

STATE
♦ OF THE ♦
PARKS

A Resource Assessment



ROCKY MOUNTAIN NATIONAL PARK



NATIONAL PARKS CONSERVATION ASSOCIATION

JULY 2002

STATE ♦ OF THE ♦ PARKS

State of the Parks Program

More than a century ago, Congress established Yellowstone as the world's first national park. That single act was the beginning of a remarkable and ongoing effort to protect this nation's natural, historical, and cultural heritage.

But over the years, Americans have learned that designating national parks does not automatically ensure the well being of the resources parks are meant to protect and the history those resources represent. Many parks are threatened by incompatible development of adjacent lands, air and water pollution, skyrocketing visitation, and rapid increases in motorized recreation. Historic structures suffer from deterioration. Most cultural landscapes have yet to be adequately inventoried.

Only a small part—usually less than 10 percent—of the National Park Service budget each year is earmarked for management of natural, historical, and cultural resources. And in most years, only about 7 percent of permanent park employees work in jobs directly related to preserving park resources.

The National Parks Conservation Association initiated the State of the Parks program in 2000 to assess the condition of natural and cultural resources in the parks, forecast the likely future condition of those resources, and determine how well equipped the National Park Service is to protect the park—its stewardship capacity.

The goal is to provide information that will help policymakers and the National Park Service improve conditions in the national parks and ensure a lasting legacy for future generations.

The National Parks Conservation

Association, established in 1919, is America's only private, nonprofit advocacy organization dedicated solely to protecting, preserving, and enhancing the U.S. National Park System for present and future generations by identifying problems and generating support to resolve them.

- 350,000+ members
- 8 regional offices
- 68,000 local activists



The findings of this report are not solely reflective of past or current park management. Many factors that affect resource conditions are a result of both natural and human influences over long periods of time, in many cases before a park was established. The intent of the State of the Parks program is to document the present status of park resources and determine what actions can be taken to protect them for future generations.

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ROCKY MOUNTAIN NATIONAL PARK

A Resource Assessment

Summary

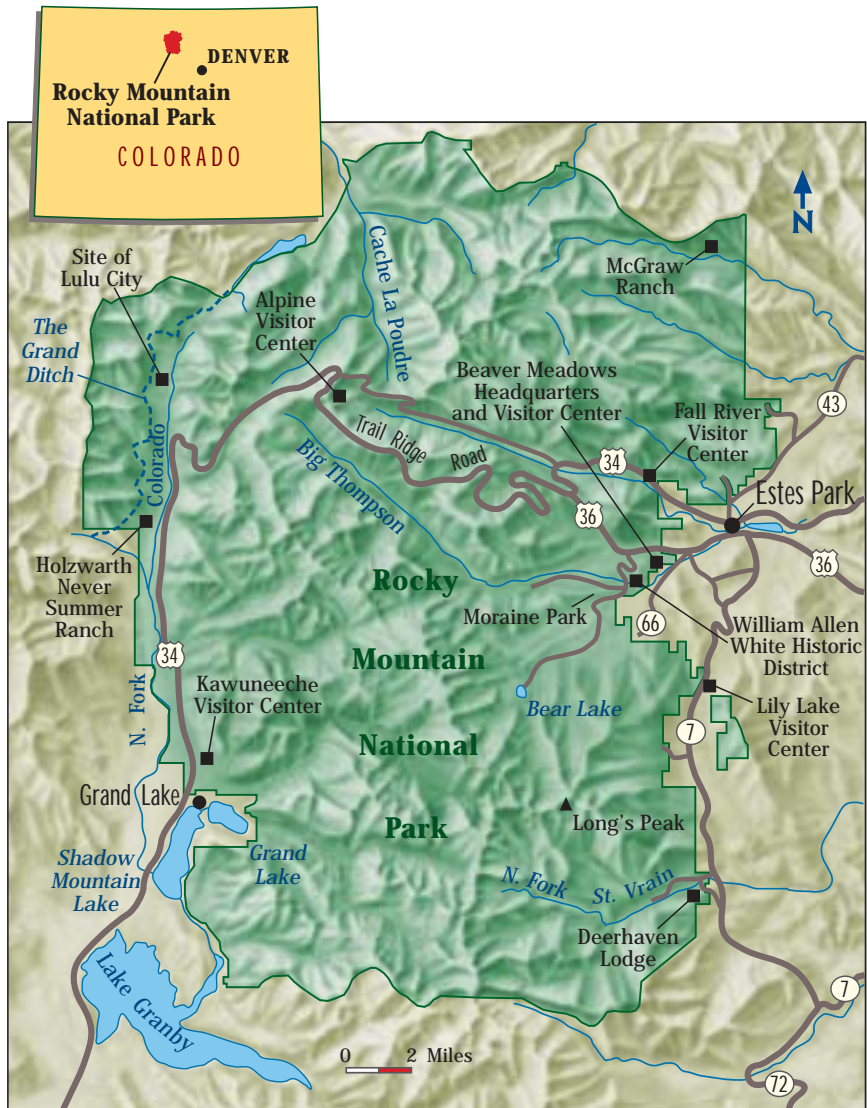
Rocky Mountain National Park stands as a prominent reminder of the natural, historical, and cultural potential of the National Park System. This park's beautiful but rugged and unforgiving landscapes harbor hundreds of high-elevation plant and animal species—some that are increasingly rare outside the park or found nowhere else. Some of the park's human-made structures bespeak the boom-and-bust cycles and never-ending search for adequate water supplies that characterized the nation's westward expansion.

As is true of most national parks, Rocky Mountain faces pressures that threaten to diminish its splendor and importance to posterity. This report documents many of those pressures and recommends measures to improve natural and cultural resource conditions as well as the park's stewardship capacity. The report is the third in a series of four assessments issued during the test phase of the State of the Parks program.

The assessment of Rocky Mountain National Park concluded that on a scale of 0 to 100, the condition of the park's known **natural resources rates 75**.

Among the findings:

- ◆ The park lacks vital scientific data on the population structure and dynamics of an array of vertebrate species, including black bear, bobcat, mountain lion, and coyote and more than 45 species of birds and many species of bats.
- ◆ Many of the park's top predators are now gone, which has led, in part, to



- unnaturally high elk populations and overgrazing of the willow communities in the animals' primary winter range.
- ◆ Decades of fire suppression in the lower elevations of the park have caused an increase in fuel loads and a reduction in the number of canopy openings needed for aspen regeneration.

- ◆ Non-native invasive species edge out many native species, such as moss campion and native grasses.
- ◆ Visibility in the park is somewhat impaired 90 percent of the time because of both natural and human-made particulates caused by, among other sources, forest fires and pollution. Sensitive plants face increased incidences of harmful ozone levels.

And a build-up of nitrogen in soils, plants, and high-altitude lakes along the eastern portion of the park may lead to problems with nutrient deficiencies in terrestrial plants and metal toxicities in freshwater organisms.

The condition of the park's known **cultural resources rates 67**. Among the findings:

- ◆ The park lacks resource studies of historic structures and major historical themes—mining, ranching, and resorts, which hinders the park's interpretive services and the staff's ability to protect historic resources.
- ◆ The park needs a completed ethnographic overview and assessment.
- ◆ Only one of the park's 15 identified cultural landscapes has been thoroughly documented.
- ◆ The park lacks scientific information from excavations, which severely limits management and interpretation of prehistoric archaeological sites.
- ◆ If funding is not approved for additional space, the park will not have adequate storage for museum collections and archival materials.
- ◆ The park's American Indian and Euro American oral history program needs to be completed.

The park's **stewardship capacity**—the ability of Rocky Mountain staff to pro-

tect resources in the park (described further on page 20)—**rates 77**. The park is somewhat underfunded, but congressional support for the federal Natural Resource Challenge has supplied money for research and resource management activities. Additional funds have been secured from the Recreation Fee Demonstration Program. The park also enjoys outstanding local support through volunteers, partnerships, and work with the adjacent community of Estes Park to address resource issues of common concern. However, the park's Master Plan is 26 years old, and the park lacks specific resource management plans that would guide resource protection and allocation of funding and staffing.

Recommendations











Among the recommendations targeted to improve resource conditions and stewardship:

- ◆ Secure the resources needed to develop an elk and vegetation management plan as soon as possible and accelerate the planning process.
- ◆ Conduct studies of key vertebrate populations.
- ◆ Develop a park policy for managing the effects of chronic wasting disease.
- ◆ Expand funding and support for strategic planning to address wildfire hazards on a geographic basis, both within and outside the park.

- ◆ Secure funding and expand support for more research and monitoring sites, such as those in PRIMENet (Park Research and Intensive Monitoring of Ecosystems Network), in the western United States to ensure vital long-term monitoring of air quality in sensitive, high-elevation ecosystems.
- ◆ Complete historic resource studies.
- ◆ Finish the park's ethnographic overview and assessment and use the resulting information.
- ◆ Document the 15 identified cultural landscapes.
- ◆ Add to museum storage facilities.
- ◆ Complete National Register of Historic Places documentation and condition reports for historic structures.
- ◆ Transcribe and preserve oral history tapes.
- ◆ Increase law enforcement efforts to eliminate the looting of artifacts and vandalism at archaeological sites.
- ◆ Update the park's 1976 Master Plan, providing appropriate guidance for the park's current and future challenges.

To accomplish these and other important tasks, increased funding and staffing are essential. The recommendations, if implemented, will help to ensure that Rocky Mountain National Park remains a vibrant part of our natural, cultural, and historical legacy.

EVALUATION OF CONDITIONS AT ROCKY MOUNTAIN NATIONAL PARK

CATEGORY	CURRENT CONDITIONS (SCALE: 0 TO 100)	FORECAST
Natural resource conditions	overall 75	overall 
Native biodiversity	89	
Terrestrial communities and systems	75	
Freshwater communities and systems	60	
Cultural resource conditions	overall 67	overall 
History and historic structures	84	
Collections and archives	74	
Archaeological sites	78	
Ethnography	47	
Cultural landscapes	53	
Stewardship capacity	overall 77	
Funding and staffing	82	
Planning	45	
External support	94	

The State of the Parks program rated current conditions at Rocky Mountain National Park and forecasted likely future conditions. “Flat arrows” indicate that no major changes are forecast for the next ten years. “Down arrows” indicate likely deterioration of conditions over the next decade. “Up arrows” indicate likely improvement.



Longs Peak

*“[H]eaven-piercing,
pure in its pearly luster,
as glorious a mountain
as the sun tinges red in
either hemisphere....
Longs Peak stands in
my memory as it does
in that vast congeries of
mountains, alone in
imperial grandeur.”*

Isabella Bird, 1873



I. Alpine Wonder

Rocky Mountain National Park brings pure joy to the human spirit. Alpine meadows strewn with multi-colored wildflowers, mountainsides dotted with golden aspen, crystal-clear lakes, fast-flowing mountain streams, a multitude of wildlife species—all afford limitless opportunities to enrich our imagination.

It is the mountains, though, that immediately capture attention. The most prominent of the park's towering summits, Longs Peak, inspired these words in 1873 from Isabella Bird, the first female member of England's Royal Geographic Society: “[H]eaven-piercing, pure in its pearly luster, as glorious a mountain as the sun tinges red in either hemisphere.... Longs Peak stands in my memory as it does in that vast congeries of mountains, alone in imperial grandeur.”

The park, much of which lies above 8,000 feet in elevation, is bisected by the Continental Divide in Colorado's Central Rockies. Its geologic origins date back nearly two billion years when the entire region was covered by an ancient inland sea. Now some of the oldest rocks are found in the high peaks uplifted 750 million years ago to form the current mountain range. Approximately 95 percent of the park has been designated or recommended as wilderness to protect the fragile alpine tundra and Rocky Mountain montane ecosystems—and their storehouse of biological diversity—that have attracted adventurers and sightseers since the mid-1800s when exploration of the area began in earnest.

More than three million visitors to the park each year can attest to a dazzling array of recreation opportunities such as hiking, backpacking, camping, fishing, birdwatching, wildlife viewing, and photography. One of the most memorable events is the annual elk bugling during the fall rut.

This 265,769-acre park holds immense interest for Americans, international visitors, and scientists. During the past 25 years, the park has been singled out for its global importance. The United Nations' Man and the Biosphere Program recognized Rocky Mountain National Park as an International Biosphere Reserve in 1976 because of the park's storehouse of biological and ecological treasures. In 2001, the American Bird Conservancy named Rocky Mountain National Park to its 100 Globally Important Bird Areas list because of its many bird species that are concentrated in one general habitat type. The white-tailed ptarmigan, which favors alpine tundra, is one such species. The park has also been nominated for National Audubon Society's new Important Bird Areas Program.

FROM PAST TO PRESENT

It is not clear precisely when humans first arrived in what is now the park. Archaeological artifacts include broken spearheads and scrapers, which point to the arrival of early nomads (the Clovis culture) some 10,000 years ago.

Recent archaeological research has demonstrated a long and continuous occupation by Indians until the middle of the 19th century. The ancestors of the modern Ute were probably in the area beginning at least 6,000 years ago, and they continued to use the area until the late 1800s. Sporadic Apache occupations are documented beginning from approximately 1500 AD. There is also archaeological proof that the Arapaho came to the area from the Plains in the late 1700s.

Today the most obvious signs of tribal life are boulders that were carried just outside the park boundary to the top of Oldman Mountain for ceremonial purposes, although ongoing archaeological work continues to uncover other evidence.

The Park Service notes “French trappers and the Spanish explorers before them explored the area outside the park in their wilderness forays.” The first American expedition to the area, led by Major Stephen Long in 1820, did likewise, although that expedition came close enough to the park—within 40 miles—to spot the towering 14,255-foot mountain that is named after Long. In the following years, intrepid explorers and curiosity seekers ventured into the park’s current boundaries, climbing Longs Peak and other landmark heights. Books and notes describing their adventures attracted even more visitors, some of whom stayed to restore their health.

Miners came when gold and silver were discovered in other parts of the Rockies. The mining town of Lulu City, in the northwestern part of the park, had a three-year boom before the dreams of many went bust. Farmers and ranchers attempted to tame the landscape, but disputes over water rights coupled with an environment generally unsuited for crops and domestic livestock defeated many.

In 1884, Enos Mills arrived in the area from Kansas, bought Longs Peak Inn, and started nature tours. He also began a campaign to protect the landscape as a national park. The first step was taken in 1902 when President Theodore Roosevelt extended the Medicine Bow Forest Reserve to include the current park area. Seven years later, Mills officially proposed a 1,000-square-mile national park from the Wyoming border to Pikes Peak. The Denver Chamber of Commerce and Colorado Mountain Club supported the proposal, while mining, logging, and agricultural entities generally opposed it.

Congress eventually adopted a compromise of 358.3 square miles, proposed by James Rogers of the Colorado Mountain Club, and on January 26, 1915, President Woodrow Wilson signed legislation establishing Rocky Mountain National Park. Over the years, Congress has enlarged the park’s boundaries to more than 415 square miles, including the 469-acre Lily Lake area that was added in 1992 to prevent a proposed residential development of more than 500 units.

In 1884, Enos Mills arrived in the area from Kansas, bought Longs Peak Inn, and started nature tours. He also began a campaign to protect the landscape as a national park.



Alpine tundra system

II. The Rocky Mountain Assessment

CATEGORIES ASSESSED FOR ROCKY MOUNTAIN NATIONAL PARK

Natural Resource Conditions

- Native biodiversity
- Terrestrial communities and systems
- Freshwater communities and systems

Cultural Resource Conditions

- History and historic structures
- Collections and archives
- Archaeological sites
- Ethnography
- Cultural landscapes

Stewardship Capacity

- Funding and staffing
- Planning
- External support

Rocky Mountain National Park's outstanding natural, historical, and cultural heritage is a source of pride for the American people. But many wildlife habitats and species in the park are threatened by the invasion of pernicious non-native species and diseases. Much more information is needed to understand the population dynamics and interactions of the park's large vertebrates in the absence of the ecosystem's top predators and decades of fire suppression that have altered the natural fire regime of lower elevation terrestrial communities. Recent drought conditions in the area underscore the challenge of restoring natural fire conditions within the park, while protecting neighboring communities and private landholders from extremely high wildfire danger.

Along the park's boundaries, habitat loss and fragmentation and increased air pollution are cause for concern. Lack of a strong ethnographic program and inadequate study of historical themes hinder interpretation of the park's history. Only one of the park's 15 identified cultural landscapes (the McGraw Ranch) has been thoroughly evaluated, and the park has insufficient storage for museum collections and archival materials.

To determine the condition of known natural and cultural resources at the park, the National Parks Conservation Association in cooperation with Colorado State University's Natural Resource Ecology Laboratory developed a resource assessment process. It examines current resource conditions, evaluates the park staff's capacity to fully care for the resources, and forecasts potential conditions over the next ten years.

RESOURCE CATEGORIES

The assessment collects information for a number of critical categories, 11 in all for Rocky Mountain National Park. A series of "indicators"—essentially questions pertinent to the condition of the resources—is used to elicit data for each category. In total, data are collected for more than 100 indicators.

Information is also collected about stresses and threats that have negative impacts on park resources. These include invasive non-native species, pollution, altered natural processes, land use and boundary issues, and climate change.

Information from the indicators is used to rate the current condition of park resources and then to forecast likely resource conditions. For more on the assessment process and rating system, see the appendix.

RESOURCE CONDITIONS AND FORECASTS

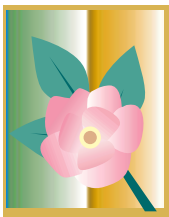
The forecast predicts that the park's terrestrial communities, cultural landscapes, and museum collections and archival materials will likely deteriorate over the next ten years if funding and staffing priorities remain the same.

In the forecast discussions in the following sections of this report, "flat arrows" indicate no major changes over the next ten years, "down arrows" mean likely deterioration of resource conditions, and "up arrows" mean likely improvement.

1. Natural Resources

Included in the natural resources category are native biodiversity and terrestrial and freshwater communities and systems.

The rugged terrain of Rocky Mountain National Park spared the park and surrounding areas from large-scale settlement and development until recently. Increasingly, a number of stressors resulting from human activity are having an impact on the park's native biodiversity and natural terrestrial and freshwater communities and systems. The overall score for natural resources is 75.



Native Biodiversity

CURRENT CONDITIONS = 89

33 % OF OVERALL RATING FOR NATURAL RESOURCES

Rocky Mountain National Park encompasses a number of vegetative communities that support a vast array of life forms. Included are 1,017 known vascular plant species, ten of which are found only in the park, and 231 nonvascular plant species. The park is home to 68 mammal and 264 bird species, more than 2,000 invertebrates, seven fish, five amphibians, and one reptile—the western terrestrial garter snake. At least 81 of the plant and ten of the vertebrate species are not native to the park.

The federal government lists two of the park's vertebrate species, the bald eagle and greenback cutthroat trout (Colorado's state fish), as threatened, although the bald eagle has been proposed for delisting because of its greatly improved status nationwide. The boreal toad, also found in the park, underwent an extensive review and was found to be worthy of listing, but was placed on the waiting list because other species have a higher priority. It will be re-evaluated annually. The park contains potential habitat for the lynx, listed as a federally threatened species, and two of the animals from Colorado's lynx reintroduction program have passed through the park in recent years. Colorado classifies nine other vertebrates in the park as threatened or endangered.

Among the rare species in the park are 27 vascular plants, 15 vertebrates, and 13 invertebrates. Ten vascular plant species as well as one mammal, two fish, an amphibian, and two insects are listed as globally rare. Although several of the park's nonvascular plant species are rare, no known threatened or endangered nonvascular plant species grow in the park.

At least four mammal species—grizzly bear, gray wolf, lynx, and wolverine—have been extirpated or their populations have been reduced to mere remnants. Over several decades, Rocky Mountain staff and local citizens reintroduced the extirpated river otter, beaver, American elk, and peregrine falcon and supplemented remnant populations of bighorn sheep, greenback and Colorado River cutthroat trout, and the boreal toad.

Non-native and emerging diseases have had serious repercussions for many ungulate species in Rocky Mountain National Park, including native bighorn sheep. Non-native mountain goats, formerly found in the park, may have transmitted Johnes' disease to bighorns, and park staff continue to remove any goats that cross into the park.

RESOURCE CONDITIONS AND FORECASTS



Alpine sunflower, largest of all wildflowers in the alpine tundra. This plant, found only in the Rocky Mountains, stores ten or more summers' worth of solar energy in its roots before it blooms once and then dies.



Non-native diseases such as Johnes' disease, respiratory disease complex, and pasteurellosis have had serious repercussions for native bighorn sheep at the park.

RESOURCE
CONDITIONS
AND FORECASTS

Natural Resources



The native white-tailed ptarmigan looks similar to a small grouse, but has feathered toes and is found in rugged uplands among rocky screes and ridges near snowfields.



Fire is key to maintenance of suitable habitat for neotropical songbirds in these upland shrub communities.

Respiratory disease complex, a disease caused by non-native bacteria, kills bighorn lambs. Lambs also can be killed by pneumonia caused by non-native bacterial species of *Pasteurella* and *Mannheimia*. Pasteurellosis causes nearly 100 percent mortality in lambs that are born to ewes infected prior to the mating season.

Elk and mule deer are also susceptible to Johnes' disease and to chronic wasting disease, an emerging ailment related to mad cow disease that damages portions of an animal's brain and ultimately results in death. This disease is also a perceived threat to human health and to agriculture in adjacent areas. It can remain dormant in the environment for a long time, making it difficult to control. No known method currently exists for cleansing contaminants from the environment.

FORECAST

The assessment forecasts little change in the status of the park's native biodiversity over the next ten years. To improve native biodiversity, several actions need to be taken. First, Rocky Mountain National Park lacks a baseline inventory for invertebrate and nonvascular plant species that are found within its boundaries. Such an inventory is essential to successful management of the park's biological diversity.

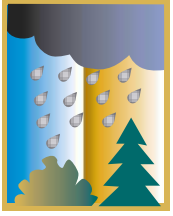
Some scientists also have suggested monitoring the changes in populations of invertebrates and nonvascular plants with short generation spans. Instead of waiting decades to see evidence of global change in a forest ecosystem, scientists could see changes in a population of insects or microbes that complete their life cycle in weeks or months, providing more immediate evidence of changes in global climate patterns. In addition, paleo-environmental research could provide information to demonstrate past global climate changes and their effect on plant and animal communities within the park.

Park staff have not yet undertaken population studies of numerous vertebrate species, including some that are species of concern. Information on population distribution and abundance, coupled with identification of critical habitat, will help ensure the continued presence in the park of black bears and 45 species of birds that are "vulnerable" to extinction within their home ranges. Population studies and identification of critical habitat also would assist management of the coyote, bobcat, porcupine, mountain lion, marten, and mink and the possible reintroduction of lynx and wolverine.

Research on natural fire regimes in upland shrub communities could provide vital information to help slow the current decline of songbirds across North America. Neotropical songbirds use Rocky Mountain National Park as a breeding ground, and fire is key to maintaining suitable habitat for these birds.

Research on environmental stressors, such as pollution, and the impact of non-native species would help to stabilize and improve the status of the greenback and Colorado River cutthroat trout species and the boreal toad.

No known control method or treatment exists for Johnes' disease or chronic wasting disease in wild ungulates. The outlook is somewhat brighter in relation to non-native bacteria of the genus *Pasteurella* and *Mannheimia*. Researchers are searching for a vaccine, and additional research could help to identify other methods of controlling these diseases.



Terrestrial Communities and Systems

CURRENT CONDITIONS = 75

33 % OF OVERALL RATING FOR NATURAL RESOURCES

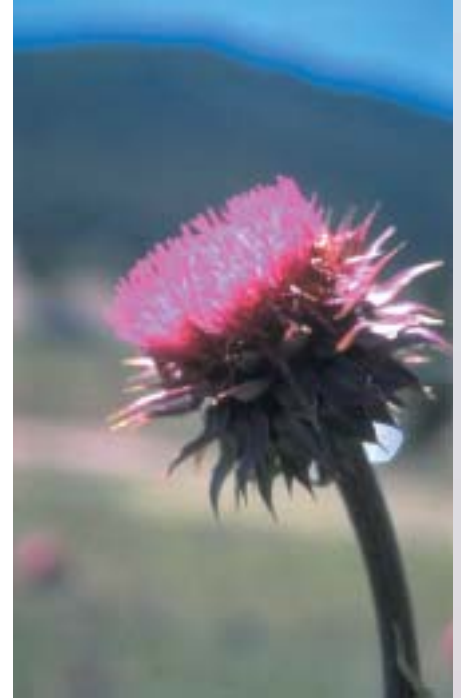
Rocky Mountain's terrestrial communities, although dominated by coniferous forests, are characterized by dramatic vegetation shifts across abrupt changes in elevation from below 8,000 feet to more than 14,000 feet. Many plant communities thrive in the parks, including dry and wetland meadows, upland shrub, ponderosa pine, lodgepole pine, Douglas fir, Engelmann spruce, subalpine fir, limber pine, and aspen stands. In the alpine region, described by the Park Service as a "land of extremes," vegetation has adapted to "hurricane-force winds, arctic temperatures, and an extremely short growing season." Plants consist of stunted, wind-twisted spruce and fir trees, lichens and microorganisms in fields of rocks, cushion plants, and other vegetation that hugs the ground and extends long taproots into the soil.

Many of the threats described in this section of the report have not significantly damaged terrestrial communities and systems. However, if left unmanaged, these threats have the potential to degrade resources.

Some of the park's terrestrial communities and systems have undergone significant changes, primarily because of past human influences. Wildfire, for example, has long been a part of the park's natural ecological functions. For decades, however, management policy focused on fire suppression. One result is the increased fuel load that exists in the lower elevations of the park, such as in ponderosa pine forests, which leads to more intense fires than would normally occur. In addition, recent drought conditions in this area have created a high risk of wildfire danger to neighboring communities and private lands that are in the path of prevailing winds, especially along the eastern boundary of the park.

Fire suppression has also caused changes in vegetation communities, primarily in the lower elevations of the park through the replacement of natural, post-fire successional tree species with homogenous shade-tolerant stands. This alteration of forest structure affects aspen, which requires canopy openings to survive, and contributes to overall declines in diversity. Aspen, for example, is known as habitat for a wide variety of butterfly, bird, and plant species. Declines in aspen stands are likely to affect these and other species. An additional threat to aspen is the high level of elk grazing on aspen seedlings in the park's elk winter range.

Several plant communities—notably aspen, dry grass, dry shrub, ponderosa pine, and riparian (streamside) meadows and willow habitats—are at risk from non-native plant species that invade after disturbances such as fire. Ironically, prescribed burns that are designed to restore the natural fire regime can lead to establishment of invasive species. This creates additional patches of forest that must be managed for exotic species—at considerable cost. Many pernicious non-native plants have been introduced, either intentionally or accidentally. Yellow toadflax is currently the invasive plant species of most concern to the park. Canada thistle has increased throughout the lower portions of the park, and evidence points to horse trails as the major vector of this unwanted plant, although the exact method of dispersal is unclear. Aggressive non-native grasses are also found in meadows below 8,500 feet. Such



Many of the park's lower elevation native plant communities are at risk of invasion from non-native plants such as the musk thistle.



Aspen, willow, and ponderosa pine communities host the highest butterfly diversity within the park.

RESOURCE
CONDITIONS
AND FORECASTS

Natural Resources



Elk populations have soared to about 3,000 in the absence of top predators—particularly the grizzly bear and gray wolf—resulting in structural damage to willow communities in the park.

species can quickly out-compete many native species, thus changing the mix of food for many animals that are adapted to native plants.

Elk foraging is changing willow communities in elk winter range, possibly causing lower willow productivity, which is measured by the accumulation of energy and nutrients by green plants, and a decline in soil nitrogen (affecting fertility). Grazing harms the canopy, causing a reduction in the height of the trees and lower seed production. Elk populations are a problem, in part, because the park is no longer home to top predators such as grizzly bears and gray wolves.

The greatest future threat to the park's terrestrial systems may well stem from air pollution generated by the 3 million people who live along the eastern slopes of the Rockies—from Cheyenne, Wyoming, to Pueblo, Colorado—and the more than 3 million people who drive through the park each year. Visibility in the park, which ranges from a low of 30 miles on high pollution days to a high of 120 miles, is somewhat impaired 90 percent of the time. Although currently considered minor, this problem may worsen over time.

Since 1987, ozone levels of .08 parts per million (the point at which sensitive plants can be harmed) have occurred at least 130 times in the park. And numerous studies document increased atmospheric nitrogen deposition and higher-than-normal levels of nitrogen in forest soils and the plant tissues of Englemann spruce and subalpine fir along the eastern range of the Colorado Rockies, including Rocky Mountain National Park. The long-term impacts from nitrogen loading include increased rock weathering, greater loss of mineral nutrients from the soil, plant nutrient deficiencies, changes in plant growth rates, and negative impacts on soil microorganisms that aid plant uptake of nutrients.

FORECAST



The assessment indicates that the condition of many terrestrial communities and systems at Rocky Mountain National Park is likely to decline over the next ten years. Park staff face a considerable challenge in managing the park's wild-fire program. Vigorous fire suppression was initiated in 1915 when the park was established. In 1992, a new prescribed-burn policy allowed staff to set controlled fires in an effort to return forest structure to more natural conditions. The new policy also allowed naturally caused fires to continue burning. The difficulty lies in avoiding the build-up of the combustible materials that lead to very hot fires that can destroy seed banks while preserving those species that require regular fires. Studies indicate that prescribed fires need to burn 800 to 1,200 acres per year in the park to return plant communities to their natural dynamic state. However, park staff have conducted prescribed burns on only 3,975 acres since 1992, primarily to limit smoke emissions and because staff are awaiting the results of research that will shed light on the interrelationships among elk grazing, vegetation, and fire management.

Once obtained, those results will be incorporated in the new fire management plan that park staff are developing to guide decisions on prescribed burns. The new policy also will include guidance on the prevention of catastrophic fires. The park is currently removing trees and other fuels along the boundary to protect neighboring communities. The new fire management policy also will emphasize the need to synchronize fuel reduction actions with state and county agencies and private property

owners and coordinate the program on a landscape scale—both inside and outside the park. Before administering the prescribed burn policy, staff must consider the danger of opening up areas to invasive non-native species.

Control programs for non-native species were first initiated at Rocky Mountain in 1960. Today, park staff manage for 14 invasive non-native plants and are proposing control programs for an additional 19. Eighty-one invasive non-native plant species are known to occur in the park. As a precaution, all liveries are now required to use only certified weed-seed-free hay. The hay has to be inspected and certified to be free of seeds of invasive, non-native plants to limit inadvertent introductions.

The park has an active program to train volunteers to help control the spread of invasive plants. Control measures both inside and outside the park should be carefully evaluated, however. In one case, an insect introduced outside the park to control non-native thistles migrated into the park where it now attacks the seedheads of both native and non-native thistles.

Rocky Mountain staff are still working to find an acceptable solution to the problems caused by the elk population. Elk were hunted to extinction prior to 1900 in what is now the park. In 1913 and 1914, before the park was established, local citizens reintroduced elk, but not its natural predators. Until 1968, elk numbers were controlled by artificial means to keep the population at about 500 animals, but since 1968 management has allowed natural reproduction, and numbers have soared to about 3,000. As a result, some aspen and willow communities are at risk from overgrazing. A recent National Research Council study on ungulate management in Yellowstone National Park concluded that adaptive management strategies that intervene at specific localities (large fenced areas) are potentially less disruptive than other techniques for controlling the size of elk populations. An elk and vegetation management plan is being drafted.

The park has had little human development, and as a result there is little need to restore land. Park staff are currently working to restore land at three areas—the Hidden Valley Ski Resort, the Glacier Livery, and the golf course and other remnants of development at Moraine Park. Also, in relation to human activity, Congress banned commercial air tours in the air space over Rocky Mountain National Park in 1998. This is the only protected area in the country where commercial air tours have been banned by law.

Global climate change could have a profound effect on all of the park's terrestrial communities and systems. Changes in precipitation and temperature will likely cause elevational and latitudinal shifts in plant communities across mountain landscapes. It is not known which biological organisms will be able to adapt to these changes.



This brightly colored male Western tanager uses the park upland shrub communities as a respite from its annual long-distance trip between tropical wintering grounds and arctic and alpine systems.

Natural Resources



Freshwater Communities and Systems

CURRENT CONDITIONS = 60

33 % OF OVERALL RATING FOR NATURAL RESOURCES

Rocky Mountain National Park's high summits, dotted with 147 lakes, give rise to 473 miles of streams and rivers. Included are the headwaters of four major river systems—the North Fork of the Colorado River, the North Fork of the St. Vrain River, the Big Thompson River, and the Cache la Poudre River. These systems harbor a number of key species and vegetative communities that are threatened by non-native species and diseases, diversion of water from the Colorado River basin, and increased nitrogen levels caused by air pollution.

Since the late 1800s, non-native species such as brown, rainbow, Eastern brook, and Yellowstone cutthroat trout have been introduced into Rocky Mountain lakes and streams for sportfishing. These species affect native trout populations through predation, competition for food and habitat, spreading of disease, and hybridization. They also alter natural habitats and food webs and prey on other aquatic species, such as amphibians and large benthic and planktonic invertebrates.



Lily Lake is one of 147 freshwater lakes at Rocky Mountain National Park. It became part of the park in 1992 to prevent a proposed residential development.

In the 1980s, the non-native parasite *Myxobolus cerebralis* was accidentally introduced to Colorado with imported fish from a private hatchery. The parasite, which causes the incurable whirling disease in trout, quickly spread and exists in all lower montane valleys of the Fall and Colorado rivers in the park.

A number of impoundments and diversions in the park have altered natural hydrologic systems, perhaps beyond redemption. When dams at Lawn and Cascade lakes breached in 1982, the resulting damage affected the entire Fall River watershed, eroding vast amounts of soil, dredging valley bottoms, and creating a large alluvial fan, an area formed when a stream's velocity is abruptly decreased and large amounts of soil are deposited. Some 22,000 metric tons of soil were deposited in the Fall River alone. These changes provided optimal conditions for some species and inadequate conditions for others. Macroinvertebrates, three species of amphibians, and small mammals fared well, while most arthropods and large mammals did not.

Diversions also influence the park's aquatic systems and communities. The Grand Ditch, for example, has significantly changed water flows and distribution as well as natural ecosystem processes along the North Fork of the Colorado River. Constructed between 1894 and 1933, this canal originally diverted water from the Colorado River watershed east to Larimer and Weld counties for agriculture and domestic livestock. Today, the Grand Ditch delivers an average of 20,000 acre-feet of water every year from the west side of the park to the burgeoning populations along Colorado's eastern front range and out into the eastern plains.

This manipulation of the watershed transformed the Colorado River, both inside and outside the park. The park's higher elevation headwaters and streams are susceptible to invasion by non-native species that inhabit altered downstream freshwater habitat, and native fish in the park are affected by loss of stream flow. Riparian areas within

the Kawuneeche Valley have also undergone morphological and ecological changes, such as loss of peat lands as a result of altered water flow.

FORECAST

The assessment indicates that the condition of freshwater communities and systems in the park is unlikely to change much during the next ten years. The introduction of non-native fish decades ago and nearly 70 years of water diversion from the Colorado River make it highly doubtful that the park's total complement of natural freshwater communities and systems can be restored. Water diversions continue and are not likely to end because the Grand Ditch retains senior water rights under state law. The cumulative ecological effects of these practices on species composition, habitat, and the food web are little understood despite years of research.

Park staff have attempted to restore natural water cycles where possible, and they recently removed the last of five high-elevation dams in the park and replanted the Lawn Lake backcountry to native vegetation. However, the park lacks biological studies that compare restored and unimpaired watersheds to determine the success of the restoration programs. It also lacks a detailed examination of the status of native invertebrate and amphibian populations in both natural and altered freshwater systems, which would establish a baseline for future management. The North Fork of the Colorado River has not been evaluated for wild and scenic river designation, which would further protect this watershed by prohibiting any federally licensed dams, ensuring existing water quality, and requiring a comprehensive river management plan that addresses resource protection.

Tests are available to detect the presence of whirling disease in surface waters; therefore, park staff have the means to determine whether waters are infected before reintroducing native fish to streams and rivers.

Early evidence from research indicates fundamental changes in the biological and chemical cycling of nitrogen in the park's high-elevation lakes because of increased atmospheric deposition of nitrogen. Long-term changes could include increased acidity of sensitive high elevation lakes with naturally low buffering capacity that may lead to heavy metal toxicities. An additional threat to high-elevation lakes includes atmospheric deposition of low-weight persistent organic pollutants that have been transported long distances, often with soil materials. Such chemicals have been detected in lake sediments and fish tissue in other alpine lakes in the Rocky Mountains. A specific objective in the park's 1998 Resource Management Plan calls for mitigation strategies for human-caused impairments to natural systems from air and water pollution. However, park staff are aware that this approach will probably not protect sensitive, high-altitude freshwater bodies from elevated nitrogen deposition.

Global climate change also is expected to have impacts on freshwater communities and systems within the park. Increases in precipitation and earlier-than-normal melting of the snow pack could change the peak flow of streams and rivers, increase flooding and erosion damage, and increase stratification (that is, establishment of distinct layers of temperature and salinity) of lakes—all of which will affect aquatic communities.



The leopard frog is commonly found in a variety of freshwater habitats at Rocky Mountain National Park.

2. Cultural Resources

Included in the cultural resources category are history and historic structures, museum collections and archives, archaeological sites, ethnography, and cultural landscapes.

Even though Rocky Mountain National Park lacks large-scale settlements and land development, many reminders of the past can be found. Local and national support are required to protect the park's historic structures, museum collections, archival materials, and cultural sites. The overall score is 67.



The McGraw Ranch house is part of a National Register of Historic Places Historic District and the future site of housing for Continental Divide Research and Learning Center researchers.



History and Historic Structures

CURRENT CONDITIONS = 84

20% OF OVERALL RATING FOR CULTURAL RESOURCES

Historic structures at Rocky Mountain National Park—from ranch houses, cabins, and Park Service buildings to a privy turned into a phone booth—reflect a livestock ranching culture that gave way to dude ranches and other tourist attractions before and after establishment of the park.

Many studies exist of important individuals and events associated with the park, but the historic literature lacks information on themes such as ranching, mining, mountaineering on Longs Peak, Civilian Conservation Corps camps, and national park administration. An oral history program for Euro-American occupations is under way. However, oral history tapes and archival records, important to resource management decisions and improved interpretive programs, have yet to be thoroughly researched.



The William Allen White cabin and Historic District is significant because of its association with White. He was a well-known writer and newspaper owner in the early 1900s who spent every summer at the park.

Rocky Mountain staff manage approximately 148 historic buildings and structures, 140 of which are listed, or are eligible for listing, on the National Register of Historic Places.

Under park staff direction, graduate students from universities in Colorado and Utah recently completed an assessment of the park's 132 historic buildings that included detailed data sheets and photo documentation. The assessment found 15 percent of the historic buildings in good condition, 55 percent in fair condition, and 30 percent in poor condition. Structural deterioration, park operation (use by tenants and occupants), erosion, and the effects of extreme weather are the primary reasons that buildings are in poor condition.

The park contains six historic districts—Deerhaven Lodge, Fall River Entrance, Holzwarth-Neve Summer Ranch, McGraw Ranch, William Allen White cabin and studio, and the Utility Area—that are listed on the National Register of Historic Places. Among the many interesting, historically significant structures are Twin Owls Residence and McLaren Hall, the two oldest existing buildings constructed by the

Park Service. They exemplify the “rustic” style of architecture favored by Stephen Mather, the first director of the National Park System, and Horace Albright, his assistant and successor.

The Trail Ridge Road area, the highest continuously paved highway in North America (peaking at more than 12,100 feet above sea level), offers tourists an opportunity to cross the Continental Divide through a unique tundra system. The Trail Ridge Road is believed to be in fair to poor condition.

McGraw Ranch, located in a peaceful valley north of Estes Park, is an example of park structures that are being saved through adaptive use to meet park needs. This National Register Historic District, pioneer homestead, and dude ranch is being extensively rehabilitated and is scheduled to open as housing for the Continental Divide Research and Learning Center in spring 2003.

The William Allen White Historic District is significant because of its association with White, a well-known writer and newspaper owner. He purchased a cabin on the eastern slope of Moraine Park in 1912 and spent many summers there until his death in 1943. In the main cabin, studio, and sleeping cabins, White hosted notables such as Charles Evans Hughes, Jane Addams, William Jennings Bryan, and Clarence Darrow. The Park Service purchased the land in 1972 and today uses the main cabin to house participants in the park’s Artists in Residence program.

The top level of historic distinction, National Historic Landmark, was awarded to the Beaver Meadows Visitor Center and Headquarters. The headquarters building, designed by the Frank Lloyd Wright School of Architecture, is in good condition.

FORECAST

Rocky Mountain National Park has one of the best documentation systems for historic structures among western national parks. The files contain photo documentation and track all alteration, stabilization, rehabilitation, and restoration projects. In addition, the park has completed an outstanding five-year plan for treatment of historic buildings. The plan identifies needs, sets priorities for preservation and cyclical maintenance, includes photos, and establishes a schedule for routine monitoring of the buildings.

Even though deficiencies are well documented and a maintenance plan is in place, park staff may not be able to satisfy the plan. Maintenance of historic structures has suffered in the past from lack of funding and inability to find and employ workers with appropriate expertise and skills. Therefore, this assessment indicates that the condition of historic structures is not likely to change over the next ten years.



Mama's Cabin at the National Register of Historic Places Historic District Holzwarth-Never Summer Ranch.

HOLZWARTH-NEVER SUMMER RANCH

Holzwarth-Never Summer Ranch in the park’s Kawuneeche Valley was built by homesteading German immigrants John and Sophia (“Mama”) Holzwarth in 1918. Used initially to raise cattle and horses and to grow hay, it became a tourist destination in 1922, when Holzwarth’s Trout Lodge was established.

The Park Service acquired the Holzwarth place in 1974, and it is now part of the park’s interpretive program in the summer months.

The ranch is listed on the National Register of Historic Places as a historic district.



National Register of Historic Places Historic District Holzwarth-Never Summer Ranch, post 1900.

Cultural Resources



Collections and Archives

CURRENT CONDITIONS = 74

20% OF OVERALL RATING FOR CULTURAL RESOURCES

Museum collections and archival materials at Rocky Mountain National Park range from archaeological artifacts and cultural items such as furniture and farm equipment to historical documents, photographs, notes, drawings, and maps. The materials also include natural history specimens, including one of the oldest plant specimens (dating from 1916) that has been collected throughout the region.

Archaeological finds, comprising nearly 48 percent of the 47,533 collection items, are expected to quadruple in number because of a five-year study under way. The park's collection of animal, plant, and geological specimens will also increase over the next several years under a new inventory and monitoring program.

Twenty-eight percent of the park's museum collections and archival materials have not been cataloged and are unavailable for research or use in interpretation. Most of the backlogged items are archival materials, only 2 percent of which have been cataloged and are accessible to researchers.

The National Park Service requires each park to adhere to the agency's museum standards checklist. A recent evaluation by park staff indicates that Rocky Mountain National Park meets about 75 percent of those standards, an above-average score, and that an estimated 80 percent of the park's cataloged items are in good physical condition.

FORECAST

↓ The Park Service hired the first permanent curator for Rocky Mountain National Park in May 2001. As a result, there should be a relative reduction in the catalog backlog and improvement in the amount of time it takes to process newly acquired objects and materials and add them to the park's collection.

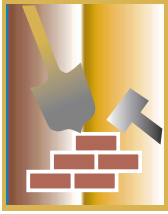


Early survey of Trail Ridge Road, the highest continuously paved highway in North America, peaking at more than 12,000 feet.

However, the Rocky Mountain Museum Storage Facility, built in 1996, does not have enough space to store and care for on-site collections or for materials that will be acquired and collected over the next several years. The building's construction should allow for relatively easy expansion, but funding has not yet been secured.

If park staff succeed in gaining additional storage space, the condition of the park's museum collections and archives will stabilize, even improve. But the number of collection items is expected to more than double over the next few years. Without additional storage, the condition of museum collections and archives is likely to deteriorate and remain unavailable for research and interpretive use. In addition, few attempts have been made to exhibit museum objects because of limited space.

Despite program advances, the forecast for museum collections and archives will remain negative until additional storage and exhibit space is in place.



Archaeological Sites

CURRENT CONDITIONS = 78

20% OF OVERALL RATING FOR CULTURAL RESOURCES

Rocky Mountain National Park contains a rich array of archaeological resources. Prehistoric occupations include those of the earliest Americans, the Clovis culture, about 10,000 years ago. More recent occupations include Apache, Ute, and Arapaho Indians and Euro Americans. The most recent occupation by Euro Americans accounts for historic archaeological remains found at the mining towns of Lulu City and Gaskill and on several ranches and resorts.

As of March 2002, 14 percent of the park had been surveyed for archaeological resources, resulting in records for 404 prehistoric archaeological sites and 696 historic archaeological sites. Still, information on human occupations and adaptations is meager because such information can be derived only from excavations of the sites. To date, just 256 sites, less than one-fourth of the total number of identified sites, have been evaluated.

Of those sites, six have national significance, two have state significance, and one has local significance. Twenty-six others are eligible for inclusion in the National Register of Historic Places. The remaining 221 sites are not eligible for designation. The completion of a Multiple Property Nomination in 2004 is expected to dramatically increase the number of Rocky Mountain sites listed on the National Register of Historic Places.

More than half of Rocky Mountain National Park archaeological sites that are recorded in the Park Service's nationwide archaeology database are poorly documented. The greatest threats to these sites stem from erosion, neglect, Park Service operations, visitation, and vandalism. It is expected that vandalism—particularly in relation to the collection of artifacts and destruction of prehistoric rock features—will rise as visitation to the park increases. Sites in high-visitation areas such as campgrounds and picnic areas and along popular trails are at highest risk.

FORECAST

▲ The assessment indicates that the condition of Rocky Mountain National Park's archaeological resources should improve over the next ten years. The park is in the midst of a five-year effort—the Systemwide Archaeological Inventory Program—that is driven by a comprehensive research design. This program will significantly increase knowledge about the park's archaeological resources. Park staff are also conducting archaeological identification and evaluation studies to comply with Sections 110 and 106 of the National Historic Preservation Act of 1966. In addition, outside funding and partnerships have been secured to conduct studies related to fires and archaeology, game drives, and the historic archaeology of the Grand Ditch.

When the studies are completed, including the five-year inventory program in 2002, managers of the park's archaeological sites will be relatively well equipped with the knowledge they need to protect the resources. Even so, the richness of the park's archaeological resources demands thorough documentation of all sites, evaluation of their significance, and a monitoring plan.



Early climbing in Rocky Mountain National Park, along with ranching, mining, and resorts, is a topic in need of additional research.

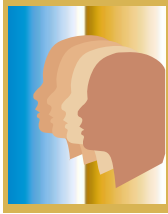


A few examples of archaeological surface artifacts found at Rocky Mountain National Park.



Remnant of mining days along the historic Lulu City trail.

Cultural Resources



Ethnography

CURRENT CONDITIONS = 47

20% OF OVERALL RATING FOR CULTURAL RESOURCES

Within the National Park Service, ethnography refers to traditionally associated people and the natural resources, objects, sites, structures, and landscapes that are culturally significant to their present way of life. The National Park System harbors many tribal ceremonial and subsistence areas, settlements, and legendary sites as well as diverse ethnic groups and occupational groups, such as farming, ranching, fishing, crafts, and industry. The Park Service requires staff for each park to identify ethnographic groups associated with the park and to collaborate with those groups to protect culturally valuable natural resources, sites, landscapes, objects, and structures.

The most obvious groups associated through tradition with Rocky Mountain National Park include the Ute and Arapaho tribes. Some evidence suggests that Apache also used the area possibly as early as 1500 A.D.



Fall River Entrance to Rocky Mountain National Park in the early days.

Rocky Mountain has a fledgling ethnography program. But park staff do not have funding to complete the draft process for an Ethnographic Overview and Assessment, which will help uncover data gaps and sensitive locations in the park to ensure that management decisions include all ethnographic groups and points of view.

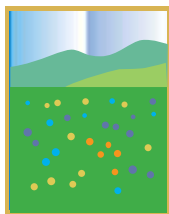
Some activities related to ethnography are under way, including an oral history project involving Northern Utes and Northern Arapahos. Tribal elders have visited a site in the park where vision quests were held and where trees were peeled to obtain inner bark for food. The elders are assisting park staff in devising an American Indian interpretive plan. Park staff are consulting with the Ute tribe concerning four sites that are affiliated with early occupation and that may be eligible for designation and protection as Traditional Cultural Properties on the National Register of Historic Places. An ethnobotanical study is also under way at the park.

FORECAST

Rocky Mountain's oral history program and the current effort to develop an American Indian interpretive plan speak well of the National Park Service's intention to protect, honor, and understand Rocky Mountain ethnographic groups and their associated sites and resources. In fact, Rocky Mountain staff and the National Park Service support office in Denver, Colorado, are doing all they can with the resources they have to improve the ethnography program at Rocky Mountain National Park.

However, the lack of a completed ethnographic overview and assessment is troubling and is part of the reason the ethnography category rated a score of only 47. The overview and assessment is a basic document that is necessary to guide future work in protecting cultural and historical sites related to tribal and other ethnic groups as well as occupational groups that have had a major influence on the park.

Without this document, it is not likely that the condition of the park's ethnographic resources will change over the next ten years. The park's ethnography program may not be perceived as credible until the overview and assessment is ready to use and additional studies on issues such as traditional use, landscapes, and cultural affiliation are undertaken. In addition, the National Park Service's Ethnographic Resource Inventory lacks updated information on which park staff can rely when making management, community awareness, and interpretive decisions.



Cultural Landscapes

CURRENT CONDITIONS = 53

20% OF OVERALL RATING FOR CULTURAL RESOURCES

The State of the Parks assessment incorporated the National Park Service's definition of cultural landscape: "a geographic area, including cultural and natural resources and the wildlife or domestic animals it contains, that is associated with a historic event, activity, or person or that exhibits other cultural or aesthetic values."

Fifteen cultural landscapes have been identified at Rocky Mountain National Park. Fourteen of these landscapes were assessed at a cursory level to determine that they are, indeed, cultural landscapes eligible for the National Register of Historic Places, and one—the McGraw Ranch, listed on the National Register—has been assessed at the highest level to provide information for treatment and monitoring. The Holzwarth-Never Summer Ranch is scheduled for extensive research by the National Park Service Support Center (Denver, Colorado) during 2004.

Staff have made significant progress since initiating the park's cultural landscape program. One cultural landscape, McGraw Ranch, is in good condition, while the remaining 14 are in need of additional research, maintenance, and monitoring.

FORECAST

↓ As the cultural landscape program progresses, advanced assessments of the landscapes will provide the knowledge needed to determine their condition, the threats that they face, and appropriate treatments. With a boost in funding and increased commitment, the park should be able to evaluate and treat the landscapes, nominate them all for inclusion on the National Register, and regularly provide for them in the park's Resource Management Plan. If additional funding is not secured and a stronger commitment is not made, this assessment predicts that the park's cultural landscapes will lose historical integrity over time.



The park is conducting studies related to historic archaeology of the Grand Ditch.

3. Stewardship Capacity

The third and final step in the resource assessment process examines stewardship capacity—how well equipped the Rocky Mountain staff are to protect the park’s natural and cultural resources. Included in stewardship capacity are funding and staffing, planning, and external support.

Overall, the park’s stewardship capacity rated 77. The park is somewhat underfunded, but over the last few years money from the federal Natural Resource Challenge and park fees have helped alleviate this situation. External support from nearby communities remains high. However, the master plan to guide park management is clearly out of date.



Funding and Staffing

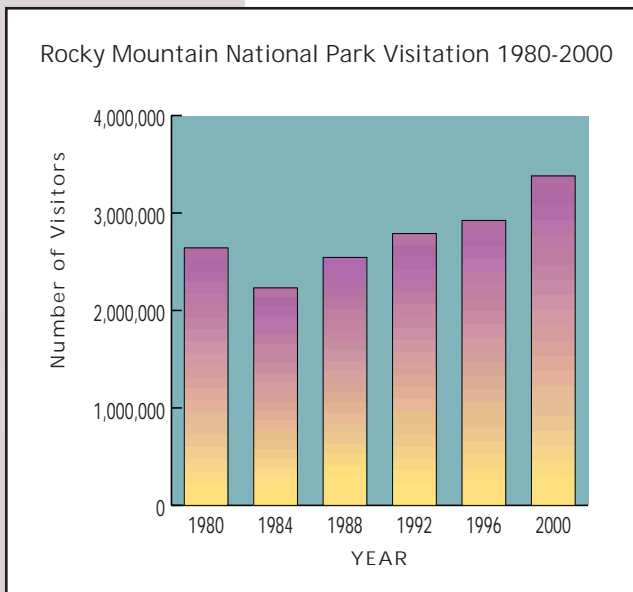
RATING: 82

60% OF OVERALL RATING FOR STEWARDSHIP CAPACITY

The most significant factor in the park staff’s capacity to protect park resources is the amount of funding it receives from Congress and other sources. Funding is crucial to hiring staff and buying equipment and materials to get the job done. This category rated 82 in relation to protecting park resources during fiscal year (FY) 2000. The park experienced a record 3,380,044 visitors in FY 2000. To serve visitors and protect resources, the park has a base operating budget of \$9.17 million. Recent legislation allows the park to collect additional fees under the Recreation Fee Demonstration Program for special services and visitor programs. These fees, 80 percent of which remain at the park, added nearly \$3.8 million to the park’s base FY 2000 budget.

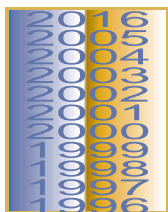
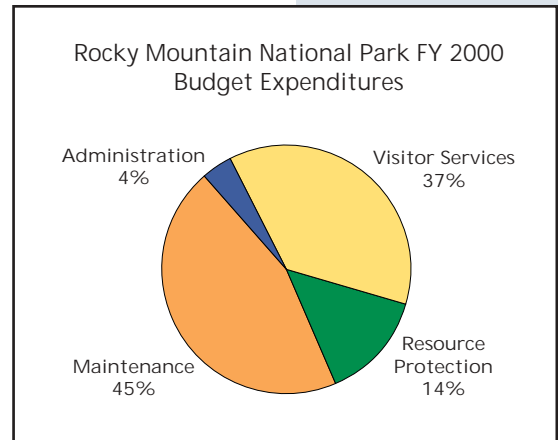
Of that budget, 45 percent went to maintain park facilities, roads, and trails; 37 percent to provide visitor services; 14 percent to preserve cultural and natural resources; and 4 percent to support park administration. Revenues from all park fees contributed \$629,000 to visitor services, \$2 million to preserving park resources, and \$1.2 million to park maintenance. However, these funds cannot be used for long-term positions or to purchase office space or equipment, such as computers, radios, and furniture, that are needed to organize data and draft planning documents.

The park’s base operating budget has increased in actual dollars since the early 1980s—\$5 million from 1981 to 1998. But the real increase, adjusted for inflation, was \$1.35 million—only 2 percent per year. This small annual increase was used to partially accommodate increased personnel costs, new unfunded congressional mandates, and growing park visitation. In relation to visitation, current staffing levels are not sufficient both to protect park resources and maintain quality visitor services. The number of full-time equivalent positions has not risen in proportion to the rate of increased visitation.



One significant source of new revenue to national parks, including Rocky Mountain, is the federal Natural Resource Challenge through which Congress has approved special funds to enhance and improve resource management. At Rocky Mountain National Park, these funds are being used to develop resource inventory and monitoring programs, expand research, and develop a learning center.

In 2000, Rocky Mountain's research program was enhanced through the creation of a full-time research administrator position. The administrator is responsible for establishing priorities for research efforts and coordinating scientific studies of park resources. Park staff are making good use of modern communications by posting current research needs and projects, along with contact information for the appropriate staff, on the park's web site (http://www.nps.gov/romo/Research/Info_needs.htm).



Planning

RATING: 45

20% OF OVERALL RATING FOR STEWARDSHIP CAPACITY

The assessment indicates that planning efforts require immediate attention if resource protection is to remain a priority at the park.

In 1976, park staff completed the Master Plan, which spells out the needs and priorities for management of the park. National Park Service policy encourages revision of this planning document every ten or 15 years, as conditions affecting a park change and new priorities are required. Yet congressional funding for park planning is modest, and competition for these scarce dollars is strong.

Conditions have certainly changed at Rocky Mountain National Park since 1976, particularly in relation to rapidly rising visitation and new or increased stresses on park resources. But park staff have not revised the Master Plan, primarily because of insufficient funding. Thus, park staff lack guidance for long-term, proactive management and must rely on more limited planning objectives in the park's 1998 Resource Management Plan, which is four years old.

The resource plan contains the elements that are needed to indicate how much park staff have accomplished to protect the park's cultural resources. For example, all cultural landscape objectives in the plan have been met, and the plan lays out a vision for a formal ethnography program.

But the plan does not include specific information on baseline conditions for natural resources in the park. Instead, the document refers readers to various other sources for the detailed information that is necessary to understand current resource conditions. A more thorough analysis of the present condition of natural resources would give park staff the information they need to list resource protection needs by priority and direct funding and staff time to meet those needs.

The park is in the process of developing a long-term elk and vegetation management plan, based on seven years of research. The plan is needed to update objectives in the

Stewardship Capacity

Educating the public about the importance of park resources is a critical stewardship tool.

Resource Management Plan that focus on control of elk populations to reduce the impacts of elk foraging on vegetation and that reflect the challenge of restoring a natural fire regime to lower elevation communities in the park.

In addition, the park has no overall plan to guide visitor interpretation, although the 1976 Master Plan suggests several interpretive themes. Park staff are currently drafting a comprehensive plan to reflect those themes and others that are important to the park's mission. The park also has no Museum Housekeeping Plan, Emergency Operations Plan, Integrated Pest Management Plan, Collection Condition Surveys, or updated Collections Management Plan—all of which help to better protect cultural resources.

On the positive side, the park's five-year historic preservation plan is one of the best in the National Park System (see discussion on page 15).

INTERPRETATION

Educating the public about the importance of park resources is a critical stewardship tool. The public cannot be expected to value park resources and support protection efforts without understanding the importance.

The 13 permanent interpreters in the Interpretive Division at Rocky Mountain are assisted by 37 seasonal employees. As part of their duties, they operate six visitor centers in the park and three contact stations. Every year they conduct more than 2,600 ranger-led activities, produce and distribute 29 publications, and provide environmental education for nearly 10,000 students.

In FY 2000, the park's Division of Interpretation accounted for about 15 percent (\$1.36 million) of the park's base operating budget. Expenditures included activities related to interpretation, environmental education, volunteer coordination, cultural resources, and support for museum/archives. The park does not have a comprehensive interpretive plan, although a draft plan is under way (see Planning). When completed, the plan should help park staff to focus on the programs it offers to the public.



External Support

RATING: 94

20% OF OVERALL RATING FOR STEWARDSHIP CAPACITY

The National Park Service alone cannot fully achieve successful park resource stewardship. Across the country, volunteers, formal partnerships, and various park support groups make enormous contributions to the ongoing work of protecting park resources.

At Rocky Mountain National Park, the level of volunteer participation remained at a fairly consistent level from 1995 to 2000. In 2001, park staff aggressively recruited volunteers from the Front Range and succeeded in diversifying the make-up of the volunteer pool. That year, 1,678 volunteers collectively contributed more than 87,350 hours. Under the guidance of park staff, the volunteers worked on natural

resource research projects, assisted the National Trust for Historic Preservation to re-roof buildings and restore stone foundations, aided in visitor transportation during the busy summer season, and expanded wildlife education programs within the park and in the community of Estes Park.

HIGHLIGHTS OF VOLUNTEER HOURS BY CATEGORY FOR 2001

Campground host	5,719 hours
Curatorial	76 hours
Interpretation	31,362 hours
Maintenance	16,905 hours
Visitor protection	14,465 hours
Resource management	12,415 hours
Student Conservation Association	4,470 hours
Miscellaneous	1,940 hours

Rocky Mountain is one of the few parks to create a land-use specialist position to work with local citizens outside the park.

Park staff have established important partnerships with organizations that use their own expertise and resources to advance resource stewardship. One such partnership is with the Rocky Mountain National Park Associates, a group that seeks donations for long-term park needs. Since 1986, the associates have contributed \$7 million worth of work to 35 improvement projects—capital construction (three visitor centers and renovation of a museum), trail work (including five trails accessible to wheelchairs), land acquisition (including scenic easements and water rights), and historic preservation (13 structures).

The National Trust for Historic Preservation has worked with park staff to restore the 15 structures on the historic McGraw Ranch. The Trust has raised \$500,000 for the project, and volunteers have contributed 400 hours to reglaze windows, stain cabins, and work on the barn.

Funds from the Natural Resource Challenge have enabled park staff to start the new Continental Divide Research and Learning Center and thus reach out to even more scientists and educators and increase external support for the park. Researchers will be housed and provided workspace at the newly rehabilitated McGraw Ranch.

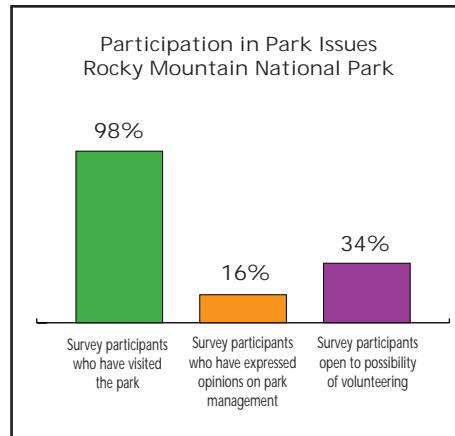
A unique, although unofficial, partnership exists between the park and the citizens of Estes Park—the park’s largest gateway community.

Recognizing that owners of adjacent private lands play a vital role in the protection of park resources, Rocky Mountain is one of the few parks, if not the only one, to create a land-use specialist position specifically to work with local citizens outside the park’s boundaries and identify and address land-use issues of common concern. Joint strategies have been developed to protect scenic vistas and night skies, maintain access to the park where trails cross private land, conserve wildlife habitat, mitigate wildfire hazards, and manage noxious weeds.

To probe nearby community views about Rocky Mountain National Park, researchers for the State of the Parks assessment distributed a written questionnaire

Stewardship Capacity

A survey of Estes Park residents showed that 34 percent were interested in volunteering at the park, a potential reservoir of help.



to a random sample of 200 residents of Estes Park, Colorado. Nearly all respondents—98 percent—had visited the park. A little more than one-third (34 percent) expressed interest in volunteering at the park, a response that represents a potential reservoir of assistance to stretch the park's financial and human resources. Additional volunteers could also generate greater understanding and support for park operations among local communities.

Only 16 percent of the respondents, however, had expressed their views on park management issues over the past five years. This finding is somewhat surprising given that park personnel provided a number of opportunities for public comment on a range of issues and projects during that time period, especially with citizens of Estes Park.

THREATS

A critical component in gauging stewardship capacity is the Park Service's understanding of threats to park resources that originate outside national park boundaries. The Park Service can do little to mitigate threats beyond its borders, but these threats can have a significant impact.

A 1980 National Park Service report that listed threats to park resources found an average of 13.5 internal and external threats per park. The report identified four—urban encroachment, acid precipitation, non-native plants, and dilapidated dams and reservoirs—for Rocky Mountain National Park.

In 2002, the State of the Parks assessment concluded that there are 12 potential and/or existing external threats, most of which are described in various portions of this report. The most significant of those threats include the rapidly increasing human population near the park; loss of scenic vistas and habitat outside the park; noise and air pollution; light pollution, which affects the night sky; non-native plants, animals, and diseases; and disturbances to in-stream flows because of water diversions.

III. Recommendations

The State of the Parks assessment of Rocky Mountain National Park indicates that park staff have made headway in fulfilling the park's mission. However, the assessment also indicated a number of causes for concern. If these concerns are not fully addressed, it is likely that resource conditions will not improve over the next decade.

The National Parks Conservation Association recommends the following actions to help ensure that the natural and cultural resources of Rocky Mountain National Park are protected into the future.

Natural Resources

NATIVE BIODIVERSITY

- ◆ Conduct baseline inventories of the park's invertebrate and nonvascular plant species to improve management and monitoring of their populations.
- ◆ Complete population studies of key vertebrate species to understand their abundance, distribution, critical habitat needs, and biotic interactions within the park.
- ◆ Secure funding for additional research into the transmission of chronic wasting disease between animal populations and for live testing of the disease in elk.
- ◆ Develop a Park Service-wide policy to manage chronic wasting disease using an interdisciplinary approach that addresses legal issues, disease research, and management options for vegetation and ungulates.

TERRESTRIAL COMMUNITIES AND SYSTEMS

- ◆ Expand funding and support for the fuels and fire management program to address wildfire hazard on a landscape scale both within and outside the park. This effort should include strategic planning that involves coordination with state and county agencies and owners of adjacent private lands.
- ◆ Develop a Park Service-wide policy that resolves conflicts in existing policy goals related to ungulate and vegetation management in parks where top predators are not present.
- ◆ In light of more than seven years of research, secure the resources needed to develop an elk and vegetation management plan to protect the park's sensitive plant communities from the effects of overgrazing and accelerate the planning process.
- ◆ Employ integrated pest management techniques to control the spread of invasive non-native species following prescribed burns.

Natural Resources continued

- ◆ Expand the park's Exotic Plant Management Plan to include an inventory of invasive non-native plants along known disturbance corridors such as the Grand Ditch.
- ◆ Continue research to understand the ecology of aspen in coniferous forests in the absence of fire.
- ◆ Continue research in upland shrub communities to understand the ecology in relation to fire and under different levels of ungulate foraging.
- ◆ Expand efforts to educate visitors and residents in communities adjacent to the park about the methods and importance of controlling the spread of invasive non-native species and diseases.

FRESHWATER COMMUNITIES AND SYSTEMS

- ◆ Congress should fund and expand support for more PRIMENet (Park Research and Intensive Monitoring of Ecosystems Network) sites in the western United States. This will help to ensure vital, long-term monitoring of air quality in sensitive high elevation western ecosystems.
- ◆ Consider recommending "wild and scenic river" designation to provide greater protection for the North Fork of the Colorado River.
- ◆ Monitor the presence of heavy metals and persistent organics in the tissue of fish from high-elevation lakes.
- ◆ Determine whether whirling disease is present in surface waters before reintroducing native fish species.
- ◆ Conduct comparative studies to determine the success of watershed restoration programs.

Cultural Resources

- ◆ Conduct additional research to increase the 1997 baseline inventories for cultural resources by a minimum of 5 percent.

HISTORY AND HISTORIC STRUCTURES

- ◆ Consider acquiring full-time architectural historian experts to conduct compliance activities on historic structures and advance the park's historical research.
- ◆ Expand park research efforts to develop a solid understanding of the significance of historic structures, with emphasis on adaptation and reuse of structures.
- ◆ Undertake a comprehensive historic resource study to provide context for all of the park's historic structures, including buildings, bridges, and roads.
- ◆ Secure funding for historic preservation expertise during the summer months to conduct work that requires warm weather.

- ◆ Develop top-of-the-line documentation for historic structures such as bridges and roads. This documentation should match the quality of work that has been done for the park's historic buildings.
- ◆ Conduct historic resource studies to enhance knowledge of historic themes—mining, ranching, and tourism—and to improve management decisions and interpretative programs.
- ◆ Work with partners to establish an interpretive publication series such as those at Yellowstone and other units of the National Park System.
- ◆ Complete the Euro-American oral history project and research to add to historical documentation and improve park interpretation.

COLLECTIONS AND ARCHIVES

- ◆ Avoid an increased backlog by obtaining the expertise to process the anticipated influx of museum collections that will result from planned archaeological studies.
- ◆ Expand storage facilities to accommodate expected increases in museum collections and archival materials.
- ◆ Reduce the 98 percent catalog backlog of archival materials.

ARCHAEOLOGICAL SITES

- ◆ Increase the number of recorded archaeological sites that are in “good” condition from 25 percent to 50 percent.
- ◆ Develop a cohesive, multi-disciplinary research plan for natural history.
- ◆ Develop a paleo-environmental studies program to provide baseline information on local and global climatic change. Relate the findings to prehistoric adaptations with regard to changes in plant and animal communities over time.
- ◆ Conduct remote/geophysical mapping and excavation of historic archaeological sites and towns to improve documentation and interpretation.
- ◆ Expand partnerships with universities to increase archaeological research in the park.
- ◆ Update and maintain archaeological data in the National Park Service's systemwide inventory database.

ETHNOGRAPHY

- ◆ Complete the Ethnographic Overview and Assessment to create an information baseline for use in management decisions.
- ◆ Secure temporary cultural anthropological experts to manage a systematic study that will determine whether a full-fledged ethnography program is appropriate for the park.
- ◆ Improve interpretative programs through collaboration with tribes.

Cultural Resources continued

CULTURAL LANDSCAPES

- ◆ Conduct the appropriate levels of documentation for all resources identified as qualifying cultural landscapes.
- ◆ Complete treatment plans and an annual monitoring program, as appropriate, for all of the park's cultural landscapes.
- ◆ Work with the National Park Service Regional Office to update the Servicewide Cultural Landscapes Inventory, which would assist in reaching resource management decisions.

Stewardship Capacity

FUNDING AND STAFFING

- ◆ Request increased funds to reduce the 18 percent funding shortfall for the park.
- ◆ Request increased base funding for the park's resources management science and research program and cultural programs to ensure proper preservation of resources.
- ◆ Increase law enforcement activities to protect archaeological sites from vandals and looters.

PLANNING

- ◆ Request funding to replace the 1976 Master Plan.
- ◆ Ensure that the next revision of the Resource Management Plan provides more thorough coverage of baseline conditions for natural resources.
- ◆ Complete the current comprehensive interpretive plan.
- ◆ Bring museum plans up to date, starting with the Collections Management Plan.

EXTERNAL SUPPORT

- ◆ Recruit additional volunteers for projects that promote resource protection goals.
- ◆ Expand existing research partnerships with universities to help alleviate threats to park resources.
- ◆ Make the new Continental Divide Research and Learning Center a focal point to expand existing partnerships and external support.

Appendix: Assessment Process

The National Parks Conservation Association (NPCA) used information from a resource assessment of Rocky Mountain National Park to determine the current condition of known resources, forecast resource conditions over the next ten years, and evaluate the park's stewardship capacity.

NPCA, in cooperation with the Natural Resource Ecology Laboratory at Colorado State University, developed the assessment process.

In total, data about Rocky Mountain National Park were collected for more than 100 indicators in the following categories:

Natural resources

- ◆ Native biodiversity
- ◆ Terrestrial communities and systems
- ◆ Freshwater communities and systems

Cultural resources

- ◆ History and historic structures
- ◆ Collections and archives
- ◆ Archaeological sites
- ◆ Ethnography
- ◆ Cultural landscapes

Stresses/threats that affect resource conditions

- ◆ Invasive species
- ◆ Pollution
- ◆ Altered natural processes
- ◆ Land use and boundary issues
- ◆ Climate change

Stewardship capacity

- ◆ Funding and staffing
- ◆ Planning
- ◆ External support

DATA SOURCES FOR THIS REPORT*

Colorado

- ◆ University of Colorado, Boulder
- ◆ Colorado Division of Wildlife
- ◆ Colorado State University
- ◆ Colorado Natural Heritage Program
- ◆ Colorado State Historic Preservation Office

U.S. Government

- ◆ Bureau of the Census
- ◆ Environmental Protection Agency
- ◆ National Oceanic and Atmospheric Administration
- ◆ National Atmospheric Deposition Program/
National Trends Network
- ◆ National Wetlands Inventory
- ◆ U.S. Geological Survey
- ◆ U.S. National Park Service and Park Service staff at Rocky Mountain National Park and the Denver Support Office

Other

- ◆ The National Trust for Historic Preservation
- ◆ The Nature Conservancy
- ◆ American Park Network

* *Data from these sources were collected during visits to the park and from park publications, personal interviews, Internet resources, and literature reviews.*

Researchers collected and entered data into a centralized database, then prepared a report that summarized the results. The report underwent peer review and also was reviewed by staff at Rocky Mountain National Park.

The report will serve as part of the framework for an assessment of national parks across the country. Information generated through the assessment process will allow comparisons of park conditions or threats to park resources on national and regional scales. This is the first time that such an assessment has been undertaken for the National Park System. The approach used is a work in progress. Comments on the program's initial direction and methods are welcome.

Appendix: Assessment Process

Continued

RATING THE PARKS

In the final phase of the assessment process, the National Parks Conservation Association devised a rating system that used most of the collected data to evaluate resource conditions, forecast how resources will fare over the next ten years, and determine how stewardship capacity may affect resource conditions. The scores stem from risk analyses and questionnaires.

Resource conditions. In most cases, the scores for resource conditions were calculated from the weighted averages that the National Park Service determined for the condition of known resources. Terrestrial and freshwater communities and systems were evaluated based on documented damage to terrestrial and freshwater resources. Information from the Colorado State University report was used to estimate the severity, geographic scope, and irreversibility of damage.

This portion of the assessment process was patterned after The Nature Conservancy's site conservation planning model. Checklists that combine all collected information about a resource were used to determine the degree of existing information, the extent of existing research, and the planning efforts under way to protect the resource. The percentage of positive responses determined the condition score.

Each resource received a score on a 100-point scale. An overall average was calculated with a different weight assigned to each resource based on a determination of the relative importance of the resource to the park. Currently, insufficient baseline data exist to ascertain whether a score of 100 is attainable for all of the resources at Rocky Mountain National Park.

Resource forecast. Indicators of stress and threats to resources and stewardship capacity were applied across each cultural and natural resource to determine what their impacts likely would be over the next ten years. A checklist was used to derive a score based on the percentage of positive responses to questions posed about threats to existing resources. This approach enabled a risk analysis that indicated whether likely degradation (down arrow), no change (flat arrow), or improvement (up arrow) in resource conditions is expected.

The impact of park threats, a stewardship capacity indicator, was also used to evaluate how resource conditions may change as a result of threats outside the control of National Park Service staff.

Stewardship capacity. Stewardship capacity refers to the Park Service's ability to protect park resources. The collected information was circulated to staff and peer reviewers for analysis and to assign ratings. An overall average based on a 100-point scale was used to determine the ratings discussed in this report.

As part of the assessment process to determine the degree of external support provided to the park, a questionnaire was mailed to a random sample of 200 residents of Estes Park, Colorado.

For more information about the ratings in this report, contact National Parks Conservation Association, State of the Parks program, P.O. Box 737, Fort Collins, CO 80521. Phone: 970-493-2545; Fax: 970-493-9164; e-mail: stateoftheparks@npca.org.

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