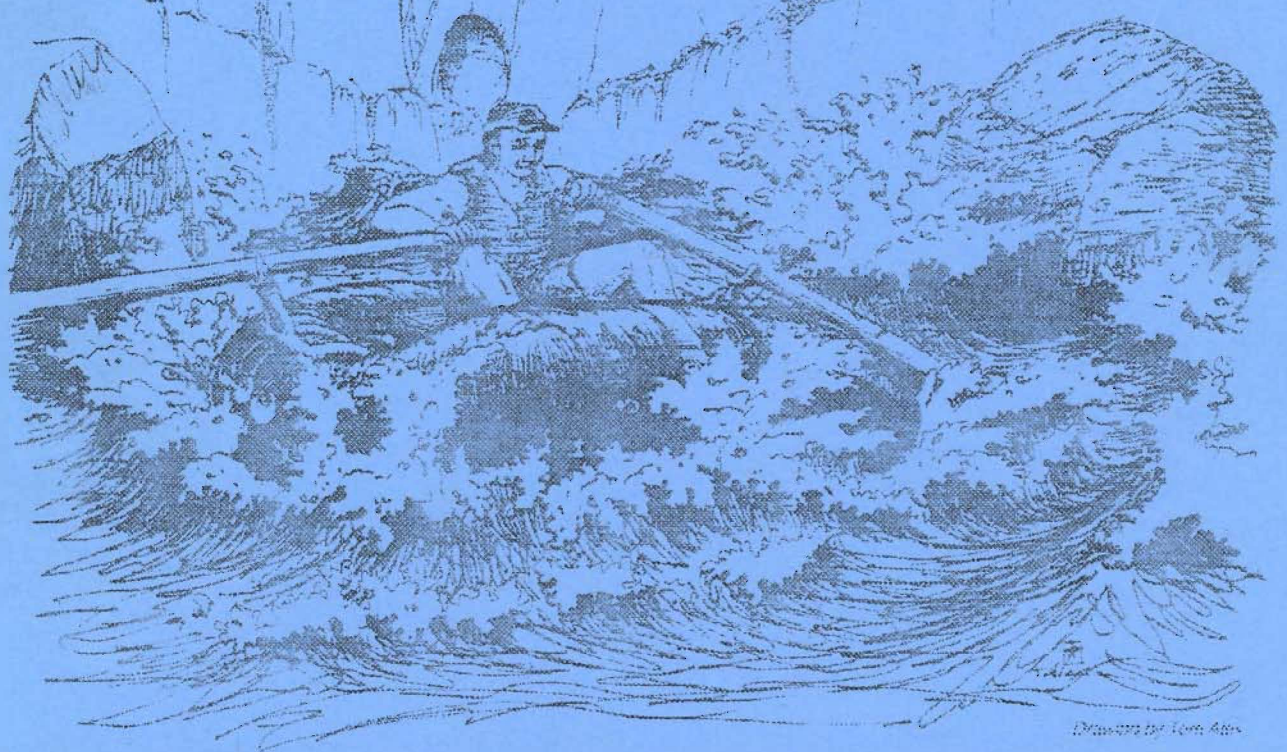


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# RECREATIONAL RIVER USE MANAGEMENT PLAN BIG BEND NATIONAL PARK

March 1997



*Illustration by Tom Allen*



*Recreational River Use  
Management Plan*

*Big Bend National Park  
Texas*

*1997  
National Park Service  
U.S. Department of the Interior*

*Recreational River Use Management Plan*

*Big Bend National Park*

1997

*Prepared by:*

**BIG BEND NATIONAL PARK**

*Approved by:*

A handwritten signature in black ink that reads "Jose A. Cisneros". The signature is written in a cursive style with a long horizontal stroke at the beginning.

**Jose A. Cisneros, Superintendent,  
Big Bend National Park**

3/7/97  
Date

## **Executive Summary**

*The revised Backcountry Management Plan, which was approved in 1995, prescribes the development of a river use management plan. This Recreational River Use Management Plan (Plan) serves as an amendment to the Backcountry Management Plan and meets its objectives. The Plan describes actions that will govern specific recreational use issues of zoning, motor use, fishing, access, human waste, and recreational use limits. Concerns other than recreational use of the river, such as trespass livestock, air and water quality, water quantity, etc., are addressed in other documents.*

**Zoning** - *The Backcountry Management Plan provides for three distinct social experience opportunities and assigns all backcountry areas into Threshold, Primitive, and Wild management zones. The Plan formalizes historic patterns of use and defines management strategies for each zone to perpetuate distinct social experience opportunities. Threshold zone characteristics include higher use levels and greater user density. Because more people may use segments of the threshold zone, more encounters with other groups and fewer opportunities for solitude may occur. Primitive zone characteristics provide for less crowding and lower use densities than the threshold zone. Primitive zone users encounter fewer other groups and experience more solitude than users of the threshold zone. Wild zone characteristics include the expectation of encountering few or no other parties. River users experience few human influences. The wild zone has the lowest density of users and the greatest opportunity for solitude.*

**Motor Use** - *Although both motorized and non-motorized boating occurs within the Park, statistics show that a small percentage of permittees use motorized watercraft. In the threshold zone, including Santa Elena Canyon, electric motor use is allowed in all river segments throughout the year. Santa Elena Canyon, however, is closed to all other motorized watercraft. The between-canyon threshold zone river segments are open to use of up to 60 horsepower motors year-round. The primitive zone, which includes Mariscal Canyon, is closed to all motorized watercraft except during October. Up to 60 horsepower motors may be used in the primitive zone during October. Motorized watercraft may not be used in the wild zone, which includes Boquillas Canyon, at any time. Exclusion of motors from the wild zone provides an experience characterized by solitude and wilderness.*

**Fishing** - *The use of pole and line, rod and reel, hand line, trot line, and throw line is allowed, but jug fishing is not. State fishing regulations apply, but a State fishing license is not required. A free National Park Service (Service) fishing permit, available from visitor contact stations, is required; one permit per party per trip. Twenty-five fish per person per day or in possession is the*

*catch limit. Fish caught in the park may be used only for personal consumption. Terrestrial and aquatic invertebrates are protected. No collecting of worms, larval insects, or other non-fish life forms is allowed. No live bait may be used, except for minnows obtained from the Rio Grande.*

***Access*** - *The Service will provide road access upstream and downstream of each major canyon. Access to the river is provided upstream of Santa Elena Canyon at Lajitas and downstream of Boquillas Canyon at Heath Canyon. Both locations are outside park boundaries; both are privately owned. At **developed** access points, vehicles have access to the river's edge. The Service provides ramps to the river at Santa Elena Take-out and Rio Grande Village. At **primitive** access points, access is provided to the riverbank, not the river's edge. Primitive access is provided at Talley, Solis, and Cottonwood Campground. **Undeveloped** access points exist at all other areas where the river is accessible to carry-in boating. These areas are considered designated launch points.*

***Human Waste*** - *All human waste must be carried out except for private parties using the river between the Santa Elena Take-out and Talley and between Solis and the entrance to Boquillas Canyon and except for kayak-only or single-canoe trips.*

***Recreational Use Limits*** - *Management policies direct the Service to prevent unacceptable impacts on the resources or adverse effects on visitor enjoyment. The number of launches per day and the party size per launch is limited. When establishing recreational use limits, the Service considered the historic variety of experiences, current use, and the physical characteristics of the river segments. Limits are placed at somewhat higher levels than the use during the early- to mid-1990's. These limits perpetuate the variety of historic visitor experiences and prevent problems from occurring in the future.*

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## **I. Preface**

The Backcountry Management Plan, which received National Environmental Policy Act (NEPA) review and which was approved in 1995, prescribes the development of a river use management plan. This Recreational River Use Management Plan (Plan) serves as an amendment to the Backcountry Management Plan and meets its objectives. This Plan will be the primary reference for management of recreational use on the Rio Grande within Big Bend National Park (Park). This Plan will be reviewed every five years for revision as necessary.

Chapters II through VII provide goals and objectives of the Plan and a general overview of the Rio Grande corridor, including a description of the environmental setting and current recreational use trends.

Chapter VIII and IX review the planning process for this document and outline specific issues that require management decisions. The six issues addressed in this Plan include zoning, motor use, fishing, access, human waste, and recreational use limits. Chapter IX also highlights the current situation. Issues beyond the scope of this document include trespass livestock, commercial hauling, smuggling, air and water quality, water quantity, cultural resource protection, etc. Laws, regulations, and policies shape various external influences and fundamental practices. Other Park management plans address these issues.

Recreational use policies and regulations are detailed in chapter X. These actions will govern the issues of zoning, motor use, fishing, access, human waste, and recreational use limits.

Under NEPA, significant management actions, such as the six issues addressed by this Plan, must be considered in terms of their benefits, their costs, and their impacts upon a variety of resources and values. An environmental assessment (EA) fulfills this requirement. The EA also considers reasonable alternatives to the actions, including the No-Action alternative. The No-Action alternative leaves existing conditions, policies, or actions in place. A copy of the EA is available upon request.

Appendix 1 contains definitions of terms used in this Plan.

## **II. Introduction**

The Rio Grande originates from springs and snow melt high in the southern Rocky Mountains of Colorado. As it flows southward, its waters are diverted for flood control, irrigation, power generation, recreation, and municipal uses in New Mexico and Texas. By the time the Rio Grande leaves El Paso, so much water has been diverted that the riverbed between El Paso and Presidio is often dry. Depending upon annual precipitation, 69 to 86 percent of the water in the Rio Grande downstream from Presidio flows from the Mexican Rio Conchos.

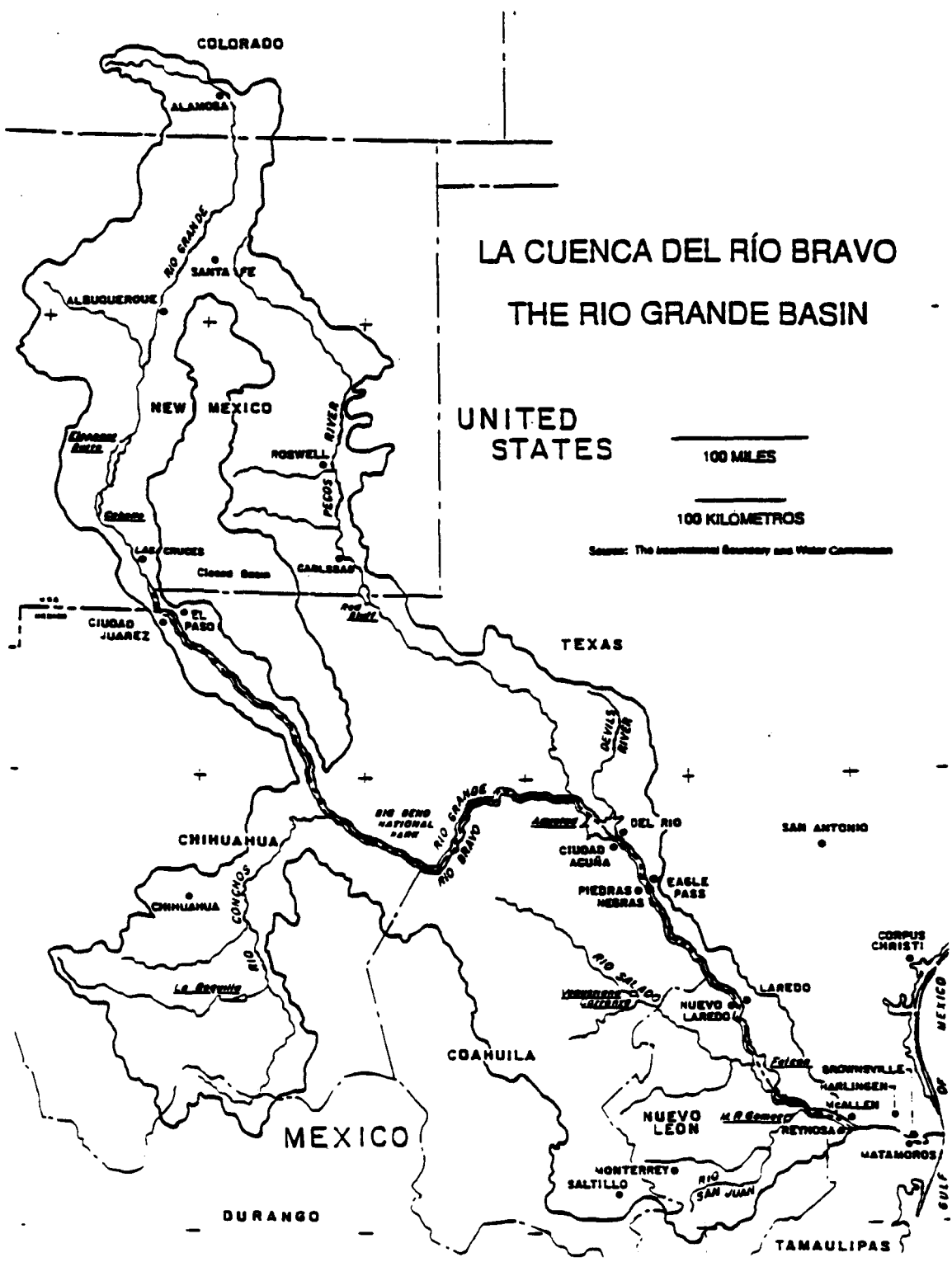
The Rio Conchos originates in the Sierra Madre of western Chihuahua, Mexico and joins the Rio Grande at Ojinaga, Chihuahua and Presidio, Texas. A smaller percentage of the Rio Conchos' water is currently diverted for agricultural and municipal purposes than from the Rio Grande.

For more than 1,000 miles, the Rio Grande forms the international boundary between Mexico and the United States; Big Bend National Park administers approximately one-quarter of that boundary. Within the 118 twisting miles that also define the Park's southern boundary, the river's southeasterly flow changes abruptly to the northeast and forms the "big bend" of the Rio Grande.

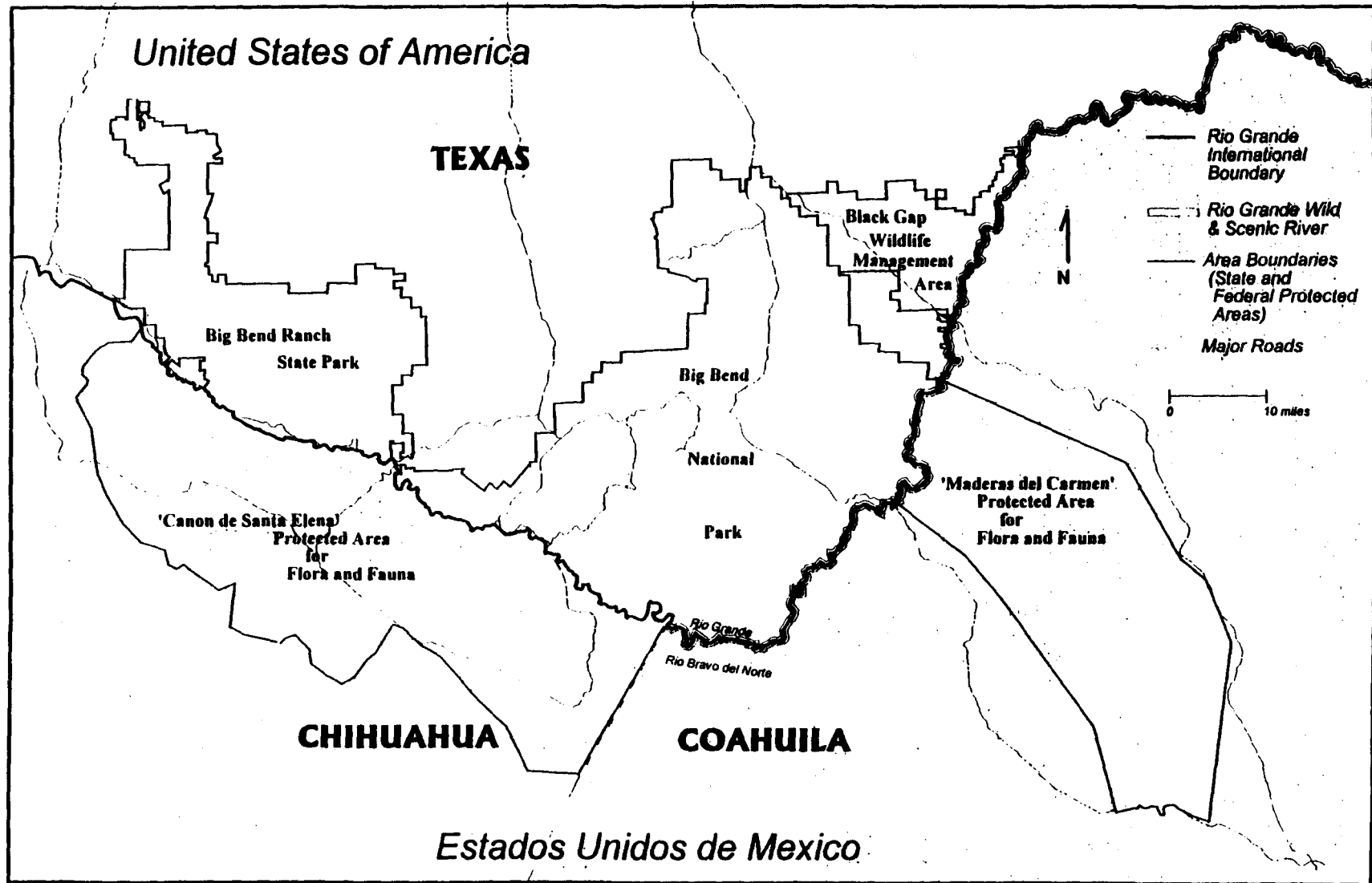
Because the Rio Grande serves as an international boundary, the Park faces unusual constraints when administering and enforcing park rules, regulations, and policies. The Park has jurisdiction only to the center of the deepest river channel; the rest of the river lies within the Republic of Mexico. South of the border, people call the Rio Grande by its Mexican name, Rio Bravo del Norte.

The Park encompasses more than 800,000 acres in the southern tip of Brewster County, Texas. It has national significance as the largest protected area of Chihuahuan Desert topography and ecology in the United States. Few areas exceed the Park's value for the protection and study of geologic and paleontologic resources. Cretaceous and Tertiary fossil organisms exist in variety and abundance. Archeologists have discovered artifacts estimated to be 9,000 years old, and historic buildings and landscapes offer graphic illustration of life along the international border at the turn of the century.

South of the river lie the Mexican states of Chihuahua and Coahuila and the new Protected Areas for Flora and Fauna, which are comprised of the regions known as the Maderas del Carmen and the Cañon de Santa Elena. The Black Gap Wildlife Management Area, administered by Texas Parks and Wildlife Department (TPWD), lies adjacent to much of the eastern park boundary. The Southern Investors Service



Map 1. Regional Map depicting the Big Bend's location in relation to Texas, New Mexico, Colorado, and the drainages of the Rio Grande, Rio Conchos, and Pecos River.



4

Big Bend National Park Area Map

Company (Lajitas) and Terlingua Ranch developments border the park on the west. Big Bend Ranch State Park, also administered by TPWD, lies farther west. Private ranch lands comprise the Park's remaining boundary.

In 1978, Congress designated a 196-mile portion of the Rio Grande from the Chihuahua/Coahuila state line in Mexico to the Terrell/Val Verde county line in Texas as part of the National Wild and Scenic Rivers System. The upper 69-mile section of this 196-mile corridor lies within the Park. The Wild and Scenic Rivers Act of 1968 directs that designated rivers "...be preserved in free-flowing condition, and that they and their immediate environments be protected for the benefit and enjoyment of present and future generations." The National Park Service (Service) administers this 196-mile section as the Rio Grande Wild and Scenic River.

In 1976, the United Nations Education, Science, and Conservation Organization's Man and the Biosphere (MAB) Program recognized the Park. Because of its international significance, the Park was designated an International Biosphere Reserve.

The Rio Grande corridor and its associated natural systems, cultural treasures, and recreational opportunities comprise prime visitor attractions at the Park. Because of the public's interest in the Park and in river management, the Service is striving to ensure that the public receives information and is included in efforts to protect and manage resources.

This Plan addresses issues associated with the 118 Rio Grande river miles within the national park, including the 69-mile section designated as wild and scenic. The portion of the Rio Grande Wild and Scenic River downstream from the Park (the "Lower Canyons") exhibits distinct issues and will be addressed in a future General Management Plan specific to that section.

### **III. Goals and Objectives of the Plan**

#### **A. Goals**

- provide a long-term plan for recreational river use activities within the Park
- preserve environmental processes and the natural and cultural resources of the river corridor by avoiding, mitigating, or eliminating unacceptable environmental impacts resulting from recreational river uses
- perpetuate a diversity of quality river experiences while maintaining desired visitor expectations

#### **B. Objectives**

- provide a variety of sociological experiences for river users
- distribute river use between various user groups
- provide access to the river corridor for recreational users of most ages, abilities, and physical limitations
- establish motorized watercraft guidelines
- define procedures to handle human waste generated by recreational users
- designate parameters for fishing within the river corridor
- initiate a public information and interpretation program to educate recreational river users about the Plan
- base recreational river use management policies upon sound data and encourage continued inventory and monitoring of natural, cultural, and recreational resources

## **IV. Legislation**

### **A. Enabling Legislation**

An Act of the 74th Congress (49 Stat. 393) authorized the establishment of the Park on June 20, 1935, and provided that

"lands...as necessary for recreational park purposes...are hereby established, dedicated, and set apart as a public park for the benefit and enjoyment of the people."

The Act stipulated that provisions of the Service's Organic Act of August 25, 1916, (39 Stat. 535), as amended, apply

"...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

All planning, development, and management decisions and actions must conform to provisions of the Park's enabling legislation, the Service's Organic Act, and legislation relating to cession of exclusive jurisdiction by the State of Texas to the United States (Deed of Cession signed by Governor Stevenson on December 30, 1943, and Deed of Cession signed by Governor Clements on September 22, 1980).

The amendment of November 10, 1978, (P.L. 95-625) to the National Wild and Scenic Rivers System Act (P.L. 90-542) established the Rio Grande Wild and Scenic River to include:

"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 International Boundary and Water Commission officially revised these mileages to 853.2 and 657.5. The revised mileages are used in this Plan.



## **B. Other Legislation**

Management decisions and actions must also comply with the following:

- Natural Environmental Policy Act of 1969
- Geothermal Steam Act of 1970
- General Authorities Act (16 USC 181 1c) of 1970
- Clean Air Act of 1972 as amended
- Clean Water Act of 1972 as amended
- Endangered Species Act of 1973 as amended
- Resource Conservation and Recovery Act of 1978
- Redwood National Park Expansion Act (PL 95-250, 92 Stat. 163) 1978
- Executive Order 11988, "Floodplain Management"
- Executive Order 11990, "Protection of Wetlands" of 1978
- Antiquities Act of 1906
- Historic Sites Act of 1935
- National Historic Preservation Act of 1966 and its compliance procedures, Executive Order 11593 of 1971
- Archeological and Historic Data Preservation Act of 1974
- Archeological Resources Protection Act of 1979 as amended
- Native American Graves Protection and Repatriation Act of 1990
- Americans with Disabilities Act of 1992

## **C. Other Considerations**

- Code of Federal Regulations, Part 36
- Big Bend National Park Compendium, 1997
- Big Bend National Park Statement for Management, 1992
- National Park Service Management Policies (1988)
- Big Bend National Park General Management Plan (GMP), 1980
- Wilderness Act of 1964\*

***\*While the river does not lie within proposed wilderness, some portions of the floodplain do. The proposed wilderness boundary extends to the water's edge in Santa Elena, Mariscal, and Boquillas canyons.***

## **V. General Environment and Social Setting**

### **A. General Environmental Setting**

The Park exhibits dramatic contrasts; its climate may be characterized as one of extremes. Dry, hot late spring and early summer days often exceed 100 degrees in the lower elevations. Winters are normally mild throughout the Park, but sub-freezing temperatures occasionally occur.

Because of the range in altitude from approximately 1,800 feet along the river to 7,800 feet in the Chisos Mountains, a wide variation in available moisture and in temperature exists throughout the park. These variations contribute to an exceptional diversity in plant and animal habitats.

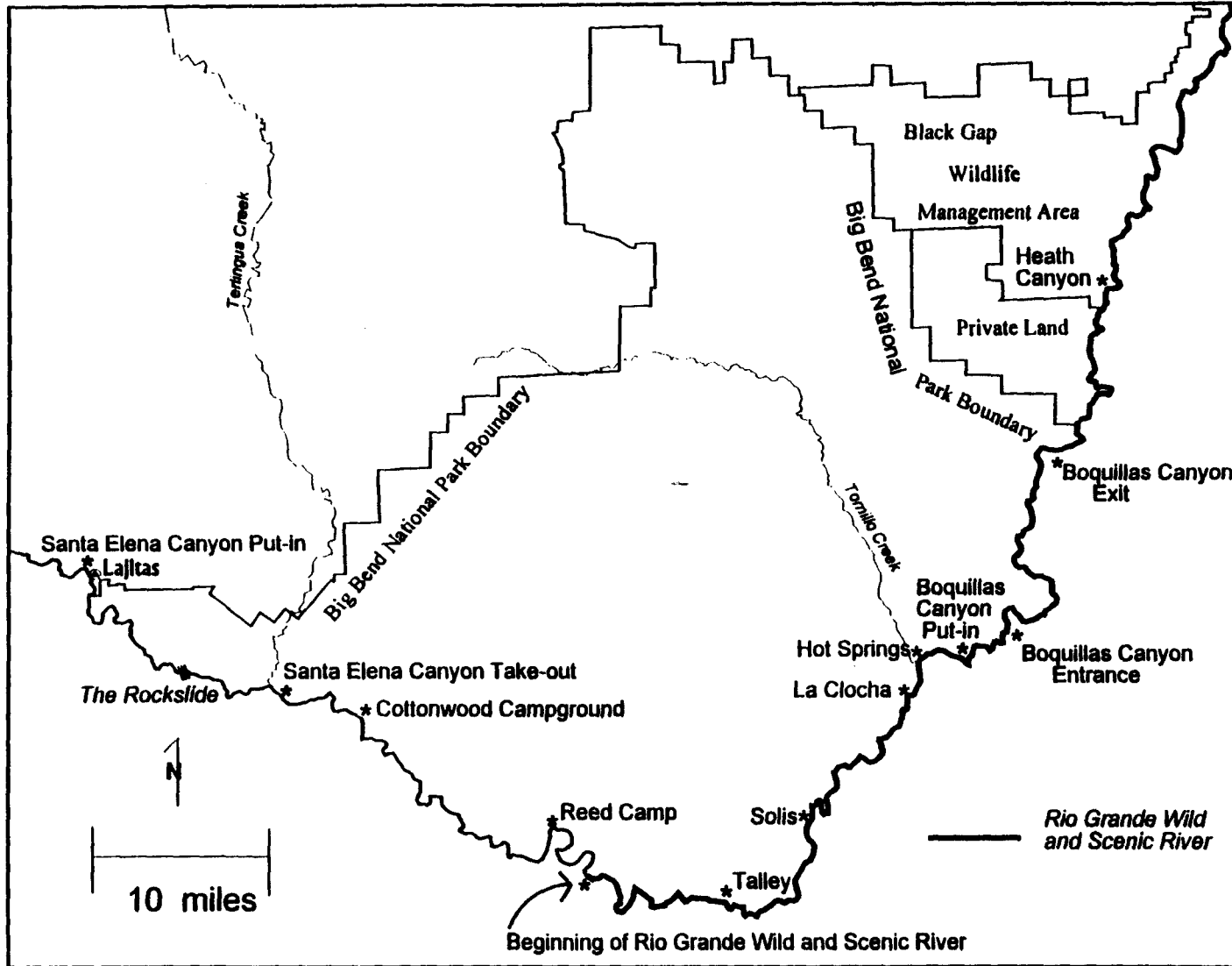
### **B. The River**

1. **The Canyons** - The 118 river miles that form the southern park boundary include the spectacular canyons of Santa Elena, Mariscal, and Boquillas. The Rio Grande, meandering through this portion of the Chihuahuan Desert, has cut deep canyons with nearly vertical walls through three uplifts comprised primarily of limestone.

Creation of the Rio Grande canyons occurred relatively recently in geologic terms. A change in the climate some 3 million years ago at the beginning of the Ice Age affected the face of the landscape.

Some geologists speculate that Mexico's Rio Conchos formed the canyons by eroding away many layers of rock and cutting into the harder, faulted rocks that now comprise the canyons. Evidence indicates that the ancestral Rio Grande flowed into a basin in Mexico southwest of present-day El Paso. About 60,000 years ago the Rio Conchos tributary captured the main branch of the Rio Grande and redirected its flow to the Gulf of Mexico. The much enlarged river, despite its greater power, could flow nowhere but in the already existing channels. The greater erosive power of the combined rivers accelerated the canyon cutting process and resulted in the magnificent canyons of the present Rio Grande. (National Park Service, 1983)

a. **Santa Elena Canyon** - The Rio Grande severs the Sierra Ponce/Mesa de Anguila to form Santa Elena Canyon, the westernmost of the Park's canyons. For seven miles the river



The Rio Grande through Big Bend National Park

flows between sheer limestone walls that rise as much as 1,500 feet. The Rock Slide rapid, located within two miles of the canyon entrance, challenges rafters and canoeists and at certain water levels becomes a Class IV rapid. The 20-mile Santa Elena Canyon trip begins outside the Park on private property in Lajitas and ends within the Park one mile downstream from the mouth of Santa Elena Canyon.

b. Mariscal Canyon - The Rio Grande begins its "big bend" to the northeast within the walls of Mariscal Canyon. Here the river cuts through Mariscal Mountain to form a 6-mile long canyon with walls rising more than 1,400 feet. Two rapids generally are designated as Class II or III. The 10-mile Mariscal Canyon trip begins at Talley and ends at Solis Landing.

c. Boquillas Canyon - The river leaves the Park through Boquillas Canyon, the longest canyon trip within the Park. In places, walls rise 1,200 feet above the river as it slices through the Sierra del Carmen. The 33-mile Boquillas Canyon trip begins at Rio Grande Village in the Park and ends at Heath Canyon outside Park boundaries. Rapids rate no higher than Class II.

2. **Between-Canyons** - Throughout the open desert areas, the highly productive Rio Grande riparian zone includes various plant and animal species and significant cultural resources. This vegetative belt extends into the desert along creeks and arroyos. The river zone remains agriculturally important to Mexican and Texas neighbors adjacent to the Park. This section offers spectacular vistas of the Chisos Mountains, the Sierra Quemada, Sierra del Carmen, Sierra Ponce, and other mountains in the Park and Mexico. It also offers great potential for solitude in an undeveloped setting.

### **C. Social Setting**

The Park lies in south Brewster County, one of the most sparsely populated areas of the country. Brewster County consists of 6,204 square miles and has a population of approximately 13,000 people. Most of the population resides in two towns: Marathon and Alpine, which lie 69 and 100 miles, respectively, to the north and northwest of Park headquarters. The western gateway communities of Study Butte, Terlingua, and Lajitas have experienced growth in recent years but still lag behind Marathon and Alpine in terms of population.

Bus and rail lines serve Alpine, but bus lines provide the only commercial transportation to Marathon. The nearest major airport with regularly scheduled commercial flights is the Midland-Odessa Airport, 220 miles from park headquarters. A small commuter airline provides service to Alpine, 100 miles from Park headquarters.

Visitation to the Park grew steadily during the early 1990's. Two Government shut-downs and low water in the Rio Grande combined to cause dramatic drops in visitation in 1995 and 1996. The river zone has become a primary recreational area for visitors attracted to its scenic and recreational qualities. Approximately three percent of park visitors participate in either a commercial or private river trip. (Figure 1)

	1992	1993	1994	1995	1996
Number of park visitors	296,899	330,271	332,781	297,824	277,886
Number of river users	10,548	10,040	12,011	9,681	5,234

Figure 1. Number of River Users Compared to the Number of Park Visitors.

The Mexican states of Chihuahua and Coahuila lie immediately south of the Park. Farming and ranching adjacent to the river sustain the small Mexican communities of Paso Lajitas, Santa Elena, San Vicente, Boquillas, and La Linda.

Current users of the Rio Grande corridor include private and commercial recreational boaters and fishermen, non-boating riverside campers, day use recreationists, and neighboring livestock and farming operations.

#### **D. Natural Resources**

1. **Wildlife** - The riparian corridor, where vegetative growth and an ample water supply provide a more diverse and hospitable environment than the surrounding desert, attracts many wildlife species.

Numerous avian migrants use the river corridor as an important resting point along their spring and fall migration routes. While many bird species only pass through the area, common resident species seen or heard along the river include the yellow-breasted chat, black phoebe, white-wing dove, canyon wren, and roadrunner. The endangered

peregrine falcon nests high on canyon cliffs. Ravens, turkey vultures, and a variety of raptors commonly soar overhead.

Because of human and livestock influences, larger mammals seldom inhabit the river corridor. Collared peccaries, mule deer, bobcat, and mountain lion make occasional use of the between-canyon regions. Small mammals are more abundant; striped skunks, ringtails, and rodents commonly occur. Rare visitors include coatimundi; observations of black bears are increasing.

**2. Aquatic Habitat** - A diverse array of water sources contribute to the aquatic environments of the Rio Grande corridor. In addition to the river, tributary sources include permanent streams or creeks and warm and cool springs. Tinajas, stone basins filled by rainfall runoff, may be found in side canyons.

The cumulative effects of human activity over the years have degraded the Rio Grande aquatic environment. Heavy silt loads, exacerbated by livestock grazing the sparse desert vegetation, impair productivity of fish and invertebrate eggs laid upon the river substrate.

Upstream impoundments and diversions have altered natural river flow quantities and patterns. Downstream dams have caused sturgeon and freshwater eel, both dependent upon migration to the sea, to vanish from the Big Bend area.

Fertilizers and pesticides from upstream agricultural activities in both the United States and Mexico and sewage from upstream towns and villages cause rapid algal growth. Algae consume much of the dissolved oxygen needed to support other aquatic life forms.

Forty-six known species of fish inhabit the Big Bend area; 34 are native, and 12 have been introduced. In addition to the endangered Gambusia gaugei, eight others are listed on either Federal or state threatened or endangered lists. Six have been extirpated, primarily due to the effects of dams, habitat modification, and introduced competitor species.

The Park has little information about the aquatic invertebrates of the river corridor. Basic inventories have identified a broad spectrum of insect larvae and several mollusk species, including some which could be greatly affected by further degradation of water quality. The Park currently has no monitoring programs in place to detect changes in aquatic invertebrate populations.

**3. Riparian Habitat** - The Rio Grande riparian zone varies from small intra-canyon banks to floodplains more than one-half mile wide. It supports a diverse habitat heavily influenced by flooding, soil transport, and increased moisture availability.

Introduced, but widespread, bermuda grass dominates many sections of riverbank. Throughout the river corridor, extensive stands of introduced giant reed and native common reed line the river bank. Mesquite and saltbush send roots deep into the soil for moisture and are characteristic of drier areas of the floodplain.

Early biological surveys indicate that lance-leaf cottonwoods and willows were common, but since European colonization of the area, their seedlings rarely survived grazing effects. Prior to the Park's establishment, farmers tilled and cleared most larger sections of floodplain and grazed livestock in the river corridor. Trees, such as huisache and willow, still commonly occur near the river.

Non-native tamarisk competes more successfully for water and nutrients than native species. Other opportunistic species, such as mesquite and creosote bush, continue to dominate many acres.

Ecologists have long recognized the Rio Grande riparian habitat as the most heavily damaged ecological zone of the Park. Introduced species and the continued effects of trespass livestock are primarily responsible for its unnatural condition. Grazing denudes grasses and shrubs; trampling destroys vegetation and allows soil erosion; and fecal waste contaminates water sources. Non-native species out-compete many native species and alter the nature of river banks.

In spite of the many alterations that human influences have created the riparian zone remains a lifeline of water with abundant plant and animal species and a more hospitable habitat than the adjacent desert.

**4. Threatened and Endangered Species** - Two of the Park's four endangered animal species occur within the river corridor: the Peregrine falcon (Falco peregrinus) and the Big Bend gambusia (Gambusia gaigei). Two threatened cactus, bunched cory cactus (Coryphantha ramillosa) and Chisos Mountains hedgehog cactus (Echinocereus chisoensis), occur within the river corridor in a few locations. Several species of concern (more research is needed) occur in the river corridor. The Mexican black bear is a state-listed species. Hypothetical species include the southwest willow flycatcher and jaguarundi.

Past and current human activities continue to affect the survival of Big Bend's endangered species. The peregrine falcon is recovering, but still experiences eggshell thinning due to pesticides. Flooding of the Rio Grande periodically threatens one of the three Big Bend gambusia habitats. Fishermen, who release bait or catch fish in the gambusia's habitat, could significantly affect that habitat. The small colonies of threatened bunched cory cactus and Chisos Mountain hedgehog cactus are at risk from collecting or development disturbances.

**5. Water Flow Quantities** - The Rio Grande, the second longest river in the United States, is no longer a naturally flowing river. Extensive diversion networks and dams control flows on both the Rio Grande and the Rio Conchos. Neither river is currently managed to provide an in-stream flow needed to sustain riparian habitat or recreational purposes.

The Rio Grande Compact Commission (Commission), a three state entity representing Colorado, New Mexico, and Texas, manages water flows of the Rio Grande from its headwaters to Fort Quitman, which lies downstream of El Paso. Established in 1938, the Commission manages private water rights, some of which date to the 1800s, and apportions the Rio Grande's flow, including a share to Mexico at El Paso.

The bi-national International Boundary and Water Commission (IBWC) manages water in the Rio Grande from Fort Quitman to the Gulf of Mexico. The treaty of 1944 between the United States and Mexico requires that at least one-third of the combined annual flow volume from the six Mexican rivers that flow into the Rio Grande belong to the United States. The Rio Conchos is the largest of the six Mexican tributaries. The treaty also states that these flows must total at least 350,000 acre-feet annually, based upon a five-year moving mean average. The treaty does not, however, establish release schedules for these six rivers. Thus, flows passing through the park vary considerably over time due to the unpredictability of releases from the impoundments.

In summer 1995, surplus waters were released from the New Mexico reservoirs. The deteriorated river channel between Fort Quitman and Presidio caused more than 65 percent of the water that reached Fort Quitman to spill from the river's channel and to form shallow lakes before reaching Presidio. The IBWC has long considered a project to stabilize the Rio Grande's riverbed downstream from Ft. Quitman to Presidio. The project would clearly delineate the official boundary and



would ensure that more of the Colorado and New Mexico waters reached the lower Rio Grande. In 1978, IBWC prepared an Environmental Impact Statement to make channel improvements. These were initiated in the mid-1980's, but were not completed. Much of that work has since deteriorated.

The IBWC monitors the 1944 treaty allocations through a system of gauging stations on the Rio Grande and Rio Conchos. Some of these stations have been monitored since 1889. The Johnson Ranch gauging station near Castolon has measured flows since 1936.

Historically, flows passing through the park have varied considerably. The highest daily flow of the Rio Grande above the Rio Conchos confluence near Presidio and Ojinaga was 13,700 cubic feet per second (cfs) on June 14, 1905; it is now frequently dry. Since 1896, the greatest flood of record on the Rio Conchos had an estimated momentary flow of 162,094 cfs and occurred on September 11, 1904.

Within the Park, the Johnson's Ranch gauging station recorded several days in 1953, 1955, 1957, and 1958 when the riverbed was dry with zero cfs being measured. Only 27.5 cfs were measured on September 9, 1968. The maximum daily flow of 65,332 cfs occurred on October 1, 1978.

A number of small thermal seeps and springs and a few larger ones along the Rio Grande contribute modest amounts to the river's flow within the Park. Many of these go dry during extended periods of drought. The characteristic semi-arid climate of the region makes the Rio Grande one of the most sensitive rivers to climatic change within the United States.

**6. Water Quality** - During the last 15 years, development has flourished along the Mexico and United States border, and the population of the border region has doubled to more than six million people. The growth is partially fueled by more than 1,400 maquiladora (product assembly) plants. With that growth comes increased potential for water quality degradation and toxic chemical contamination.

Historically, many communities on both sides of the border have had inadequate water and sewage treatment facilities. One of the side agreements to the North American Free Trade Agreement addresses environmental concerns. The bi-national Border Environment Coordinating Committee has been established to deal with those infrastructure needs.

In 1993, American Rivers, the principal river conservation organization in the United States, listed the Rio Grande/Rio Conchos as the most endangered river in America. It stated that this river system was "presenting the greatest human health threat of any river in America due to the headwaters-to-mouth degradation and to pollution by newly developed industrial plants along the Mexican side of the border."

Three studies associated with water quality in the river have been conducted since 1987. In 1987, researchers from Memphis State University sampled river water near Rio Grande Village. Although they identified a non-pathogenic amoebae, Vahlkampia, they found neither the pathogenic Naegleria fowleri nor Acanthamoeba culbertsoni.

This study does not conclusively prove that the pathogenic amoebae were not present or that they could not emigrate or multiply in detectable numbers. This non-detection merely suggested that the amoebae were not present in sufficient numbers to cause human infection at the time of sampling.

Two fatalities, which occurred near El Paso and Laredo in 1994, were attributed to amoebic infection associated with swimming in the effluent of settling and stagnant ponds. To cause encephalitis, the amoebae must be taken deeply into the sinus cavities until they reach the point where nerves from the nose enter the brain.

According to microbiologists, only repeated diving into stagnant polluted water and having water forced up the nasal passage with a great deal of pressure is likely to expose a river user to the amoeba. They claim that the potential of a river user being affected by the Naegleria fowleri should be considered extremely unlikely given the circumstances cited previously. Acanthamoeba culbertsoni enters the body through cuts and scratches and is even more uncommon than Naegleria fowleri. It also occurs in stagnant water with a very high organic content. (Detterline, 1987)

In May 1993, the University of Texas at El Paso (UTEP) conducted a water quality study of the river between Lajitas and La Linda. Ten sampling sites along the river and other backcountry water sources provided a snapshot view of water quality.

The UTEP study showed that most pollution in the Rio Grande within the park occurred from general runoff that picks up pollutants as it travels.

No iron or mercury were found, and the levels of cadmium, lead, and arsenic were below this study's detection limits.

Researchers did, however, detect high levels of fecal coliform bacteria in this snapshot view. These bacteria originate from man, cattle, or other warm-blooded mammals that live near the river. These specific organisms are not usually harmful but may indicate the possible presence of pathogens. (McKay, 1994)

Through the IBWC, Mexico and the United States conducted a study of toxic contaminants in the Rio Grande from El Paso to Brownsville in 1992 and 1993. The study involved a one-time sampling of 19 mainstream and 26 tributary sites. Each country conducted sampling and analysis according to their respective analytical capabilities.

In the Park, researchers sampled two sites: the mouth of Santa Elena Canyon and Terlingua Creek before it flows into the Rio Grande. The study found no specific readings at the park stations that would raise concern.

Outside the Park, the study found few potential toxic chemical-related problems in the mainstream of the Rio Grande. If toxic impacts occurred at mainstream sites, the effects were relatively slight. Researchers observed no instances of severe impairment to aquatic plant and animals. Potential problems were more prevalent in tributaries because some tributaries transport wastewater in relatively undiluted form.

No short-term risks were indicated for the 24 sites for which edible fish tissue analysis was conducted, including the mouth of Santa Elena Canyon and Terlingua Creek. Data from fish fillet samples were evaluated for potential human health risks using U.S. Food and Drug Administration tolerance levels; none were exceeded.

Outside the park, the study revealed that at 17 of 22 sites, slight human health risks could result from regular, long-term consumption of untreated water and/or fish. For risks to occur, however, fish would have to be consumed on a daily basis over a period of many years. Significant risks were observed for the other five sites, but all were sewage effluent-dominated tributaries. (IBWC, 1994)

A second phase of this study is underway to better define the degree of impact, assess temporal variation, and further identify sources of toxic chemicals. Park sites are included in this second phase.

Although several state and Federal agencies, including park staff, periodically monitor the quality of the river's water, monitoring is not done frequently enough to give managers a clear understanding of the Rio Grande's water quality. Most studies provide only a snapshot view of the river. The Texas Natural Resources Conservation Commission (TNRCC) fosters the Texas Watch Program, organized groups of volunteers who collect and analyze water samples for five basic quality parameters on a quarterly basis.

Although the National Park Service (Service) cannot directly affect the quantity and quality of upstream river water, staff members use IBWC records to track water flow on a daily basis. Twice a month, the Service samples water quality at five locations near Rio Grande Village and Santa Elena Canyon. The Service participates in the Texas Watch program and has begun working with the Rio Grande Compact Commission and IBWC to explore long-term strategies to ensure minimum flow levels and treaty compliance.

## **E. Cultural Resources**

Cultural resources in the Park range from the Paleo-Indian period 10,500 years ago through the historic period, represented by Native American groups such as the Chisos, Mescalero Apache, and Comanche. More recently, Spanish, Mexican, and American settlers farmed, ranched, and mined in the area.

Throughout the prehistoric period, humans found shelter and maintained open campsites throughout the Park. The archeological record reveals an Archaic-period desert culture whose inhabitants developed a nomadic hunting and gathering lifestyle that remained virtually unchanged for several thousand years.

Past human inhabitants used all portions of the park, but were particularly attracted to the river corridor during the most recent prehistory. Archeological sites containing limited quantities of ceramic artifacts suggest that some later indigenous peoples had a semi-sedentary lifestyle and practiced limited agriculture along the river.

The historic cultural landscape centers upon various subsistence or commercial land uses. The riparian and tributary environments were used for subsistence and irrigation farming. Transportation networks, irrigation structures, simple domestic residences and outbuildings, and planed and terraced farm land lining the stream banks characterize these landscapes.

Of the ten National Register historic properties that the Service preserves, four lie within the river corridor. They include the Sublette Farm, the Daniels Farm, the Castolon Historic District, and the Hot Springs District. The Barker Lodge was listed on the National Register on October 20, 1989.

Because current park visitors are also attracted to water sources, damage to sites occur through artifact collection, digging, and insensitive use. Erosion, trampling by trespass livestock, and invading tamarisk cause deterioration of prehistoric and historic sites concentrated along the river.

## **VI. Special Considerations**

### **A. International Aspects**

The international boundary between the United States and Mexico, which also forms the southern park boundary, lies along the middle of the deepest channel of the Rio Grande. Any activity taking place south of the international boundary occurs in the Republic of Mexico and is subject to Mexican laws. Obstacles in the river and the river's current and course force river users to continually cross the international boundary, and thus enter and exit the Park and the United States, as they travel.

1. **Mexican Protected Areas** - In November 1994, then Mexican President Carlos Salinas de Gortari designated two Federally protected areas for flora and fauna across the border from the Park. These areas total approximately 1.2 million acres of the northern Chihuahuan desert. President Salinas identified more than 500,000 acres of the Maderas del Carmen region of the Sierra del Carmen range in Coahuila as the Maderas del Carmen Protected Area. He designated nearly 700,000 acres south of the Santa Elena Canyon region as the Cañon de Santa Elena Protected Area. These protected areas will sustain wildlife and natural features. Directors for both areas assumed their responsibilities in February 1997. The creation of these protected areas raises possibilities for developing joint river management strategies with national and state governments in Mexico.

2. **Smuggling** - Smuggling activities into and from Mexico occasionally disturb and intimidate visitors engaged in normal sightseeing and camping activities along the river. Commercial haulers attempt to avoid Mexican import taxes by transporting electronics, food, and other commercial goods across the border at unofficial crossings in the Park.

Occasionally, Mexican livestock has been smuggled into the United States through the Park to avoid U.S. Department of Agricultural (USDA) quarantine restrictions and fees. Interdiction efforts for all these activities may affect Park visitors.

3. **Mexican Land Use** - As they float the river, visitors may catch glimpses of a variety of Mexican land uses. Ranching, small-scale farming, and limited mining of silver, fluorspar, and mercury provide the primary methods of subsistence. Other activities include harvesting

candelilla and processing it into wax, collecting cacti for sale in the United States, and trapping fur-bearing animals.

**4. Border Crossings** - Three historic and long-standing unofficial border crossings exist in the park: Santa Elena, San Vicente, and Boquillas. These row-boat crossings allow for foot traffic only and have no support facilities. Commercial and motor vehicle traffic must cross at other locations. Neither U.S. Immigration and Naturalization Service nor U.S. Customs Service agents staff these unofficial crossings.

Mexican citizens traveling into the United States must obtain a permiso if they plan to travel 25 miles beyond the international border or spend more than 72 hours in the United States. Presidio, 60 miles west of the park, is the closest U.S. Immigration and Naturalization Service office where these documents may be processed. U.S. citizens may travel up to 30 kilometers into Mexico without documentation.

Prior to 1986, only people bringing merchandise into the United States had to report to a designated port of entry for U.S. Customs Service inspection. The 1986 amendment to the Tariff Act of 1930 now requires that all individuals enter the United States only through a designated port of entry. The closest designated port of entry is also Presidio. The 1986 amendment, however, grants the Secretary of the Treasury the discretion to make exceptions to the amendment. The Park is currently working with offices in Washington, D.C. to have such an exception made for park visitors and park staff.

## **B. Water Rights**

The IBWC enforces international rights and obligations under numerous boundary and water treaties and related agreements with Mexico. Refer to the Water Quantity section (V.D.5.) for specific information about treaty obligations.

Water rights on Federally-owned property in the Park belong exclusively to the United States under Texas State Law (priority date 1927). This accords the United States rights to both percolating (underground) sources and springs originating from percolating water.

Two appropriative water rights, consolidated in 1989 through the Texas Water Commission, now Texas Natural Resources Conservation Commission, from existing successor-in-interest rights, exist. For water diverted from the Rio Grande at Castolon and Rio Grande Village, these annual rights include 1,000 acre feet for irrigation and 530 acre feet for municipal purposes.

### **C. Cooperative Agreements**

Memoranda of Understanding exist between the Service and the following entities:

- the Environmental Protection Agency (EPA), regarding the Clean Water Act
- the USGS to coordinate the long-term water quality needs of units of the Service with the USGS National Water Quality Assessment Program
- Sul Ross State University to foster scientific research



## **VII. Historical Use and Management of the River Corridor**

### **A. Historical Use**

Although recreational river running of the Rio Grande began during this century, archeologists date use of the river corridor back thousands of years. The archeological record reveals that prehistoric Indian groups used the riparian and tributary environments.

During their colonial period, the Spanish viewed the Rio Grande area as a natural defensive barrier between Spanish settlements south of the river and Apache and Comanche raiders to the north. The Spanish limited their activities to infrequent explorations, military expeditions, minor settlements, and the establishment of presidios at San Vicente and San Carlos. By the time Mexico attained its independence from Spain in 1821, primary Indian raiding trails passed near the Rio Grande canyons with one branch of the Great Comanche Trail crossing the river near Mariscal and the other near Lajitas.

Hispanic settlement and economic development of the area began in the early 1800's as people discovered that the "despoblado," the uninhabited land, could provide a living; Anglo settlement began to occur in the 1880's. Ranching spread into the Rio Grande area as did irrigated farming. Subsistence living along the river involved fishing, trapping, and hunting. Other historical uses of the river corridor included settlements, commercial operations such as wax making, fur trading, and the Hot Springs resort. The U.S. military and the Texas Rangers had chapters of their colorful histories associated with the river corridor of the Big Bend.

Local mining, although not directly identified with the Rio Grande corridor, had a direct impact upon the river environment. Early reports and diaries described the river corridor as lined with cottonwood and willow trees. By the early 1900's, however, most of the trees had been harvested for mining operations. Reports show that by 1930, coal was mined near Terlingua to provide fuel for the quicksilver furnaces after the companies had depleted the wood supply. (Langford, 1952; Gomez, 1990)

Topographic engineers during 1859 and 1860 attempted to fulfill the mandate of the Treaty of Guadalupe Hidalgo by surveying the international boundary between Mexico and the United States. Dr. Robert T. Hill successfully journeyed along the Rio Grande from Presidio to the mouth of the Pecos River near Langtry in 1899. He was guided by James MacMahon, a trapper and only

person to have previously floated the river through the canyon sections successfully. (Hill, 1901)

The river corridor and its spectacular canyons supplied the scenic initiative for this area to be considered as a tourist attraction. In 1933, a group supporting establishment of a public park in the area successfully lobbied the Texas Legislature for the creation of Texas Canyons State Park. Later that same year, the public lands were enlarged and the name was changed to Big Bend State Park, later to be recommended as a national park.

When the Federal Government passed legislation authorizing the Park in 1935, the Service sent groups of scientists and technicians into the area to explore its features and locate possible wildlife refuges. One such exploration was the widely publicized Webb Expedition through Santa Elena Canyon during May 1937.

With the establishment of the Park in 1944 and its associated publicity and subsequent development, genuine recreational use of the river corridor began. Visitor-related recreational use of riverside camping, fishing, and floating began with modest numbers of participants and has steadily increased over recent decades. River running began on a full-time commercial basis in the 1970's. Other recreational river uses, including birdwatching, photography, day hiking, and enjoyment of solitude, have also increased in recent years.

## **B. Management**

Most of the area encompassing the river corridor is classified and managed by the Park as a "Natural Zone." According to the Park's General Management Plan (GMP), these zones are managed "as a natural zone where natural resources and processes remain largely unaltered by human activity, except for approved development essential to management, use, and appreciation of the park." The GMP further identifies the three river canyons as subzones to be managed as "Outstanding Natural Feature Subzones" to provide for visitor enjoyment without impairing their quality, intrinsic value, or uniqueness.

In 1978, the Wild and Scenic Rivers Act was amended to include a portion of the Rio Grande from river mile 853.2 at the Chihuahua/Coahuila state line to river mile 657.5 at the Terrell/Val Verde county line. The upstream 69 miles of the Rio Grande Wild and Scenic River, which includes Mariscal and Boquillas canyons, lie within the boundaries of the Park.

The Service requires all operators of private and commercial watercraft within park boundaries to obtain a free Backcountry Use Permit from any visitor

center before launching. Self-permitting stations exist at the Barton Warnock Center in Lajitas for Santa Elena trips and at the Stillwell Store for Boquillas Canyon trips. General regulations outline the Service's requirements for all river users.

The Service began to require written authorization in the form of Special Use Permits for commercial river outfitters during the late 1970's. The Service converted those permits to Commercial Use Licenses in 1981. In 1995, the commercial authorizations took the form of Incidental Business Permits, a type of Special Use Permit. An attachment to each commercial authorization defines additional requirements for commercial users.

### **C. Use Trends**

A study conducted by Texas A&M University in 1993 examined use of the Rio Grande corridor. Researchers compiled data from permits issued from 1983 through 1992. Additional data for 1993 through 1996 was obtained by examining permits and monthly use reports.

River use peaked in 1985 (Figure 2). A general drop in the total number of permits issued since 1985 appears attributable to a drop in private use. More than 1650 private permits were issued in 1985 compared to 412 in 1990. After 1990, total permits and private permits increased until 1994, when the extreme drought conditions caused another decrease.

Commercial river use levels remained relatively stable between 1984 and 1992, fluctuating between 700 and 900 annually. Commercial use reached a high of 1113 permits issued in 1994. Drought conditions in 1995 and 1996, however, caused a sharp reversal of the trend (Figures 2 and 3).

According to the Texas A&M University study, private permittees consistently have more boats per permit than commercial outfitters, but commercial outfitters consistently have more people per boat than private permittees.

- 1. Santa Elena Canyon** - From 1990 through 1996, Santa Elena had about four times as many permits as either Mariscal or Boquillas Canyon (Figure 4). During this time, Santa Elena received five times as much commercial use as private use.

Since 1983, the proportion of commercial permits issued for day trips in Santa Elena increased from 10 percent in 1983 to just over 50

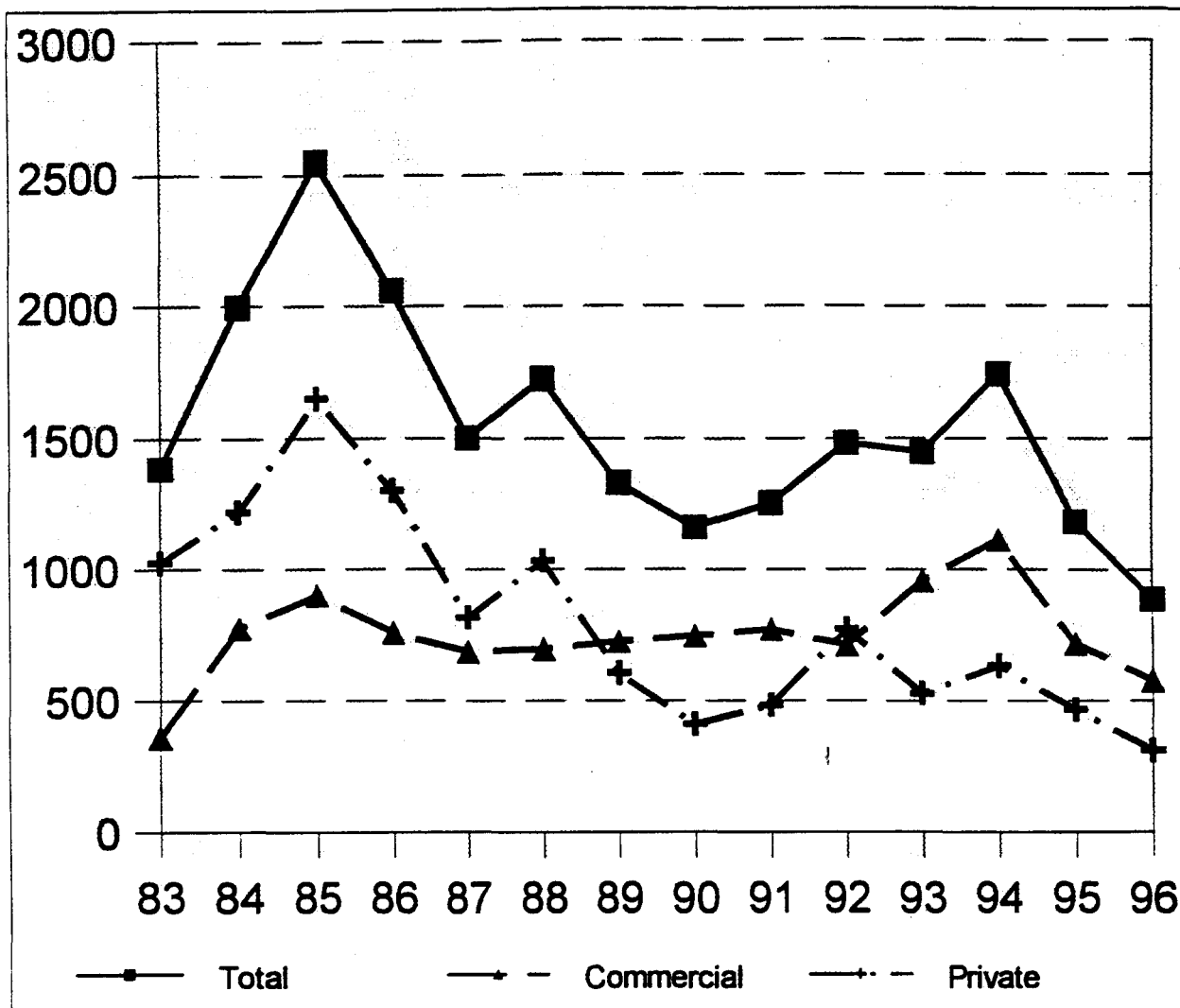


Figure 2. Trends by Total, Commercial, and Private Permits (1983-1996).

percent in 1992. In addition, the general drop in private use is reflected in the decrease in private permits issued for Santa Elena during the late 1980's.

Data indicate that Santa Elena Canyon provides a distinctly different river recreation experience from the other river segments. Santa Elena trends include:

- greater use of rafts compared to other types of water craft, such as kayaks, canoes, or motorboats
- more river users on day-trips compared to overnight trips, and

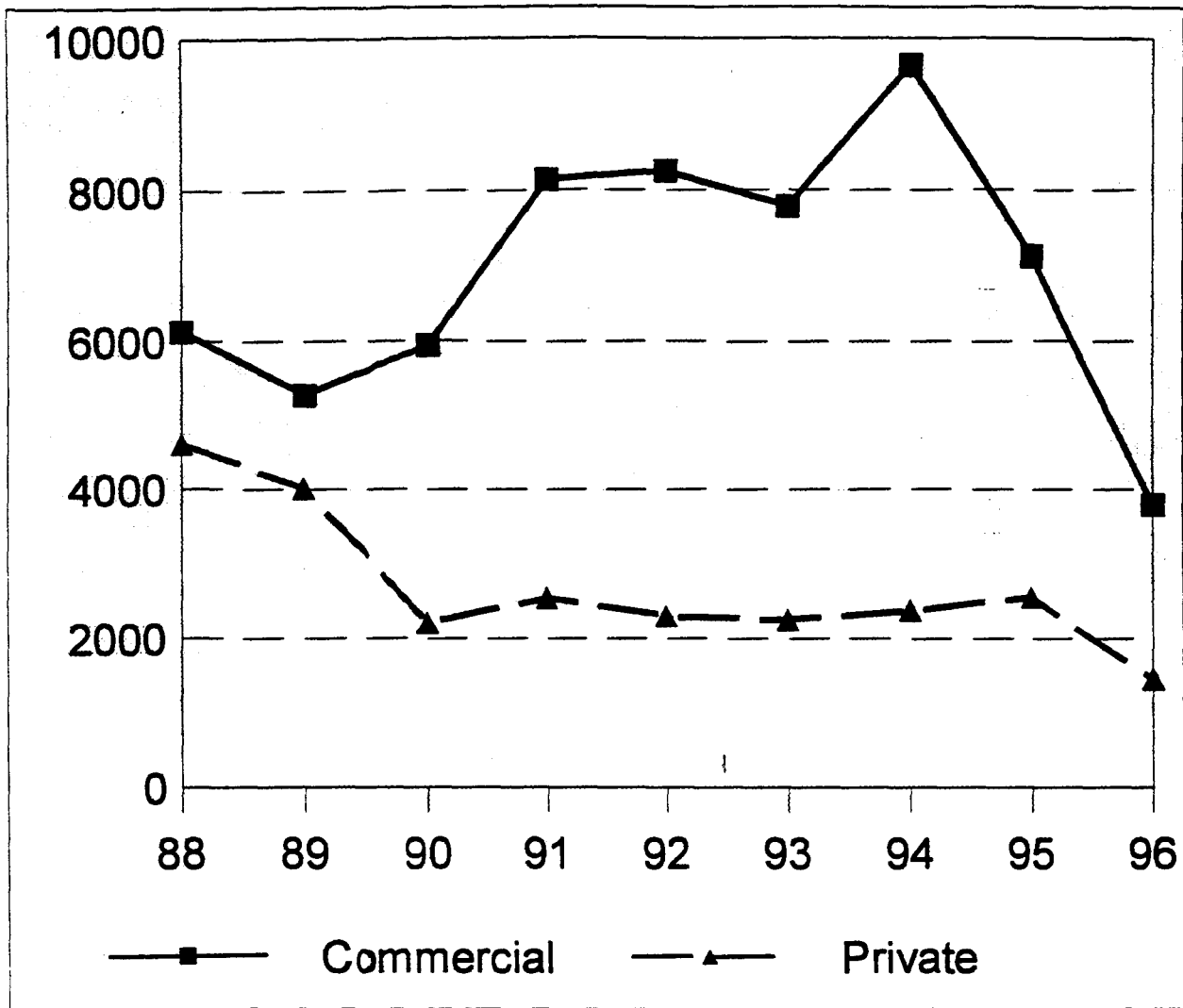


Figure 3. Trend of Commercial Users Compared to Private Users (1988-1996).

- more commercial use than private use.

Easier access, less time required for the entire trip, and greater logistical convenience result in the higher commercial use of Santa Elena Canyon than of the other canyons. By contrast, private users revealed that seeking a challenge was the primary motivational factor for their use of Santa Elena Canyon.

2. **Mariscal Canyon** - Prior to 1990, approximately the same number of combined private and commercial permits were issued for Mariscal and Boquillas Canyons (Figure 4). In the early 1990's, however, the use of Mariscal Canyon dropped, possibly because of the length and

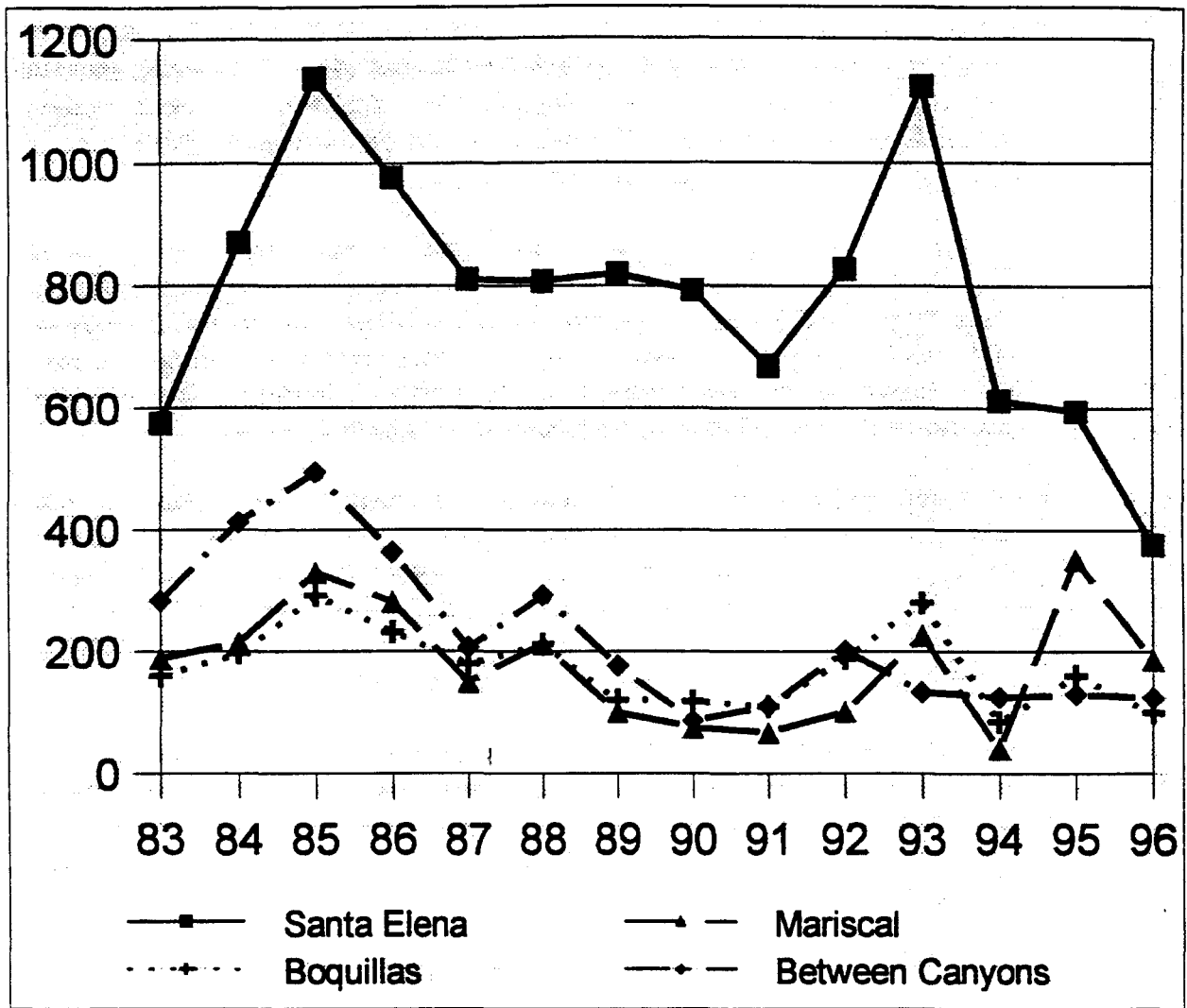


Figure 4. Permits issued for Santa Elena, Mariscal, Boquillas and Between Canyon Segments (1983-1996).

condition of the unpaved access roads. The Backcountry Management Plan designated the River Road and access roads to Talley and Solis as unpaved, high clearance roads. Budget and personnel constraints force the Service to maintain these roads only one or two times a year compared to the four to six times a year that they were maintained prior to 1990.

Because Mariscal Canyon is the narrowest of the three canyons, it has the deepest channel during low water years. Thus, in 1993, the first of the 1990's low water years, commercial use shifted to Mariscal Canyon when Santa Elena Canyon became impassable, and the number of commercial trips through Mariscal in 1993 almost doubled from 1992.

Outfitters found, however, that the logistics of a Mariscal Canyon trip were more difficult than the Santa Elena Canyon trip. A one-way shuttle between the river access points and Terlingua, Texas takes approximately three hours. Continual use on the unpaved roads took a heavy toll on shuttle equipment in 1993.

During the low water period in 1994, commercial trips shifted use to Colorado Canyon, upstream from the Park boundary in Big Bend Ranch State Park. The Colorado Canyon trip is a shorter and logistically easier trip with access on paved roads. So when water conditions allow, commercial companies prefer to shift use to Colorado Canyon even though the water level may be higher in Mariscal Canyon.

In March and April of 1995, however, the water level dropped so low that even Colorado Canyon was impassable; commercial use was forced to once again return to Mariscal Canyon. During the spring of 1996, the water level dropped so low that guests often had to get out of the boat up to 20 times in the 10-mile Mariscal Canyon trip. Even Mariscal Canyon had become impassable; commercial use ceased.

Records indicate that, unlike commercial use, private use does not switch to Mariscal Canyon. Instead, private launches on the entire river decrease in conjunction with lower water levels. In contrast to commercial use, private use of Mariscal Canyon tends to be the greatest during high water periods.

**3. Boquillas Canyon** - Use of the lengthy Boquillas Canyon has remained relatively stable. Solitude and a wilderness experience are primary motivating factors for using Boquillas Canyon.

Of the 14 commercial companies, 14 use Boquillas Canyon as compared to the 10 that use Santa Elena Canyon and 11 that use Mariscal Canyon. At least five of the companies travel long distances to conduct less than three trips a year. So although Boquillas Canyon receives the lowest user numbers, more companies offer a Boquillas Canyon trip than offer trips through Mariscal or Santa Elena (Figure 4).

**4. Between-Canyons** - The open river section between Mariscal and Boquillas Canyons has been popular and receives about the same amount of use as Boquillas Canyon. This use generally comes from private rather than commercial operators. In the low water spring of 1995, however, several companies offered a half-day float from the Santa Elena Canyon take-out to Cottonwood Campground (Figure 4).

**D. Quality of Experience** - The Texas A&M researchers learned that getting away from the everyday routine of life was the most important motivational reason for Rio Grande users to come to Big Bend. More than three-quarters of each sample responded "extremely important" to this item. Experiencing solitude was also a primary motivational factor for participating in a river trip. The majority of users indicated that solitude was very important to their trip. Of the groups queried, more private river users and roadside campers sought solitude than did commercial patrons. Similarly, solitude was slightly less important to Santa Elena Canyon users than to users of the other river segments. The highest percent of respondents, 84, listed solitude as important for Boquillas, compared to 78 percent for Mariscal, 76 percent for the between-canyon segments, and 71 percent for Santa Elena.

In general, outfitter clients were slightly less likely to report being challenged as extremely important compared to private users or road-access users. Private permittees seeking a challenge floated Santa Elena rather than the other segments of the river.

The least important motivational factor for river use was fishing. More than two-thirds of the study's participants reported the lowest importance level regarding their interest in catching fish. A minority of users, however, indicated that catching fish was desirable; these were primarily private permittees and road-access users. Private permittees using between-canyon segments were the most likely to report catching fish as extremely important and Santa Elena Canyon private users were the least likely to report catching fish as being important; compare 22 percent to 2 percent respectively. (Stewart, 1993)



## **VIII. Public Involvement**

On July 30, 1993, the Service invited the public to participate in a scoping process to determine the extent or range of issues to be addressed in the Plan. At least 118 press releases containing the invitation to participate in the scoping process were sent to interested parties. The Service also issued a moratorium upon permitting additional commercial river operations until the completion of the plan.

The Service received 23 written responses to the scoping invitation. The most frequently addressed issues included management of human waste (18), solitude and wilderness experiences versus higher use levels (17), litter in the river corridor (16), access to river put-ins and take-outs (15), commercial and private use (15), extent of development at river put-ins and take-outs (14), motorized versus non-motorized watercraft (14), and use limits (14). Respondents also addressed issues such as protection of aquatic habitat (7), fishing methods (6), fishing regulations (2), types and origin of bait (2), water quality (1), and safety of river runners (1).

On June 17, 1996, the Service issued and mailed approximately 150 copies of a press release that announced the draft Plan was available for a 60-day public comment period. More than a hundred copies of the draft Plan were mailed to individuals and organizations on the park's mailing list and to individuals who requested copies of the Plan. On August 13, 1996, the Service extended the public comment period for another 30 days.

The Service received 49 written responses about the draft Plan. These 49 written responses contained 202 comments, which were consolidated into 119 comments for the purpose of analysis. Frequently addressed concerns included the need for a reservation/allocation system, the implementation of recreational use limits, the economic impact of the plan, the planning process, the definition of wilderness and solitude, the use of motors and miscellaneous comments.

Through review of the comments, the Park identified a number of key points that were not clearly understood by the public. The Park invited interested parties to attend an open house on November 15, 1996. All individuals who responded to the draft Plan and who received the earlier press releases were sent an invitation to the open house. The open house provided park staff the opportunity to clarify points that caused confusion and personally respond to questions surfacing from the discussions. Nineteen people attended the open house.

The Park held a meeting on December 11, 1996, to discuss proposed changes to the draft Plan with representatives of various interest groups. Individuals representing private users, motor users, commercial users, the Pecos River Compact Commission, State Senator Frank Madla's office, the Texas River Protection Association, and the Brewster County Judge attended the meeting. The group reached consensus on all

issues, and the proposed changes have been incorporated into the final Plan and environmental assessment.

Through review and analysis of the comments that were submitted during the public comment period, the National Park Service identified an issue that was not addressed in the draft Plan - low water period uses. The park prepared amendments to the draft Plan and environmental assessment and released them for a 14-day public comment period. On January 13, 1997, the Park mailed out 262 press releases, 146 of which included copies of the amendments. The Park received one comment about the proposed amendments.

## **IX. Management Issues**

### **A. Management Issues Excluded from the Plan**

Because this document only addresses recreational river use, various conditions associated with the Rio Grande corridor present management concerns beyond the scope of this document. Such issues include trespass livestock, commercial hauling, narcotics smuggling, illegal aliens, air and water quality, etc. Other Park planning documents address these issues.

**1. Trespass livestock** - Domestic livestock that cross the river from Mexico and graze in the riparian areas have significantly damaged park resources, as evidenced by stock trails, eroded riverbanks, areas of vegetation trampling and grazing, and the lack of typical riparian tree species. Many of the park's prime river-side recreational camping areas are trampled and contain animal waste. Cattle and horses commonly enter and disturb occupied campsites. Historical and archeological sites have been and continue to be damaged by livestock trampling and subsequent erosion.

The international border confounds the mitigation of trespass grazing effects along the Rio Grande. It is neither feasible nor practical to fence the international boundary, as other boundaries of the park have been, due to expense, public and international relations, and the likelihood of damaging floods. Enforcement measures must be considered in light of their international nature.

The Service recognizes that the long term solution to this problem centers around education, economic incentive and opportunity, and community involvement as well as on-going enforcement actions. To maximize trespass livestock control, the park recently developed a three-prong approach, which includes enforcement, education, and research.

The U.S. Department of Agriculture, in cooperation with the Service, conducts periodic trespass livestock round-ups. The Park has initiated educational outreach programs about park values in the Mexican border towns and continues to pursue longer term diplomatic and economic development solutions. To better monitor and document trespass livestock impacts, three vegetative research exclosures have been built in the Castolon area. These exclosures will allow the park to better assess trespass livestock's impact on the riparian zone.

**2. International Border Activities** - Smuggling activities occasionally occur in the river corridor, as described in section VI.A.2. Surveillance overflights by the U.S. Border Patrol, U.S. Customs Service, and Service officials may at times disturb the wilderness experience of river recreationalists, but can be expected to continue. The Service is working with the other agencies to mitigate the noise impacts of these overflights.

Enforcement efforts have sharply curtailed commercial hauling activities and have forced operators to use crossing points outside park boundaries. Additional joint enforcement activities between the U.S. Border Patrol and the Service will continue.

Three unofficial border crossings exist in the park: Santa Elena, San Vicente, and Boquillas. Park visitors, who wish to add a Mexican community visit to their Big Bend experience, use these row-boat ferry crossings. Neighboring Mexican nationals also use the crossings for a variety of reasons. The Park will continue to work with the U.S. Immigration and Naturalization Service, the U.S. Border Patrol, and U.S. Customs Service to address border crossing activities.

**3. Water Quantity and Quality** - Sections V.D.5. and V.D.6 describe water quantity and quality issues in detail.

**4. Air Quality** - In recent years, the Park has begun to experience severely degraded air quality, especially when air currents are from the southeast. Four major source regions are known to contribute to visibility impairment in the Park. The largest contributor is east-central Mexico, particularly the industrial centers of Monterrey-Monclova and the Carbon I and II power plants near Piedras Negras, 136 air miles southeast of the park. Central Mexico is the second largest contributor of visibility-reducing sulfates in Big Bend. A third source of pollution is the Gulf Coast petroleum processing region of the U.S. and Mexico. Finally, closer to home, wind-blown soils contribute to reduced visibility.

The United States and Mexico have formed a binational technical work group to investigate the issue of the Carbon plants and to address the impacts of air pollution from industrial growth along the international boundary. In September and October of 1996, the binational work group conducted an initial 30-day monitoring study at 20 sites in the U.S. and Mexico. The data is being analyzed to determine where the air was the dirtiest and where it picked up the sulfur dioxide and other

pollutants. Depending upon the results, more intensive studies will be conducted at more sites and at different times of the year to help pinpoint the pollution sources.

In addition to the existing Carbon plants, a new smaller complex of coal-fired electricity generating plants is planned for Palau, Coahuila, a short distance from Carbon I and II. Construction was to begin in October 1996 on the first of two 180 megawatt plants.

Energy demand along the U.S.-Mexico border is expected to increase seven to eight percent per year through 2009, requiring electricity generation capacity to more than double in the next 15 years. The Carbon project is viewed in Mexico as the model for future energy development in the region. Conversion of the facility to burn natural gas instead of coal would set a positive precedent in minimizing regional environmental degradation while allowing necessary expansion of electricity generation capacity.

## **B. Management Issues Included in the Plan**

This section provides current descriptions of the six recreational use-related issues that the Plan addresses.

1. **Zoning** - Although no formal management zones existed prior to this Plan, use data indicate that river recreationalists use different river segments to gain different types of experiences. Most users plan their trips around a particular river segment; only an extremely small percentage travel through two or more river segments on the same trip.

Collectively, the river segments provide a diversity of recreational river experiences. The social setting, number of encounters, expectations of encounters with other groups, perception of impacts, the importance of solitude, and the level of challenge vary from segment to segment. Access to and from the river differ by river segments, and the extent of other non-recreational uses (i.e., livestock grazing) may also vary. Finally, the presence of ranger patrols and enforcement personnel currently varies among river segments.

Over recent years, Santa Elena Canyon has become the most popular canyon for day trips. Commercial use has risen, and private use has decreased. The canyon is important to private users who hope to achieve a challenging experience. A lower percentage of Santa Elena Canyon users seek solitude and wilderness values than do the users of

the other river segments. Also, a lower percentage of commercial users than private users seek solitude.

The location of and access to Mariscal Canyon present logistical challenges not experienced by users of the other canyon segments. These challenges probably combined to cause the decrease in recreational use from 1998 through 1992 (Figure 4). Extreme drought conditions in the Big Bend area, however, caused a shift in commercial use to Mariscal Canyon beginning in 1993 because of its better water conditions during periods of low water. During normal and high water periods, Mariscal users fall in the middle of the range of those seeking solitude and a wilderness experience compared to the other canyon segments.

Seeking solitude and a wilderness experience comprises the primary motivating factor for those traveling through Boquillas Canyon. Characteristics of the canyon require that the vast majority of users spend several days on the river. The length of the Boquillas Canyon trip allows the user to become immersed in the wilderness experience.

The Between-Canyon segments are primarily associated with private use. Many users camp at backcountry road campsites along the River Road. These segments are also associated with fishing and motor use and receive about the same amount of use as Boquillas and Mariscal canyons. Of the four sections, users of the Boquillas, Mariscal, and Inter-Canyon segments appear to be roughly equal with respect to seeking solitude and a wilderness experience. (Stewart, 1993)

2. **Motor Use** - Although both motor and non-motor use occurs within the Park, statistics show only a small percentage of permittees use motorized water craft. From 1990 through 1996, the Service issued 2,523 private river use permits. Of those, users with motorized craft received 6 percent or 163 permits. None of the commercial companies offer river trips with motorized watercraft.

	1990	1991	1992	1993	1994	1995	1996
Number of permits	23	17	47	32	11	12	21

Figure 5. Number of Permits Issued for Motorized Watercraft per Year (1990-1996).

During these seven years, permits for motor use were issued for all months of the year. December, January, and February show the least amount of use while March, April, September, and October show the most. The Service closes the river canyons to motor use between

February 1 and July 15 to prevent disturbance of nesting peregrine falcons.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Number of permits	1	5	28	23	12	9	19	9	20	22	14	1

Figure 6. Total Number of Permits Issued for Motorized Watercraft per Month (1990-1996).

A maximum of 73 of the 163 permits issued indicate possible motor use within the canyons. During the months of July through December from 1990 through 1996 when the canyons are open for motor use, 7 permits were issued for the Rio Grande Village area indicating possible use in Boquillas Canyon; 22 permits were issued for the Talley/Solis areas indicating possible use in Mariscal Canyon; and 38 permits were issued for the Cottonwood/Santa Elena Canyon exit/Lajitas areas indicating possible use of Santa Elena Canyon.

According to information gathered from backcountry use charts, interviews with permit-writing staff, and entry-exit data, most motor users fish rather than participate in recreational boating. The Service does not have information about what percentage of motor users fail to get permits.

Extremes in high or low water levels impede or preclude hard-hull craft use of the river. Limitation recommendations on hard-hull boat use through Class III rapids apply when river levels exceed 2000 cubic feet per second (cfs). Physical barriers, such as gravel bars and rock slides, may preclude the use of most motorized water craft from certain portions of the river corridor during periods of low water.

Access is currently provided at specific locations along the river corridor and varies from drive-in to carry-in.

No water quality research has examined levels of contaminants in the river associated with motor use. Further investigations should determine such levels and their effect upon aquatic systems.

As stated earlier in Chapters VI, VII, and VIII, the expectation and experiencing of solitude are primary motivational factors for individuals deciding to participate in a river trip. During the scoping process for this

plan, one of the most frequent requests of respondents was for the Plan to protect opportunities for solitude.

The survey of 330 private permittees from March through December 1993 (Stewart, 1993) indicated that 67 percent reported seeing no motorized watercraft. Of the 33 percent who encountered motorized watercraft, only 25 percent indicated that the encounter detracted from their experience.

**3. Fishing -** Recreational fishing has occurred throughout the history of the Park. Target fish include any of several species of catfish, primarily the flathead and channel catfish. Consumptive use of fish and taking of live bait from the river channel are the sole exceptions to Service policies established to minimize human impacts on natural animal populations.

The Texas A&M University user survey indicated that a minority of river users, usually private parties, consider fishing to be an important activity. Most river users who are fishing camp at road-access campsites along the river and use motorboats to set and check lines.

Fishing methods include the hand line, pole and line, rod-and-reel, throw lines (lines attached to the bank at one end), and trot lines (lines fixed to the bank at both ends). Lines and markers are occasionally abandoned and remain as litter until removed by park staff or other boaters. Seining is allowed to capture bait minnows. Jug fishing (floating plastic or metal bottles with a short line and hook attached) is prohibited because jugs frequently become lost or entangled in vegetation and constitute a highly visible form of trash.

The Service does not require a state license or park permit for fishing. Users may fish at any time and place in the main river. Fishing is not allowed in tributary streams nor at the warm springs and ponds near Rio Grande Village, home of the endangered Big Bend gambusia. The personal catch limit is 25 fish per day or in possession. To prevent introduction of exotic species into the river environment, use of live bait other than minnows caught from the Rio Grande within the Park is prohibited.

Records do not indicate how many visitors participate in fishing or how many fish are caught. Several fish surveys (Platania, 1990) and studies of toxics in fish (Irwin, 1988) represent the little data available regarding Big Bend fisheries. No research has assessed the impact of fishing or seining upon the aquatic environment. In recent years, increased river



pollution has raised concern about whether fish tissue is safe for human consumption. The IBWC study published in 1994 indicated that slight human health risks could result from regular, long-term consumption of fish.

**4. Access** - Current access to the river varies. At Lajitas and Heath Canyon, landowners outside park boundaries have granted boater access across their property. No formal agreement exists with either landowner.

Developed access points at Lajitas, Santa Elena Take-out, Rio Grande Village, and Heath Canyon consist of minimally maintained dirt ramps to the water's edge. Primitive access, a dirt or paved road ending at the riverbank but not extending to the water's edge, exists at Talley, Solis, and Cottonwood Campground. Undeveloped access, consisting of roads ending near the river and foot trails to the water, exists at Jewels Camp, Woodsons, Black Dike, Hot Springs, and La Clocha.

A variety of roads serve the various river access points, ranging from paved roads to unpaved roads for four-wheel drive, high-clearance vehicles. During wet weather, four-wheel drive is generally needed for access over unpaved roads.

Users may camp in designated frontcountry or backcountry campsites near most access points. A backroad campsite permit is required.

The Service provides restrooms and trash receptacles at or near the two developed access points of Santa Elena Take-out and Rio Grande Village. No facilities are provided at Lajitas or Heath Canyon or at primitive or undeveloped access points within the park.

River dynamics make it difficult to provide permanent ramps into the water. Fiscal and manpower constraints, as well as impacts to resources, also influence the development and maintenance of access points.

**5. Human Waste** - The presence of improperly buried human feces and toilet paper in the vicinity of river campsites has called attention to the issue of human waste disposal. Popular campsites suffer from a surrounding ring of human waste litter. Burning of toilet paper has led to wildland fires.

Commercial users have voluntarily carried out solid human waste for a number of years. In 1994, solid human waste carry-out became a

condition of commercial outfitter permits. Encouraging private users to carry out solid human waste has produced mixed results.

Until recently, the standard method for carry out included use of plastic bags. These bags, incompatible with septic systems and wastewater treatment plants, were ultimately disposed of in landfills. New Environmental Protection Agency (EPA) regulations prohibit human waste disposal in landfills. Therefore, river users may no longer use plastic bags to carry out human waste. The Park presently provides for the disposal of paper-bagged waste at the Santa Elena Take-out.

Reusable toilet systems provide an alternative to systems dependent upon paper bags. In the past several years, a number of manufacturers have developed and are marketing toilet systems designed to be dumped at RV dump stations. These range from molded plastic to welded metal and cost from \$60.00 to \$500.00. Many are designed for large commercial groups on longer trips, but there are a few smaller, less-expensive options suitable for small parties and/or short trips. Several recreational vehicle campgrounds to the north and west of the park accept waste from boaters for a small fee.

While the Park would like to provide for the disposal of human waste in locations that would serve all river users, present disposal systems do not lend themselves to the remoteness and lack of utilities and maintenance in the areas to be serviced. Additionally, Federal regulations limit development of structures in floodplains.

**6. Recreational Use Limits** - The Texas A&M University study shows that peak use occurred in 1985 for Santa Elena, Boquillas and Between-canyon river segments and in 1986 for Mariscal. Use in each segment then declined until 1991. Use then increased until 1994. Drought conditions forced a dramatic reduction in use in 1995 and 1996.

The Service historically placed no limit upon the number of parties that could launch each day in any of the river segments. Each commercial company, however, could start no more than 30 passengers, not including guides, on a particular river segment.

Each private party that launched in any of the three river canyon segments could start no more than 30 people each day. Private party launches in the Between-canyon river segments were limited to no more than 45 people each day. No limit existed on the number of private parties that could launch each day.

## **X. The Plan**

### **A. Use Issues**

This section describes management strategies that address the following six recreational river use issues.

**1. Zoning** - This Plan serves as an amendment to the Backcountry Management Plan, which provides three distinct social experience opportunities and assigns all backcountry areas into threshold, primitive, or wild management levels. As an amendment to the Backcountry Management Plan, this Plan meets the Backcountry Management Plan's objectives. Management strategies for each zone perpetuate distinct social experience opportunities.

Many respondents to the Texas A&M University user survey identified getting away from the routine and experiencing solitude as a primary reason for using the Rio Grande. Similarly, many people participating in the Big Bend Visitor Study indicated that they came to Big Bend to experience the wilderness environment and solitude or quiet. The Service recognizes that definitions of naturalness and solitude vary between individuals. Management zoning to perpetuate a spectrum of social experiences accommodates that range of visitor expectations.

Current and historic patterns of recreational use on the Rio Grande indicate that more than 95 percent of users treat the river as being comprised of different segments for recreational opportunities. Most use just one river segment per trip.

The Service provides for a spectrum of social experiences through the designation of threshold, primitive, and wild zones. Six river segments combine to form the threshold zone. The primitive and wild zones each consist of one river segment. Each zone includes one of the three major canyons.

a. The **threshold zone** provides backcountry experiences characterized by higher use levels and a greater density of users. Because more people may use the threshold zone, users may experience more encounters with other groups and fewer opportunities for solitude. Thus, those seeking solitude and a wilderness experience may choose to use a different zone. The

Service does not designate campsites. Due to the limited number of sites, several popular sites may receive most of the use. Because of more concentrated use, more impacts in the threshold zone may occur in the riparian zone than occur in the primitive and wild zones. Evidence of development may be more apparent.

Santa Elena Canyon lies outside the Wild and Scenic River designation. Visitor use data from recent years indicate that Santa Elena Canyon displays characteristics of a threshold area.

The threshold zone includes the following river segments (Map 4):

- the western Park boundary to the Santa Elena Canyon Take-out, which includes Santa Elena Canyon
- the Santa Elena Canyon Take-out to Cottonwood Campground
- Cottonwood Campground to the old Reed Camp location;
- the old Reed Camp location to Talley
- Solis to La Clocha
- La Clocha to Boquillas Canyon Entrance

These river segments combine to form the threshold zone, which totals 85 miles or 72.3 percent of the 118-mile river corridor.

b. **Primitive zone** characteristics include less crowding and lower user densities than the threshold zone. Use levels are moderate. Primitive zone users encounter fewer other groups and experience more solitude than users of the threshold zone. All camping is undesignated.

All of the **primitive zone**, which includes Mariscal Canyon, lies within the Rio Grande Wild and Scenic River. It is accessible only at the Talley and Solis primitive access points. The primitive designation ensures that users of Mariscal Canyon will experience more solitude than the users of Santa Elena Canyon.

One river segment comprises the **primitive zone**, which extends from

- Talley to Solis.

The **primitive zone** comprises 10 miles or 11.5 percent of the river corridor.

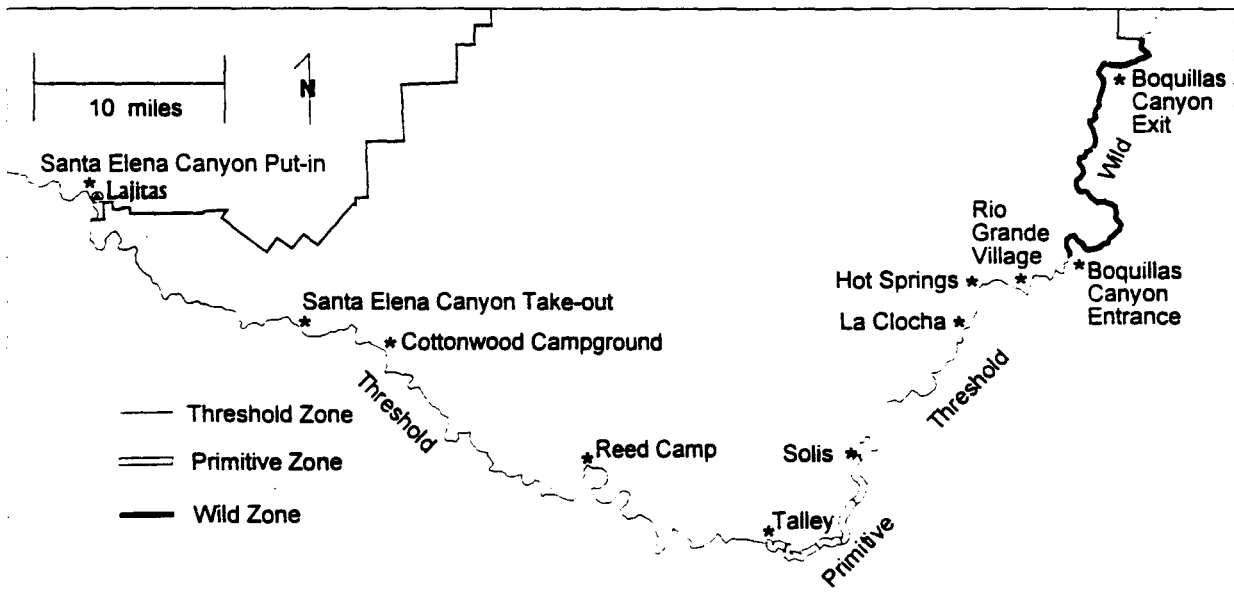
c. The wild zone of the river is characterized by the expectation of encountering few or no other parties. Users experience few human influences. The wild zone has the lowest density of users, which ensures the greatest opportunity for solitude. All camping is undesignated.

The wild zone, which includes Boquillas Canyon, also lies within the Rio Grande Wild and Scenic River designation. Designation as the "wild" zone ensures that users of Boquillas Canyon experience the least amount of intrusion from other groups and from development. Users have the greatest opportunity to experience solitude. The zone is generally inaccessible except by trail; access points lie outside the wild zone. Shorelines remain essentially primitive.

One river segment comprises the wild zone, which extends from

- the entrance of Boquillas Canyon to the eastern boundary of the Park.

The wild zone comprises 20.6 miles or 17.5 percent of the river corridor.



Map 4. Designated Zones

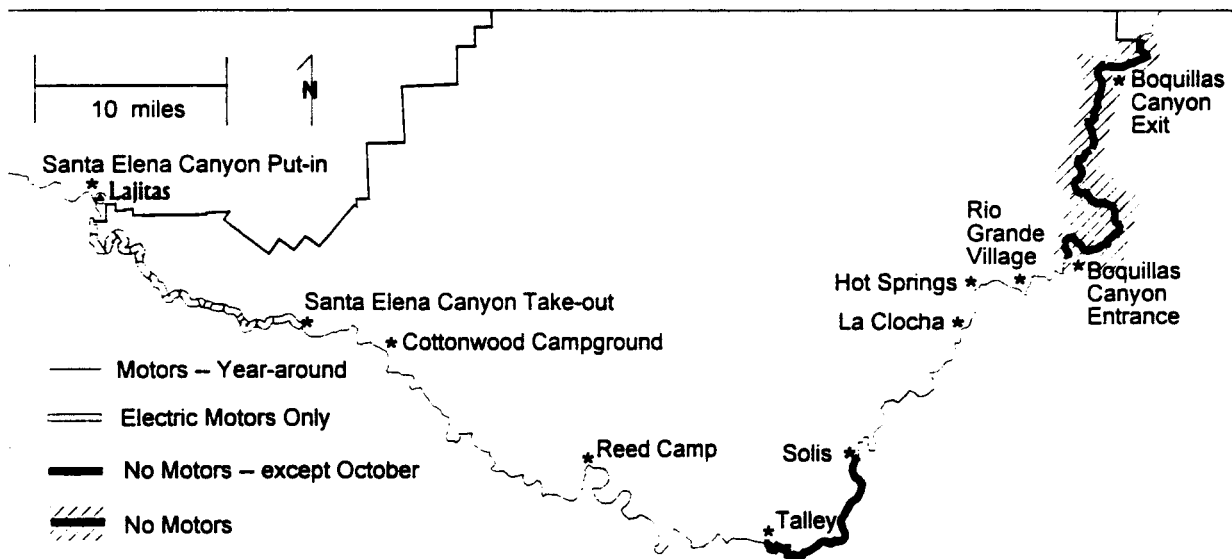
**2. Motor Use** - Motor use in the threshold zone varies according to the river segment. Electric motor use occurs in all threshold segments, including Santa Elena Canyon, throughout the entire year. Santa Elena Canyon segment is closed to all other motorized watercraft. Between-canyon threshold river segments are open year-round to watercraft using up to 60 horsepower motors.

The primitive zone, which includes Mariscal Canyon, is closed to all motorized watercraft, except during October, when it is open to watercraft using up to 60 horsepower motors.

The wild zone, which includes Boquillas Canyon, is closed to all motorized watercraft throughout the entire year.

The park may impose closures of certain river segments to motorized watercraft in order to protect endangered or sensitive species, as appropriate.

Motorized watercraft use is limited to conventional boats with inboard or outboard motors. Jet skis and other motorized watercraft that are used primarily for recreational purposes rather than providing access to Park resources are not allowed.



Map 5. Motor Use

**3. Fishing** - Fishing and seining for bait minnows is allowed on the Rio Grande within the Park. Taking fish from or releasing fish into any tributary stream of the Rio Grande or other stream, spring, or pond in the Park, however, is not allowed.

Unless otherwise stated in the Code of Federal Regulations (Title 36), State fishing regulations apply in the Park, but a State fishing license is not required. A free Service fishing permit from visitor contact stations is required, one permit per party per trip.

Twenty-five fish, per person per day, or in possession, is the catch limit. Fish caught in the Park may be used for personal consumption only; they cannot be sold. Limits do not apply to bait minnows.

After cleaning, fish parts must be removed as trash or deposited in the main river current.

Terrestrial and aquatic invertebrates are protected in the Park. No collecting of worms, larval insects, or other non-fish life forms is allowed. Use of live bait, except minnows obtained from the Rio Grande within the Park, is not allowed.

Fishing with pole and line, rod and reel, hand line, trot line, and throw line is allowed, but jug fishing is not.

Unattended throw and trot lines must have a valid gear tag attached between the tie point and first hook. The tag must include name and address of the person using the line and the date the line is set out. Fishing lines may not be left unattended for more than 24 hours and must be removed by the owner at the end of the fishing trip.

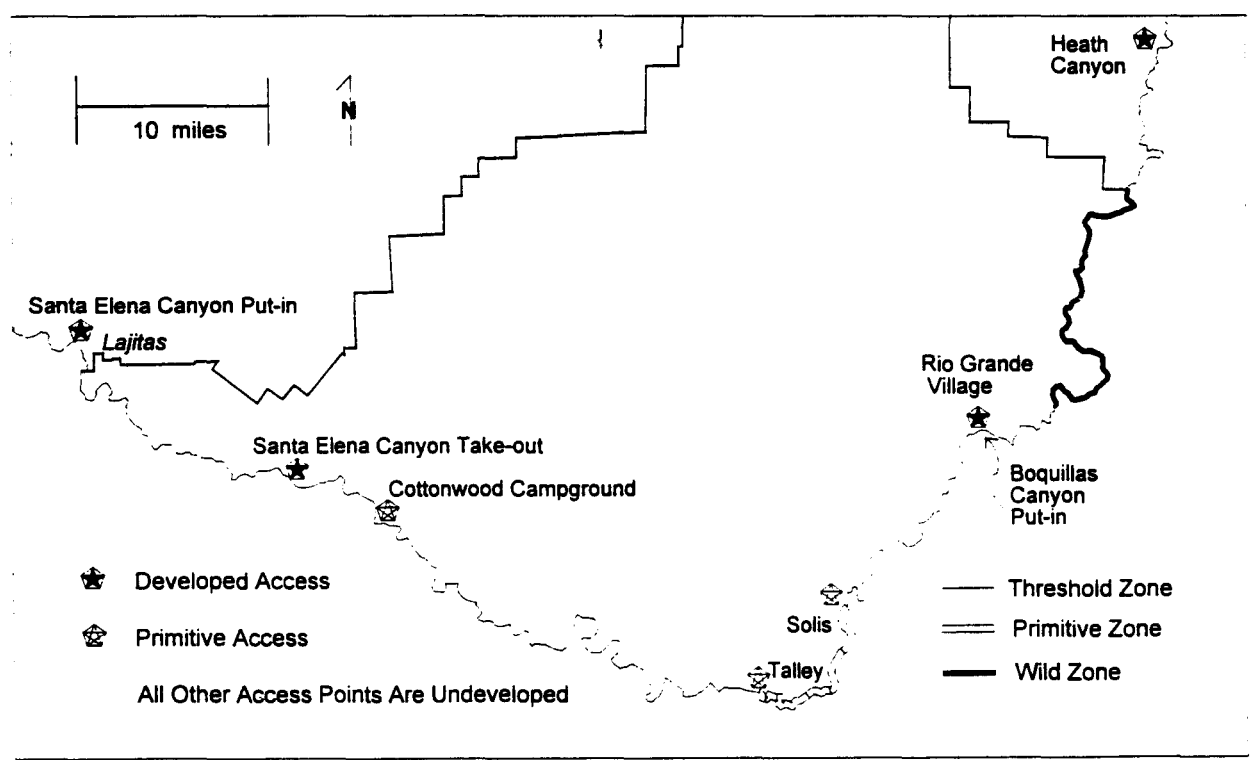
**4. Access** - The Service provides for access above and below the three major canyons. Access to the river above Santa Elena Canyon and below Boquillas Canyon is provided outside the Park at Lajitas and at Heath Canyon. Both locations are outside park boundaries and are privately owned.

At designated **developed access points**, the Park provides access that is suitable for recreational users of most ages, abilities, and physical limitations. River dynamics may cause temporary access changes. At **developed access points**, vehicles can drive to the river's edge. The Service provides ramps to the river at Santa Elena Take-out and Rio Grande Village.

At primitive access points, access is provided to the river bank, not to the river's edge. Primitive access is provided at Talley, Solis, and Cottonwood Campground. The Service will provide primitive access near Reed Camp should future levels warrant it.

Undeveloped access points exist at all other locations where the river is accessible to carry-in boating. Examples of undeveloped access points include Jewels Camp, Woodsons, Black Dike, Hot Springs, and La Clocha. These areas are considered designated launch points.

Toilets and trash receptacles are provided at developed access points served by paved roads within the Park. The Service will consider ways to provide them at Lajitas and Heath Canyon. No facilities will be provided at other access points.



Map 6. Access



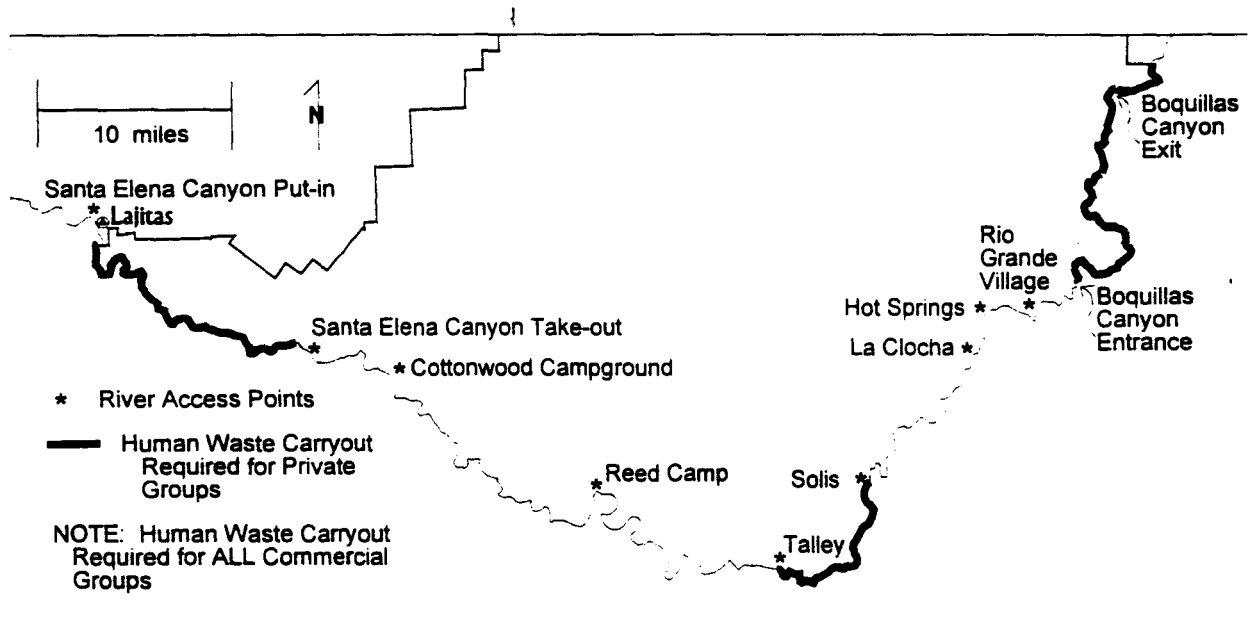
**5. Human Waste** - All solid human waste must be carried out with the following exceptions:

a. Carry out is encouraged, but not required, for private river users between the Santa Elena Take-out and Talley, and between Solis and the entrance to Boquillas Canyon. Human waste impacts will be monitored in these areas, however, and further actions taken if required.

These exceptions exist due to the low level of recreational use that the areas receive. This exception allows private boaters who do not have toilet systems the opportunity to experience a river trip.

b. Carry out is not required for kayak-only or single canoe trips. Human waste impacts in connection with this exception will be monitored, and future action will be taken if necessary.


This exception exists because space in a kayak or single canoe prohibits carrying a toilet system.



Map 7. Human Waste Carry out

Human waste carry out systems must be compatible with proper disposal at a sewage treatment facility or holding tank. Users of the Santa Elena Canyon dump trailer may continue to use paper bag and

sawdust systems until the trailer is replaced with a station that can handle waste from bagless carry out systems.

Pending available funding, a new disposal site that meets the EPA's human waste disposal requirements will be developed to serve west-bound users at the Santa Elena takeout, Castolon, or the north end of Old Maverick Road. The system accepting paper bags will remain functional until that time. A second disposal site for north-bound users will be developed at Panther Junction or Persimmon Gap. 

The carry-out requirements will go into effect as identified in the implementation section of this Plan regardless of the status of disposal facilities provided in the Park.

The Service will encourage retailers in the area to sell or rent human waste carry-out systems. The Service will educate the public on the need for and methods of human waste carry-out systems.

**6. Recreational Use Limits** - Management policies direct the Service to prevent unacceptable impacts on Park resources and adverse effects on visitor enjoyment. The Service recognizes that respondents to the Texas A&M University survey indicated they did not experience social problems from their encounters with other groups. The Service used that information in evaluating historic and recent use levels.

The number of launches per day and the party size per launch are limited. A launch is defined as a start or an entry from another river segment. Trips proceeding from one river segment into another are considered a new launch in the second river segment. Only one permit is required for a trip that continues through more than one river segment.

When establishing recreational use limits, the Service looked at the historic variety of experiences provided by each canyon segment, recent use, and physical characteristics of each river segment. Because social problems have not historically or recently existed, the Service established limits at somewhat higher levels than recent use. The goal is to perpetuate the variety of historic visitor experiences and to prevent problems from occurring in the future.

## **THRESHOLD ZONE:**

**Group Size Limits** - Each commercial company or special use group may launch no more than 30 people, excluding commercial guides, on any threshold river segment each day. Each private launch group may not exceed 30 persons.

### **Launch Limits -**

*For the western Park Boundary to the Santa Elena Canyon Take-out segment, which includes Santa Elena Canyon:*

- six commercial companies may each launch a combination of day, overnight, and multi-day trips per day
- five private groups may each launch a day, overnight, or multi-day trip per day
- one special use group may launch a day, overnight, or multi-day trip per day

When examining use data for Santa Elena Canyon from 1990 through 1996, the Service determined that 76 percent of the trips were commercial and 24 percent were private. Using a ratio of three commercial trips to one private trip, the limits would have been six commercial and two private launches. Using professional judgement and knowing that private trips tend to be smaller than commercial trips, however, the Service set the number of private launches allowed to five per day for Santa Elena Canyon.

*For the Santa Elena Take-out to Cottonwood Campground and from the La Clocha to Boquillas Canyon Entrance segments:*

- four commercial companies may launch per day
- twelve private groups may launch per day
- one special use group may launch per day

Because of their proximity to developments, only day use is allowed on these river segments.

*For the Cottonwood Campground to Reed Camp, the Reed Camp to Talley, and the Solis to La Clocha segments:*

- three commercial companies may each launch a combination of day, overnight, or multi-day trips per day
- eight private groups may each launch a day, overnight, or multi-day trip per day
- one special use group may launch a day, overnight, or multi-day trip per day

**PRIMITIVE ZONE:**

**Group Size Limits** - Each commercial company or special use group may launch no more than 20 people, excluding commercial guides, per day. Each private launch group may not exceed 20 persons per day.

**Launch Limits** -

*For the Talley to Solis segment, which includes Mariscal Canyon:*

- one commercial company may launch a combination of day, overnight, and multi-day trips per day
- one commercial company may launch a 1-day trip per day
- three private groups may each launch a day, overnight, or multi-day trip per day
- three special use groups may each launch a day, overnight, or multi-day trip per week (Sunday through Saturday)

Extreme drought conditions from 1993 through 1996 created a change from historic use patterns for Mariscal Canyon. During years of normal to high water (the early 1990's) the use ratio was three private trips to two commercial trips. Launch limits have been established based upon those ratios. Launch limits in Mariscal Canyon for low water periods are addressed separately at the end of this section.

**WILD ZONE:**

**Group Size Limits** - Each commercial company or special use group may launch no more than 20 people, excluding commercial guides, per day. Each private launch group may not exceed 20 persons.

## **Launch Limits -**

*For the Boquillas Canyon entrance to the eastern Park boundary, which includes Boquillas Canyon,*

- Three commercial companies may each launch a combination of day, overnight, and multi-day trips per day. When three commercial launches occur, at least one must be in the afternoon;
- four private groups may each launch a day, overnight, or multi-day trip per day; and
- three special use groups may each launch a day, overnight, or multi-day trip per week (Sunday through Saturday).

Launches for Boquillas Canyon will not be counted against the limits for the La Clocha to Boquillas Canyon entrance segment.

When examining the use data for Boquillas Canyon from 1990 through 1996, the Service determined that roughly four private trips occurred for every commercial trip. The Service altered these ratios slightly based upon professional judgement and the importance of Boquillas Canyon for groups traveling long distances on holiday weekends. The limits of four private launches and three commercial launches, with one of the commercial launches occurring in the afternoon, were established.

River Segment	Zone	Commer Launch	Priv. Launch	SUP Launch	#'s*	Motor
West Boundary - SEC Take-out	T	6	5	1	30	elec. only
SEC Take-out - Cottonwood Camp (day use only)	T	4	12	1	30	Y
Cottonwood Camp - Reed Camp	T	3	8	1	30	Y
Reed Camp - Talley	T	3	8	1	30	Y
Talley - Solis	P	1 + 1 day	3	3/wk	20	N*
Solis - La Clocha	T	3	8	1	30	Y
La Clocha - Boquillas Can. (day use only)	T	4	12	1	30	Y
Boquillas Can. - east boundary	W	2 + 1 afternoon	4	3/wk	20	N

\*excluding commercial guides T - Threshold, P - Primitive, W - Wild

\*motor use during October

Figure 7: Zoning and Use Limits

### LOW WATER PERIODS

During the mid-1990's, Big Bend experienced extreme drought conditions. Low water levels forced boaters to drag their watercraft over shallow sections. As water levels further decreased, commercial guests had to get out of boats and walk on unstable river cobbles through the water as guides pushed and pulled boats over obstacles. Eventually, water levels became so low that rafters and canoeists could not boat Santa Elena Canyon.

When water levels in Santa Elena Canyon drop so low that rafters and canoeist cannot boat it, use records indicate that commercial companies prefer to shift use to Colorado Canyon, which lies in Big Bend Ranch State Park upstream from the park boundary. A Colorado Canyon trip is logistically simpler than a Mariscal Canyon trip, and all shuttle

transportation uses paved roads. In 1995 and 1996, however, the water level dropped so low that even Colorado Canyon was impassable; commercial outfitters were forced to use Mariscal Canyon.

Use records and daily water flows from the IBWC indicate that commercial operators can no longer run Santa Elena Canyon when flow drops to between 125 and 150 cubic feet per second (cfs) on the Presidio gauge. At that point, conditions have deteriorated so much that guests no longer receive a quality river experience.

During extremely low water conditions that prevent use of Santa Elena Canyon, launch limits in Mariscal Canyon will be increased to allow Park visitors a quality river experience and to provide for continued operation of the commercial outfitters.

If the water level drops below 200 cfs on the Presidio gauge, commercial operators may request the Service to implement low water launch limits in Mariscal Canyon. During low water periods, two commercial companies may launch any combination of day, overnight, and multi-day trips per day. In addition, two commercial companies per day may launch a 1-day trip.

Commercial Launches	Normal and High Water	Low Water
Any combination of day, overnight or multi-day trips	1 commercial company	2 commercial companies
Day trip only	1 commercial company	2 commercial companies

Figure 8. Commercial Launches in Mariscal Canyon during Periods of Low Water.

As a general rule, when the water level returns to 200 cfs on the Presidio gauge for a week, Mariscal Canyon launch numbers will return to one commercial company launch per day of any combination of day, overnight, and multi-day trips and one commercial launch per day of a day trip.

Records indicate that, unlike commercial use, private use does not switch to Mariscal Canyon. Instead, private launches on the entire river decrease in conjunction with lower water levels. In contrast to commercial use, private use of Mariscal Canyon tends to be the greatest during high water periods.

**B. Natural Resources** - The following resource regulations state general provisions guiding resource protection and are excerpted from Title 36, Code of Federal Regulations and the Park's Compendium, which should be referred to for a complete listing of resource protection regulations.

- Possessing, destroying, injuring, defacing, removing, digging, or disturbing plants, animals, fossils, minerals, or other natural features is prohibited.
- No fruits, nuts, berries, edible plants, or edible plant parts may be collected, even for personal consumption.
- Between February 1 and July 15 of each year, the following visitor use restrictions will be implemented to minimize disturbance to nesting Peregrine falcons.

Closed to public access: the Mariscal Canyon Rim west of Cross Canyon; within one-quarter mile of the Santa Elena Canyon Rim; and the Santa Elena Canyon Rim's extension to Bruja Canyon.

Closed to motor use: the Santa Elena Canyon entrance to the mouth of Alamo Creek, Talley to Solis, and between the entrance and exit of Boquillas Canyon.

If the birds expand their range and develop new territories, additional restrictions may occur. Restrictions are implemented only if birds are nesting; specific closures will not be implemented if the birds abandon a site.

**1. Endangered and Threatened Species** - Action plans for monitoring and protecting endangered species populations occurring within the Park will be developed. Human use of certain areas or habitats may be restricted for the protection of endangered species. Notice of such restrictions will be made in advance when possible, as part of an approved action plan.

**2. Wildlife** - The Service will seek to improve wildlife habitat in the riparian corridor. Educational outreach activities in neighboring American and Mexican communities will continue to include messages which encourage appreciation of and support for park wildlife.

**3. Aquatic Habitats (including fisheries)** - The Service will seek to implement monitoring of aquatic organisms on a continuous, long-term



basis. When correlated to influences such as pollution and altered flows, these data may reveal cause-and-effect relationships. These results will be applied in supporting efforts to protect the river environment.

#### **4. Riparian Habitats**

a. **Sensitive Plant Species** - The Service will monitor sensitive plant populations occurring in the river corridor to detect changes, which indicate the need for increased protection. Monitoring will occur on an annual basis, if possible.

b. **Exotic Plant Species** - Existing budgets do not allow for effective control of riverside exotic species, primarily grasses and tamarisk. These species continue to displace native species. Even if control methods were affordable, flood events would cause rapid and widespread re-establishment of exotic species.

The Service will attempt to control introduced species in sensitive locations, such as spring environments and sites where rare, threatened, or endangered species could be adversely affected by non-native competitors.

**C. Cultural Resources Regulations** - Park management will continue to pursue the means to survey and document unrecorded archeological and historic sites. The Service will seek to develop programs to monitor human impacts upon such sites.

**Regulations** - The following resource regulations state general provisions guiding resource protection and are excerpted from Title 36, Code of Federal Regulations and the Park's Compendium, which should be referred to for a complete listing of resource protection regulations.

Possessing, destroying, injuring, defacing, removing, digging, or disturbing a structure or its furnishings or fixtures, or other cultural or archeological resources is prohibited.

**D. Recreational Resources Regulations** - The following recreational regulations state general provisions guiding resource protection and are excerpted from Title 36, Code of Federal Regulations and the Park's Compendium, which should be referred to for a complete listing of regulations.

- Within the boundaries of the Park, the Rio Grande is closed to automobile traffic, whether self-powered or under tow.
- Camping is not allowed within one-half mile of any developed area or road, except in developed campgrounds or at designated backcountry road campsites.
- Closed to camping are: the area between the upriver end of the Santa Elena Canyon Nature Trail and Castolon, bounded by the Rio Grande and Park Route 16; the river floodplain from one-half mile upstream from the mouth of Tornillo Creek to the Boquillas Canyon trail terminus; and within one-half mile of San Vicente Crossing.
- Wood fires are allowed when contained in firepans and located within the floodplain of the river in areas that are open to camping. Only dead and down wood from the floodplain may be used. Charcoal fires contained in fire pans may be used in any area of the river floodplain. Fire remains must be cold and out, and deposited in trash receptacles or carried out of the Park, except for non-floatable debris that may be placed in the main current of the river.
- Cooking and food liquids must be strained (including dishwater) and deposited in the river. Strained materials must be carried out and deposited in a trash container.
- Dogs (except guide, search, and hearing ear dogs), cats, and other pets are prohibited on the river.
- Alcoholic beverages are prohibited in the Langford Hot Springs area, including the parking area, the loop trail, and the area from the mouth of Tornillo Creek to one-half mile downstream from the springs along the Rio Grande. Nude bathing is also prohibited at Langford Hot Springs.

**E. Resource and Use Impact Monitoring** - Little impact monitoring has been conducted in the Park. Baseline documentation of backcountry campsite impacts, including specific campsites within the river corridor, has been made. Cyclic monitoring programs, which identify change in camping and livestock impacts over time, however, are not in place.

The Service will coordinate efforts to devise monitoring programs for human use and livestock impacts. The Service will strive to implement a program which establishes acceptable impact limits, monitors change over time, and provides management responses to maintain impacts below established limits.

## **F. Administration**

**1. Considerations in Managing Boating Use - Factors**, which because of law, regulation, or circumstances, influence river management include:

- The international boundary with Mexico
- Mariscal Canyon through Boquillas Canyon is included in the National Wild and Scenic Rivers System
- Threatened and endangered species located within the river corridor, including the cactus, Coryphantha ramillosa; the Peregrine falcon, Falco peregrinus; and Big Bend mosquito fish, Gambusia gaigei
- Historic and prehistoric sites
- Limited vehicle access to much of the river corridor
- The limited number of large campsites in Santa Elena and Mariscal Canyons
- Executive Orders 11990 and 11988, which prohibit placing structures in the floodplain
- Water quality and volume as affected by upstream use in Colorado, New Mexico, and Texas under the direction of the Rio Grande Compact Commission, the IBWC, and Mexico
- Natural river dynamics such as erosion and course changes

**2. Administrative Constraints and Responsibilities** - The Service will provide access to the river, make park rules and regulations available to the public, enforce the rules and regulations, respond to emergencies in the river corridor, monitor park resources and user impact upon those resources, and manage commercial and private use of the river. The degree to which this is carried out will depend upon the park budget.

Two River Rangers patrol, enforce regulations, provide emergency services, and monitor resources along the river corridor. The Service has one Management Assistant who oversees all commercial activity in the park, including commercial use of the river. The River Rangers work with the Management Assistant to monitor commercial use of the river and enforce commercial authorization stipulations.

River information is available to the public by phone or mail. Park visitor centers provide publications and information via exhibits and staff contact. Funding levels presently require the closure of some visitor centers during low visitor use months.

**3. Permit System Management** - The Service requires a permit for the use of any watercraft (except day use inner tubes) within Park boundaries. *Only one permit is needed for a trip, even for those users traveling through two or more river segments or zones.* Permit numbers will generally be unrestricted. If, however, prescribed launch limits are exceeded during a specified time period and location for two consecutive years, use limit restrictions will be implemented the following year for that specific time period and river segment. The Service will monitor time periods during the year, such as Columbus Day weekend, rather than specific dates, such as October 12 to 14.

*Example:* No use limits are exceeded until Thanksgiving weekend, 1998, when private use in Boquillas Canyon exceeds the number of launches. Permits would still be issued in unrestricted numbers the following year (1999).

In 1999, private use again exceeds the number of launches during the Thanksgiving weekend in Boquillas Canyon. The following year (2000), the number of launches in Boquillas Canyon during the Thanksgiving weekend would be restricted. Only the number of private launches during Thanksgiving weekend in Boquillas Canyon would be affected.

*Example:* Commercial use in Santa Elena Canyon exceeds the prescribed number of launches during the second week of March in 1999. The following year, 2000, commercial use of Santa Elena Canyon drops below the prescribed number of launches during the second week of March. Use restrictions for commercial use of Santa Elena Canyon would not be put in place during the second week of March in the year 2001, because limits had not been exceeded for two consecutive years.

If use of an area during the specified period drops below the established use limits for three consecutive years, permits will once again be issued in unrestricted numbers.

a. Unrestricted use - During unrestricted use periods, private groups can obtain a permit at any visitor center up to 24 hours before launching. Santa Elena boaters can receive permits at the Barton Warnock Environmental Center self-permit station.

Commercial outfitters will continue to self-issue permits for their trips. Copies of the permits must be submitted to the Park Communications Center on a weekly basis.

b. Restricted use, private - Once prescribed numbers of launches for a location during a specific time period are exceeded during two consecutive years, private use will be restricted for the time and place. Private permits will be available by reservation (up to 90 days in advance) and on a first-come basis (up to 24 hours before launching). Roughly three-quarters of the allocated permits will be available by reservation. The remaining one-quarter will be available on a first-come, walk-in basis.

River segment	Total private permits	Permits by reservation	Permits by walk-in
West boundary - SEC Take-out	5	4	1
SEC Take-out - Cottonwood Camp.	12	9	3
Cottonwood Camp. Reed Camp	8	6	2
Reed Camp - Talley	8	6	2
Talley - Solis	3	2	1
Solis - La Clocha	8	6	2
La Clocha - Boquillas Canyon	12	9	3
Boquillas Canyon - East Boundary	4	3	1

Figure 9. Private Permits by Reservation and Walk-in.

Park staff will track use, and once use levels have been reached, no more permits will be issued for that location for that day. Permits will still be issued for other areas in which use is not restricted. Private users will be able to obtain a permit from the staff at the Barton Warnock Environmental Center during the restricted period (if the use limit has not been reached) but will not be able to self-permit.

Should the Service incur significant expenses to administer private permits or a permit reservation system, permits may be issued to users at a cost intended to recoup expenses.

c. **Restricted use, commercial** - Once commercial launch numbers for a location during a specific time period are restricted, commercial users will be required to apply for launch reservations. They will continue to self-permit for all unrestricted locations and dates.

The Service will notify commercial outfitters by August 1 of the specific locations and dates of restricted launches for the following year. Commercial outfitters will submit requests for launches on restricted dates by September 1. The Service will grant launch dates by October 1. Scheduling conflicts (dates for which launch demands exceed availability) will be resolved by the commercial outfitters or a random lottery. A fee for each launch request may be charged to cover the cost of administering the permit program.

d. **Special Use Groups** - In some cases, the Service will issue a Special Use Permit (SUP) to public institutions and governmental or quasi-governmental organizations. Examples of institutions that may receive consideration for a SUP include university recreational organizations, military recreational groups, museum-sponsored tours, etc.

This type of group usually has an individual or group of individuals who receive compensation for organizing and/or conducting trips. Rather than marketing their trips to the general public and park visitors as commercial companies do, these groups target members of their organization or institution. To be considered a special group, at least eighty percent of the trip participants must be members of the organization or institution.

Permits will be issued to special groups on a first-come basis, up to six months in advance of the launch date. Since SUP's are fewer and more controllable, permits will be issued only up to, but not exceeding, launch limits.

An organization must apply for a separate SUP prior to each trip, pay the SUP fee, and meet all the SUP special conditions. The special conditions place basically the same requirements on the special use group as commercial companies must meet. Guides must meet minimum qualifications, and the group must follow the same procedures on the river as commercial companies do.

If this type of organization contracts a commercial outfitter to outfit and conduct the trip, the trip is considered commercial.

A SUP does not limit the obligation of the Superintendent to issue similar permits at the request of other persons seeking to conduct the same or similar activities in the area. Neither does it constitute a concession contract or permit within the meaning of 16 U.S.C. 20 et seq. No preferential right of renewal attaches to the permit.

**4. Boat Permits - The following are special conditions of all river use permits:**

- a. Each person shall have a U.S. Coast Guard approved personal flotation device (PFD) which is properly fitted, in serviceable condition, and immediately accessible while on the river. Type I, III, or V PFD's are required for Santa Elena and Mariscal canyons. PFD's must be worn in Class II or greater difficulty whitewater. An extra PFD must be carried on each trip.
- b. Each vessel shall carry an extra paddle or oar; kayaks shall have an extra paddle per party.
- c. Each group using inflatable vessels, except air mattresses or inner tubes, must carry an operable pump and a patch kit capable of making major repairs.
- d. No vessel shall carry more than a safe load (in persons or total weight) considering the type of craft, intended use area, and water and weather conditions.

e. Inner tubes are not allowed in Santa Elena or Mariscal canyons.

**5. Interpretation and Visitor Information - The Service has identified three target groups with specific information needs:**

- Service personnel directly or indirectly involved in implementing the river use management program
- Related agencies and park neighbors, including those adjacent to river boundaries and those receiving economic benefits from river use
- Visitors and the general public, including park users and permittees, special interest groups, Park and local community residents, Park concessions employees, and the media

Service personnel must be aware of river use management activities to ensure the effective information dissemination to the general public. The entire park staff should be familiar with the River Use Management Plan and policies regarding resource protection, recreational use, and visitor safety. The Service will accomplish this on-going education program through training, general employee meetings, and active participation by park staff in the Park's river management program.

Park Management will assure an open line of communication with all affected groups, such as neighbors and Federal, State, and local agencies with a vested interest in the Park's river use management activities.

The Park's Public Information Officer (PIO) will serve as the key person to disseminate general information and generate press and public information releases. The Management Assistant will distribute pertinent information to commercial operations.

The general staff, with Interpretation and Visitor Services taking the lead, will disseminate accurate river use information to the visiting public. This includes interpretation of the river ecosystem, river use regulations, safety information, and recreational skills. In conjunction with other park divisions, the Division of Interpretation and Visitor Services will develop techniques, such as bulletin boards at access points, to explain river use management policies to the public. Visitor and Resource Protection staff members will disseminate appropriate



information while conducting river patrols and meeting boaters at launch and take-out points.

**6. Safety, Search, and Rescue** - Hand moving of driftwood that blocks the channel and creates a potential safety hazard will be allowed. Moving any geologic feature, such as boulders or gravel, is prohibited.

Service regulations require that all incidents, which involve a personal injury requiring more than first aid, property damage more than \$100, emergency evacuations, etc., must be reported to the Service. The Service directs evacuation, rescue, and patient treatment should an incident require resources beyond those immediately available to the involved party.

**7. Commercial Use** - The Code of Federal Regulations (36 CFR 5.3) requires that any business or commercial activity receive written authorization to operate within the Park. Commercial operators must comply with detailed operating conditions as defined in an attachment to their authorization.

The Service has defined commercial as

"All services and activities offered to park visitors and/or the general public, which use park resources, and are undertaken for or result in compensation, monetary gain, benefits, or profit to an individual, organization, or corporation."

Commercial status is not determined based upon whether or not such entity is organized for purposes recognized as non-profit under local, State, or Federal law.

To be considered noncommercial, all members of the group must share in the preparation of the trip (logistics, food purchase, equipment assembly, transportation, and vehicle shuttle) and conduct of the trip (including food preparation and sanitation). Collecting a set fee (monetary compensation), payable to an individual, group, or organization for conducting, leading, or guiding a noncommercial river trip is not allowed.

Trips may be considered noncommercial even though a member of the trip, within his or her normal scope of employment, receives a salary from an educational institution or non-profit organization to participate

in the trip. This salary may not come directly through fees contributed by members of the party. No person may be hired or paid to participate in a trip operating under the noncommercial permit system.

Local commercial companies also have authorization to conduct salvage operations on the river. Private boaters may contract with authorized companies to retrieve any equipment they may have abandoned. Commercial companies will notify the Service of any salvage operations they conduct.

## **XI. Implementation Schedule**

The Service recognizes that many aspects of the Plan will require a period of public education before strict implementation can occur. The Plan implementation will begin on October 1 of the year following its approval. This will allow commercial companies to honor reservations they may have already made before converting to new limits and practices. It will also provide the Service with the time needed to develop new interpretive literature and public announcements to inform river users of new regulations and requirements.

## ***Definitions***

***Commercial*** - All services and activities offered to park visitors and/or the general public, which use park resources, and are undertaken for or result in compensation, monetary gain, benefits, or profit to an individual, organization, or corporation.

***Commercial Guides*** - Individuals who meet the Service's minimum first aid and training requirements. Before beginning to work in the Park, outfitters must submit copies of the individual's first aid certificates and certify that the individual has met the training requirements.

***Developed Access*** - Minimally maintained dirt ramps to the water's edge.

***Group*** - A party of people who stay together during their trip, including meals and camping. Each party is required to have a permit.

***Jug Fishing*** - A fishing method which uses a free floating object, usually a plastic or metal bottle, with a short line and hook attached.

***Launch*** - The start of a river trip, or entry into one river segment from another river segment.

***Primitive Access*** - Dirt or paved roads that end at the riverbank, not necessarily at the water's edge.

***Primitive Zone*** - A management area characterized by less crowding and lower user densities than the threshold zone.

***River Segment*** - A specific portion of the river, designated for management purposes, with identified beginning and ending points.

***Special Use Group*** - Individuals or a group of individuals, who are members of a specific organization, such as university recreational organizations, military installation recreational organizations, museum-sponsored tours groups, etc. The organization sponsors services or activities, which use park resources, and results in compensation, monetary gain, benefits, or profit to an individual, organization, or

corporation, but not a commercial outfitter. At least 80 percent of the trip participants must be members of the organization. If a special use group contracts a commercial outfitter to outfit and conduct the trip, the trip is considered commercial, and the commercial outfitter must be permitted.

***Threshold Zone*** - A backcountry management area that is characterized by high use levels and user densities.

***Throw Line*** - A fishing method in which a line is attached to the bank at one end.

***Trot Line*** - A fishing method in which a line is attached to the bank at both ends.

***Undeveloped Access*** - Dirt road that ends near the river with a foot trail leading to the water's edge.

***Wild Zone*** - A backcountry management area that is characterized by the expectation of encountering few or no other parties.

***Zones*** - Backcountry areas with defined management strategies to perpetuate distinct social experience opportunities.

***Annual Totals by Canyon, 1983 - 1996*****Santa Elena**

<b>Year</b>	<b>Private Trips</b>	<b>Private People</b>	<b>Commercial Trips</b>	<b>Commercial People</b>
1983	378	2096	242	1902
1984	391	2037	535	3982
1985	595	3263	585	3653
1986	440	2728	568	3809
1987	277	1590	561	3801
1988	316	1750	530	3700
1989	198	993	631	4193
1990	138	725	667	4980
1991	118	548	562	4561
1992	282	1580	568	5198
1993	227	1078	897	6289
1994	165	751	448	4318
1995	120	467	476	2736
1996	109	477	359	2374
<b>TOTALS</b>	<b>3818</b>	<b>15343</b>	<b>7891</b>	<b>57252</b>

**Mariscal**

<b>Year</b>	<b>Private Trips</b>	<b>Private People</b>	<b>Commercial Trips</b>	<b>Commercial People</b>
1983	206	1208	45	368
1984	239	1406	57	394
1985	278	1407	127	721
1986	244	1306	108	800
1987	152	847	66	1082
1988	202	1038	86	608
1989	110	492	28	215
1990	77	369	29	205
1991	60	346	28	155
1992	126	698	46	274
1993	89	498	138	514
1994	26	113	14	123
1995	109	564	242	1811
1996	37	227	143	1288
<b>TOTALS</b>	<b>1955</b>	<b>10519</b>	<b>1158</b>	<b>8558</b>

**Boquillas**

<b>Year</b>	<b>Private Trips</b>	<b>Private People</b>	<b>Commercial Trips</b>	<b>Commercial People</b>
1983	177	1148	15	102
1984	205	12066	37	220
1985	273	1413	66	421
1986	249	1239	36	297
1987	200	1018	33	249
1988	233	1153	33	262
1989	125	526	20	133
1990	112	563	29	160
1991	105	605	21	132
1992	215	1436	34	299
1993	193	971	88	661
1994	70	347	14	152
1995	129	704	31	218
1996	83	446	14	133
<b>TOTALS</b>	<b>2426</b>	<b>12940</b>	<b>483</b>	<b>3439</b>

**Private Launches Over Limit By Canyon, 1990 - 1996**  
**(Had limits been in place)**

<b>Santa Elena Canyon (Launch Limit: 5)</b>			
<b>Year</b>	<b>Date</b>	<b>Launches</b>	<b># Over Limit</b>
1991	11/28	8	3
	12/29	6	1
1992	3/14	14	9
	3/17	22	17
	3/20	8	3
	3/21	6	1
	4/03	6	1
	4/17	15	10
	4/18	10	5
	5/30	6	1
1993	3/16	8	3
1994	3/14	6	1
	3/18	7	2
	4/16	6	1
1996	11/28	7	2

<b>Mariscal Canyon (Launch Limit: 3)</b>			
<b>Year</b>	<b>Date</b>	<b>Launches</b>	<b># Over Limit</b>
1991	3/09	4	1
1992	3/07	4	1
	3/16	8	5
	3/21	6	3
	3/24	4	1
	5/16	4	1
1995	3/13	5	2
	3/19	4	1



**Boquillas Canyon (Launch Limit: 4)**

Year	Date	Launches	# Over Limit
1990	11/22	11	8
1991	11/28	6	2
1992	3/14	6	2
	3/15	12	8
	3/22	8	4
	3/25	5	1
	4/10	9	5
	11/26	6	2
1993	11/25	6	2
1995	3/19	5	1
	11/23	9	5
1996	11/28	6	2

**Commercial Launches Over Limit By Canyon, 1990 - 1996**  
**(Had limits been in place)**

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**Santa Elena Canyon (Launch Limit: 6 Companies)**

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Year	Date	Launches	# Over Limit
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No exceedances

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**Mariscal 1990 - 1992 (Normal Launch Limit: 2 Companies - 1 of which may be an overnight<sup>1</sup>; the other may only launch a day trip)**

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Year	Date	Launches	# Over Limit
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1992	3/15	2 overnight	1 overnight
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<sup>1</sup> Any multi-day trip, regardless of how many nights permitted

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**Mariscal 1993 - 1996 (Low Water Period Launch Limit: 4 companies - 2 of which may be overnight<sup>2</sup>; the other 2 may only launch day trips)**


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Year	Date	Launches	# Over Limit
1993	4/09	3 overnight	1 overnight
1995	3/13	3 overnight, 2 day	1 overnight
	3/14	3 overnight, 2 day	1 overnight
	3/15	3 overnight, 1 day	1 overnight
	3/16	3 overnight, 1 day	1 overnight
	3/20	2 overnight, 3 day	1 day
	3/24	3 overnight, 2 day	1 overnight
	3/28	3 overnight, 2 day	1 overnight
	5/06	3 overnight	1 overnight
	4/07	3 overnight, 2 day	1 overnight
4/12	3 overnight, 2 day	1 overnight	

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**Boquillas Canyon (Launch Limit 3 Companies ) 1990 - 1996**


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Year	Date	Launches	# Over Limit
No Exceedances			

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<sup>2</sup> Any multi-day trip, regardless of how many nights permitted

RIVER USE AREA CONTROL CHART PAGE 1 OF 4

MONTH: \_\_\_\_\_ YEAR: \_\_\_\_\_

Record # of people in each launch on each day

SPHERIC NAME	CODE	Record # of people in each launch on each day																															TOTALS		
		LAUNCH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		31	
UPPER PARK BOUNDARY TO SANTA ELENA TAKEOUT	T01	PRIVATE LAUNCH																																	
	T01	2																																	
	T01	3																																	
	T01	4																																	
	T01	5																																	
SANTA ELENA TAKEOUT TO COTTONWOOD CAMPGROUND	T02	PRIVATE LAUNCH																																	
	T02	2																																	
	T02	3																																	
	T02	4																																	
	T02	5																																	
	T02	6																																	
	T02	7																																	
	T02	8																																	
	T02	9																																	
	T02	10																																	
	T02	11																																	
	T02	12																																	
T02	1	SPECIAL USE LAUNCH																																	

Control Charts

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RIVER USE AREA CONTROL CHART PAGE 2 OF 4

MONTH: \_\_\_\_\_ YEAR: \_\_\_\_\_

Record # of people in each launch on each day

SEMENT NAME	LINE	LAUNCH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS	
COTTONWOOD CAMPGROUND TO REED CAMP  10 PEOPLE PER LAUNCH MAX.	T03	1																																	
	T03	2																																	
	T03	3																																	
	T03	4																																	
	T03	5																																	
	T03	6																																	
	T03	7																																	
	T03	8																																	
	T03	1																																	
REED CAMP TO TALLEY  30 PEOPLE PER LAUNCH MAX.	T03A	1																																	
	T03A	2																																	
	T03A	3																																	
	T03A	4																																	
	T03A	5																																	
	T03A	6																																	
	T03A	7																																	
	T03A	8																																	
	T03A	1																																	

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Record # of people in each launch on each day

SEMENT NAME	CODE	LAUNCH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS
TALLEY TO SOLIS	P02	1																																
	P02	2																																
	P02	3																																
20 PEOPLE PER LAUNCH MAX.	P02	3																																
NO MOTORS	P02	1 per week																																
1 SPECIAL USE LAUNCH PER WEEK																																		
SOLIS TO LA CLOCHA	T04	1																																
	T04	2																																
30 PEOPLE PER LAUNCH MAX.	T04	3																																
	T04	4																																
	T04	5																																
	T04	6																																
	T04	7																																
	T04	8																																
	T04	1																																
	T04	1																																

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Record # of people in each launch on each day

SEGMENT NAME	CODE	LAUNCH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS
LA CLOCHA TO BOQUILLAS CANYON	T05	1																																
	T05	2																																
	T05	3																																
	T05	4																																
	T05	5																																
	T05	6																																
	T05	7																																
	T05	8																																
	T05	9																																
	T05	10																																
	T05	11																																
	T05	12																																
BOQUILLAS CANYON TO LOWER PARK BOUNDARY	W01	1																																
	W01	2																																
	W01	3																																
	W01	4																																
20 PEOPLE PER LAUNCH MAX.																																		
NO MOTORS																																		

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