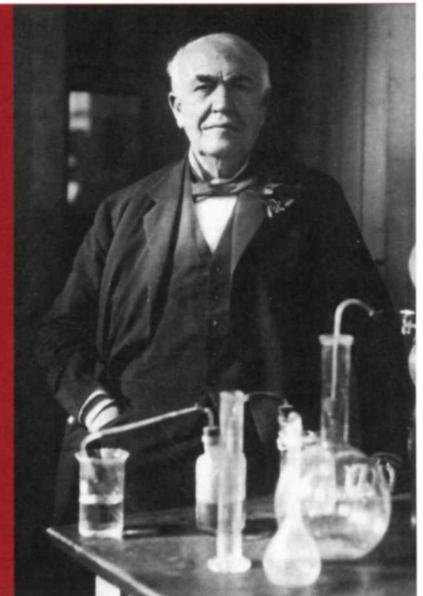


CLOCKWISE FROM LEFT: © Chris Collins/Corbis, © Justin Lane/epa/Corbis, © Bettmann/Corbis

**ICONIC STRUCTURES** like the Flatiron Building and the Statue of Liberty symbolized a better life for immigrants like this family. Ellis Island processed more than 12 million immigrants from 1892 until 1954.

### Side Trip: Edison National Historic Site

As a visitor to Glenmont—Thomas A. Edison’s sprawling ten-acre estate in West Orange, New Jersey—you’ll be walking in the footsteps of guests ranging from Henry Ford to the King of Siam. The 29-room Queen Anne mansion and outbuildings, located in Llewellyn Park—the nation’s first gated community—as well as the inventor’s lab a mile away, make up the Edison National Historic Site. A short train ride from New York’s Penn Station to Orange via New Jersey Transit brings you within a 15-minute walk of the mansion, where the Park Service provides hourly tours. As you stroll through rooms furnished with the original Victorian adornments, you can’t help being immersed in Edison’s life, including the last third of it spent here with his second wife, Mina. A reproduction of Edison’s first tin-foil phonograph and home projecting kinoscope decorate the den. The garage houses his Model-T and Mina’s electric cars. Closed for the past three years for renovations, Edison’s lab is expected to reopen in the summer with a display of his collection of consumer phonographs and views of the room where he made the first motion picture. For information, go to [www.nps.gov/edis/home.htm](http://www.nps.gov/edis/home.htm).



© Bettmann/Corbis

For a city that's chock-a-block with skyscrapers, Manhattan is dotted with a surprisingly generous share of urban greenspaces.

Building. For more information, check out [www.nps.gov/stli](http://www.nps.gov/stli).

### Ellis Island

After you leave Liberty Island, a ten-minute ride brings you to Ellis Island, also part of the Statue of Liberty National Monument, which documents the life and times of the 4,000 to 5,000 new arrivals who were processed daily during the peak immigration years from 1892 to 1924. Plan to spend about two hours exploring the Ellis Island Immigration Museum situated in the grand red brick Main Building. The renovated Great Hall, or Registry Room, stands as it did from 1918 to 1924, with the stairs where immigrants filed past medical doctors—aka “six-second specialists”—who observed them for a provisional diagnosis of ailments, and benches where they waited to answer the inspectors’ stream of questions. The three floors contain artifacts galore: three-tiered dormitory beds, steamship tickets, and wooden trunks. In the galleries surrounding the Great Hall, immigrants communicate silently through the black and white photographs on the walls, and their voices come alive through audio headsets. The Park Service provides several ways to view the museum: rangers’ hourly tours, self-guided audio tours, the documentary film *Island of Hope, Island of Tears*, and the recreation of a Board of Inquiry hearing for immigrants who were denied entry. This winter on Ellis Island, a special exhibit of contemporary photographs focuses on the hospital wards of the former self-contained city.

### Theodore Roosevelt's Birthplace National Historic Site

For a city that's chock-a-block with skyscrapers, Manhattan is dotted with a surprisingly generous share of urban greenspaces. One such area, Gramercy Park, in a fashionable

East Side neighborhood of the same name, holds the distinction of the last private park to remain relatively unchanged since 1840. Peek through the iron gates that are locked to all but residents of the surrounding apartment building and guests at the recently renovated Gramercy Park Hotel. This exclusive community, still featuring some original 19th-century townhouses, is where Theodore Roosevelt spent his first 14 years in his family's Italianate brownstone (the building administered by the Park Service is a reconstruction built in the 1920s). Today, gourmands flock to the area for its fine restaurants, notably, Gramercy Tavern, where you can avoid the sky-high dinner prices by choosing the \$36 prix-fixe lunch. Nearby on East 20th Street, join one of the Park Service's hourly tours through five period rooms of Roosevelt's reconstructed boyhood home and two museum galleries. The Victorian-era brownstone houses memorabilia including Roosevelt's Brooks Brothers Rough Rider uniform and his white shirt marred by a prominent bullet hole, evidence of a 1912 assassination attempt. You'll come to view our 26th President as an explorer, adventurer, and naturalist as you examine T.R.'s boyhood bird taxidermy and the stuffed East African lion bagged during one of his safaris. Each of the house's chambers is well appointed, with highlights such as the red velvet chair in the library where he studied, and the original satin-and-rosewood-veneered furniture in the master bedroom. In the formal parlor, displayed for the first time, are intricate brass, enamel, and porcelain mantle pieces. For more information, visit [www.nps.gov/thrb](http://www.nps.gov/thrb). NP

**Jeanine Barone** bikes, hikes, and cross-country skis all over the world, including in her native New York.

## Travel Essentials

For information about hotels, shopping, nightlife, Winter Restaurant Week, and other travel details, contact [www.nycvisit.com](http://www.nycvisit.com). Fly in to Newark Liberty International and take the AirTrain to Penn Station, then hop on the subway. (JFK's AirTrain takes you to Jamaica or Howard Beach in Queens where you can board a subway for Manhattan.) From LaGuardia airport, your best bet is a shuttle to Manhattan via New York Airport Service (800-872-4577). Although most visitors enjoy walking the city's streets in milder seasons, a faster alternative on cold winter days is the 24-hour subway ([www.mta.info/nyct/subway](http://www.mta.info/nyct/subway)). Metrocards are used on all subways and buses and can be purchased for a single trip, one day, or even a week of unlimited travel. Don't be surprised by random bag checks conducted by the police. Because of increased security, all visitors go through airport-style screening before boarding the Statue of Liberty/Ellis Island ferry or entering the monument, so avoid bringing large bags, packages, and items typically prohibited by airport screeners.

© Scott Kirkwood/NPCA

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A BACKPACKER HIKING  
in Capitol Reef National Park, Utah



© ANTHONY JOHN WEST/CORBIS

# The Lost Arch

Guidebooks measure trail mileage down to the foot and pin a mountain's elevations to the inch, but how can you put mystery on a map?

There were, by my count, 27 different hikes listed on the trail brochure the ranger had given me, hikes ranging from one-tenth of a mile to multi-day overnight treks. The shelves of the visitor center were lined with guidebooks spelling out literally hundreds of potential routes complete with GPS coordinates for campsites, detailed directions to the best rock art panels, and suggestions for the best perches from which to watch the desert sunsets. It was all there, it seemed—a step-by-step guide to enjoying the backcountry of Utah's Capitol Reef National Park. But I had something even better: I had an old napkin.

It's a fine desert morning, the sun just now warming the back of my neck, the sky that perfect blue, aster blue, as if you could hold a pinch of it to your nose and inhale the fragrance of wildflowers. There is no movement but the slow puffs of dust raised from

each drumbeat of my boots on the canyon floor, no sound but the slow waves of my own breath and the far-off laughter of a raven.

A few days before, I had sat in a café in Torrey drinking coffee with an old friend who knows the canyons of the Capitol Reef country like the deeply etched lines on his own hands. The conversation turned to sandstone arches. Capitol Reef is riddled with arches and natural bridges. There is the 133-foot reach of Hinkman Bridge and the double-span of Brimhall Bridge. There are Saddle Arch and Cassidy Arch, and others, all well documented, often-visited, and

too that somehow we might be buffing the element of surprise out of our national parks with too much information. What is the role of self-discovery in a backcountry experience? How do you map mystery or provide GPS coordinates to the unexpected?

As a former seasonal park ranger myself, I know that interpretation is vital in a national park. The current budget cuts in interpretation programs and staff in our national parks threaten to cut off an important way people connect with parks. But good interpretation also knows the value of a well-timed silence. It knows what not to say to keep alive the sense

their path. I scramble down into a dry gulch where the rocks clatter like dinner plates under my boots, lift myself onto a small bench of rock and then, turning once, I catch a glimmer of blue sky where there should be only solid rock. There it is.

It is not much by guidebook standards: spanning barely 30 feet and backed by a scraggly alcove, a small but graceful arch curling its sandstone arm around a chip of desert blue sky. Nameless. Not on the maps. No trail. No sign.

I crawl up on a flat rock in the shade that offers the best view of the arch and just sit. A

## Imagine what it would be like to step unaware for the first time to the rim of the Grand Canyon or to see Old Faithful erupt without the buses, timetables, and bleachers.

at the end of well-trodden trails. “But,” my friend said, “there are still a few out there that the trails haven’t found.” An edge to his voice caught my attention like a flash of color on a canyon wall. An arch that is not on the maps? Something the guidebooks had missed? I leaned in closer.

This arch, it seemed, had been discovered decades ago by a group of Eastern tourists who had so little idea where they were that they were never able to pinpoint its location on the maps. Although a lot of others had gone in looking for it, my friend said, no one had been able to find it again—not other hikers, not the park rangers, not the guidebook writers, no one. But, he said, he knew where it was.

It took some coaxing and a promise that the details would be blurred at the edges, but soon, in a conspiratorial whisper hidden by the clatter of café coffee cups, he was making faint lines on the only piece of paper we could find, a napkin.

Days later, I take one more glance at the tattered napkin, stuff it in my pocket, and step farther into the trail-less canyon. Like many hikers, I spend hours poring over maps, dog-earing my guidebook collection before a hike, planning and re-planning. But I worry

of self-discovery for the visitor. With too many guidebooks, too many interpretive signs and arrows pointing the way, an exploration can quickly become a thoughtless exercise in connecting the dots. Imagine what it would be like to step unaware for the first time to the rim of the Grand Canyon or to see Old Faithful erupt without the buses, timetables, and bleachers. Those days are gone, but at least some element is still hidden in parts of our national parks, and can remain if we let it.

At a break in the canyon rim marked with a faint squiggle on the napkin, I climb out of the canyon and strike off cross-country. Here the directions are vague, the lines lost in the creases of the napkins. Eventually, I find myself face-to-face with an unexpected cliff, indicating that I’ve veered well off course, but I don’t bother to look at the napkin again. There are cougar tracks in the sand, and I turn and follow them back down the draw.

Hours later, completely turned around and lost, I have all but given up. Sitting in the shade of a small overhang, I watch a trio of ravens carving invisible lines in the sky until my muscles begin to grow stiff. With no better idea, I step off in the general direction of the ravens’ flight, vaguely following

lizard scuttles by like a chip of rock come to life. A light wind whispers flute-like through the high note of the arch.

That hike was nearly a decade ago now. The napkin has long since turned to tatters, but the memory of that afternoon is still strong. In the years that followed, I often found myself wondering if there is a trail to that small arch now, if I could find that spot with a guidebook’s help today. I don’t know. I do know that I hope that there will always be a “lost arch” somewhere in our national parks, a nameless peak, an animal that people rarely see but one that leaves its tracks etched deeply in our souls by stalking the tales told around a campfire or in the quick, half-seen flicker of a shadow on a moonlit hillside. Even in the information age there is a place, too, for silence.

In one small afternoon of that silence so long ago, I sat quietly and alone beneath a nameless arch, watching the shadows stretch out across the slick rock, watching the wind slowly erase my faint tracks from the canyon sand. **NP**

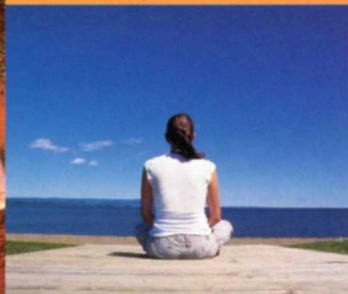
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**Jeff Rennie** is a teacher at The Conserve School in Wisconsin’s North Woods, where he teaches the literature of national parks.



The Hopewell Rocks, Hopewell Cape

Chaleur Bay



Camp above breathtaking beaches or go spelunking along the legendary Fundy shores.

All of the parks in the province have trails to explore but be sure to include the Fundy Trail on any outdoor itinerary. By car, bike, or simply on foot, you can follow the rolling Fundy coastline to inspiring lookouts, gushing falls, and trails boardwalks that dip down to hidden beaches.

# Natural Wonder...

## It's a Walk in the Park in New Brunswick!



Kouchibouguac National Park of Canada, Kouchibouguac

### Two National Parks, Endless Wonder.

Probably the pride of New Brunswick's network of parks and trails are the two National Parks. The rugged southern shoreline hosts Fundy National Park of Canada. This park is famous for its grand views of a world-renowned phenomenon.

*Nature's creativity is astounding. It's a spectacle, a show unlike any other. You see it in the towering rocks that have been sculpted by the World's Highest Tides in the Bay of Fundy or the serenity of the Chaleur Bay, so still you can't tell where water ends and sky begins. It's the delicate warmth of the rarest dunes, oldest mountains rolling like giants, or the many faces of the River Valley. This is a show. The best way to see it? Well that starts in New Brunswick's many parks and trails.*

The unique shape of the bay has created the World's Highest Tides, rising and falling an unbelievable 16 meters (48 ft.) twice a day, everyday. At high tide, you can explore the carved coastline by kayak. Just six hours later, you can walk along the ocean floor. There's also an extensive network of trails of varying degrees, so there's something for every hiker. The park is also host to a golf course as well as guided tours and excellent camping.

On the golden eastern shoreline, there's Kouchibouguac National Park of Canada, a sandy treasure that's a must for park enthusiasts. Take a dip in the lagoon where the water temperature has

been recorded as high as 30°C (86°F)! There are endless beaches to be discovered as well as miles and miles of biking through its scenic coastal trails.

### Any Outdoor Activity, All Kinds of Provincial Parks and Awesome Trails.

New Brunswick's many Provincial Parks provide the perfect backdrop for a whole host of amazing outdoor activities. The question is: what do you want to do? From championship golf near the winding St. John River to climbing the highest peak in the Maritimes, there's just so much to choose from. You can mountain bike along ridges that over look the Chaleur Bay, declared "one of the most beautiful bays in the world.

### Natural Wonders.

### Natural Comforts.

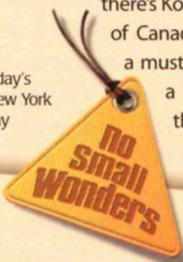
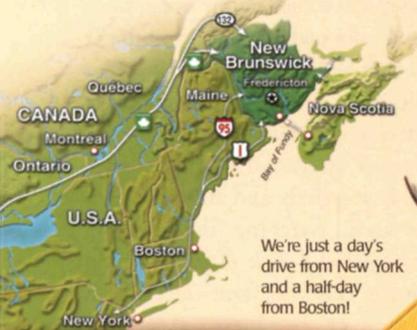
Amazingly, you'll find these unspoiled wonders amidst unmatched comforts. From all kinds of campgrounds to tucked-away B&Bs or luxury hotels in vibrant cities, there are as many ways to stay as there are places. The most succulent seafood is offered in tempting local recipes and that legendary east coast hospitality greets you around every bend.

Just a walk in the park? Not in New Brunswick's parks and trails. Here you will only find an unforgettable journey through Natural Wonder that you just have to see and feel for yourself.

The Fundy Trail, St. Martins



**Contact us for your FREE DVD and FREE 2007 Vacation Planning Kit and discover awesome vacation ideas, great value and a world of Natural Wonder.**



## Harbor Hopping in New England

From the breathtaking mansions of Newport to the picture-perfect Gay Head Bluffs of Martha's Vineyard, New England has a distinct charm that visitors remember for years to come. The rustic seaport villages and quaint island towns of the northeastern shore are rich in maritime history, and accented with Victorian clapboard houses. This cozy corner of the United States offers a wealth of activities for every type of traveler. There is so much to do it is impossible to choose just one coastal town to visit!

Luckily, American Cruise Lines offers you the opportunity to "harbor hop" the islands of New England, wrapping all of the seafaring heritage, beauty and excitement of the northeast into one amazing trip. Spend eight days cruising along the calm shores, witnessing the ever-changing scenery, stopping at fabulous ports of call, and taking in the fresh salty air. In addition, passengers will enjoy the comforts of their brand new ship, part of the newest fleet in the industry, which includes extra spacious staterooms, lounges, and a well-stocked library. Specially arranged activities and lectures will be hosted by local historians and naturalists, and tantalizing feasts including scallops and lobsters will be prepared by the expert staff of chefs. With fewer than 100



fellow passengers, guests also relish in the personalized service and utmost attention given by the all-American crew.

Why decide on one New England location to visit when you can see them all? Pack your suitcase once, and explore each charming island and bustling harbor with American Cruise Lines.

For those travelers who wish to witness the splendor of a different area along the east coast, American Cruise Lines offers eight other irresistible itineraries.

To book your New England Islands Cruise, or learn more about any of the other magnificent coastal tours call 800-814-6880 or visit [www.americancruiselines.com](http://www.americancruiselines.com).

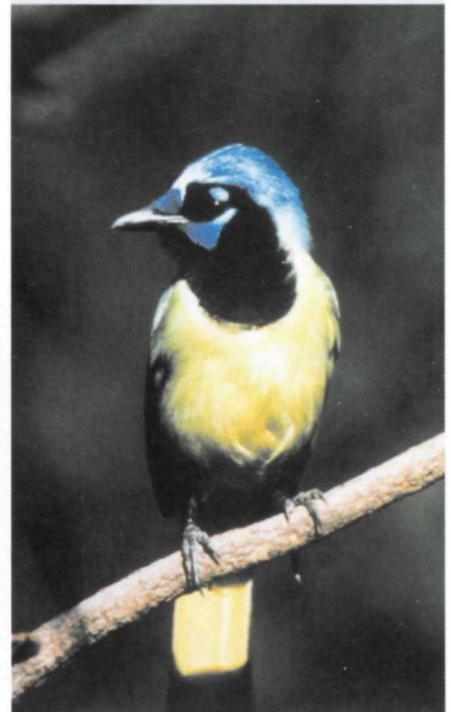


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## Yosemite: Art of an American Icon

Explore Yosemite through the eyes of its artists, experience its changing image, and learn about the national park's impact as a cultural phenomenon.

From landscape greats and contemporary photographers to native weavers, Yosemite's transition from remote haven to national destination is the focus of Los Angeles' Autry National Center's exhibition, Yosemite: Art of an American Icon. This exhibition consists of more than 140 art pieces and 9,000 square feet of space. Spanning three centuries, the exhibition examines the ways in which artists have shaped the park's visual identity over time, the reflexive impact of Yosemite in their efforts, and Yosemite's ongoing relevance as a distinct, contemporary Western landscape that is visited by more than three million people each year. The exhibition also seeks to establish a comprehensive and inclusive



art history for one of America's premier landscape icons.

Part One: 1855-1969, is open September 22, 2006 through January 21, 2007 in the George Montgomery Gallery. Part Two: 1970-Present is open November 10, 2006 through April 22, 2007 in the Showcase Gallery.

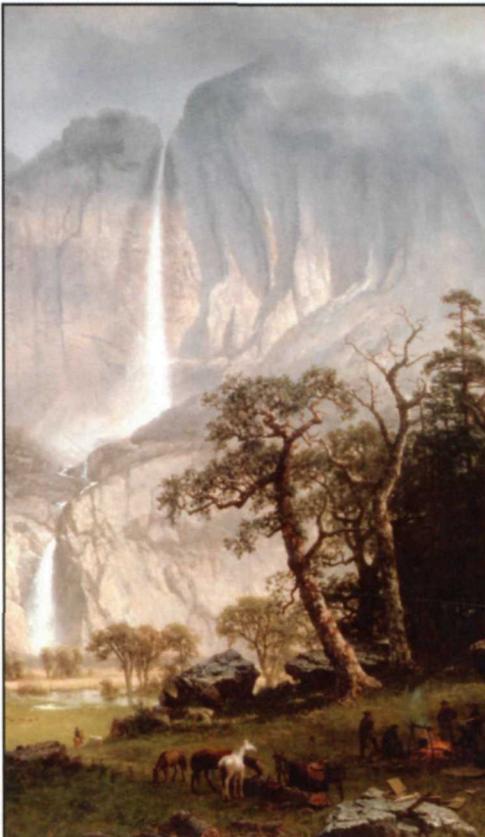
For more information contact the Autry at 323-667-2000 or visit us online at [www.autrynationalcenter.org/yosemite](http://www.autrynationalcenter.org/yosemite) or [www.artofyosemite.com](http://www.artofyosemite.com).

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## YOSEMITE ART OF AN AMERICAN ICON

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Left: Albert Bierstadt, Cho-Looko, The Yosemite Fall, 1864, oil on canvas. The Putnam Foundation, Timken Museum of Art, San Diego.

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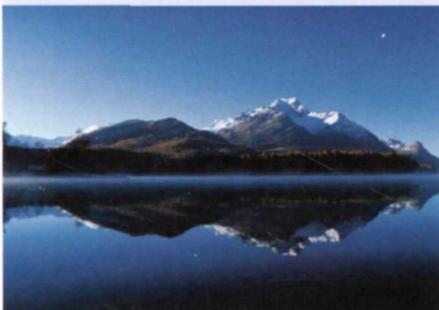


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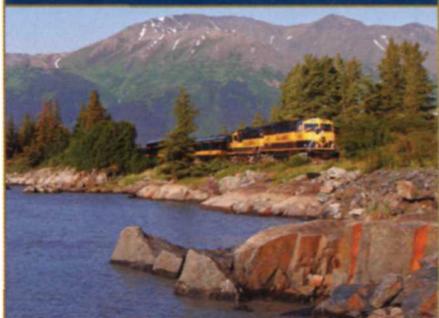
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Photo Caption: Cottages at Mammoth Cave National Park, KY



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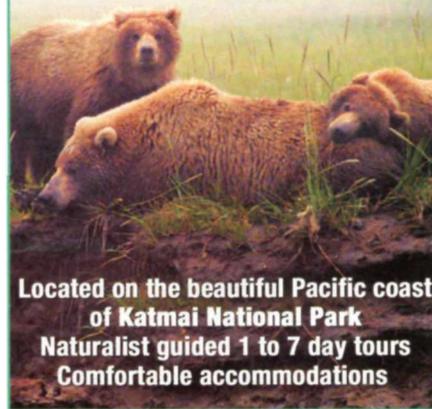


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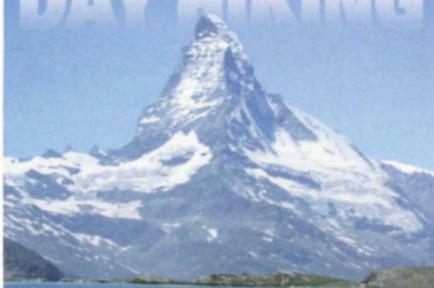
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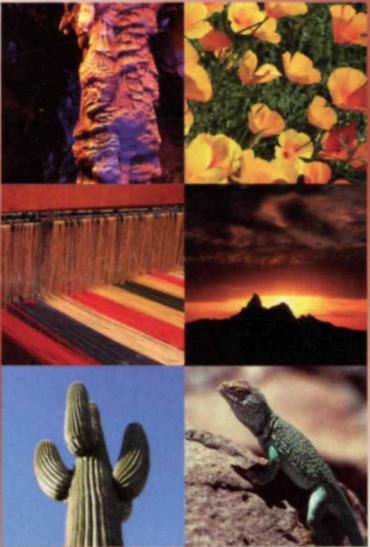


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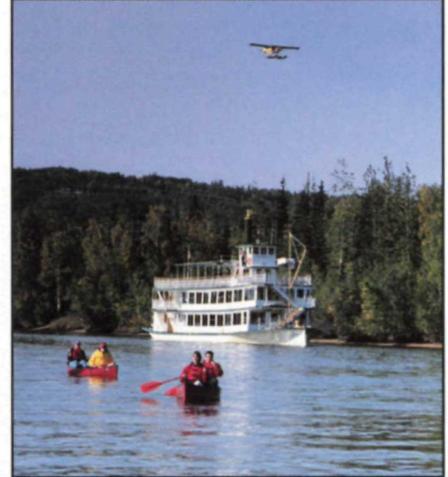
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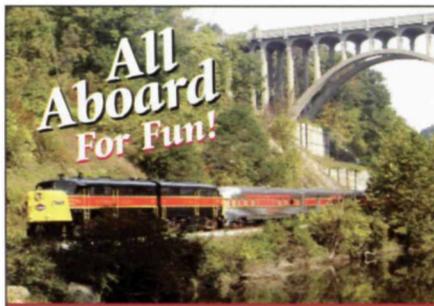
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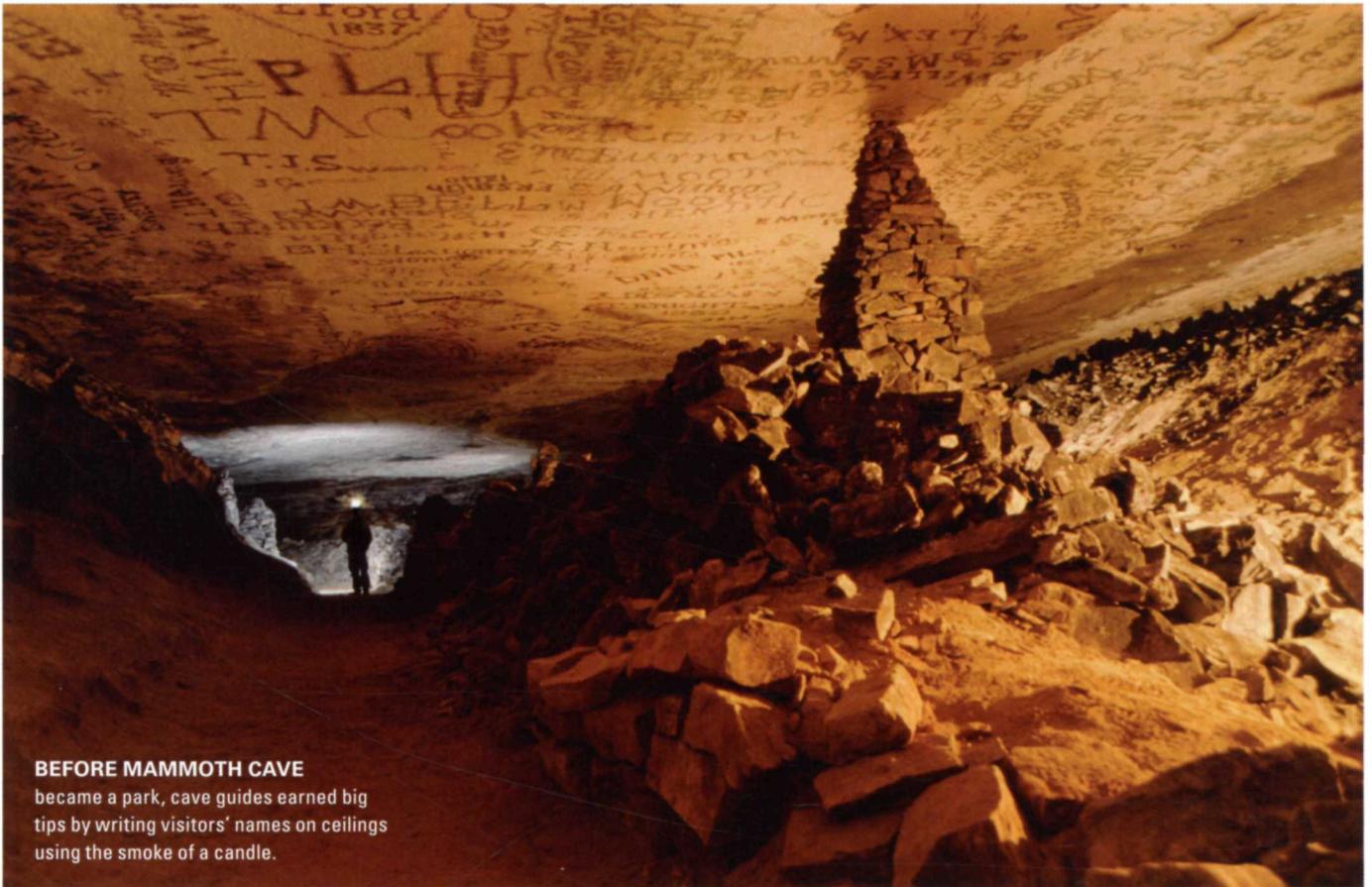
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**BEFORE MAMMOTH CAVE**

became a park, cave guides earned big tips by writing visitors' names on ceilings using the smoke of a candle.

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# Below the Surface

Centuries ago, Kentucky slaves interpreted Mammoth Cave's history. And in the process, they became a part of it.

In the depths of Mammoth Cave National Park, visitors walk with heads lowered, feeling their way along a crooked path that winds through dark, narrow passageways. The air is cool and moist, and the ranger's last story hangs in the air, sustained, like notes, in the previous chamber. Famous people have walked this path: Ralph Waldo Emerson, Jenny Lind, Elton John, and others whose names are written in soot on smooth, sandstone ceilings.

Suddenly the tunnel opens up into a grand rotunda reaching heights of 60 feet, where massive walls echo with memories of

elaborate banquets, dancehalls, weddings, and the first ever "air-conditioned" Methodist church service. Years ago, musicians fresh out of school and desperate for work hauled clunky instruments through the same tiny spaces to perform for visitors, in hopes of being discovered and touring with the wealthy. Nineteenth-century women—without husbands in tow—crawled through cave dirt to reach this spot, finding liberation from a stifling society in a most unlikely way.

But perhaps the most fascinating story belongs to the early cave guides: slaves. "Mammoth Cave doesn't jump into your mind as

an African-American park, but it's a primary story here," says Joy Medley Lyons, chief of program services at the park.

This cave system, spanning 350 miles (and counting), lies beneath Western Kentucky's karst landscape and formed hundreds of millions of years ago, well before dinosaurs ruled the earth. After the Woodland Indians, there were few permanent residents in the area until the late 1700s when explorers like Daniel Boone pushed farther west. Settlers soon learned that the region offered a valuable commodity: nitrate-rich cave dirt, or saltpeter, used to produce gunpowder and preserve meat before the dawn of refrigerators.

The first official owner of Mammoth Cave claimed a 200-acre federal land grant in 1798, like many Americans setting out to own a slice of the "American Dream." Small-scale saltpeter mining operations began and continued with subsequent owners. When England blocked America's ports before the War of 1812, production went into high gear, allowing the nation to defend itself despite

being cut off from the rest of the world.

After the war, saltpeter operations slowed to a halt, but Mammoth Cave held promise as a tourist attraction. In 1839, Dr. John Croghan, a brilliant businessman with a medical degree and a hearty sense of adventure, purchased the cave—and with it, Stephen Bishop, a slave who was a cave guide under his previous owner. They quickly began converting the home that had housed the managers of the mining operation into the spacious Mammoth Cave Hotel, with plans to build on the entertainment appeal below ground, too.

But Croghan's push for fame came to a halt in 1842 when he decided to pursue a subterranean hospital for tuberculosis patients, hoping that constant cave temperatures and moist air would cure their disease. About a dozen patients moved underground, living there in huts built of stone and wood. The project failed after two years.

Bishop, along with two other slaves, continued leading tours in the cave, charming celebrities and rich European tourists who

flocked to this spectacular place. Visitors often left as enthralled by their smart, gracious, well-spoken guide as they were by the cave. The guides, Bishop in particular, were quite observant and eager to learn. "They were hearing conversations about culture and government, food and clothing styles—things that my own white ancestors in Owensboro, Kentucky, weren't hearing a darn thing about," Lyons says.

In time, the guides began pushing the limits of exploration, seeking out new passageways with little more than a candle to light the way. One visitor challenged Bishop to take him somewhere no one else had gone. Recalling a treacherous drop-off that he'd once encountered, Bishop lugged a ladder into the cave, positioned it over the gaping hole, and crossed to the other side with his visitor. That breakthrough opened up a whole new wing of the cave that had never been explored.

The deeper they pushed, the more bizarre their discoveries became: eyeless fish; translucent crickets; gypsum that took the form of flowers, cottony tufts, and delicate ten-

drils. Guides learned to identify these cave dwellers by inviting scientists on tours, sharing their newfound knowledge with the cave visitors that followed.

In 1849, Croghan died from tuberculosis, leaving the cave to his nieces and nephews. Seven years later, Bishop was given his freedom, as requested in Croghan's will. But Bishop had little time to savor it; he died the following year. Mat Bransford, another prominent slave guide, continued to lead tours—a family legacy that would last 101 years.

In 1941, Franklin D. Roosevelt signed legislation designating Mammoth Cave as a national park, but five years would pass before its dedication ceremony, delayed because of World War II. A few families from the original homesteads relocated nearby, and to this day their descendents keep close ties to the park.

"There's so much here," Lyons says. "It's not just cave mileage waiting to be discovered. There are *people* waiting to be rediscovered." NP

**Amy Leinbach Marquis** is assistant editor for *National Parks* magazine.



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## PARKSCAPES 2007

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Grand Canyon Family Classic  
JULY 8-13

Alaska Under the Midnight Sun  
JULY 14-23

Cowboy Country Family Adventure  
AUGUST 2-9

Volcanoes & Rivers of Oregon & Washington  
AUGUST 20-26

South Dakota National Parks & the Black Hills  
SEPTEMBER 3-8

Niobrara National Scenic River  
SEPTEMBER 8-12

Wild California Oases: Joshua Tree National  
Park & Anza-Borrego Desert State Park  
OCTOBER 14-19

New Years in Yellowstone National Park  
DECEMBER 28-JANUARY 3, 2008



## SEQUOIA & KINGS CANYON NATIONAL PARKS

California

As a photographer, it's rare that I visit a place and am so intimidated by its grandeur that I feel there's no way to capture it. This is one of those places. I shot the image in the wintertime. I put several cameras out, several nights in a row, and planted them straight up into the tree. I opened up the camera's shutter just after it got dark, and collected the film again just before it got light. On one of those nights, I returned to find about two inches of snow on the cameras and the lenses. You can probably attribute the purple sky to film chemistry more than light. It's not done with a digital camera—nothing's been done in the computer. It's a direct scan from the original Kodachrome.

We discovered the "Secret" to a smooth silhouette...

## World's most comfortable bra eliminates bra bulge and makes you look 10 pounds thinner—*Bra-vo!*

**B**ulky fabrics, pinching hooks, unsightly seams, back aches, bra lines, bad fit—what crazy person invented the conventional bra anyway! Tired of dealing everyday with unflattering and cumbersome bras, Amanda Kennedy, a former actress and model, has finally perfected a comfortable flattering bra for real women. It's the end of the line for visible bra lines and the dreaded back bulge—two big fashion faux pas. Amanda designed the ingenious Sassybax™, a cure for the most common problems of old fashioned bras. The Sassybax™ seamless stretch material is made of super smooth microfiber that hugs your body in a slimming silhouette. This fiber will make you look sleeker and thinner as it smoothes and softens any unsightly back bulges.



Before



After

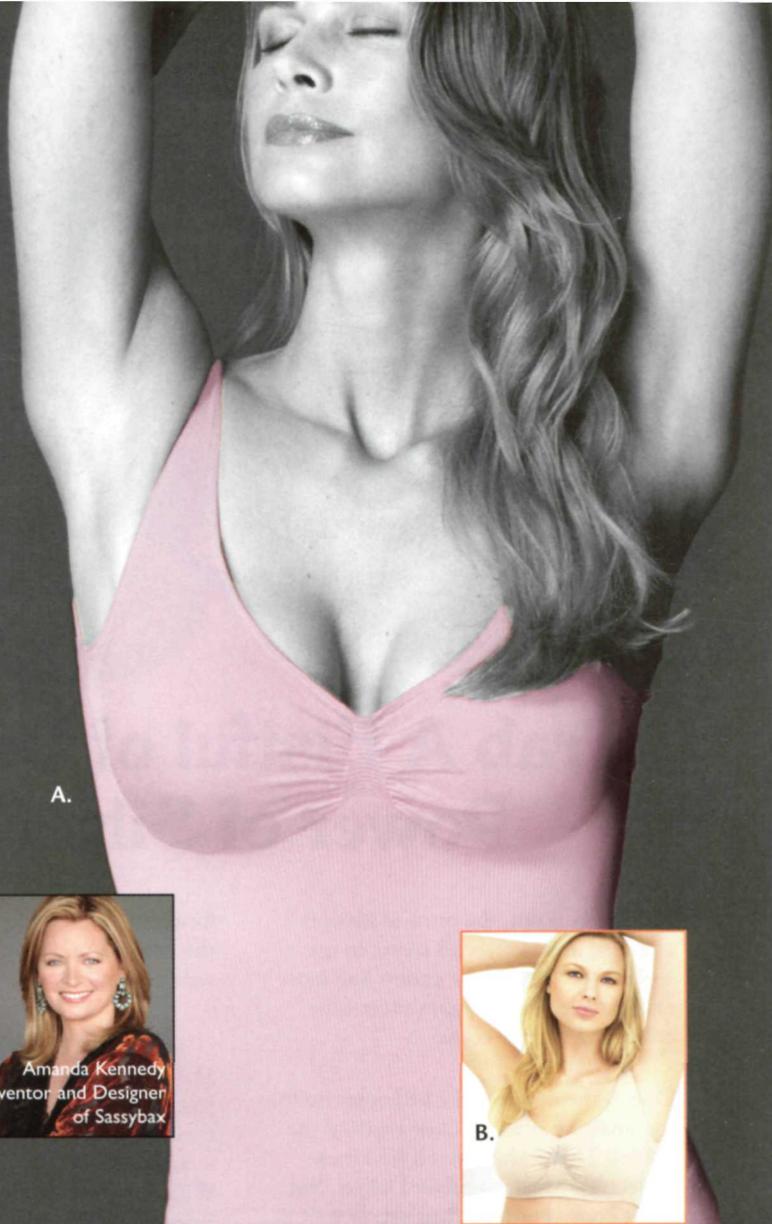
It's amazing that an actress like Amanda who spent so much time getting noticed invented a product that is meant to be invisible. She spent 11 years guest starring in such shows as *Cheers*, *Remington Steele*, *Dallas* and *Hart to Hart*, but as she tiptoed into her 40's, she realized that her clothes didn't look so sleek anymore. Her uncomfortable bra accentuated every bulge. Back bulge is not a woman's fault—it's the bra. Amanda poured herself into helping greater womanhood, not those few who may be blessed with a near perfect shape. Her inspiration came from control top panty hose that Amanda cut, clipped and formed into her first prototype. Then she redesigned a model in the supersoft microfiber that felt like wearing nothing at all, but still offered excellent support even when her full figured DD sized friends tried it on. Now the fashion world is

abuzz with Sassybax. It's been raved about by *The View*, *Good Morning America*, *CBS News* and *FOX News*. You may have read the great reviews in some prominent publications. The "before and after" video on *Good Morning America* was startling. The host was quoted as saying with Sassybax, "She's completely line free, all the lumps and bumps are gone, she looks terrific."

These Sassybax stretch bras have no hooks, provide incredible comfortable support and most importantly a smooth bulge-free silhouette. No more pulling and shifting. Wear even the clingiest

"I think I've found a new wardrobe staple that I could wear day and night. Thanks. And good luck with your line; it's well needed."

Actress, singer and former Miss America



A.



Amanda Kennedy  
Inventor and Designer  
of Sassybax



B.

fabrics with confidence. Sassybax are designed for women who prize natural sexiness and uncompromising comfort over scratchy push up bras that leave lumps and bumps under body skimming tops. Try the Sassybax for 30 days with our in-home trial. If you're not convinced your mirror reflects a more sleeker, sexier you, just return it for a refund of the purchase price. Until now, Sassybax was only available in a handful of high end luxury boutiques.

A. Sassybax™ Torso Trim—2 payments of \$34.95 or \$69.90 + S&H

B. Sassybax™ Bralette—2 payments of 29.95 or \$59.90 + S&H

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