

ADJACENT US- MEXICO BORDER NATURAL PROTECTED AREAS: PROTECTION, MANAGEMENT AND COOPERATION

By **Mark J. Spalding**, international environmental attorney, and lecturer, Graduate School of International Relations and Pacific Studies, University of California, San Diego, and **Joanna G. Salazar**, Graduate School of International Relations and Pacific Studies

Prepared for a panel entitled ENVIRONMENTAL POLICY FORMATION IN MEXICO: LESSONS AND PROSPECTS as part of a Center for US-Mexican Studies conference on THE ENVIRONMENT OF GREATER MEXICO: HISTORY, CULTURE, ECONOMY, AND POLITICS

March 5-6, 1999¹

Abstract

There are a number of adjacent parks and other adjacent natural protected areas along the US-Mexico border. The vehicle for a discussion of their binational management will be the two binational natural protected areas cooperation pilot programs established in a 1997 DOI/SEMARNAP letter of intent. The paper briefly describes the set of natural protected areas in these pilot programs as well as the US and Mexican federal policies regarding natural protected areas management. It then describes the extant binational cooperation on adjacent natural protected areas. The paper closes with a focus on the barriers and opportunities for further cooperative efforts regarding those parks. The result of the analysis indicates there is a remarkable amount of cooperation at the present time as well as significant opportunities for more cooperation, however there still remain many obstacles.

I. Introduction

At present, Mexico and the US have well-developed policies regarding protected natural areas, particularly in their national parks and other officially designated natural sites. The policy-making in this area has not always been coordinated at the binational level, at the national level or at the state level. Often different agencies have developed parts of such policies, however, due to limited mandates or internally conflicted mandates; they cannot always define a comprehensive vision of protection for natural areas. This said, there has been some government inter-agency coordination initiatives within each national government and with each other. For example, as a manifestation of a binational shared concern, there are instances of sharing of information and expertise related to protected natural areas.

The US, and to a much lesser extent Mexico, have also been developing policies/programs for cooperative management with local and aboriginal communities. Such Tribal issues are of critical importance in the US because Tribal governments are the primary managers of Tribal trust land and Tribal natural and cultural resources located both on and off current Reservations. Also all federal agencies and departments, including the National Park Service (NPS), Forest Service (USFS),

¹ This paper was presented in draft form in March 1999, it was then distributed in Spanish and in English to the members of the Border XXI Natural Resources Workgroup at the National Coordinators Meeting in Ensenada in May 1999, and at the 2nd US-Mexico Letter of Intent Meeting in Tucson in July 1999. The authors are thankful for all the comments provided, but especially wish to acknowledge the invaluable comments and direction on this document by the following individuals (organizations listed for identification purposes only): Steve Cornelius of the Sonoran Institute, Susan Goodwin of the Department of the Interior, Beau McClure of the Bureau of Land Management, Carol Purchase of the Big Bend National Park, Melida Rodriguez Tajbakhsh of the US Fish and Wildlife Service, and Terry Sprouse of the Arizona Department of Water Resources.

Bureau of Land Management (BLM), and the US Fish and Wildlife Service (FWS) must consult with Indian Tribes on a government-to-government basis before taking any action which affects Tribal members, lands or other resources. To add to this mix, there has been a strong conflict between some states and the federal government in the US regarding the regulation of federal natural areas that fall within those states' boundaries.

Given the current state of development of government policy and development of non-governmental interest, there is a tremendous opportunity for more binational cooperation related to adjacent protected natural areas. Because Mexico and the US have many shared ecosystems at their shared border, there is a need for a broad perspective on protected natural areas, or at least binational principles and goals. Once such principles are established, there is a need for coordination and implementation at the national level because protected areas management cuts across departments. Such national level coordination is needed from an ecosystem point of view.

At present there has been significant environmental degradation in protected natural areas — particularly in the most popular parks. This coincides with the under-funding of protected areas management, a trend toward less government spending, and pressure to generate funds from tourism. Thus, the time is ripe for a new direction that balances economic, social, cultural and environmental interests without sacrificing the human need for connectedness with nature.

Although cooperative relationships have developed locally among border communities, NGOs and state and federal agencies, efforts have generally been area - or issue - specific and uncoordinated along the East-West spectrum. Stakeholders along the border have rallied around specific issues to form coalitions for addressing border environmental problems, and as such, these coalitions have generally been North-South focused. In the same vein, there have been cases where local management staff from US federal and state authorities have sought cooperation from their southern counterparts, local research organizations and communities in order to successfully carry out natural resource protection in designated areas along the border. Traditionally these efforts have been fragmented and specific. However, in the last decade, agencies within the US and Mexican federal governments have made great strides in coordinating their efforts both along the border as well as across the border. In addition, with the recent implementation of the 1997 Letter of Intent to Cooperate on Border Region Protected Areas, many of the previously established relationships have been formalized, thereby facilitating existing cooperative efforts as well as initiating new ones.

II. Description of Properties

The Border region — the Southwest US and Northern Mexico — combines the ecoregions of Eastern Temperate Forests, North American Deserts, Mediterranean California, Temperate Sierras, the southernmost part of the Great Plains, and some Southern Semi-Arid Highlands. The landscape varies from mountains, grasslands, and canyons to desert. It hosts many impressive Biosphere Reserves, National Parks, National Monuments, Wildlife Refuges, National Forests, Military Reservations, State lands and other public lands much of it with wilderness status.

Some interesting facts:

- The borderlands² have the highest rate of species endangerment in the United States.
- Thirty-one percent of the species listed as threatened or endangered by the DOI are found in the borderlands.
- In those states within the borderlands with the greatest natural diversity, the rates of endangerment are the highest for those species found along the boundary. Forty percent of California's endangered species, 60% of Arizona's, 72% of New Mexico's, and 76% of Texas' are borderland species.

² The borderlands or border zone is most often defined as the 100km on either side of the border.

- On the Mexican side of the border there are 85 species of plants and animals in danger of extinction. There are also 450 endemic species and 700 migratory species found in the border area.
- The border's many parks may need protection from encroachment by urban sprawl.

As part of the 1997 Letter of Intent, two pilot project areas were established. These are made up of eight different protected areas that lie on both sides of the US-Mexico border. These areas will be looked at throughout this paper to demonstrate successful cooperative efforts, point out obstacles that still exist, and examine opportunities for collaboration in binational protected areas' management.

Table 1: Case Study Areas

Name	Date Established	State	Acres
PILOT SISTER AREA #1			
Organ Pipe Cactus National Monument	In 1937 named a NM then designated a Biosphere Reserve in 1976.	Arizona, United States	330,689
Cabeza Prieta National Wildlife Refuge	Established in 1939 as a Wildlife Refuge then added to wilderness system in 1990	Arizona, United States	860,000
Reserva de la Biosfera El Pinacate y Gran Desierto de Altar	In 1979 set aside as a Forest Protected Zone and Wildlife Refuge; in 1982 named an Ecological Reserve and designated as a Biosphere Reserve in 1993	Sonora, Mexico	1,764,953
Reserva de la Biosfera Alto Golfo de California y Delta del Rio Colorado	First recognized in 1955 as a Refuge Zone then established as a Biosphere Reserve on June 15, 1993	Baja California, Mexico	2,308,847
Imperial National Wildlife Refuge	Designated in 1941.	California, United States	25,125
PILOT SISTER AREA #2			
Big Bend National Park	In 1944 established as a NP then designated a Biosphere Reserve in 1976	Texas, United States	801,000
Área de Protección de Flora y Fauna Maderas Del Carmen	November 7, 1994 as an APFF	Coahuila, Mexico	514,701
Área de Protección de Flora y Fauna Cañon de Santa Elena	November 7, 1994 as an APFF	Chihuahua, Mexico	684,709

Big Bend National Park

Big Bend National Park is situated on the US side of the border and lies along the Rio Grande River as it turns to the northeast separating the states of Texas on one side, and Chihuahua and Coahuila on the other. First authorized in 1935 and established June 12, 1944, the park was designated a Biosphere Reserve in 1976 under UNESCO's Man and the Biosphere Program (MAB). Within its 801,000 acres are found over 1200 species of plants, 75 species of mammals, 450 species of birds, 40 species of fish, 56 species of reptiles, and 11 species of amphibians.

Since 1944, the area included in Big Bend NP has greatly increased. In 1988, the Big Bend Ranch State Natural Area that lies adjacent to the Park was also included by way of a purchase made by the Texas Parks and Wildlife Department adding substantially to the total existing acreage of the protected area. In addition, lying next to and within the Park is the Rio Grand Wild and Scenic River. This is a 196-mile portion of the Rio Grande that extends from the Chihuahua/Coahuila state

line in Mexico to the Terrel/Val Verde county line in Texas. This portion of the river was designated by Congress in 1978 as part of the National Wild and Scenic Rivers System, and although only 69 miles of it actually lie within the boundaries of Big Bend, the entire section is administered by the Park.

Big Bend NP also constitutes a large portion of the Chihuahuan Desert Biosphere Reserve which in addition to Big Bend, contains the Agricultural Research Service's La Jornada Experimental Range in New Mexico, and Bolson de Mapimi, located in the Mexican states of Chihuahua, Coahuila, and Durango. Together, these three sites form a regional reserve where natural resource protection, research, and implementation coincide. Under the structure of the Biosphere Reserve System, Big Bend serves as the "core" protected area where national and cultural resources are fully protected. This provides baseline information that results from inventory and monitoring activities. La Jornada serves as the "buffer zone" where research and field application takes place, and Mapimi serves as the "transition area," although it does contain its own core and buffer zones as well. Mapimi is managed cooperatively by scientists, policy-makers, landowners, and ejidatarios, involving local residents in the implementation of sustainable practices researched and designed in the core and buffer areas of the Reserve.³

Cañon de Santa Elena/Maderas del Carmen

The "sister area" lying adjacent to Big Bend on the Mexican side is actually made up of two areas which, after more than 60 years' effort, recently attained protected status in the Mexican system. These areas are the Cañon de Santa Elena and the Maderas del Carmen that lie within the Chihuahua desert along the northeast border of the state of Chihuahua and the northwest border of the state of Coahuila respectively. Both areas were named Flora and Fauna Protected Areas on November 7, 1994 and together they constitute almost 1.2 million acres. Within their desert ecosystem, which harbors many endemic plants and a variety of wildlife, mountainous islands with an elevation of 2400m. jet into the sky. Called the Chisos Mountains, these peaks south of the Rio Grande contain an even greater diversity of flora and fauna than those lying north of the border in Big Bend NP.⁴ Animal life, plant life, and topography are similar on both sides of the border but many mammals and birds are found in greater numbers in Mexico due to the larger amount of high elevation acreage. In these areas grow large oak, juniper and pine forests as well as chaparral vegetation that support a distinct fauna and serve as refuges for animals such as the black bear, the mountain lions, and Sierra de Carmen white-tailed deer.

As part of the Letter of Intent (LOI) signed in 1997, a joint management plan is being implemented between these areas and Big Bend National Park; however, the lands within the Mexican preserves are virtually all privately owned and therefore lack some protections afforded US parks. Consequently, overall management plans will differ significantly. One of the main components of the plan is to attract tourism from Big Bend to these areas and expand on eco-tourism opportunities in order to regenerate the local economy.

Organ Pipe Cactus National Monument

Organ Pipe Cactus National Monument, named after the large cactus characteristic of the Sonoran Desert, is a 330,689-acre natural preserve in southern Arizona. It lies directly on the US-Mexico border to the northeast of its sister area, El Pinacate y el Gran Desierto de Altar Biosphere Reserve in Mexico. In addition to sharing a 35-mile border with the state of Sonora, the Monument also shares an eastern boundary of approximately 33 miles with the Tohono O'odham Nation. This Nation encompasses 2.8 million acres to the east of Organ Pipe and includes approximately 16,500

³ The National Park Service Big Bend website: <http://www.nps.gov/bibe/natres.htm>

⁴ Maderas del Carmen website: <http://www.ine.gob.mx/ucanp/data/consultaFicha.php3?anp=100>

Tribal members living throughout its lands.⁵ Within the Monument exist 55 species of mammals, 43 species of reptiles, four species of amphibians and one specie of fish. The desert pupfish is endemic to the area, although a related species is believed to live in the Rio Sonyata in Mexico, which has given further impetus for cooperative cross-border efforts aimed at protection.

Organ Cactus Pipe NM is part of the Sonoran Desert that includes the area from the tip of Baja California north to southeastern California and the southernmost third of Arizona. It is also part of the “Greater Sonoran Desert Protected Ecosystem,” a six-million acre-area which includes the following regional lands in addition to Organ Pipe: the Tohono O’odham Nation, Cabeza Prieta National Wildlife Refuge, Barry M. Goldwater Air Force Range, the Pinacate and Alto Golfo Biosphere Reserves in Mexico, and Bureau of Land Management Areas of Critical Environmental Concern in the US.⁶ Although Organ Pipe is primarily controlled by the USNPS, the characterization of the entire area as one protected ecosystem has been beneficial for cooperative management practices beyond respective area boundaries.

Cabeza Prieta National Wildlife Refuge

Cabeza Prieta NWR lies in the Sonoran Desert of southwestern Arizona, nestled between the Barry M. Goldwater Air Force Range to the west, the Organ Pipe Cactus NM to the east, and Mexico to the south. It is the largest wilderness refuge in the lower 48 states, with 860,000 acres off limits to development. It was set aside in 1939 largely to protect the desert bighorn sheep and endangered Sonoran pronghorn although the area is home to over 200 bird species, 40 mammal species, an array of reptiles and amphibians, and over 420 species of plants.

Pinacate y el Gran Desierto de Altar Reserva de la Biosfera

The Pinacate is also found in the Sonoran Desert, encompassing the area just south of the Cabeza Prieta NWR in Arizona and just north of the Alto Golfo Biosphere Reserve in the state of Sonora. Long revered as a sacred area by the Tohono O’odham, El Pinacate is made up of two very distinct characteristics. One is the Pinacate lava field that was created by volcanic activity related to the earth’s cooling. This portion of the protected area is characterized by hundreds of black cinder cones jetting haphazardly from the surface and boasts two peaks reaching 3700 and 4000 feet in the air.⁷ On the other side of the peaks is the largest sand dune in North America, the Gran Desierto.

El Pinacate was first recognized by presidential decree as a Forest Protected Zone and Wildlife Refuge on March 1, 1979. At that time, the protected area consisted of 70,790 acres. However, by 1993 the Sonoran state government, with the help of local academic institutions, put together a proposal regarding the possibility for both the Alto Golfo and the Pinacate to be made Biosphere Reserves. This, in confluence with the interest shown in the area by Luis Donaldo Colosio, the head of SEMARNAP, led to the declaration of El Pinacate y el Gran Desierto de Altar as a Biosphere Reserve by presidential decree on June 10, 1993.⁸ The new designation greatly expanded the coverage of the protected area to its current size of 1,764,953 acres, made up of 36% federal property, 63% ejido land and 1% private.

The ecological and cultural values of the Pinacate include: over 400,000 acres of volcanic shield with approximately 700 cinder cones, over one million acres of active sand dunes of various types, prehistoric and cultural sites from the Tohono O’odham culture, 500 species of vascular plants, 41 species of amphibians, and two types of freshwater fish.⁹ Threats to the area include: ecological

⁵ Pearson, p.1

⁶ Ibid. p. 2.

⁷ Zakin p. 1.

⁸ Ezcurra, interview.

⁹ Pearson

degradation from illegal roads, drug smuggling activities, increasing numbers of off-road vehicles, poaching of plants and animals such as the ironwood tree and the antelope, and thievery of cactus and historical artifacts.¹⁰

When named as a biosphere reserve, the government of the state of Sonora placed the Ecological Center of Sonora in charge of creating an integrated management program for the area.¹¹ However, the Pinacate is still a federal protected area and is managed by SEMARNAP/INE. The resulting management program is a joint work program for an integrated team made up of government agencies, academic institutions, and local non-profit organizations.

Reserva de la Biosfera Alto Golfo de California y Delta del Rio Colorado

The alteration of the ecosystems of the Upper Gulf due to apportionment of water rights along the Colorado River has resulted in efforts over the past 45 years to protect this expansive area. The need to design and implement a conservation program in the area was first highlighted in 1955 when the Upper Gulf area was decreed a Refuge Zone by the Mexican Office of Fish and Related Industries.¹² Various decrees were made throughout the following 37 years, often spurred by concerns over the threatened Totoaba and related harmful fishing practices. By 1992 the Technical Committee for the Preservation of the Vaquita (Gulf of California harbor porpoise) and the Totoaba, (the two most noted threatened species in the area) in the Upper Gulf of California was established. These events and actions culminated on June 15, 1993 when the expansive delta of the Colorado River and the many surrounding wetlands, estuaries, and desert ecosystems were formally protected as a Biosphere Reserve.

The Reserve covers 2,308,847 acres made up largely of sand dunes, halophilic scrub, intertidal mudflats and estuary ecosystems. It is distinct due to the varied ecosystems that fall within it: desert sand dunes, salt marshes, estuaries and marine life. This is the third marine reserve in Mexico but the first that contains a large marine area and the participation of two states (Baja California and Sonora) and the Federal Government. It is significant for its specific geological, biological and oceanographic qualities where many endemic species exist, including the aforementioned Gulf of California harbor porpoise, or Vaquita and the Totoaba, both threatened species. It also serves as a nursery for many marine species as well as a resting-place for migratory birds.

Given its status as a Biosphere Reserve, it has designated core and buffer areas. The core area occupies 407,005 acres and the remaining 1,901,841 acres are designated as its buffer zone. Thirty-three percent of the area is federal land, 62% is categorized as ejido land, 2% is state owned, and 2% is unaccounted for. Management of the reserve includes a partnership of state agencies, local communities and academic institutions under the supervision of federal authorities.

Imperial National Wildlife Refuge

The Imperial National Wildlife Refuge containing a mere 25,125 acres is miniscule in comparison to its 2,308,847-acre “sister area” on the Gulf to the south. However, despite its size, it is a key connection with the Alto Golfo Biosphere Reserve because it is the southern-most wildlife refuge in a chain of national wildlife refuges along the Colorado River. These refuges - Havasu, Bill Williams, and Cebola - also participate in partnership projects with Imperial NWR and the Alto Golfo Biosphere Reserve. Imperial lies along the Colorado River, approximately 35 miles north of Yuma. It is the only protected area named in the pilot project that does not actually lie directly on the US-Mexico border. However, it was included in the LOI to provide a northern connection to the Alto Golfo area and a large part of its migratory bird population finds temporary residence in both

¹⁰ Zakin

¹¹ Rojas, p.3

¹² Alto Golfo website

areas. This refuge represents the last non-channelized section of the Lower Colorado River and is characterized by an array of wildlife, primarily waterfowl, marsh and waterbirds, shorebirds, songbirds, mule deer, and desert bighorn sheep. The refuge is managed and maintained by the US Fish and Wildlife Service within the Department of the Interior.

III. US-Mexico Border Environmental Cooperation on the National Level

Cross-border cooperation between the United States and Mexico has been relatively successful over the last 150 years. Despite significant differences in cultural and economic attributes, the two nations have been able to solve border-related issues and problems fairly amicably. This is in part due to the geographical location of the border region, which lies hundreds of miles away from both respective central governments. Until recently, this distance between the US-Mexico border and the capitals in both countries has allowed central policy-makers to maintain a sort of peripheral attitude regarding the border region, one which has attached less importance to the region than that given to other regions of each country.¹³ However, as industrialization, development, and population have increased along *la frontera*, so has a plethora of social, political, economic, and environmental issues.

As a result, policy-makers in Mexico City and Washington D.C. have had to take a more active role in governing binational affairs pertaining to the distant border. Yet, ironically, in creating national policy designed to manage the regions' problems, opportunities have arisen for more local and regional collaboration and cooperation to occur. In fact, the inability of the central governments to adequately manage border issues from afar has led to the formation of a complex network of cooperative efforts among local, state and federal officials, various government agencies, NGOs, and communities on both sides of the border.

As far back as 1935 there was discussion of creating an international peace park in the Big Bend/Cañon de Elena area, yet it was not until 1966 that any formal agreement was established to address border issues (aside from the creation of the International Boundary Commission in 1889 which was renamed to the International Boundary and Water Commission in 1944). It was also in 1966 that the Comisión para el Desarrollo Fronterizo y la Amistad was established to "explore and find solutions to the basic binational problems."¹⁴ Within this Commission, 14 workgroups were established to address different issue areas. One of these was the workgroup for parallel national parks. However, by 1969 the Commission had fallen apart due to budgetary constraints as well as the Commission's lack of an agenda to adequately respond to the realistic needs of the communities.¹⁵

It was not until 1983, when what is commonly referred to as the La Paz Agreement was signed, that such issues were taken up again by the central governments. Since the La Paz Agreement, the pace has quickened in the establishment of binational accords to address border environmental issues and more specifically protected areas' management along the US-Mexico border. With the signing of the NAFTA, environmental concern for the border was brought to the forefront of US-Mexican relations culminating in the Border XXI program presented in 1996. Border XXI was presented as a comprehensive plan for protecting public health and the environment along the US-Mexican border. Its central strategy consists of three components: public involvement, decentralization of environmental management by promoting institutional strengthening at the local level, and improved cooperation and communication among US and Mexican federal, state and local authorities. Border XXI has done most well with improved federal cooperation and some public involvement, and least

¹³ Ganster

¹⁴ Almanza p2-3.

¹⁵ Ibid.

well on decentralization. Border XXI also established nine workgroups to address specific issue areas.¹⁶ The Natural Resources Workgroup includes natural protected areas in its portfolio.

However, the latest and perhaps most significant action as far as protected areas management is concerned is the Letter of Intent to Cooperate on Border Region Protected Areas which was signed in May, 1997. This LOI, signed by DOI Secretary Bruce Babbitt and SEMARNAP Secretary Julia Carabias, states an intent to expand upon current activities regarding the conservation of contiguous protected areas, and names the Natural Resource Workgroup as the monitor for such activities

Table 2: Federal binational agreements between the United States and Mexico relevant to protected areas' management.

Year	Agreement
1944	Treaty Relating to the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande
1966	La Comisión para el Desarrollo Fronterizo y la Amistad (CODEF) was established (It dissolved less than one year later)
1983	The Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area (the La Paz Agreement) is signed
1984	USFWS and SEDESOL sign an accord for cooperation in wildlife conservation
1988	Memorandum of Understanding on Cooperation in Management and Protection of National Parks and Other Protected Natural and Cultural Heritage Sites (between USFWS and SEDUE)
1992	Release of the Integrated Border Environment Program (IBEP) 1992-1994
1993	US and Mexico agree to conduct a joint field study of the Big Bend National Park
1994	NAFTA environmental side agreement (the North American Agreement on Environmental Cooperation)
1994	Memorandum of Understanding between the US National Park Service and the Mexican National Institute of Ecology
1995	Letter of Intent signed by the Dept of Interior and <i>counterpart</i> to work together in protected areas management
1995	Memorandum of Understanding Concerning Scientific and Technical Cooperation on Biological Data and Information
1996	USGS and INEGI sign agreement to cooperatively acquire compatible aerial photography for the entire border region
1996	Border XXI program (building on IBEP)
1996	Memorandum of Understanding to Establish the Canada/Mexico/United States Trilateral Committee for Wildlife, Plants and Ecosystem Conservation and Management
1997	Letter of Intent to Cooperate on Border Region Protected Areas signed

The information in this table is by no means an exhaustive list of agreements signed by the US and Mexico for addressing border issues. In fact, there have been many other accords, memorandums, agreements, etc. that have dealt with specific border-related problems such as hazardous waste, endangered species trade, solid and residual waste management, and drug enforcement. The agreements shown, do however, provide the framework within which the various states, agencies, communities, and other stakeholders along the border negotiate their strategies and actions. It is also this broad understanding of cooperation between the central governments of both countries which has allowed such an extensive network of local binational cooperative relationships to flourish both within and around the various protected areas. Without such a framework, local

¹⁶ Border XXI Framework Document

initiatives would be hindered by having to seek central government approval for each and every action due to legal restrictions.

IV. US Policy Regarding Protected Areas Management

One of the most difficult issues behind binational cooperation in adjacent protected areas stems from the structure of protected areas' management on the US side. It is misleading to categorize this discussion as "US Policy" as there is no one cohesive policy regarding protected areas. For the most part there is an attempt to manage each specific area with respect for its unique qualities. In addition, responsibility for protected areas' management in the US falls under a myriad of agencies within the Department of the Interior (DOI), all with slightly different mandates. The Department of the Interior manages nearly 10 million acres within 100 km of the border. The National Park Service, US Fish and Wildlife Service and Bureau of Land Management are primarily responsible for protected areas. Other bureaus within the Department provide services and have other responsibilities within the border region.

1. The National Park Service (NPS)
2. The Bureau of Land Management (BLM)
3. The US Fish and Wildlife Service (FWS)
4. The Bureau of Reclamation (BOR)
5. The Minerals Management Service (MMS)
6. The Geological Survey (USGS)
7. The Bureau of Indian Affairs (BIA)

These agencies combined manage 37% of the total land border with Mexico. Yet while each of these seven agencies falls under the umbrella of the Department of the Interior, their responsibilities, administration and management styles, land use priorities, and agency cultures differ quite dramatically. In addition, the US Department of Agriculture through the Forest Service controls other natural protected areas, as does the Army Corp of Engineers and the Department of Defense through public land withdrawals.

Major US Agencies involved in management of Natural Protected Areas

Agency	Forest Service	Bureau of Land Management	Fish and Wildlife Service	National Park Service
Department	US Department of Agriculture	US Department of the Interior	US Department of the Interior	US Department of the Interior
Internet information	http://www.fs.fed.us/	http://www.blm.gov/	http://www.fws.gov/	http://www.nps.gov/
Mission	Recreation, timber harvesting, livestock grazing, fish and wildlife habitat, and wilderness	Recreation, timber harvesting, livestock grazing, fish and wildlife habitat, and wilderness	Conservation and protection of fish and wildlife	Preserving, protecting and interpreting the natural, cultural, and historic lands and resources of the Nation
Land	191 million acres (about one-half forested areas)	264 million acres (mostly range lands).	87.5 million acres	78 million acres

Year Established	1905	1946 (from the combination of the General Land Office – 1812, and the Grazing Service - 1934)	<i>NEED DATE</i>	1916
-------------------------	------	---	------------------	------

Source (Cody, Major Federal, 1995)

As a result of Congressional design, in the US there is no one systematic approach to protected area conservation. The lack of a comprehensive system plan, or umbrella agency, has posed some problems in promoting cooperative stewardship across respective administrative boundaries within the United States. Subsequently, this has created some obstacles in coordinating land use planning with Mexico as well as with the indigenous nations in the area such as the Tohono O’odham Nation in the Sonoran Desert. On the other hand, if all protected areas were managed the same way – for example as a park, or a wildlife refuge, or a national forest – the unique qualities of any specific area might not be adequately addressed. For instance, the protected areas on the US side that are part of the pilot project established by the 1997 Letter of Intent fall under various protected areas status and have varying management agencies. The good news is that the LOI attempts to coordinate management activities between these areas and their counterparts on the Mexican side as well as promote cooperation between and among the many protected areas along the entire border.

There are far more protected areas along the southern US border than need to be mentioned for the purposes of this paper. However, it is beneficial to understand that a large number of protected areas, with varying designation categories and managed by a plethora of federal, state and local authorities, exist along the border. The distinct character of these areas and the varying managing agencies make it impossible for one overall national management plan to encompass them all. It is precisely this situation which has led to the multitudes of individual cooperative management efforts with Mexico to address issues specific to each area. It is also the confusing nature of the US system that has led to efforts within the Department of the Interior to streamline its agencies’ activities with Mexico.

In order to promote a more systematic approach to border-related activities, on August 11, 1994 the nine agencies listed above signed an Environmental Charter. This Charter recognized the need for a “comprehensive, integrated inter-bureau approach to working cooperatively with Mexican counterparts in the shared responsibility for monitoring, preserving and managing the US-Mexico shared border ecosystems.”¹⁷ Many of the agencies had been working with Mexico on specific projects for decades before this Charter. This marks the first time however, that the DOI has formed a cohesive unit for monitoring and coordinating each of the activities of the nine agencies in order to better utilize resources among them and generally work more efficiently to address border environmental problems with Mexico. The first article of the Charter formally establishes the DOI US-Mexico Border Environmental Issues Field Coordinating Committee which oversees 10 inter-bureau “issue teams.”¹⁸ These issue teams have representation from the various agencies that have a relevant interest in each specific issue area. Each team is defined to address a specific problem area or topic ranging from environmental education to research and management of shared water resources.

One of the issue teams has as its defined priority US-Mexico “Sister Areas,” and is specifically charged with collaborating with Mexican counterparts in the design and management of protected areas along the border. The DOI Bureau agencies participating in this team are the BLM, FWS,

¹⁷ DOI website

¹⁸ GNEB p.19.

BIA and NPS, which collectively control nearly 10 million acres within 100 kilometers of the border. Currently, this issue team is involved in various activities within the three contiguous protected areas examined in this paper, as well as coordinated efforts in the management of other protected areas along the border. Another related issue team is the Lower Rio Grande Issue Team which is involved in many initiatives/activities related to the land and communities along the Lower Rio Grande, including many programs directly related to Big Bend.

The three US agencies most involved in land management along the border are the National Park Service, the US Fish and Wildlife Service, the Bureau of Land Management, and the US Forest Service with the NPS being the most visible, managing five units directly on the border. NPS employees and their Mexican counterparts had been informally working together for many years on protected areas management along the border, but in 1988, with the signing of the Memorandum of Understanding, such efforts were formalized. Spurred by the MOU, the NPS established in 1991 the Mexico Affairs Branch office in Las Cruces NM to promote information exchange among all NPS units along the border as well as to strengthen technical cooperation with Mexico. Since 1994, efforts have been focused on issue identification and management solutions among the binational protected areas. This office works closely with the issue teams of the Field Coordinating Committee of the DOI as well as with the various Border XXI workgroups. Some of its staff comes from these other border environmental workgroups and the FCC.¹⁹

Nonetheless, a confusing mosaic of activities exists along the border among, between and within various agencies, making it difficult to clearly define one overall cooperative strategy. In order to present an overall view and advise the US President and the Congress on environmental needs of the border, the Good Neighbor Environmental Board was created.²⁰ The Board is comprised of representatives from appropriate government agencies, the four border states, and private and non-profit organizations. It meets with its Mexican counterpart, Region I of the Mexican National Advisory Council for Sustainable Development, and submits reports to the US Government annually. In an attempt to present one cohesive list of border-related activities, the Good Neighbor Environmental Board has presented a matrix of some federal agencies' activities and partnerships. A good example of the magnitude of activities currently underway, still incomplete, the table spans over fifty pages!²¹

IV. Mexican Policy re: Protected Areas Management

Article 27 of the Mexican Constitution establishes the lands, waters and structures that make up federal public property. These include virtually all natural resources and waters, as well as an exclusive economic zone extending 200 nautical miles off the Mexican coast.²² The Ministry (Secretariat) for Urban Development and Ecology (Secretaría de Desarrollo Urbano y Ecología) (SEDUE) was created in 1982. Within the SEDUE, the Sub-secretariat for Ecology (Subsecretaría de Ecología) was created in 1983, and established the national system of natural protected areas (sistema nacional de áreas naturales protegidas) (SINAP) in 1986 as part of the National Programme for Ecology. The SINAP is an instrument to ensure the preservation, rational use and value of the natural and cultural resources, determining their management and priorities. And while there have been protected areas in Mexico for many centuries, SINAP marks the beginning of a formal policy agency dedicated to protected natural areas.

¹⁹ Sanchez interview.

²⁰ GNEB Annual Report. Author Mark J. Spalding currently serves on the GNEB.

²¹ The GNEB matrix is available on the GNEB webpage.

²² Summary of North American Environmental Law at <http://www.cec.org>

Currently, the Secretariat of the Environment, Natural Resources and Fisheries (Secretaría de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP))²³ is responsible for exercising control over the nation's beaches, federal coastal zones and lands that were once covered by the ocean. In addition, SEMARNAP administers and regulates the sustainable use and exploitation of all federal natural resources with the exception of petroleum, hydrocarbons and radioactive minerals. The SEMARNAP is responsible for establishing and administering Federal Natural Protected Areas, as well as for issuing permits, licenses, concessions, authorizations and assignments for the use and exploitation of the environment, water, forests, fisheries, fauna and flora, beaches, and lands in the federal coastal zones.

Ten Presidential decrees issued this century created 374 protected areas in Mexico. As a result, nearly 6% of the country falls under some form of protection. Unfortunately, many of these decrees disregarded local interests and even disregarded then-existing conditions of development. Most importantly, there have been few funds to administer the protected areas. In 1994, protected areas management responsibilities were transferred to the newly created SEMARNAP. However, because there were still no more funds for administration, the transfer had little impact.

However, in 1995, INE received some funds from the Global Environmental Facility (GEF) with which it identified the 10 most important protected areas and drafted management plans for these areas.²⁴ An agency now within the National Institute of Ecology (INE),²⁵ SINAP was put in charge of protected areas management. SINAP is currently restructuring its administration to establish a regional basis, budget and directorships. The biggest and most important reserves are slated to receive more federal appropriations. As of 1997, funds were also to be available through a nationwide trust for protected areas, the Fideicomiso Nacional para las Areas Naturales Protegidas (FNANP). The trust will consist of US\$20 million from the Global Environment Facility, US\$7 million from the World Bank Northern Border Initiative, and an as yet unspecified sum from the Mexican government. The goal is to use the corpus of the trust to generate \$200,000 in annual income per reserve in Mexico. Fondo Mexicano Para la Conservación was established in 1996 with a generous endowment of about \$45 million and has delivered grants totaling \$1-2 million per year to ENGOs, local governments and academic/research institutions working on protected natural areas issues. In addition, and as part of the Mexican government's effort, ECONAP has been established. It has 60 members from many sectors in society and is intended to raise private sector support for the national reserve system.

The current law governing protected areas is the 1988 General Law for Ecological Equilibrium and Environmental Protection (LGEEPA or Ley General del Equilibrio Ecológico y la Protección al Ambiente) as amended in December 1996. This law regulates natural protected areas and, makes legal provisions for SINAP, defining categories used and creating provisions for wild and aquatic flora and fauna.

LGEEPA establishes a total of eight different types of Natural Protected Areas that fall within the National System of Natural Protected Areas. The following table describes them:

²³ SEMARNAP is a newly formed Secretariat in the Mexican government, which is intended to bring all environmental issues under a single umbrella. The Secretary is Julia Carabias Lillo. Carabias is also in charge of one other independent agency, the Attorney General for the Environment ("Profepa") and the three undersecretariats: Fisheries, Natural Resources, and Planning. The Federal government has exclusive jurisdiction over "Protected Natural Areas."

²⁴ One of the ten is the Biosphere Reserve of the Alto Golfo de California.

²⁵ A few of INE's (Instituto Nacional de Ecología) relevant functions are planning and environmental impact assessment, environmental regulation, and conservation and ecological exploitation. It is also in charge of international cooperation issues. To carry out these functions, INE has state delegates that deal with local issues.

- **Biosphere Reserves.** Biosphere Reserves are ecosystems inhabited by species considered to be endemic, endangered or threatened with extinction that are not significantly altered by human activity. The executive may restrict or prohibit activities that alter the Reserve's ecosystem by issuing temporary, indefinite, total or partial land use controls or restrictions, which may also apply to private land use practices within the Reserve. Activities dealing with preservation and scientific research are allowed. While there are typically people living within buffer zones of biosphere reserves, new human habitats in Biosphere Reserves are strictly prohibited. Inhabitants that were living within an area when it was designated a biosphere reserve are allowed to remain.
- **National Parks.** National Parks may be created for a number of different reasons: because of the scenic beauty of an ecosystem; because of its scientific, educational, recreational, or historic value; because of the existence of fauna and flora of national significance; or simply because its features favor the development of ecological tourism. National Parks are for public use and, like Biosphere Reserves, are generally reserved for recreation, tourism, research, education, and conservation purposes.
- **Natural Monuments.** Natural Monuments are those areas or places that possess a natural element of national significance warranting their protection by reason of their unique or exceptional features, esthetic interest, historic or scientific value. Natural Monuments do not possess the variety of ecosystems or the area required by other categories of Natural Protected Areas. Only scientific research, recreation, education or conservation activities are permitted in Natural Monuments.
- **National Parks in Mexican Marine Zones.** National Marine Parks may be established in marine areas that make up part of the national territory, including beaches and federal lands in coastal zones. As is the case for other Natural Protected Areas, the use of National Marine Parks is generally limited to ecological preservation, research or study of aquatic ecosystems, as well as to recreational activities. Should the use of the natural resources of a Park be approved, it must comply with the Ecology Law, the Federal Fisheries Law (Ley Federal de Pesca), the Federal Oceans Law (Ley Federal del Mar), and other relevant laws and regulations. Such authorizations are also subject to the limitations set out in, the declaration creating the Park.
- **Natural Resource Protected Areas.** Natural Resource Protected Areas include a number of different types of preservation or restoration areas: forestry reserves and protected and forestry zones; restoration and forestry propagation zones; and protection zones for rivers, springs, water deposits and sources for human use and consumption.
- **Wild Flora and Fauna Protected Areas.** Areas for the Protection of Wild Flora and Fauna are intended at preserving the habitat of wild and aquatic flora and fauna species that is necessary for their development. Such areas may be used for recreational, wildlife repopulating, scientific, preservation or sustainable exploitation purposes. The use of wild flora and fauna may be granted to local inhabitants or to other parties, provided that studies show that such use is viable. All uses must, however, comply with applicable laws and regulations, Official Mexican Standards (NOMs), and land use limitations set out in the declaration and resolutions thereof.
- **Sanctuaries.** Sanctuaries are natural areas with an exceptionally rich endowment of a given flora or fauna species or subspecies, or their habitat. Areas of an exceptional beauty may also be declared sanctuaries. This may be the case for gullies, natural wells, caverns and other areas with similar features.

(From the Summary of North American Environmental Law located at <http://www.cec.org>)

These seven types of Natural Protected Areas are under federal jurisdiction. Two offices within SEMARNAP are responsible for managing issues related to Federal National Protected Areas: SINAP, which is part of INE and the Undersecretariat of Natural Resources (Subsecretaría de

Recursos Naturales). The Undersecretariat of Natural Resources and INE generally share jurisdiction over Federal Natural Protected Areas.²⁶

Mexico's natural protected areas system is its main tool for the conservation of biodiversity and to maintain the integrity of its ecosystems. Unlike the US, it is managed in a highly centralized fashion. And while there is less need in Mexico for internal federal coordination, Mexico's coordination and cooperation with civil society including environmental groups is lacking the same depth as found in the US. In the past, the protected areas system has been unable to protect adequately the natural richness of the country due to lack of legislation and resources for management. This has been compounded by the fact that many of the existing decrees have not been carried out. Ambiguity over management also arises because areas designated as national parks often remain in private ownership.

The Zedillo Administration's 1995-2000 National Development Plan, grants a high priority to the establishment and management of the protected natural areas. The 1995-2000 Environment Program gathers and reaffirms each mandate, defining as a high-priority strategy the conservation and protection of biodiversity in natural protected areas as well as the decentralized restoration of the national parks. Using all available legal instruments in bringing this to implementation, strategies were developed in the 1995-2000 Protected Natural Areas Program. These included the:

- Strengthening of Management Systems.
- Expansion of the National Protected Area System (SINAP) through the definition of priorities for conservation of and new categories of natural protected areas, with an emphasis in coastal and marine areas.
- Decentralization, restoration and re-categorization of national parks.
- Develop internal organizational structures and local institutions.
- Improve financing.
- Promote public participation and social co-responsibility.²⁷
- Exploit the opportunities of regional development.
- Promote the education, qualification and development of technical personnel.
- Create a biodiversity information system to facilitate the management and dissemination of knowledge on the protected natural areas.

Natural Protected Areas are created by the federal executive branch through a "declaration" which must be published in the *Diario Oficial de la Federación*. Before a Natural Protected Area may be declared, however, a number of planning steps must be taken. When an area has been identified as possessing the appropriate characteristics of a Natural Protected Area, a basic study must be carried out, taking into account both the biological and the social factors that warrant the protection of the area. Next, the exact area to be conserved must be mapped and properly zoned. At this point, SEMARNAP is required to personally notify, whenever possible, all land owners and other persons that are affected by the proposed Natural Protected Area. Interested parties are given up to 30 days to submit their comments. SEMARNAP considers these comments and makes any adjustments that are deemed necessary to the proposed decree, which is then submitted to the executive branch before it becomes an official declaration.²⁸

Following the publication of the declaration in the *Diario Oficial*, the agency or agencies that nominated the Natural Protected Area must prepare a management plan with the assistance of other federal, state or municipal authorities, within the time specified in the declaration. In addition to specifying the purpose of the reserve, the management plan must contain a description of the physical, biological, social and cultural characteristics of the area within a national, regional and

²⁶ Summary of North American Environmental Law at <http://www.cec.org>

²⁷ A newly formed National Council of Protected Natural Areas plays a protagonist's role in this effort.

²⁸ Summary of North American Environmental Law at <http://www.cec.org>

local context. All management plans must also include those applicable Official Mexican Standards (Normas Oficiales Mexicanas (NOMs)) aimed at preventing the contamination of water and soil as well as managing the flora and the fauna.²⁹

There is also a National Council for Protected Natural Areas whose duty is to advise SEMARNAP on the making of policies regarding the establishment and management of protected natural areas. The Council comprises members of the different sectors of society and government levels, as well as scholars and representatives of non-governmental organizations.

Currently there are eight national protected areas that lie directly along the northern border of Mexico (and two more areas undergoing federal declaration). Many others lie within the 100 kilometer defined border region.

Table 3: Protected areas along the northern border of Mexico

Protected Area	Designation	State	Coverage (acres)
1. Alto Golfo de California y Delta del Rio Colorado	Biosphere reserve	Baja California y Sonora	2,308,847
2. El Pinacate y Gran Desierto de Altar	Biosphere reserve	Sonora	1,764,953
3. Cañon de Santa Elena	Flora and Fauna Protected Area	Chihuahua	684,706
4. Maderas del Carmen	Flora and Fauna Protected Area	Coahuila	514,701
5. Constitución de 1857	National park	Baja California	12,372
6. Sierra de San Pedro Martir	National park	Baja California	1,123,849
7. Sierra de los Ajos, Buenos Aires y la Púrica	National Forest	Sonora	53,090
8. Bavispe	National Forest	Sonora	436,365
9. Sierra La Mariquita-La Elenita-Rio San Pedro	In process to become Flora and Fauna Protected Area	Sonora	264,290
10. Sierra San Luis	In process to become Flora and Fauna Protected Area	Sonora	145,730
Total			6,308,903

According to SEMARNAP Secretary Julia Carabias, Mexico has adopted a three-part strategy for natural protected areas (ANPs): conserve strategic areas for biodiversity, avoid land use changes due to economic and social pressures which undermine the value of the ecosystem by increasing the value of the land (promote sustainable exploitation of natural resources), and restore already degraded areas.³⁰ Covered in this strategy are 115 ANPs with 12,000,000 ha.

To achieve the three-part strategy outcome for ANPs, SEMARNAP hopes to increase the amount of land under protection. More importantly it plans to strengthen ANPs already decreed through the development of management plans, hiring of field staff, development of infrastructure and field stations, buying equipment, increased financing, and improved local participation.

According to Carabias, there have been a number of successes to date:

1. A national program for ANPs strategy itself has been developed.
2. The legal framework for ANPs was strengthened (1988 and 1996).

²⁹ Summary of North American Environmental Law at <http://www.cec.org>

³⁰ Julia Carabias communication 23 October 1998.

3. Advisory councils for each ANP (multi-stakeholder process) were created.
4. Coordination units for ANPs to promote beneficial use of natural resources were created.
5. The government has incorporated new areas into the ANP system, including many marine parks.
6. Nine final and 23 draft management plans have been written.
7. Forty-three ANPs are now staffed.
8. Twenty-four ANPs have advisory councils.
9. Thirty-six ANPs have equipment and other needed infrastructure in place.
10. In five years, there has been an 800% budget increase for the ANP program.
11. ANP support funds of \$18 million from GEF have been moved to the Fondo Mexicano para la Conservación de la Naturaleza and are now available for use.
12. ANP private sector support totaling \$5 million has been obtained.
13. Donations for the support of ANPs have been given tax deductibility status.
14. A number of ecological restoration projects have been established.³¹

Carabias also listed the many efforts at US-Mexico cooperation under DOI and USDA regarding ANPs. In this regard, she also mentioned non-governmental efforts to promote wise use and to undertake academic studies.

V. Adjacent Protected Areas Management: Case Studies and Overall Cooperative Efforts

As stated previously, the 1997 LOI established two pilot project areas that encompass protected areas on both sides of the US-Mexico border. The first consists of the Biosphere Reserves of the Alto Golfo de California y Delta del Rio Colorado in Baja California and Sonora and El Pinacate y Gran Desierto de Altar in Sonora on the Mexican side, along with the Organ Pipe Cactus National Monument and the Cabeza Prieta National Wildlife Refuge in Arizona, the Imperial National Wildlife Refuge in California and Arizona and “specific special management areas administered by the BLM” on the US side. The second project area includes the wildlife protection areas of Maderas del Carmen in Coahuila and the Cañon de Santa Elena in Chihuahua on the Mexican side as well as Big Bend National Park in Texas.

The 1997 LOI was by no means the first time adjacent protected management had been perceived in a binational context. The concept of park units working across administrative boundaries with other parks is not new, but it has been only in the last 10 to 15 years that the concept has been incorporated into overall park management.³² Coordinated efforts in most of these pilot areas have been ongoing and increasing while in one area, the Alto Golfo, cooperation between the US and Mexico has been ongoing but complicated by the politics of water use from the Lower Colorado River in the US.

Pilot Area One

The parks situated within the Sonoran Desert in particular have established very good working relationships with each other and with the communities and indigenous people in the area. Established over 60 years ago, Organ Pipe NM and Cabeza Prieta NWR have had sufficient time to realize the ecological and political benefits to working cooperatively even though management philosophy has not always been progressive in the area of international cooperation. However, border realities and perceptions have changed. Organ Pipe maintains a fence across the entire southern boundary in order to dissuade the natural movement of livestock from Mexico and local Reservations. Current park management plans now seek to build stewardship across administrative boundaries. In particular, throughout the 1990s, Organ Pipe, Cabeza Prieta and Pinacate have been involved in a number of cooperative efforts. Because Pinacate is a relatively new protected area, the

³¹ Ibid.

³² Pearson p.1.

US parks have been able to offer assistance in many ways such as training workshops, collection and processing of weather data, formulating Pinacate's General Management Plan and providing equipment. Both Organ Pipe and Pinacate have established daily working relationships with the town of Sonoyta, Sonora, and local ejidos and the Tohono O'odham have been included in planning and carrying out programs for preservation of cultural resources, addressing air quality issues, and decreasing surface water pollution.

Including the Tohono O'odham Nation in the general planning activities on both sides of the border is extremely important, but such inclusion has been a challenge to local park managers given the existing cultural differences. Coordination with this nation has been ongoing in the US, however, cooperation between the Tohono O'odham and representatives from the Mexican government has been problematic.³³ Because the Pinacate is considered a sacred area to the indigenous people of the area, its protection and management by state and federal entities is a sensitive issue. It appears that although Tribal representatives have been included in creating the management plan, there is continuing interest at the federal level to determine how to recognize them as important stakeholders in the area.

However, Cabeza Prieta and Organ Pipe have been relatively successful in coordinating their management plans with one another and with the neighboring indigenous communities. Yet on the north and west side of Cabeza Prieta lies the 2.6 million-acre Barry M. Goldwater Air Force Range, preserved for the purpose of military flight training since WWII, but not legally protected.³⁴ Although controlled on the ground by the FWS, most of Cabeza Prieta's airspace is controlled by the neighboring Air Force. On one hand, the obvious contradictions in adjacent land use have caused some conflict. Some land managers argue that low-flying airplanes and helicopters negatively affect wildlife in the National Wildlife Refuge, and that tow darts left from training missions threaten visitors and mar the protected landscape. On the other hand, the neighboring land has been kept free from development therefore allowing the ecosystem to remain relatively undisturbed.

On a positive note, both of these areas, along with Organ Pipe and the two reserves to the south are being considered for the creation of a Sonoran Desert National Park.³⁵ The idea is based on the biosphere model that the newly created Mexican parks have followed, forming management plans and strategies on the ecosystem as opposed to individual park boundaries. It would be both a monumental task and achievement to negotiate such a Park between four distinct US government agencies (NPS, FWS, BLM and the Air Force). Although conceptually based on the biosphere model, no new biosphere reserves are currently being proposed in the US.³⁶ This new initiative is being discussed by members of the Sonoran Desert Initiative (mentioned below), the International Sonoran Desert Alliance, the Tohono O'odham Nation, the NPS and the Coordinating Unit of Natural Protected Areas in Mexico (UCAPN).³⁷ Whether this can be achieved is yet to be seen, but of all the adjacent areas along the border, the Sonoran desert protected areas thus far have demonstrated the most success in cooperating across administrative boundaries.

³³ Ezcurra, interview.

³⁴ The Wilderness Society website. The phrase "but not legally protected" should be clarified. The Barry M. Goldwater Air Force Range is protected from livestock grazing and mining; permits are required to enter the Range; and portions (over 100,000 acres) of it are provided additional protection with the establishment of administrative designations such as Areas of Critical Environmental Concern."

³⁵ Ezcurra, interview.

³⁶ The biosphere model has largely been rejected in the US in the last 1-2 years by the federal government and local land managers alike. Given the land boundaries already in place in the US, it is more feasible to coordinate across existing boundaries than attempt to create new ones. Furthermore, the US has not continued funding the UNESCO MAB Program.

³⁷ Ibid.

It is very important to distinguish between the Sonoran Desert National Park concept which focuses on a new administrative unit and the Sonoran Desert Ecosystem Partnership which is a forum for many agencies and communities on both sides of the border to promote coordination and resolve issues of common concern. This Partnership is not an administrative unit, and the Park concept does not yet **include** Mexico or the Tohono O'odham Nation.

Aside from the areas in the Sonoran desert named in the pilot project, there have also been many cooperative efforts in and among nearby protected areas such as Coronado National Memorial (which shares three and a half miles of international boundary with Mexico) and Chiricahua National Monument. These two areas have worked with Sierra los Ajos, Buenos Aires y la Purica Forest Reserve in Sonora. Both Organ Pipe and Chiricahua have begun coordinating with Sierra San Pedro Martir National Park and Constitución 1857 National Park in Northern Baja to develop their management plans. Furthermore, though not federal in nature, the Arizona Game and Fish Department (AGFD) has for some time maintained a working relationship with both non-profits and governmental agencies on both sides of the border to address endangered species issues and habitat protection. Through this state agency many joint wildlife collaborations have ensued with active NGO participation in both Mexico and the US.³⁸

Finally, the cooperative work currently underway in the area cannot be discussed without mention of two very important non-governmental organizations: the Sonoran Institute and the International Sonoran Desert Alliance. The Sonoran Institute was established in 1990 as a way to encourage community involvement in natural and cultural resource preservation and to discover ways to do so while meeting the economic and social needs of the community and local ejidos. By providing a forum for discussion to identify common goals and innovative solutions, it has played an integral role in unifying local communities and the Tohono O'odham Nation with policy-makers on both sides of the border. Similarly, the International Sonoran Desert Alliance is a representation of stakeholders along the border cooperating to “identify and implement activities that promote sustainable economic development for rural communities, protect the valuable biological resources, and guarantee a respect for the cultural heritage of the Sonoran Desert.”³⁹ The Alliance is international by nature, works very closely with the SI and has likewise earned the reputation of being a strong link in the cooperative chain enveloping the Sonoran Desert Ecosystem. Appropriately, these two institutions have offered to facilitate a discussion on operationalizing a Sonoran Desert Ecosystem structure that could be integrated into the LOI.⁴⁰

While connected on the eastern edge to the Pinacate, the Alto Golfo Biosphere Reserve is distinctly different from the Pinacate and the other areas in the first pilot project. First, its protection is focused on the marine ecosystem surrounding the Upper Gulf and therefore its management is inherently different. Second, although there is some binational cooperative activities occurring in the area, the politics behind it are somewhat more complicated.

The ecosystem along the Gulf's delta, as well as the health of the marine environment depends to a great extent on the availability of water flowing down through the Colorado River. In this way, these ecosystems are integrally related to the protection and use of the Colorado River in the US before it reaches Mexico. Furthermore, the riparian habitat is similar along the river on both sides of the border and therefore any species management plan should look at the entire area. For this reason the Imperial Wildlife Refuge was recognized as a “sister area” for the pilot program.

Before the construction of the Glenn Canyon and Hoover dams in the US, the Colorado River continually reached the delta and the Sea of Cortez, supporting the estuarine habitat and marine life found in the Alto Golfo Biosphere Reserve. However, as a result of the construction of these dams,

³⁸ Abarca et al. p.3-4.

³⁹ ISDA website

⁴⁰ Conference summary p 6.

water diversions and river impoundment, river water rarely makes it to the Sea of Cortez. Consequently the salinity balance of the river has been altered and nutrient flows to the fisheries reduced.⁴¹ Although Mexico is allocated 1.5maf⁴² of the Lower Colorado River's base flow, most of this is diverted to Mexicali Valley (Baja California and Sonora) for agricultural use. Therefore, the protection of the Alto Golfo Biosphere Reserves ecosystem depends on water use decisions largely made north of the border.

To address critical habitat issues along the Colorado River in the US, the Lower Colorado Multiple Species Conservation Program has been established. This program has brought together a broad base of stakeholders including state and federal government, various environmental groups, and local tribes although there has been little if any Mexican participation in the program.⁴³ Likewise, the program area stops at the border even though the habitat reaches far into Baja California. Critics have voiced concern over lack of Mexican participation in the program and the USFWS has encouraged a binational focus for habitat and species conservation efforts. However, as mentioned previously, the underlying issue is one of water provision and as such cooperative efforts are further hindered in this arena.

There have been exchanges between the Imperial Wildlife Refuge and the Alto Golfo in the past few years, funded largely by the USFWS. These exchanges have been small projects focused on education, community outreach, and personnel exchange. Within the Alto Golfo itself, there is a great deal of community participation, NGO presence and coordination with the activities of the Pinacate.

Pilot Area Two

For over 60 years, the Big Bend/Maderas del Carmen/Cañon de Santa Elena area has been characterized by attempts and intentions to collaborate on natural resource protection. As early as 1935, preceding the establishment of a protected area on either side of the border, there was discussion between the two governments regarding the establishment of an "international peace park" that would cross the international border. Over the years, international political events and the continual turnover of administrations in Mexico hindered the creation of a formal working agreement for the area. That is not to say however, that cooperation has not existed. For instance, in 1988 when the Memorandum of Understanding on Cooperation in Management and Protection of National Parks and Other Protected Natural and Cultural Heritage Sites was signed between the USFWS and SEDUE in Mexico, the NPS and state of Coahuila also signed an agreement concerning technical assistance and materials for management of protected areas.⁴⁴ This was before Big Bend's adjacent areas in Mexico were actually established, however work was being carried out in other protected areas in Coahuila.

Other cooperative efforts have taken place between Big Bend and La Jornada on the US side and Bolson de Mapimi on the Mexican side. These three parks were partners in a biosphere reserve relationship and although it has now turned into more of an "ecosystem group" given the decline in biosphere popularity in the US, annual meetings are still held to coordinate research and integrate public participation in the areas.

As in the Sonoran desert, the Chihuahuan desert is a continuous ecosystem that extends beyond international boundaries. Recognizing this, those who have managed the area have pushed for research, community education and resource protection to be dictated by ecological, not political

⁴¹ Briggs and Cornelius, p.4.

⁴² maf= million acre feet

⁴³ While the Mexican government has expressed little interest in participating, a number of Mexican ENGOs would like to participate, even if as non-voting members that could provide input into the process.

⁴⁴ SEDUE 1993

boundaries. Cooperation however, has traditionally been on specific issues and has been informal in nature. With the creation of the protected areas in Mexico, the existing collaboration has been put on a more formal footing and the 1997 LOI has served to solidify and further encourage the existing relationships. While both pilots have benefited in different ways, the Big Bend/Sta. Elena/Maderas area has benefited from the LOI because it is at a more formative stage in cross-border relationship building than those areas in the Sonoran Desert.

Many of the binational activities occurring in both pilot project areas fall under the auspices of the Field Coordinating Committee of the NPS, and more generally within the work program of the Natural Resources Workgroup of the Border XXI program. These activities will be elaborated on below.

Border XXI

The Border XXI Program has provided the most recent framework for US and Mexican federal entities responsible for the border environment to work cooperatively in addressing environmental protection and natural resource management along the US-Mexico border. As mentioned previously, nine workgroups were established to implement the Program by “integrating the efforts of participating entities and defining specific projects to meet Border XXI objectives.”⁴⁵ Each workgroup has a US and Mexican Co-Chairperson and all activities are binational in nature. The workgroup that deals most with issues related to protected areas along the border is the Natural Resources Workgroup which is made up of representatives from the following Mexican and US agencies:

Description of Border XXI Natural Resources Workgroup

In Mexico	In US
• Coordinating Unit for Natural Protected Areas ☺ part of INE/SEMARNAP	• National Park Service ☺ DOI
• Subsecretary for Fish ☺ SEMARNAP	• Forestry Service ☺ Dept. of Agriculture
• Subsecretary for Natural Resources	• Bureau of Reclamation ☺ DOI
• General Director of Wildlife ☺ INE/SEMARNAP	• Bureau of Land Management ☺ DOI
• Federal Prosecutor for Environmental Protection ☺ SEMARNAP	• Fish and Wildlife Service ☺ DOI

Plans are in development to add representation for states and tribal governments to this workgroup.

Through the Border XXI mechanism, this workgroup has initiated and continues to oversee many activities related to natural resource protection and management in the parks along the border. As previously stated this workgroup was given responsibility for overseeing the activities related to the 1997 LOI. Therefore, many of the cooperative efforts mentioned above fall within the administrative or funding scope of the federal government.

Due to the relative lack of resources on the Mexican side, most of the programs are designed to offer training, technical transfer and management planning for parks on the south side of the border. In addition, many projects have been initiated to conduct regional data gathering, which by the ecological nature of things, ties many of the adjacent parks together through information sharing and coordinated solutions to counteract a decline in any given species. The programs are undertaken by various agencies within the DOI. The following table provides information on such activities.

⁴⁵ Border XXI Program 1997-1998 Implementation Plans p. iii.

Table 4: Border XXI Natural Resource Workgroup Activities Relating to Protected Areas Management

Project	Partners/Participants									
	Federal		State		Academic and other instit.		Local non-gov. (NGO)		Other (i.e. parks)	
	US	M	US	M	US	M	US	M		
1. Training Course on Management Planning of Protected Areas in Mexico	X	X	X	X		X	X	X		Various
2. Exchange of Biological Data and Expansion of Biodiversity Information Networks	X	X								
3. Lower Rio Grande Ecosystem Initiative	X	X	X	X	X		X			Big Bend, Maderas del Carmen
4. Water Quality Monitoring	X	X	X		X					Big Bend
5. Analysis of Altered Flows in the Big Bend Section of the Rio Grande	X	X								Big Bend
6. Mapping of Sierra del Carmen Mountain Range—Vegetation, Soils and Geology	X	X	X		X	X				Big Bend, Maderas del Carmen
7. El Largo-Madera Ecosystem Management Practice	X	X						X		Maderas del Carmen
8. Implementation of Management Plan for the Alto Golfo de California and Colorado River Delta Biosphere Reserve	X	X			X	X				Alto Golfo
9. Implementation of Management Plan for the El Pinacate and Gran Desierto de Altar Biosphere Reserve	X	X			X	X				El Pinacate
10. Implementation of Management Plan for Santa Elena Canyon Flora and Fauna Protection Area	X	X			X	X	X	X		Canyon Sta. Elena, Big Bend
11. Implementation of the Management Program in the Maderas del Carmen Flora and Fauna Protection Area	X	X			X	X	X	X		Maderas del Carmen Big Bend
12. Community Participation workshops in the Maderas del Carmen and Santa Elena Canyon Flora and Fauna Protection Areas	X	X					X	X		Maderas del Carmen and Canyon SE
13. Course Workshop for community participation of the Alto Golfo de California and Colorado River Delta Biosphere Reserve	X	X					X	X		Alto Golfo
14. Conservation and recovery of the Sonoran Pronghorn Antelope	X	X	X	X	X	X	X			Cabeza Prieta, Organ Pipe, el Pinacate

15. Conservation and recovery of the Black Bear	X	X					X	X	Big Bend, Canyon SE, Maderas del Carmen
16. Conservation and recovery of the Desert Bighorn Sheep	X	X				X	X	X	el Pinacate
17. Conservation and Recovery of Ironwood	X	X							el Pinacate
18. Conservation and Use of Mesquite	X	X							el Pinacate
19. Biosphere Reserve Coordination	X	X	X		X	X	X	X	La Jornada, Mapimi, Big Bend
20. Inspection and vigilance of Natural Protected Areas	X	X	X	X					All border parks

As is clear from this table, there is a substantial amount of collaboration between the respective federal governments and academic and other institutions in particular. However, few of these activities include state level participation. This is explained by the fact that in both countries, the parks studied are part of a national system of protected areas and therefore the respective states have little responsibility or resources for managing these areas.

Texas is the only state on the border that has chosen to take an active role in the Natural Resources Workgroup, even though DOI asked all the states, from the very beginning, to participate. Because states have the authority over resident flora and fauna protection, DOI needs state participation in our border programs.

Other workgroups have been charged with carrying out programming focused on issues in or around specific border parks. The two most visible of these efforts are the Big Bend Air Quality Study, which was initiated by a binational agreement signed in 1993, and the Aerial Photography Initiative, which is the result of an agreement signed in 1996 between the USGS and INEGI. Border XXI programming funds by way of the Air Workgroup, as well as funding from the US Environmental Protection Agency have supported the Big Bend Air Quality Study. The USGS on the US side and INEGI on the Mexican side are carrying out the Aerial Photography Initiative, funded completely through the Environmental Information Resources Workgroup.

Most if not all of these efforts funded nationally have some component of local or international non-governmental participation. For instance the Transboundary Resource Inventory Program (TRIP) was originally an informal US-based effort organized in 1993 for the purpose of linking institutions and information across state and international borders. It included the private sector, NGOs and academic institutions. By 1996 the TRIP had both a US board of directors and a Mexican steering committee to better facilitate the creation and provision of geographic data for the private and public sectors. However, although the TRIP was originally conceived and developed on a grass-roots level, it required US and Mexican federal involvement in order to achieve bilateral objectives.⁴⁶ As a result, much of TRIP planning is now being coordinated through mechanisms established under the 1996 Memorandum of Understanding between the USGS, INEGI, SEMARNAP and the EPA. The formalization of geographic border data acquisition at the federal level, has enabled the locally based initiative to truly flourish.

VII. Discussion

⁴⁶ TRIP homepage

In this paper, we have attempted to describe the natural protected areas in two pilot projects that are located adjacent to each other at the US-Mexico Border. This description has included the properties' physical attributes, each countries' separate policy toward natural protected areas and their joint efforts to date for cooperation in managing these adjacent natural protected areas. This section is focused on the obstacles and opportunities for further cooperation that this description suggests exist.

It is difficult to even imagine genuine cooperation on natural protected areas between the US and Mexico given inconsistent, often incongruent legal systems, culture, and resources. In the US, we have noted there remains a plethora of agencies with different and sometimes conflicting responsibilities. These agencies are usually under-funded relative to their conservation mandates. Meanwhile, Mexico's natural protected areas policy is more centralized, which can create as bad a result as the US' relative chaos. Mexico's environmental authorities are chronically short on human and capital resources, which might be used for a true natural resources effort in protected natural areas. While both nations are adding land to their natural protected areas systems, there is a continuous loss of and threat to natural protected areas from encroachment. This is through encroachment by outsiders and through serious land tenure conflicts. In Mexico, the land in natural protected areas in the border region is primarily private property or ejido/communal lands over which the government has less control. In the US the conflict is usually state versus federal. These lands are variously controlled by a diverse set of stakeholders including indigenous communities, peasant farmers, fishermen, ranchers, miners, etc. As a result, both federal governments are subject to constant pressure for land use change. They are faced with a lack of sustainable development options and instead saddled with many decades of neglect regarding attention to protection and financing of their natural protected areas. For successful protection of natural resource areas there must be information collection and dissemination/exchange, similar goals across administrative boundaries, an approach that is broad and ecologically based, stakeholder input (community, NGOs, government, private landowners), long-term vision, willingness of individuals (or governments in this case) to cede some control, social and cultural understanding of management tactics on the other side, ability to identify the nature of any conflicts, workable solutions that include local partnerships, and support of the national governments to implement and monitor solutions.

However, there is remarkable cooperation between the two nations and, perhaps, many opportunities for more such cooperation. They can continue to build on joint commitments on environmental and conservation issues. There is certainly more room to engage the private sector and non-governmental/conservation organizations in these efforts. Mexico and the US can also look to jointly manage/monitor ecological impacts and benefits of tourism and other economic development in these natural protected areas. The two nations can jointly develop adequate and environmentally sound transportation, infrastructure, and financing for tourism. In doing so, they can share techniques for the reconciliation of consumptive/non-consumptive multiple uses of natural resources (e.g. forest management). Related to this is the opportunity for joint development of overlooked tourist destinations. The US and Mexico can develop regulatory and licensing programs to bring a level of legitimacy of private companies self-promoting as ecotourism outfitters and then focus on sustainable tourism development in rural, remote and Tribal communities. Finally, and perhaps most importantly, the logic behind cross-boundary stewardship should be established: i.e. natural ecosystems do not recognize administrative boundaries and boundaries themselves often pose the greatest threat to the area that they are serving to protect.

References

- Abarca et al. (1994). *Conservation opportunities in borderlands: The Arizona-Sonora perspective*. Tucson, Arizona. Paper presented at the Symposium of Biodiversity and Management of the Madrean Archipelago.
- Alcérreca, C., Consejo, J.J., Flores, O., Gutiérrez, D., Hentschell, E., Herzig, M., Pérez-Gil, R., Reyes, J.M., y Sánchez-Cordero, V. (1988). Fauna silvestre y áreas naturales protegidas. Universo Veintiuno.
- Barry, T. and Brown, H. (1994). *The challenge of cross-border environmentalism*. Albuquerque: The Resource Center.
- Blake, T.A. and Steinhart, P. (1994). *Two Eagles/Dos Aguilas: The natural world of the United States-Mexico borderlands*. Berkeley: University of California Press.
- Boyer-Turk, P. (1993). Programa cooperativo regional reserva de la Biosfera del Desierto Sonorense (resumen). *Noticias de CEDO*, v.5, n.2.
- Briggs, M. and Cornelius, S. (1997, July 24). *Opportunities for Ecological Improvement Along the Lower Colorado River*. Publishing information unknown.
- Cody, Betsy A. (1995, May 15). "Major Federal Land Management Agencies: Management of Our Nation's Lands and Resources" Congressional Research Service Report 99-599 ENR.
- Department of the Interior. US-Mexico Border Activities Fact Sheet.
- Department of the Interior. (1999). *US Mexico border issues support cooperative interbureau charter*. DOI webpage: <http://www.doi.cog/english/fccprelease.html>.
- EPA (1998). *Big Bend National Park Visibility Study*. EPA website: <http://www.epa.gov/earth1r6/6pd/air/pd-q/bigbend.htm>
- EPA (1997). *US-Mexico Border XXI Program: 1997-1998 Implementation Plans and 1996 Accomplishment Report*. EPA 160-R-98-001.
- EPA (1998). *US-Mexico Border XXI Program: 1998 Implementation Plans*. EPA 160-R-98-003.
- Ezcurra, E. M. (1998, October). *Conservation and sustainable use of natural resources in Baja California: An overview*. Briefing paper for the San Diego Dialogue's Forum Fronterizo. San Diego.
- Ezcurra, E. M. (1999, January 22). Personal Interview. Director, Biodiversity Research Center of the Californias, San Diego Museum of Man.
- Ferman et al. (date unknown). *A methodology for developing a management program for protected areas: The biosphere reserve of the Upper California Gulf and Colorado River Delta, Mexico*.
- FAO (n.d.). La Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres. Oficina Regional de la FAO para América Latina y el Caribe, Santiago, Chile.

- Furze, Brian, Terry de Lacy, and Jim Birckhead, (1996). Culture, Conservation and Biodiversity: The Social Dimension of Linking Local Level Development and Conservation through Protected Areas John Wiley & Sons.
- Ganster, P. (1996, June). *Environmental issues of the California-Baja California border region*. Border Environment Research Reports (Number 1). Southwest Center for Environmental Research and Policy.
- Garza Almanza, V. (1996). *Desarrollo sustentable en la frontera Mexico-Estados Unidos*. Ciudad Juárez: Universidad Autónoma de Ciudad Juárez.
- Gómez-Pompa, A. and Kaus, A. (1990). Traditional management of tropical forests in Mexico. In: A.B. Anderson (Ed.), *Alternatives to Deforestation: Steps toward Sustainable Use of the Amazon Rain Forest*. Columbia University Press, New York. Pp. 45-64.
- González, A. and Sánchez L., V.M. (1961). *Los parques nacionales de México*. Instituto Mexicano de Recursos Naturales Renovables, A.C.
- Good Neighbor Environmental Board. (1998, July). *Annual report*.
- Halffter, G. (1984). Las Reservas de la Biósfera: Conservación de la Naturaleza para el Hombre. *Acta Zool. Méx.* 5: 4-48.
- Halffter, G. (1991). El concepto de la reserva de la biósfera. *Memorias del Seminario sobre Conservación de la Diversidad Biológica de México* 1: 1-25.
- Halffter, G. (1992). *Áreas naturales protegidas de México: una perspectiva*. Instituto de Ecología. (Unpublished).
- Hayden, J. (1998). *The Sierra Pinacate*. Arizona: University of Arizona Press.
- Instituto Nacional de Ecología, (n.d., copy on file with author). Cuadernos de Trabajo 3 - Áreas Naturales: Economía e Instituciones.
- Instituto Nacional de Ecología, (1995). Riservas De La Biosfera y Otras Áreas Naturales Protegidas De México.
- Instituto Nacional De Ecología, website: <http://www.ine.gob.mx/>
- IUCN (1994). *Guidelines for protected areas management categories*. IUCN, Cambridge, UK and Gland, Switzerland.
- IUCN (1985). *Status of multilateral treaties in the field of environment and conservation*. IUCN Environmental Policy and Law Occasional Paper 1: 1-6.
- Jardel, E.J., Aguirre, G., Santana, E., and Halffter, G. (1992). Desarrollo de las reservas de la biósfera en México. Paper presented at Workshop III.3 of IV World Parks Congress, Caracas, Venezuela.
- Kelly, M. and Enkerlin, E. (1998). The Laguna Madre: A border that unites. *Pronatura*, number 3. Obregon, Mexico.
- Knight, R., and Landres, P. (1998). *Stewardship Across Boundaries*. Washington, D.C.: Island Press.

- Lara, F. (1999, January). *Cross-border partnerships for environmental management: The why, who, and how of the US-Mexican border experience*. Paper presented at the Transborder Cooperation and Sustainable Development in a Comparative Context Conference, San Diego, California.
- Loomis, J. (1993). *Integrated public lands management: Principles and applications to national forests, parks, wildlife refuges and BLM lands*. New York: Columbia University Press.
- Mader, R. (1997, August). *Digesting Borderland Environmental News*. Ron Mader's website: <http://www.txinfinet.com/mader/planeta/1197/1197border1.html>.
- Mader, R. (1998). *Mexico: Adventures in nature*. John Muir Publications.
- Mader, R. (1997, January). *Mexico: When is a national park a national park?* Ron Mader's website: <http://www.txinfinet.com/mader/ecotravel/mexico/mexparks2.html>.
- Mexican preserves foster border cooperation. (Two wildlife preserves abutting Texas' Big Bend National Park). (1995, March-April). *National Parks*, v69, n3-4.
- Ness, H. (1999, January). Telephone interview. Director, US-Mexico Affairs Office of the National Parks Service.
- Odañez Diaz, Maria De Jesus, Oscar Flores Villela, (1995). Areas Naturales Protegidas
- Ormazábal, C. (1988). *Sistemas nacionales de áreas silvestres protegidas en América Latina*. Basado en los resultados del taller sobre Planificación de Sistemas Nacionales de Areas Silvestres Protegidas, Caracas, Venezuela, 9-13 junio 1986. Proyecto FAO/PNUMA sobre manejo de areas silvestres, areas protegidas y vida silvestre en America Latina y el Caribe. Oficina Regional de la FAO para América Latina y el Caribe, Santiago, Chile. Pp. 20-23.
- Peacock, D. (1998, March-April). *Desert Solitary*. *Audubon*.
- Pearson, G. (1998). *Organ Pipe Cactus National Monument: Tri-national management challenges and opportunities for cooperation with Mexico and the Tohono O'odham Nation. A historical perspective*. Arizona: Organ Pipe Cactus National Monument.
- Price and Humphrey (eds.) (1993). Application of the Biosphere Reserve Concept to Coastal Marine Areas UNESCO/IUCN
- Rettie, D. (1995). *Our national park system: Caring for America's greatest natural and historic treasures*. Chicago: University of Illinois Press.
- Rojas-Caldelas, R. (1999, January). *Management of natural areas: El Pinacate-Gran Desierto de Altar, Sonora*. Paper presented at the Transborder Cooperation and Sustainable Development in a Comparative Context Conference, San Diego, California.
- Sanchez, C. (1999, January 20). Personal Interview. Associate Regional Director International Affairs and Special Projects, US Fish and Wildlife Service.
- SEDUE (n.d.). *Sistema nacional de áreas naturales protegidas*.
- SEDUE (n.d.). *Sistema nacional de áreas naturales protegidas (SINAP), México*.

SEDUE (1989). Información básica sobre las áreas naturales protegidas de México. Subsecretaría de Ecología. Dirección General de Conservación Ecológica de los Recursos Naturales (DGCERN). SINAP.

Sellars, Richard West (1998, January-February). "Science or tradition? What should be emphasized in park service management" National Parks v72, n1-2, pages 39-40.

Secretaría de Medio Ambiente, Recursos Naturales y Pesca, (1995). Programa de Areas Naturales Protegidas de Mexico 1995 – 2000.

Secretaría de Medio Ambiente, Recursos Naturales y Pesca, main www page:
<http://semarnap.conabio.gob.mx/>

Simonian, Lane, (1995). Defending The Land Of The Jaguar: A History Of Conservation In Mexico.

Spiller, S. (1999, January 20). Personal Interview. Coordinator, Southwest Strategy, US Fish and Wildlife Service.

Summary of events. Colorado River Delta-Upper Gulf of California Workshop. Mexicali, Baja California, Mexico; October 30-31, 1997.

Summary matrix of selected US agencies US-Mexico border region programs and projects 1992-1997 (Incomplete). Compiled for the Good Neighbor Environmental Board. GNEB website:

The State of Chihuahua. (1993). *Proyecto Reserva de la Biosfera Santa Elena, Sierra del Carmen*. Chihuahua, Chih.: Dirección General de Desarrollo Urbano y Ecología y el Departamento de Ecología.

The US-Mexico border area regional environmental information system. EPA website:
<http://epawww.ciesin.org/usmbreis/usmb-more.html>.

The National Park Service website: <http://www.nature.nps.gov>.

The World Conservation Monitoring Centre website:
http://www.wcmc.org.uk/protected_areas/data/cnppa.html.

TRIP homepage: <http://www.bic.state.tx.us/trip/>

UNESCO (1972). Convention Concerning the Protection of the World Cultural and Natural Heritage.

US and Mexican nations cooperate to protect natural areas. (1998, April 8). *Ajo Copper News*, v.74, n.28, p.1.

United States Geological Survey, Biological Resources Division. (1997, November). *United States Department of the Interior US/Mexico Border Field Coordinating Committee Lower Rio Grande Issue Team Summary of Activities Fiscal Year 1998*. Columbia, Missouri: Environmental and Contaminants Research Center.

Varady, R., Ingram, H, and Milich, L. (1995). The Sonoran Pimería Alta: Shared environmental problems and challenges. *Journal of the Southwest*, v.37, n1, p.102.

- Vargas, F. (1984). Parques nacionales de México y reservas equivalentes. Instituto de Investigaciones Económicas, UNAM.
- Vargas, F. (1990). Las áreas naturales "protegidas" en México; una utopía, basada en simulaciones, mitos, demagogia y autoritarismo. II International Symposium on Protected Areas in Mexico. Centro de Ecología UNAM. 22-26 October 1990.
- Vargas Marquez, Fernando, (1984). Parques Nacionales de México y Reservas Equivalentes: Pasado, Presente Y Futuro
- Vice President Gore calls for healthier, more livable communities. (1998, September). The White House; Office of the Vice President.
- World Conservation Monitoring Centre (1988). Mexico Conservation of biological diversity. World Conservation Monitoring Centre, Cambridge, UK.
- World Conservation Monitoring Centre http://www.wcmc.org.uk:80/cgi-bin/pa_paisquery.p
- World Resources Institute website: <http://www.wri.org/wri/biodiv/bioregio.html#defining>
- Yruretagoyena, C. (1999, January 21). Phone Interview. International Sonoran Desert Alliance.
- Zakin, S. (1995, February). *The border's last frontier: The Pinacate*. Ron Mader website: <http://www.txinfinet.com/mader/planeta/0297/0297zakin.html>