

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE



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INTRODUCTION TO THE ALTERNATIVES

This chapter contains descriptions of the three alternatives. Alternative A, the “no-action” or status quo alternative, which is described first, reflects existing conditions and serves as a basis for comparing and evaluating the other alternatives. Then the two “action” alternatives (B and C) that propose the future direction for Big Bend National Park are described.

Alternative B is the National Park Service’s preferred alternative. In the process used to select the preferred alternative, the planning team found that alternative B would safeguard the resources, scenic values, and current visitor experience of Big Bend National Park.

Before the action alternatives were developed, information was gathered about the resources in the park. Information about the issues and scope of the project was solicited from the public, other agencies, special interest groups, and park staff through newsletters, meetings, and personal contacts. This helped with the development of the action alternatives. All the alternatives were intended to support the park’s mission, purpose, and significance and to address issues; avoid unacceptable resource impacts; and respond to public desires and concerns. A number of the actions proposed in the alternatives would require additional compliance steps before implementation. These steps would include identification, evaluation, and consultation. The detail for these requirements can be found elsewhere in this document.

DECISION POINTS

Based on public comments and NPS concerns, decisions must be made in this *General Management Plan* about several major points. Alternatives have been developed to explore these decision points.

- Considering opportunities available outside the park, what kind of opportunities for experiences do we want visitors to have in various areas of the park while preserving the biodiversity of

Chihuahuan desert ecosystem and the integrity of the park’s cultural resources?

- What is the best way to protect the viewshed from within the park and the resources of the Christmas Mountains?

RELATIONSHIPS TO OTHER AGENCIES’ PLANS

Possible conflicts between the alternatives and county, state, tribal, or federal land use plans and policies must be considered.

Big Bend is in southern Brewster County, Texas. Properties surrounding the park are primarily privately owned residential and agricultural lands. There are a few commercial and state-owned parcels. There are no tribal lands nearby.

Land and Water Resources Conservation and Recreation Plan

The plan was written by the Texas Parks and Wildlife Department to guide the department for the next 10 years in conserving the state’s natural and historic heritage and providing public access to the outdoors. The plan addresses conservation of land and water resources and recreation on land and water.

The Land and Water Resources Conservation and Recreation Plan establishes priority habitat types and ecoregions based on conserved status, threat, and biological value. It evaluates existing state parks, wildlife management areas, and historic sites and determines whether the sites need additional resources to meet the demands of the constituency of the sites or whether sites would be better managed by another entity. The agency will focus its efforts on acquiring additional lands to improve access, recreational experiences, wildlife habitat, and resource protection on priority state parks and wildlife management areas. It will strive to fully interpret, protect, and appropriately market all priority historic

sites. The plan identifies the need for more state parks to serve major urban areas and the importance of continued support of local park development through the Texas Parks and Wildlife Department's grant programs. The agency identifies instream flow study needs to improve river basin conservation and priority bays on which to focus conservation efforts.

Black Gap Wildlife Management Area

This management area, administered by the state of Texas, is about 55 miles south of Marathon. "It is bordered by the Rio Grande on the east, by Big Bend National Park on the west and south, and by Texas General Land Office (GLO) and privately owned tracts to the north," (Black Gap Wildlife Management Area 1996). It is comprised of almost 83,000 acres. The primary goals of the wildlife management area as stated in its 1996 draft *Management Plan* are:

- To develop and manage wildlife habitats and populations of indigenous wildlife species.
- To provide a site where research of wildlife populations and habitats can be conducted under controlled conditions.
- To provide public hunting and appreciative use of wildlife in a manner compatible with the resource.
- To protect populations of endangered, threatened, and migratory wildlife and protected plant species and related habitats.
- To provide natural environments for use by educational groups, naturalists, and other professional biological investigators.
- To provide areas to demonstrate habitat development and wildlife management practices to landowners and other interested groups.
- To preserve unique natural sites and relict vegetation communities.

Big Bend Ranch State Park

This area is administered by the Texas State Parks and Wildlife Department. According to its 1994 *Management Plan*, this nature area is

just west of Big Bend National Park and it includes the Solitario and Bofecillos Mountains. The area covers about 300,000 acres and has about 25 miles of Rio Grande frontage between the towns of Presidio and Lajitas. Marfa and Alpine are about an hour's drive to the north. Some proposals of the *Management Plan* are:

- Opportunities for expanded public use will occur in the Rio Grande Corridor, the Fresno/Contrabando Lowlands, the Bofecillos Highlands, and in the Solitario. This will include camping, hiking, mountain biking, and equestrian use that will be managed through a permit system.
- Levels of public use will be established that will be within the limits of prudent resource and visitor protection services. The Department will strive to maintain the primitive character of the state park.
- Interpretive and educational programs will be developed to foster an understanding and appreciation of the diverse natural and cultural resources of the Big Bend region including the proposed Santa Elena/Sierra del Carmen Biosphere Reserve in Mexico.
- An emphasis will be placed on repairing and rehabilitating existing facilities, such as the historic structures at Saucedo, improving visitor facilities at Fort Leaton and the Warnock Center, and stabilizing existing roads and trails that have been designated for public use.
- Big Bend Ranch, Fort Leaton, and the Barton Warnock Environmental Education Center will be managed by the Superintendent of Big Bend Ranch State Park. An administrative headquarters is located near Presidio, adjacent to Fort Leaton.

Brewster County

Brewster County does not have a master plan guiding management of natural resources and private and public land use (office of the Brewster County judge, pers. comm. 9/27/01). The county has regulations designed to prevent high density development in southern Brewster County including the area near the park. Counties in Texas do not have authority

to zone. (See the “Affected Environment” chapter, “Socioeconomic Environment” section, “Land Use” subsection).

Brewster County has been informed of and involved in the development of this plan through informal and formal discussions with county staff (more details are available in the “Public Involvement” section of the “Consultation and Coordination” chapter). The “Environmental Consequences” chapter contains analyses of the impacts of concern to the county. The county favors Big Bend National Park continuing to focus on what they have rather than on land acquisition, keeping park management close to its current level, and making as much of the park as possible accessible to visitors.

Maderas del Carmen

This protected area in Mexico preserves 208,381 hectares (84,365 acres) of the Chihuahuan Desert south of Big Bend in the state of Coahuila, Mexico. The Management Program for the protected Area for Flora and Fauna, Maderas del Carmen, proposes to

- assure the permanence of the natural resources
- guarantee preservation of biological diversity of the area
- rely on necessary technical information about the area’s resources to facilitate and make its protection and management more efficient
- protect the natural resources of the area by rationally using them, which coincides with the general objectives and conservation of the area
- promote the participation and collaboration of the proprietors, users of the area, and the general public in the conservation and management programs for the area
- administer, coordinate, and supervise the financial, human, and material resources on

which the protected area relies, as well as the actions that are undertaken within it

Cañon de Santa Elena

This protected area in Mexico preserves 277,209 hectares (112,230 acres) of mountains and valleys south of Big Bend in the state of Chihuahua, Mexico. Its objective is to preserve the natural habitats and ecosystems of the region, assuring the balance and continuity of the evolutionary and ecological processes; preserve existing biological diversity; and achieve the rational and controlled use of natural resources. The Management Program for the protected Area for Flora and Fauna, Cañon de Santa Elena, Chihuahua, Mexico, proposes to

- preserve the genetic and biological diversity of the area
- establish specific mechanisms for the conservation of protected flora and fauna to ensure their continued existence and foster their increase in number
- implement programs for the use of resources according to the characteristics and potential of each ecosystem
- promote actions to avoid the deterioration of the habitats and ecosystems and to discourage nonregulated activities
- promote conscientiousness of the local populace so that they contribute to preservation of natural resources, including paleontological and cultural resources
- establish efficient administrative systems that preserve, protect, and allow sustainable use of resources
- promote both productive and ecotourism-related activities that allow the improvement of the quality of life of the local population

Any changes brought about by any of the alternatives would not conflict with any of the approved plans of other jurisdictions.

MANAGEMENT PRESCRIPTIONS (Management Zones)

An important tool in planning and management is the establishment of management prescriptions for various areas in the park. Management prescriptions (zones) identify how different areas could be managed to achieve a variety of resource conditions and visitor experiences. Each prescription specifies a particular combination of resource, social, and management conditions. The National

Park Service would take different actions in different zones with regard to the types and levels of uses and facilities. The following five management prescriptions have been described for Big Bend. Alternatives for future conditions and management have been developed by placing these prescriptions in different configurations.

TABLE 1: MANAGEMENT PRESCRIPTIONS, BIG BEND NATIONAL PARK

<i>Management Prescription</i>	RESOURCE CONDITIONS	VISITOR EXPERIENCES	FACILITIES AND ACTIVITIES
<i>Wilderness</i>	<p>These areas will be managed to ensure that their use and enjoyment would leave them unimpaired for future use and enjoyment as wilderness, provide for the protection of the areas as wilderness, and provide for the preservation of wilderness character. Archeological resources, if discovered, would generally be left intact unless threatened by loss due to erosion. Historic period ruins would generally be preserved unless they posed a threat to life, health, and safety.</p>	<p>Wilderness management would be coordinated with the backcountry nonwilderness prescription and similar experiences would be provided. However, management strategies and options would be more restrictive than under the nonwilderness prescription. Visitors would use these areas for day and overnight use. On the more popular trails, there would be a moderate probability of encountering others, particularly at campsites and other points of interest. Visitors would be influenced less by other human activities than they would in the nonwilderness prescription area. Travel would be along a range of routes from delineated trails to trail-less backcountry requiring a high degree of outdoor skills and self-reliance. Management actions would comply with NPS policies regarding wilderness.</p>	<p>Facilities could include maintained trails, foot bridges, directional signs, and primitive campsites. If campsites were designated, they might contain toilets and food storage lockers.</p>
<i>Backcountry Nonwilderness</i>	<p>Natural conditions would be mostly undisturbed, but evidence of visitor and administrative use might be apparent. Resource impacts would be restricted to hiking and stock use, campsites, and approved administrative facilities and activities. Past impacts would be reversible, although areas might require intensive effort and long periods to recover. Cultural resources would be protected and preserved. Resource conditions might be modified for necessary visitor and operational needs, but in a manner that would minimize visual and resource impacts.</p>	<p>Backcountry nonwilderness management would be coordinated with the wilderness prescription, and similar experiences would be provided. However, management strategies and options would be less restrictive than under the wilderness prescription. Visitors would use these areas for day and overnight use. On the more popular trails, there would be a moderate probability of encountering others, particularly at campsites and points of interest. Visitors would be influenced by other human activities more than they would in the wilderness prescription area. Travel would be along a range of routes from well-maintained trails to trail-less backcountry requiring a high degree of outdoor skills and self-reliance. Use levels might vary. There would be limits on the number of campers. There might be established campsites, food storage containers, and toilets in some locations. Hiking, camping, and stock use would be permitted.</p>	<p>Facilities might include maintained trails, unpaved backcountry roads, foot bridges, interpretive and directional signs, primitive campsites, administrative roads, and administrative equipment (such as wells or radio repeaters). If campsites were designated, they might contain facilities such as toilets and food storage lockers.</p>

<i>Management Prescription</i>	RESOURCE CONDITIONS	VISITOR EXPERIENCES	FACILITIES AND ACTIVITIES
<i>Cultural</i>	Intensive management of identified and evaluated cultural landscapes highlighting the historical period would occur. Structure exteriors would be preserved; interiors would be preserved for interpretation or adaptively used for park and visitor support needs. Preservation strategies would be developed for each resource in this prescription. Archeological and ethnographic resources would be protected and preserved.	Visitors would be immersed in a cultural setting that reflects a prehistoric or historic period with minimal exposure to modern intrusions, both visible and audible. Visitors could explore sites on their own or participate in ranger-conducted programs. Recreational activities would be managed to support the area's prehistoric or historic character. Some areas may be closed to visitors to protect resources and resource values.	Interpretive exhibits, programs, demonstrations, and tours could take place in these areas. Prehistoric or historic sites, structures, and settings would be key features. There would be limited visitor amenities through adaptive use of historic structures (sales, restrooms, water fountains, etc.) and limited administrative support (staff offices, storage, housing, etc.)
<i>Visitor Services</i>	To the greatest degree practical in this management prescription, facilities would be models of best management practices and sustainable development. This prescription would be where there are limited or no significant resources or in areas that were previously disturbed by development. The natural environment could be modified for park operations, but it would still harmonize with the surrounding environment. Although the environment could be highly modified within the area, pollutants and other disturbances (e.g., storm-water runoff and dust from construction) would be contained and mitigated before affecting adjoining areas. The physical footprint of structures and stored material in this area would be minimized. Archeological resources would be avoided or adverse effects on the resources would be mitigated if necessary.	The visitor experience in this area would be highly social and focused on interpretation, education, orientation, visitor comfort, and safety. This structured environment would be highly accessible and ranger-led, and contacts with park staff and other visitors would be common; overcrowding would be avoided. Visitors would have an opportunity to get an overview of park resources in a short time with a minimum of physical exertion. An opportunity to learn about the park's significance and compelling stories through the interpretation of themes would be an important element. Visitors would have an opportunity to purchase materials related to the park. Necessary food and lodging would be available here.	Sightseeing, learning about the park through interpretive media and self-guided and ranger-led tours, short walks, and programs could be common activities. The area, also, would serve as a staging area for more extended tours. Orientation and interpretation facilities such as a visitor center, kiosk, wayside exhibits, and other interpretive media would be appropriate. Support facilities such as fee collection, restrooms, running water, first-aid areas, and hardened circulation areas and trails could be present. Recreation facilities such as developed campgrounds might be available. Space could be available for research, collections, classroom activities, and libraries. Utilities would include water, electricity, telephones, and computer access.

<i>Management Prescription</i>	RESOURCE CONDITIONS	VISITOR EXPERIENCES	FACILITIES AND ACTIVITIES
<i>Operations</i>	<p>To the greatest degree practical, facilities in this management prescription would be models of best management practices and sustainable development. This prescription would be where there are limited or no significant resources or in areas that were previously disturbed by development. The natural environment could be modified for park operations, but facilities would still harmonize with the surrounding environment. Although the environment could be highly modified in this area, pollutants and other disturbances (e.g., storm-water runoff and dust from construction) would be contained and mitigated before affecting adjoining areas. Facilities and operations in the area would be buffered to avoid visitors seeing them or being disturbed by associated noise. The physical footprint of structures and stored material in this area would be minimized. Archeological resources would be avoided or adverse effects on the resources would be mitigated if necessary.</p>	<p>This area is not intended for visitors; however, limited incidental visitor use would be permitted. Most visitors would be only slightly aware of the facilities in this area during their visits.</p>	<p>The area could include structures and grounds used for administration and operations, such as offices, maintenance shops, collection areas, storage areas, warehouses, garages, research facilities, conference/meeting/training facilities, housing, boat and equipment storage, vehicle maintenance, and outdoor storage. Facilities for park utilities and communication needs would be located in this area. Facilities would provide a safe, efficient, comfortable, and aesthetic work environment for park staff. Hardened circulation and parking areas would be appropriate in this area as well as service roads for operations activities. Housing would have sufficient space for family activities.</p>

ALTERNATIVE A — NO-ACTION (STATUS QUO)

CONCEPT

Under this alternative the park would continue current management direction, and there would be no significant change in interpretation and management of the park. This alternative is presented as a basis for comparing the two “action” alternatives. Examining the no-action alternative is also useful in understanding why the National Park Service or the public may believe that certain changes are necessary or advisable. The two action alternatives (B and C) present ways of exploring those changes.

Actions that are already funded have been included in the no-action alternative. Other future actions planned for implementation by the park that have not been funded are included in the “Environmental Consequences” under “Methods for Analyzing Impacts” under the subheading “Projects That Make Up the Cumulative Impact Scenario, Current and Future Actions.” The impacts of these actions are analyzed as part of the cumulative impact analysis.

THROUGHOUT THE PARK

The park staff would continue to protect and maintain known cultural and natural resources as time and funding allow. Cultural and natural resource inventory work and monitoring would continue and be expanded if possible. Park staff would continue to encourage and seek funding for the research that is needed to fill the gaps in knowledge about resources (following the park’s strategic plan).

Park staff would continue to manage existing proposed and potential wilderness areas from 1984 *Final Environmental Impact Statement, Proposed Wilderness Classification (NPS 1984)* as wilderness, as required by NPS policy.

There would be little change in visitor facilities (see Alternative A maps). The only changes in operations would be construction of an already

approved and funded fire management building at Panther Junction.

The maps in this document are for illustration purposes only and are not drawn perfectly to scale.

The park has instituted a program of conservation and visitor education on the need to limit water use and the role of water in a desert environment.

The park would upgrade the water treatment system at Castolon.

Fire suppression systems would be upgraded at residences and the historic district at Castolon, 45 housings at Panther Junction and Rio Grande Village, headquarters at Panther Junction, and two single-story apartment buildings and a dorm at Chisos Basin.

The National Park Service proposes to reconstruct a 0.5-mile segment of Park Route 12 at mile marker 14. Park Route 12 is the paved route from Panther Junction to Rio Grande Village, within the park. The proposal calls for vertical realignment of the road between miles 14 and 14.5 to allow greater sight distance and increased highway safety. To accomplish the realignment, low water crossings would be replaced with culverts at two sites. An *Environmental Assessment* was released for public review in January 2002.

Housing would continue to be scattered throughout the park and in short supply. Adequate office and storage space for park staff would continue to be lacking and sometimes in facilities that are not suitable for efficient park operation.

Coordination would continue with agencies and other groups regarding water quality and quantity in the Rio Grande, air quality, threatened and endangered species, wildlife management, and law enforcement. The park’s water rights would continue to be maintained at current levels.

The significant cultural properties would continue to be preserved and interpreted as time and funding permit. All national register sites and/or districts currently receive preservation maintenance and interpretation as time and funding allow. This would continue.

Park staff would continue to work with Mexican protected areas' staff and with Mexican villages that border the park. Park interpretive programs beyond park boundaries would continue.

There would be no change in the electrical lines that are in the viewshed of the road into Chisos Basin.

CHISOS BASIN

The visitor center, campgrounds, lodge, and employee housing would continue to be available to visitors and employees. The fire suppression and water systems would be upgraded.

PANTHER JUNCTION

The park is developing an early warning system and evacuation plan for all of Panther Junction, which is in the maximum estimated floodplain (see appendix F).

Facilities at Panther Junction would continue to increase slowly over the coming years to meet park needs. A few temporary housing and storage units would be placed in the Panther Junction area. The fire suppression system would be upgraded.

The National Park Concessions Inc. Foundation has provided the funds to build two new duplex units that will provide eight concession employee bedrooms at Panther Junction. The eight bedrooms will replace very old facilities (trailers) with modern housing.

RIO GRANDE VILLAGE

The park is developing an early warning system and evacuation plan for all of Rio Grande Village, which is in the 100-year floodplain.

Facilities would continue to increase slowly over the coming years to meet park needs.

Fuel storage tanks would be raised above the level of or protected from the 500-year flood.

Irrigation of shade trees and lawns at the campground would continue to use 25.6 million gallons per month.

Efforts to locate a separate water source for visitors and staff would continue.

Campsites close to the Big Bend gambusia pond would be relocated to eliminate some potential impacts.

The fire suppression system at four residences would be upgraded.

The hydrologic patterns would remain altered.

The Barker Lodge, NPS housing units, and the 25-site campground at Rio Grande Village would continue to be used.

CASTOLON

The store would continue operations. Employee and concessioner housing would remain in their current locations. The fire suppression system and water treatment and delivery systems would be upgraded.

COTTONWOOD CAMPGROUND

The park is developing an early warning system and evacuation plan for Cottonwood Campground, which is in the 100-year floodplain. The campground and amphitheater would continue current operations. The single egress road would continue to be used. Irrigation of shade trees at the Cottonwood Campground would continue to use about 125,000 gallons per month.

NORTH ROSILLOS/HARTE RANCH

Ongoing work to restore natural hydrologic and soil conditions would continue as funds permit. Inventories would continue to identify the cultural and natural resources in this area. A

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

small-scale experimental restoration treatment to determine how best to restore natural grasslands would be undertaken, and successful treatments would be used elsewhere in the park.

PERSIMMON GAP, MAVERICK, AND GATEWAY COMMUNITIES

The housing unit at Persimmon Gap and the entrance station at Maverick would continue to be used. No facilities would be provided in gateway communities.

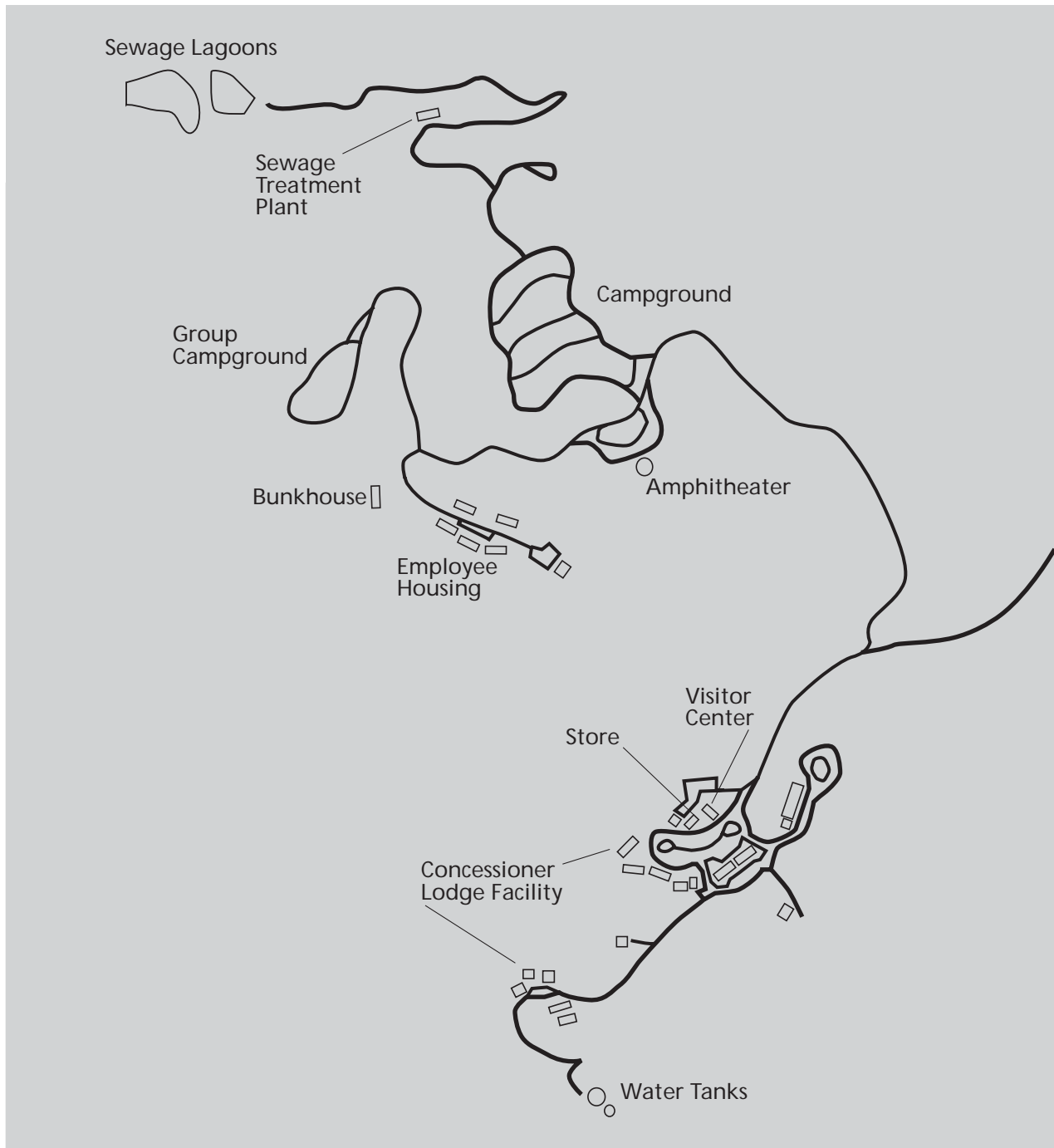
PARK BOUNDARY

No change in the park boundary is proposed under this alternative.

ESTIMATED COSTS

All costs are in year 2002 dollars. Alternative A would retain the current base staff of 100 full-time-equivalent (FTE) positions at a cost of \$4.3 million per year.

The construction, rehabilitation, and restoration costs for alternative A would be \$5.7 to \$7.7 million. The estimate is general and should be used only for comparing the alternatives.

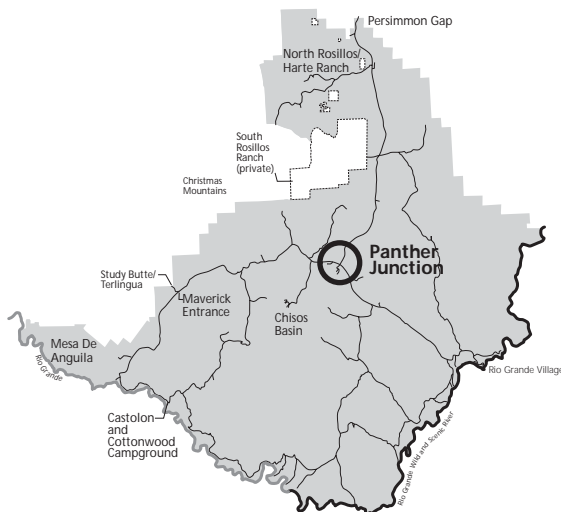
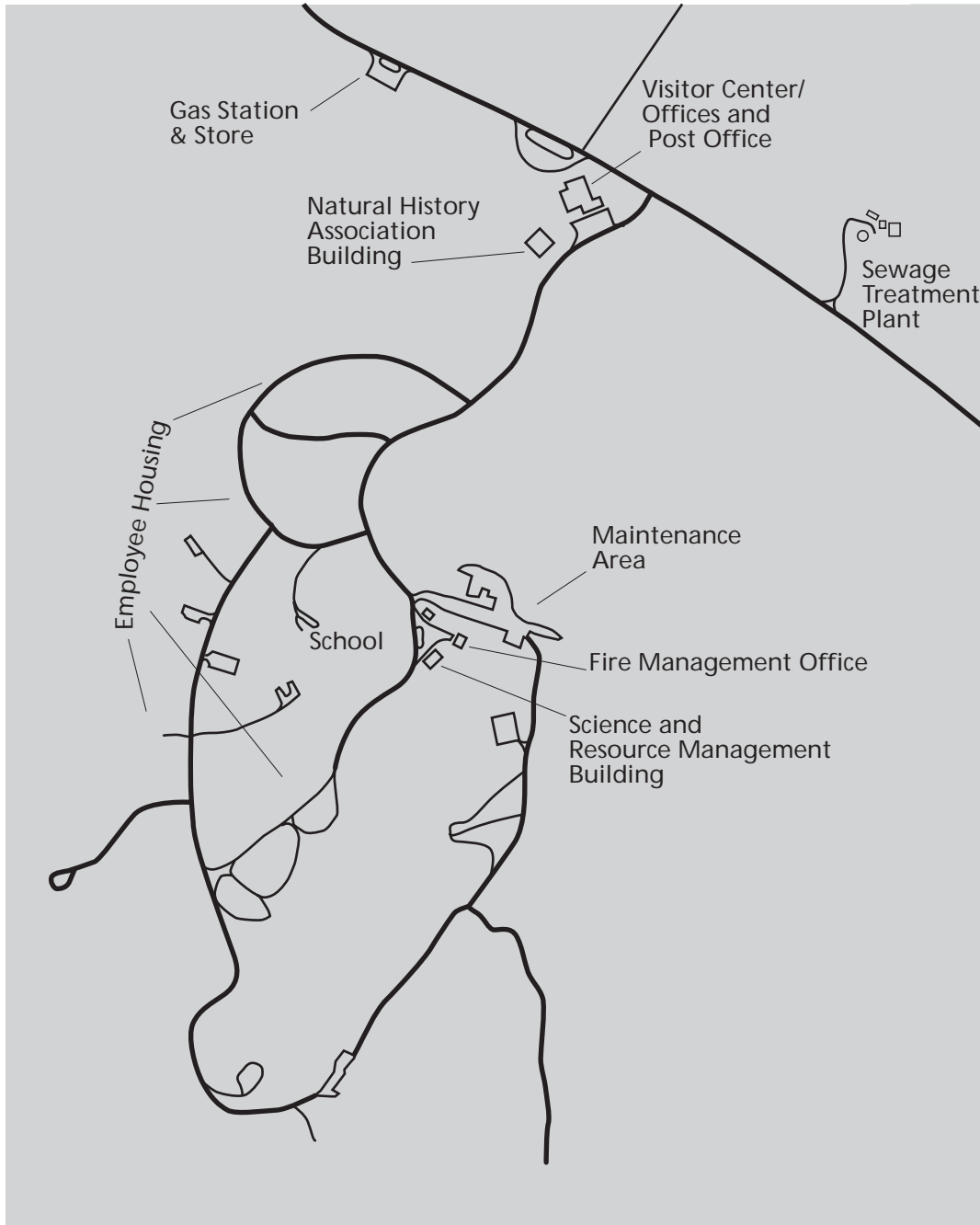


ROADS

Alternative A No Action (Status Quo) Chisos Basin

Big Bend National Park
National Park Service
U.S. Department of Interior
DSC • Dec 2002 • 155/20077





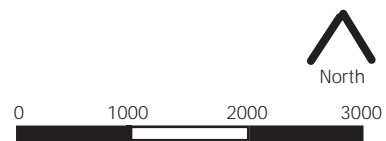
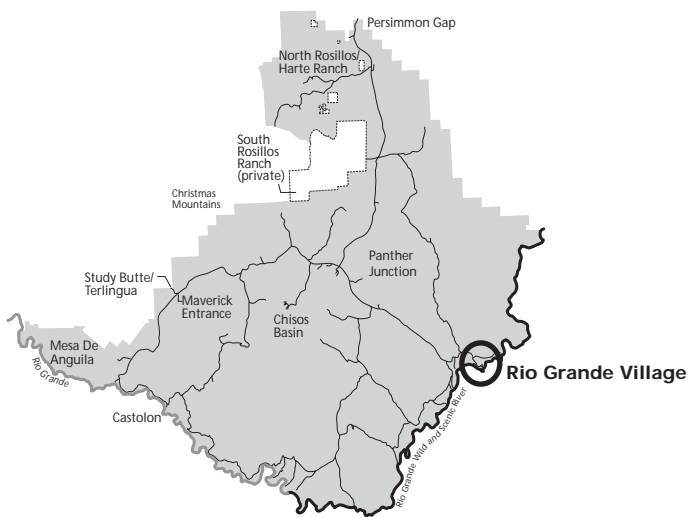
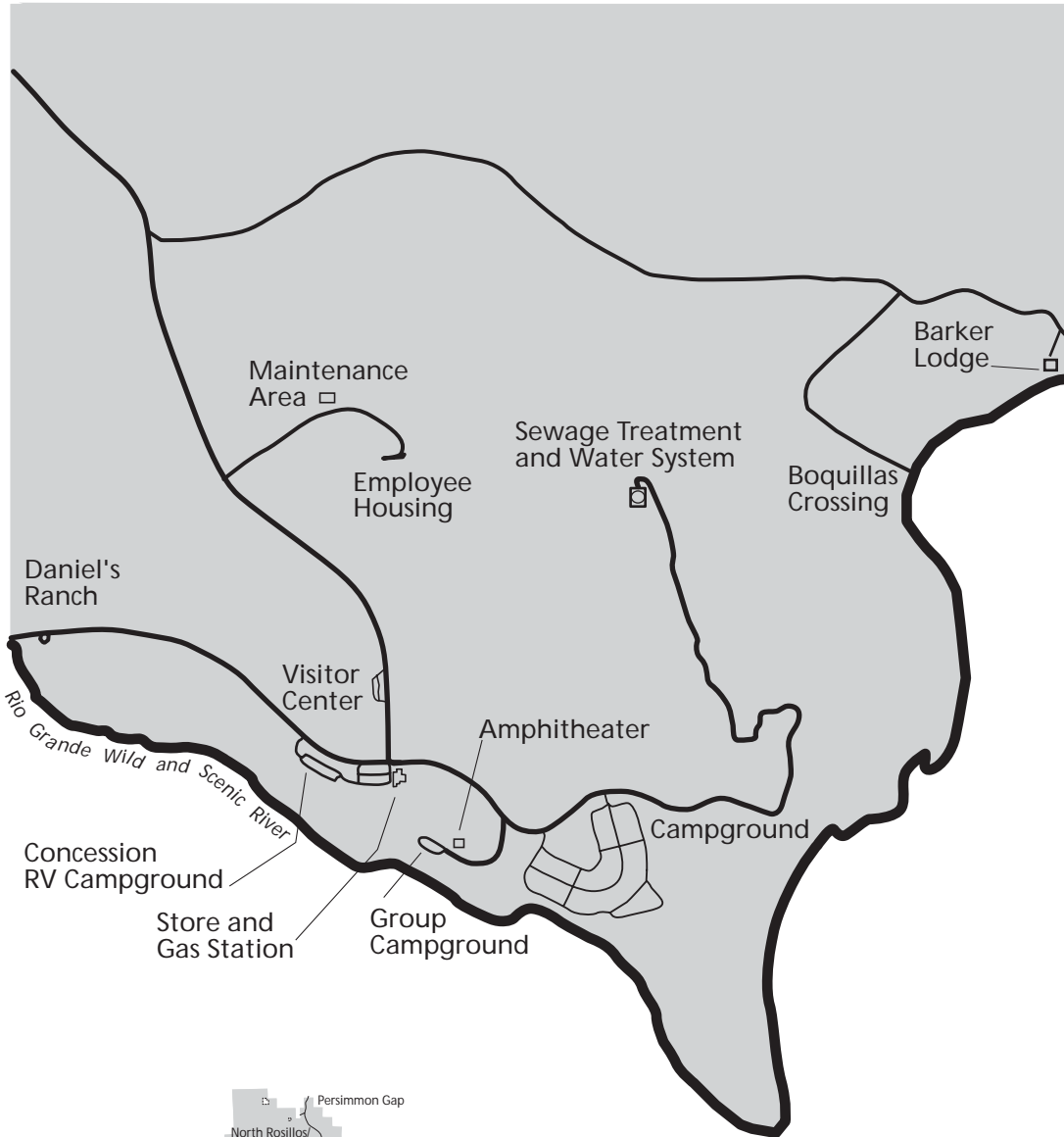
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Alternative A No Action (Status Quo) Panther Junction

Big Bend National Park

National Park Service
U.S. Department of Interior
DSC • Dec 2002 • 155/20083



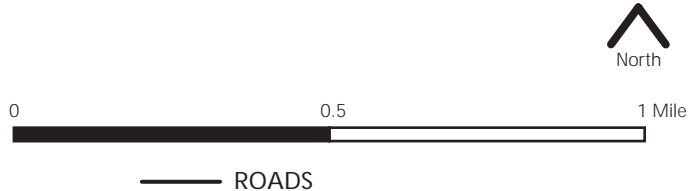
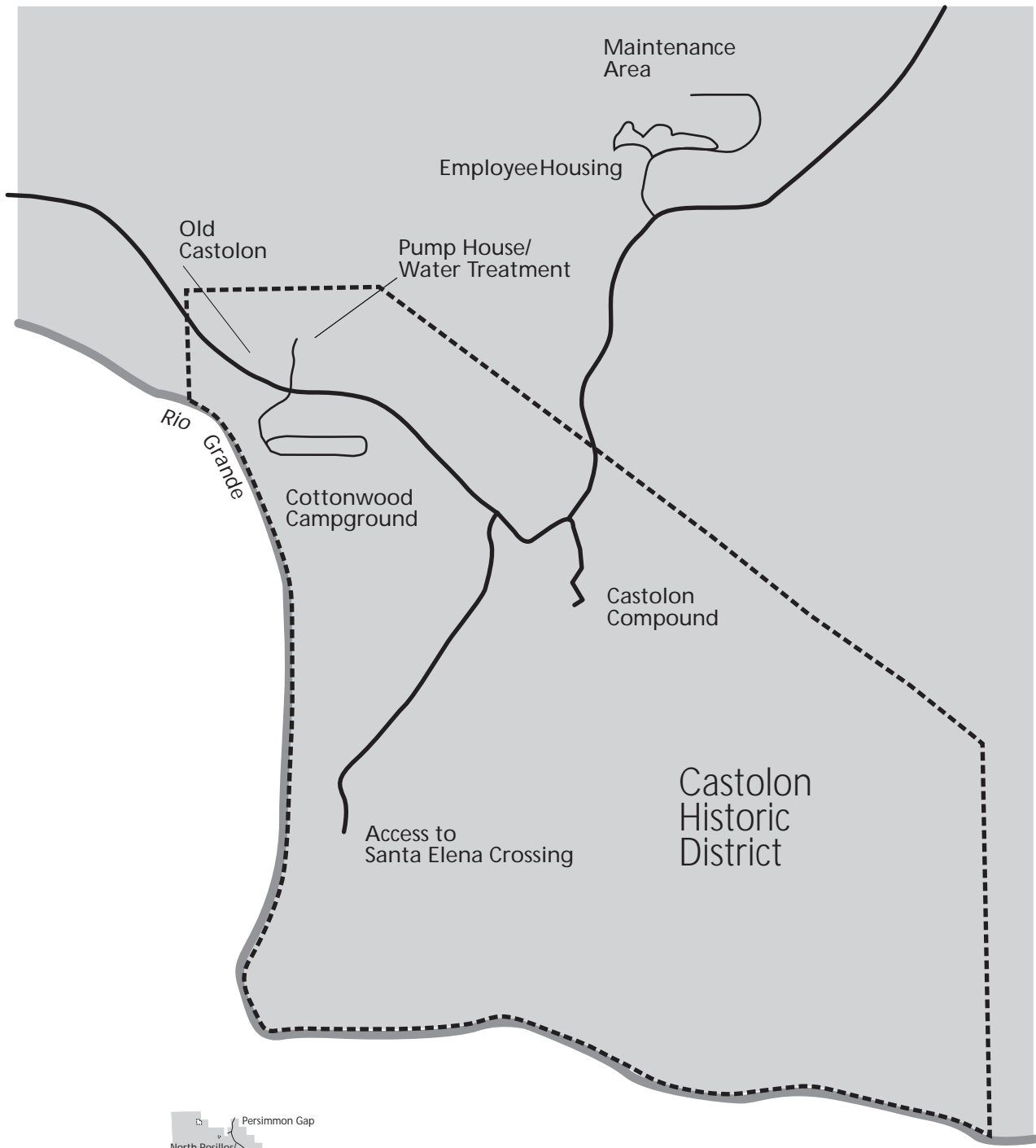


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Alternative A No Action (Status Quo) Rio Grande Village Big Bend National Park

National Park Service
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Alternative A No Action (Status Quo) Castolon

Big Bend National Park
National Park Service
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DSC • Dec 2002 • 155/20074



Alternative A — No-Action (Status Quo)

ALTERNATIVE B — (PREFERRED ALTERNATIVE) — ENHANCED AND ADEQUATE NATURAL RESOURCE STEWARDSHIP AND ENHANCED VISITOR FACILITIES

CONCEPT

This alternative would offer an enhanced experience for visitors while creating a more sustainable park and providing better protection for park resources.

A new visitor center would be developed that would include an auditorium, an expanded exhibit area, and possibly an outdoor exhibit area. Interpretation would be developed for the Buttrill Spring area. A number of actions such as reducing irrigation water used at Rio Grande Village by 50%, phasing out plants that are heavy water users at Rio Grande Village and Cottonwood Campground, relocating personnel to gateway communities, and removing some development from Chisos Basin would result in reduced water use. All these actions would provide for a better visitor experience and make the park more sustainable.

DETAILED DESCRIPTION

The description of this alternative, like descriptions of the other action alternative, is organized by management prescriptions. The various kinds of prescriptions are described at the beginning of this chapter. Also see the Alternative B maps for various areas within the park.

The maps in this document are for illustration purposes only and are not drawn perfectly to scale.

Wilderness Prescription

(See Park Area map)

Most of the land that comprises the park has been determined either as “proposed” wilderness or “potential” wilderness. These recommendations have been transmitted to Congress

by the president, but have not been acted on by Congress. The National Park Service is required to manage these lands to preserve their wilderness values until Congress acts. To accomplish this requirement, these lands would be managed under the wilderness prescription. This prescription would preserve vast desert and mountain landscapes that are unaltered by human hands. These areas contain dramatic contrasts, from lofty wooded peaks to canyons carved by the Rio Grande, all dominated by the great expanse of the Chihuahuan Desert. The visitor would have the opportunity for a primitive experience with chances to see the magnificent scenery that is unique within the United States as well as to sense the solitude and quietness that typifies the area.

Some of the notable features in the prescription are the Mesa de Anguila and the north side of the Santa Elena Canyon, the area east of the Santa Elena Canyon containing the creosotebush plant community, the lava capped Burro Mesa, the Chisos Mountains, and portions of the Chisos Basin. Most of the area around Mariscal Mountain, Talley Mountain, and Chilicotal Mountain would be in this prescription, as well as portions of Tornillo Creek, McKinney Hills, Boquillas Canyon on the Rio Grande, and the Sierra del Carmen Mountains. All of the cliffs in the three major canyons of the Rio Grande would be managed under the wilderness prescription.

The North Rosillos/Harte Ranch section of the park contains lands that are being evaluated by park staff to determine their suitability or nonsuitability for further study and possible recommendation for wilderness designation. See “Appendix E: Draft Wilderness Suitability Assessment,” and the “Purpose, Need, and Scoping” chapter. If lands are found suitable for further study and possibly recommended for wilderness designation, these lands would

be managed as wilderness at least until the wilderness study was completed.

Backcountry Nonwilderness Prescription

(Much of Chisos Basin, Panther Junction, Rio Grande Village, Castolon [outside the historic district], and North Rosillos/Harte Ranch)

The following portions of the park have been excluded from the wilderness proposal: (1) areas along the Rio Grande and south of the River Road that are less than 5,000 acres and are impacted by citizens of Mexico and fishermen, (2) corridors along the roadways, and (3) areas that contain pole-mounted telephone, powerlines, or the soil and moisture study area. However, many of the areas contain values similar to those found in wilderness areas. In alternative B these lands would be in the backcountry nonwilderness prescription. In the North Rosillos/Harte Ranch area, the park would develop an interpretive trail at Buttrill Spring and might develop a Rosillos trail.

The Mariscal Mine, Luna’s Jacal, Homer Wilson Ranch, and Sam Nail Ranch (not a national register site) are cultural resources found in areas covered by this prescription. A high priority for preservation work would be given for all sites eligible for listing on the National Register of Historic Places, such as the structures at Mariscal Mine and Luna’s Jacal. The Homer Wilson and Sam Nail Ranches would be preserved and interpret both natural and cultural resource topics related to West Texas ranching.

Cultural Prescription

(Daniel’s Ranch, Barker Lodge, Castolon Historic District, Bone and Buttrill Springs, and the adobe structures near the airstrip in North Rosillos/Harte Ranch area)

The cultural prescription would include Daniel’s Ranch and Barker Lodge in the Rio Grande Village area, and the Castolon Historic District. Barker Lodge would be adaptively used for housing for researchers. The preservation and interpretive activities at the

Daniel’s Ranch and Castolon Historic District would continue.

In the North Rosillos/Harte Ranch area, Bone Spring and Buttrill Spring have been placed in this prescription, and the park would develop preservation strategies for each of these features. The various sites around Buttrill Spring and Bone Spring would be evaluated for their potential to be listed on the National Register of Historic Places — possibly as part of a cultural landscape. Features around Buttrill Spring would be preserved for their historic and interpretive significance. An interpretive trail would be developed in the area of Buttrill Spring.

Visitor Services Prescription

*(Chisos Basin - campground, group campground, and amphitheater area and the visitor center, store, and lodge area
Panther Junction - area along the main park road from the visitor center/headquarters to the gas station and store
Rio Grande Village - visitor center, campground, group campground, store, gas station, concession RV campground, and surrounding area
Cottonwood Campground
Persimmon Gap - area surrounding entrance station, visitor center, and picnic area; the new site for the Maverick entrance station)
many of the roads in the park)*

At Chisos Basin, electrical lines would be placed underground to decrease their impact on park scenic values. To promote the Basin’s sustainability and decrease the human impact on the Basin, especially water use, the National Park Service would remove one NPS employee residence and the NPS “bunkhouse,” which is used for seasonal housing, after replacement housing is built at Panther Junction. If additional park housing were needed, it would be developed elsewhere in the park or in gateway communities. No lodging units would be removed from Chisos Basin, but if water shortages did occur in the Basin, then the Park Service would close facilities, concessions, and campground areas on a temporary basis.

At Panther Junction, a new visitor center would be built to provide comprehensive interpretation of the park's interpretive themes. A new visitor center is the most effective and efficient way to address numerous shortcomings in the current facility, which serves not only as the main park visitor center but also as the park operational headquarters building. This results in conflicts between strictly park administrative activities and the need to provide a full range of visitor services. The current building was constructed in 1961 and designed to accommodate a smaller park staff and a park annual visitation of slightly more than 90,000 people. Forty years later, the park staff has grown and park annual visitation averages between 300,000 and 340,000 (and has been as high as 474,000). Because of the geography and layout of the park road system, nearly every visitor goes by the visitor center. During peak periods of use, the interior space becomes very congested with staff and visitor activities.

The visitor center lacks sufficient indoor spaces for such basic interpretive functions as interpretive programs, films, and other multimedia presentations. The visitor center's original auditorium, many years ago, was converted into a park community/meeting/training room for park functions (such as administrative activities such as permitting for park activities) or for potlucks, Girl Scout meetings, religious services, and other community activities — purposes never anticipated in the original design. It has become the center for these activities because it is one of the very few public facilities within a 100-mile area that is large enough to accommodate numbers of people. (A small year-round visitor center in the Chisos Basin is geared to those visitors planning activities in the Basin. The two other visitor contact stations in the park at Rio Grande Village and Persimmon Gap operate only seasonally. None of these sites have the geographic advantage of Panther Junction.) The visitor center cannot accommodate all these activities and still be an effective visitor center. During peak periods, it can be difficult to even get into the building much less gain any understanding or appreciation of the various

exhibits, displays, and literature available on the park.

In addition, it is critical to provide visitors with safety information to enable visitors to safely enjoy the park's beauty and not have their visit marred by accident or injury. Currently, the visitors can with effort gain the necessary information, but a new facility would provide a more efficient and effective mechanism for both distributing materials and face-to-face contact with visitors.

The new visitor center would include an auditorium for orientation and interpretive programs, expanded exhibit areas, and the main Big Bend Natural History Association bookstore. The center would take advantage of the desert climate by using outdoor exhibit space as much as possible for such items as paleontological exhibits and other appropriate interpretive themes. The new building would consolidate offices for the interpretive division. It would contain enough space to adequately provide interpretation of the park's interpretive themes and fully address the complexities of this huge park. Rather than having one large and very expensive structure, a number of the exhibits would be incorporated into the building area so that they could be protected from the elements but remain open to the outside even when the building was closed. In this way, exhibit space would be increased for minimal cost.

The new building would allow for the conversion of the old structure into much needed office space for current and future park staff. This conversion would be undertaken only after this Mission 66 structure was evaluated to determine its national register eligibility. If it was found eligible, the rehabilitation would be done in a manner that would preserve its character-defining features. This would consolidate offices that currently are in various locations around Panther Junction and make administrative operations more efficient.

The natural resources and collection management building (described in the cumulative impact scenario) should adequately provide for the collection storage needs for the

duration of this plan. In case additional collection storage space was necessary, the other new storage areas would be evaluated to accommodate this need.

At Rio Grande Village, some campsites would be relocated to reduce impacts on the endangered Big Bend gambusia. To give further protection to the Big Bend gambusia, the park staff would seek to find a separate water source so that the fish and people would no longer be sharing the same source. The former overflow camping area would be returned to natural conditions. The concessioner-operated RV campground would be enlarged by about 40% in area, but would not exceed 30 total sites. The current visitor center building would be expanded to provide office space for four park rangers, or a separate building would be constructed for this purpose depending on which would be more cost-effective.

At Cottonwood Campground, some of the campsites would be relocated away from the river because the riverbank in that area tends to slough off. An additional egress road from the campground would be constructed.

To eliminate visitor and employee safety issues at the Maverick entrance station and to remove it from its prominent place in the viewshed, the entrance station would be removed and a new one would be constructed closer to the park's western boundary.

Operations Prescription

(Chisos Basin - sewage lagoons/sewage treatment plant area, employee housing, water tanks, and NPS operational area near the lodge

Panther Junction - all the developed area south of the visitor center/headquarters, the sewage treatment plant, and the road to this plant

Rio Grande Village - the area north of Daniel's Ranch, the maintenance area, the employee housing area, the sewage treatment and water system area, and the roads to these areas

Castolon - maintenance area, employee housing, and pump house/sewage treatment area

North Rosillos/Harte Ranch - park airstrip and a portion of the road leading to the airstrip)

The water system at Castolon would be upgraded to meet state standards. Up to 15% of the park's personnel and functions would be moved to gateway communities. This would require the park to construct or lease offices and /or residences in the gateway communities. Some employees might rent or buy their own residences. This action would increase the park's sustainability.

A new storage warehouse would be built at Panther Junction to consolidate this scattered function into one building specifically designed for storage. New housing inside the park would be located in Rio Grande Village, Castolon, and Persimmon Gap if water sources can be found. Also, the National Park Service could build additional housing units in Panther Junction to accommodate NPS needs as well as the needs of the Border Patrol and the concessioner. A total of eight new housing units would be constructed to provide for better resource protection, visitor safety, and interpretation. Fire bays would be built at Rio Grande Village and Castolon to achieve greater resource protection.

PARTNERSHIPS, PROGRAMS, AND ACTIVITIES

Water is critical to understanding and preserving the Big Bend ecosystem. This alternative proposes a number of actions to meet this critical need. In Rio Grande Village the amount of land irrigated by water from the Rio Grande would be reduced by about 50% to about 12.6 million gallons per month. Priority for irrigation would be given to shade trees in campgrounds and picnic areas. As cottonwoods die, they would be replaced by more drought-tolerant native species. Overall, plants that are heavy water users would be phased out to reduce the amount of irrigation. In the Rio Grande Village area, a study would be made on

Alternative B, Chisos Basin

map

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Alternative B, Panther Junction

map

Alternative B, Rio Grande Village

map

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Alternative B, Castolon

map

Alternative B, North Rosillos/Harte Ranch

map

how best to restore natural hydrology consistent with maintaining cultural landscapes. The park staff would explore the feasibility of acquiring additional water rights for the entire length of the Rio Grande in the park for the purpose of increasing flows in the river.

In the North Rosillos/Harte Ranch area, small-scale experimental restoration treatments would be undertaken to determine how best to restore the natural grasslands. Successful treatments would then be used in other areas of the park.

The park staff would continue to seek ways to strengthen connections with the Mexican protected areas bordering the park. This would include working with the staff in the Mexican protected areas to better protect and provide an understanding of the areas' natural and cultural resources. In addition, the park staff would continue to seek ways to work with the Mexican villages that border the park. This would include, but not be limited to, more interpretive programs.

Park interpretive programs that extend beyond park boundaries would be expanded, including external curriculum-based environmental education and use of technology to develop distance learning opportunities.

PARK BOUNDARY

No major changes in the park boundary would be proposed under this alternative.

ESTIMATED COSTS

In 2001 Big Bend National Park, in a unique partnership with the National Parks Conservation Association and a consortium of philanthropic organizations led by the Kendall Foundation, developed a business plan to identify the financial and personnel shortfalls at this park (NPS and NPCA 2001). This plan analyzed how many full-time equivalent employees (FTEs) would be necessary for the park to meet resource protection, management, administrative, maintenance, visitor experience, and facility operational standards.

The additional FTE requirements below are based on that analysis.

There would be a transition period between when this plan is approved and when the park could become fully staffed. During this transition period, the park would seek to increase its efforts in the areas of grant and fund raising, developing partnerships, and doing cost-benefit analysis on park activities to increase park efficiency to cover the shortfall and meet minimal operational standards. These are at best temporary solutions.

All costs are in year 2002 dollars. All alternatives retain the current base staff of 100 full-time-equivalent (FTE) positions. To fully implement this alternative, an increase of 25% to 35% in park staff would be required. The reason this plan calls for the additional FTE employees is the growing need to provide for homeland security, the need to provide better resource and visitor protection as well as to provide for visitor experience and enjoyment. Big Bends' location has required the park to increase security measures along this border and to greatly increase its security role. Increased enforcement efforts along the entire U.S.-Mexico border have forced the smuggling of contraband and undocumented aliens to less protected areas of the border. As a result, the already limited law enforcement resources at Big Bend are now dealing with an increased number of drug and border violations as well as terrorist threats. Also the poaching of animals, plants, minerals, and fossils from the park has become an increasing concern.

Big Bend is bigger than Rhode Island. Due to the limited number of cultural resource staff, only 3% of the park has been adequately surveyed for archeological and cultural resources purposes. Currently park staff has concentrated their efforts on the preservation on known cultural resources. Also, growth of exotics such as tamarisk, gradual deterioration due to climate, and visitor depredations have all combined to result in the slow deterioration of the park's cultural resources.

Currently, the interpretive ranger staff is stretched to its limits. This has resulted in

fewer programs, short hours at some fee stations and visitor orientation facilities, and less person-to-person contact by park staff. Some of the functions normally done by interpretive rangers are now being done by volunteers.

As an interim measure, volunteers could be used to help preserve resources and provide for a quality visitor experience (between 1987 and 2000, the park has added volunteer hours equating to 20 FTE employees), but the long-term continuation of this measure would result in the gradual deterioration of the park experience and resources. Also cooperative efforts with the border patrol could help in providing security for park staff and visitors, but again this is only a short-term solution to the larger problem of providing adequate resource protection. Greater emphasis on public education concerning the fragile nature of natural and culture resource could slow but not stop damage to the park's resources. In conclusion, the above measures might provide a degree of resource protection and preservation. But eventually, park staffing must be increased. It is expected that the increase in park staffing of 25% to 35%. The staffing request over a 20-year period would be an increase of approximately 1.5% a year.

The additional positions would be in resource protection, interpretation, maintenance, and

administrative support. The additional FTE employees would eventually raise park costs to between \$1.4 and \$2.0 million per year. Added to current staffing costs of \$4.3 million per year, the total would be \$5.7 to \$6.3 million per year.

The construction, rehabilitation, and restoration costs for alternative B would be about \$ 18.3 to \$25.0 million. The estimate is general and should be used only for comparing the alternatives in this plan.

TABLE 2: REPRESENTATIVE DEVELOPMENT COSTS FOR ALTERNATIVE B

Removal of one NPS employee residence and seasonal housing in Chisos Basin	\$ 70,000
Construct new visitor center at Panther Junction	\$4,500,000
Rehabilitation of old visitor center into administrative space	\$ 600,000
Expanded office area at Rio Grande Village	\$ 75,000
Rehabilitate Barker Lodge	\$ 500,000
Construct eight new housing units in park	\$1,060,000

ALTERNATIVE C — MAXIMIZE NATURAL RESOURCE STEWARDSHIP AND PRESERVATION BY PROVIDING A MORE RESOURCE-ORIENTED VISITOR EXPERIENCE

CONCEPT

This alternative would provide for the enduring protection and preservation of the park's natural resources. Actions would be undertaken to give greater resource protection while allowing for visitor use.

This alternative would result in the construction of a new park administrative headquarters while rehabilitating the existing facilities to better serve visitors. Removal of all development except for main roads at Chisos Basin and Rio Grande Village would be undertaken to provide greater protection for natural resources. Trailheads would be developed in these areas for visitor access. The private sector would be encouraged to develop lodging for visitors outside of the park.

DETAILED DESCRIPTION

The description of this alternative, like the description of alternative B, is organized by management prescriptions. The various prescriptions are described at the beginning of this chapter. Also see the Alternative C maps for placement of management prescriptions on areas within the park.

The maps in this document are for illustration purposes only and are not drawn perfectly to scale.

Wilderness Prescription

(See Park Area map)

Most of the land that comprises the park has been determined either as "proposed" wilderness or "potential" wilderness. These recommendations have been transmitted to Congress by the president, but have not been acted on by Congress. The National Park Service is required to manage these lands to

preserve their wilderness values until Congress acts. To accomplish this requirement, these lands would be managed under the Wilderness Prescription that would preserve vast desert and mountain landscapes that are unaltered by the hand of man. These areas contain dramatic contrasts, from lofty wooded peaks to canyons carved by the Rio Grande, all dominated by the great expanse of the Chihuahuan Desert. The visitor would have the opportunity for a primitive experience with chances to see the magnificent scenery that is unique within the United States as well as to sense the solitude and quietness that typifies the area.

Some of the notable features in the prescription would be the Mesa de Anguila and the north side of Santa Elena Canyon, the area east of Santa Elena Canyon containing the creosotebush plant community, the lava-capped Burro Mesa, the Chisos Mountains, and portions of the Chisos Basin. Most of the area around Mariscal Mountain, Talley Mountain, and Chilicotal Mountain would also be in this prescription, as well as portions of Tornillo Creek, McKinney Hills, Boquillas Canyon on the Rio Grande, and the Sierra del Carmen Mountains. All the cliffs in the three major river canyons of the Rio Grande would be managed under the wilderness prescription. The Hot Spring trail would be extended to a new trailhead and nature trail to Boquillas Crossing.

The North Rosillos/Harte Ranch section of the park contains lands that are being evaluated to determine their suitability or nonsuitability for further study and possible recommendation for wilderness designation. See "Appendix E: Draft Wilderness Suitability Assessment," and the "Purpose, Need, and Scoping" chapter. If lands are found suitable for further study and possibly recommended for wilderness designation, these lands would be managed as wilderness at least until the wilderness study was completed.

Backcountry Nonwilderness Prescription

*(Chisos Basin - most of Basin
Panther Junction - most of area excluding
developed areas
Rio Grande Village - most of area
Castolon - most of area north and west of
historic district
North Rosillos/Harte Ranch - most of area
excluding roads and development)*

Portions of the park excluded from the 1984 wilderness proposal are: (1) areas along the Rio Grande and south of the River Road that are less than 5,000 acres and are impacted by citizens of Mexico and fishermen, (2) corridors along the roadways, (3) areas that contain pole-mounted telephone and power lines, and (4) the soil and moisture study area. However, many of the excluded areas contain values similar to those found in proposed or potential wilderness. Alternative C has placed these lands in the Backcountry Nonwilderness prescription.

In the North Rosillos/Harte Ranch area, the park may develop a Rosillos trail. All concession and park facilities in the Chisos Basin and Rio Grande Village would be removed, except the main road, and the area would be restored to natural contours and revegetated. A trailhead and parking area and restrooms would be provided. These areas would be managed following the Backcountry Nonwilderness prescription. No concessions lodging would be allowed in the park, but the private sector would be encouraged to develop lodging facilities outside the park boundaries.

The Mariscal Mine, Luna's Jacal, Homer Ranch, and Sam Nail Ranch (not a national register site) are cultural resources found in areas covered by this prescription. All sites eligible for listing on the national register would be preserved. These resources would continue to be preserved, and over time the interpretation of these sites would be upgraded as time and funding permit. This prescription would result in these areas being managed to either continue the natural conditions or to reduce past impacts on resources.

Cultural Prescription

*(Daniel's Ranch, Barker Lodge area,
Castolon Historic District, the two springs,
and the adobe structures near the airport)*

The park would consult with the Texas Historic Preservation Office to determine if the non-character-defining features of Barker Lodge could be documented and allowed to deteriorate. If this was not feasible, then Barker Lodge would be preserved in the most cost effective manner. The current preservation and interpretive activities at the Daniel's Ranch and Castolon Historic District would continue. The water and fire suppression system would be upgraded to provide for better protection of the historic district.

In the North Rosillos/Harte Ranch area, Bone Spring and Buttrill Spring would be placed in this prescription, and the park staff would develop preservation strategies for each of these features. The various sites around Buttrill Spring and Bone Spring would be evaluated for their potential to be listed on the National Register of Historic Places — possibly as part of a cultural landscape. Features around Buttrill Spring would be preserved for their historic and interpretive significance. An interpretive trail would be developed in the area of Buttrill Spring.

Visitor Services Prescription

*(Panther Junction - area along the main park
road from the visitor center/headquarters
to the gas station and store
Cottonwood Campground
Persimmon Gap - area around the entrance
station, visitor center, and picnic area
Maverick - the new site for the entrance
station)*

At Chisos Basin, electrical lines would be placed underground to decrease their impact on park scenic values. At Panther Junction, the visitor center/ headquarters would be rehabilitated to better serve as a visitor center, consolidate offices for the interpretive division, and provide space for collections. This would be undertaken only after this Mission 66 structure was evaluated to determine its

Alternative C, Chisos Basin

map

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Alternative C, Panther Junction

map

Alternative C, Rio Grande Village

map

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Alternative C, Castolon

map

Alternative C, North Rosillos/Harte Ranch

map

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

eligibility for listing on the national register. If it is found eligible, the rehabilitation would be done in a manner that would preserve its character-defining features.

At Cottonwood Campground, some of the campsites would be relocated away from the river, and a new egress road would be constructed from the campground.

To provide better visitor orientation and eliminate visitor and employee safety hazards at the Maverick entrance station, it would be removed; a new entrance station constructed on a site closer to the park's western boundary.

Operations Prescription

(Panther Junction — all the developed area south of the visitor center/ headquarters and the sewage treatment plant

Castolon - maintenance area, employee housing, and pump house/ sewage treatment area

North Rosillos/Harte Ranch - park airstrip and a portion of the road leading to the airstrip)

The water system at Panther Junction would be upgraded to meet state standards. Up to 15% of the park's personnel and functions would be moved to gateway communities. This would require the park to construct or lease offices and /or residences in the gateway communities. Some employees may rent or buy their own residences. This action would increase the park's sustainability.

A new administrative building would be built at Panther Junction so that all administrative offices there would be in one building. A new storage warehouse would be built at Panther Junction to consolidate this scattered function into one building specifically designed for storage. A fire bay would be built at Castolon to achieve greater resource protection. The natural resources and collection management building (described in the cumulative impact scenario) should adequately provide for the collection storage needs for the duration of this plan. In case additional collection storage space was necessary, the other new storage

areas would be evaluated to accommodate this need.

PARTNERSHIPS, PROGRAMS, AND ACTIVITIES

Water is critical to the understanding and preserving the Big Bend ecosystem. When development is removed from Rio Grande Village and Chisos Basin, the existing vegetation would be replaced with drought-tolerant species. Overall, plants that are heavy water users would be phased out and irrigation discontinued in Rio Grande Village. In the Rio Grande Village area, a study would be made on how best to restore natural hydrology consistent with maintaining cultural landscapes. The park staff would explore the feasibility of acquiring additional water rights for the entire length of the Rio Grande in the park for the purpose of increasing flow in the river.

In the North Rosillos/Harte Ranch area, small-scale experimental restoration treatments would be undertaken to determine how best to restore natural grasslands. Successful treatments would be used in other areas of the park.

The park would continue to seek ways to strengthen connections with the Mexican protected areas bordering the park. This would include working with staff in the Mexican protected areas to better protect and provide an understanding of the areas' natural and cultural resources. In addition, the park staff would continue to seek ways to work with the Mexican villages that border the park. This would include, but not be limited to, more interpretive programs.

The park's interpretive program would be expanded in a variety of ways to extend beyond park boundaries. This would include expanded, external, curriculum-based environmental education and using technology to develop distance learning opportunities.

PARK BOUNDARY

No change in the park boundary would be proposed under this alternative.

ESTIMATED COSTS

In 2001 Big Bend National Park, in a unique partnership with the National Parks Conservation Association and a consortium of philanthropic organizations led by the Kendall Foundation, developed a business plan to identify the financial and personnel shortfalls at this park (NPS and NPCA 2001). This plan analyzed how many full-time-equivalent (FTE) employees would be necessary for the park to meet resource protection, management, administrative, maintenance, visitor experience, and facility operational standards. The additional FTE requirements below are based on that analysis.

There would be a transition period between when this plan is approved and when the park could become fully staffed. During this transition period, the park would seek to increase its efforts in the areas of grant and fund raising, developing partnerships, and doing cost-benefit analysis on park activities to increase park efficiency to cover the shortfall and meet minimal operational standards. These are at best temporary solutions.

All costs are in year 2002 dollars. All alternatives retain the current base staff of 100 FTE positions. The staffing figures represent additional positions that would be needed to carry out this alternative. The additional positions would be in the resource, protection,

interpretation, maintenance, and administrative divisions. An increase in FTE employees of between 8% and 15% at a cost of between \$625,000 and \$846,000 per year would eventually be required to implement this alternative. Added to the current staff cost of \$4.3 million per year, total costs would be \$4.9 to \$5.1 million per year.

The construction, rehabilitation, and restoration costs for alternative C are estimated to range from \$16 to \$18.4 million. The estimate is general and should be used only for comparing the alternatives in this plan.

TABLE 3: REPRESENTATIVE DEVELOPMENT COSTS FOR ALTERNATIVE C

Removal of structures and revegetation at Chisos Basin	\$1,100,000
Removal of structures and revegetation at Rio Grande Village	\$6,614,420
Rehabilitation of visitor center/ headquarters at Panther Junction	\$1,140,000
New administration building at Panther Junction	\$2,400,000
Preservation of Barker Lodge	\$ 300,000
Construct two new housing units in the park	\$ 300,000

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

SUMMARY

One alternative previously under consideration was eliminated from the draft plan. The principal focus of this alternative was the relocation of most facilities in the Chisos Basin, Rio Grande Village, and Castolon. Most comments received on this proposal pointed out that simply moving facilities would result in impacts in the areas where facilities were removed and in areas to which these facilities were moved — many new areas of the park. The bullets indicate elements that were not included in another alternative.

Chisos Basin

- Remove all concession and park facilities from Chisos Basin except for campground and two residences for law enforcement and maintenance.
- Relocate the lodge and concession operations to an area between Basin Junction and Panther Junction. If this action were not feasible, permit no concession lodging in the park.

Panther Junction

- Expand visitor center to best interpret the park's natural and cultural material.

Castolon

- Develop new campground and amphitheater in mesquite flat or southeast along the river; remove current campground and amphitheater.
- Relocate concessions housing out of historic district.

Rio Grande Village

- Relocate campsite facilities and certain park support facilities such as visitor center and housing outside the 100-year floodplain.
- Relocate the gas station, store, and park support facilities such as maintenance outside the 500-year floodplain, possibly at the junction of the road to Boquillas.
- Reduce park facilities to a total of five residences (three for maintenance and two for law enforcement).
- If sufficient space can be identified, develop additional campsites.
- Reduce concessions facilities to two residences.

North Rosillos/Harte Ranch

- Designate a substantial portion of North Rosillos/Harte Ranch area for a wilderness study and manage it following the wilderness prescription. Exclude the county road, landing strip with surrounding buildings, and mountain lodge from this study.
- Allow the remaining structures to deteriorate in place; if necessary for visitor safety, remove them.
- Manage most land in the North Rosillos/Harte Ranch area following the wilderness prescription.

Parkwide

- Develop in situ display of paleontological resources and improve fossil bone exhibit

Christmas Mountains

- Encourage the Texas General Land Office to find a buyer for the land who would manage it to be compatible with park purposes.

IDEAS SUGGESTED AND ELIMINATED FROM FURTHER CONSIDERATION

During the planning process, the public suggested two ideas that were dropped from further consideration. These ideas are discussed below.

Museum of Paleontology. The new visitor center would have paleontological exhibit space, and an appropriate location in the park would be identified for an in situ display of paleontological resources including fossils.

Christmas Mountains. The Christmas Mountains are owned by the Texas State Land Office. The lands are protected by a strict conservation easement, and that easement remains in place regardless of ownership. The easement will protect the park viewshed and the Christmas Mountains from any development. Because of this, it was decided that the focus of this management plan should be on the lands owned by the park within the current boundary.

THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed in section 101 of the National Environmental Policy Act. In the National Park Service, the environmentally preferred alternative is identified by (1) determining how each alternative would meet the criteria set forth in section 101(b) and (2) considering any inconsistencies between the alternatives analyzed and other environmental laws and policies (Director's Order 12, 2.7.E.).

The preferred alternative, alternative B, is the environmentally preferred alternative based on the following criteria provided in the National Environmental Policy Act:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choices;

- achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative B, which rated high in all categories, would enhance the park's ability to carry out its mission through developmental and programmatic activities while limiting the amount of new environmental impacts from the development. This would be accomplished through, in the main, limiting development to previously developed areas. Alternatives A and C lack the range of diversity and variety of individual choices found in B. Alternative B best balances the need to protect the park's resources while allowing visitors to enjoy the widest range of activities. Alternative B fulfills the responsibility of protecting resources for future generations by taking actions to reduce water use in the park and provide for additional measures to protect endangered species. Alternative C provides similar protection, but reduces opportunities for all visitors to fully enjoy the park and its resources. Therefore, the preferred alternative is the environmentally preferred alternative.

MITIGATION AND ADDITIONAL STUDIES

GROUND DISTURBANCE/SOILS

Where possible, new development would be built on previously disturbed sites. During design and construction, park natural resource staff would identify areas to be avoided.

Best management practices for controlling soil erosion, such as the placement of silt fencing, retention and replacement of topsoil, revegetation of sites with native species, and selective scheduling of construction activities, would be taken to reduce runoff and soil loss from construction sites. Salvaged vegetation, rather than new planting or seeding, would be used to the extent possible. Workers also would be required to control dust, and all construction machinery would be required to meet air emission standards. Restoration efforts would be scheduled to minimize impacts on downstream water users.

VEGETATION

Park staff would survey proposed development sites for sensitive species and would relocate new development if sensitive species populations were present. Similarly, trails, roads, campsites, and picnic sites would be located to avoid impacts on sensitive species.

To the extent possible, help minimize the spread of nonnative plants, park managers would allow only the use of weed-free materials and equipment for park operations and visitor use activities.

WATER RESOURCES

Best management practices such as the use of silt fences, would be implemented to ensure that construction-related effects were minimal and to prevent long-term impacts on water quality, wetlands, and aquatic species from displacement of soils.

A statement of findings for floodplains would be prepared if the selected alternative included

retaining a campground in the 100-year floodplain or any development in the flash-flood-prone area at Panther Junction. The statement of findings would include an emergency preparedness plan for evacuating people in the event of a flood. More detail is available in the “Affected Environment” chapter, under “Natural Resources.”

Any new facilities proposed in the floodplain (except trails, roads, and picnic facilities) would be designed to manage flood conditions, and a statement of findings for floodplains would be prepared.

Increased caution would be exercised to protect wetlands from damage caused by construction equipment, erosion, siltation, and other activities with the potential to affect wetlands.

Construction materials would be kept in work areas, especially if the construction took place near streams or natural drainages.

Wetlands would be delineated by qualified NPS staff or certified wetland specialists, and they would be marked before construction.

THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN

Undertake mitigating measures during normal park operations as well as before, during, and after construction to minimize immediate and long-term impacts on rare, threatened, and endangered species. These actions would vary by specific project and area of the national park affected.

Conduct surveys for rare, threatened, and endangered species as warranted. If sensitive species are found, prior to design or construction in those areas, consultation would be undertaken with the Fish and Wildlife Service for federally listed species or the Texas Parks and Wildlife for state listed species to determine the most appropriate locations, construction methods, and mitigating measures.

Site and design facilities/actions to avoid adverse effects on rare, threatened, and endangered species. If avoidance is infeasible, minimize and compensate adverse effects on rare, threatened, and endangered species as appropriate and in consultation with the appropriate resource agencies.

Develop and implement restoration and/or monitoring plans as warranted. Plans would include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.

AIR QUALITY

The best available clean fuel technology would be applied (as it becomes available) to the extent feasible.

Measures to reduce air pollution would be taken.

Dust abatement measures would be employed.

CULTURAL RESOURCES

In accordance with NPS policies and procedures, the protection of cultural resources would continue. The disturbance of significant resources would be avoided wherever possible. Where avoidance or preservation could not be achieved, appropriate mitigation would be carried out according to the procedures of the Advisory Council on Historic Preservation (36 CFR 800).

“Stop work” provisions and other protective measures would be included in project documents implementing the approved plan. (A stop work order would only be used in an extreme situation. Projects would be designed to identify and protect resources well before development plans were finalized.) Construction would be restricted to the immediate vicinity of the projects, and new disturbance would not be permitted outside the designated project area.

If previously unknown and significant archeological resources were unearthed during construction, or if human remains were

discovered, work in the discovery area would be stopped immediately, and the park superintendent and the contracting officer would be notified immediately. Measures would be instituted to protect the remains, sacred objects, associated funerary objects, and objects of cultural patrimony. The superintendent would notify the state historic preservation officer. Any artifacts found in association with the remains, funerary objects, sacred objects, and objects of cultural patrimony, would be left in place. If the remains were determined to be of American Indian origin, the park superintendent would notify associated tribes according to the Native American Graves Protection and Repatriation Act and its implementing regulations.

A number of park landscapes and structures at Panther Junction, Rio Grande Village, Chisos Basin, and Castolon are potentially eligible for inclusion on the National Register of Historic Places as part of the National Park Service’s Mission 66 work. Before taking any actions that would affect these sites, the sites would be evaluated in consultation with the Texas Historic Preservation Office. If these sites were determined eligible, then a strategy would be developed for their preservation or documentation.

Studies would be undertaken to determine:

- What is the archeological site distribution throughout the park, how do the sites relate to the various environmental zones, and what does this tell us about prehistoric populations and their adaptations to a changing environment?
- What cultural sites are located in areas of development and visitor use where the potential for adverse impacts from those activities are greatest?
- What native American tribes are affiliated with Big Bend and Rio Grande Wild and Scenic River?
- What ethnographic resources can be found in the park (Native American, Hispanic, others)?
- What are past and present Hispanic influences on Big Bend and the Rio Grande?
- What cultural landscapes in the park are eligible for nomination to the National Register of Historic Places?

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

- What is the best way to provide treatment for identified and evaluated cultural landscapes and historic structures?
- What archeological resources would be impacted in areas where development or visitor activity is planned?
- What is the best way to record and preserve the 450 buildings, structures, and ruins scattered throughout the park?
- What was the Hispanic settlement that took place in the area of the park in the 18th and 19th centuries?
- What native plants and animals were used by the Hispanic populace?
- What was the effect of mining on the park environment?

- What is the best way to document and preserve the 40 gravesites and 300 graves scattered throughout the park?

A parkwide cultural sites inventory, necessary for science-based planning for development and for resource management and interpretation, is needed to provide information on the prehistory of the park.

Also, a scope of collections needs to be prepared and a cadastral survey of all disputed sections of boundary needs to be conducted, especially in recent additions in the northwest section of the park.

TABLE 4: COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B (Preferred)	Alternative C
Concept	No significant change in current interpretation or park management direction.	<p>Offer enhanced experience for visitors while creating a more sustainable park and providing better protection for park resources.</p> <p>A new visitor center would be developed that would include an auditorium, an expanded exhibit area, and possibly an outdoor exhibit area. Interpretation would be developed for the Buttrill Spring area. A number of actions such as reducing irrigation water used at Rio Grande Village by 50%, phasing out plants that are heavy water users at Rio Grande Village and Cottonwood Campground, re-locating personnel to gateway communities, and removing some development from Chisos Basin would result in reduced water use. All these actions would provide for a better visitor experience and make the park more sustainable.</p>	<p>Provide for the enduring protection and preservation of the park’s natural resources. Give greater resource protection while providing for visitor use.</p> <p>This alternative would result in the construction of a new park administrative headquarters while rehabilitating the existing facilities to better serve visitors. Removal of all development except for main roads at Chisos Basin and Rio Grande Village would be undertaken to provide greater protection for natural resources. Trailheads would be developed in these areas for visitor access. The private sector would be encouraged to develop lodging for visitors outside of the park.</p>
Wilderness	Manage existing proposed and potential wilderness areas from 1984 <i>Final Environmental Impact Statement, Proposed Wilderness Classification (NPS 1984)</i> as wilderness as required by NPS policy.	Same as alternative A. If wilderness suitability assessment for North Rosillos/Harte Ranch area finds lands suitable for further study and possible recommendation for wilderness designation, manage these lands as wilderness at least until the wilderness study was completed.	Same as alternative B.
Throughout the Park	Continue to provide all park offices and housing in the park boundary.	Move up to 15% of park personnel and functions to gateway communities; construct or lease offices and/or residences in gateway communities.	Same as alternative B.
	Maintain park water rights at current levels.	Acquire additional water rights to increase flows in the river.	Same as alternative B.
	Continue to work with Mexican protected areas’ staff.	Seek ways to strengthen connections with the Mexican protected areas.	Same as alternative B.
	Continue to work with Mexican villages that border the park.	Seek additional ways to work with the Mexican villages that border the park, possibly including more interpretive programs.	Same as alternative B.

	Alternative A	Alternative B (Preferred)	Alternative C
Throughout the Park (cont.)	Continue interpretive programs beyond park boundaries.	Expand interpretive programs that extend beyond park boundaries, including environmental education and the use of technology. Develop <i>in situ</i> paleontological exhibit.	Same as alternative B.
Chisos Basin	Retain visitor center, campgrounds, lodge, and NPS housing.	Relocate one NPS employee residence and NPS bunkhouse to Panther Junction.	Remove all development from Basin except main road; restore to natural conditions with drought-tolerant species. Provide trailhead, restroom, and parking area at trailhead. Encourage private sector to develop lodging outside the park.
	Do not change electrical lines, which are in the viewshed of the road into Chisos Basin.	Place electrical lines underground (to decrease visual impacts).	Same as alternative B. Remove electric lines when remove development.
Panther Junction	Construct new fire management building.	Same as alternative A	Same as alternative A.
	Develop early warning system and evacuation plan.	Same as alternative A.	Same as alternative A.
	Retain visitor center and administrative functions in headquarters building.	Construct new visitor center, including auditorium, bookstore, and expanded exhibit area. Determine feasibility of developing outdoor exhibits for large items (casts of paleontological resources).	Construct new administrative building.
		Provide and consolidate space for storage and office space for interpretive division. Rehabilitate former visitor center area of headquarters to consolidate administrative offices. Provide NPS employee residence and bunkhouse to replace those removed from Chisos Basin.	Rehabilitate visitor center/headquarters to better serve as a visitor center, storage, and consolidated offices of the interpretive division.
	Add a few temporary housing and storage units as needed.	Construct storage warehouse. Replace housing (as described in the cumulative impact scenario).	Same as alternative B.
	Upgrade fire suppression system	Same as A.	Same as A.

	Alternative A	Alternative B (Preferred)	Alternative C
Rio Grande Village	Maintain visitor center building at current site.	Expand current visitor center building to provide offices for four park rangers or build a separate building for this purpose — whichever is most cost-effective.	Remove all development (except main road) from village, including visitor center; restore to natural conditions with drought-tolerant species. Provide trailhead, restroom, and parking. Extend Hot Spring trail to new trailhead and nature trail to Boquillas Crossing.
	Develop early warning system and evacuation plan for floodplain.	Same as alternative A.	Remove all development except main road and cultural resources from floodplain.
	Raise fuel storage tanks above 500-year flood level.	Same as alternative A.	Remove fuel tanks.
	Continue to irrigate shade trees and lawns.	Reduce irrigation water used by 50% (to 12.6 million gallons per month); give priority to shade trees in campgrounds and picnic areas. When they die, replace cottonwoods with more drought-tolerant species. Phase out plants that are heavy water users.	Phase out plants that are heavy water users. Continue irrigation only until area is restored.
	Retain altered hydrologic patterns.	Study how best to restore natural hydrology consistent with maintaining cultural landscapes.	Same as alternative B.
	Continue efforts to locate a separate water source for visitors and staff.	Same as alternative A.	Remove all visitor, staff, and concessioner facilities, therefore no alternative water source would be needed.
	Relocate some campsites away from Big Bend gambusia pond.	Same as alternative A.	Remove all development, including campgrounds.
	Use Barker Lodge for housing.	Use Barker Lodge for housing for researchers	Consult with state historic preservation office to see if non-character-defining portions of the lodge could be documented and left to deteriorate; if that was not feasible, preserve lodge in most cost-effective manner.
		Return overflow camping area to natural conditions.	Remove all development except main road, including campgrounds.
	Retain 25-site RV campground.	Concessioner would enlarge RV campground by about 40% with a total of no more than 30 sites.	Remove all development except main road, including campgrounds.
	Retain nine housing units (plus Barker Lodge).	Construct four new NPS housing units if a water source is found.	Remove all development except main road.
		Construct fire bay.	Remove all development except main road.
	Castolon	Retain 11 housing units	Construct two new NPS housing units if water source is found.
Upgrade water and fire suppression systems.		Same as A.	Same as A.
		Construct fire bay.	Same as alternative B.

	Alternative A	Alternative B (Preferred)	Alternative C
Cottonwood Campground	Develop early warning system and evacuation plan for the floodplain.	Same as alternative A.	Same as alternative A.
	Continue to irrigate shade trees and other vegetation.	When cottonwoods die, replace them with more drought-tolerant species. Phase out plants that are heavy water users.	Same as alternative B.
	Continue to have campsites in areas where riverbank caves in.	Relocate some campsites away from river.	Same as alternative B.
	Retain single egress road.	Construct additional egress road from campground.	Same as alternative B.
North Rosillos/ Harte Ranch	Continue work to restore natural hydrologic and soil conditions and inventory cultural and natural resources as funds permit. Undertake small-scale experimental restoration treatments to determine how best to restore natural grasslands; use successful treatments elsewhere in the park.	Same as alternative A.	Same as alternative A.
	Retain existing conditions, with no trails.	Develop an interpretive trail at Buttrill Spring and possibly develop a Rosillos trail.	Same as alternative B.
		Develop preservation strategies for Bone Spring and Buttrill Spring. Preserve features around Buttrill Spring for historic and interpretive significance.	Same as alternative B.
		Evaluate features around Buttrill Spring and Bone Spring for potential to be listed on national register	Same as alternative B.
Persimmon Gap	Retain one housing unit.	Construct NPS duplex unit if a reliable water source is found.	Same as alternative A.
Maverick Entrance	Retain current station.	Remove current station; construct new one closer to western park boundary.	Same as alternative B
Gateway Communities	Maintain no facilities in gateway communities.	Construct or lease residences and offices.	Same as alternative B.
Boundary Adjustments	Propose no changes.	Same as alternative A.	Same as alternative A.
Costs	100 FTEs at about \$4.3 million/year Construction, rehabilitation, and restoration costs \$5.7 – \$7.7 million	25%-30% more FTEs for a total of about \$1.4-\$2 million/year Construction, rehabilitation, and restoration costs \$18.3 – \$25 million	8%-15% more FTEs for a total of about \$4.9 – \$5.1 million/year Construction, rehabilitation, and restoration costs \$16 – \$18.4 million

TABLE 5: COMPARISON OF IMPACTS

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Soils</i>		
<p>Soil disturbance from ongoing maintenance, repair of buildings, upgrading one water system, and removing or protecting fuel storage tanks from the 500-year flood would be minor, adverse, and long term. Soil erosion by wind and water, and soil nutrient transport from foot traffic, would be minor, long term, and adverse.</p> <p>Impacts of development such as eliminating inflow of water, diverting precipitation from natural drainages, and compaction would be long term, adverse, and minor.</p>	<p>Construction on about 10 acres within the park and up to 2.5 acres outside would disturb soils by increasing wind and water erosion. Because relatively small areas would be affected and mitigating measures would be employed, these adverse impacts would be minor and long term. Soil erosion by wind and water and soil nutrient transport from trail building on an acre or more and trail rehabilitation as needed would have a minor, long-term, adverse impact. Restoring soils on 61.5 acres to natural contours, rerouting runoff to natural drainages and revegetating the area would have a major, long-term, beneficial impact on soils. Removing some structures and constructing others on small sites within developed areas could require regrading that would result in the loss of some of the natural soil profile — a minor, long-term, adverse impact.</p>	<p>Soil disturbance from actions proposed would be restricted to the minimum required. Construction in alternative C would disturb approximately 4 acres of soil inside the park and 2.5 acres outside. All of the soils in the park that would be disturbed by construction are in developed (disturbed) areas except the Maverick entrance station; consequently, soil erosion by wind and water and soil nutrient transport would result in minor, long-term, adverse impacts. (Soil characteristics for sites outside the park are unknown because no site has been selected.) Removing development, restoring natural contours, and revegetating 700 acres at Chisos Basin, Rio Grande Village, and Maverick entrance station would have a major, long-term beneficial impact on soils.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Vegetation</i>		
<p>Maintenance and ongoing visitor use would affect vegetation by leading to changes in the relative abundance of species, the death of some plants from the exposure of root systems, the trampling and death of some plants, and the resultant changes in species composition. These would be negligible to minor long-term adverse effects. The irrigation of shade trees and lawns at the campgrounds at Rio Grande Village and Cottonwood would continue to cause the growth of unnaturally lush vegetation and allow exotic species to flourish, an ongoing, moderate, long-term adverse impact.</p>	<p>Construction activities would disturb 10 acres of already disturbed vegetation inside the park and 2.5 acres outside, a minor long-term adverse impact. Revegetation would be attempted, but arid conditions make revegetation difficult. Restoring natural contours and revegetating 61.5 acres would have a moderate long-term beneficial impact on vegetation.</p> <p>The removal of the bunkhouse, and one NPS staff residence at Chisos Basin would result in a 3% decrease in annual water use of Oak Spring — a minor long-term beneficial impact on plants that use water from Oak Spring.</p> <p>Withdrawal of 50% of the irrigation water from about 14 acres of exotic vegetation at Rio Grande Village would allow native vegetation to return — a moderate to major long-term beneficial impact on native vegetation.</p>	<p>Construction activities would disturb about 4 acres of already disturbed vegetation inside the park and 2.5 acres outside, a minor long-term adverse impact. Revegetation would be attempted, but arid conditions make revegetation difficult. Restoring natural contours and revegetating about 700 acres would have a moderate, long-term, beneficial impact on vegetation.</p> <p>The removal of all development except a trailhead, parking, and restroom at Chisos Basin would result in a cessation in human use of 4 million gallons per year from Oak Spring — a long-term major beneficial impact on plants that use water from the spring.</p> <p>Withdrawal of irrigation water from about 638 acres of exotic vegetation at Rio Grande Village would allow native vegetation to return — a major, long-term beneficial impact on native vegetation.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<p>Overall, the fragmentation of wildlife habitat, the alteration of wildlife movement, and vehicular collisions with wildlife from this alternative would continue to have a long-term minor adverse impact.</p>	<p><i>Wildlife</i></p> <p>Reducing human use of water at Oak Spring by 3% would provide more water for wildlife, a long-term, minor, beneficial impact on wildlife using the spring. Restoration of natural contours and vegetation on about 61.5 acres at Rio Grande Village would increase wildlife habitat, a moderate long-term beneficial impact on smaller animals.</p>	<p>Stopping withdrawal of water from Oak Spring for human use would be expected to have a long-term, moderate, beneficial impact on wildlife using Oak Spring. Restoration of natural contours and vegetation on about 700 acres at Chisos Basin, Rio Grande Village, and the Maverick entrance station would increase wildlife habitat, a moderate, long-term, beneficial impact on wildlife.</p> <p>Withdrawal of irrigation water from about 638 acres of exotic vegetation at Rio Grande Village would allow native vegetation to return and would benefit wildlife by providing a more natural food source. This would be a long-term, beneficial, moderate impact on wildlife.</p> <p>Although wildlife habitat would still be fragmented by the roads into Chisos Basin and Rio Grande Village and by day use of the area by visitors, fragmentation would be reduced in both areas by removal of most development and discontinuing overnight stays in the campground (and motel units at Chisos Basin). This would be a moderate, long-term, beneficial impact on wildlife habitat.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Water Quantity</i>		
<p>Continued use of nearly all the water at Oak Spring for human use at Chisos Basin during periods of extended drought, as well as at certain very limited times when it is not raining during normal years, there would be a negligible, intermittent, long-term, adverse impact. Overall, impacts on the quantity of water in the Rio Grande would be negligible, long term, and adverse.</p>	<p>Reduction of human use of water from Oak Spring by about 3% would be a minor, intermittent, long-term, and beneficial impact on water quantity. Reduction of park use of river water for irrigation by 12.8 million gallons per month, a small amount compared to the flow in the river, would have a minor, long-term, beneficial impact on water quantity in the river. Finding a separate source of drinking water for visitors and employees at Rio Grande Village would leave an additional 2.9 million gallons in the pond system — a major, long-term beneficial impact on pond system water quantity. However, depending on the alternative water source, an adverse impact on that source might occur from park use.</p>	<p>Removing all human use of water from Oak Spring, 4 million gallons per year, would be a long-term, major, beneficial impact. At Rio Grande Village, eliminating the use of irrigation water — 25.6 million gallons per month — from the Rio Grande would be a moderate, long-term, beneficial impact. Removing all human use of the spring at Rio Grande Village, 2.9 million gallons per year, would be a major, long-term, beneficial impact.</p>
<i>Threatened, Endangered, and Candidate Species</i>		
<p>Overall, the continued presence of development in the Chisos Basin, continued clearing of the road edges, browsing by herbivores, and human disturbance would have a negligible, long-term adverse impact on the black-capped vireo. Improving Big Bend gambusia habitat by eliminating competition for spring water and relocating campsites would have a minor to moderate long-term beneficial impact on the fish.</p>	<p>Changes at the Chisos Basin would not impact the black-capped vireo. Improving Big Bend gambusia habitat by eliminating competition for spring water and relocating campsites would have a minor to moderate, long-term beneficial impact on the fish.</p>	<p>Overall, decreased traffic on the Chisos Basin road would have a beneficial, minor and long-term impact on the black-capped vireo by reducing human disturbance. Restoring about 60 acres of vegetation in the Basin might have a moderate to major long-term beneficial impact on the bird by increasing habitat.</p> <p>The availability of about 2.9 million additional gallons of water to the pond system where Big Bend gambusia live, restoring more natural conditions in the area through revegetation, and potentially doubling the available habitat through wetland restoration would be expected to have a minor to moderate, long-term, beneficial impact on the fish.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Floodplains</i>		
<p>The natural and beneficial values of floodplain areas would continue to be compromised by the presence of campgrounds at Rio Grande Village and Cottonwood, other development at Rio Grande Village, and the development in the flash flood hazard area at Panther Junction. This continuing long-term adverse impact on natural processes would be moderate.</p> <p>Although severe flooding has been infrequent and risks are minor to moderate, flooding at Rio Grande Village, Cottonwood Campground, or Panther Junction could result in major adverse impacts on the visitors or employees involved.</p> <p>Even though the risk of flooding is not great at Panther Junction, damage or loss of 60% of the museum collection would be a major, long-term adverse impact on the collection, and loss of infrastructure would be a major, long-term adverse impact on operations. Loss of infrastructure would require the park to find temporary offices and housing outside the park.</p>	<p>The natural and beneficial values of floodplain areas would be enhanced at Rio Grande Village by the reduction of the likelihood of fuel spilling into flood waters and the restoration of more natural vegetation. This impact would be minor, beneficial, and long term.</p> <p>Same as A.</p> <p>Same as A.</p>	<p>Removal of about 638 acres of development from Rio Grande Village and revegetation of the area would have a long-term, major, beneficial impact on the natural floodplain values.</p> <p>Same as A.</p> <p>Same as A.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Wetlands</i>		
<p>Maintaining use of nearly all the water from Oak Spring during certain times of the year for human use at Chisos Basin during periods of extended drought, as well as at certain, very limited times when it is not raining during normal years; continuing use of the campgrounds at Rio Grande Village and Cottonwood; continuing use of other development at Rio Grande Village; and irrigation at both campgrounds would continue a moderate long-term adverse effect on wetlands.</p>	<p>Reducing use of water from Oak Spring by 117,8,00 gallons per year (3%) would be a minor long-term beneficial impact on the wetland at the spring.</p>	<p>Removing all human water use from Chisos Basin would mean that about 4 million additional gallons per year would be available to wetland vegetation, a long-term, major, beneficial impact on wetlands associated with Oak Spring.</p> <p>Removing most visitor use, discontinuing irrigation, eliminating use of spring water for humans, and restoring about 638 acres to more natural conditions would have a major, long-term beneficial impact on wetland processes at Rio Grande Village.</p>
<i>Archeological Resources</i>		
<p>There would be long-term, moderate, adverse impacts from construction at Panther Junction. There would be no or negligible effects on archeological resources from the addition to the lodge in Chisos Basin. The ongoing efforts to identify and protect archeological resources would have a long-term minor to moderate beneficial impact on archeological resources; limited staff and funding for such work would keep these impacts at minor to moderate levels.</p>	<p>The development that would occur under the implementation of this alternative would not impact known archeological resources in the park; in those areas where there are possible unknown archeological resources there is sufficient space to avoid impacting these resources. Some excavation work might be required to complete compliance for some construction and removal activities. There would be no direct or indirect impacts on archeological resources, and no change to existing conditions. This would result in a long-term, negligible beneficial impact on these resources.</p>	<p>Overall, alternative C would result in leaving large portions of the park in a natural condition, which would have a long-term, minor, beneficial impact on archeological resources.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Historic Buildings/Structures</i>		
<p>Research and resource documentation is improving the park's ability to make informed management decisions. The ongoing efforts to identify and preserve structures coupled with the park's efforts to improve structures so that more structures are in good condition would benefit these resources. The overall result would be a long-term negligible to minor beneficial effect on the park's historic structures. The upgraded fire suppression and water systems at Castolon would be a long-term, minor to moderate beneficial impact for these structures.</p>	<p>The preservation actions taken in the preferred alternative would have an overall long-term, moderate, beneficial impact on the park's historic structures.</p>	<p>Overall, alternative C would result in the demolition of some historic structures while other structures would be preserved. This would result in a long-term moderate to major, adverse impact on historic structures.</p>
<i>Cultural Landscapes</i>		
<p>Research and resource documentation is improving the park's ability to make informed management decisions. The ongoing efforts to identify and evaluate landscapes would result in actions to preserve these landscapes. The overall result would be a long-term, minor, beneficial effect on the park's cultural landscapes.</p>	<p>Identifying those features at Buttrill Spring that contribute to this potential cultural landscape and preserving these features would have a long-term, minor, beneficial effect. Water conservation measures in the Rio Grande Village could change the vegetation characteristic of this landscape, which could have a long-term, moderate adverse impact on this potential cultural landscape.</p> <p>Placing more than 90% of the park in either the wilderness or backcountry nonwilderness prescription and less than 10% in management prescriptions that would allow for development would have a long-term negligible, beneficial impact on the park's cultural landscapes.</p>	<p>Overall, alternative C would result in the loss of some potential cultural landscapes. This would result in a long-term, major, adverse impact on these resources. Application of the management prescriptions would have a long-term negligible, beneficial impact on the park's cultural landscapes.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Ethnographic Resources</i>		
<p>Research and resource documentation is improving the park’s ability to make informed management decisions. The ongoing efforts to identify and to evaluate ethnographic resources and park programs to meet the needs of various groups would result in actions to preserve these resources. The overall result would be a long-term, negligible to moderate, beneficial effect on the park’s ethnographic resources.</p>	<p>The actions in the preferred alternative would result in a long-term, negligible, beneficial impact on the park’s ethnographic resources.</p>	<p>The overall result of alternative C would be long-term, moderate adverse impacts on ethnographic resources.</p>
<i>Museum Collections</i>		
<p>Alternative A would result in only slight improvement in the condition and care of park collections. A new natural resources and collections management building to be constructed at Panther Junction (described in the cumulative impact scenario) that would better protect and preserve the collections would be offset by the limited ability to display, curate, and access the collections. This alternative would result in a long-term, minor, beneficial impact on park collections.</p>	<p>There would be a long-term major, beneficial, impact to artifacts and collections at Panther Junction. Overall, there would be a long-term, minor beneficial effect on park collections in that the collections would be better preserved and interpreted.</p>	<p>The overall effect of this alternative would be to have a long-term, major beneficial impact on park collections in that the collections would be better preserved and interpreted.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Visitor Understanding</i>		
<p>Alternative A would result in continuing degradation of the visitor experience because of noise, congestion, and visitor frustration at not finding adequate interpretive and education facilities and easy access to safety information. This alternative would result in a continuing long-term adverse impact on visitors coming to the park at peak times.</p> <p>Visitors would have many opportunities to travel around the park at their own pace. This would continue to be a long-term major benefit for visitors.</p> <p>The campgrounds, picnic areas, and lodge offer mostly pleasant experiences that users value highly. Retaining these facilities would constitute an ongoing, moderate, long-range beneficial effect for visitors.</p> <p>Although the above effects would continue over time, none of the impacts are anticipated to increase or decrease appreciably.</p>	<p>Over the long term, most visitors at Chisos Basin would benefit from a reduction in congestion and noise brought about by alternative B; this would be a moderate beneficial effect on visitors' experiences during the peak season. Less congestion and noise would result in a long-term benefit for visitors coming to the park at peak and nonpeak times.</p> <p>A new visitor center would provide adequate space for interpreting the park's primary themes, conducting interpretive and educational programs, and ensuring that visitors received sufficient information to effectively plan for a safe and enjoyable stay. This would provide a major long-term benefit for most park visitors.</p> <p>Moving some of the campsites farther from the river would lessen the potential danger to visitors from flooding.</p>	<p>Over the long term, day use visitors at Chisos Basin and Rio Grande Village would benefit from removing overnight facilities. This would be a major long-term beneficial impact on visitor experience of natural and cultural resources.</p> <p>A rehabbed visitor center at Panther Junction would provide additional space for interpreting the park's primary themes, conducting interpretive and educational programs, and ensuring that visitors received sufficient information to effectively plan for a safe and enjoyable stay. This would provide a moderate long-term benefit for the majority of park visitors.</p> <p>Removing lodging and camping facilities would result in the loss of overnight experiences for some visitors. Removing the interpretive centers at Chisos Basin and Rio Grande Village would eliminate opportunities for visitors to learn, through exhibits and other indoor media, some of the key themes and resource management issues of these sections of the park. The loss of these facilities would be a major long-term adverse impact on the overnight and interpretive visitor experiences in these areas.</p> <p>Retaining the Cottonwood Campground and picnic areas would constitute a moderate long-range beneficial effect for visitors, and moving some of the campsites further from the river would lessen the potential danger from flooding.</p>

Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<i>Socioeconomic Environment</i>		
<p>The existing benefits of the park to the local and regional economy would continue, with minor improvements in temporary employment opportunities and revenues as the planned restoration and upgrade construction activities took place. There would be both direct and indirect, long-term, minor beneficial effects of continuing existing practices at the park.</p>	<p>The existing economic and socioeconomic benefits that the park brings to the local and regional economy would continue. There would be minor to moderate direct short-term and long-term improvements in both permanent and temporary federal and private sector employment opportunities from implementing alternative B, which would generate about 600 jobs. There would also be minor to moderate indirect improvements in overall socioeconomic activity and tax revenues as the planned upgrades of facilities and programs are implemented. These economic benefits would be due to increased payrolls and visitor spending, providing about \$20.1 million in additional sales and \$1.9 million in additional tax revenues. These benefits would be both local and regional in nature, with the minor to moderate improvements to employment benefiting the relatively isolated and sparsely populated southwest Texas counties of Brewster, Presidio, and Terrell. There would also be international economic stimulation with enhanced employment opportunities for Mexican communities along the border. There might be beneficial cumulative socioeconomic impacts in the Mexican villages that border the park, and at the Big Bend Ranch State Park, Black Gap Wildlife Management Area, and the Rio Grand Wild and Scenic River from enhanced recreational activity.</p>	<p>The existing economic and socioeconomic benefits that the park brings to the local and regional economy would continue, and there would be moderate to major direct short-term and long-term benefits in both permanent and temporary federal and private sector employment opportunities with alternative C, which would generate about 2,505 jobs. There would also be a moderate to major indirect long-term, beneficial impact in overall socioeconomic activity and tax revenues as the planned upgrades of facilities and programs are implemented. This beneficial effect would result from increased payrolls and visitor spending providing about \$85 million in additional sales and \$8.3 million in additional tax revenues. These benefits would be both local and regional in nature, with the moderate to major improvements to employment benefiting the relatively isolated and sparsely populated southwest Texas counties of Brewster, Presidio, and Terrell. There would also be international economic stimulation with enhanced employment opportunities for Mexican communities along the border.</p>