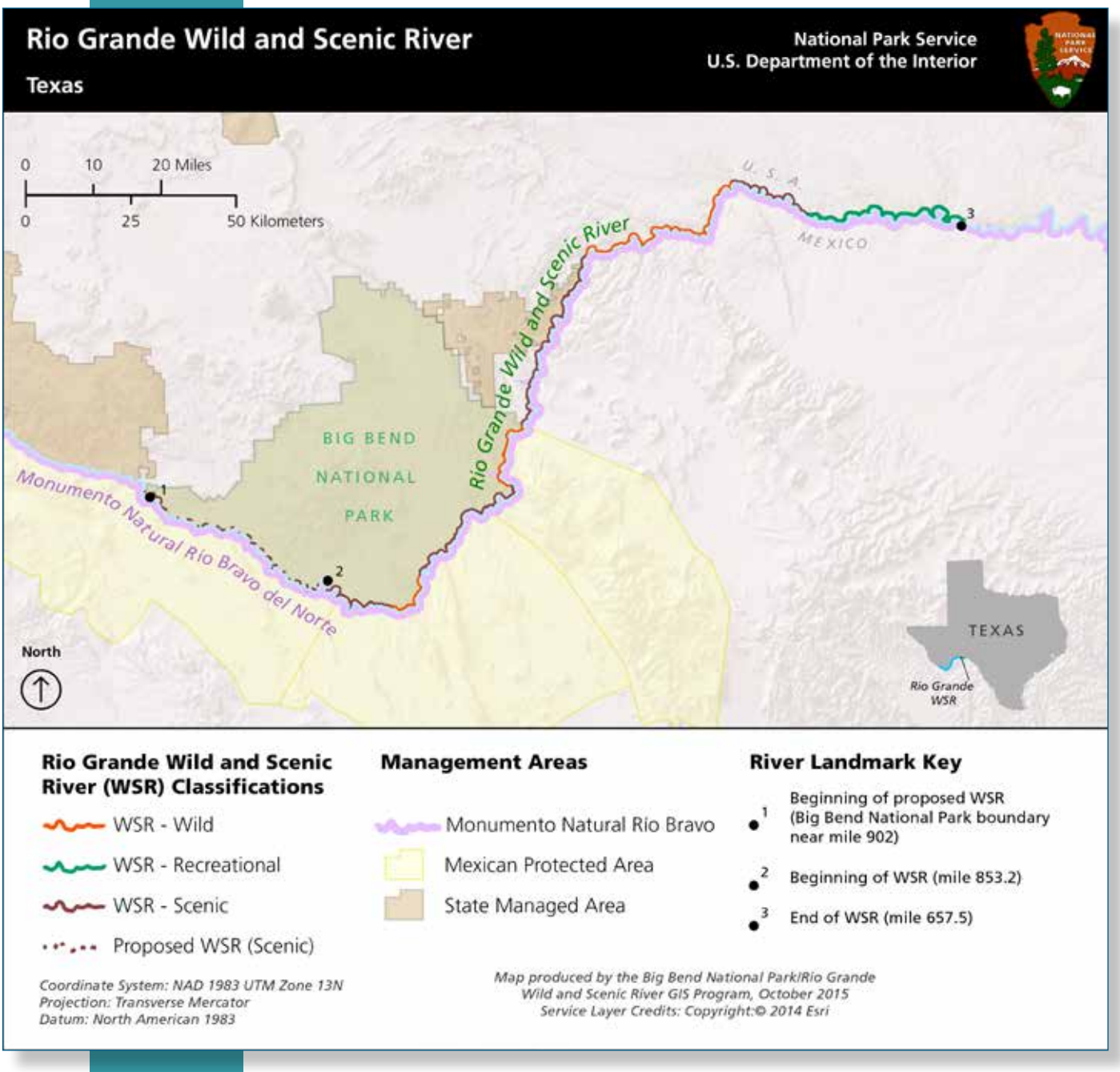
NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR

Foundation Document

Rio Grande Wild and Scenic River

Texas

May 2016


Rio Grande Wild and Scenic River
Texas
National Park Service
U.S. Department of the Interior
0 10 20 Miles
0 25 50 Kilometers
U. S. A.
MEXICO
Rio Grande Wild and Scenic River
BIG BEND NATIONAL PARK
Monumento Natural Río Bravo del Norte
1
2
3
North
TEXAS
Rio Grande WSR
Rio Grande Wild and Scenic River (WSR) Classifications
WSR - Wild
WSR - Recreational
WSR - Scenic
Proposed WSR (Scenic)
Management Areas
Monumento Natural Río Bravo
Mexican Protected Area
State Managed Area
River Landmark Key
1 Beginning of proposed WSR (Big Bend National Park boundary near mile 902)
2 Beginning of WSR (mile 853.2)
3 End of WSR (mile 657.5)
Coordinate System: NAD 1983 UTM Zone 13N
Projection: Transverse Mercator
Datum: North American 1983
Map produced by the Big Bend National Park/Rio Grande Wild and Scenic River GIS Program, October 2015
Service Layer Credits: Copyright:© 2014 Esri

Contents

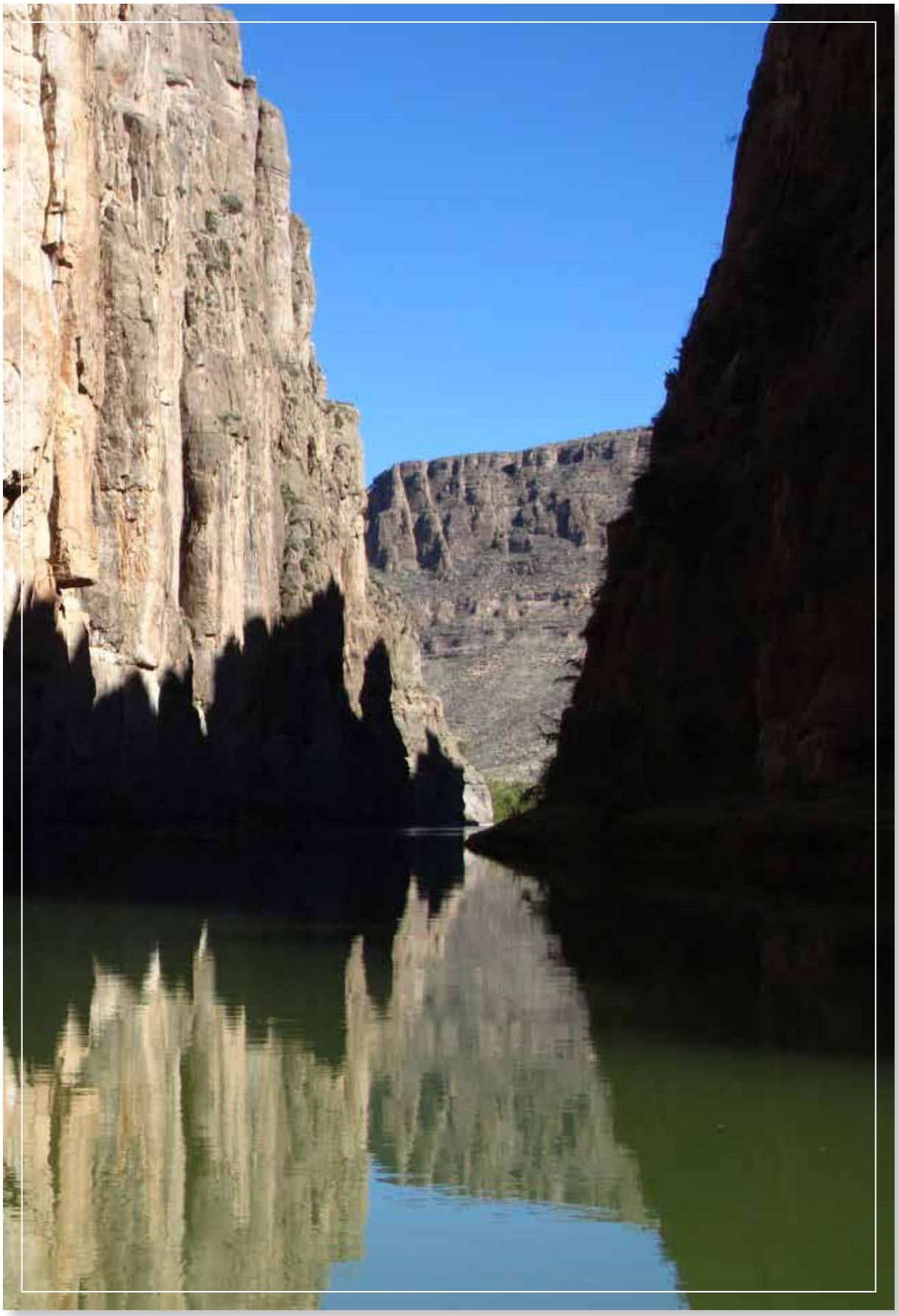


photo by Jennette Jurado

Mission of the National Park Service

The National Park Service (NPS) preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The National Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.

The NPS core values are a framework in which the National Park Service accomplishes its mission. They express the manner in which, both individually and collectively, the National Park Service pursues its mission. The NPS core values are:

- **Shared stewardship:** We share a commitment to resource stewardship with the global preservation community.
- **Excellence:** We strive continually to learn and improve so that we may achieve the highest ideals of public service.
- **Integrity:** We deal honestly and fairly with the public and one another.
- **Tradition:** We are proud of it; we learn from it; we are not bound by it.
- **Respect:** We embrace each other's differences so that we may enrich the well-being of everyone.

The National Park Service is a bureau within the Department of the Interior. While numerous national park system units were created prior to 1916, it was not until August 25, 1916, that President Woodrow Wilson signed the National Park Service Organic Act formally establishing the National Park Service.

The national park system continues to grow and comprises more than 400 park units covering more than 84 million acres in every state, the District of Columbia, American Samoa, Guam, Puerto Rico, and the U.S. Virgin Islands. These units include, but are not limited to, national parks, monuments, battlefields, military parks, historical parks, historic sites, lakeshores, seashores, recreation areas, scenic rivers and trails, and the White House. The variety and diversity of park units throughout the nation require a strong commitment to resource stewardship and management to ensure both the protection and enjoyment of these resources for future generations.

The arrowhead was authorized as the official National Park Service emblem by the Secretary of the Interior on July 20, 1951. The sequoia tree and bison represent vegetation and wildlife, the mountains and water represent scenic and recreational values, and the arrowhead represents historical and archeological values.

Introduction

Every unit of the national park system will have a foundational document to provide basic guidance for planning and management decisions—a foundation for planning and management. The core components of a foundation document include a brief description of the park as well as the park's purpose, significance, fundamental resources and values, and interpretive themes. The foundation document also includes special mandates and administrative commitments, an assessment of planning and data needs that identifies planning issues, planning products to be developed, and the associated studies and data required for park planning. Along with the core components, the assessment provides a focus for park planning activities and establishes a baseline from which planning documents are developed.

A primary benefit of developing a foundation document is the opportunity to integrate and coordinate all kinds and levels of planning from a single, shared understanding of what is most important about the park. The process of developing a foundation document begins with gathering and integrating information about the park. Next, this information is refined and focused to determine what the most important attributes of the park are. The process of preparing a foundation document aids park managers, staff, and the public in identifying and clearly stating in one document the essential information that is necessary for park management to consider when determining future planning efforts, outlining key planning issues, and protecting resources and values that are integral to park purpose and identity.

While not included in this document, a park atlas is also part of a foundation project. The atlas is a series of maps compiled from available geographic information system (GIS) data on natural and cultural resources, visitor use patterns, facilities, and other topics. It serves as a GIS-based support tool for planning and park operations. The atlas is published as a (hard copy) paper product and as geospatial data for use in a web mapping environment. The park atlas for Rio Grande Wild and Scenic River can be accessed online at: http://insideparkatlas.nps.gov/.

Part 1: Core Components

The core components of a foundation document include a brief description of the park, park purpose, significance statements, fundamental resources and values, and interpretive themes. These components are core because they typically do not change over time. Core components are expected to be used in future planning and management efforts.

Brief Description of the Park

The Rio Grande (or El Rio Bravo del Norte in Spanish) stretches from the mountains of southern Colorado to the Gulf of Mexico, a distance of approximately 1,885 miles (mi). Along the way, the Rio Grande forms part of the international boundary between the United States and Mexico. In 1978, Congress designated a 196-mile portion of the Rio Grande in southwestern Texas as part of the national wild and scenic rivers system. The designated stretch of the Rio Grande begins in Big Bend National Park, opposite the boundary between the Mexican states of Chihuahua and Coahuila. It then flows through Mariscal and Boquillas Canyons in the national park. Downstream from the park, it extends along the state-managed Black Gap Wildlife Management Area and several parcels of private land in the Lower Canyons. The wild and scenic river segment ends at the county line between Terrell and Val Verde Counties, Texas.

This component of the national wild and scenic river system is unique in that only half of the river is designated. The southern half of the river could not be included in the designation because it is owned by Mexico. However, in 2009 the government of Mexico protected over 300 miles of the river with the Monumento Natural Río Bravo del Norte, which begins 18 miles (30 kilometers [km]) east of Ojinaga, Mexico, and terminates near the mouth of the Pecos River and the start of Amistad Reservoir.

Rugged canyons, verdant riparian areas, scenic rapids, and unspoiled views contribute to the scenic allure and outstanding visual quality of this area. The Rio Grande Wild and Scenic River corridor represents an exceptional example of Chihuahuan Desert fauna in association with species that depend on the rare aquatic and riparian habitats of the river. It is an isolated outpost of rapidly dwindling and irreplaceable natural resources such as several fauna in association with species, including threatened and endangered species that depend on the rare aquatic and riparian habitats of the river. A number of wildlife species (especially birds) use the Rio Grande as a travel corridor. Many species of animals depend on the riverine habitat for survival.

Near its upstream end, the Rio Grande has sliced through the surrounding rocks to form steep-walled, sometimes narrow, canyons. Downstream from Boquillas Canyon, the river flows across a relatively broad and open floodplain. Near Reagan Canyon, the floodplain narrows abruptly, and the river flows in a continuous deeply cut canyon for almost 40 miles. In the Lower Canyons portion of this segment, the river and its tributaries lie 500 to 1,500 feet below the surrounding plateaus. Spectacular river canyons, occasional rapids, the primitive character of the river, and its international flavor create a stimulating environment for a high-quality recreational experience. The river can be enjoyed from canyon rims, along the shore, or in a boat. The designated segment is long enough to offer several varied and meaningful recreational experiences, lasting from a few hours to several days.

Park Purpose

The purpose statement identifies the specific reason(s) for establishment of a particular park. The purpose statement for Rio Grande Wild and Scenic River was drafted through a careful analysis of its enabling legislation and the legislative history that influenced its development. The park was established when the enabling legislation adopted by Congress was signed into law on November 10, 1978 (see appendix A for enabling legislation and subsequent legislative acts). The purpose statement lays the foundation for understanding what is most important about the park.

The Rio Grande Wild and Scenic River protects and enhances the free-flowing condition, water quality and quantity, biological, geological, cultural, recreational, and scenic values of the river corridor, which follows the international boundary between the United States and Mexico.

Park Significance

Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. These statements are linked to the purpose of Rio Grande Wild and Scenic River, and are supported by data, research, and consensus. Statements of significance describe the distinctive nature of the park and why an area is important within a global, national, regional, and systemwide context. They focus on the most important resources and values that will assist in park planning and management.

The following significance statements have been identified for Rio Grande Wild and Scenic River. (Please note that the sequence of the statements does not reflect the level of significance.)

1. The spectacular river canyons, hot springs, primitive wilderness character, and international setting of the river provide opportunities for extended recreational experiences, including absolute solitude, self-reliance, and opportunities to observe unique prehistoric, historic, and modern cultures along the US-Mexican border.

2. The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects.

3. The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats.

4. The Rio Grande is highly unusual in the region because it flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—providing a rare opportunity to see textbook examples of many active geologic processes and features, including dramatic faulting, folding, igneous sills, canyons, basins, and fossils.

5. The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, verdant riparian vegetation, and striking cliffs, to wide open basins and long, unobstructed views.

6. The riparian corridor provides a moist ribbon through the desert that has sustained human presence for 13,500 years. In the park, the highest density of prehistoric and historic sites and the greatest diversity of human uses are concentrated here. Many of the most significant cultural resources of the park are associated with the Rio Grande corridor.

7. The Rio Grande / Rio Bravo del Norte constitutes an essential element in the continuity and corridor connection between the US and Mexican protected areas. The Rio Grande Wild and Scenic River protects 196 river miles, and the Rio Grande's sister park, Monumento Natural Río Bravo del Norte, protects an additional 133 river miles of this same stretch of river on the Mexican side. The river and its values are managed by US and Mexican agencies, landowners, and partners, creating binational protection for the whole river system.

Fundamental Resources and Values

Fundamental resources and values (FRVs) are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements. For park units with wild and scenic river designations (or proposed designations), elements of the river's outstandingly remarkable values (ORVs) are a fundamental part of a park unit's resources and values.

Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

The following fundamental resources and values (which are the same as the river's outstandingly remarkable values) have been identified for the Rio Grande Wild and Scenic River:

- **Free-Flow and Water Quality and Quantity –** Peak flows in the Rio Grande Wild and Scenic River come from intense North American monsoon rains and regionally significant springs, instead of from snowmelt like many rivers of the American West. The natural hydrology of the Rio Grande and its largest tributaries has been dramatically altered upstream by dams and agricultural diversions; however, the designated segments of the river are free from diversions, a quality that is extremely rare for an almost 200-mile stretch of a major river in the United States. The upstream sections of the river exhibit degraded water quality characteristics, but these improve drastically in the park due to high-quality groundwater inputs.
- **Biological Values –** The Rio Grande Wild and Scenic River corridor supports a diverse assemblage of species that is unparalleled in the Rio Grande watershed. The riparian corridor protects several rare vegetation communities and provides a refuge for numerous species of migratory birds, invertebrates, and fish, including species that require this habitat for their survival. The quality and quantity of ground and surface water available in the various segments impacts the character of riverine and riparian habitats.

photo by Jennette Jurado

- **Cultural Values –** Humans have lived along the Rio Grande Wild and Scenic River for at least 13,500 years. The corridor contains a wide variety of cultural resources, from the extensive archeological sites of hunter-gatherers to European exploration and settlement, to more recent ranching, mining, floodplain farming, and regional economic development. The corridor also contains the highest density of archeological and historic sites in the park, as well as four sites listed in the National Register of Historic Places and several others that are eligible for listing.

- **Geological Values –** The Rio Grande Wild and Scenic River flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—carving through the surrounding rocks to form steep-walled and sometimes narrow gorges. Its deep canyons showcase 100 million years of geologic history along the river, including one of the largest and most continuous exposures of Cretaceous strata in Texas. Features seen along the river include uplifts, faults, folds, rapids, rock pinnacles, rock arches, and other spectacular formations.

- **Recreational Values –** Colorful, expansive landscapes give way to vault-like canyons that carry travelers along the Rio Grande Wild and Scenic River, providing world-class, year-round boating, hiking, camping, wildlife viewing, and photography. Park visitors can enjoy and experience rare desert flora and fauna, solitude, natural sounds, clean clear air, natural springs, and, since the surrounding counties are some of the least populated in the lower 48, the amazing scenic views and night skies of a remote and dramatic landscape that is largely wild and undeveloped.

- **Scenic Values –** The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, deeply folded, faulted, and dissected landscape, verdant riparian vegetation, and striking cliffs to long and unobstructed views. Sheer cliffs define the landscape where extremely rugged canyons meet the exceptionally clear, daytime views, or dark night sky. Scenic values include unobstructed views of faraway Mexican landscapes and clear base flows that allow views to the bottom of the river.

Interpretive Themes

Interpretive themes are often described as the key stories or concepts that visitors should understand after visiting a park—they define the most important ideas or concepts communicated to visitors about a park unit. Themes are derived from, and should reflect, park purpose, significance, resources, and values. The set of interpretive themes is complete when it provides the structure necessary for park staff to develop opportunities for visitors to explore and relate to all park significance statements and fundamental resources and values.

Interpretive themes are an organizational tool that reveal and clarify meaning, concepts, contexts, and values represented by park resources. Sound themes are accurate and reflect current scholarship and science. They encourage exploration of the context in which events or natural processes occurred and the effects of those events and processes. Interpretive themes go beyond a mere description of the event or process to foster multiple opportunities to experience and consider the park and its resources. These themes help explain why a park story is relevant to people who may otherwise be unaware of connections they have to an event, time, or place associated with the park.

The following interpretive themes have been identified for Rio Grande Wild and Scenic River:

- The Rio Grande's ecosystem supports an extraordinary richness of plants and animals.
    - The Rio Grande and adjacent shores provide valuable habitat for communities of plant and animal species, including several endangered and threatened species. The river's protected status helps in the preservation, study, and recovery of many of these species.
    - Surface and groundwater is highly important to a desert ecosystem. Nowhere does the Chihuahuan Desert exhibit more biodiversity than along a waterway such as the Rio Grande. The springs of the Lower Canyons are significant in protecting the groundwater-dependent ecosystem along these segments.
- One hundred million years of geologic history is exposed along the river; this allows visitors, students, and scientists to study and learn about the geologic processes that formed the current landscape.
- An important part of the NPS mission is to preserve or restore natural resources, including natural soundscapes. Intrusive sounds are also a matter of concern to visitors. The Rio Grande is relatively free of intrusive or unnatural sounds, and management strives to preserve this value.
- Nonnative plants and animals are extremely disruptive to river-related ecosystems. Natural resource managers work with riverside landowners and river users to detect, monitor, remove, and prevent the spread of nonnative species.
- Water constitutes the most important resource in the Chihuahuan Desert.
- Maderas del Carmen and Cañon de Santa Elena are two Mexican federally protected areas adjacent to the Rio Grande. Together with Big Bend National Park, these areas preserve more than 2 million acres of important wildlife habitat and migration corridors. The areas offer unique opportunities for the United States and Mexico to work together toward common resource preservation goals.

Part 2: Dynamic Components

The dynamic components of a foundation document include special mandates and administrative commitments and an assessment of planning and data needs. These components are dynamic because they will change over time. New special mandates can be established and new administrative commitments made. As conditions and trends of fundamental resources and values change over time, the analysis of planning and data needs will need to be revisited and revised, along with key issues. Therefore, this part of the foundation document will be updated accordingly.

Special Mandates and Administrative Commitments

Many management decisions for a park unit are directed or influenced by special mandates and administrative commitments with other federal agencies, state and local governments, utility companies, partnering organizations, and other entities. Special mandates are requirements specific to a park that must be fulfilled. Mandates can be expressed in enabling legislation, in separate legislation following the establishment of the park, or through a judicial process. They may expand on park purpose or introduce elements unrelated to the purpose of the park. Administrative commitments are, in general, agreements that have been reached through formal, documented processes, often through memorandums of agreement. Examples include easements, rights-of-way, arrangements for emergency service responses, etc. Special mandates and administrative commitments can support, in many cases, a network of partnerships that help fulfill the objectives of the park and facilitate working relationships with other organizations. They are an essential component of managing and planning for Rio Grande Wild and Scenic River.

For more information about the existing special mandates and administrative commitments for Rio Grande Wild and Scenic River, please see appendix C.

Assessment of Planning and Data Needs

Once the core components of part 1 of the foundation document have been identified, it is important to gather and evaluate existing information about the park's fundamental resources and values, and develop a full assessment of the park's planning and data needs. The assessment of planning and data needs section presents planning issues, the planning projects that will address these issues, and the associated information requirements for planning, such as resource inventories and data collection, including GIS data.

There are three sections in the assessment of planning and data needs:

1. analysis of fundamental resources and values
2. identification of key issues and associated planning and data needs
3. identification of planning and data needs (including spatial mapping activities or GIS maps)

The analysis of fundamental resources and values and identification of key issues leads up to and supports the identification of planning and data collection needs.

Analysis of Fundamental Resources and Values

The fundamental resource or value analysis table includes current conditions, potential threats and opportunities, planning and data needs, and selected laws and NPS policies related to management of the identified resource or value.

Fundamental Resource or Value	Free-Flow and Water Quality and Quantity
Related Significance Statements	• The spectacular river canyons, hot springs, primitive wilderness character, and international setting of the river provide opportunities for extended recreational experiences, including absolute solitude, self-reliance, and opportunities to observe unique prehistoric, historic, and modern cultures along the US-Mexican border. • The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects. • The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats. • The Rio Grande is highly unusual in the region because it flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—providing a rare opportunity to see textbook examples of many active geologic processes and features, including dramatic faulting, folding, igneous sills, canyons, basins, and fossils. • The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, verdant riparian vegetation, and striking cliffs, to wide open basins and long, unobstructed views. • The Rio Grande / Rio Bravo del Norte constitutes an essential element in the continuity and corridor connection between the US and Mexican protected areas. The Rio Grande Wild and Scenic River protects 196 river miles, and the Rio Grande's sister park, Monumento Natural Río Bravo del Norte, protects an additional 133 river miles of this same stretch of river on the Mexican side. The river and its values are managed by US and Mexican agencies, landowners, and partners, creating binational protection for the whole river system.
Current Conditions and Trends	**Conditions** • The Rio Grande Basin is one of the largest drainage areas in the United States, flowing east along the Mexican border and the southernmost boundary of Big Bend National Park to the Gulf of Mexico. • During periods of low flow, the Rio Grande's flow regime is controlled primarily by the influence of the Rio Conchos in Mexico. • Aquifers are showing signs of drought stress. • The reference condition for the water quality from Big Bend National Park is the Texas Commission on Environmental Quality water quality criterion, which considers water quality to be protective of aquatic life and human recreation for the Rio Grande. • Water quality is a vital sign for parks in the Chihuahuan Desert Network, including Big Bend National Park. Total dissolved solids, chloride, sulfate, dissolved oxygen, coliform bacteria, and macroinvertebrates are core water quality measures identified by Big Bend National Park. • Water quality parameters of total dissolved solids, fecal coliform, and macroinvertebrates all indicate significant concern. Total dissolved solid concentrations in the Big Bend National Park reach of the Rio Grande are related to rate of water flow and discharge volumes. Historically, water inputs from the Rio Conchos helped improve total dissolved solid concentrations in the Rio Grande bordering Big Bend National Park, but this effect is no longer evident due to decreased flows. • Nonnative species are affecting channel morphology.

Fundamental Resource or Value	Free-Flow and Water Quality and Quantity
Current Conditions and Trends	**Conditions (continued)** • The US Fish and Wildlife Service (USFWS) has reintroduced silvery minnow in and above Rio Grande Wild and Scenic River, the success of which depends on the river's free flowing nature and its water quality. • At this time, Rio Grande Wild and Scenic River is directly connected to the Luis Leon Dam on the Conchos River in Mexico. • The most upstream reach of the river shows apparent streamflow losses. In the next reach, small downstream increases in streamflow have been measured. The next three downstream reaches are all characterized as gaining reaches. • In 2010, the entire stretch of Rio Grande in Big Bend National Park (section 2306) was identified as not meeting water quality standards for total dissolved solids. Today, water quality is degraded in the upper reaches of the designated river segments. • Chloride, sulfate, and dissolved solids concentrations decrease downstream along each of the subreaches. They exceed general use protection criteria set by the Texas Commission on Environmental Quality in the first two reaches only. **Trends** • Dams, water diversions, agricultural extraction, and domestic use of water resources in urban areas have reduced much of the Rio Grande's historic streamflow, modified flow regimes, reduced sediment transport, and increased water pollution in the past century. • Total dissolved solids, chlorides, and sulfides are increasing and appear to be related to decreases in water flow rates, discharge volumes, and increased reliance on groundwater at a regional level. • Nutrient concentrations are increasing. • There are signs of channel narrowing, increased sedimentation, and increased flood frequency.
Threats and Opportunities	**Threats** • The primary stressor of hydrology in Rio Grande Basin is anthropogenic alterations, particularly dam construction and increased water use. • Increase in mean annual temperature, storm frequency/intensity, and droughts projected for the region due to climate change could degrade water quality (decrease dissolved oxygen, increase in temperature), reduce groundwater recharge and stream flows, and increase episodic runoff events (increasing dissolved, suspended solid concentrations, and other water quality impacts along the Rio Grande and tributaries). • A sedimentation retention dam is proposed and being planned for Rio Conchos. • Nonnative vegetation is affecting channel morphology. • Climate change is impacting the availability of and demand for water. • Development and the associated extractive water uses are growing in the area and changing drainage patterns. • Solar and wind energy development activities are impacting aquifers. • How the Luis Leon Dam is operated directly affects timing and duration of low and high flows. **Opportunities** • Research to assist with scientifically sound management relating to water use, acid rain, sedimentation, river dynamics, etc. • Engage Mexican agencies and other partners (state, federal, and nongovernmental organizations) in the establishment of an adaptive environmental management program for the Rio Grande. • Develop section 7 of the Wild and Scenic Rivers Act processes in the park. • Collaborate with Texas Water Development Board on managing water in the region.

Fundamental Resource or Value	Free-Flow and Water Quality and Quantity
Existing Data and Plans Related to the FRV	• Commission on Environmental Cooperation Conservation Assessment (2013). • Environmental Flows Recommendations Report (2012). • Additional data at state agencies and International Boundary and Water Commission. • Dean and Schmidt reports on channel narrowing and sediment transport. • NPS trip reports on water gains and losses. • United States Geological Survey (USGS) report on water quality. • USGS and International Boundary and Water Commission stream gauges and reports. • Please refer to appendix D for past planning and data collection efforts related to water resources.
Data and/or GIS Needs	• Climate change vulnerability assessment. • Continuous, long-term water quality monitoring. • Determine sources of salinity and nutrients and the role of declining annual flows on water quality. • Ecological flow assessment. • Monitor and determine impacts of groundwater extraction (oil and gas production, water supply development) on Rio Grande springs. • Study on sedimentation, flow, and geomorphology.
Planning Needs	• Adaptive environmental management program. • Climate change scenario planning. • Comprehensive / long-range interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Resource stewardship strategy. • Water use management plan.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Clean Water Act • Endangered Species Act • Water rights adjudication and law (e.g., treaty of February 3, 1944, with Mexico) • Wild and Scenic Rivers Act • Executive Order 11514, "Protection and Enhancement of Environmental Quality" • Executive Order 11988, "Floodplain Management" • Executive Order 12088, "Federal Compliance with Pollution Control Standards" • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • None

Fundamental Resource or Value	Biological Values
Related Significance Statements	• The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects. • The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats.
Current Conditions and Trends	**Conditions** • A significant decline in surface water from both the northern branch of the Rio Grande and the Rio Conchos has led to a decline in aquatic species abundance and diversity. Still, the Chihuahuan Desert fish community is relativity intact in the Lower Canyons. This community is now groundwater dependent. • Three of five native mussel species remain in the Lower Canyons. • Current riparian zone conditions are different than historical conditions due to fewer scouring floods. The vegetation is unnaturally dense and largely nonnative; giant cane and salt cedar being the dominant nonnatives. • More than 40 species of fish are found in the park, and the fish community is dominated by several minnow species. • Rio Grande silvery minnow has been reintroduced in and above the designated river reaches by the US Fish and Wildlife Service on an experimental basis. • Reaches are listed on the state's impaired water bodies for exceeding limits of total dissolved solids, chlorides, and sulfate. • The nonnative mussel/clam Corbicula is well-established in the river; however, distribution along the river corridor is undocumented. • Inventory and monitoring are conducted annually for birds and mammals. • The Mexican beaver, considered a threatened and endangered species in Mexico, is present in the park. • The peregrine falcon, a species of concern, is a breeding species in the canyons along the river corridor. • Habitat for the yellow-billed cuckoo is found along the entire riparian river corridor. The western yellow-billed cuckoo was listed as a threatened species in 2014, and critical habitat inside the park was identified from Terlingua Creek to Solis. • There are cave and karst features that provide habitat for bats. • The Rio Grande Wild and Scenic River exhibits low quality aquatic communities and habitats upstream and higher quality aquatic habitats farther downstream. • Streamflow in the Big Bend National Park region is now largely determined by the Rio Conchos, a tributary in Mexico that joins the Rio Grande approximately 50 mi (80 km) upstream of the park and by pulsed inputs of stormwater from local rainy-season events. The Rio Conchos supplies around 80%–90% of the streamflow and a substantial portion of the sediment to the Rio Grande in Big Bend National Park. In some years; however, springflow is greater than the contribution from the Rio Conchos. Groundwater from limestone aquifers can be important in maintaining the river's aquatic habitats during dry years. • Fifty-three species of fish have been identified in the Big Bend Reach of the Rio Grande. Five species are extirpated, 2 species are extinct, and 13 are introduced. In Big Bend National Park, several studies report intact populations relative to other reaches upstream and downstream.

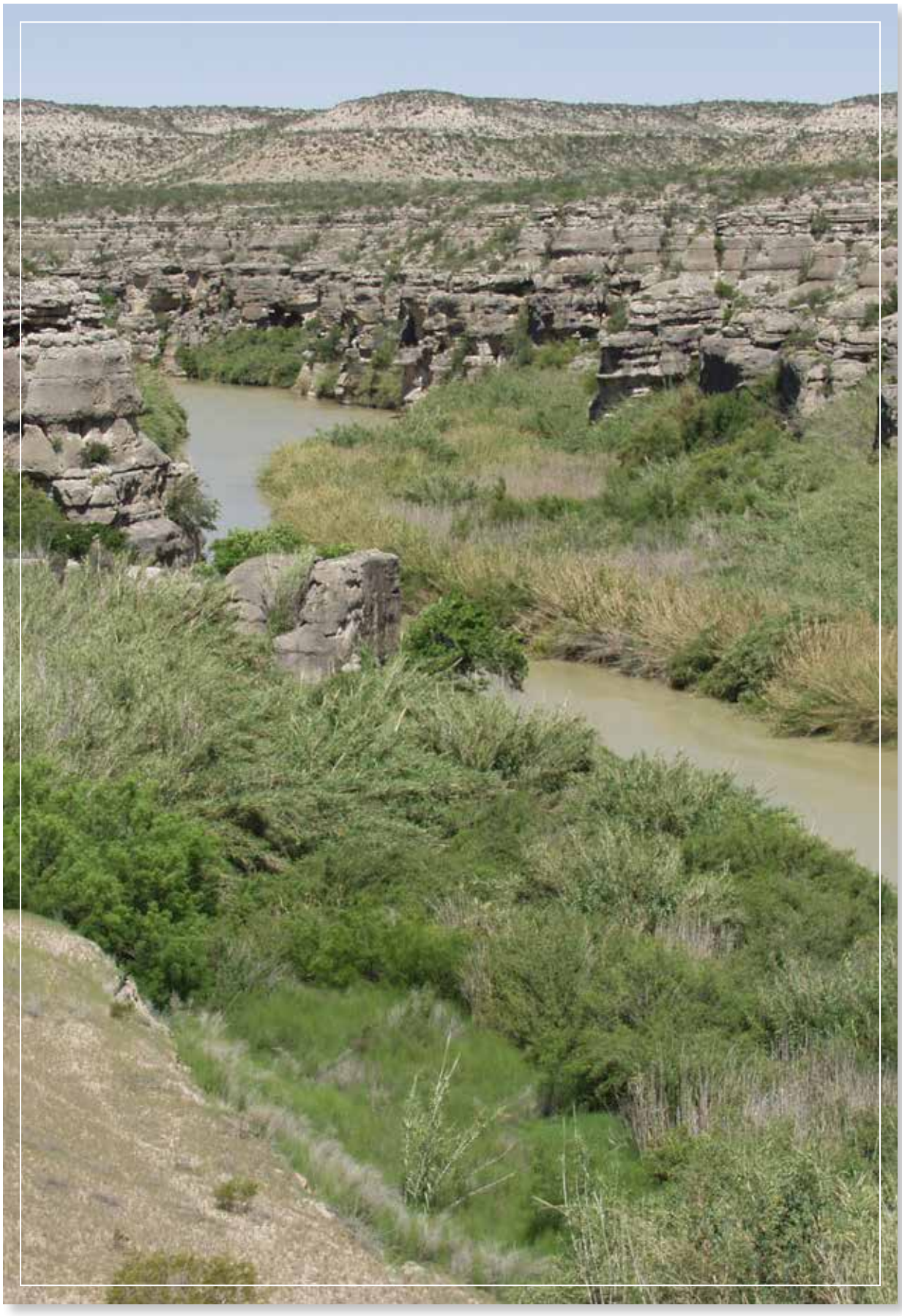
Fundamental Resource or Value	Biological Values
Current Conditions and Trends	**Conditions (continued)** • The Rio Grande is a vital refuge for migratory birds, including waterfowl, shorebirds, and songbirds such as warblers, vireos, and flycatchers. • Seventy-eight bird species regularly found along the Rio Grande are considered "river obligates" and several are protected by federal or state governments. • The relative lack of noise and artificial light contributes to the quality and diversity of ecosystems along the river corridor. **Trends** • Total dissolved solids concentrations are increasing. • The width of unnatural riparian zones is increasing. Historically, these zones were discontinuous and sporadic. • Vegetation along the Rio Grande has changed dramatically over the last century, particularly after the construction of large dams upstream of the park. • Many of the floodplains in the park are now dominated by nonnative species such as salt cedar, giant cane, and Bermuda grass. • Nonnative river cane is being systematically removed from Boquillas Canyon through binational control efforts and funding provided by nongovernmental organizations. • Channel narrowing is ongoing and is resulting in a loss of aquatic habitat. • Aquatic macroinvertebrates have seen a declining trend across all measures. • Several native fish species have been extirpated from the park, and others have seen their natural ranges reduced.
Threats and Opportunities	**Threats** • Poor water quality. • Low water quantity and reduced flows. • Increase in mean annual temperature, storm frequency/intensity, and droughts projected for the region could impact a range of flora and fauna habitats as the region becomes warmer and dryer. • Development upstream. • Impacts on aquifers from climate change and energy development. • Risk of ozone injury to sensitive park vegetation warrants moderate concern based on NPS Air Resources Division benchmarks. • Loss of fish and mussel species due to degraded habitats. • Elevated levels of mercury and airborne contaminants are a significant concern and have been documented in air, vegetation, and birds. Dichlorodiphenyldichloroethylene and mercury were found in birds at levels possibly associated with impaired reproduction. • Nonnative plants and animals. Nitrogen deposition is likely increasing the risk of invasive exotic plant infestations. • Timing of dam releases could negatively impact some species. • An increase in light pollution or unnatural sounds (from development, air pollution, overflights, etc.) may result in substantial disruption to certain species. **Opportunities** • Work with Mexico on improving environmental flows and water quality. • Work with Texas regional water planning group (region E) to increase the number of ecologically significant stream miles. • Collaborate with the state concerning water policies with Mexico. • Improve aquatic habitats through vegetation management in collaboration with Mexico, as well as public, private, and corporate partners.

Fundamental Resource or Value	Biological Values
Threats and Opportunities	**Opportunities (continued)** • Improve water quality and water quantity with local communities—they put their reject water from reverse osmosis/brine into the river, causing impacts. • Address water quality and quantity with local communities, especially concerning the discharge from water treatment activities. • Collaborate with Texas Commission on Environmental Quality on monitoring water quality and refining instream flow recommendations. • Engage cooperatively with other federal and state agencies and local stakeholders to reduce air quality impacts in parks from sources of air pollution such as oil and gas development.
Existing Data and Plans Related to the FRV	• Natural Resources Condition Assessment (2014). • Commission on Environmental Cooperation Conservation Assessment (2013). • Baseline Assessment of Small Mammal Diversity in Saltcedar Biocontrol Release Area (2010). • Instream flow recommendation study. • Regional air quality monitoring including visibility, ozone, and deposition. • Riparian bird species inventories. • Inventory and monitoring reports on riparian species. • Dean and Schmidt reports on channel narrowing and sediment transport. • USGS report on water quality. • USGS biological assessments.
Data and/or GIS Needs	• Climate change vulnerability assessment. • Comprehensive study of the availability and distribution of aquatic habitat in relation to annual flows and vegetation management activities. • Comprehensive vegetation map and monitoring. • Ecological flow assessment. • Repeat amphibian surveys from 1990s. • Study Mexican beaver population and ecology. • Study bird population response to vegetation management along river corridor. • Study community dynamics and trend data on fish and aquatic invertebrates and health as well as habitat characteristics. • Establish mussel monitoring strategy and determine why mussels have been extirpated from upper reaches of the river. • Special studies to examine pollution dose-response relationships in sensitive park ecosystems (i.e., plants, soils, wetlands), and assess the resilience of native ecosystems in the face of external perturbations. • Study of dissolved oxygen levels/eutrophication and the effects on aquatic ecosystems. • Study of the interaction between channel sedimentation and hyporheic exchanges, nutrient transport, and dissolved oxygen as it relates to fish kills. • Study the role of tributaries and groundwater in sustaining the ecosystem. • Vegetation treatment area maps.

Fundamental Resource or Value	Biological Values
Planning Needs	• Adaptive environmental management program. • Climate change scenario planning. • Comprehensive / long-range interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Exotic species management plan (finalize). • Resource stewardship strategy.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Bald and Golden Eagle Protection Act • Clean Air Act • Endangered Species Act, as amended • Federal Noxious Weed Act, as amended • Lacey Act of 1900, as amended • National Invasive Species Act • Migratory Bird Treaty Act • Wild and Scenic Rivers Act • Executive Order 13112, "Invasive Species" • Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance" • Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management" • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Natural Resource Management Reference Manual 77*

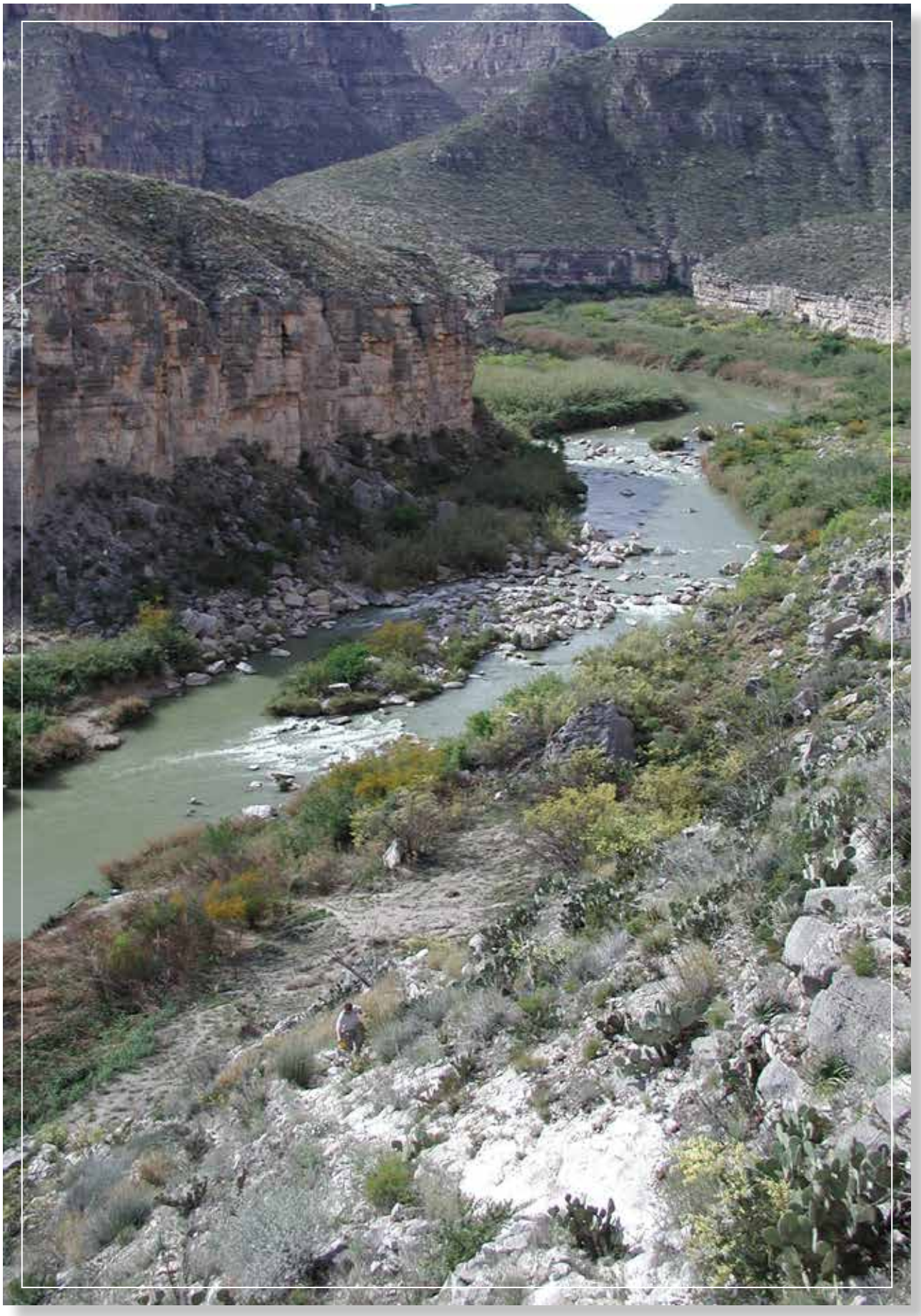
Fundamental Resource or Value	Cultural Values
Related Significance Statements	• The spectacular river canyons, hot springs, primitive wilderness character, and international setting of the river provide opportunities for extended recreational experiences, including absolute solitude, self-reliance, and opportunities to observe unique prehistoric, historic, and modern cultures along the US-Mexican border. • The riparian corridor provides a moist ribbon through the desert that has sustained human presence for 13,500 years. In the park, the highest density of prehistoric and historic sites and the greatest diversity of human uses are concentrated here. Many of the most significant cultural resources of the park are associated with the Rio Grande corridor.
Current Conditions and Trends	**Conditions** • The integrity of resources varies from good to poor. • Cave and karst features show evidence of human occupation. • Community development is concentrated along the river corridor and is evident at Sublett Farm, Old Castolon and Castolon, Hot Springs, and Boquillas / Rio Grande Village historic sites and districts. • Additional potential national register districts and cultural landscapes are found in the Castolon Valley, and Boquillas Valley, as well as smaller communities and settlements of La Coyota, Terlingua de Abajo, El Ojito, Sierra Chino, Johnson Ranch, Pantera, Solis Ranch, and the San Vicente community. **Trends** • Sites are being degraded by floods, livestock trespassing, and excessive sedimentation. • Due to channel sedimentation, higher flood levels and channel changes threaten structures and sites that were not threatened before.
Threats and Opportunities	**Threats** • Increase in storm frequency/intensity projected for the region due to climate change could impact cultural sites due to increased extreme flood events and changes stream geomorphology including increases in floodplain erosion and channel sedimentation. • Trespassing livestock. • Looting and vandalism. • Unmonitored visitation. **Opportunities** • Improved maintenance and stabilization of cultural resources. • Educate visitors about the threats of vandalism and theft. • Many known sites and presently undocumented sites are eligible for preservation under the Vanishing Treasures Program.

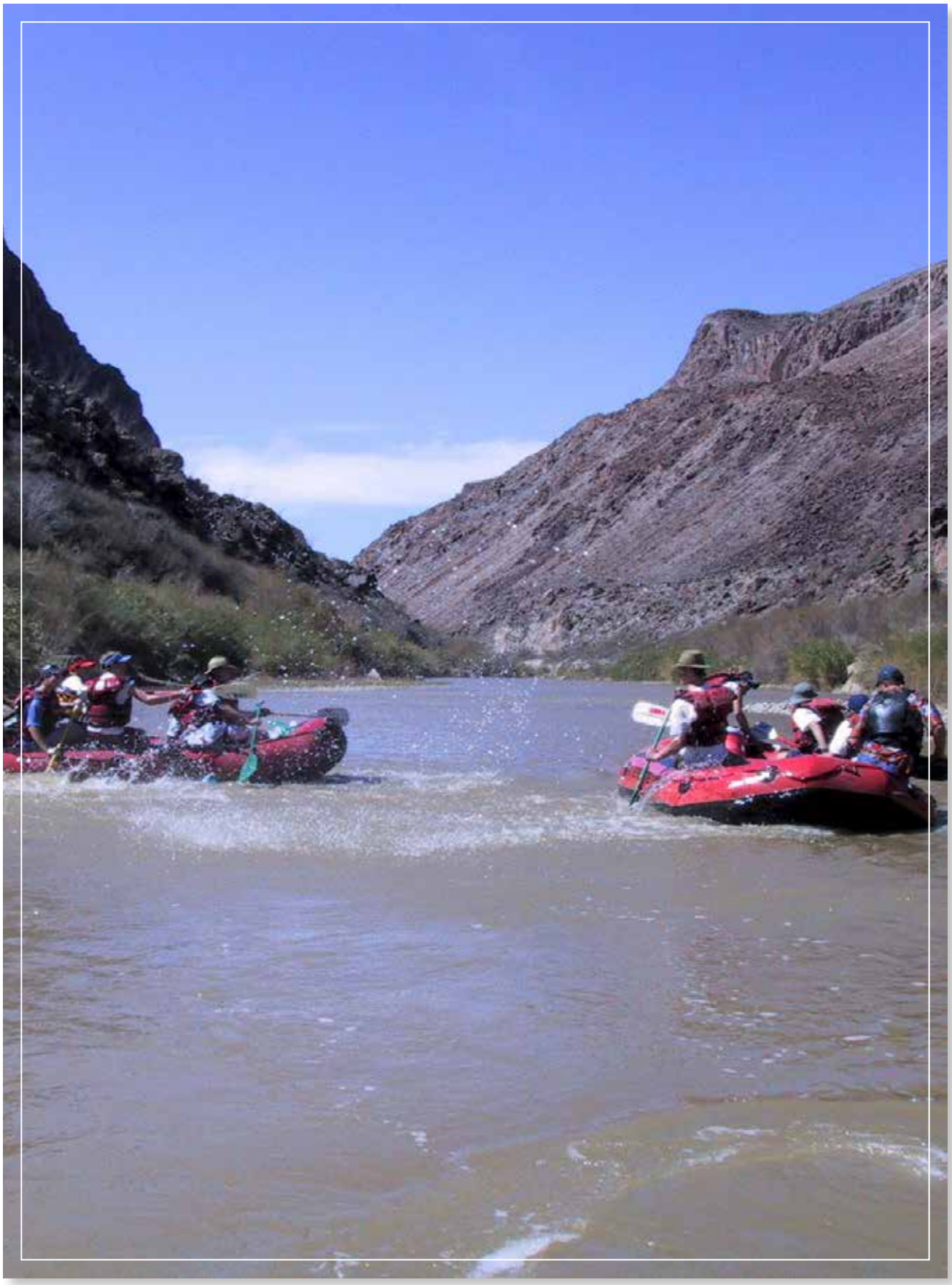
Fundamental Resource or Value	Cultural Values
Threats and Opportunities	**Opportunities (continued)** • Collaborate with Mexico on shared resources. • Nonnative plant and livestock management to reduce channel sedimentation. • Improve interpretation of cultural resources (e.g., by installing waysides at launch points and by adding information to the public website).
Existing Data and Plans Related to the FRV	• Please refer to appendix D for past planning and data collection efforts related to cultural resources.
Data and/or GIS Needs	• Cultural resources survey / structure condition. • Complete the cultural landscape inventory for resources along the river. • Data/maps for locations where channel sedimentation is impacting cultural resource sites. • Ethnographic overview and assessment. • Trespass livestock and social trails data.
Planning Needs	• Adaptive environmental management program. • Comprehensive / long-range interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Historic resource management plan (update). • Resource stewardship strategy.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • American Indian Religious Freedom Act • Antiquities Act • Archeological and Historic Preservation Act • Archaeological Resources Protection Act • Federal Cave Resources Protection Act • Historic Sites Act • Native American Graves Protection and Repatriation Act • National Historic Preservation Act, as amended • Management of Museum Properties Act • Religious Freedom Restoration Act • Executive Order 11593, "Protection and Enhancement of the Cultural Environment" • Executive Order 13007, "Indian Sacred Sites" • Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments" • "Curation of Federally-Owned and Administered Archeological Collections" (36 CFR 79) • "Protection of Historic Properties" (36 CFR 800) • Wild and Scenic Rivers Act **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • Director's Order 24: *NPS Museum Collections Management* • Director's Order 28: *Cultural Resource Management* • Director's Order 28A: *Archeology* • NPS *Museum Handbook*, parts I, II, and III • *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* • Department of the Interior Policy on Consultation with Indian Tribes



Fundamental Resource or Value	Geological Values
Related Significance Statements	• The spectacular river canyons, hot springs, primitive wilderness character, and international setting of the river provide opportunities for extended recreational experiences, including absolute solitude, self-reliance, and opportunities to observe unique prehistoric, historic, and modern cultures along the US-Mexican border. • The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects. • The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats. • The Rio Grande is highly unusual in the region because it flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—providing a rare opportunity to see textbook examples of many active geologic processes and features, including dramatic faulting, folding, igneous sills, canyons, basins, and fossils. • The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, verdant riparian vegetation, and striking cliffs, to wide open basins and long, unobstructed views. • The riparian corridor provides a moist ribbon through the desert that has sustained human presence for 13,500 years. In the park, the highest density of prehistoric and historic sites and the greatest diversity of human uses are concentrated here. Many of the most significant cultural resources of the park are associated with the Rio Grande corridor. • The Rio Grande / Rio Bravo del Norte constitutes an essential element in the continuity and corridor connection between the US and Mexican protected areas. The Rio Grande Wild and Scenic River protects 196 river miles, and the Rio Grande's sister park, Monumento Natural Río Bravo del Norte, protects an additional 133 river miles of this same stretch of river on the Mexican side. The river and its values are managed by US and Mexican agencies, landowners, and partners, creating binational protection for the whole river system.
Current Conditions and Trends	**Conditions** • Aquifers are showing signs of drought stress. • The canyons expose geological and paleontological resources. • Minimal development due to the remote and steep nature of the corridor. • Public lands provide widespread access to significant geologic exposures. • Fossils are exposed due to erosion. • There is ongoing academic research on geology and paleontology. • Changing water levels and fewer floods of large magnitude have changed sedimentation patterns. • There are cave and karst features along the corridor. **Trends** • Aquifers are experiencing a long-term drying trend. • Groundwater extraction levels have increased.

Fundamental Resource or Value	Geological Values
Threats and Opportunities	**Threats** • Uncertainty around oil and gas development and the associated water contamination and water use. • Development and the associated extractive water uses are growing in the area and changing drainage patterns. • Solar and wind energy development activities are impacting aquifers. • Exposed fossils may be stolen or damaged. • Increase in mean annual temperature with minimal change in mean annual precipitation projected for the region, along with an increase in storm frequency/intensity and droughts, threaten soils and recharge and water quality of karst aquifers. • Acid rain and air pollution may affect the rate of erosion of karst topography and soils, and may discolor geologic formations. **Opportunities** • Collaborate with Texas Water Development Board on managing water in the region. • Education of the public concerning the degradation of water and harm to aquifer. • Research to assist with scientifically sound management relating to water use, acid rain, sedimentation, river dynamics, etc. • Pursue partnerships and research that would help better understand park geological and paleontological resources.
Existing Data and Plans Related to the FRV	• 2013 Commission on Environmental Cooperation Conservation Assessment. • Archeological reconnaissance. • Existing NPS, USGS, and Sul Ross State University water-related studies and reports. • Please refer to appendix D for past planning and data collection efforts related to geological resources.
Data and/or GIS Needs	• Academic research of geology and paleontology. • Administrative boundary survey. • Comprehensive channel and floodplain measurement and monitoring program. • Existing water rights study. • Mexican land ownership contact / information / land use data. • Research the impact of recharge areas on springs and spring flows. • Soil survey for designated segments of the Rio Grande outside of park boundaries.
Planning Needs	• Adaptive environmental management program. • Comprehensive / long-term interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Resource stewardship strategy. • Water use management plan.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Clean Water Act • Federal Cave Resources Protection Act • Paleontological Resources Preservation Act • Wild and Scenic Rivers Act • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Natural Resource Management Reference Manual 77*

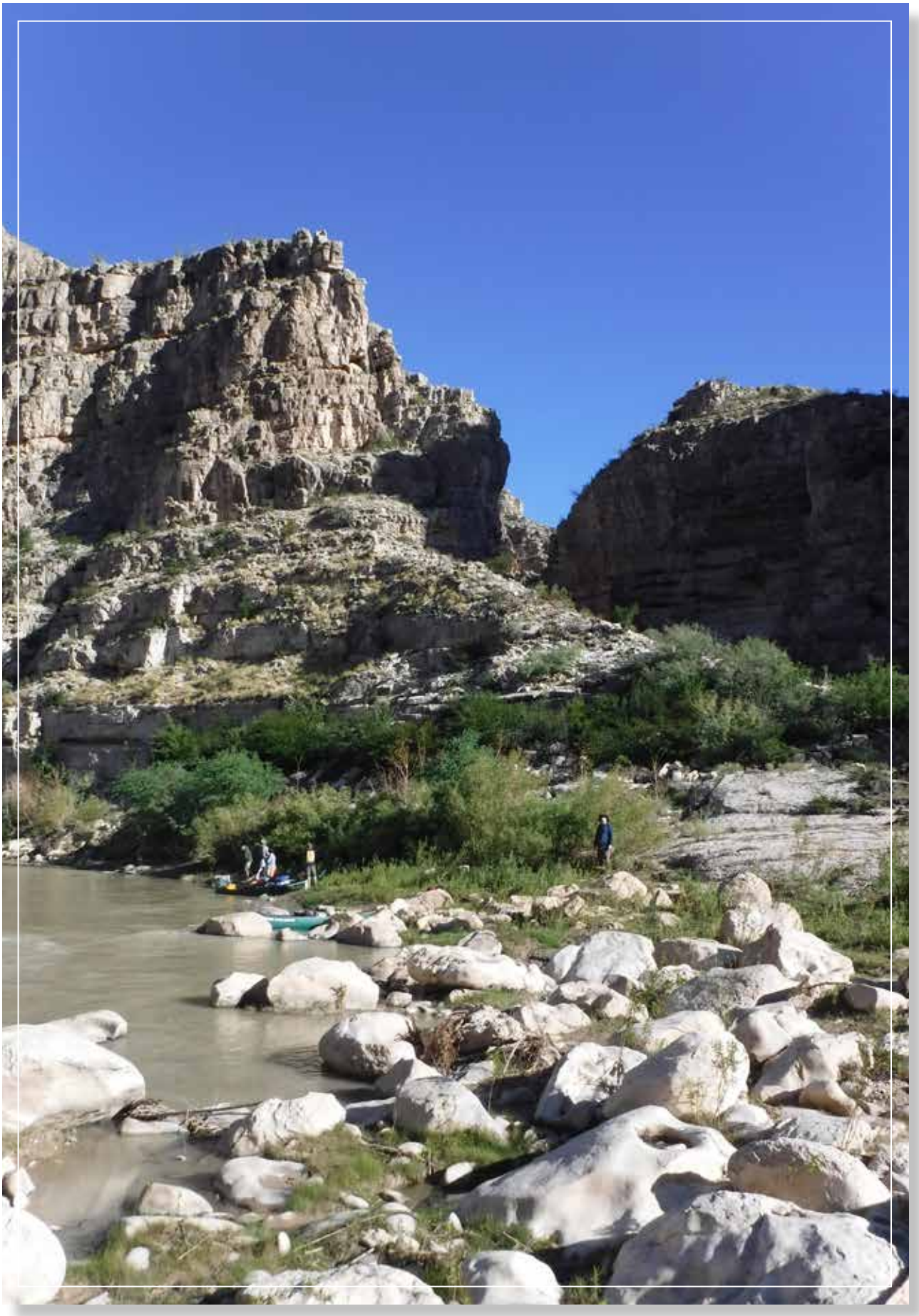




Fundamental Resource or Value	Recreational Values
Related Significance Statements	• The spectacular river canyons, hot springs, primitive wilderness character, and international setting of the river provide opportunities for extended recreational experiences, including absolute solitude, self-reliance, and opportunities to observe unique prehistoric, historic, and modern cultures along the US-Mexican border. • The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects. • The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats. • The Rio Grande is highly unusual in the region because it flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—providing a rare opportunity to see textbook examples of many active geologic processes and features, including dramatic faulting, folding, igneous sills, canyons, basins, and fossils. • The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, verdant riparian vegetation, and striking cliffs, to wide open basins and long, unobstructed views. • The riparian corridor provides a moist ribbon through the desert that has sustained human presence for 13,500 years. In the park, the highest density of prehistoric and historic sites and the greatest diversity of human uses are concentrated here. Many of the most significant cultural resources of the park are associated with the Rio Grande corridor. • The Rio Grande / Rio Bravo del Norte constitutes an essential element in the continuity and corridor connection between the US and Mexican protected areas. The Rio Grande Wild and Scenic River protects 196 river miles, and the Rio Grande's sister park, Monumento Natural Río Bravo del Norte, protects an additional 133 river miles of this same stretch of river on the Mexican side. The river and its values are managed by US and Mexican agencies, landowners, and partners, creating binational protection for the whole river system.
Current Conditions and Trends	**Conditions** • Recreational values are generally good; however, given the surface flows are highly variable and not predictable, much of the recreational use and all of the boating use is groundwater dependent. • Light but steady recreational use. • Outfitters and private boaters adapt their river usages based on water levels. • Open port of entry provides recreational opportunities to visit Mexico. • Campsites are not in good condition due to prevalence of nonnative vegetation. **Trends** • All visitors are funneled into Hot Springs Canyon when water levels are low, resulting in heavy use. • Day use is up at shorter canyon segments, like Hot Springs Canyon, and overnight use at longer segments is down. • Vegetation management is improving the conditions in Boquillas Canyon, but other areas are being further degraded. • In 2013, the park recorded 203 permits for river use at Big Bend.

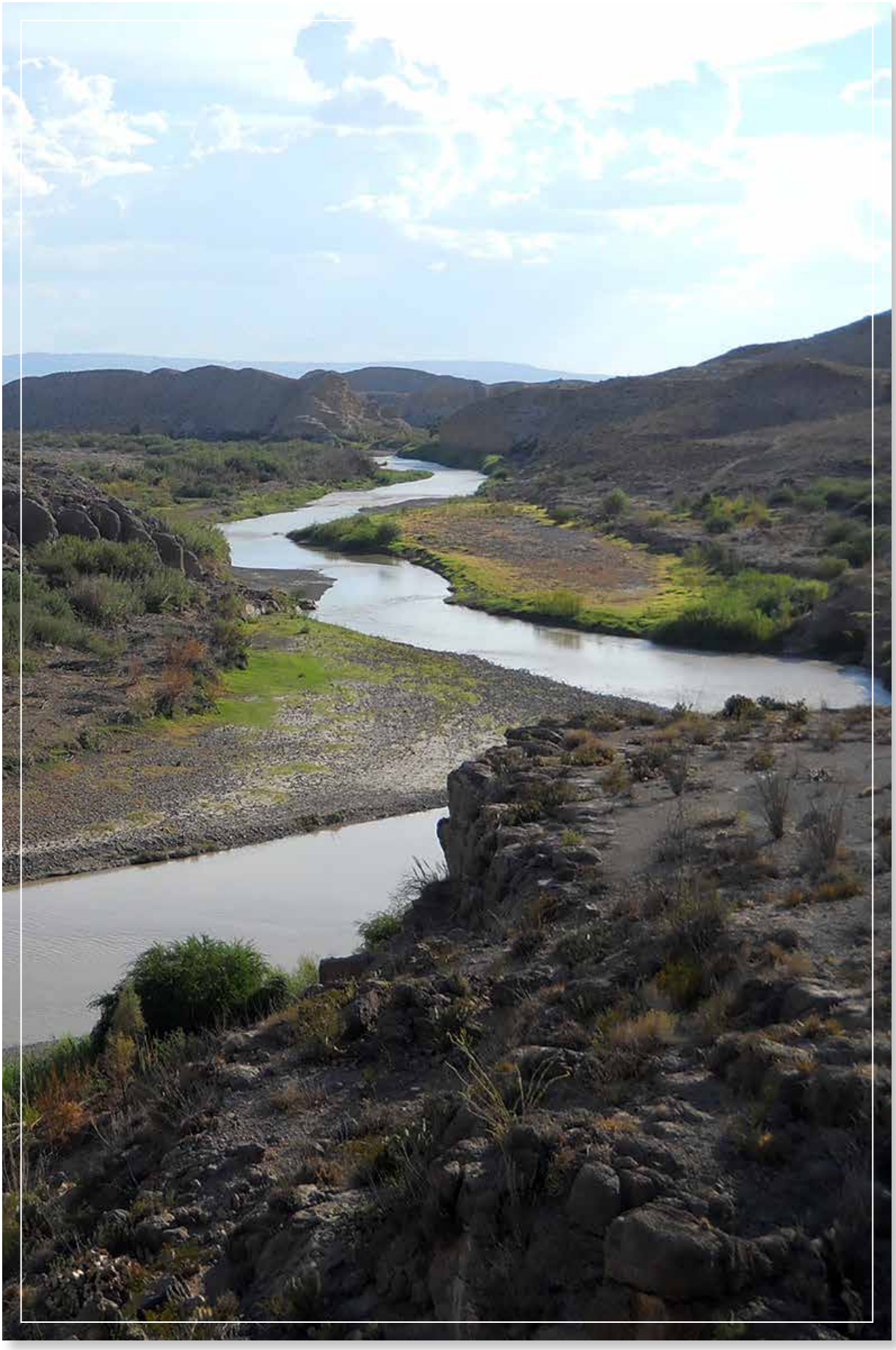
Fundamental Resource or Value	Recreational Values
Threats and Opportunities	**Threats** • Perceived border security concerns/issues. • Projected increases in mean annual temperature, drought events, and storm frequency/ intensity for the region due to climate change could impact visitor seasons and recreational activities. • Reduced water quantity and quality from climate change and upstream impoundments and extractive uses. • Plant encroachment at campsites and scouting locations at rapids. • Nonnative livestock in campsites and their interaction with visitors. • Loss of integrity of cultural sites. • Ground-level ozone warrants moderate concern for human health based on NPS Air Resources Division benchmarks. **Opportunities** • Continued collaboration with customs and border patrol. • Extend vegetation management to control or remove nonnatives at campsites. • Continue discussions with Mexico on environmental flows. • Leave no trace education with commercial use authorizations, private boaters, and local communities. • Educate public on observed and projected impacts along the wild and scenic river due to a changing climate. • Expand interpretative and educational tools to communicate the connections between air quality/pollution, scenic views, night sky, sensitive park resources, human health, climate change, and other associated resources. • Improve park sustainability and environmental leadership by becoming a Climate Friendly Park and implement an operational park Environmental Management System.
Existing Data and Plans Related to the FRV	• Commission on Environmental Cooperation Conservation Assessment (2013).
Data and/or GIS Needs	• Administrative boundary survey. • Campsites GIS data. • Continuous, long-term water quality sampling. • Comprehensive vegetation map and monitoring.
Planning Needs	• Adaptive environmental management program. • Comprehensive / long-range interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Resource stewardship strategy.

Fundamental Resource or Value	Recreational Values
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Americans with Disabilities Act • Architectural Barriers Act • Architectural Barriers Act Accessibility Standards • Clean Air Act • National Park Service Concessions Management Improvement Act • Rehabilitation Act • Wild and Scenic Rivers Act • "Concession Contracts" (36 CFR 51) • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • Director's Order 6: *Interpretation and Education* • Director's Order 42: *Accessibility for Visitors with Disabilities in National Park Service Programs and Services* • Director's Order 48A: *Concession Management* • Director's Order 48B: *Commercial Use Authorizations* • NPS *Transportation Planning Guidebook*



Fundamental Resource or Value	Scenic Values
Related Significance Statements	• The Rio Grande / Rio Bravo is an invaluable international resource for the United States and Mexico, providing vital water for diverse uses, sustaining wildlife and riparian ecosystems, and representing the most extensive ecologically intact aquatic and riparian habitat in the Chihuahuan Desert. Its remoteness provides a refuge for aquatic and terrestrial resources. As part of the only major river system in the Chihuahuan Desert, the river serves as the lifeblood for numerous threatened fish, mussels, reptiles, amphibians, birds, mammals, and insects. • The designated section of the Rio Grande Wild and Scenic River is free-flowing and, as such, characteristically exhibits wide variations in water flow and volume. The Rio Grande Wild and Scenic River, fed largely by the Rio Conchos in Chihuahua, Mexico, local aquifers, and Boquillas and Lower Canyons spring complexes, supports a largely groundwater-dependent ecosystem and associated riparian habitats. • The Rio Grande is highly unusual in the region because it flows through portions of two major geologic provinces—the Basin and Range and the Edwards Plateau—providing a rare opportunity to see textbook examples of many active geologic processes and features, including dramatic faulting, folding, igneous sills, canyons, basins, and fossils. • The Rio Grande and its tributaries are set in one of the most dramatic and storied landscapes in the West—from stunning narrow and deep canyons, verdant riparian vegetation, and striking cliffs, to wide open basins and long, unobstructed views.
Current Conditions and Trends	**Conditions** • High quality dark sky environment. • Lack of substantial development that would obstruct views. • Opportunity to experience solitude. • Scenic views are sometimes obscured by pollution-caused haze. • Some of the scenic values are outside of the management area. • Quiet, natural soundscape without sounds from boats, planes, or other artificial sources. • Water below the springs is very clear. **Trends** • Increasing light pollution. • Increasing sound pollution from jet boats and Department of Homeland Security planes. • Visibility warrants moderate concern based on NPS Air Resources Division benchmarks.
Threats and Opportunities	**Threats** • Loss of dark night skies due to light pollution. At night, air pollution scatters artificial light, increasing the impact of light pollution to night skies. • Dust emissions and pollutants that degrade visibility for four months of the year. • Houses being built on the rim of the canyon degrade scenic values. • Transmission lines are degrading scenic values. • Livestock trespassing. • Increase in mean annual temperature, storm frequency/intensity, and droughts projected for the region due to climate change could degrade some scenic values through changes in river, tributary and spring flows, changes in biodiversity, and increases in invasive species. • Decreased water quality from land uses along tributaries. • Loss of natural soundscapes from degradation by artificial noises. • Loss of night sky and sound as well as degraded air quality due to oil and gas development. • Air quality and scenic resources, including night skies, are impacted by international, regional and local sources of air pollution such as power plants, oil and gas, industrial facilities, agriculture and urban developments.

Fundamental Resource or Value	Scenic Values
Threats and Opportunities	**Opportunities** • Collaboration with and education for local communities about light pollution and protecting viewsheds and night skies. Interpretive efforts could focus on the connection between greenhouse gas emissions and the climate change impacts in the park. • Continued shared management and river stewardship with private landowners. • County zoning to protect the river corridor and nearby development. • Continued collaboration with Mexican landowners concerning the removal of nonnative species. • Collaboration with air quality programs (Interagency Monitoring of Protected Visual Environments, Clean Air Status and Trends Network, National Atmospheric Deposition Program, etc.). • Work cooperatively with other federal and state agencies and local stakeholders to reduce air quality impacts in parks from sources of air pollution such as oil and gas development.
Existing Data and Plans Related to the FRV	• Commission on Environmental Cooperation Conservation Assessment (2013). • Outstanding remarkable values report (2012). • Big Bend Regional Aerosol and Visibility Observational Study (2004). • Night sky evaluation report (2004). • Recreational river use management plan (1997). • Original weather surveillance radar studies (1970s). • Natural resource condition assessments. • Regional air quality monitoring including visibility, ozone, and deposition.
Data and/or GIS Needs	• Administrative boundary survey. • Air quality data (update). • Mexican land ownership contact / information / land use data. • Trespass livestock and social trails data. • Visitor use / satisfaction surveys. • Visual resource inventory.
Planning Needs	• Adaptive environmental management program. • Comprehensive / long-range interpretive plan (update). • Comprehensive river management plan, including establishment of desired future conditions. • Resource stewardship strategy. • Scenery conservation strategy.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Clean Air Act • Wild and Scenic Rivers Act • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Natural Resource Management Reference Manual 77*



Identification of Key Issues and Associated Planning and Data Needs

This section considers key issues to be addressed in planning and management and therefore takes a broader view over the primary focus of part 1. A key issue focuses on a question that is important for a park. Key issues often raise questions regarding park purpose and significance and fundamental resources and values. For example, a key issue may pertain to the potential for a fundamental resource or value in a park to be detrimentally affected by discretionary management decisions. A key issue may also address crucial questions that are not directly related to purpose and significance, but which still affect them indirectly. Usually, a key issue is one that a future planning effort or data collection needs to address and requires a decision by NPS managers.

The following are key issues for Rio Grande Wild and Scenic River and the associated planning and data needs to address them:

- **Climate Change –** Mean annual temperature for the region is projected to increase 3.6°F to 4.7°F by 2050 with minimal change projected in mean annual precipitation and increase in storm frequency/intensity and droughts are also projected. Water and water-dependent ecosystems are scarce resources in the arid and semi-arid southwest and are generally regarded as biodiversity hotspots. It is anticipated that climate change will alter ground and surface water quantity, as well as seasonal patterns of availability, including flooding and drought, which could significantly impact native and migratory species. A drier landscape may increase the potential for wildland fire that could threaten historic structures and/or cultural sites. These changes would in turn affect resource management, visitor use, and operations. A climate change scenario plan and an updated environmental management systems plan would provide park management tools for addressing and preparing for such changes.

- **Comprehensive evaluation of additional river segments eligibility and suitability for inclusion into the Rio Grande Wild and Scenic River boundary –** Protection and enhancement of the Rio Grande Wild and Scenic River is dependent on river components currently not included in the designated portion of the river. There are approximately 50 miles of the Rio Grande in Big Bend National Park that could be evaluated for potential classification and determination of suitability. Upstream of the park, Big Bend Ranch State Park manages approximately 25 miles of the Rio Grande. An assessment of additional segments' eligibility and suitability would provide the basis for determining which additional components to recommend as part of the Rio Grande Wild and Scenic River, the first step into designating additional segments.

- **Establish Administrative Boundary –** There is a management action needed to coordinate with NPS lands office to finalize the boundary. The associated data need is a survey.

- **Historic Buildings Preservation –** In the segment of Rio Grande Wild and Scenic River that is in Big Bend National Park and the Lower Canyons, there is a need to better document and understand current conditions of cultural resources in the river corridor. Many sites have not been surveyed to determine how the river is impacting buildings and sites. Other areas need baseline inventories conducted to determine the extent of resources present.

- **Landowner Relationships and Cooperation –** Land along the wild and scenic river is in private ownership. Protection and enhancement of the river values is dependent on cooperation and good relationships with the landowners. The need to establish a wild scenic river boundary for Rio Grande Wild and Scenic River would help in maintaining strong cooperative relationships with landowners, along with maintaining contacts with current and new landowners. Efforts in these areas are planned to start in 2015, with surveys of Lower Canyons segments starting in 2018 and 2019.

- **Nonnative Species –** Many species of invasive nonnative plants and animals have become established throughout much of the park and threaten native species. In time, these aggressive nonnative plants and animals can greatly expand their populations; alter forest and wildlife habitats; and change scenery by smothering and displacing native species. These effects, which are already occurring in some areas of the park, will worsen substantially if left untreated. A sustained effort is needed to control these internal threats to the native species and their natural habitats. Completing the exotic species management plan, which would also address trespass livestock, is an important planning need that would help address this parkwide issue.
- **Road Maintenance and Access –** In order to access the Santa Elena trail, Route 16 needs an engineering plan to be redesigned and rebuilt. Current sedimentation of the river results in regular closing of the road when it is covered by sand during high water levels. The study on environmental flows will influence future plans for the road.
- **Water Quantity and Quality –** Upstream impoundments and diversions, compounded by additional development and cultivated lands along the Mexican Rio Conchos and the Rio Grande and their tributaries, severely reduce river flows reaching the park. These conditions, exacerbated by recurring droughts, have effectively eliminated river recreation for parts of the year from 1994 to the present (2015). Current flows in the river come from inputs of regional aquifers; the Rio Grande Wild and Scenic River is now a groundwater-dependent ecosystem. Total dissolved solids, chloride, and sulfide concentrations are elevated and increasing in the river due primarily to origins outside of the park, and many of the efforts to reduce elevated concentrations will require coordination with regional or international groups. These water quality parameters improve downstream in the park due to contributions of high quality groundwater from numerous springs. A water use management plan, comprehensive river use plan, a study of the interaction between channel sedimentation and hyporheic exchanges, nutrient transport, and dissolved oxygen as it relates to fish kills would inform activities that would improve water quantity and quality.

Planning and Data Needs

To maintain connection to the core elements of the foundation and the importance of these core foundation elements, the planning and data needs listed here are directly related to protecting fundamental resources and values, park significance, and park purpose, as well as addressing key issues. To successfully undertake a planning effort, information from sources such as inventories, studies, research activities, and analyses may be required to provide adequate knowledge of park resources and visitor information. Such information sources have been identified as data needs. Geospatial mapping tasks and products are included in data needs.

Items considered of the utmost importance were identified as high priority, and other items identified, but not rising to the level of high priority, were listed as either medium- or low-priority needs. These priorities inform park management efforts to secure funding and support for planning projects.

Planning Needs – Where A Decision-making Process Is Needed			
Related to an FRV, OIRV, or Key Issue?	**Planning Needs**	**Priority (H, M, L)**	**Notes**
All FRVs	Adaptive environmental management program (combined effort with Big Bend National Park)	H	This multiagency plan is needed for effective long-term management of riparian vegetation, water quality, and aquatic habitat. The plan involves binational and multiagency collaboration.
FRV	Comprehensive river management plan, including establishment of desired future conditions	H	This plan would support relationships with landowners, protects resources and outstanding remarkable values, and establishes visitor use carrying capacity. It is not included in the adaptive environmental management program. Some components may be found in 2004 general management plan and 2012 outstanding remarkable values report, and these may satisfy legal requirements.
Key Parkwide Issue and FRV	Exotic species management plans (finalize)	H	In 2015, park staff is developing this plan to protect resources in the Lower Canyons. This plan would allow for management of aoudads and other nonnative species that cause impacts on natural and cultural resources.
All FRVs	Resource stewardship strategy (combined effort with Big Bend National Park)	H	Plan would provide a 20-year resource management strategy and would be a combined effort with Big Bend National Park. Includes a discussion of climate change. The resource stewardship strategy would include interpretive and education components to help address the resource issues identified.
Key Parkwide Issue	Assessment of additional river segments' eligibility and suitability	M	The assessment of additional segments' eligibility and suitability would provide the basis for determining which additional components to recommend as part of the Rio Grande Wild and Scenic River, the first step into designating additional segments.
All FRVs	Comprehensive / long-range interpretive plan (update)	M	An updated comprehensive interpretive plan is needed to account for the opening of the border with Boquillas, Mexico, and other changes that have occurred with social media and interpretive programming. There is a tremendous opportunity to use the park as a teaching tool for overarching regional and local environmental quality issues. Updated plan would integrate visitor education and interpretation into reduction of vandalism and other visitor-caused impacts/threats. Similarly, an update or addendum to the comprehensive interpretive plan could focus communication efforts regarding resource threats and degradation that are human-caused.
Key Parkwide Issue	Environmental management system (update)	M	This is a joint plan with Big Bend National Park. Need help organizing and making it a real plan; green products, renewable energy, water use, recycling would help with park operations.
FRV	Scenery conservation strategy (combined effort with Big Bend National Park)	M	The strategy, based on the visual resource inventory, would focus on collaborative efforts to protect scenic views in areas that NPS does not manage. The plan addresses threats from residential, commercial, agricultural, and extractive uses.

Planning Needs – Where A Decision-making Process Is Needed			
Related to an FRV, OIRV, or Key Issue?	**Planning Needs**	**Priority (H, M, L)**	**Notes**
Parkwide Issue	Climate change scenario plan (combined effort with Big Bend National Park)	L	Scenario planning would support resource stewardship strategy, comprehensive river management plan, and adaptive management program. Plan would help better understand the range of plausible climate futures for the region that can be incorporated into other park planning and management efforts.
FRV	Historic resource management plan (update)	L	
Key Parkwide Issue and FRV	Water use management plan	L	

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV, OIRV, or Key Issue?	**Data and GIS Needs**	**Priority (H, M, L)**	**Notes, Including Which Planning Need This Data Need Relates To**
FRV	Administrative boundary survey	H	This would help clarify park operations and support landowner agreements, as well as recreational uses. It is a legal requirement that would begin inside the park.
FRV	Climate change vulnerability assessment (combined effort with Big Bend National Park)	H	This study would help understanding how changes in the physical environment will differentially alter the park's ecosystem.
FRV	Comprehensive channel and floodplain measurement and monitoring program	H	Park staff have been actively participating with researchers to conduct this program to understand current conditions, results of cane removal on the system, and how sediment has been moving with flood events.
FRV	Comprehensive study of the availability and distribution of aquatic habitat in relation to annual flows and vegetation management activities	H	Baseline assessment of groundwater-dependent ecosystems is ongoing. A study on the relationship of aquatic habitat availability, annual flows, and vegetation management is needed. Adaptive environmental management program and a comprehensive river management plan are the two related planning needs.
FRV	Continuous, long-term water quality monitoring	H	The greatest data gap related to water quality is a shortage of comparable historic and recent data. Much of the data comes from short-term, intermittent sampling, rather than continuous monitoring of conditions. Effort would include collecting data on water quality of tributaries. Data would also help better understanding of pollutants, contaminants, and other trash from tributaries.
FRV	Determine sources of salinity and nutrients and the role of declining annual flows on water quality	H	Discharge and flow rate data should be collected and analyzed in conjunction with water quality samples to better understand the influence of water flow on water quality in the Rio Grande.
FRV	Ecological flow assessment	H	Assessment would help in understanding the relationship between instream flow and ecological conditions and would help validate ecological flow requirements. More information is needed on the river's streamflow (e.g., sources, timing and duration of low and high flows, rate of downstream flow attenuation).
FRV	Monitor and determine impacts of groundwater extraction (oil and gas production, water supply development) on Rio Grande springs	H	Data would assist in understanding potential impacts of oil and gas production and increased groundwater extraction on Lower Canyons springs discharge.
FRV	Research the impact of recharge areas on springs and spring flows	H	Data would support resource stewardship strategy, adaptive environmental management program (binational effort), Texas instream flows, regional water planning, and associated recreational flows.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV, OIRV, or Key Issue?	**Data and GIS Needs**	**Priority (H, M, L)**	**Notes, Including Which Planning Need This Data Need Relates To**
FRV	Study community dynamics and trend data on fish and aquatic invertebrates and health as well as habitat characteristics	H	Data would support resource stewardship strategy, adaptive environmental management program, Texas instream flows, recovery plans for threatened and endangered and candidate species, and support the exotic species management plan.
FRV	Study of the interaction between channel sedimentation and hyporheic exchanges, nutrient transport, and dissolved oxygen as it relates to fish kills	H	This data need includes studies of water quality and impacts of tributaries and would support resource stewardship strategy, adaptive environmental management program (binational effort), Texas instream flows, recovery plans for threatened and endangered and candidate species, exotic species management plan, total maximum daily loads requirements, and environmental flows agreement.
FRV	Study on sedimentation, flow, and geomorphology	H	Data would support resource stewardship strategy, adaptive environmental management program (binational effort), Texas instream flows, regional water planning, Route 16 study, and protection of cultural features near river.
FRV	Study the role of tributaries and groundwater in sustaining the ecosystem	H	Tributary runoff and groundwater are currently what sustain the aquatic ecosystem. Adaptive environmental management program, comprehensive river management plan, resource stewardship strategy, and climate change scenario plan are the related planning needs.
FRV	Trespass livestock and social trails data	H	Data would identify the health and safety hazards and erosion caused by trespassing livestock and social trails. It would support a resource stewardship strategy, resource management and trails management strategy, backcountry management, and cultural resources site assessment. It would identify how livestock and social trails negatively impact the visitor experience.
FRV	Visitor use / satisfaction surveys	H	Data would support management actions and planning efforts, help coordinate with concessions and commercial use authorizations, identify educational gaps in outreach opportunities, and clarify economic service benefits.
FRV	Academic research of geology and paleontology	M	Research would provide unique information not available elsewhere for scientifically sound management and educational visitor opportunities.
FRV	Comprehensive vegetation map and monitoring	M	Data would assist in understanding vegetation management impacts on high water line vegetative communities, its effect on birds, and as it relates to aquatic habitat availability. Vegetation monitoring should be integrated with geomorphic monitoring.
FRV	Cultural resources survey	M	Data would support the comprehensive river management plan, exotic species management plan, long-term park management, and historic structures report. Would include a conditions assessment. Effort would include additional monitoring of cultural resources site/structure condition.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV, OIRV, or Key Issue?	**Data and GIS Needs**	**Priority (H, M, L)**	**Notes, Including Which Planning Need This Data Need Relates To**
FRV	Establish mussel monitoring strategy and determine why mussels have been extirpated from upper reaches of the river	M	Need baseline mussel population monitoring data to understand population response to degrading river conditions. Develop strategies with US Fish and Wildlife Service for improving conditions for listed and other mussel species. Resource stewardship strategy is the related planning need.
FRV	Existing water rights study	M	Need to understand how existing water rights impact flows inside Rio Grande Wild and Scenic River.
FRV	Mexican land ownership contact / information / land use data	M	This data would support binational resource management and would complement trespass livestock data to help to understand the associated threats.
FRV	Repeat amphibian surveys from 1990s	M	Original 1990s study was completed by US Geological Survey in response to global amphibian decline. Park needs to understand impacts associated with reduced water flows and river restoration efforts on amphibian populations. Resource stewardship strategy is the related planning need.
FRV	Study bird population response to vegetation management along river corridor	M	Need baseline bird population monitoring data to understand avian responses to degraded environmental conditions as well as response to NPS restoration efforts. Resource stewardship strategy is the related planning need.
FRV	Study of dissolved oxygen levels/ eutrophication and the effects on aquatic ecosystems	M	Complete study to understand fish kills that occur during low flow years. Eutrophic effects likely impact all species. Adaptive environmental management program and a comprehensive river management plan are the two related planning needs.
FRV	Special studies to examine pollution dose-response relationships in sensitive park ecosystems (i.e., plants, soils, wetlands), and assess the resilience of native ecosystems in the fact of external perturbations	M	This would be a combined effort with Big Bend National Park. Study would help close knowledge gap that is important to address as park management programs are developed.
FRV	Vegetation treatment area maps	M	Effort would include organizing database of treatment activities and mapping locations of treatment areas using georeferenced data. Data would inform the exotic species management plan, resource stewardship strategy, and visitor use (camping access).
FRV	Visual resource inventory (combined effort with Big Bend National Park)	M	The inventory would identify scenic values and NPS/visitor values for key views and segments of the river. The inventory would also complement the cultural landscape inventories identified under the Cultural Values FRV.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV, OIRV, or Key Issue?	**Data and GIS Needs**	**Priority (H, M, L)**	**Notes, Including Which Planning Need This Data Need Relates To**
FRV	Air quality data (update)	L	Long-term dataset for the park; developments in oil and gas industry in the Permian Basin and northern Mexico pose new threats to air quality; national program funded by National Park Service and State of Texas.
FRV	Campsites GIS data	L	These may change over time, but the park would get a timestamp of data.
FRV	Complete the cultural landscape inventory for resources along the river	L	This cultural landscape inventory is underway for portions of the river, and there is a list of other areas needing a cultural landscape inventory.
FRV	Data / maps on locations where channel sedimentation is impacting cultural resource sites	L	
FRV	Ethnographic overview and assessment	L	Includes identification of Hispanic and American Indian connections to corridor.
FRV	Soil survey for designated segments of the Rio Grande outside of park boundaries	L	
FRV	Study Mexican beaver population and ecology	L	This study is ongoing. Data is needed to better understand existing vegetation management impacts.

Part 3: Contributors

Big Bend National Park and Rio Grande Wild and Scenic River

Cindy Ott-Jones, Superintendent
Tom Alex, Park Archeologist
Jeff Bennett, Park Physical Scientist/Hydrologist
Ken Bigley, Chief of Administration
Don Corrick, Park Geologist
David Elkowitz, Chief of Interpretation
Allen Etheridge, Chief Ranger
Dave Larson, Chief of Science and Resource Management
Natasha Moore, Park Ranger, Volunteer Coordinator
Linda Richards, Chief of Facilities Management
Heather Rickleff, Environmental Protection Specialist
Michael Ryan, River District Ranger
Joe Sirotnak, Park Botanist
Raymond Skiles, Park Wildlife Biologist
Bobbie Smith, Park Ranger - Boquillas Crossing Port of Entry
Ed Waldron, Park Fire Management Officer
Erik Walker, Park Trails Crew Supervisor

NPS Intermountain Region

Wendy Berhman, Planning Liaison
Darcee Killpack, Regional GIS Coordinator
Attila Bality, Rivers, Trails, and Conservation Assistance Program, Community Planner

NPS WASO, Park Planning and Special Studies

Pam Holtman, Foundation Quality Assurance/Quality Control Coordinator

NPS Denver Service Center – Planning

Tracy Atkins, Project Manager
Melody Bentfield, Contract Librarian
Kelly Donahue, Landscape Architect
Tatiana Márquez, Economics Specialist
Laura Pernice, Geographic Information System Specialist
Danielle Stevens, Contract Editor
Nancy Shock, Foundation Coordinator
Alex Williams, Natural Resource Specialist
Angie Marie Wing, Contract Visual Information Specialist

Appendixes

Appendix A: Enabling Legislation and Legislative Acts for Rio Grande Wild and Scenic River

Plan, provisions and regulations.

referred to in this paragraph within one year from the date of enactment of this paragraph. Any development or management plan prepared pursuant to subsection (b) shall include (a) provisions for the dissemination of information to river users and (b) such regulations relating to the recreational and other uses of the river as may be necessary in order to protect the area comprising such river (including lands contiguous or adjacent thereto) from damage or destruction by reason of overuse and to protect its scenic, historic, esthetic and scientific values. Such regulations shall further contain procedures and means which shall be utilized in the enforcement of such development and management plan. For the purposes of carrying out the provisions of this Act with respect to the river designated by this paragraph, there are authorized to be appropriated not more than $8,125,000 for the acquisition of lands or interests in lands and $402,000 for development.".

Appropriation authorization.

ADDITION OF RIO GRANDE SEGMENT

Description. 16 USC 1274.

SEC. 702. Section 3(a) of the Wild and Scenic Rivers Act is amended by adding the following new paragraph at the end thereof:

"(17) RIO GRANDE, TEXAS.—The segment on the United States side of the river from river mile 842.3 above Mariscal Canyon downstream to river mile 651.1 at the Terrell-Val Verde County line; to be administered by the Secretary of the Interior. The Secretary shall, within two years after the date of enactment of this paragraph, take such action with respect to the segment referred to in this paragraph as is provided for under subsection (b). The action required by such subsection (b) shall be undertaken by the Secretary, after consultation with the United States Commissioner, International Boundary and Water Commission, United States and Mexico, and appropriate officials of the State of Texas and its political subdivisions. The development plan required by subsection (b) shall be construed to be a general management plan only for the United States side of the river and such plan shall include, but not be limited to, the establishment of a detailed boundary which shall include an average of not more than 160 acres per mile. Nothing in this Act shall be construed to be in conflict with—

Consultation.

Plan and provisions.

"(A) the commitments or agreements of the United States made by or in pursuance of the treaty between the United States and Mexico regarding the utilization of the Colorado and Tijuana Rivers and of the Rio Grande, signed at Washington, February 1944 (59 Stat. 1219), or

"(B) the treaty between the United States and Mexico regarding maintenance of the Rio Grande and Colorado River as the international boundary between the United States and Mexico, signed November 23, 1970.

23 UST 371.

Appropriation authorization.

For purposes of carrying out the provisions of this Act with respect to the river designated by this paragraph, there are authorized to be appropriated such sums as may be necessary, but not more than $1,650,000 for the acquisition of lands and interests in lands and not more than $1,800,000 for development.".

ADDITION OF SKAGIT SEGMENTS

Boundaries.

SEC. 703. Section 3(a) of the Wild and Scenic Rivers Act is amended by adding the following new paragraph at the end thereof:

"(18) SKAGIT, WASHINGTON.—The segment from the pipeline crossing at Sedro-Woolley upstream to and including the mouth of Bacon

16 USC 460m-15 note.

SEC. 404. CONSOLIDATED MANAGEMENT.

In order to achieve the maximum economy and efficiency of operations in the administration of the National Park System units established or expanded pursuant to this Act, the Secretary shall consolidate offices and personnel administering all such units to the extent practicable and shall utilize the existing facilities of the New River Gorge National River to the extent practicable.

16 USC 460m-15 note.

SEC. 405. NEW SPENDING AUTHORITY SUBJECT TO APPROPRIATIONS.

Any new spending authority which is provided under this Act shall be effective for any fiscal year only to the extent or in such amounts as provided in appropriation Acts.

TITLE V—TECHNICAL CHANGE TO WILD AND SCENIC RIVERS ACT

SEC. 501. ACREAGE LIMITATIONS.

Notwithstanding the provisions of section 501(b)(1)(B) of Public Law 99-590, section 3(b) of the Wild and Scenic River Act (16 U.S.C. 1274(b)) is amended to read as follows:

"(b) The agency charged with the administration of each component of the national wild and scenic rivers system designated by subsection (a) of this section shall, within one year from the date of designation of such component under subsection (a) (except where a different date if provided in subsection (a)), establish detailed boundaries therefor (which boundaries shall include an average of not more than 320 acres of land per mile measured from the ordinary high water mark on both sides of the river); and determine which of the classes outlined in section 2, subsection (b), of this Act best fit the river or its various segments.

Federal Register, publication.

"Notice of the availability of the boundaries and classification, and of subsequent boundary amendments shall be published in the Federal Register and shall not become effective until ninety days after they have been forwarded to the President of the Senate and the Speaker of the House of Representatives.".

Approved October 26, 1988.

LEGISLATIVE HISTORY—H.R. 900:

HOUSE REPORTS: No. 100-106 (Comm. on Interior and Insular Affairs).
SENATE REPORTS: No. 100-481 (Comm. on Energy and Natural Resources).
CONGRESSIONAL RECORD:
Vol. 133 (1987): May 27, considered and passed House.
Vol. 134 (1988): Sept. 8, considered and passed Senate, amended.
Oct. 3, 4, House concurred in Senate amendment with an amendment.
Oct. 7, Senate concurred in House amendment.

Appendix B: Traditionally Associated Tribes

Tribal Contacts

Absentee Shawnee Tribe of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, OK 74801

Apache Tribe of Oklahoma
Apache Business Committee
PO Box 1330
Anadarko, OK 73005-1220

Comanche Nation, Oklahoma
Comanche Tribal Business Committee
PO Box 908
Lawton, OK 73502

Fort Sill Apache Tribe of Oklahoma
Fort Sill Apache Business Committee
Route 2, Box 121
Apache, OK 73006

Jicarilla Apache Nation, New Mexico
Jicarilla Apache Tribal Council
PO Box 507
Dulce, NM 87528

Kickapoo Traditional Tribe of Texas
HCR 1 Box 9700
Eagle Pass, TX 78852

Kiowa Indian Tribe of Oklahoma
Kiowa Business Committee
PO Box 369
Carnegie, OK 73015

Mescalero Apache Tribe of the Mescalero Reservation, New Mexico
Mescalero Apache Tribal Council
PO Box 227
Mescalero, NM 88340

San Carlos Apache Tribe of the San Carlos Reservation, Arizona
San Carlos Tribal Council
PO Box 0
San Carlos, AZ 85550

Shoshone Tribe of the Wind River Reservation, Wyoming
Eastern Shoshone Business Council
PO Box 538
Fort Washakie, WY 82514

Tonto Apache Tribe of Arizona
Tonto Apache Tribal Council
Tonto Reservation #30
Payson, AZ 85541

White Mountain Apache Tribe of the Fort Apache Reservation, Arizona
White Mountain Apache Tribal Council
PO Box 700
Whiteriver, AZ 85941

Ysleta Del Sur Pueblo of Texas
Ysleta Del Sur Pueblo Tribal Council
PO Box 17579
El Paso, TX 79917

Appendix C: Inventory of Special Mandates and Administrative Commitments

Special Mandates

- **1978 Designation of the Rio Grande Wild and Scenic River –** Stipulates that the Wild and Scenic Rivers Act would not conflict with the 1944 Water Treaty or the 1970 Boundary Treaty between the United States and Mexico. Under these treaties, either of the countries may construct flood control works or water diversion structures. The 1944 treaty specifies that at least one-third of the combined annual flow volume from the six Mexican rivers that feed the Rio Grande belongs to the United States. This treaty also requires that the discharge must total at least 350,000 acre-feet annually, based on a five-year moving mean average. The International Boundary and Water Commission is responsible for implementing these treaties.

- **1968 Wild and Scenic Rivers Act Land Acquisition –** Stipulates that fee title acquisition will be limited to an average of no more than 100 acres per mile of river. Condemnation will not be used to acquire fee title to any lands if 50% or more of the entire acreage is owned by the United States or the State of Texas. However, condemnation may be used when necessary to clear title or to acquire scenic easements or other easements necessary to provide public access to the river and to permit the public to traverse the length of the river or selected segments of it.

- **1968 Wild and Scenic Rivers Act –** States that hunting and fishing will be permitted on lands and waters administered in the river under applicable state and federal laws and regulations, unless, in the case of hunting, those lands or waters are in a national park or monument. Zones or periods of time may be designated in which no hunting will be permitted for reasons of public safety, administration, or public use and enjoyment. The act also states that the river will be administered in ways that will protect and enhance its values, without limiting other uses that do not substantially interfere with public use and enjoyment, provided the other uses are not inconsistent with the act.

- **1968 Wild and Scenic Rivers Act –** Statess that, except for property deemed necessary for purposes of administration, development, access, or public use, an owner may retain right of "use and occupancy" of noncommercial residential structures lived in year-round, if construction was begun before January 1, 1967; or any owner can use the lands he sells for agricultural purposes. The right will expire on the death of the owner or spouse, whichever is later, or not to exceed 25 years after the date of acquisition.

- **Treaty of November 23, 1970 –** Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and Colorado River as the International Boundary – resolved all pending boundary differences between the two countries and provided for maintaining the Rio Grande and the Colorado River as the international boundary. It provides procedures designed to avoid the loss or gain of territory by either country incident to future changes in the river.

- **Treaty of February 3, 1944 –** *Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande* – distributed the waters in the international segment of the Rio Grande from Fort Quitman, Texas, to the Gulf of Mexico. This treaty also authorized the two countries to construct, operate, and maintain dams on the main channel of the Rio Grande. The 1944 treaty also changed the name of the International Boundary Commission to the International Boundary and Water Commission, and in article 3, the two governments entrusted the International Boundary and Water Commission to give preferential attention to the solution of all border sanitation problems.

- **Convention of May 21, 1906 –** *Equitable Distribution of the Waters of the Rio Grande* – provides for the distribution between the United States and Mexico of the waters of the Rio Grande in the international reach of the river between the El Paso-Juárez Valley and Fort Quitman, Texas.
- **Convention of March 20, 1905 –** *Elimination of the Bancos in the Rio Grande from the Effects of Article II of the Treaty of November 12, 1884* – established the center of the normal channel of the rivers as the dividing line.
- **Convention of March 1, 1889 –** *Water Boundary* – established the International Boundary Commission to apply the rules in the 1884 Convention and was modified by the Banco Convention of March 20, 1905, to retain the Rio Grande and the Colorado River as the international boundary.
- **Convention of November 12, 1884 –** *Touching the International Boundary Line Where It Follows the Bed of the Rio Colorado* – established the rules for determining the location of the boundary when the meandering rivers transferred tracts of land from one bank of the river to the other.
- **Treaty of February 2, 1848 –** *Peace, Friendship, Limits, and Settlement (also known as the Treaty of Guadalupe Hidalgo)* – established the US-Mexico international boundary. The treaty of December 30, 1853, modified the boundary as it exists today.

Administrative Commitments

Title/Agency/ Organization	Purpose/Description	Expiration Date	Responsible Party
Commercial Use Authorization			
Concession Agreements with Forever Resorts	Operate facilities throughout the park: lodging units, restaurant, and store in the Chisos Basin; service station at Panther Junction; store, trailer hookups, gas station, laundromat, and showers at Rio Grande Village; and store and gas station at Castolon	2017	Chief of interpretation and partnerships
Various	Biking	(x1) permits Valid 1 year	Chief of interpretation and partnerships
Various	Bird watching	(x4) Valid 1 year	Chief of interpretation and partnerships
Various	Ferry	(x1) Valid 1 year	Chief of interpretation and partnerships
Various	Hiking	(x10) Valid 1 year	Chief of interpretation and partnerships
Various	Overland tours	(x2) Valid 1 year	Chief of interpretation and partnerships
Various	Photography	(x2) Valid 1 year	Chief of interpretation and partnerships
Various	River tours	(x4) Valid 1 year (x4) Valid 2 years	Chief of interpretation and partnerships
Cooperating Association			
Big Bend Natural History Association	Cooperative relationship	10/31/2016	Chief of interpretation and partnerships
Cooperative Agreements			
Friends of Big Bend National Park	Provides legal and policy framework to encourage innovation and creativity to meet mutual goals	4/19/2021	Chief of interpretation and partnerships
Family Crisis Center and Local Counties	Sexual Assault Response Team	Indefinite	Chief ranger
Texas Department of Public Safety (TX DPS)	Use of TX DPS mobile frequencies	Indefinite	Chief ranger

Title/Agency/ Organization	Purpose/Description	Expiration Date	Responsible Party
General Agreements			
Big Bend National Park (BIBE) / Rio Grande Wild and Scenic River (RIGR) / Pecos County	Emergency medical services	3/2016	Chief ranger
BIBE / RIGR / Presidio County	Emergency medical services	3/2016	Chief ranger
BIBE / RIGR / Terrell County	Emergency medical services	3/2016	Chief ranger
US Department of the Interior (USDI), National Park Service (NPS), BIBE and San Vicente Independent School District	Operation of elementary school and land assignment	10/2016	Superintendent
BIBE / RIGR / Terlingua Fire	Emergency medical services	4/2017	Chief ranger
BIBE / RIGR / Brewster County	Emergency medical services	4/1/2019	Chief ranger
Adjacent Landowners	Outlines insurance policies for landowners adjacent to the river	Annual process	Superintendent
Interagency Agreements			
US Customs and Border Protection (USCBP) and BIBE	Road maintenance	9/30/2015	Chief of facility management
USDI NPS BIBE and USCBP	Los Diablos wildland fire crew	2/18/2019	Chief ranger
Candidate Conservation Agreement between BIBE, Guadalupe Mountains National Park, and the USFWS Austin Ecological Services Field Office	Identify threats to candidate species, plan the measures needed to address the threats and conserve these species, identify willing landowners, develop agreements, and design and implement conservation measures and monitor their effectiveness		

Title/Agency/ Organization	Purpose/Description	Expiration Date	Responsible Party
Intergovernmental Agreements			
NPS USDI and the Secretariat of Environment and Natural Resources (SEMARNAT) of the United Mexican States [This agreement supersedes the May 18, 2000, agreement between the SEMARNAT through its National Institute of Ecology and the NPS]	Creation of a framework for cooperation between the parties concerning: the conservation of protected areas and their diversity; to the extent possible, the enjoyment of these areas by visitors; recognition of sustainable development alternatives for rural Mexican communities located in those areas; and the exploration of strategies for related cooperation with rural communities, citizens groups, and scientific and other organizations of both countries accepted within the legal framework of each country	2017 with option to extent or amend (first signed Feb. 14, 2012)	
Joint Declaration of Sister Park Partnerships (Maderas del Carmen and Cañon de Santa Elena Flora and Fauna Protected Areas [MEX] and Big Bend National Park [USA])	Officially designates and recognizes "Sister Park" relationships and work as partners in national parks and natural protected areas with similar resources or mutual interests in a common set of management issues, for the purpose of furthering the cause of natural and cultural resources conservation and enjoyment	Indefinite (first signed March 23, 2006)	The National Commission for Natural Protected Areas of the Secretariat of the Environment and Natural Resources of the United Mexican States and NPS, USDI
Letter of Intent between the USDI and the Secretariat of Environment, Natural Resources, and Fisheries of the United Mexican States for Joint Work in Natural Protected Areas on the US-Mexico Border	Plan to expand existing cooperative activities in the conservation of contiguous natural protected areas in the border zone and to consider new opportunities for cooperation in the protection of natural protected areas on the US-Mexico border	Indefinite (first signed May 5, 1997)	
TX DPS and TX Law Enforcement Telecommunication System	Communications and information systems equipment	Indefinite	Chief ranger
Wildfire Prevention Agreement with Mexico	An agreement with Mexico on the prevention of wildfires		
Binational Strategic Planning with Sister Parks (Informal Event)	Annual planning event with Maderas del Carmen and Canyon de Santa Elena sister parks; first year initiated in 2013 with identified work plans established; planning events also completed during 2014 and 2015 with associated work plans	Indefinite – recurring on annual basis	Chief of science and resource management
Interpark Agreement			
BIBE / Fort Davis National Historic Site (FODA) / Amistad National Recreation Area (AMIS) / Palo Alto Battlefield National Historic Park	Fire management	3/26/2019	Chief ranger
BIBE / Sequoia and Kings Canyon National Parks	Visitor and resource protection split position	Until vacated	Chief ranger

Title/Agency/ Organization	Purpose/Description	Expiration Date	Responsible Party
License Agreement			
US Climate Reference Network	Meteorological station	Indefinite	Chief ranger
Memorandums of Agreement			
USDI and USCBP	Boquillas Crossing Port of Entry	12/31/2014	
USDI, US Forest Service, USCBP	Environmental coordination and review of border security	12/31/2017	
Big Bend Natural History Association (BBNHA) and BIBE	Recreational vehicle site construction	Upon completion	Superintendent
Memorandums of Understanding			
BIBE / AMIS / FODA / Sul Ross State University	Collection of specimens	9/26/2014	Superintendent
USDI Office of Aviation Services (OAS) and Texas Department of Public Safety (TX DPS)	Procedures and guidelines to use to request and provide aircraft support when conducting joint operations	6/30/2015	USDI, OAS
Texas Parks and Wildlife Department (TPWD), USDI NPS BIBE, USFWS Region 2, USGS Central Region – Texas Water Science Center, and USGS Biological Resources Division – Ft. Collins Science Center	Promotion of collaborative working relationships to advance scientific basis for conservation actions and the effectiveness of their applications in the Big Bend region, to include Big Bend National Park; the Rio Grande Wild and Scenic River; Black Gap, Elephant Mountain, and Sierra Diablo Wildlife Management Areas; Balmorhea, Big Bend Ranch, Chinati Mountains, Davis Mountains, Franklin Mountains, Hueco Tanks, Monahans Sandhills, and Seminole Canyon State Parks; and the Devils River State Natural Area	10/2015	
NPS and TPWD	Cooperative management of national and state parks	7/11/2016	Intermountain Region
USDI NPS and the USFWS	Strengthen migratory bird conservation by identifying and implementing strategies intended to complement and support existing efforts, and facilitate new collaborative migratory bird conservation partnerships and comprehensive planning strategies for migratory birds	4/2020	Division Chief of NPS Biological Resource Management and Division Chief of USFWS Migratory Bird Management
Cooperation for Wilderness Conservation between the NPS, USFWS, and US Bureau of Land Management; SEMARNAT through the National Commission for Natural Protected Areas of the United Mexican States; and the Parks Canada Agency of the Government of Canada	Creation of voluntary framework for cooperation and coordination among participants concerning the commemoration, conservation, and preservation of wilderness areas	Indefinite (first signed Nov. 7, 2009)	

Title/Agency/ Organization	Purpose/Description	Expiration Date	Responsible Party
Memorandums of Understanding (continued)			
National Parks Conservation Association	Management/use of National Parks Conservation Association parcel of land along RIGR	Indefinite	
Rio Grande Institute	Development of interpretational tourism	Indefinite	
USDOI and Mexico Secretariat of Environment, Natural Resources and Fisheries	Declaration / letter of intent to work jointly in matters related to protection and conservation of the environment	Indefinite	
USDI, US Department of Homeland Security, and US Department of Agriculture	Cooperative national security and counterterrorism efforts	Indefinite	
USDI, US Border Patrol, and US Department of Justice	Aviation services for joint law enforcement	Indefinite	
Partnership Agreement			
International Mountain Biking Association and NPS	Establishes a formal framework for building on existing projects and expanding opportunities for mountain biking in national parks	2015	
Resource Education			
Forever Resorts and BBNHA	Donation contributions	12/31/2016	Chief of interpretation and partnerships
Right-of-Way			
Big Bend Telephone Company, Inc.	Operation and maintenance of telephone system lines		
Harte Ranch Road	BIBE ceded right-of-way		
Palomino Cell Road			
Rio Grande Electric Cooperative, Inc.	Operation and maintenance of electrical power distribution lines (also service contract)	3/19/2016	
Special Use Permits			
USDI BIBE / RIGR and US Postal Service	Operation of post office	12/31/2017	Superintendent
Special Use Permits (Filming, Spreading Ashes, Weddings)			Chief of interpretation and partnerships

Appendix D: Past and Ongoing Park Planning and Data Collection Efforts

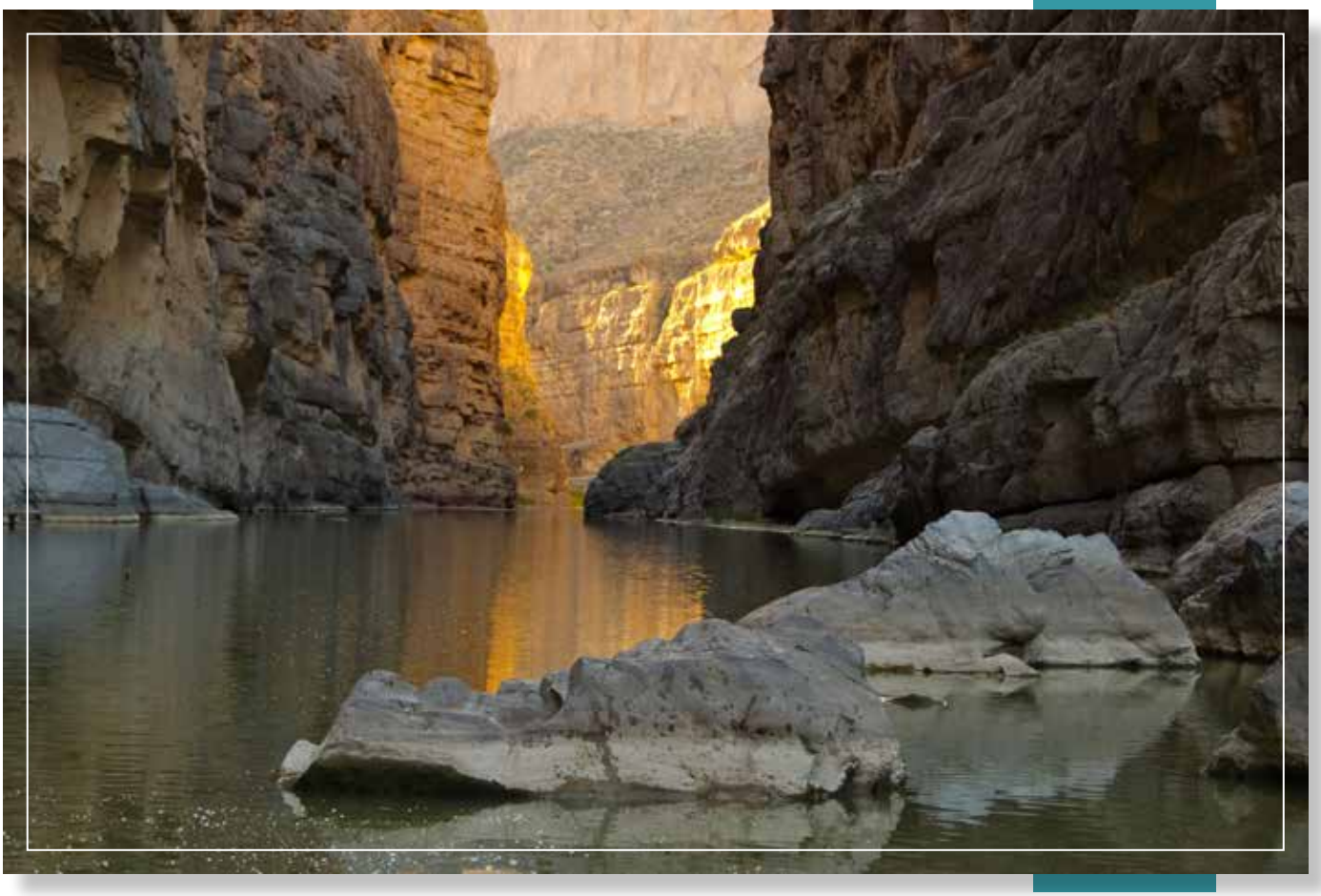
Data Collection Efforts

Chihuahuan Desert Network Vital Signs Monitoring Plan (2010), Natural Resource Report, National Park Service / Chihuahuan Desert Network / NRR – 2010/188. National Park Service, Chihuahuan Desert Network, Genesis Building, New Mexico State University, Las Cruces, New Mexico, 88003.

- Knowing the condition of natural resources in national parks is fundamental to the ability of the National Park Service to manage park resources "unimpaired for the enjoyment of future generations." To more fully meet its mission, the National Park Service has implemented a strategy, funded by the Natural Resource Challenge, to programmatically institutionalize natural resource inventory and monitoring.

Integrated Resource Management Applications

As of November 4, 2014, Rio Grande Wild and Scenic River has 172 entries (journal articles, published reports, unpublished reports, books, geospatial datasets, conference proceeding papers, aerial photographs, plans, notes, projects, dissertations, surveys, newsletter articles, vector datasets, and maps) that reference past and ongoing park planning and data collection efforts. Many of these resources are held in the Science and Resource Management Library, Panther Junction, Big Bend National Park, Texas.



Name	Type	Published
Chihuahuan Desert Network Vital Signs Monitoring Plan	Monitoring Plan	2010
Reestablishment of the Rio Grande Silvery Minnow into the Big Bend Stretch of Rio Grande Environmental Assessment	Planning	2007
Saltcedar Biological Control Environmental Assessment Big Bend National Park	Planning	2007
Comprehensive Interpretive Plan Big Bend National Park and Rio Grande Wild and Scenic River	Planning	2005
Endangered Big Bend Mosquitofish Habitat Enhancement Environmental Assessment	Planning	2005
Rio Grande Wild and Scenic River Final General Management Plan / Environmental Impact Statement	Planning	2004
Recreational River Use Management Plan Big Bend National Park	Planning	1997
Strategic Plan: Big Bend National Park, Rio Grande Wild and Scenic River **Restricted Access**	Planning	1997
Final General Management Plan / Development Concept Plan Rio Grande Wild and Scenic River	Planning	1981
Rio Grande Wild and Scenic River Statement for Management	Planning	1980
Final Environmental Statement Proposed Inclusion of the Rio Grande in the National Wild and Scenic Rivers System	Planning	1976
Air		
Air Quality Monitoring Protocol and Standard Operating Procedures for the Sonoran Desert, Southern Plains, and Chihuahuan Desert Networks	Monitoring Protocol	2011
Assessment of nitrogen deposition effects and empirical critical loads of nitrogen for ecoregions of the United States	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Acidification Effects from Atmospheric Sulfur and Nitrogen Deposition: Chihuahuan Desert Network	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Acidification Effects from Atmospheric Sulfur and Nitrogen Deposition: Main Report	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Nutrient Enrichment Effects from Atmospheric Nitrogen Deposition: Chihuahuan Desert Network	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Nutrient Enrichment Effects from Atmospheric Nitrogen Deposition: Main Report	Data	2011
Impacts of atmospheric nitrogen deposition and climate change on desert ecosystems. Big Bend National Park: Final Report	Data	2006
Big Bend Regional Aerosol and Visibility Observational Study Final Report	Data	2004
Ozone risk assessment for Chihuahuan Desert Network	Data	2004
Introduction to Visibility	Data	1999
Preliminary Review of Prescribed Burning Smoke Management Planning for Big Bend National Park	Data	1991

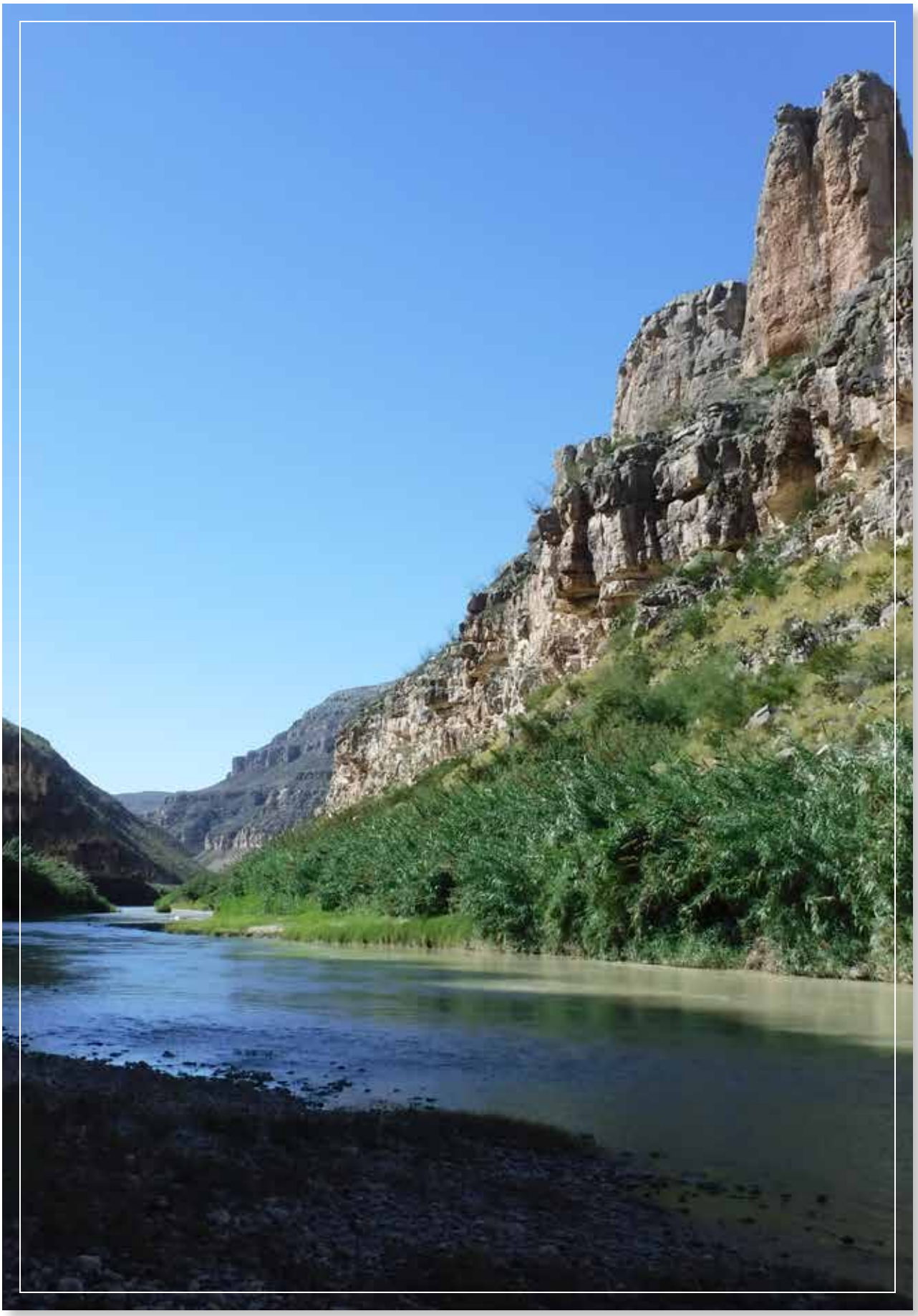
Name	Type	Published
Biota		
Landbird Monitoring in the Chihuahuan Desert Network, Annual Report(s) [2013, 2012, 2011, 2010]	Data	2014, 2013, 2012, 2011
Landbird Monitoring Protocol and Standard Operating Procedures for the Chihuahuan Desert, Northern Great Plains, Sonoran Desert, and Southern Plains Networks, Version 1.00	Monitoring Protocol	2013
Chihuahuan Desert Network Resource Brief Mammals of the Rio Grande Wild and Scenic River	Data	2013
Assemblages of Rodents in Riparian Forests along the Rio Grande in Big Bend National Park Current and Historic Insights on the Effects of Invasion by the Salt Cedars	Data	2012
Chihuahuan Desert National Parks Reptile and Amphibian Inventory	Data	2011
Mammals of the Rio Grande Wild and Scenic River Downstream of Big Bend National Park, 2008 Final Report	Data	2011
Baseline Assessment of Small Mammal Diversity in Saltcedar Biocontrol Release Area Big Bend National Park Final report: Fall 2009 and Spring 2010 **Restricted Access**	Data	2010
Chihuahuan Desert Network Park Monitoring Brief Natural Resource Monitoring at Big Bend National Park and Rio Grande Wild and Scenic River	Data	2010
Report of 2010 Research Activities Effect of Biological Control of Saltcedar (*Tamarix supp.*) on Athel (*Tamarix aphylla*) in Big Bend National Park	Data	2010
Riparian Bird Population Monitoring at Saltcedar Biological Control Sites Big Bend National Park	Data	2009
Mammals of the Rio Grande Wild and Scenic River downstream of Big Bend National Park	Data	2008
Mesocarnivore Richness and Relative Distribution Along Riparian Areas of Big Bend National Park	Data	2008
Peregrine Monitoring Field Data, Big Bend National Park and Rio Grande Wild and Scenic River	Data	2006
Selected Bibliography and Species List for Herpetofauna, Rio Grande Wild and Scenic River	Data	2006
Baseline Inventory of Amphibians in the Maderas del Carmen and Canon de Santa Elena Protected Areas, Mexico, and Big Bend National Park, Texas, USA, at the Beginning of the 21st Century	Data	2005
Status of Fish Communities in the Rio Grande, Big Bend National Park, Texas	Data	2005
Survey[s] of the Status of the Black-Capped Vireo in Big Bend National Park, Brewster County, Texas	Data	2004, 1997, 1996, 1992
Fishes of Big Bend National Park and the Rio Grande Wild and Scenic River Big Bend National Park Restricted Access	Data	2003
Amendment to the Full Study Plan for Vertebrate and Vascular Plant Inventory of the Chihuahuan Desert Network	Data	2002
Baseline Assessment of Instream and Riparian-Zone Biological Resources on the Rio Grande in and near Big Bend National Park	Data	2002
Status of American Peregrine Falcons in Big Bend National Park and the Rio Grande Wild and Scenic River	Data	2001, 2000

Name	Type	Published
Biota (contiued)		
Rare Plant and Animal Species on National Park Service Lands in Texas	Data	1998
List of Fishes Found in the Rio Grande and Tributary Streams in the Big Bend of Texas	Data	1993
Distribution of the Chihuahuan Desert Herpetofauna and its Relation to the Climate	Data	1982
Significance of Rio Grande Riparian Systems upon the Avifauna	Data	1977
Plant Ecology of the Riverbank, Lower Canyons of the Rio Grande	Data	1976
Climate and Weather		
Climate Change Resource Brief Recent Climate Change Exposure of Rio Grande Wild and Scenic River	Data	2014
Enhanced Monitoring to Better Address Rapid Climate Change in Southwest Desert Parks: A Multi-Network Strategy	Monitoring Strategy	2011
Weather and Climate Inventory, National Park Service: Chihuahuan Desert Network	Data	2007
Cultural Resources		
Big Bend National Park: History and Archeology	Data	2008
Intermountain Region New Deal Resources Research Findings for Big Bend National Park	Data	2008
Landscape of Ghosts, River of Dreams: A History of Big Bend National Park	Data	2002
Castolon Historic Structures Report Amendment Big Bend National Park **Restricted Access**	Data	2000
Presidios of the Big Bend Area	Data	1990
Archeological Survey of the Chisos Basin Trail Reconstruction Project **Archeology Access**	Data	1989
The Big Bend: A History of the Last Texas Frontier	Data	1975
Longhorns of the Big Bend: A Special Report on the Early Cattle Industry of the Big Bend Country of Texas	Data	1962
Nonnative and Invasive Species		
Exotic Plant Monitoring in the Chihuahuan Desert Network: 2011 Annual Report	Data	2012
Development of Invasive Plant Species Monitoring Protocol for Park Units in the Chihuahuan Desert Network, National Park Service. Progress Report (October 2008–August 2009)	Monitoring Protocol	2009
Home Range and Movement of Nutria (*Myocastor coypus*) along A Stretch of the Rio Grande River, Big Bend National Park, Texas **Restricted Access**	Data	2006
Habitat Use and Food Habits of Nutria (*Myocastor Coypus*) in the Rio Grande Village Area of Big Bend National Park **Restricted Access**	Data	2005
Exotic Plant Management Team Annual Report	Data	2003, 2002

Name	Type	Published
Geology		
Image Mosaic Rio Grande Wild and Scenic River	Digital Imagery	2008
Geologic Map of Texas	Map	1992
Rio Grande Upper Dams Investigations Big Bend District Index to Geologic Maps	Map	1955
Rio Grande Upper Dams Investigations Big Bend District Area Geologic Map: Fresno Creek to Talleys Ranch Reach, Reagan Canyon to San Francisco Creek, San Francisco Creek to Indian Creek Reach, Talleys Ranch to Reagan Canyon Reach	Map	1951
Rio Grande Upper Dams Investigations Big Bend District Area Geologic Map: Indian Creek to Del Rio Reach	Maps	1950, 1951
Landscape Scale		
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Acidification Effects from Atmospheric Sulfur and Nitrogen Deposition: Chihuahuan Desert Network	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Acidification Effects from Atmospheric Sulfur and Nitrogen Deposition: Main Report	Data	2011
Evaluation of the Sensitivity of Inventory and Monitoring National Parks to Nutrient Enrichment Effects from Atmospheric Nitrogen Deposition: Chihuahuan Desert Network	Data	2011
Analysis and Summary of Boquillas Canyon Monitoring Data Big Bend National Park **Restricted Access**	Data	2009
Inventory of Big Bend National Park and Rio Grande Wild and Scenic River Park Brief	Data	2009
Historic Reconstruction of the Ecology of the Rio Grande / Rio Bravo Channel and Floodplain in the Chihuahuan Desert Report Prepared for Chihuahuan Desert Program, World Wildlife Fund	Data	2000
Park History and Management		
Compendium: Big Bend National Park, Rio Grande Wild and Scenic River	Data	2013
Rio Grande Wild and Scenic River Outstandingly Remarkable Values Newsletter	Planning	2012
Conservation Assessment, Commission for Environmental Cooperation	Data	2013
Regional Perspectives and Opportunities for Feral Hog Management in Texas	Manage-ment Strategy	2005
Protecting Biodiversity in the Chihuahuan Desert Transboundary Corridor: A Strategy for Binational Collaborative Management	Data	2002
Annual Performance Plan Fiscal Year 1999 Big Bend National Park, Rio Grande Wild and Scenic River	Data	1999
An Administrative History of the Rio Grande Wild and Scenic River with Focus on Major Concerns and Public Comment	Data	1988
Rio Grande Wild and Scenic River Study (final)	Data	1975
Report on the Conference with Mexican Representatives Concerning the Proposed Big Bend	Data	1935

Name	Type	Published
Paleontology		
Paleontological Resource Inventory and Monitoring: Chihuahuan Desert Network	Data	2007
Fossil Unionacean Bivalves from Three Tributaries of the Rio Grande	Data	1982
Research History		
Data Mining at Big Bend National Park 2008	Data	2008
Biology of the Rio Grande Border Region: A Bibliography	Data	1997
Bibliography, Summary, and Recommendations for Scientific Research at Big Bend	Data	1985
Socioeconomics		
Alternatives for the Use of the Natural Resources of the Region between Santa Elena and Boquillas	Data	1994
Vegetation		
Chihuahuan Desert Network: Plant Responses to Climate Change	Data	2013
Terrestrial Vegetation and Soils Monitoring Protocol and Standard Operating Procedures: Sonoran Desert and Chihuahuan Desert Networks, Version 1.1	Monitoring Protocol	2012
Gradsect and Field Sampling Plan for Big Bend National Park / Rio Grande National Wild and Scenic River	Data	2011
Vegetation Classification List Update for Big Bend National Park and Rio Grande National Wild and Scenic River	Data	2011
Vegetation Inventory Study Plan for Big Bend National Park and Rio Grande Wild and Scenic River	Data	2010
Vegetation Inventory Project for Rio Grande Wild and Scenic River – in progress	Data	2009
Assessment of Top Down and Bottom Up Controls on Fire Regimes and Vegetation Abundance and Distribution Patterns in the Chihuahuan Desert Borderlands: A Hierarchical Approach	Data	2006
Visitor Use		
Big Bend Visitor Use Resource Brief	Data	2010
Big Bend National Park, Rio Grande Wild and Scenic River, Texas Santa Elena Canyon – Visitor Use	Data	1996
Visitor Services Project: Big Bend National Park	Data	1993
Public Use and Counting Instructions for Rio Grande Wild and Scenic River	Data Protocol	1989

Name	Type	Published
Water		
Hydrographic and Impairment Statistics Database: Rio Grande Wild and Scenic River	Data	2013
Environmental Flows Recommendations Report. Final Submission to the Environmental Flows Advisory Group, Rio Grande Basin and Bay Area Stakeholders Committee and Texas Commission on Environmental Quality	Data	2012
Streamflow Gains and Losses and Selected Water-Quality Observations in Five Subreaches of the Rio Grande / Rio Bravo del Norte from near Presidio to Langtry, Texas, Big Bend Area, United States and Mexico, 2006: US Geological Survey Scientific Investigations Report 2012–5125	Data	2012
Historical Perspective of Surface Water and Groundwater Resources in the Chihuahuan Desert Network, National Park Service	Data	2009
Baseline Water Quality Inventory, Rio Grande Wild and Scenic River	Data	2008
Assessing the Effects of Historical Mining in the Rio Grande / Rio Bravo Watershed, Big Bend National Park Area, Texas and Mexico	Data	2006
Chihuahuan Desert Network Water Resource Information and Assessment Report Phase II	Data	2006
Water-Resources Vital Sign Monitoring in the National Park Service Chihuahuan Desert Inventory and Monitoring Network	Data	2006
Identification of Issues, Monitoring Objectives, and Approach for Development of a Water-Quality Assessment Plan for the Rio Grande in Big Bend National Park, Texas: Administrative Report.	Data	2001
United States Department of the Interior US-Mexico Border Field Coordinating Committee Water-Resources Issues in the Rio Grande – Rio Conchos to Amistad Reservoir Subarea	Data	1998
Binational Study Regarding the Presence of Toxic Substances in the Rio Grande / Rio Bravo and its Tributaries along the Boundary Portion between the United States and Mexico	Data	1994
Hydrogeology, Geochemistry, and Quality of Water of the Basin and Oak Springs Areas of the Chisos Mountains	Data	1993
Big Bend National Park Water Resources Scoping Report	Data	1992
Reconnaissance Investigation of the Ground-Water Resources of the Upper Rio Grande Basin, Texas. Texas Water Commission Bulletin 6502	Data	1965



Intermountain Region Foundation Document Recommendation
Rio Grande Wild and Scenic River
April 2016

This Foundation Document has been prepared as a collaborative effort between park and regional staff and is recommended for approval by the Intermountain Regional Director.

Cindy Ott-Jones 4/20/2016

RECOMMENDED
Cindy Ott-Jones, Superintendent, Rio Grande Wild and Scenic River **Date**

Sue E. Masica 5/25/16

APPROVED
Sue E. Masica, Regional Director, Intermountain Region **Date**

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

RIGR 192/129849
May 2016

Foundation Document • Rio Grande Wild and Scenic River

NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR