A Thesis submitted to the Department of Environmental Sciences and Policy of Central European University in partial fulfillment of the Degree of Master of Science

Protecting Wildlife on Public Lands:

NATIONAL SECURITY AND WILDLIFE CONSERVATION ALONG THE UNITED STATES-MEXICO BORDER

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Budapest

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ABSTRACT OF THESIS submitted by:
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Wildlife conservation is challenging along the US-Mexico border. In the past few years, extensive illegal activity and associated law enforcement has continued to intensify, disturbing wildlife and diverting attention away from conservation on public border lands. Diverse habitats and species are protected under federal and state environmental laws; yet security mandates infringe upon conservation efforts, marginalizing the environmental mission. US border legislation has mandated infrastructure in the form of physical walls, which threatens wildlife migration and breeding. This project investigates the compatibility of border security strategy and wildlife conservation on public lands. It explores perspectives of key actors in the region through qualitative interview sampling. Findings reveal that US national security operations are compromising the ability of conservationists to meet environmental requirements. In the US, financial resources intended to protect wildlife are being redirected to border security issues, while border apprehension strategies are damaging the land. Border security and wildlife conservation are thus incompatible at the federal level; however professionals in the field believe they are theoretically and practically compatible, provided that positive collaboration occurs.

Keywords: US-Mexico border, conservation policy, legislation, transboundary, threatened species

CONTENTS

LIST OF ABBREVIATIONS*

AGFD	Arizona Game and Fish Department
ADWA	Arizona Desert Wilderness Act
BAN	Border Action Network
BANWR	Buenos Aires National Wildlife Refuge
BLM	Bureau of Land Management
BP	Border Patrol
CAA	Clean Air Act
CBD	Center for Biological Diversity
CBP	Customs and Border Protection
CCP	Comprehensive Conservation Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPNWR	Cabeza Prieta National Wildlife Refuge
CRS	Congressional Research Service
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
DHS	Department of Homeland Security
DOA	Department of Agriculture
DOW	Defenders of Wildlife
DOD	Department of Defense
DOI	Department of the Interior
ESA	Endangered Species Act
EPA	Environmental Protection Agency
ISDA	International Sonoran Desert Alliance
IUCN	World Conservation Union
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NFS	National Forest Service
NPS	National Park Service
NWRS	National Wildlife Refuge System
SEMARNAT	Secretariat of Environment, Natural Resources and Fisheries of the United Mexican States (translation)
SHS	Secretary of Homeland Security
SFA	Secure Fence Act
TWA	The Wilderness Act
T&E	Threatened and Endangered [species]
UNEP	United Nations Environment Programme
USBP	United States Border Patrol
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
YBPS	Yuma Border Patrol Station

*Note: Acronym list does not include every organization mentioned in the report.

This thesis is dedicated to

All the wildlife in areas of human conflict,
All the people that volunteered time to talk about it,
And to Jay, for all his support.

CHAPTER 1: INTRODUCTION

In the last two hundred years, unprecedented human population growth has strained the relationship between humans and wildlife. Habitat destruction and pollution have threatened natural lands worldwide, and many species have become endangered or lost to human civilization. Population increase also fuels tension between nations, as demand for land and resources rises and puts pressure on national economies. As these trends intensify, wildlife become increasingly vulnerable and conservation becomes more critical.

Peaceful coexistence between humans and wildlife is a critical conservation mission, and managing natural resources in the context of human society is a challenge that every nation in the world must face. Managers must weigh human development interests with land protection in the interest of sustainability, as people and wildlife compete for resources. Unique circumstances of each region and resource provide a fabric for decision makers at every level, lending specific context for policy effectiveness. For wildlife, managerial decisions can mean the difference between survival and extinction.

Placed into a context of international politics, conservation missions gain another layer of complexity. Issues that straddle borders are inherently challenging, and transboundary conservation may be marginalized for many reasons. First, national security has a tendency to take precedence in border areas – particularly conflicted ones. Second, nations are not required to satisfy the policies and laws of their counterparts. Third, since no single nation can be held responsible for enforcement across a border, transboundary accountability cannot be ensured. International actors are relied upon for transboundary regulation, yet most often the international regime is not granted enough power to surpass the opinions if its host nations.[1] Instead, nations themselves must commit to resolving transboundary issues in a voluntary, collaborative manner. In the case of conservation, they must develop a program that makes ecological sense for the area. Dedicated cooperation from

[1] Host nations often prevent international actors from gaining power because they feel it threatens their national sovereignty. This is particularly true regarding to sovereignty over natural resources.

multiple actors can be essential to the survival of species whose ranges cross international borders.

1.1. Background

In the case of the United States-Mexico border, transboundary conservation challenges are particularly intensified by human conflict. In the past ten years, illegal immigration from Mexico for the purpose of employment has rapidly escalated. According to the US Department of the Interior (DOI), the number of immigrants detained within 100 miles of the border skyrocketed from 512 to 113,380 in a period of only three years (Kenworthy 2006). This has created severe tension and controversy in the US in recent years, and the federal government has responded by increasing military presence along the border (including agents and infrastructure).

The US-Mexico border is biologically diverse, with hundreds of desert species making it a focal point for wildlife conservation (TWS 2005). The uniqueness and vulnerability of the local Sonoran Desert ecosystem has incited collaboration between the US and Mexico - even in the context of the conflicted border - and dozens of nongovernmental organizations (NGOs) have also joined in the conservation mission. On the US side of the border, the scenario for wildlife protection gains further gravity due to the status of the land: border lands are largely public lands, protected under national environmental laws, whose missions are dedicated to conservation and protection of resources for future sustained use.

The US and Mexico have laws in place to ensure the survival of at-risk species along the border; several international agreements have been forged between the nations. As issues of national security persist on the north side of the border, however, federal policy decisions have granted border projects legal precedence over the conservation mission on public lands, fundamentally weakening environmental laws and their ability to protect wildlife. The US government has passed some extreme legislative actions, which have further perpetuated the controversy of the conflict. In 2005, for example, the government introduced legislation mandating a double-layer wall to be built to physically separate the US from Mexico; in 2006, to expedite the construction of the wall, a separate piece of legislation granted permission for the

Department of Homeland Security (DHS) Secretary to waive standing national and state laws. Landmark environmental laws can also be waived under this measure, including the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the Clean Water Act (CWA) – laws specifically designed to assess and mitigate environmental harm caused by human activities and projects. Such legislative actions have high risk potential in the Sonoran Desert, which is home to hundreds of fragile species.

Securing the United States border and conserving local wildlife are unique and challenging tasks. Rampant socio-political, economic, and ecological issues make informed decision-making essential to the effectiveness of conservation plans. Yet in this complex region, exploring alternatives may allow for effective border security without severely compromising conservation policy.

1.2. Motivation, Aim and Objectives

Often the interests of nonhuman organisms are overlooked in political decision-making. It is likely, however, that conservation concerns along the US-Mexico border could be included in national security decisions without significantly altering their course or effectiveness. This study fosters the notion that border strategies can be effective without compromising environmental laws and conservation mandates on public lands.

Exploring the implications of US border strategy in an international conservation context lends insight into how border conflict impacts the fragile Sonoran Desert ecosystem and its wildlife, and how that impact might be mitigated. Laws and international agreements have set a precedent for wildlife protection on the ground, yet recent legislation undermines conservation objectives. It remains unclear if it is truly necessary to eschew environmental laws; research has not been conducted to determine if border strategy and wildlife conservation are indeed compatible.

This project aims to investigate the compatibility of border security projects with wildlife conservation on public lands along the US-Mexico border. The thesis attempts to show that by design, national border security can be compatible with

standing environmental laws and conservation policies. The underlying hypothesis is that *border security strategy can be effective while coexisting with standing environmental laws.* In other words, a basic regard for environmental law and openness to innovative border control at the federal level may allow for effective border security *and* environmental compliance benefiting wildlife on lands proximal to the US-Mexico border. The inherent assumption is that viable innovative approaches are not being explored, but decision-makers are simply allowing border concerns to take precedence, resulting in the marginalization of environmental concerns. If the two realms are compatible, as this project pursues, it may not be necessary to displace environmental laws that protect vulnerable wildlife.

Several objectives assist in providing guidelines to fulfill the aim of the project. First, reviewing pertinent environmental laws and policies intended to protect wildlife along the US-Mexico border is necessary to provide a legal context for conservation in the region. Second, identifying and consulting professionals having expertise in the field will provide insight to the situation on the ground; this allows the conservation scenario to be articulated, and obstacles to conservation delineated. Finally, in the interest of mitigating found obstacles and promoting improved protection of borderlands wildlife in the future, practical suggestions and recommendations will be offered based on the research results.

CHAPTER 2:
OVERVIEW OF LAWS, POLICIES AND PERSPECTIVES REGARDING CONSERVATION IN THE BORDER REGION

This thesis investigates the compatibility of wildlife conservation with border security projects in Arizona, along the US-Mexico border. This chapter presents the legal and political frameworks behind border security and wildlife conservation in an interdisciplinary fashion, with respect to the national realm as well as the efforts taking place on the ground.

2.1. Introduction

Conservation laws and policies have been established on public lands in the United States, which are intended to protect and conserve native species and their habitats. Yet national security bears great intensity upon the region, and may affect the ability of conservationists to achieve their goals and/or meet mandated legal requirements. In effort to examine the effectiveness of environmental laws and policies in the borderlands, it is therefore vital to determine the direct and indirect impacts of border security strategy upon regional wildlife.

As animals do not know political boundaries but migrate based on the resources they need to survive, actions within Mexico and the international regime are intermixed with the US effort to protect wildlife. Exploring the nature of the conservation relationship between the US and Mexico is necessary, to provide a comprehensive framework for accountability toward wildlife along the border. Key actors are identified throughout, for the purpose of raising consciousness about grassroots action taking place at the border. Although it would be pertinent to additionally examine the character of conservation in Mexico, Mexican land use is beyond the scope of this project. The international context of this thesis is presented through a legal and political perspective only; the US obligation toward wildlife serves as a basis for international considerations.

The first section of this chapter introduces the geographical area of focus, through a political boundary-type lens and then from the ecological perspective. The second section is dedicated to characterizing the legal framework for wildlife conservation along the border, which includes landmark environmental legislation at the federal and international levels. The chapter proceeds to introduce the basic conservation policies and plans in effect, including those in a national wildlife refuge on the border. Agencies and grassroots organizations are introduced in the conservation section. Finally, border security issues (including legislation, plans and associated threats to wildlife) are presented in the second portion of this chapter. This latter section confers the contemporary political scene with respect to the conservation context, exposing the relationship between border activity and wildlife conservation.

2.2. Geographic Premise of the Study

The length of the US-Mexico border is about 2,000 miles (3,200 km), making it one of the longest policed borders in the world (Marris 2006, Bies 2007). Border lands are geographically, politically, culturally, and biologically complex. Rapid development has more than quadrupled the population of the Sonoran ecoregion since 1960 (AGFD 2007b). Conflict in the region adds to the challenge of conserving species there, where critical habitat is plagued by human activity, including vast amounts of illegal immigration and sizeable border enforcement efforts. Managing these lands is a demanding task, and the variety of involved governments and political boundaries compounds the challenge for conservationists. A majority of lands on the US side of the border are considered public lands, which are maintained by the federal government for the purposes of resource management and human recreation. Public lands are a general focus of this thesis because by law their resources are required to be protected and sustained for future generations. Public land types vary greatly along the border; in Arizona, for example, lands situated along the border include national parks, wildlife refuges, forests, historic monuments, and other officiated land sites [Figure 1]. The various land types are managed by different federal agencies. Though the agencies abide by different missions and directives and vary internally with management strategy, all are required to abide by federal and international environmental laws.

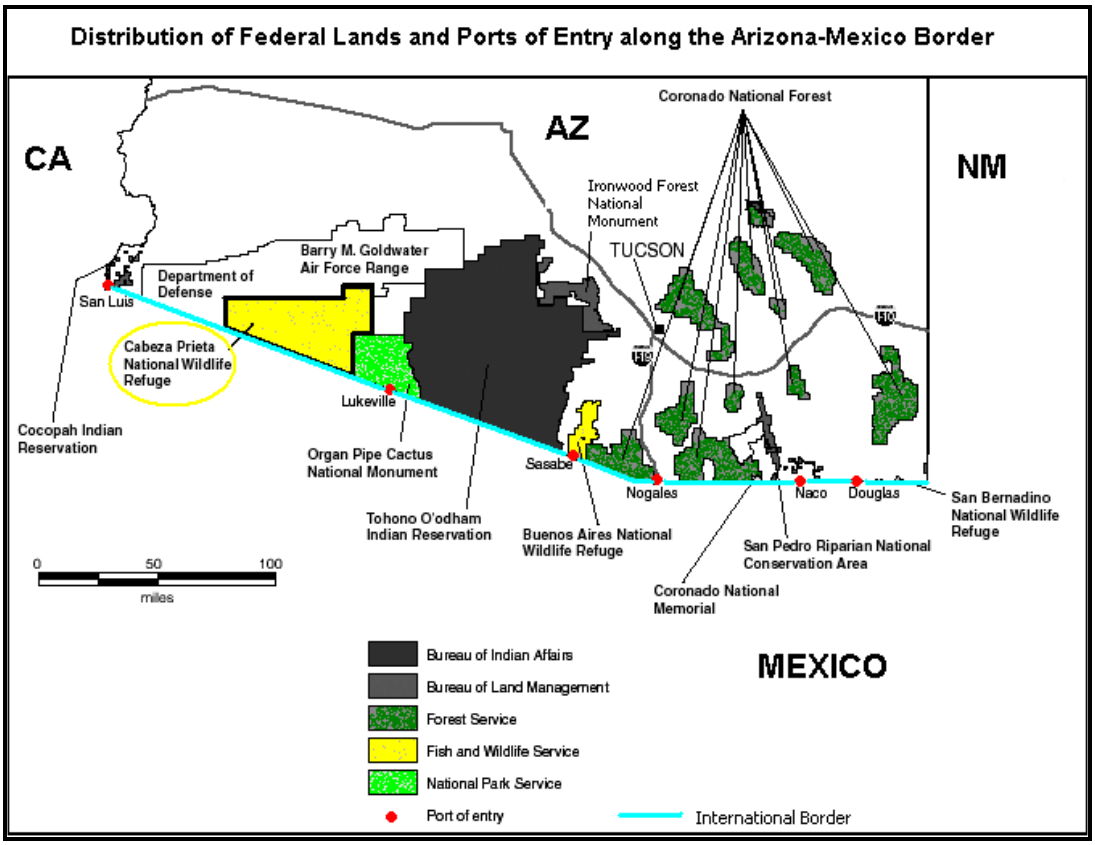

Fig.1. The AZ-Mexico border is dominated by public lands, including wildlife refuges, national monuments and memorials, and national forests. Source: U.S. Government Accountability Office 2007 (with amendments).

It is noteworthy, however, that some laws differ per land type; a pertinent example is that different types of land will likely offer different levels of protection for wildlife. A list of public land *types* in Arizona and their management agencies are listed in Table 1 below [*for a complete list of AZ public borderlands see Appendix 2*].

Table 1. Arizona public land types and corresponding management agencies

Public land type	*Managing agency*
National wildlife refuges	US Fish and Wildlife Service (USFWS)
National historic preservation areas	National Park Service (NPS)
National conservation areas	Bureau of Land Management (BLM)
National monuments	Bureau of Land Management (BLM) or National Park Service (NPS)
National forests	US Forest Service
Public lands, other	Bureau of Land Management (BLM)

In order to demonstrate the gravity of the situation for at-risk wildlife, this thesis uses the Cabeza Prieta National Wildlife Refuge (CPNWR) as a focal study area. In the

US, laws governing national wildlife refuges offer higher levels of species protection than other public land types. The CPNWR rests along 56 miles of the US-Mexico border, in the southwest corner of Arizona State [Figure 1]. Established in 1939 to preserve the local Sonoran Desert ecosystem, the Refuge consists of 860,000 acres of land, making it the third largest wildlife refuge in the United States (Fischman 2003). In 1990, Congress designated 93% of the CPNWR as Wilderness Area – a special, higher level of land protection granted by the federal government (NWPS 2007). The neighboring Organ Pipe Cactus National Monument is also designated wilderness, as well as minute portions of the Coronado National Forest in Southeastern Arizona. Legal stipulations of wilderness areas and more generally on public lands will be discussed in section 2.3.

The biological character of the border region adds to the urgency of conservation there. The Sonoran Desert is the largest remaining intact desert ecosystem in the United States, and about two-thirds of its area is located in Mexico [Figure 2].

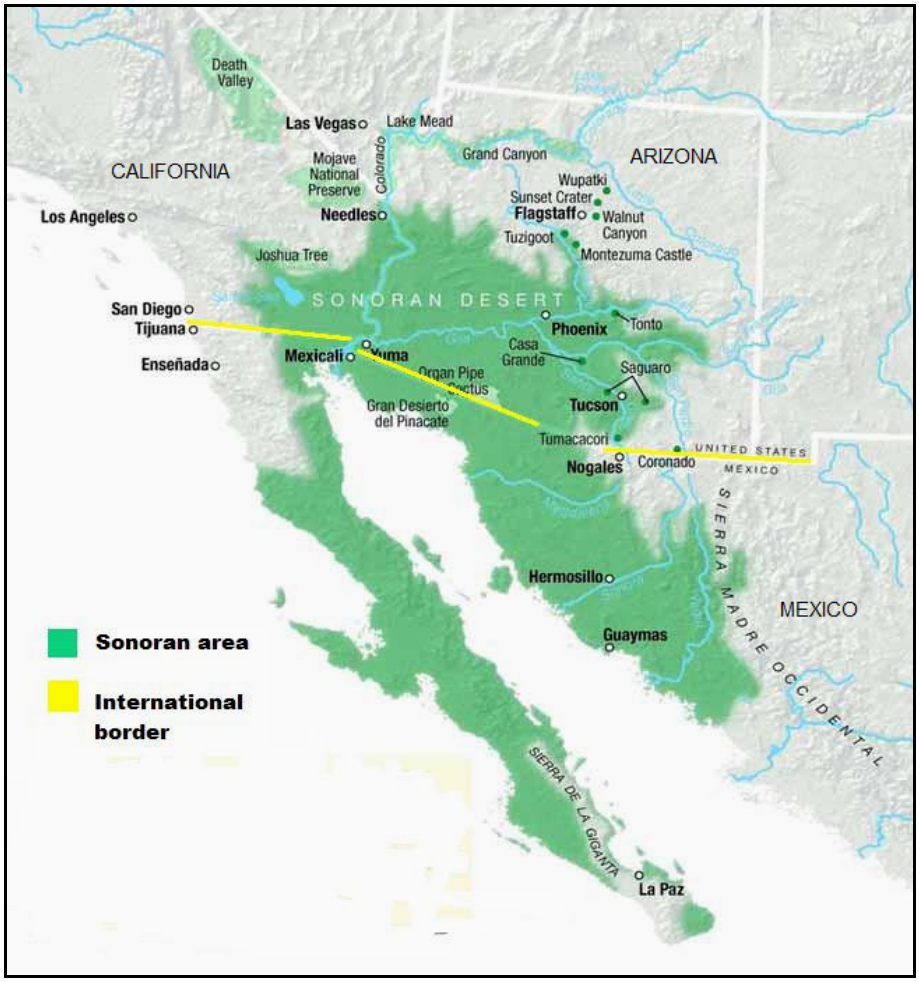

Fig.2. The 120,000 square-mile area of the Sonoran desert, which spans Mexico, California and Arizona. Source: Hauk 2000 (with amendments).

Due to its geographic location between two mountain ranges (the Sierra Nevada to the east and the Rocky Mountains to the west), the Sonoran hosts a large variety of microclimates/microecosystems that account for its incredible array of biodiversity (AGFD 2007b). The Sonoran has a tropical/subtropical climate and receives rainfall according to these microhabitats, ranging from about 2-12 inches per year (Houk 2000, Jones and Sahee 2004). Volcanism in the past left over five smaller mountain ranges here, as well as foothills, valleys, washes and river systems, all of which serve to diversify the terrain and habitat. Wildlife here includes tortoises, snakes, fish, reptiles, bats, rodents, rabbits, deer, sheep, pronghorn, bear and large cats. Cabeza Prieta has about 300 known wildlife species that may be affected by the border situation; 43 of these are considered threatened and endangered (T&E) species (TWS 2005, DOW 2007a). In addition, millions of birds migrate through the Sonoran each year, and hundreds of them are native to the desert (Houk 2000). *[For a complete list of species at-risk, see Appendix 2].*

The southern border of the CPNWR is Mexico, and is 56 miles (90 km) long. In contrast to the US side, lands along the Mexican side of the border are predominantly privately-owned. While it would be greatly useful to examine the status of the land and conservation on the Mexican side of the border, this is beyond the scope of this project. This thesis explores the status of conservation on Arizonan public borderlands, with particular attention to the CPNWR. The research is framed by a legal and biological perspective, and the role of the international community (including Mexico) is approached through this standpoint. The next section provides the legal background for conservation in public US border lands.

2.3. Legal Framework for Conservation on Border Lands

This section introduces landmark environmental laws established to protect public lands and wildlife from degradation. To conserve these lands and their resources, a large amount of formal legislation exists at the state, federal, and international levels. Federal laws are discussed first, and are followed by AZ State laws. The latter portion of this section outlines consensual international legislation forged between the US and Mexican governments (as is pertinent to conservation), as well as related

United Nations agreements. For legislation regarding border security in the region, refer to section 2.5.2.

2.3.1. Domestic law

Federal laws bind the nation to environmental accountability, providing a legal framework for responsible natural resources management. Some laws are quite specific in dealing with wildlife issues; to protect migratory birds, for example, the US has passed three major Acts [*Migratory Bird Treaty Act of 1918, Migratory Bird Conservation Act of 1929, and the Migratory Bird Hunting Stamp Act of 1934]* (USFWS 2002). There are few comprehensive environmental laws to protect non-avian wildlife, however other environmental laws are more encompassing and serve to protect species and habitat. The *National Environmental Policy Act* of 1969 (NEPA) is a broad law that requires all major projects on public lands to have an Environmental Assessment or Impact Statement (EIS) conducted prior to their approval (USFWS 2005). NEPA is a very important conservation law. It insists that evidence of project impacts will reach decision-makers, ensures public participation in the environmental planning process – which is highly desirable in formulating policy – and forces managers to consider alternatives to higher-impact strategies (Jones and Sahee 2004, Slown 2003). Wildlife refuge conservation plans are granted legitimacy by the NEPA mandate, as they abide by its provisions in their planning process; NEPA also gives the plans unique federal protection and permission to influence the human environment (Pima County 2002). [*For more on Comprehensive Conservation Plans refer to section 2.4.2*]. Without NEPA, large-scale border operations would not be required to consider any impacts to land or wildlife in the area, nor reveal those impacts to the public. NEPA represents the very basic legal roots of conservation in the US, in that it requires decision-makers to seriously consider the environment in development projects.

One of the strongest pieces of environmental legislation concerning wildlife in the US today is the *Endangered Species Act* (ESA). Enacted in 1973, the ESA aims to prevent threatened and endangered species from extinction by three routes: 1) protecting critical habitat, 2) funding state conservation programs, and 3) requiring project assessments (such as EIAs and EISs) prior to approval, to ensure that species at risk are not compromised by development (NWF 2007a). Over a

thousand species are protected under the ESA today, and by aiding the survival of these species, the law also improves the health of the environment generally as it keeps habitats intact. Defenders of Wildlife (DOW), a large and influential NGO, calls the ESA "the crown jewel of America's conservation laws" (DOW 2004a); the National Wildlife Society calls the ESA "America's safety net for wildlife" (NWF 2007b). Yet the Act has been weakened by many sectors of the federal government in the past decade, mostly because its 'critical habitat' protection provision interferes with development goals – and because enforcing it is costly. In his book *Bush versus the environment*, analyst R.S. Devine (2004) explains, "The ESA ranks near the top of environmental laws that the [Bush] Administration does little to enforce… [the administration] often uses under-funding to avoid implementing portions of the ESA" (115-116). US Congressmen John Dingell, the author of the ESA, claims that the US Department of Defense (DOD) seeks exemptions from laws like the ESA and TWA to "avoid accountability for its actions", particularly in light of the fact that these laws contain clauses that allow for military-related exceptions (US White House 2003, TWS 2005). The New York Times (2003) agrees, claiming that blanket exemptions aren't necessary, but that the Pentagon and Army seek them because they "have always found environmental laws inconvenient". Non-governmental organizations are working hard to defend the provisions of the ESA, including the Center for Biological Diversity (CBD), the World Wildlife Fund (WWF), and the National Wildlife Society (NWS). According to the NWS, the ESA is essential to the survival of many species in the USA, such as the endangered Sonoran Pronghorn antelope (*Antilocapra americana sonoriensis)*, a species endemic to the Sonoran Desert and the CPNWR. Wildlife at risk in the border region, including further discussion on the Sonoran Pronghorn, are discussed in section 2.6.

Another law critical to protecting wildlife habitat along the border is the *Wilderness Act* (TWA), which was passed by Congress in 1964. TWA designates areas that are unspoiled as wilderness to be protected under federal law, which are not to be utilized for human purposes. Under the Act, Wilderness Areas are specified as "area(s) where the earth and the community of life are untrammeled by man, where man himself is a visitor who does not remain… with the imprint of man's work substantially unnoticeable" (US Congress 1964). TWA prohibits the use of motorized equipment and/or vehicles, for example, and does not allow for the

formation of temporary or permanent roads. Fulfilling this legal stipulation is increasingly challenging in the border region, where the presence of human activity and infrastructure are substantially increasing, and smugglers frequently use vehicles off-road. In addition, according to Robert S. Devine (2004), TWA is relatively weak because it hasn't been taken very seriously by the Federal Bureau of Land Management (BLM) - who is responsible for administering the system - and as a result, wilderness land designations and additions have been scant.

> Oil and gas outfits cover BLM lands, and of the BLM's 264 million acres only about 6.5 million acres—about 2.5 percent—currently are protected as wilderness. But millions of additional acres have been identified as potential wilderness, and some of the White House's most problematic… actions have been aimed at not realizing that potential (Devine 2004, 94-95).

Development-based motives may greatly impede the fulfillment of TWA. Other sources suggest that TWA has been largely ignored in management plans along the border – including in the CPNWR – so that CBP is not held accountable for its damage to wilderness (TWS 2005). It remains to be seen whether the US National Wilderness Preservation System will be taken seriously as was mandated by Congress in 1964, or if development pressures will obscure the mission of the Act.

Among other reasons, the domestic laws discussed above are intended to protect species living in the United States, including those habituating the rural desert areas along the US-Mexico border. Other laws such as the Clear Air Act and Clean Water Act are of concern in the border region but are beyond the scope of this thesis, as these Acts deal primarily with pollution and human health issues and are not directly related to wildlife protection.

2.3.2. State and international law

Laws at the state and international level are placed together in this section to illustrate their more marginal role on public border lands. While these laws are in no way less important or critical to conservation, their relative weakness is a result of the fact that federal agencies manage public lands in the US – agencies that manage primarily according to federal mandates and federal laws. Still, legislation at the State and international levels is legitimate and profound, and perusing it provides important context for understanding the transboundary scope of conservation.

Along the AZ-Mexico border, it is helpful to wildlife that Arizona State Game and Fish Department (AGFD) officials are required to comply with all federal environmental laws listed above, as national law trumps state law in the US. In 1984, Arizona produced its own Wilderness Act at the state level to work in conjunction with the Federal Act. The *Arizona Desert Wilderness Act* (ADWA) was officially codified into law in 1990, and it was under this Act that the CPNWR was designated wilderness. A lot of wilderness is at stake in the State of Arizona, which has 47 specified wilderness areas that total 1.7 million acres of wilderness lands (AGFD 2006). The ADWA helps to reinforce federal law, providing another layer of protection at the regional level.

In the international realm, the protection of resources/wildlife across borders is characteristically difficult and is largely addressed through intergovernmental agreements. Various conventions and agreements have indeed been forged between the United States Department of the Interior (DOI) and the Mexican government's Secretariat of Environment, Natural Resources and Fisheries of the United Mexican States (SEMARNAT) to address the transboundary protection of natural resources, including wildlife [Table 2]. Although the history of environmental agreements between the US and Mexico appear to establish a legal framework for the protection of transboundary wildlife, it is unclear in the literature if these agreements are still respected or if they are considered expired.

Table 2. Legal agreements formally established between the US Department of the Interior and the Mexican SEMARNAT, 1936-2000.

Title of Legal Agreement	*Date signed*
The Convention between Mexico and the United States of America for the Protection of Migratory Birds and Game Mammals	February 7, 1936
The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere	October 12, 1940
The Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area	August 14, 1983
The Memorandum of Understanding on Cooperation in Management and Protection of National Parks and Other Protected Natural and Cultural Heritage Sites	November 30, 1988, and January 24, 1989
The Memorandum of Understanding Concerning Scientific and Technical Cooperation on Biological Data and Information	May 16, 1995
The Memorandum of Understanding Establishing the United States/Canada/Mexico Trilateral Committee for Wildlife and	April 9, 1996

Ecosystem and Conservation Management	
Annex Two to the Memorandum of Understanding to establish the aerial photography initiative in the border region between the United States Geological Survey and the Institute of Statistics, Geography, and Information Science of the United Mexican States	May 6, 1996
The Letter of Intent between the Parties for Joint Work in Natural Protected Areas on the United States-Mexico Border	May 5, 1999
The Wildfire Protection Agreement for the Common Border	June 4, 1999
The Memorandum of Understanding to Work Jointly in Matters Related to the Protection and Conservation of the Environment	May 18, 2000

Source: US Department of the Interior 2000.

Among other conservation and restoration obligations, Article 2 of the May 2000 MOU (the last entry of Table 2 above) specifically includes the "protection of wild flora and fauna, including migratory and transboundary species" as one of the cooperative statutes between the US and Mexico (USDOI 2000). The nations are not, however, signatories to the famed Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention), which is a global regime designed to protect wildlife migrating between national boundaries (CMS 1979). Yet in addition to the agreements between the US and Mexico listed in Table 2 above, both countries are signatory nations to a treaty entitled *The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere*. Established by the United Nations Environment Programme (UNEP) in 1942, the Convention intended to prevent species from extinction by fostering protected wilderness areas, as well as establishing a conciliatory relationship between signatory nations in aiding this mission (UNEP 1942). These types of international agreements, if implemented on the ground, help to reinforce the federal and state protections of border lands.

It is evident that conservation has been an issue of concern between the US and Mexico, and past agreements offer mandates for the transboundary protection of wildlife. Yet US legislation at the federal level remains precedent on border lands. Federal law is thus relied upon to exemplify and empower conservation missions; on in contrast, any weakening of federal environmental mandates is likely to threaten conservation efforts at each level of government.

2.4. Conservation Policies and Actors in the Region

Detailed plans and policies exist as instruments to help achieve the ambitious security and conservation goals of the border region. This section introduces the National Wildlife Refuge System (NWRS), the parties responsible for managing natural resources on public lands and their associated policies, and the international background applicable to wildlife conservation in the CPNWR. Although conservation policies and laws are introduced separately in this report, some pertinent laws are synthesized into this section, as they provide foundation for an established policy.

2.4.1. The National Wildlife Refuge System (NWRS) and relevant authorities

The National Wildlife Refuge System (NWRS) consists of 547 refuges across America, and is administered by the United States Fish and Wildlife Service (DOI 2007) [Figure 3]. Refuges are the only lands in the United States founded specifically for the purpose of wildlife conservation. The NWRS mission is outlined in the *NWRS Improvement Act of 1997*: "the fundamental mission of our Refuge system is wildlife conservation" (USFWS 2005, 3).

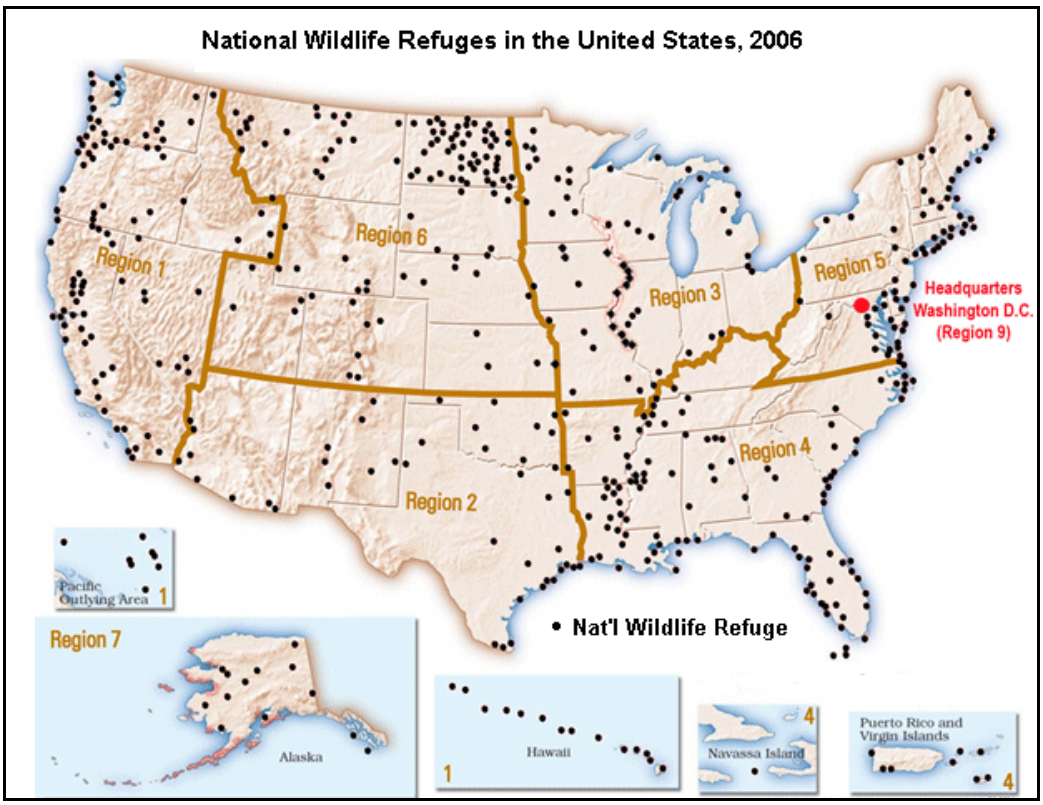

Fig.3. Refuge locations in the United States. The 547 refuges are classified by their regional locations; Cabeza Prieta NWR is located in Region 2. Source: USGS 2006.

At the CPNWR, the AGFD is responsible for day-to-day management operations, in conjunction with the US Fish and Wildlife Service (USFWS). However, the management situation gains complexity because much of the Refuge land is owned by the BLM, which has its own laws that can restrict AGFD management. For example, BLM lands are often utilized for military operations; at the CPNWR, aircraft flights are allowed under a Memorandum of Understanding (MOU), and are quite common (NWPS 2007).

Internationally, U.S. National Wildlife Refuges are granted recognition by the International Union for the Conservation of Nature and Natural Resources (more commonly known as the World Conservation Union), or IUCN. The IUCN is a conglomerate partnership of 83 states, 110 government agencies, over 800 NGOs, 81 international organizations, and over 10,000 experts and scientists from around the world, who are dedicated to resource conservation and endangered species protection (IUCN 2007). The IUCN designates global habitats and species that are most at-risk, in compliance with landmark United Nations resolutions such as those of Stockholm (1972) and Rio (1992), and works with its partners to formulate conservation plans. Under the IUCN, the CPNWR is dually listed as a 'Category IV Habitat/Species Management Area', and 93% a 'Wilderness Area 1b', which protects the land under international law (IUCN 2007). Several species in the CPNWR are also listed at-risk under IUCN red-list designations (see section 2.5 and Appendix 3). It is worthwhile to mention, however, that international laws are most often nonbinding, and thus recommended protections for species/habitat are voluntary.

2.4.2. Policies regarding conservation in the CPNWR

Due to the nature of America's governance, the federal government, State of Arizona, and the local Pima County have each developed full conservation plans for the Sonoran Desert region. This section of the chapter briefly introduces these plans and then discusses conservation policy efforts taking place in Mexico. The latter portion presents the nongovernmental actors currently engaged in conservation efforts in the region and their associated missions.

When the federal government passed the aforementioned *Refuge System Improvement Act Amendments* in 1997, they required federal land management

agencies managing each refuge to formulate a Comprehensive Conservation Plan (CCP) by the year 2012. In response, the USFWS completed a 507-page draft plan for the CPNWR in 2005, entitled *Comprehensive Conservation Plan/Wilderness Stewardship Plan/Environmental Impact Statement for the Cabeza Prieta National Wildlife Refuge* (USFWS 2005). While the extensive CCP for the CPNWR is ambitious, it is criticized in the literature for failing to address impacts directly caused by BP strategy (and therefore uphold important laws such as TWA) (TWS 2005); the plan appears to avoid the national security fray. At the state level, the Arizona Game and Fish Department finalized the even lengthier (834-page) *Comprehensive Wildlife Conservation Strategy* (CWCS), which is applicable statewide from 2005-2015 (AGFD 2006). The AGFD has multiple conservation programs to fulfill the CWCS such as their *Wildlife Action Plan*, and many others which are aimed at preserving wildlife migration corridors and home ranges extending into Mexico. Local government in the area has also developed a conservation policy entitled the *Sonoran Desert Conservation Plan,* which also works to preserve wildlife habitat and migration corridors, as well as cultural resources, mountain parks, ranches and riparian areas (Pima County 2002). Other public land types and federal agencies have various plans concerning conservation as well. The BLM has a *Draft Resource Management Plan and Draft Environmental Impact Statement (DRMP/DEIS),* a 719-page document that meant to serve the greater Yuma area; the plan (which just completed its public comment phase) has sections dedicated to international border issues, and their resulting threats to wildlife (BLM 2006). The US Environmental Protection Agency (EPA) has its own program entitled *Border 2012: US-Mexico Environmental Program* dedicated to "protect[ing] the environment and public health in the US-Mexico border region, consistent with the principles of sustainable development" (USEPA 2003). *Border 2012* was signed by all ten US-Mexico Border States in 2002, and though it is a highly collaborative and international effort, unfortunately the program is restricted to anthropocentric (pollution/health) concerns.

Mexico also has conservation plans for the Sonoran Desert region. The nation has two forms of protected lands: national parks and reserves, and along the border the Mexican government has established sister park programs that work with agencies managing public lands in the United States. Across from the CPNWR, for example, the extensive Reserva de La Biosfera del Pinacate y Gran Desierto de Altar (the

Pinacate and Grand Desert Biosphere Reserve) takes place in the cooperative parks program [Figure 4].

Fig.4. Mexico's Pinacate Biosphere Reserve, just across the border. Source: Away.com.

Mexico's Environment Ministry has developed unique programs to "conserve the ecology and environment of the northern [Mexican] states bordering the US… [to] guarantee the conservation of not only those species unique to Mexico… but also migratory species from the US… for their continued survival" (Lichtinger 2003, 2). While Mexico is committed to participating as an active partner in conservation, the nation's efforts are extremely resource limited. Estrada (2002) reflects, "Mexico's [conservation] budget is practically nonexistent," which may limit their effectiveness. Although it would be useful to explore the laws and policies of Mexico in further detail, it is largely beyond the scope of this study. The role of Mexico is viewed herein only as it pertains to international conservation on US public lands.

2.4.3. The role of NGOs

In addition to the plans founded in the governmental sector, non-governmental organizations (NGOs) have also created plans and projects to assist the region's conservation efforts. In fact, a large variety of organizations are actively working to improve the situation for wildlife along the US-Mexico border [Table 3]. Most of these groups are membership-based non-profit organizations who work to provide information to the public, defend the environment in court, network to cooperatively conserve land and wildlife, and exert pressure on government agencies to consider

wildlife-friendly policies, and many have unique programs designed to confront border conservation needs[2].

Table 3. Organizations supporting wildlife conservation along the US-Mexico border.

Organization/Program	Mission
Defenders of Wildlife (DOW)	Protect all native wild animals and plants in their natural communities and advocate new approaches to wildlife conservation.
The Wildlands Project (TWI)	Restore and protect the natural heritage of North America through a system of protected Wildlands.
Border Action Network (BAN)	Protect human and civil rights and the Sonoran Desert along the US-Mexico border.
Center for Biological Diversity (CBD)	Protect endangered species and their habitats from the effects of rapidly increasing militarization of the border.
Pacific Biodiversity Institute (PBI)	Conduct scientific research in the fields of ecology, conservation biology and natural resource management, focused on the conservation of biodiversity and maintenance of ecological integrity in the Pacific region.
The Nature Conservancy (TNC)	Preserve plants, animals, and natural communities by protecting the lands and waters they need to survive.
International Sonoran Desert Alliance (ISDA)	Protect the valuable biological resources and guarantee a respect for the cultural heritage of the Sonoran Desert.
Southwest Consortium for Environmental Research and Policy (SCERP)	A university consortium dedicated to environmental research of the U.S.-Mexican border region (Created by the US Congress, and partnered with the EPA).
The Drylands Institute (TDI)	Advance knowledge of SW North America's flora, fauna, ethnobiology and humans; research the Sonoran Desert Region; conserve natural and cultural resources; preserve biological diversity
Sky Island Alliance (SIA)	Preservation and restoration of native biological diversity
World Wildlife Fund (WWF)	Conserve nature using scientific knowledge to preserve the diversity and abundance of life on Earth and the health of ecological systems.
Coalition to Bring Down the Walls (CBDW)	Promote respect for human/civil rights; fight the militarization of the Southern Border region
The Southwest Strategy (TSS)	Restore and maintain the cultural, economic, and environmental quality of life in Arizona and New Mexico
The Wildlife Society (WS)	Enhance the ability of wildlife professionals to conserve diversity, sustain productivity, and ensure responsible use of wildlife resources.
The Wilderness Society (TWS)	Protect and restore America's wilderness areas, using scientific expertise, analysis and bold advocacy tools.
Teaming with Wildlife Coalition (TWC)	Prevent wildlife endangerment by supporting increased public funding for wildlife conservation and associated recreation and education in every state.

[2] Detailed information on particular programs pertaining to the border can be easily retrieved online, on the organizations' home pages.

National Wildlife Federation (NWF)	Educate, inspire, and assist individuals and organizations in conserving wildlife and other natural resources; to protect the environment.
Jaguar Conservation Team (JAGCT)	To develop a plan to protect the endangered jaguar in the U.S.-Mexico borderlands.
Northern Jaguar Project, Inc.	To conserve the endangered northern jaguar; to reserve expansion in Mexico through land purchase in the area that is the source of jaguars migrating across the U S border.
The Sonoran Institute (TSI)	Inspire and enable community decisions and public policies that respect the land and people of western North America.
Nauralia, Committee for the Conservation of Wild Species (Mexico)	Protect Mexican biodiversity by planning and developing conservation projects to preserve ecosystems and their species, mainly those in extinction danger; to spread awareness and environmental education.

Dozens of alliances and partnerships also exist among NGO groups in the region. A basic internet search reveals voluminous amounts of information about wildlife conservation efforts in the border region, including a plethora of unique projects.

In summary, a large number of organizations and actors are working to help regional wildlife, and there is plenty of scattered collaboration. Yet efforts likely to overlap on a regular basis, formulating an extremely complex management scheme that is further fragmented by different participating levels of government. It is important to recall that at all times, federal law and policy take precedence over the state and local levels of government, and the ability of the private sector is limited by federal management on public lands. There is no indication in the literature that organizations are working together to produce a streamlined, large-scale effort, nor evidence of significant participation from the international regime.

2.5. The Politics of Border Security

The southern border of the United States is maintained by the U.S. Customs and Border Protection (CBP), a bureau of the federal government's Department of Homeland Security (DHS). To ensure national security, the CBP is responsible for apprehending people who try to illegally enter the country. This is done primarily with over 9,000 Border Patrol (BP) personnel, as well as thousands of national guard

troops, who monitor the border intensely around the clock acting as security guards and law enforcement agents (Marris 2006). The CBP also commissions border projects by hiring private contractors to construct and manage new infrastructure. The Mexican government does not have an equivalent of border patrol, but they do have law enforcement agents trying to prevent illegal immigration and maintain control on the southern side of the border. Law enforcement officials on both sides of the border actively cooperate with one another, and are working together to improve future strategy for border control (Carnegie 2001). This section briefly introduces the immigration situation at the US-Mexico border, and then outlines the most contemporary legislation concerning border infrastructure projects. Finally, sociopolitical perspectives of the barrier-infrastructure debate are explored in-depth.

2.5.1. Immigration in the region: trends

Illegal immigration from Mexico has increased significantly in the past decade, necessitating increased militarization in the border region. In this time, Arizona has become a nexus of illegal immigration, border patrol efforts, and associated immigrant deaths. According to the US Border Patrol (BP), in 2005 more immigrants were apprehended in the three AZ BP sectors than in the other six sectors combined (i.e. the remaining entirety of the US-Mexico border), and over half of all BP personnel are currently assigned to the three AZ sectors (Washington Post 2006). As we have seen, much of Arizona is rural, arid desert; so why are migrants crossing here? While immigrants used to cross in urban areas (where they could quickly blend into American citizen culture), the trend in immigration has shifted to rural areas and the open desert, on lands such as the CPNWR and Organ Pipe National Monument. This is due to a Border Patrol strategy deemed "prevention through deterrence" that aimed to make crossings extremely difficult in urban areas, in effort to deter migration (Jones and Sahee 2004). Rather than deterring migrants, however, the strategy merely directed migrant traffic toward the remote wilderness areas on public lands in a phenomenon labeled the *funnel effect,* which is discussed in detail in section 2.5.3. In Cabeza Prieta, immigrants crossing into the United States must trek through as much as 85 miles of arid desert to reach civilization; despite this, however, about a thousand people try to cross every day (Di Silvestro 2007, DOW 2007a). From a conservation perspective, "prevention through

deterrence" was hugely counterproductive because it brought human activity into remote wilderness areas.

2.5.2. Border security legislation

As conflict has heightened along the US-Mexico border, in the past few years the US federal government has responded with increased militarization of the border, including tighter regulation at checkpoints, increased surveillance techniques and thousands of new BP agents. In conjunction with this trend, in the policy realm the government expressed support for new border infrastructure projects by passing some major acts of legislation. Some of these threaten standing environmental laws in the region by granting extra power and jurisdiction to border projects. Perhaps the most menacing piece of legislation in this manner is the *Real ID Act.* President Bush signed the *Real ID Act* into law in late 2005; the Act's passing has fueled great controversy because, according to section 102, it grants power to the Secretary of Homeland Security (SHS)[3] to waive any/all federal laws "deemed necessary" in order to expedite the construction of border infrastructure (US Congress 2005). Stephen Mumme, a professor of political science and expert on environmental policy in border regions, was shocked at the Act, because "this is the first time in American history we've put so much power over domestic law into the hands of a single administrator" (Bies 2007). Laws that the SHS can waive under Real ID include landmark environmental legislation meant to protect natural resources and wildlife [*see section 2.3*]. The waiver has been used only twice to date, once in the San Diego-Tijuana area and once on the Goldwater Range just east of the CPNWR (DOW 2007a); in both cases, it was used to forego environmental assessments required under NEPA so that a border fence could be built without delay. This incites legal concerns: in his decision to use the waiver on the Barry M. Goldwater Range, for example, the DHS Secretary disregarded his department's endorsed plan (which included public participation and conservationist support) to build less-costly, more wildlife-friendly barriers rather than the fences (DOW 2006). These barriers prevent cars from crossing the border but allow for wildlife to migrate [*see section 2.5.3*]. While some literature reveals that the Border patrol does not take NEPA requirements seriously on a regular basis in its security projects (Jones and Sahee 2004, Marris 2006), other literature expresses positive participation and active compliance from the CBP

[3] The current Secretary of Homeland Security is Michael Chertoff.

(DOW 2006, Slee 2006). In assessing the literature, it is unclear whether internal agency compliance with the environmental process is being regulated.

Reinforcing its strong support of border infrastructure, less than a year ago the U.S. Government passed another piece of bold legislation, entitled the *Secure Fence Act* (SFA). Signed into law by President Bush on September 14, 2006, the SFA repeats the provision of Real ID, lending the SHS the authority to:

> Take all actions… necessary and appropriate to achieve and maintain operational control over the entire international land and maritime borders of the United States… [including] physical infrastructure enhancements… such as additional checkpoints, all weather access roads, and vehicle barriers (U.S. Congress, House 2006, 2-3).

In addition to granting the DHS/BP authoritative power, the Act mandates that a 700-mile long double-barrier wall be built along the US-Mexico border to physically separate the nations (this would block about 1/3 of the 2,000-mile international border length). The SFA specifies that the 'fence'[4] be reinforced and double-layered, and that a continuous stretch be built from Calexico, CA to Douglas, AZ [Figure 5]. The stretch is particularly dismal news for transboundary wildlife in Arizona, as only 30 miles of the AZ-Mexico border will be left unblocked (CBD 2006).

Fig. 5. Fencing authorized under the Secure Fence Act legislation in 2006. The plan involves 700 miles of double-layered, reinforced fencing along the US-Mexico border, which blocks almost all of the Arizona-Mexico border. Source: CNN 2007.

[4] It is a matter of interest that the term 'fence' is often used in legislation text. As the physical structure would prevent anything from crossing, 'wall' is perhaps the more accurate term.

Whether the fence will actually be built remains questionable, since "little or no funds were appropriated to the task" when the Act was approved (Robbins 2006). Funding is required to be secured by the end of 2008, and to date about 100 miles of fencing are in place on the border – which is not double-barrier (Bies 2007). Together, the Real ID Act and Secure Fence Act are powerful pieces of legislation that move to heighten infrastructure at the border at a rapid rate, with or without environmental compliance.

More recently, in June 2007 the US Congress introduced a new immigration bill entitled the *Comprehensive Immigration Reform Act* (CIRA), which reiterates the need for construction of a border wall. In a progressive move, the proposal also calls for "border protection strategy… [to be conducted] in a manner that best protects" four categories of public lands and their responsible agencies, including land units of the NPS, NFS, USFWS, and others, namely the DOI and the DOA; to suit this task, the proposed bill calls for special training for CBP agents according to the public land type where they are employed, as well as collaboration between CBP agents and federal employees of the NPS, NFWS, and the FS (US Congress 2007a). In late June, however, the CIRA was rejected by President Bush.

Another contemporary action took place in June this year: US Representative Grijalva introduced legislation entitled the *Borderlands Conservation and Security Act of 2007* (BCSA). Publicly opposing the 'one fence fits all solution' supported by the REAL ID and SFA, Rep. Grijalva introduced the BCSA to discourage the construction of border infrastructure and, instead, promote more flexibility of BP strategy and grant more power to the public land management agencies responsible for conservation (US Congress 2007b). If this hopeful legislation is passed, it will codify the notion that border strategy *must* be flexible enough to comply with existing environmental and public land laws.

In summary, current federal legislation mandates an increase in barrier infrastructure that threatens at-risk wildlife on the ground. Double-barrier infrastructure mandated under the SFA is currently being constructed [*see Appendix 5*]. Since this large-scale project may bear extreme consequences for wildlife, the next section explores the politics and perspectives surrounding border infrastructure in greater depth.

2.5.3. Regarding the barrier infrastructure debate

There are a huge variety of barrier strategies along the border, ranging from barbed-wire fences to triple-layered walls. The various types of barriers currently being used to separate the US-Mexico border are listed in Table 4 (and are ordered generally from low-security to high). Often the different types are combined vertically to discourage climbing, and/or horizontally to foster the double-barrier strategy.

Border barriers currently being constructed can, however, be classified into two main groups: vehicle barriers and pedestrian barriers. Vehicle barriers allow for the migration of wildlife, and are therefore preferred by conservationists; yet because they also allow for the migration of human traffic, they tend not to be preferred by politicians (Bies 2007). In Organ Pipe National Monument, a vehicle barrier built after the shooting of a biologist severely reduced illegal traffic there (DOW 2006). Such a decrease in traffic is favorable for wildlife, because it mitigates disturbance while still allowing them to migrate.

Table 4. Types of barriers along the US-Mexico border

Nothing.
Three wire cattle fence.
Vertical railroad rail.
Horizontal railroad rail with 6" drill stem uprights.
Concrete filled thin wall six inch steel tube of staggered height.
Corrugated steel plate.
Perforated corrugated steel plate (landing mat).
Square tubing.
Crushed cars.
Climb proof expanded metal fence.
Climb proof chain link fence.
Concrete column or "Bollard" barrier.

Source: US Border Patrol 2007.

Supporters of barriers along the international border claim that the double-layered wall effectively reduces illegal immigration by tightening security infrastructure. The U.S. Border Patrol and the Department of Homeland Security are highly supportive of border fencing, arguing that it prevents illegal immigrants and terrorists from

entering the country. On the American Border Patrol (ABP) homepage, a statement reveals that the ABP is eager to build more barriers, remarking, "Construction of the barrier along the border south and east of Yuma is a good first-step, but it is just a start. DHS should construct a double fence as was specified in the Secure Fence Act of 2006" (YBPS 2007). There is a lot of political support for the double-barrier to be built. For example, the U.S. House of Representatives has a 90-member group called the 'House Immigration Reform Caucus' who consistently support border fence projects; a 575,758-member organization called 'We Need Fences' also supports the 700-mile long infrastructure project (Robbins 2006). Some proposals veer toward an even more elaborate infrastructure system at the border, which would devastate a 50-meter width of land area along the border line [Figure 6].

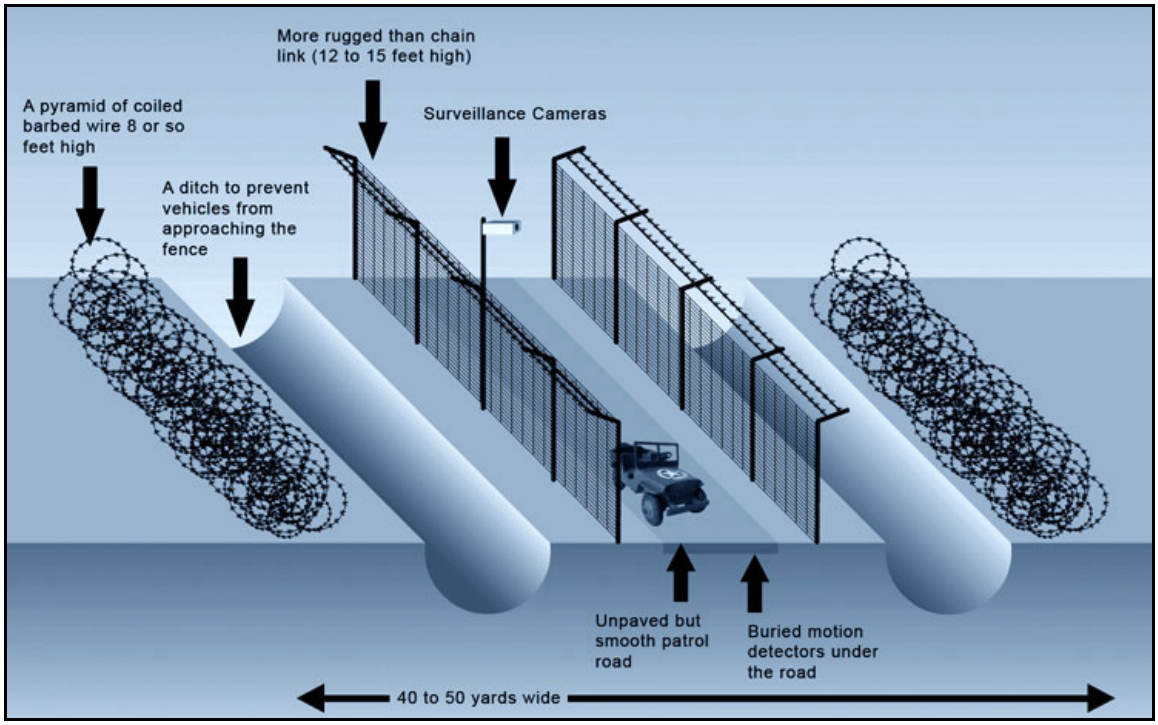

Fig.6. A proposal for border infrastructure that includes coiled barbed wire fences, trenches, double-layered steel fences lined with barbed-wire, buried motion detectors and video and automobile surveillance. Source: Weneedafence.

Supporters of the border fence generally feel that national security is of the highest priority, and that infrastructure is urgently needed to control the border area – even if it trumps environmental laws.

On the opposition side of the debate, concerns regarding barrier infrastructure include ineffectiveness, lack of diplomacy, high building/taxpayer costs, unintended consequences, and the location problem. Opponents argue that the proposed fence

is like a 'Berlin Wall', "antithetical to the American ideal of an open society," which will serve to alienate Americans, Mexico and the International community (Marris 2006, Robbins 2006). Others agree, citing history as an argument against wall-building: since walls do not address the root cause of problems, they are eventually just torn down. Mexican President Vicente Fox has repeatedly opposed border barriers in public statements, arguing that they are ultimately ineffective because they "do not solve the underlying problems [of immigration]" (CRS 2006, 25). On this note, many are concerned that the United States government turns to physical infrastructure as a temporary, 'band-aid' solution rather than presenting diplomatic solutions through immigration policy reform. Since the need for diplomatic action between the US and Mexico is apparent in the case of immigration, opponents claim that a border blockade will further alienate Mexico and the international community.

Since infrastructure at the border does not mitigate the root forces behind immigration, the effectiveness of the barriers is questionable. Evidence has shown that instead of deterring migrants, the fences merely funnel them further from the high-security populated areas into more rural areas such as the CPNWR (CRS 2006, DOW 2007a). As mentioned previously, this *funnel effect* trend raises major concerns; in addition to the legal concerns discussed, the *effect* introduces grave human rights concerns as well. A 2006 study produced by the University of Arizona's Mexican-American Studies and Research Center validates the funnel effect and discusses the connection between infrastructure increases in urban areas and immigrant deaths in the rural desert of Arizona. The report reveals:

> [There is a] structural link between the "funnel effect" created by U.S. immigration control policies and the immense increase in known UBC[5] deaths… [the government's] 'prevention-through-deterrence' measures, initially implemented in the mid- to late-1990s, intentionally redirected hundreds-of-thousands of unauthorized migrants away from previously busy crossing points in California and Texas into Arizona's perilous and deadly landscape. [Our] findings unambiguously confirm previous evidence that such U.S. policies did create the "funnel effect" and that it is indeed the primary structural cause of death of thousands of… unauthorized men, women, and children who have died while trying to enter the U.S. (Rubio-Goldsmith *et al*. 2006, 5-6).

Thus for migrants and wildlife, border patrol strategy has insidiously (and perhaps inadvertently) increased threats to survival. The funnel effect definitely succeeded in

[5] UBC stands for 'unauthorized border crosser', a formal term for an illegal immigrant.

re-routing immigrants into rural desert areas, where they were easier to capture, and apprehensions increased; yet it failed to deter illegal migration – and as a result, immigrant deaths have soared in the rural Arizona desert in recent years [Figure 7].

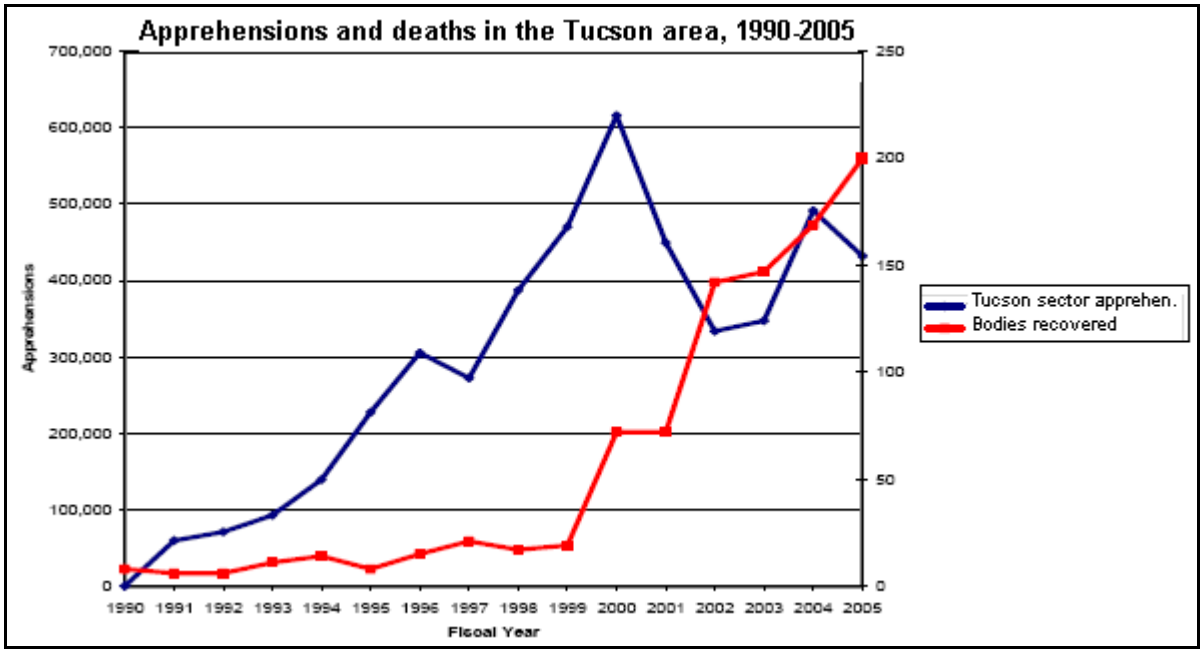

Fig.7. Implications of the funnel effect. Increased militarization of the border's urban areas led to an increase in apprehensions and deaths in the BP's rural Tucson sector. Source: Mexican-American Studies and Research Center (MASRC), University of AZ 2006.

The US Congressional Research Service acknowledges the funnel effect as well, and calls more remote areas 'migration hot spots' (CRS 2006, 26). This re-routing of immigrants to more dangerous places led the Border Action Network (BAN), in cooperation with various communities, to launch a report labeling fencing as a false solution. Robbins (2006) explains, "Barriers help to curb illegal immigration only where they are put, because people find ways around them". The immigrants will keep going until they find a place to cross – even if it's a remote desert area. The head of law enforcement at the U.S. Interior Department calls this the 'balloon effect': "squeeze enforcement in one place, and the problem pops out somewhere else" (Kenworthy 2006). While the humanitarian aspect of the infrastructure debate is beyond the scope of this report, the funnel effect has brought more immigrants and infrastructure into pristine and remote habitat, generating major disturbance in areas where wildlife typically have solitude.

Due to the questionable effectiveness of border infrastructure, many organizations have produced reports and statements citing reasons to oppose barrier projects. The Border Action Network (2006) recommends that fencing construction be halted because fences "disrupt communities, the environment, and international political relationships" (2). Many others agree that border barriers are not successful in curbing human migration, and are working to combat the Secure Fence Act. Alternatives to barrier infrastructure are also commonly suggested, and lists of formal recommendations have been produced by several groups. BAN argues that "U.S. immigration Policy has transformed the region into a militarized zone where the U.S. Constitution and international law are selectively applied," resulting in human rights violations and unnecessary deaths (BAN 2006, 2). Another NGO, the Center for Biological Diversity (CBD), agrees with the BAN. After the SFA was issued in late 2005, the Center issued a public statement that staunchly opposed the project, claiming that "the only things the walls won't stop are people" (Remington 2006). Yet opponents of the double-barrier prescribed by the SFA aren't closed to the idea of barriers; vehicle barriers allow for wildlife migration and are therefore deemed 'wildlife-friendly' [see Figure 8]. As mentioned previously, vehicle barriers are known for their allowance of wildlife and migrants on foot to cross, yet are effectively designed to impede automobiles [Figure 9].

Fig.8. A 'wildlife-friendly' fence at Organ-Pipe Cactus National Monument. This barrier prevents motorized vehicles from crossing the US-Mexico border, but does not impede wildlife or pedestrian migration. Source: Bies 2007.

Fig.9. A vehicle barrier comprised of steel pillars. The pillars are staggered so that makeshift ramps cannot be leaned against them enabling cars to cross. People, wildlife, ATV's and motorcycles can easily cross. Source: US Border Patrol 2007.

With regard to a wall, the similarity between people and wildlife arises as we see that neither is able to travel across. A fundamental difference also arises: people can dig under, ladder over, climb, or cut a hole in a wall, whereas wildlife are more likely to avoid walls and be truly impeded – even to the point of extinction. When it comes to the infrastructure debate, there are no easy solutions at the US-Mexico border; further pitfalls of infrastructure are discussed in the next section, which addresses the various impacts of border activity and infrastructure upon wildlife.

2.6. Threats to wildlife in the border region

Wildlife along the border habituate a harsh and arid climate, with minimal water and prey resources. This section introduces the major threats to wildlife caused by human presence along the border, ranging from physical threats such as infrastructure to systematic threats such as funding shortages. Certain at-risk species are presented, and the section concludes with a discussion regarding the threats that wall infrastructure pose for species.

2.6.1. Threats associated with the border conflict

Human activity is disproportionately high in border lands, where most of the disturbance to wildlife is caused by the presence of illegal immigrants and BP

personnel in remote areas. Personnel continually use low-flying aircraft for surveillance purposes, creating noise pollution and physiological stress for wildlife. Roads and off-road vehicles fragment habitat, damage soils, alter hydrology, and bring visual, noise, and chemical pollutants into protected areas, which can "drive imperiled animals out of breeding and foraging areas key to their survival" (CBD 2006). Although the creation of roads and trails is illegal in wilderness areas, over 250 miles of them have been carved over time throughout Cabeza Prieta, most of which are attributed to drug smuggling activity (Slee 2006, Ingley 2005). Furthermore, large amounts of trash are often left behind on protected border lands [Figure 10]. Volunteers for the Buenos Aires NWR (which shares 5.5 miles of border with Mexico and is about 1/8 the size of the CPNWR) find about 500 tons of trash per year, and the Bureau of Land Management (who monitors 155 miles of the AZ-Mexico border) reportedly removed seven hundred abandoned cars and 250,000 pounds of garbage in just two years (Di Silvestro 2007). Cabeza Prieta estimates that on average, each person that crosses leaves behind about 8 pounds of trash (Ingley 2005).

Fig.10. Garbage left behind by illegal immigrants. When the migrants cross, guides lead them to sites such as this, where they change clothes and leave what they were carrying (Di Silvestro 2007). Border patrol strategy also forces immigrants to drop their belongings (Jones and Sahee 2004). Photo source: US Border Patrol 2007.

Yet the trash isn't only a problem caused by the migrants. A BAN report entitled *Environmental Protection on the Line: the Untold Environmental Impacts of Arizona/Mexico Border Enforcement* reveals that Border Patrol strategy contributes

to the waste problem, because apprehended immigrants are forced to leave their belongings behind in the desert, and BP does not return to collect it (Jones and Sahee 2004). Trash removal on public lands takes up valuable employee and volunteer time, and in the meantime may be ingested by unsuspecting wildlife.

In addition to disturbance problems derived from increased human and vehicle activity, other anthropogenic sources add to the burden on border wildlife. Large-scale security infrastructure projects such as roads and camera towers agitate wildlife and their habitats. Surveillance tools such as stadium-type flood-lighting, motion detectors, day and night cameras, on and off-road patrol vehicles, and low-flying aircraft are cited repeatedly as altering the natural habitat and behavior of Refuge wildlife (Slown 2003, DOW 2004b, Jones and Sahee 2004, CBD 2007). Yet perhaps the most menacing direct disturbance of wildlife along the border is the barrier infrastructure between the two nations, because certain types do not allow wildlife to migrate. Inability to migrate could lead to genetic bottlenecks, where diversity within species is lost because they cannot disperse across their home ranges to breed. Due to the gravity of this threat to the survival of at-risk species, the technical and political aspects of barrier infrastructure are explored more deeply in the next section.

2.6.2. Species at risk

As was discussed in previous sections, the most imminent and largest-scale threat to wildlife is most probably infrastructure and its associated disturbance of habitat. The Center for Biological Diversity estimates that over 400 border species are at-risk in Arizona, and the CPNWR is home to rare and endangered species including the cactus pygmy owl *(Glaucidium brasilianum cactorum)* and the Sonoran pronghorn antelope (CBD 2007). The barrier proposed by the Secure Fence Act in 2006 almost completely blocks the Arizona-Mexico border, which may affect the ability of many species to migrate. Although the pedestrian barrier threatens migratory species most severely by impeding breeding ranges, border barriers also greatly threaten non-migratory species by limiting their home ranges needed for survival. Some species most vulnerable to the border conflict are federally-listed as endangered, including the Sonoran Pronghorn antelope*,* the ocelot (*Leopardus pardalis)* and the

jaguar *(Panthera onca)*, an umbrella species[6]. Larger mammals are particularly challenged by infrastructure because they have large home ranges, many of which cross the international border [Figure 11]. The jaguarundi and jaguar, for example, have a diminishing presence in the Southern US, with most of their current range being in Mexico.

Fig.11. Four species (Jaguarundi, Ocelot, Black Bear and Jaguar) in AZ whose ranges would be disrupted by the double-layer fencing authorized under the SFA. Source: CBD 2007/Curt Bradley.

Due to their need for a large amount of land and prey base, transboundary movement is particularly essential to the survival of the jaguar.

> For jaguars to thrive or even to persist in Arizona… they must have movement corridors to connect with source populations in northern Mexico. Abundance of available prey, and suitable resting sites, are important… to this wide-ranging species. The core population of jaguars in northern Mexico must also be sufficiently large to provide for dispersal into the U.S.-Mexico borderlands (AGFD 2007).

[6] Refer to glossary for definition (Appendix 1).

In conjunction with their critical status, the AGFD has designed a special team, program and an informative webpage dedicated to Jaguar Conservation. The jaguar has also been listed as endangered by the Mexican government since 2002, which has been working to conserve the species by discouraging hunting and by managing biosphere reserves (SEMARNAT 2002). In the international regime, the IUCN lists the Jaguar as a 'near-threatened' species; the animal is also listed in Appendix I of the CITES agreement (CITES 1973). However, neither the United States nor Mexico have voluntarily agreed to protect the species listed under CITES. On the domestic front, the US has national obligations to protect federally listed species like the jaguar, under the ESA. According to the Center for Biological Diversity (2006), however, the Bush administration has failed to establish protections for the jaguar. Increasing border infrastructure is likely to threaten the jaguar's presence in the southern United States, which is the northernmost portion of the species' home range [Figure 12a, b].

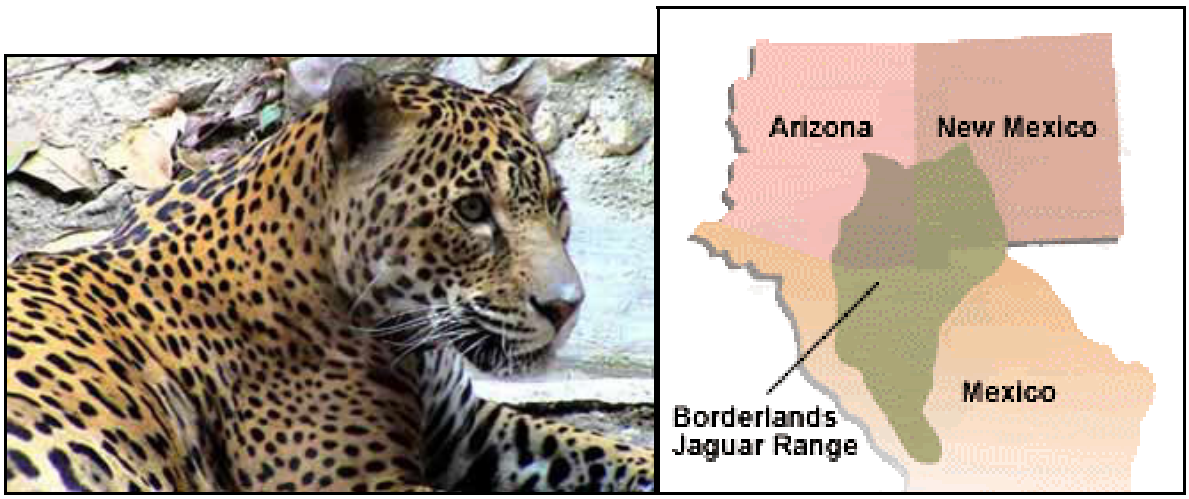

Fig.12a and b. Jaguar and its historic range that crosses the border. Today, a population of jaguars is known to reside in the Northern Mexican State of Sonora, "within dispersal distance of suitable habitat" on the US side. Source: Friends of Calakmul 2007, AGFD 2007, Defenders 2007**.**

Another species severely threatened by barrier infrastructure is the endangered Sonoran Pronghorn Antelope [Fig.13]. Although the Pronghorn does not migrate to breed, border infrastructure constricts the species to a small portion of its home range; essentially, the Pronghorn are trapped in the most resource-scarce area of their historic range in the Southern US.

Fig.13. A pair of endangered Sonoran Pronghorn Antelope in AZ. Source: NWF 2007.

Hunted almost to extinction in the early 20th Century, the Pronghorn was placed on the endangered species list in 1967 for protection, yet a drought in 2002 caused the population to wane to only 21 animals. Captive breeding ensued; a recent *National Wildlife Magazine* article indicates the current population in the CPNWR and southern AZ to be about 75 antelope, with about 400 in northern Mexico (DiSilvestro 2007). Pronghorn antelope are wary of human activity and tend to avoid border infrastructure. Friederici (1999) explains, "We'll often see the pronghorn 50 meters from the fence, moving along it. They never cross it... in four years we haven't documented a single crossing of a paved road or the boundary fence with Mexico." Isolation on the US side of the infrastructure causes concern about pronghorn restoration efforts, as genetic inbreeding is likely to take place.

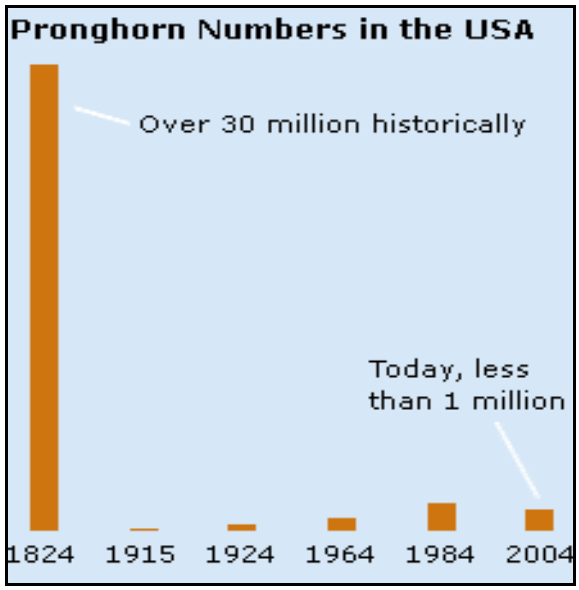

Fig.14. Sonoran Pronghorn population trend. The graph shows a large historic population, collapse due to exploitation in the early 20th Century, and a slight recovery due to conservation efforts thereafter. Source: NWF 2007.

Some are concerned that the Pronghorn are threatened with extinction, perhaps in the next 50-100 years (Frederici 1999). Though they're the fastest land mammal after the cheetah and can jump very high, Pronghorn are not adapted to human activity or infrastructure, and must struggle to survive in their midst. If elaborate infrastructure is added to the current scene, and no adaptive strategies are made with new barriers to allow pronghorn to cross into Mexico, it may mean extinction for the endangered antelope.

While the species discussed in this section are the highest-profile threatened species in the region, hundreds are likely to potentially be impacted by border activity. Furthermore, there are many federally listed species in the region that are not mentioned here. *[For a list of species, see Appendix 3; for images, see Appendix 5.]*

2.6.3. System shortages as a threat

A less direct but highly significant threat to conservation in the border region is the shift of attention from conservation missions to time-consuming border problems, and particularly in the agencies responsible for wildlife management. In a bold statement to the *USA Today News,* Roger Di Rosa, manager of the CPNWR, confessed that "the basic work of the Refuge – protecting wildlife – has been compromised… we are not fulfilling our mandates for managing wilderness or the Refuge" (Kenworthy 2006). This distraction from conservation objectives is typical of public lands in the border region; in the same news article, superintendent Kathy Billings of Arizona's Organ Pipe National Monument estimated that her staff spends 75% of their time tackling border-related issues. This deterrence from fundamental wildlife conservation goals is perhaps the greatest long-term threat to wildlife in the region, who depend on these federal land agencies to practice conservation and enforce environmental law. In a study of the border region and the CPNWR, Slown (2003) found that "border issues are beyond refuge control, but affect all management activities" (5). In addition to detracting the time of employees, border issues and tasks also hinder conservation internally, through their finances. DiSilvestro (2007) explains, "[agency] budgets are being spread thinly to accommodate the need for greater border security". The loss of time and money

affects all public lands along the border, but is felt by some more than others. In the case of the National Wildlife Refuges, budgets are already scant in comparison to other land agency budgets. Refuges receive only a fifth of the funding (per acre) that national parks receive [Figure 15].

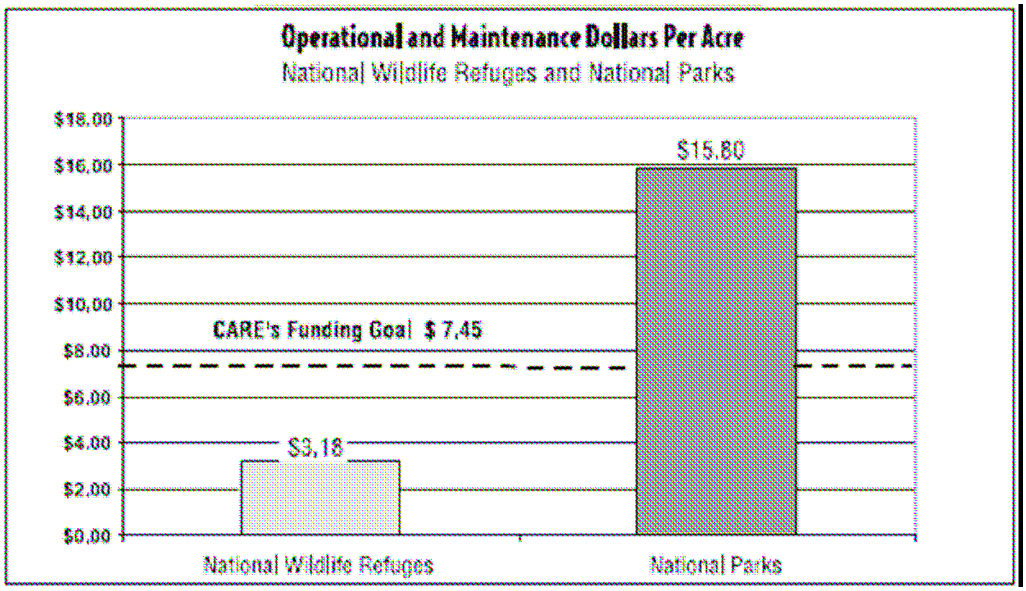

Figure 15. The USFWS budget allocation (per acre), in comparison to the NPS budget. While refuges strive to meet $7.50 an acre, parks receive more than double the amount. Source: Cooperative Alliance for Refuge Enhancement (CARE), 2001.

As public lands struggle to achieve conservation goals along the border, the federal government adds to the challenge by cutting funding for its land management agencies. In February 2007 the federal government supplied 1.5 billion dollars *less* to the NWRS than in 2006; the NWRS is losing a fifth of its staff due to these cuts, which will damage programs central to NWRS functioning such as education and endangered species recovery (DOW 2007a). Extended cuts even took place in the Southwestern US, for Refuges comprising Region 2, including the CPNWR (DOW 2007b) [refer to the NWRS map, Figure 3]. While budget cuts are more subtle, internal changes, the loss of employees and financial resources has a systematically profound effect upon conservation effectiveness: it becomes increasingly difficult to protect wildlife along the US-Mexico border if the government undercuts resources needed to do so.

In stark contrast, the border patrol budget is burgeoning as never before [Figure 16], which further adds to the polarization of the debate. The DHS was granted over 43 billion dollars by the government for their 2007 budget, with a major increase in

border protection expected (Richey 2006). The budget strengthens the capacity of surveillance along the border, increasing infrastructure and technology and strengthening programs. Yet it also adds to the scale of human activity taking place on Arizona public lands: the numbers of border patrol agents have skyrocketed in recent years, and plans propose thousands more agents. As discussed in earlier sections, enhanced infrastructure and BP presence on protected borderlands continually threaten at-risk wildlife *[refer to sections 2.5.3 and 2.6].*

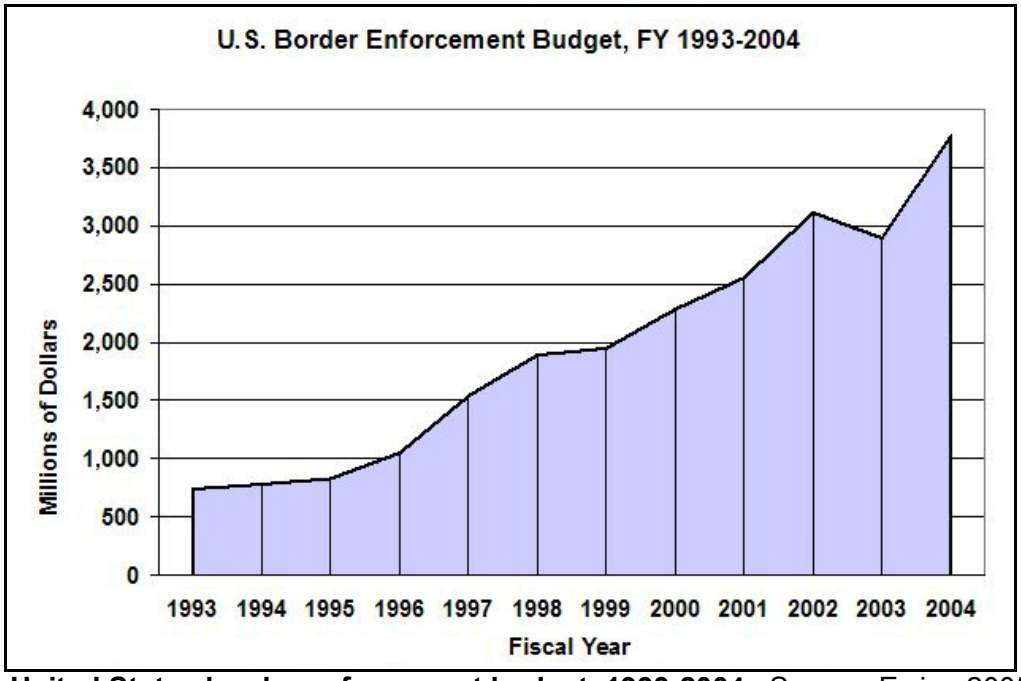

Fig.16. United States border enforcement budget, 1993-2004. Source: Ewing 2005.

The vulnerability of animals along the US-Mexico border and the lack of resources for conservation compound the already-challenging political nature of the conflict. For many of these species, protection will not only need to be ensured legally, but preventative measures will need to be taken soon to help them recover on US public lands before they disappear entirely.

2.7. Summary

The compatibility of national security and environmental laws and policies on public lands is not widely understood. While plenty of collaborative effort toward conservation is taking place, It appears that conservation objectives are overshadowed by national security issues near the border. Border security is a socially and politically sensitive issue, and infrastructure projects need to be

considered carefully so that the impacts to native wildlife are minimized. Politicians and conservationists are in conflict over the necessity of building a physical barrier between the United States and Mexico. Furthermore, there is concern that a lack of financial resources and/or staff distracted by border problems will plague the future of agencies trying to protect public lands and vulnerable wildlife, preventing them from completing their conservation objectives.

This thesis investigates how compatible conservation efforts and national security are on federally-protected public lands in the border region, according to experts and resource managers on the ground. While there is a plethora of literature discussing pro- and anti-infrastructure border projects, the capability of the security strategy and conservation missions to effectively coexist has not been formally investigated. This thesis helps to fulfill that task by examining the legal literature surrounding each field, the corresponding policies and politics related to conflict management, and the nature of border infrastructure impacts on wildlife protection in the region.

CHAPTER 3: RESEARCH DESIGN

This chapter confronts the design of the research including basic sampling methodology and the approach toward data analysis. The project's active research process is preceded by archival research of the pertinent legal literature, which sets the foundation for qualitative sampling. Standing laws, conservation policies, and contemporary accounts of the border scenario are reviewed therein, in order to identify significant events/actors and the current protection mechanisms for wildlife in the region. Associated challenges and limitations of the research are provided in the final section.

3.1. Sampling

Samples were collected in the form of in-depth interviews with experts in the field. The population sampled was characterized by professionals working in different sectors. Of eighteen interviews, six strata were represented: land/resource management, NGOs, INGOs, border patrol, wildlife biology/research, and policy regulation/research. Interviews were therefore non-random; specialists were relied upon because the general public is not well informed about environmental laws, border patrol strategies, and/or land management practices. Interview data are not intended to generalize the population, but instead lend professional insight to the in-depth political and legal issues of the topic.

Two thirds of the interviewees are federal employees and a third employed outside the federal sector. Five public land types are represented: national monuments, parks, forests, wildlife refuges, and BLM lands[7]. Interviewees from five agencies participated, including the NPS, NFWS, NFS, a BLM regulatory branch within the US DOI, and CBP agents of the US DHS. BP agents consisted of those on the ground as well as in a land management role. Representatives from five NGOs participated

[7] Specific border lands represented in the survey include: Cabeza Prieta National Wildlife Refuge, Organ Pipe Cactus National Monument, Coronado National Monument, Coronado National Forest, Buenos Aires National Wildlife Refuge and the Pecos Historic National Park.

in the study, including three from international NGOs[8]. Finally, professional field biologists working with wildlife in both the US and in Mexico are represented among the sample, as well as policy contributors within the federal government and in the private sector (academia). Although it was beyond the scope of this project, consulting other types of stakeholders such as private landowners and hired contractors would also be useful.

A level of diversity-of-response was achieved by sampling experts according to their professions. This produced a purposeful stratified sample according to particular subgroups of interest, where perspectives were attained from the governmental sector (land management, law enforcement, regulatory work); nongovernmental sector (domestic and international nonprofit work), and academia sector (field biology and policy formulation). The strategy is described in Taylor and Bogdan (1984), who advise researchers to "vary the type of people interviewed… [in order to] cover the full range of perspectives" (83). Theoretically, the stratified sample compliments the research by supplying greater contextual breadth.

The qualitative process followed an interview guide that served as a tool, to keep the research consistent according to established themes (see Appendix 4). The guide differs from a questionnaire in that it produces similar results, while still allowing for adaptive questioning. The target sample size of the study was 24 interviews, and 18 were attained. Allotted interview time was a minimum of fifty minutes, with five intended for initial introductions and protocol to be established; many proceeded to over ninety in length. All interviews were tape recorded with candidate consent, to aid transcription and avoid misinterpretation of data. Transcription promptly followed on a per-interview basis.

Snowball, or chain, sampling was another strategy applied throughout the process. The technique "relies on people identifying other people or cases to investigate," networking contacts with informants to provide further investigative potential to the research (Taylor-Powell 1998, 7). An interview journal was kept, in which notes taken per interview were compiled and observer comments noted. A research trip

[8] NGOs represented in the study include: Center for Biological Diversity, Border Action Network, and the Wildlands Project; INGOs include the Nature Conservancy and Northern Jaguar Project.

was taken to southern Arizona, where about half the interviews were conducted in person in the border region. Descriptive entries of the in-person interview experience were recorded to lend further insight into the candidate's professional environment, and how the border issues may affect the atmosphere in their work environment. In-field photography was also achieved in Arizona as part of the observant research process. Remaining interviews comprising the sample were performed over the phone, with a small percentage conducted by electronic mail.

3.2. Data analysis

After the interviews were conducted, they were fully transcribed, which greatly increased familiarity with the data. Responses were then entered into a comprehensive raw database, according to research topics; data were therefore coded according to the questions and themes outlined in the research guide [*see Appendix 4*]. Candidate response was not restricted to any particular consecutive order, yet interviewees clearly addressed the conceptual themes outlined in the guide. This greatly assisted data compilation, as it guided the coding process in sorting data into the themes. Maintaining the database allowed responses to be compared and assessed for patterns and discrepancies. Once patterns of response were identified, they were isolated and clearly described in the results section (Chapter 4). Outliers are also identified and discussed in Chapter 4.

3.3. Limitations

Interview candidate availability and willingness to participate are unpredictable variables beyond the control of the researcher, yet naturally affect the overall consistency of samples. Although candidates from each selected professional strata (management agencies, law enforcement, NGOs, biologists) did participate in the thesis, candidate accessibility and response resulted in disproportionate participation across the strata. Specifically, border enforcement agents were less willing to participate and field biologists were not as populous as was anticipated. As a result, these two groups are underrepresented in relation to the other two strata. Furthermore, the majority of interviewees were public land managers (federal

employees for NPS, NFWS, and FS), so data are skewed toward a resource management perspective.

As may be anticipated, time constraints were probably the greatest limiting factor to this thesis. Given more time, more data could be compiled, although it is likely that results would be relatively consistent with current data[9]. Research was conducted on a willingness-to-participate basis, and thus some interviewees were restricted to only forty minute interviews. Also due to time constraints, a small percentage of candidates were restricted to electronic response. The in-field research trip was also limited by time, as well as financial resources. Logistics created additional challenges, as the multiple locations of interview candidates restricted the potential for interviews to be in-person, and confined travel time. All interviews were conducted using the same guidelines, however, and even phone interviews were recorded, in effort to maintain consistency through the data collection and assessment process.

[9] After about half of the interviews were conducted, repetition of response became so evident that, should more data be compiled, it would likely approach a point of saturation.

CHAPTER 4: RESULTS AND DISCUSSION

This chapter reveals the contemporary scene for conservation on border lands, according to the professionals sampled. Results cover the current status of wildlife, the impacts of border infrastructure and patrol strategy, legal challenges in the midst of security and conservation, and the involvement of key actors, including the international role. Discussion follows presentation of the thesis results, which are summarized in Chapter 5.

4.1. Status of wildlife

For wildlife, public land managers and biologists believe that the situation has worsened in the past few years. In contrast, border patrol agents feel that increased militarization of the border has helped protect wildlife in recent years. When questioned about what most threatens wildlife in the border region, interviewees across all strata expressed concern about the dramatic increase of human activity in the past few years, which has resulted in an increasing amount of *direct disturbance* of wildlife. Almost a third of the interviewees agreed that the volume of human activity in the region is the greatest single threat to wildlife there. In addition, according to professionals the second greatest concern of wildlife is *habitat deterioration,* which is greatly associated with direct disturbance of wildlife.

Surveyed professionals agree that naturally, the *cumulative impacts* of the region, (eg. border enforcement, illegal activity, drought, infrastructure, resource scarcity) - combined, over time - are the primary concern for wildlife.[10] The most widely cited forms of disturbance having the greatest effect on the ground on a regular basis consist of roads and off-road driving; as vehicle use and roads fragment habitat in the rural desert, they limit the ranges of animals and can result in genetic flow problems. In line with previous literature (DiSilvestro 2007, Ingley 2005),

[10] Cumulative impacts are required to be assessed by the BP under NEPA (again, demanding difficult and costly science.) Combined impacts may impact wildlife more severely than expected when those impacts are considered singularly.

interviewees cited trash, trails, fires and aerial activity as significant concerns. Finally, urban development and border infrastructure are becoming increasingly problematic *[see section 4.3]*.

While certain species are known to be affected more than others, professionals in the field reiterate that a lack of data on this topic makes it difficult to target *which* species have the greatest need for protection. Consistent with the literature (CBD 2007, DiSilvestro 2007), professionals are most concerned about high-profile, endangered species such as Jaguar, Sonoran Pronghorn, Lesser Long-nosed bat, and Flat-tailed horned lizard. A third of respondents directly mentioned the lack of species-specific data, explaining that more common species may also be highly affected. Several also emphasized that just because a species is not listed doesn't mean it's not vulnerable to threats (e.g. deer, bear).

As the biodiversity of the region is high, it is also useful to look at the particular ecosystems that may be most vulnerable. In the Sonoran desert, for example, Holly Richter of the Nature Conservancy describes how riparian habitats are critical for millions of migratory songbirds, which serve to support the whole ecosystem.

> I do a lot of land conservation and protection projects, and it's obviously impossible to do that without looking across the border. The San Pedro [river] flows S-N from Mexico into the US, and is a very important migratory corridor.

Future research needs to be conducted at the species-specific and habitat-specific levels, so that adverse impacts of human activity on wildlife are revealed. In light of the dynamic border scene, they also must be monitored consistently to test and/or mitigate things such as impacts of new infrastructure and BP strategies.

With regard to what most affects wildlife, results confirm previous literature (Ingley 2005, CBD 2006, AGFD 2007b, Di Silvestro 2007) that human activity has increased dramatically and the health of the land is generally in decline. This activity is a product of both illegal operations (migrants/smugglers), and border patrol operations (agents/surveillance). The interviewees spent a lot of time discussing both these sources. A majority expressed the belief that until illegal activity and agent activity decrease, the situation for border wildlife will continue to degrade. As agent presence is unlikely to decrease as long as illegal activity is on the rise, the importance of *mitigating the motive* for migrants to illegally enter the country cannot

be overemphasized. In other words, unless the social factors driving the illegal activity are confronted, degradation of wildlife and habitat are likely to continue. Thus steps need to be taken to reform immigration policy in Washington *[see section 4.3]*. Although disturbance on the ground directly impacts wildlife in the region, results reveal that diminishing resource capacity – an indirect threat – could very well be the most problematic issue for borderlands wildlife. This is discussed in detail in the next section.

4.2. Conservation issues and obstacles

It is often the case with projects (and particularly with environmental ones) that grave resource limitation prevents goals from being met. This section explores shortfalls in-depth, and concludes with a discussion of how human conflict/illegal activity can impede conservation efforts.

4.2.1. Lack of capacity

According to border region professionals, a *lack of capacity* is the greatest obstacle to wildlife conservation. Lack of capacity is expressed in two ways. A *lack of adequate funding* undermines on-the-ground-efforts by limiting resources, including staff size and equipment. Second, a *lack of scientific data* (linked to the lack of funding) severely challenges the effectiveness of conservation projects. Most interviewees expressed concern about this lack of capacity when asked about impediments to conservation. Further, respondents consistently explained that financial inadequacy is primarily an allocation problem; natural resource funds are being grossly redirected to deal with border issues/concerns. For example, Roger DiRosa of the CPNWR estimates that 60-70% of the total Refuge budget is spent on border issues. Similarly, Kym Hall, supervisor of the Coronado National Monument, expresses frustration at the inability to direct funding toward resource management, conservation, and species recovery.

> Right now, resource management is probably our lowest priority—not because it's less important, but because [of] the scope of what we can afford to do. If we weren't spending all our money working on illegal activity, we could be doing a better job… we could be redirecting our priorities [toward species protection].

Hall believes that the redirecting of funding to border issues is probably the greatest obstacle to conservation in the Monument. Another professional, Mitch Ellis, agrees with Hall, citing the redirecting of funding as the cause for a lack of capacity in the Buenos Aires National Wildlife Refuge.

> By the time it's all said and done, almost half of our budget gets sidetracked with border issues. It's a big impact… we'd be doing other things with [the money] for sure, [such as] hiring more biologists rather than law enforcement officers, [performing] more survey work, and [doing] more active habitat management.

In sum, public land managers are not necessarily experiencing a problem of financial scarcity (though many did mention that budgets are low), as much as a problem of designating *species conservation* a financial priority.

Conservation projects like species monitoring and habitat recovery are demanding and costly—especially in the dynamic border region, where projects require high maintenance and the ability to adapt. Land managers believe that the lack of adequate financial resources profoundly detracts from their ability to perform science in the region, such as conducting basic environmental assessments, monitoring at-risk species, and restoring habitat. About half of the interviewees brought up the "capacity problem" when asked about their ability to implement conservation policy. They explained that obligatory redirecting of resources detracts from fundamental missions that are also legally mandated.

> Here [along the US-Mexico border] it's like, we'd like to do all that, but guess what? We're on the border. [So] it doesn't really match with what we do. [Border activity] absolutely detracts from our mission, that's for sure. It's our reality (K.Hall).

Similarly, according to Holly Richter, the Nature Conservancy (a citizen-funded INGO) can afford scientific analyses, yet sustaining these conservation programs in the long-term is a serious challenge.

> We aim for adaptive management, where we monitor, react and then analyze [the effects of the mitigation]… to keep this effort going over a period of time requires a substantial amount of funding, for informed decision-making. Funding needs are perpetual.

Federal land budgets are characteristically tight, and in the intense border region, resource managers simply do not have the tools necessary to fulfilling conservation objectives.

In addition to the redirecting of funding, border issues also consume a large amount of these professionals' time. Almost all of the respondents describe border issues as 'permeating' the atmosphere of their office or work environment. Most spend the majority of their time on the issues; a quarter of interviewees admit that they often dedicate 75% or more of their time to border issues. For many, time and attention invested focusing on the border is increasing. "The border issues – they touch every last one of our program areas," remarks a deputy supervisor for the Coronado National Forest. Several agencies have developed strategies to manage the dilemma, such as delegating certain people to deal with border issues (to prevent the whole staff from being distracted by border problems), and creating tools like 'border cards' that employees use as an alert system (to keep people aware).

As mentioned previously, the other leg of the capacity problem, a *lack of scientific research*, is significantly impeding conservation. Without good science, informed decision-making is difficult and the formulation of policy lags, which detracts from the effectiveness of conservation efforts on the ground. For example, Shela McFarlan (of the BLM's Borderlands Managers' Task Force) is tasked with developing policy that mitigates border impacts on wildlife. Yet, according to several interviewees, no one really knows *what* the impacts of the border are. Without scientific data regarding what the effects are on species, it is difficult to take action to protect them. "There are suggestions as to the impacts on wildlife, but no real scientific assessments. The lack of science is an obstacle, in the sense that you're not always sure what the priorities are," admits a Coronado Forest supervisor. Without sound evidence knowing what habitat, species, or issue needs the most attention, conservationists must currently rely on insight and expertise. Here, the two capacity shortages (*lack of funding* and *lack of scientific research*) merge, because without staff biologists, science cannot be performed to educate decision-makers. Mitch Ellis, director of the Buenos Aires National Wildlife Refuge, explains:

> We don't have enough people to effectively document the damage [to the land/wildlife], and monitor the changes… [so] a lot of what we do is very much guesswork, when we're saying what the impacts are [to wildlife].

Overall, professionals in the field expressed discomfort and frustration with these capacity problems, because they effectively degrade their ability to practice effective conservation.

4.2.2. Impacts of illegal border activity

The second most widely cited obstacle to conservation in the border region is the illegal character of many border activities. Danger in the region poses a major safety risk for workers, as drug traffickers and human smugglers often carry firearms. The higher the risk of illegality in the area, the more restricted its use. Public lands employees are unable to access the field to perform their work, which is a major problem in some areas. The bureaucracy, politics, and logistics involved make it difficult, for example, for a wildlife biologist to work on the other side of the border. Tim Tibbitts explains, "Just to go across to work for a day, I need to provide advance notice many weeks ahead of time… to go overnight and work with bats in Pinacate, it's maybe 8 or 9 weeks [of wait time for paperwork to be processed]." While it's understandable that the border is a sensitive region, such obstacles to practicing adaptive and timely science can greatly deter conservation projects from being established.

Additionally, other obstacles to conservation cited include: 1) politics in Washington (framing that a wall is necessary at the border, for example); 2) the general marginalization of environmental issues/importance (so that species protection becomes obscured); 3) top-down management style of the DHS; 4) a lack of understanding that impacts accumulate for wildlife; 5) the transboundary nature of the issues (language barriers, logistics); and 6) a lack of a streamlined conservation vision among actors in the region. Each of these obstacles acts to weaken conservation by further miring environmental protection with political issues. The general trend is a lack of understanding and adaptability; with dedicated effort, some aspects of these obstacles can be isolated from conservation missions, enabling them to progress.

Obstacles to conservation, whatever they are, are intricately woven into the political climate of the border region. It appears that in such a difficult context, the federal government considers it acceptable for taxpayer money and federal resources to become devoted to border control, justified on the grounds of national security. Overall, conservation on public lands is obscured by border demands, and these politics are undermining the very purpose of environmental protection mechanisms in the United States.

4.3. Border Infrastructure and wildlife: now, and the future

Each type of infrastructure at the border is associated with different impacts upon wildlife. In addition, the species in question is also a major determining factor in the so-called 'friendliness' of the infrastructure. Specifics of these complex relationships are largely uninvestigated, and thus impacts are difficult to clarify. All interviewees expressed interest in protecting wildlife, and felt that infrastructure should be avoided unless deemed absolutely necessary. One subject felt that wildlife is not currently impacted by border infrastructure in the rural desert, given that pedestrian walls are not built.

Professionals are aware that infrastructure activities disturb wildlife, yet they recognize the need for some infrastructure as a protective tool for the land. BP agent and public lands liaison Dion Ethell explains, "It'll take hundreds of years [for the lands] to totally recover – that's how important it is for us to get our infrastructure in there. This infrastructure at the border is really going to protect [the land]." To protect the land, one area where there was agreement that infrastructure is necessary was with regard to vehicle barriers and the vehicle traffic; there is consensus in the field that vehicle barriers are effective in stopping habitat disturbance caused by vehicles without impeding wildlife movement. The barrier at Organ Pipe National Monument, for example, has reduced illegal vehicle traffic by 95%, decreasing the need for BP enforcement activity as well. Since this traffic is considered one of the greatest threats to habitat and wildlife in the rural desert (as discussed previously), stopping vehicles is one of the best ways to prevent degradation. Most feel that their use is worth their associated impacts: 70 percent of those interviewed support the construction of vehicle barriers on public borderlands.

Pedestrian paneled walls are widely unsupported; about half of interviewees expressed concern that walls will likely affect wildlife migration, breeding, habitat, and vegetation – and like the vehicle barriers, they also funnel traffic elsewhere. This is an important benefit in urban areas, where crossing happens quickly, but things are different in the desert. Sean King of the BP explains,

> [Walls] make sense in urban areas (like Nogales), where we have fairly large towns on this side of the border, where if they hop over a chain-link fence, it takes 15 seconds to blend in with the population legally in the United States. If you have a wall up, and agents and cameras patrolling that area, you push em to the outskirts where they have 45 minutes to walk into town, and we have more time to make the apprehension.

In rural desert areas, walls also help mitigate immigration on the local scale in the short-term, but in the long-term view, people will perpetually dig under, cut through, or climb over them. Expressions such as "Show me a 20-foot wall, and I'll show you a 21-foot ladder" are commonly known and shared among professionals in the field. The notion that walls will likely stop wildlife, yet not stop migrants from crossing makes pedestrian barriers hugely unpopular.

Barrier or no barrier, the source of the immigrants and the immigration problem still looms. Mitch Ellis explains the conundrum:

> When people say walls won't work, or hiring more agents won't work, they're right if they're talking about solving the big [immigration] problem. But they're wrong, if they're talking about 'this Refuge, or this park, is really valuable and we want to protect it' – then a wall *will* do that. You *can* control certain areas.

Although barriers can protect the land, almost all interviewees agree that infrastructure fails to deter illegal immigration. Even BP agents admit that barriers only reduce illegal activity where they are put; therefore their presence is not considered a solution, by any means. Greta Anderson of the Center for Biological Diversity describes, "When Organ Pipe [NM] got their vehicle barrier, it dumped a lot of traffic on Cabeza [Prieta NWR]. So the conservation values of Organ Pipe were being met, but Cabeza got worse… it's a management paradigm." In fact, many are cynical and critical about the absence of what they express as a real solution: immigration reform. Mitch Ellis of the BANWR expresses,

> Border issues are so huge… the big problem is policy, at the higher levels. Walls are very effective for gaining control of specific areas, but [they] won't solve the big problem. If we have like a million or more people illegally entering the country every year, it *doesn't really matter* what we do enforcement-wise at the border, we'll still have a million people or more crossing the border. All we're really doing is influencing where they cross, and how they cross.

There is consensus that border problems will diminish in accordance with proactive policy at the federal level. So here we reach a dilemma: put up the barriers along the *whole* border to protect the land *now*? Or don't invest in barriers, and deter immigration through policy reform instead? Roger DiRosa of the CPNWR describes this issue as a Catch-22, because the land does need protection, and barriers do offer local protection in the absence of reform. "We're joined at the hip with Homeland Security, because if BP were not there, we couldn't have staff out there, couldn't have public out there, it'd be a war zone, a free-for-all." He continues, "BP *does* cause considerable amount of damage, but you've gotta weigh that with the damage they're preventing as well." The professionals interviewed all agreed that BP presence is necessary to protecting public borderlands.

Most believe vehicle barriers do not impede wildlife (as previously discussed), yet barriers never stand alone; professionals remind us that they are associated with surveillance activities, roads, and personnel, which accumulate and could manifest into major problems for wildlife. Greta Anderson discusses how barriers foster genetic bottlenecks, prevent species recovery, and inflict speciation. In the absence of scientific data, there is also a lot of misconception about wildlife and barriers. For example, many assume that animals like owls won't be affected because they are birds, yet owls in the Sonoran swoop rather than fly – so assumptions that they can clear barriers are incorrect. "Owls [here] get stuck in people's fences and highway medians… they don't have the ability to fly," explains Anderson. In talking about the Jaguar, another land manager talks about how the 'friendliness' of vehicle barriers is assumed because they have open spaces for passage, but no data confirm that they are truly 'wildlife-friendly'. Bryn Jones of the Border Action Network discusses how the presence of infrastructure may harm wildlife more than people might think. She uses roads as an example: "A lot of species won't cross over a road, so it's essentially like erecting a wall, splitting their habitat... then you get smaller

populations, and problems with genetic flow." Depending on their design, barriers also affect hydrology, vegetation and terrain, altering the resources that wildlife access to survive. Yet some more vulnerable species are already so adversely impacted at the border that apparently adding a wall won't make a significant difference. Wildlife biologist Tim Tibbitts explains:

> For Pronghorn, a pedestrian fence would be basically a brick wall… they wouldn't be able to get through it. [But] most of the border is already a brick wall for Pronghorn, because you've got a barbed-wire fence, and Mexico's Highway 2 which is busy—that's basically a wall they won't pass through. So, they're not going to go through a pedestrian barrier, but they're already not going to go through what's there, so it's kind of a moot point.

For other species, however, additional infrastructure may greatly affect their current status. It remains that infrastructure affects species differently in different localities, and that barriers can be designed to address species-specific needs. Once again, the need for research on these topics is of critical importance.

The concept that double-barrier 'pedestrian walls' are likely to be built along the AZ-Mexico border (in accordance with the SFA) was an area of discord among professionals. Most hope that the pedestrian fences will be avoided in rural desert areas, and feel that additional infrastructure (beyond vehicle barriers) is not necessary. Kym Hall expresses,

> What we have said over and over again, is *this is the maximum* [level of infrastructure] that these areas – these federal lands – need. [Instead of] these double-barrier people fences all along the borders, I'd rather find a way to deal with the people, because you're not going to stop them anyway… but you're not even going to allow lizards to get across? That's ridiculous; I'd rather deal with the people than stopping the wildlife migration to that degree.

Dealing with the root of the problem is of course desired by public lands managers, NGOs, biologists, and BP agents, who look to Washington for immigration reform. Yet simply put, vehicle barriers do not fulfill the mandate of the SFA, and therefore more infrastructure is planned – even in remote areas. Dion Ethell of the BP explains,

> [Vehicle barriers] aren't a double fence, and the parameters called for [by the SFA] require you to have pedestrian fence. [So] if it's a new fence needed, [vehicle barriers] will be incorporated within it, and places that already have

> vehicle barriers, they will stand… as extra reinforcement [to the pedestrian wall]. The SFA is a real law [that] calls for 700 mi of fencing, and 370 mi of that have to completed on the Southern border by December, 2008. We're working toward that mission… I do believe we will reach that goal.

Although it is difficult to ascertain from interviewees whether the SFA double-layer barrier mandate will be met, trends indicate that construction is likely to happen. Yet land managers and NGOs are skeptical and somewhat cynical, and tend not to believe that pedestrian walls will be built in the remote areas, as they are not currently planned. For the future, besides immigration reform, interviewees also expressed hope that new high-tech virtual barriers may be utilized as a lower-impact alternative to physical barriers – assuming they prove to be effective.

In summary, professionals confirmed the literature (Friederici 1999, BAN 2006, Remington 2006) with regard to the threats that infrastructure pose for wildlife. Most support the use of vehicle barrier infrastructure at the border, because it aids them in protecting land/habitat. In all cases, lightening the footprint of infrastructure and activity is of interest in the field, and is an issue regularly discussed. It is curious that public land managers don't believe that pedestrian barriers will be built; this optimism could be a function of denial or misinformation. The double-barrier wall mandated by the SFA is being constructed on the US-Mexico border currently, and BP agents have a target of completing 300 miles by December 2008.

4.4. Border Patrol Strategy: significance and progress

Due to the contentious nature and far-reaching scale of border issues, there has been a huge effort to increase environmental awareness in the region. Professionals from each sector describe forward progress with collaboration between federal agencies, and a particularly significant expansion of understanding and effort within the BP sector to minimize the impact of their interdiction forces to habitat and wildlife.

4.3.1. Impact of BP strategy on wildlife

As mentioned in section 4.1, BP strategy is of concern to actors in the field, as aerial surveillance and ground apprehension are damaging to wildlife and habitat. Many professionals discussed their belief that the BP 'prevention through deterrence' strategy succeeded in routing migrants away from urban areas and into the desert,

but failed to deter the immigrants from crossing. Roger DiRosa of the CPNWR explains how the strategy misinterpreted the desire of the migrants to cross:

> [BP's] intent was to shut down the urban areas, thinking that the remote desert would act as a deterrent. [But] they grossly underestimated the desire of people to find jobs. After all, when you're family's starving, you're going to do everything you can to get to the 'Promised Land'… [BP underestimated] the entrepreneurial spirit of the drug smugglers. BP didn't really know much about these remote areas; then, when the traffic escalated and exploded, they were ill-prepared, had never worked on such a broad scale, or in protected lands like the Refuge.

Other candidates agreed with DiRosa, emphasizing the failure of the funnel effect to deter migrants, as was pronounced in previous literature (CRS 2006, Robbins 2006, Rubio-Goldsmith *et.al.* 2006). This is problematic because wildlife are likely funneled to the same areas where immigrants are, further increasing disturbance in remote areas; thus from a conservation standpoint, the funnel effect is highly counterproductive.

However, also as discussed previously, the BP is a very important actor in helping to protect the land from illegal activity. Thus while their presence helps to protect wildlife and habitat, it is also a considered a detriment.

> [BP's] influence is extreme, all over, but it's a Catch-22… we're joined at the hip with Homeland Security, because if BP were not there, we couldn't have staff out there, couldn't have public out there, it'd be a war zone, a free-for-all. BP *does* cause considerable amount of damage, but you've gotta weigh that with the damage they're preventing as well. BP doing their job theoretically protects the resources. Now, where the conflict comes, is that we feel BP can do the same job – fulfill their mission – with a less damaging approach (R. DiRosa).

Other interviewees also expressed serious concern about the damage of BP strategy to habitat on public lands, and a few believe that BP activity does *more* harm to wildlife than illegal activity in the area. A potential explanation is that BP activity is not confined to any border 'area' in particular, since the border is undefined. "The definition of the border is where the DHS/BP says it is…. It's not a line in the sand. What we consider the border, is pretty much everything south of I[nterstate]-8, because the influence and impacts extend that far North," explains DiRosa. This has resulted in habitat disturbance covering a very wide range of land and wilderness area, and is considered a major problem. However if BP efforts were kept nearer to

the border, it is likely that their presence would act as more of a deterrent (since immigrants would *see* their captors there), and more apprehensions could be made sooner – before immigrants continue northward to impact the land and wildlife. BP use of the open desert on public lands is frustrating for land managers, because it compounds the capacity problem. Mitch Ellis explains that in the BANWR, border patrol agents comprise 90% of the vehicle traffic on roads; yet public lands employees are responsible for maintaining them. "[Border patrol] have a valid argument, that their mission is not road maintenance or anything like that. [But] it's frustrating… 90% of the traffic on these roads are BP agents." Land managers feel they have no choice but to redirect funding toward border issues, because law enforcement is an absolute necessity in the illegal context of the region. After describing how funding is immensely redirected to law enforcement in the Coronado National Forest, Kym Hall adds, "It is what it is, and we have to respond to the illegal activity." While it is understandable that the BP aren't typically responsible for domestic law enforcement or maintenance tasks – as their mission is to secure the border – it remains curious that public land managers are held responsible for tasks like road/fence maintenance and law enforcement in a region plagued with illegal activity. It is obviously beyond the severely resource-limited capacity of the National Refuge, Forest, and Park Services to manage conflict in the border region. Thus results indicate the existence of a double-standard on public lands: they are expected to carry out their own missions, as mandated, and in addition, maintain roads/trails/fences and law enforcement on the conflicted lands. As long as this double-standard is in place, wildlife are inherently jeopardized by the inability of land agencies to manage conflict while fulfilling their conservation objectives.

The capacity dilemma suggests that the federal government does not perceive security and conservation missions to be compatible, as public land managers are not required to preserve their budgets for resource protection purposes. Seen from another perspective, there is great opportunity here for valuable resources to be kept in the mission of public lands. Major improvements in conservation can be made on the ground – with the resources already designated for that purpose – if only those resources are not allowed to be redirected. In the event that this proves unrealistic, and funds *must* be redirected to manage the border conflict, it is certainly a legitimate request for public lands to receive more resources (staff, funds) in the

conflict-ridden border region. If land management agencies were not held responsible for conflict management, the conservation mission may be able to persist effectively in the midst of the border conflict.

4.3.2. Cooperation and forward progress among the BP and other agencies

It is evident the DHS and BP have significant influence in the conservation capability of the region. Therefore the relationship between border security agents and other actors is extremely important, for conservation to be effective; this has been realized relatively recently in the border scene. Public lands liaison for the BP Dion Ethell describes the shift: "A few years ago, a lot of the [CBP] agents out here had never heard terms like 'endangered species', 'Secure Fence Act' or 'Environmental Assessment'… these are terms that we're learning." With that learning has come an increased effort to merge the missions between BP operation and land management, which is exceedingly necessary. A National Forest worker describes why: "The BP are not land managers, they're issue managers." For the needs of the land to be met, BP strategy must comply with them on the ground; many of the professionals interviewed expressed how collaboration between agencies serves a critical role. Mitch Ellis of the BANWR believes that through working together, the BP and land managers can help one another fulfill their own missions.

> Our approach to coordinating with BP is to help them facilitate their work so that they do it more efficiently, with a lighter footprint on the land… in hope that having this more effective law enforcement out here, we'll see fewer migrants and drug dealers doing damage to the landscape.

Border Patrol agents interviewed agree that collaborative strategy is important, and have worked to express their concern for wildlife through cooperative efforts with public land managers in recent years. The relative success of networking in the region indicates how compatibility is largely a function of attitude and willpower. Dion Ethell of the BP explains how concern for wildlife can go a long way, if people are willing to undertake the challenge.

> BP is really concerned about going through the environmental process. We look at alternatives… for example on the BMG Range, we sat down as a team and discussed with biologists, and thought of how we could implement a design into the fence [for] salamanders who need to get back and forth. We had to implement some engineering measures, so we could keep the integrity of the fence while still allowing them to slip through. That was done: that's a win-win,

> you know, where it[the wall] doesn't bisect endangered species, but it does perform the task that it was intended for. Even though it took more expense, planning and design, the government went the extra mile.

Professionals consistently endorsed working together to achieve lower-impact solutions such as the fence design mentioned in Ethell's story above.

Another indicator of the collaboration increase is evident in the fact that new positions have even been created within the agencies, which are designed to better confront border issues by streamlining agency missions. The BP has endorsed a new position entitled 'public lands liaison' – an employee whose full-time position entails consultation, information-sharing and problem-solving with public lands managers. In fact, this position was so successful in the past year that the DHS intends to endorse it in every US law enforcement sector. The Bureau of Land Management has an 'assistant for international programs' position, and has also set up a 'Borderlands Managers Task Force' that meets quarterly to confront issues and find solutions, which was mentioned as being particularly helpful in streamlining the missions of multiple agencies. These collaborative strategies involve all level of government, including federal agencies, state, local, and tribal governments. There is, however, no participation from the public or private sectors in this collaboration.

Progress in this matter is widely applauded among professionals; every interviewee noted how collaboration and cooperation have improved – and made a significant difference – in the conservation operations of the border region. Thus with a positive attitude and consideration for environmental needs, border professionals feel their missions can be compatible. Professionals in sectors outside of federal agencies, while not required to be involved in the interagency meetings, also discussed the trend of increased collaboration as a positive step in the direction of conservation. Holly Richter of the Nature Conservancy believes this type of networking is essential to conservation in the border region.

> I think the only way to get there, is with better communication and coordination and collaboration… with security issues, as well as with wildlife mgmt. issues. There are probably ways where we can meet both of our objectives, and maybe even enhance each other's objectives, but to find that common ground takes a lot of commitment to working together.

There is evidence of commitment to working together among every sector in the field; it appears largely personality-dependent whether collaborative decisions are being enforced on the ground.

4.5. Legal findings and compliance within the agencies

Interviewees were asked to explain the legal context of conservation on public borderlands, as well as the status of their implementation. A large majority of respondents from each sector began by discussing how the REAL ID Act fosters the context of the legal scene: it places legal jurisdiction in the region into the hands of Border Patrol, weakening the power of environmental laws. Tim Tibbitts, a wildlife biologist for Organ Pipe Cactus National Monument, describes, "Legislation is becoming harder to implement for two reasons. The first is political: we get outgunned at the Washington level (and maybe we should because it's homeland security); the second, is now there are specific waivers being written into border laws, that just mean we can't enforce Wilderness [TWA], or the ESA." Professionals in the field generally understand that national security is top priority of government; yet confirming the literature (Bies 2007), they expressed a degree of frustration and bafflement at the notion that laws can simply be waived. REAL ID additionally has a clause that prevents lawsuits related to border projects, so litigation can't be used as a tool to protect wildlife (which is often a last-resort way to ensure that conservation laws are upheld).

A positive result of the REAL ID and SFA are that they've greatly increased the need for communication and collaboration between federal land agencies and the BP. The resulting increase of awareness about environmental issues within the BP was cited by every candidate interviewed. As land managers work with the BP to lessen impacts on wildlife, in recent years the BP has responded when they have the flexibility to do so *[see D. Ethell's quote p. 57]*. Because their orders come directly from Washington, however, flexibility on the ground is limited.

Environmental laws were widely referenced in discussion, of course, and interviewees were most familiar with NEPA, the ESA and the TWA. Discord in response arose with respect to implementation of the NEPA mandates: while federal

employees (BP and land managers) spoke of full compliance with NEPA, professionals working outside the government told less promising stories. "They go through the motions, on paper… but [EAs and EIAs] have become a technicality for [the BP]," describes Bryn Jones of the Border Action Network. "Their cumulative impact evaluation is often just a paragraph or two." Greta Anderson of the Center for Biological Diversity agrees that when it comes to the environmental process, legal compliance within the BP is negligible. She recalls, "With Project 28 (the billion-dollar virtual-wall test project near Sasabe), the BP only gave the public four days to comment." Rick Van Schoik, director of the Southwest Consortium for Environmental Research and Policy (SCERP), claims that the NEPA and the ESA are "implemented at the discretion of each agency, with little facilitation," and recommends more activity from watchdog groups, to ensure accountability within government.

When asked about the implementation scene, professionals expressed the most concern about the ESA and TWA; essentially, DHS mandates and BP strategies clash with these laws to a degree that their fundamental purposes are undermined. "The basic premise of wilderness is no motorized equipment, at all… so here, it's discouraging," explains Bryn Jones. Roads, temporary camps and even a helipad have been set up in wilderness areas on border lands, including the two wildlife refuges (CPNWR and BANWR). "Air support is essential to national security," a BP official admits. With the ESA, protecting habitat is enforced as long as it doesn't interfere with other interests. "We've also had a lot of trouble trying to get [Threatened and Endangered] species listed here [in the border region]," Jones remarks.

Yet on the other side of the debate, it is evident that the BP has worked to lighten their impact on the ground; forward progress has indeed been demonstrated in terms of attempted compliance. At the federal level, however, the degree of power granted to the BP has reflected in a *general inability to implement* environmental law in the region, according to a majority of the subjects interviewed. Unless the REAL ID waiver is issued for a specific project, these laws are supposed to be implemented regularly. Professionals agree that the laws are indeed written clearly, and many expressed frustration that they've been 'watered down in Washington', and/or the

DHS holds the legal 'magic wand'. It appears that progress made has not been significant enough to change the legal power relationship between the DHS/BP and other stakeholders in the region.

4.5.1. A note about compatibility

A less-well known fact among professionals in the field is that the US' standing environmental laws are *designed* to allow for human activity/use of the land when deemed necessary. A wildlife biologist for the NPS explains,

> If you look closely, all the environmental laws of the nation, including the TWA and the ESA—two of the toughest laws for resource management—they have built into them, provisions for exigent circumstances. [For example] TWA can be temporarily disengaged, if necessary, for human health and safety, and certainly in the case of national security (T. Tibbitts).

The laws have clauses labeled for situations involving 'exigent circumstances', 'emergency measures' and 'categorical exclusions', among others. Border security enforcement is certainly a legitimate reason to utilize such allowances of the laws. Yet allowances are usually intended to be used for *temporary* measures, hence the formulation of the REAL ID Act. While the professionals (including BP agents) agree that the BP should try to work within these standing laws, they also agree that that is not possible at the border. (Off-road driving, for example, could be limited only to lifesaving missions.) Fundamentally, many actors believe that conservation laws – as they stand – are compatible with national security, and the government should work within the existing legal framework to enforce the environmental process. Certain techniques such as air support, however, are viewed as instrumental and in these cases laws should be altered if necessary; for example, the Arizona Wilderness Act allows special authority for military aircraft under a MOU provision (NWPS 2007). Altering laws may present a route for border patrol to be granted *necessary* flexibility in securing the border, without allowing evasion of the environmental process.

Other challenges to implementation of environmental law were also cited: differing interpretation of laws is an obstacle with so many groups, governments and agencies involved, for example, and costs and time constraints (such as those under the SFA) also limit compliance. By far the most widely cited obstacle to effective

implementation, however, was the weakening of federal laws that are so critical across multiple levels of the conservation scene.

4.6. Key Actors

It is useful to briefly examine conservation actors in the region, as widespread efforts may foster increased compatibility. When asked which actors influence conservation most in the region, respondents provided a wide array of responses. Candidate response to the 'key actors' question reveals a strong influence from government agencies and a significant influence from NGOs. The majority cited the FWS as having the greatest influence in conservation, closely followed by the Border Patrol/DHS (due to their power and impact) and the National Park Service. A majority presented the State AGFD as being a major partner in conservation. In addition, almost half of professionals offered acclaim for the NGOs Defenders of Wildlife and the Center for Biological Diversity, for being major influences, and nearly a third felt that Defenders of Wildlife – the legal group – is the greatest conservation advocate in the region. Interviewees such as biologist Tim Tibbitts generally praise the work of NGOs for assisting in borderlands conservation.

> Conservation organizations are always there, ready to sue us, [and] I'm glad that they're there. They really serve a critical role, in being the watchdog over what's going on. It's gotten to the point that I *need* to have them there… they *need* to be a voice for constituency that doesn't know what's going on here.

A plethora of other NGOs, including several INGOs, were mentioned in interviews as having a role in the conservation effort [Table 6]. Mexican INGOs Pronatura and Naturalia were hailed as applying significant international efforts, and the Nature Conservancy has been successful in procuring land easements on both sides of the border, to ensure protection on private lands.

Table 6. NGOs, INGOs, and Alliances mentioned as having a role in border conservation (grouped and alphabetized)**.**

US NGOs	AZ Wilderness Coalition
	CA Biodiversity Council
	Center for Biological Diversity
	Defenders of Wildlife
	Humane borders
	Minutemen
	No More Deaths
	Samaritans
	Sonoran Desert Museum
	Tucson Audubon Society
	Western National Parks Association
	Wilderness Society
	Wilderness Watch
INGOs	International Sonoran Desert Alliance
	Nature Conservancy
	Northern Jaguar Project
	Sierra Club
	Sonoran Institute/Sonoran Joint Venture
	Sky Island Alliance
	Wildlands project
	World Wildlife Fund
Mexican NGOs	Naturalia (INGO)
	Pronatura (INGO)
	Unidos para la conservacion
	El colegio de la frontera norte

A few professionals found it noteworthy to mention that many NGO groups tend to shy away from border conservation projects. Perhaps because of the difficulty of implementation on the ground, many feel they are more productive working in other areas. (This is another reason why the CBD and DOW were particularly praised: for their commitment to conservation in the troubled borderlands.)

As mentioned previously, many government agencies have worked together to form alliances, and many of these have been successful. The Borderlands Managers Task Force was an alliance cited by half of the professionals as being an important part of streamlining the different federal agencies in the region. Roger DiRosa

believes the Force to be absolutely critical in conservation on the ground at the CPNWR (the group meets regularly to problem-solve and mitigate impacts through good management). Other actors mentioned include the local Pima County (a third of interviewees described the county as an actor), and fields of academia, such as AZ State University and San Diego State University. The Mexican agency SEMARNAT and the UNESCO Help Fund (a global watershed fund) were each mentioned in passing as participants.

4.6.1. International influence

While candidates agree that there is a small amount of international effort to conserve and restore wildlife of the Sonoran, very few could name international agreements, laws, projects or even political actors in the field. Most professionals appeared unaware of any presence from the international community regarding conservation, including the existing international agreements on the issues (see section 2.3.2). International laws were widely unknown; CMS and the Migratory Bird Act were mentioned in passing, but as discussed previously the US and Mexico are not signatory nations to CMS, and the Migratory Bird Act doesn't protect non-avian wildlife. International involvement was called 'negligible' and 'insignificant' by a quarter of interviewees; the remainder spent time discussing the limitations of the international sphere, such as the severe lack of financial resources and general lack of commitment to regulatory/accountability work. Others described how most international work is focused on anthropocentric issues such as air/water pollution and human health. Some expressed concern that there is a lack of international legal framework between the two nations concerning transboundary conservation; others describe a lack of international watchdog groups, which could help ensure accountability within the US and Mexican national governments. The fact that very few international stakeholders could be mentioned is fascinating, and can be taken to confirm that the international community's role is insufficient in asserting legal compliance with conservation agreements. Another interpretation, however, is that the international community simply operates independently from the domestic actors, and there is a lack of awareness about one another's conservation presence/efforts.

With regard to illegal immigration and border enforcement, the role of Mexico is also minimal, perpetuating the resource strain on the US side. Mexico has no law against

crossing the international border into the US, and the President continues to be a proponent of open borders. A Mexican field biologist explains that as a result, "Mexico has no need for a border patrol," and the US is seen as solely responsible for enforcing its anti-immigration laws on border lands. The lack of participation from Mexico in controlling the border conflict adds to the stress on public lands, their resources, and employees struggling to deal with the conflict.

Mexico is more of a participant when it comes to conservation efforts. Mexico's sister parks, the State government of Sonora, and the federal SEMARNAT agency have taken a proactive role in helping US agencies recover species and riparian habitat. The Pinacate Biosphere Reserve, for example, participated in recovering the Sonoran Pronghorn in a collaborative effort with the CPNWR, and in restoration efforts for the Masked Bobwhite Quail in the BANWR. Politics of the region are generally avoided in the collaborative conservation efforts of INGOs, explains Mitch Ellis, because the political issues between Mexico and the US are "highly contentious, and do not serve the mutual conservation objective".

International politics cannot be entirely avoided, however, and political obstacles confront both nations as they try to practice conservation. Many interviewees spoke of logistical hurdles confronting them any time they want/need to collaborate internationally, such as language barriers and resource constraints. Others spoke of the difficulty they have crossing the border to perform their work, as it requires obtaining permission and paperwork months beforehand, making adaptability almost impossible. Biologist Tim Tibbitts believes that bureaucratic obstacles are the greatest hindrance to international conservation work.

Whatever the obstacles to international collaboration, transboundary conservation is taking place between the Mexican and US governments and NGOs – though on a resource-limited scale. A general lack of international regulation and enforcement restricts global actors from ensuring accountability within federal agencies; it is likely that more participation from the global regime would pressure federal agencies to practice better compliance, aiding their consideration and compatibility.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

Professional opinions imply that wildlife conservation and national security are indeed compatible, and in fact, are being considered regularly on the ground. It is evident that efforts are being made to synchronize conservation and security measures. However, legal and political framing of the issues suggest that conservation and security are not considered compatible at the federal level. The border conflict and associated national security measures are systematically undermining efforts to conserve wildlife on public borderlands. Yet legal and federal problems resound in a conundrum for public lands managers. In the short term, there are minor ways to mitigate impacts, but the imbalance of legal power and resource support from the federal government remains a voice for incompatibility of the two sectors, with environmental missions greatly marginalized by the federal government. Until this drastic imbalance of resources (and the double-standard of the role of public land finances) is confronted, resource managers and conservationists will be prevented from meeting their objectives. Thus while many endorse and engage in improving compatibility, professionals are generally unable to implement it on a regular basis. The extent of environmental compliance remains somewhat of a mystery, however; those within government describe full compliance, yet professionals in the public and private sectors claim that legal processes are being eschewed. The credibility of compliance results is not entirely known, as few watchdog groups exist domestically or internationally to ensure accountability.

Framed in a federal context asserting the position that the environmental process is an obstacle to effective national security, the legal precedent set for environmental protection on borderlands falters. Marginalized by the security mission, federal laws that frame border strategies forced a weakening of land and species protection laws, dismantling the backbone of environmental protection in the borderlands. As a result, implementation of environmental policy and law is increasingly compromised. Although this is perhaps not the purpose of border legislation, the loss of power within land management agencies and conservation groups to protect species and enforce environmental law is very real on the ground.

Forced to confront national security issues in the meantime, public lands are continually losing resources and staff to border issues. Financial resources intended for conservation on public lands are systematically redirected toward border issues, greatly limiting conservation progress and the ability to protect public lands. There is general frustration in the region that the protection of public resources is overshadowed to such an extreme extent, that there is not enough remaining funding or policy support at the federal level to implement conservation law and policy on borderlands.

Positive trends do show that the border scene is approaching greater compatibility. Knowledge and awareness are rising through information sharing and networking efforts, and dozens of NGOs, agencies, and universities in both countries are working to improve the situation for wildlife. The border patrol is working to minimize their impact. Perspectives of the professionals with regard to the future are divided: some are encouraging, as they present a picture of stakeholders working together cooperatively to minimize impacts on the ground, and improved surveillance technology. Positive examples were provided about thoughtful, preventative actions being taken on the ground by all stakeholders, legitimizing the practical compatibility of security and conservation at the border. On the other hand, the situation for wildlife is not likely to improve without changes in the federal approach.

As the conflict escalates, Sonoran Desert habitat continues to degrade due to the large volume of human activity and traffic at the border, compounding the capacity problems and legal challenges to conservation and further restricting effectiveness. Negative trends cannot be attributed to any particular failure, yet general systematic weaknesses can be greatly mitigated in support of wildlife protection. Many of these trends are manifestations of major hurdles and weaknesses at the federal level, such as immigration policy, security law, and agency funding. If these fundamental political issues are addressed bureaucratically, the situation for wildlife may improve.

Overall, with respect to the stated aims and objectives, thesis results thus reveal a fundamental conundrum between compatibility at the federal level, which is deemed unapproachable, and compatibility on the ground, which is largely occurring. While national security and conservation are indeed compatible in theory, it is an uphill

battle for people to maintain efforts on the ground without support and dedication at the federal and international levels. In addition, there is also a general lack of international influence regarding transboundary conservation for border wildlife.

5.1. Policy recommendations

Professional opinions revealed in the findings of this research may be of use to decision-makers in addressing issues and formulating policy at the border. The following policy recommendations are deduced from the findings and conclusions of the study, and reflect the perspectives of those intimately involved in the region. They are designed in to target specific actors, with a few being directed at conservationists for on-the-ground application, and others for policymakers and regulators at the national level. Recommendations of both short-term and long-term character are presented in hope that they may be applied with maximum effectiveness.

There are multiple ways to improve the future of conservation on public borderlands. First, to surpass the complex intricacies of varying missions, mandates, and stakeholders in the region, ***there needs to be a unified vision for conservation on public border lands*.** The vision must be simple enough to clearly captivate main goals that each actor can work toward, yet be aggressive and detailed enough to incite real progress. It is suggested that an independent, international group be formed and tasked specifically with coordinating the region's diverse conservation efforts and actors, and that stakeholders from each sector participate in formulating and codifying the long-term vision. Particularly, the private and public sectors need to join federal agencies in expanding the shared effort; the ultimate goal of a shared vision is to streamline the existing patchwork of conservation efforts throughout the border region. A streamlined vision could help wildlife immensely, by: minimizing confusion and increasing practicality; addressing their habitat and concerns on an ecological, landscape level; and by clarifying actor roles, hoisting the political power of conservation actors in the region.

In order for conservation efforts to improve on the ground and in their effectiveness, resources intended for land management need to stay dedicated to the missions of

public lands. As discussed in Chapter 4, without resources devoted to land management goals, the capacity of federal agencies to protect wildlife is relatively impotent. ***Immediate action needs to be taken to address the funding problem***, on a federal policy level, so that natural resources on public lands can be protected with the funds originally provided for this purpose. Funding for law enforcement needs to be provided without relying on NPS, NFWS and FS budgets to cover costs associated with managing the border conflict. Thus for tasks directly related to border security (such as fence/wall maintenance and law enforcement), *it is strongly recommended that the DHS provide funds to the BP to hire additional staff to practice domestic law enforcement*. This way, tax dollars devoted to natural resource management are fully invested in doing so—and money for the protection of border lands and wildlife are not redirected elsewhere. To support this notion, *it is recommended that law be codified to guarantee that a certain amount of funding is reserved for species protection* as is mandated under standing environmental law. Creating a separate budget for law enforcement staff on public lands, for example, would allow land managers to maintain conservation as a priority on their agenda. Keeping conservation funding internal will enable more employees to be hired, who can monitor and assess wildlife populations so that impacts are determined and properly mitigated. Addressing the funding allocation problem supplements the long-term conservation goals of the region, and is an absolutely critical step enabling conservation to take place on public borderlands.

In the short term, conservationists should continue to forge some common sense solutions enabling local conservation to be strengthened, such as public forums and trash collection. To address capacity issues, land managers and NGOs can partner in applying for international conservation grants; grassroots campaigning and consistent lobbying of Congress is also recommended, to help motivate change at the federal level. A noteworthy general recommendation from professionals in view of the capacity problem is increased efficiency: conservation stakeholders should use great caution to consider the long term in projects, and distribute resources accordingly. Creative and resourceful conservation planning is extremely important in a capacity-limited scene.

The benefit of collaboration was a redundant theme among actors in the field, and it is an essential component to progress in the future. Taking some simple actions to increase collaboration can make a big difference for wildlife. More *partnerships need to be forged, particularly with international groups*; this requires dedication and patience. An emphasis on ***accountability and regulation are needed in the international context***, to prevent marginalization of the transboundary issues. Federal governments could aid accountability of their agencies by helping to fund international groups. Legal experts need to be involved in promoting accountability, according to international agreements between the US and Mexico, which needs to involve academia familiar with the local scene. It is imperative that networking and streamlining take place across strata to lend strength to the conservation presence, now and in the future, while perhaps omitting the more segregated and fruitless efforts taking place.

In the long-term, as discussed throughout the thesis, ***the federal government needs to take policy reform seriously***, and address problems with the immigration system in order to ease tension along the US-Mexico border. This includes reforming the federal agency budgets to better provide for public lands and resources, as well as immigration reform. The federal government needs to set a positive example affirming its concern for the public and wildlife in the border region, so that compatibility is demonstrated on a national level. The importance of policy reform addressing borderlands issues cannot be underestimated; the longer the federal government waits, the more resources and at-risk wildlife are jeopardized by border conflict.

5.2.2. Opportunities for future research

Many research topics were mentioned throughout this thesis, which could be of great use in conserving borderlands wildlife. Provided that there is funding, it would be greatly useful for the US to invest in future research regarding the implementation of international conservation agreements/laws and the long-term costs and benefits of immigration reform versus militarization of the border. Researching the role of private lands along the south side of the border in Mexico could also be of use in informing conservationists; if more is known about Mexico's role, the information may aid domestic and international groups in ensuring accountability. Finally, an analysis

of species-specific impacts of different infrastructure types could bring important information into the hands of decision-makers and conservationists. For vulnerable species, distributing this type of information could prevent extinction.

The nature of the region presents great challenges on these lands, and though solutions are not simple, much can be done at each level to protect the land and resources of the border. In the short term, increased funding and collaboration are the best ways to address conservation on the ground. The most promising ways to conserve at-risk species in the long term are through federal immigration policy reform, increased international participation and regulatory influence, and networking among public and private stakeholders. If people work together, and governments and organizations are supportive of transboundary efforts, imperiled wildlife may continue to be protected on public lands in the midst of border politics.

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APPENDIX 1
Glossary

Biodiversity: diversity of living organisms in an environment (usually defined by the number and variability of species therein).

Binational: of or relating to two nations (US and Mexico, in this case).

Consortium: an agreement, combination, or group (as of companies) formed to undertake an enterprise beyond the resources of any one member.

Endemic: belonging or native to a particular field, area, or environment; restricted or peculiar to a locality or region.

Intergovernmental: being or occurring between two or more governments or divisions of a government.

Jurisdiction: the power, right, or authority to interpret and apply the law.

Legislation: formal rules (as laws) that have the force of authority by virtue of their promulgation by an official organ of a state or other organization.

Mandate: an authoritative command; *especially*: a formal order from a superior court or official to an inferior one.

Regulatory: (an agency type tasked with) governing or directing according to rule; bringing under the control of law or constituted authority.

Riparian: relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

Transboundary: crossing or existing across national boundaries. This term is most often used in reference to the movement of pollution across borders, although it is useful in any issue having international context.

Umbrella species: a species whose home range and habitat requirements are sufficiently broad that, if protected, numerous other species of smaller range will also be protected.

Waive: to dismiss; to refrain from pressing or enforcing (as a claim or rule); to relinquish voluntarily (as a legal right).

APPENDIX 2
Public Lands along the AZ-Mexico border
(in alphabetical order)

Buenos Aires National Wildlife Refuge

Cabeza Prieta National Wildlife Refuge

Coronado National Forest

Coronado National Monument

Ironwood Forest National Monument

Las Cienegas National Conservation Area

Organ Pipe Cactus National Monument

Pecos Historic National Park

San Pedro National Riparian Conservation Area

APPENDIX 3
Border Species at Risk in Arizona

Common name	Scientific name	Conservation status*
Sonoran pronghorn antelope	*Antilocapra americana sonoriensis*	Endangered
Ocelot	*Felis pardalis*	Endangered
Jaguar	*Panthera onca*	Endangered
Jaguarundi	*Felis yagouaroundi tolteca*	Endangered
Mexican gray wolf	*Canis lupus baileyi*	Endangered
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered
Masked bobwhite quail	*Colinus virginianus ridgwayi*	Critically Endangered
Southwestern willow flycatcher	*Empidonzx trailii extimus*	Endangered
Cactus ferruginous pygmy-owl**	*Glaucidium brasilianum cactorum*	Endangered
Aplomado falcon	*Falco femoralis*	Endangered
Thick-billed parrot	*Rhynchopsitta pachyrhyncha*	Endangered
Bald eagle	*Haliaeetus leucocephalus*	Endangered
Desert pupfish	*Cyprinodon macularius*	Endangered
Gila topminnow	*Poeciliopsis occidentalis*	Endangered
Flat-tailed horned lizard	*Phrynosoma mcallii*	Endangered
Desert tortoise	*Gopherus agassizii*	Threatened
Mexican spotted owl	*Strix occidentalis lucida*	Threatened
Gila chub	*Gila intermedia*	Candidate species
Desert bighorn sheep	*Ovis canadensis nelsoni*	Conservation dependent
Mountain plover	*Charadrius montanas*	Proposed threatened
Sonoita mud turtle	*Kinosternon sonoriense longifemorale*	Candidate species
Western yellow-billed cuckoo	*Coccyzus americanus occidentealis*	Candidate species

*According to the World Conservation Union (IUCN), Center for Biological Diversity (CBD), Defenders of Wildlife (DOW), and Pima County Administrator's Office lists/classifications.
**Removed from the Endangered Species list in 2006; petitioned to be re-listed.

IUCN Species status rankings (most degraded to least):
Extinct
Extinct in the Wild
Critically Endangered
Endangered
Vulnerable
Threatened
Conservation dependent
Near Threatened
Least Concern
Domesticated

APPENDIX 4
Interview Guide: Themes and Sample Questions

Conservation Policy

How would you describe the major concerns of wildlife along the US-Mexico border? What issues threaten wildlife most?

What are the main obstacles to conservation efforts along the border?

Do you feel the situation has gotten better or worse for wildlife in the past few years?

Border security

How do border issues affect the atmosphere at your office? How much of your work time is spent on border issues?

Tell me about border infrastructure. (How are wildlife jeopardized by infrastructure? Which species are most affected? How dire is the threat to endangered species? In your opinion, can border infrastructure be wildlife-friendly?)

How would you describe the legal context of wildlife conservation in the border region? What are the most pertinent legal issues that you're confronted with?

What are the opportunities and challenges for implementing environmental laws in the border region?

To what extent does new border security legislation impact your work?

Key Actors

Which actors, organizations, or groups have the most influence in conservation efforts on-the-ground?

Is there regular communication/networking between these groups? Who do you communicate with the most, in your work?

What is the role of the international community? The Mexican government?

To what extent does the situation differ in different agencies/public land types?

The Future

How would you describe the adequacy of the information released to the public, in this field?

How do you see the situation [for wildlife] developing in the future?

What types of recommendations would you give to improve the situation?

APPENDIX 5
Images

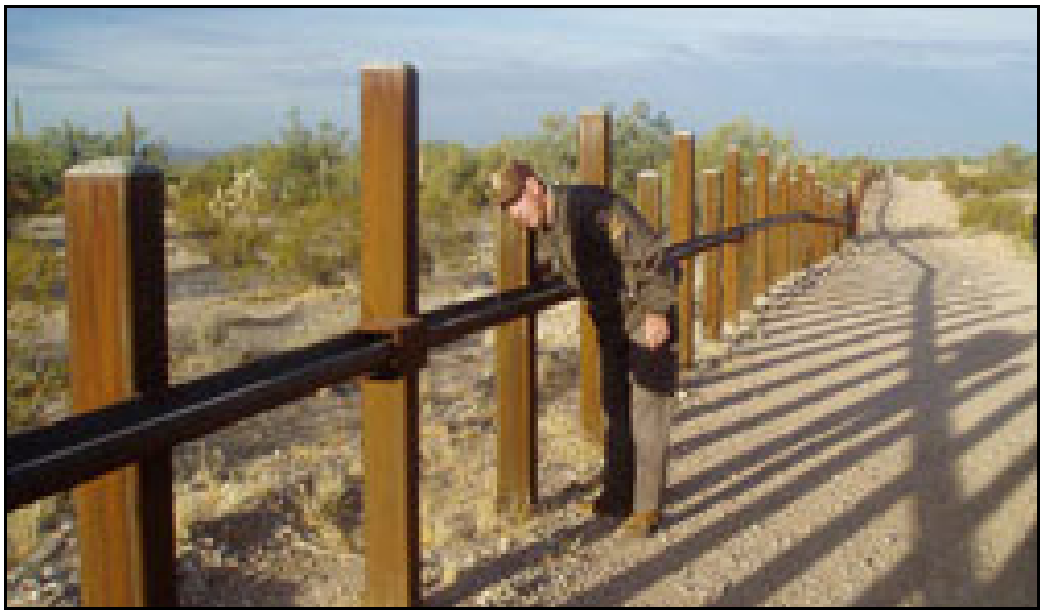
Border Wall under Construction

Erecting a steel barrier designed to block automobiles from crossing the border. Theoretically, people and wildlife can jump over this barrier.

The addition of 14-foot high transparent paneling to the steel vehicle barriers turns the barrier into a wall. The massive panels prevent migrants (and wildlife) from walking across.

Triple-layered barrier infrastructure near the Colorado River border. This area was frequented by migrants trying to cross, so three barriers were built.

Vehicle barrier at Organ Pipe National Monument



Source: FWS.

Flat-tailed horned lizard. Source: FWS

Desert tortoise. Source: T.Kinsey

Lesser long-nosed bat. Source: USFS

Desert bighorn sheep. Source: Hogle Zoo, Utah

Cactus-ferruginous pygmy owl. Source: Tucson Audubon, Blue Planet biomes.

Masked Bobwhite Quail. Source: FWS.