Rangeland Collaboration: Effects of the Border Crisis on a Governance Network

Abigail M. York[*,1,2,3] and Michael L. Schoon[1,2,4]

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Arizona State University
Tempe, AZ

*-Corresponding Author: abigail.york@asu.edu
1-Arizona State University
2-Center for the Study of Institutional Diversity
3-School of Human Evolution and Social Change
4-Complex Adaptive Systems Initiative

ABSTRACT
In the southern Arizona borderlands, natural resource managers come together to solve complex environmental issues associated with water, fire, threats to biodiversity, and exurbanization creating a diverse set of formal and informal institutional arrangements between public and private actors. Ranchers and range issues are central to governance in this system, yet ranchers and public range agencies do not operate in a vacuum, so we explore collaboration on range from a governance network perspective. We seek to understand how a challenging and potentially divisive issue affects collective action among interconnected managers and institutions. This natural resource community faces a contentious issue affecting daily life and management activities: the border crisis. We examine collaboratives and governance network's ability to continue to deal with environmental problems in the face of four border issues: militarization, smuggling, increased migration, and construction of the border fence/wall and road. This study contributes to the collective action literature through its exploration of how natural resource management governance networks withstand complex challenges, such as the border. Border security places a heavy burden on public and private land mangers, especially ranchers, affecting a way of life and limiting managers' ability to collectively act to deal with environmental issues, yet we also find innovative solutions and emergence of new collaboratives in the face of this challenge.

INTRODUCTION

In Arizona, controversy swirls around the construction of the border fence, vigilantism, Senate Bill 1070, and the recent murder of Southeastern Arizonan rancher Robert Krentz. Politicians, advocates, and lobbyists passionately argue over proper treatment of undocumented migrants, the links between immigration and the economy and crime, and whether immigration and the racial and ethnic identity of immigrants fundamentally changes the United States of America or whether immigration is fundamental to our identity. A lesser-known component of the immigration debate is the impact of border issues on land management. In this study, we focus on a southeastern Arizonan borderlands community, where border militarization, migration and smuggling traffic, fence and wall construction, and increased cartel activity present distinct dimensions negatively affecting range and natural resource management and peoples' ability to collaborate.

In this community, public and private land managers encounter immigration issues on a day-to-day basis. The impact of immigration and immigration rhetoric has affected the community's ability to manage land and their collaborative efforts to solve pressing environmental issues in the borderlands range. We analyze the impact of border issues on natural resource management and collaborative efforts based on interviews with natural resource and land managers and local policymakers. These community members expressed complex conceptualization of "the border," which directly impact land management in this rural community and their ability to work together.

In the borderlands, natural resource managers come together in several issue arenas: water, fire, threats to biodiversity, and exurbanization, but managers recognize that collective action is costly and difficult in communities and organizations with diverse interests, missions, and mandates. In order to solve many pressing natural resource management concerns at a scale broader than any single land manager, cross-border solutions and collaborative management arrangements are required. Society has struggled to understand when and why people work together when the costs and risks of collaboration are high, while rewards may not come for generations. Yet throughout the country, even in the cauldron of western lands issues, we find government officials, private land owners, and environmental and conservation groups that work together, pushing aside aspects of their agendas. Within our study area, there are countless

collaborations-big and small, formal and informal-that attempt to handle biodiversity threats, promote water conservation and riparian restoration, slow exurbanization and land fragmentation, and manage fire. In this paper, we focus our attention on the relationships between the ranching community and the larger governance network. Ranchers and public agencies do not operate in a vacuum, so instead we explore how range oriented collaborations are interconnected with other natural resource collaborations. We examine the impact of the border on this governance network, the ability of the collaboratives to continue to deal with natural resource and range issues, emerging challenges associated with the border, and the institutional evolution.

Within this context, our study examines the question of how the border affects natural resource management collaboration in the southwest. Numerous environmental issues threaten the border region, its traditional livelihoods and fragile ecosystems. The border itself has created environmental challenges, such as the wall's function as a wildlife barrier and the effects of road and wall construction on the fragile desert. Immigration and the border certainly have directly or indirectly affected public and private land managers within the southwest since federal policy shifted migration by funneling urban migrants into rural corridors like Cochise County beginning in the 1990s. Debate over the border threatens collaborative efforts that were already tenuous-such as those between private landowners, environmental NGOs, and governmental agencies.

THEORETICAL FOUNDATION

Natural resource managers in a borderlands community provide a unique opportunity to understand the border on the ground. We explore the effects of the border on natural resource collaboration, as well as the managers' views of the border. Using the lens of collective action and literature on natural resource collaboration and the border, we seek to understand how a rural community that has taken center-stage in Arizonan and national debate copes with the border on a daily basis. This understanding informs natural resource management, when and where collaboration occurs, as well as our conceptualization of the border and the effects of border policy and immigration on natural resource management.

Collaboration in rural Arizona and the southwest has a long history, but so to does conflict among competing stakeholders (Sheridan 2006). Until very recently, within the natural resource and range management domain, ranchers squared off with environmentalists and agency foresters and range conservationists (White 2008; Sayre 2005; Starrs 1998; Daggett 1998). In

the 1990s, groups of environmentalists and ranchers in isolated pockets throughout the west began to recognize common ground, which allowed collaboration on issues such as open space (White 2008). The Malpai Borderlands Group was part of this revolution that was sparked by debate over fire management (Sayre 2005). Ranchers, the Nature Conservancy, and representatives from the US Forest Service and US Fish and Wildlife Service set aside differences and began to work on adaptive management strategies with formal and informal collaborative institutional arrangements. How do we understand this ability to collaborate?

Sometimes individuals' self-interested action results in suboptimal outcomes for society as a whole, otherwise known as collective action dilemmas. Classic studies of collective action posit that no one individual or group will be independently motivated to change their behavior unless there is a privileged group or hegemon willing to create the public good of a common set of institutional arrangements (Olson 1965). However, empirical research has shown many examples of cooperation without externally imposed rules (Ostrom 1990; Baland and Platteau 1996). Instead of Hobbes' "war of all against all" (1651), groups of people self-organize into collaborative institutions to resolve collective action dilemmas. Neoliberal regime theory argues that collaborative institutions can serve as information clearinghouses which reduce transaction costs, provide transparency, and minimize enforcement costs at the international level (Keohane 1984). Studies likewise show that at the local level of communities and households, groups of people self-organize to resolve social dilemmas without the external imposition of rules (Ostrom et al. 2002). In fact, locally crafted rules often outperformed rules created at higher levels of government for several reasons, including attention to place-specific contexts, local monitoring and enforcement, and community support for the institutional arrangements (Ostrom 2008; Goldman et al. 2007). Collaborative institutions increase levels of cooperation by building social capital (Marshall 2005) leading to more collective action, as individuals gain trust and experience reduced transaction costs (Lubell and Schulz 2001; Ostrom 2005). In contrast, some argue that a multiplicity of collaborative institutions in the same policy arena may reduce overall levels of collaboration (Lubell et al. 2010) because the ecology of games allows individuals to take hard line positions in one forum or foster animosity between institutions (Long 1958). *Networks* of collaborative institutions are not well understood, a shortcoming that we begin to explore in this study.

Armitage (2005) argues community-based resource management strategies are better able to withstand change or disturbance because adaptive capacity is created in part through self-organization and flexibility of many local institutional arrangements. But what happens to a network of interconnected actors and overlapping collaborative institutions facing the complex border crisis? The very nature of a polycentric system may create flexibility and enable efficient provision of local public goods (Ostrom and Ostrom 1999; Parks and Ostrom 1999) or punishment of free-riders (Feiock 2007), but there may also be challenges associated with the competition between collaborative groups leading to less collective action (see for example Lubell et al. 2010) . We begin to explore these theories regarding polycentricity, disturbance, and collective action by evaluating the border's impact on land management collaboration in southeastern Arizona.

METHODOLOGY

In order to understand the effects of the border on collaborative land management, we selected a community in Arizona with high immigration rates, as well as a high degree of collaborative efforts. In 2009-2010, we conducted 97 semi-structured interviews with 78 individuals in Cochise County. We selected prominent landowners, leaders of collaborative organizations, nongovernmental natural resource or environmental organizations, agency personnel involved in collaborations, and local government officials. Most interviews lasted between one to three hours, although a few were all day affairs. Interview questions centered on collaborative efforts on open space, water scarcity, biodiversity, and fire management.

Because of management and collaborative activities occur across space, we also discussed the ways of understanding the production of space as related to natural resource management. For example, ranches and protected areas in southeastern Arizona can ascribe a monetary value to the land (for the production of cattle or the production of conservation sites), an aesthetic value, a religious value or even a security value (i.e. "securing the border and protecting the nation"). Any given parcel of land will be ascribed many different meaning, which may differ or overlap depending on the individual's relation to and perception of the land (Sheridan 2006). These understanding of the multiple meanings and values of the land and natural resources help us to investigate the effect of the border on the collaborative institutions and borderlands community.

Participant observation provides an opportunity to gather data on more subtle themes and nuances and to gain rapport within the local community (Bernard 2006). Establishing high levels of trust with community members is particularly important given the political volatility in the border region today. In addition to joining ranchers, land use managers and border patrol agents in their typical work environments, York attended public meetings and events in 2010. She conducted participant observation with individual ranchers, agency field officers, and NGO representatives'; activities included riding with ranchers on their property, watching agency consultations with landowners, helping with basic maintenance of buildings, and observation of board meetings and local public hearings.

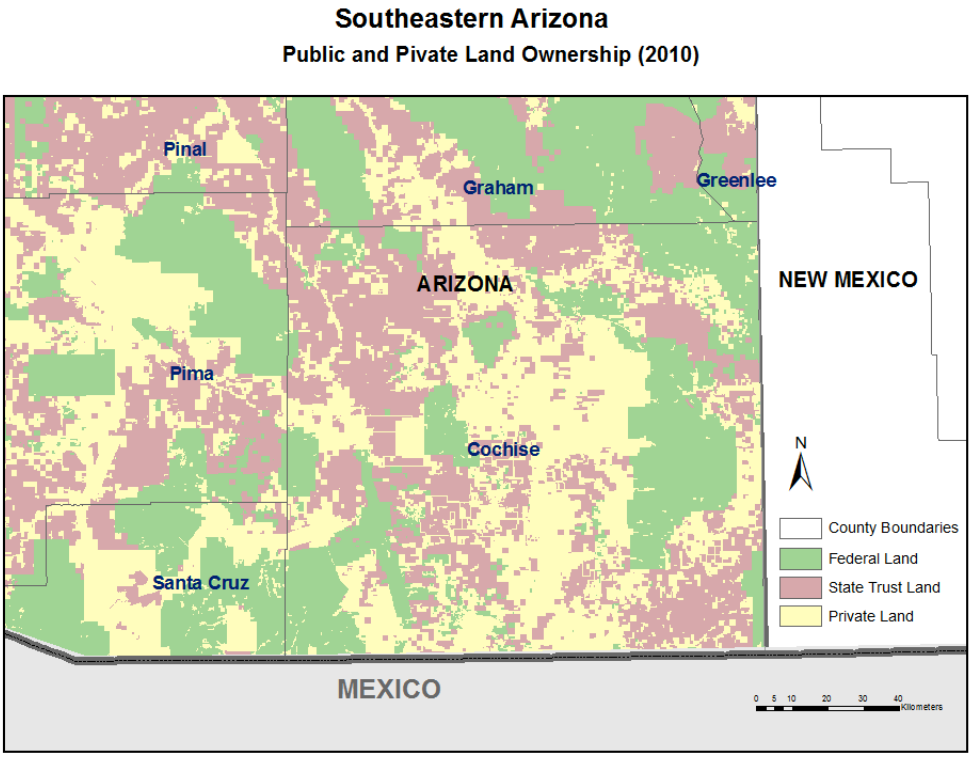
The period between the summers of 2009 and 2010 led to an escalation of violence in the region, most notably the murder of rancher Robert Krentz, resulting in increased media and political attention (Stellar 2010) and President Obama sending in the National Guard (Kelly 2010). We were of course aware of the border in this borderlands region, but were not prepared for its increasingly central role in natural resource management collaboration.

Institutional Analysis

Managers craft institutions, rules, norms, and shared strategies (Ostrom 2005), when creating and changing collaboratives-these collaboratives attempt to solve a diverse array of natural resource management issues (Wondolleck and Yaffee 2000). Prior work has demonstrated the importance of institutions in shaping the incentives for natural resource managers (York et al. 2006; Schoon 2008) and their ability to work across jurisdictional or property ownership boundaries (Schoon and York in press). Using an institutional analysis approach, we identify the relevant actors, issues, and collaborative institutions (Ostrom 2005); we focus on how these institutions and the natural resource managers respond to the border crisis using a social-ecological system approach (Ostrom 2009). During our interviews and participant observation, we collected qualitative information about natural resource managers' activities, perceived challenges and opportunities, and collaborative efforts. We supplement our fieldwork data with archival information from organization and government websites, public hearing transcripts, and relevant literature and publications. Using this information, we identified numerous collaborative groups; in this study we describe and explore the dynamics of the institutional arrangements in the face of the border crisis.

CASE

The southeastern Arizonan borderlands community is an appropriate region for this research because of the extent of collaborative activities, as well as its importance as an ecological hotspot (Specter 2002). Known as the Sky Islands, it is home to over half the bird species found in North America (Felger and Wilson 1994) and the greatest diversity of mammals north of Mexico (Warshall 1995). Recently the jaguar, *Panthera onca*, has been spotted after an absence of almost half a century (Brown and Gonzalez 2000)-the first reports and photographs of the large cat's reappearance in the region came from a rancher, Warner Glenn, who helped to found a collaborative governance organization, the Malpai Borderlands Group (Sayre 2005).



Map 1. Land Ownership in Southeastern Arizona
Map created by Sainan Zhang 2010.

Partially due to the checkerboard pattern of public and private ownership (Map 1), as well as the nature of environmental management issues in the region (principally fire management, biodiversity loss and protection, water scarcity, and fragmentation and loss of open space), natural resource managers established more than twenty formal collaborations and numerous informal arrangements. Such forms of collaboration are increasing throughout the

western USA (Wondolleck and Yaffee 2000; White 2008). Managers traditionally deal with these problems on their own, but as one Arizona forester indicated to us during an interview, "fires don't read parcel maps."

Ranchers are actively involved in collaborative natural resource governance institutions, most notably the Malpai Borderlands Group, but also ranch-level agreements, such as Safe Harbor Agreements for endangered cactus and frogs. These collaborative institutions are linked together creating a complex, multi-level governance social-ecological network with ties between government and private actors, public and private land, and biota, water, and fire that cross management boundaries. Ranchers play important roles within this network, especially because of their management of extensive tracts of public and private land throughout the region. The rancher oriented groups, such as the Malpai Borderlands Group, interface with other collaborative initiatives, such as the Northern Jaguar Project.

Collaborative governance arrangements grew out of a need to tackle complex natural resource management concerns, but this region increasingly faces a different type of disturbance from heightened border activities specifically impacts of immigration, smuggling, and militarization along the US-Mexico border. The emerging changes in the region prompts the overall question of this proposal: how does the major disturbance of increased tensions along the US-Mexico border affect collective action in natural resource management?

Natural Resource Management Actors

Today, many public agencies, including the United States Forest Service (USFS), Bureau Land Management (BLM), State Land Department, State Parks Department, Department of Defense (DOD), the National Park Service (NPS), and United States Fish and Wildlife Service (USFWS) manage vast stretches of land throughout Cochise County. Private landowners lease some of the public land for grazing and farming and own parcels interspersed with public lands. Nongovernmental Organizations like The Nature Conservancy (TNC) and Audubon Society directly manage conservation lands; and both also collaborate on projects with private and public land managers. Some groups, such as the Malpai Borderlands Group, do not manage land directly, rather members come together to discuss and coordinate management issues, such as fire management and biodiversity conservation. The Natural Resource Conservation Service (NRCS) aids farmers and ranchers in their conservation plans-focusing on water conservation, best management practices, and restoration of the range. Associated with NRCS, the Natural

Resource Conservation Districts (NRCD) are government units governed by cooperating landowners who determine priority issues within a district. Thus, NRCS and NRCDs are an important collaboration between private landowners and federal policy and management programs, such as the cost-share program Environmental Quality Incentives Program (EQUIP).

The following organizations are actively involved in environmental, water, and land management collaborations in Cochise County:

United States Forest Service (USFS)	Arizona Parks Department
Bureau of Land Management (BLM)	Arizona Game & Fish
Department of Defense (DOD)	Arizona Land Department
Natural Resource Conservation Service (NRCS)	
United States Fish and Wildlife Service (USFWS)	City of Benson Government
United States National Park Service (NPS)	City of Bisbee Government
United States Geological Society (USGS)	City of Sierra Vista Government
Bureau of Reclamation	Cochise County Government
Department of Homeland Security (DHS)/ Border Patrol (BP)	
Malpai Borderlands Group	Cuenca Los Ojos
The Nature Conservancy	Community Watershed Alliance
Audubon Society	Cascabel Hermitage Association
Sky Island Alliance	International Pollinators Association

Several organizations and public agencies in Mexico are also involved in collaborations that cross the international border, in particular the NGOs Biodiversidad y Desarrollo Armónico (BIDA) and Naturalia.

Collaborative Institutions

Within the county, well established and well studied collaborative groups and projects include the Malpai Borderlands Group and the Upper San Pedro Partnership. The Huachuca Firescape is one of a handful of newer partnerships that is growing rapidly. Other proposed projects include the Gila-Yaqui Corridor that would bring together landowners and agencies in Sonora and Arizona. Some projects are much smaller in area and scope, involving one or two landowners, an NGO, or a public agency, i.e. riparian restoration projects or Safe Harbor Agreements. In contrast, other projects such as the proposed Upper San Pedro Water Board,

would include all property owners within the established district and represents another collective resource management governance arrangement. Another type of governmental district, Natural Resource Conservation District, provides technical assistance to landowners and conducts some collaborative activities. Here are some of the existing, emerging, or proposed projects and collaborations identified by land managers that involve multiple land managers and organizations:

Upper San Pedro Partnership	Upper San Pedro Water District
Middle San Pedro Partnership/Community Watershed Alliance	Gila-Yaqui Partnership
Huachuca Firescape	Malpai Borderlands Group
Chiricahua Firescape	Northern Jaguar Project
Wildlands Network Conservation Plan	Arizona Partners for Fish & Wildlife
Cascabel Working Group	International Pollinators Initiative

All of these collaborative institutions affect ranching either directly or indirectly or include ranchers. The Chiricahua Firescape includes ranchers surrounding the Chiricahuas; they participate in fire planning with foresters and range conservation officers from the US Forest Service, park biologists from National Park Service, and officers with the State Land Department. The Norther Jaguar Project includes several ranchers who are interested in protecting open space and maintaining wildlife corridors essential for the elusive and rare jaguar. The Gila-Yaqui Partnership is currently in planning stages, but is led by ranchers who are concerned about riparian restoration. These collaborative institutions seek to solve complex natural resource management issues; ranchers are an integral part of these efforts.

NATURAL RESOURCE MANAGEMENT ISSUES

Over the past two years, during our conservations with natural resource managers, we discussed problems facing collaborative groups and projects and those that land and environmental managers individually confronted. Based on our discussions with managers several major challenges repeatedly emerged: exurbanization, fire, competing water demands and the need for riparian restoration, and threats to biodiversity. These challenges are particularly important for ranchers seeking to eek out a livelihood and be stewards of the range. Most of the collaborative institutions are directed at these four major, complex issues.

Exurbanization

One of the chief threats identified by respondents was exurbanization and associated land fragmentation. Increasing exurbanization throughout Cochise County has caused concern regarding fragmentation of habitat, breaking up the range, increased water demand with more domestic wells, and increased traffic on county roads. In Cochise County, like most rural areas in the USA, historically collaboration was a part of life; you worked with neighbors to provide public services, construct roads, maintain schools, and manage natural events such as flooding and fire. Informal neighborliness continues, although exurbanites moving into rural western landscapes have different priorities and sense of what being a good neighbor entails, i.e. not allowing cattle to get on to their "lawn." Numerous respondents, especially local officials, were frustrated by ranchette owners who purchase 20 acres in remote locations and then expect city services. Through lobbying, or becoming the "squeaky wheel," these landowners obtain services like road improvements with the cost borne either by the entire jurisdiction or imposed on the neighboring landowners. Exurbanization also leads to increased water demand, fragmentation of wildlife habitat, and loss of farm and rangeland. Exurbanization on former ranch and farmland is difficult to address, particularly as farmers and ranchers face narrow profit margins, while land values for development are high. Additionally, the next generation of farmers and ranchers frequently cannot afford to purchase a farm or ranch because of land prices based on development potential. Because of the economic downturn exurbanization has slowed, but it remains a concern in the county. Conservation easements are one of the tools used to reduce exurbanization, and numerous groups and individuals hold easements in Cochise County. MBG and TNC have worked to establish priority areas for reduction of fragmentation and range loss seeking funds to establish easements on vulnerable lands. Easements are not the only collaborations associated with exurbanization; we learned about two other efforts in northwestern Cochise. Individuals came together to lobby against a road improvement project near Cascabel and subdivision development near Benson. These groups attempted to manage exurbanization through access, in the case of the Cascabel road, and directly through denial of subdivision and home construction permits near Benson. These projects are attempts to define communities and the future of the landscape. Exurbanization is a difficult issue without a simple solution because of demand for ranchettes for retirees, commuters to regional cities, and second homes and the narrow margins for agriculture in the region, yet almost all of the

respondents expressed concern about fragmentation and a desire to maintain open spaces, wildlife habitat, and preserve traditional livelihoods.

Fire

Cooperation surrounding fire has a long history in Cochise County and much of the west, although the relatively recent shift toward managed burns was initially controversial and fraught with conflict. There are three formal collaborative projects that work on fire issues in Cochise County – the Malpai Borderlands Group, the Huachuca Firescape Plan, and the Chiricahua Firescape Plan. MBG involves federal, state, NGOs, and private ranchers in developing burn plans for southeastern Cochise County and southwestern Hidalgo County, New Mexico. The impetus for the creation of MGB began over conflict surrounding fire management between ranchers and public officials in the 1990s (Sayre 2005). The Huachuca Firescape is a newer collaboration with agreements between a smaller number of larger landholders including Audubon, TNC, USFS, NPS, and Fort Huachuca. The Chiricahua Firescape Plan brings together BLM, USFS, NPS, State Land, and private ranchers. The Firescape includes prescribed burns, as well as strategies for controlled burns that begin naturally. Agreements between local government and USFS are found throughout the county in order to protect communities and exurban development at the growing urban/wildland interface. According to a forester with USFS the MBG fire plan revolutionized fire management in the region creating a new approach incorporating multiple stakeholders and management objectives in a single, flexible document. The ability to collaboratively manage fire is increasingly difficult; numerous officials expressed frustration over growing exurbanization (see above) and the difficulty in managing burns and inability to conduct prescribed burns that would improve the ecosystem because of primary missions to protect property and communities.

Water

In Cochise County, access to water historically was a development constraint. Settlement largely centered on rivers such as the San Pedro until technology allowed construction of deep agricultural and domestic wells. In the past half century there has been increased recognition of the direct connection between surface and groundwater, particularly the impact of groundwater pumping on stream flow (cite). County rivers continue to provide irrigation water, as well as vital habitat for wildlife. The San Pedro is an important ecological hotspot serving as a major thoroughfare for numerous migratory bird species. It is also home to

the endangered Huachuca Water Umbel, which resulted in great controversy and then collaboration, through the Upper San Pedro Partnership, to reduce groundwater overdraft and maintain in-stream flows. The Upper San Pedro Partnership brings together a diverse group of private and public entities, at all levels of government, to manage the river and help maintain adequate water levels. The USPP also has cooperative water monitoring agreements with Mexican NGOs and government agencies. Although USPP is an important collaborative group in the county, perhaps the largest and most diverse group, it is not the only collaborative working on water issues. The efforts on the San Pedro directly affect ranching in Santa Cruz County-numerous, critical easements were purchased on the famous Babacomari Ranch just west of the Chiricahuas to protect the region from further residential development and groundwater pumping and improve instream flows on the Babacomari River, a tributary of the San Pedro. In Benson, several efforts are underway to form an like the USPP to manage the Middle San Pedro-currently the Community Watershed Alliance is the major actor on the Middle San Pedro.,

A large effort is also underway to create an international partnership to manage the Gila-Yaqui watershed including landowners, ranchers, NGOs, and government agencies (particularly Mexican federal environmental agencies). Similar water projects near the Willcox Playa are in the planning stages that would bring together diverse residential, commercial, environmental, and agricultural interests, particularly farmers and birders, in Central Cochise County. There are numerous collaborative efforts with individual mangers to restore streambeds and riparian areas throughout the county, many led by the NGO Cuenca Los Ojos. In these water collaboratives, some individuals expressed frustration with government involvement, either mandates such as those associated with the San Pedro, or inflexibility of state regulatory agencies when landowners attempt to restore riparian areas, whereas, others want stronger government involvement, particularly regarding domestic well construction. There is no single collaborative solution for water management in Cochise County; rather managers have created a diverse array of collaborations to deal with different aspects of the issues from riparian restoration that directly improves range conditions and groundwater recharge to efforts to decrease groundwater pumping and improve instream flows. Given the reliance of ranching on groundwater for stock tanks and riparian restoration for improved stream flows and range conditions, ranchers are actively involved in leading many of these initiatives or through voluntary participation in restoration projects throughout the county.

Threats to Biodiversity

The ecological hotspots found throughout Cochise County create numerous opportunities and challenges for area natural resource managers. Managers attempt to maintain habitat for wildlife and access to water. Safe Harbor agreements for endangered frogs, bats, fish, and plants bring together state and federal agencies on a particular landowners' property. Several ranchers not only sought agreements on their properties, but also made the USFWS aware of the existence of endangered and threatened species on their properties. Audubon Society and TNC are also involved in numerous biodiversity efforts on private property owned by the NGOs or individual landowners. NPS has worked with International Pollinators and USFWS on bat habitat in Coronado National Memorial. Some of the larger collaboratives, such as Malpai Borderlands Group and the Upper San Pedro Partnership, also include biodiversity goals and projects within their activities. The Northern Jaguar Project works to maintain habitat for the jaguar on public and private land, as well as to provide education to the community. USFWS partners with NGOs and private landholders to protect the Chiricahua leopard frog, Sonoran tiger salamander, and other endangered species. The Sky Island Alliance through the Wildlands Network Project has proposed extensive wildlife corridors overlaying public and private lands in an effort to establish priorities for agencies and communities, as well as areas to target biodiversity projects. The rich biodiversity of the region is well recognized by all managers, yet there are disagreements about the most successful means to reduce threats to the biodiversity. Some private landowners are concerned about projects that may restrict their ability to maintain livelihoods, given past perceptions of USFWS endangered species habitat requirements. While a minority perspective, NGOs are concerned about the effectiveness of cooperative agreements on private lands. Regardless of these differences in viewpoints, all managers are concerned about loss of biodiversity, especially as it interfaced with exurbanization and fragmentation of habitat. Within the ranching community, there are mixed views about biodiversity protection, particularly the potential restrictions associated with the Endangered Species Act, yet numerous ranchers have become involved and even led collaborative efforts to protect biodiversity. For some a belief about protecting the wildness of the western range and all its biota, even in the face of losses from predators or restrictions from the government, was central to their perspective as stewards of the land. Other ranchers were skeptical of the motivations of environmental organizations involved in biodiversity protection, although the long term commitment of main

stream groups, such as The Nature Conservancy, and building trust with the USFWS field officers has increased willingness of many ranchers to enter biodiversity collaborative institutions.

Ranchers fit within a complex collaborative governance network. Whether the ranchers are leading efforts, participating, or affected by the outcomes, their role as stewards and mangers of vast tracts of land was recognized by everyone we spoke with. Beginning in the last few decades, ranchers have created and joined collaborative institutions that strive to deal with exurbanization, fire, water, and biodiversity. These efforts to maintain the range now encounter a new challenge-the border.

BORDERLANDS CHALLENGE

Of course, the border with Mexico has been feature of this landscape since the Gadsden Purchase made the region part of the USA. But, until World War I, the US border with Mexico was largely unregulated and monitored with the exception of restricting Chinese immigration since the 1882 Chinese Exclusion Act (Nevins 2002). While the first immigration bills passed after World War I decreased the numbers of eastern and southern Europeans allowed into the US, Mexican immigration was allowed to proceed with no regulation (Magaña 2003). Two primary arguments were used, which have resurfaced in modern debate. First) Mexicans were perceived as only desiring seasonal work, so were not considered likely applicants for citizenship. Second) Mexicans were needed for agricultural labor (Meeks 2007). During the Great Depression the first national wave of anti-Mexican sentiment washed over the country associated with economic devastation (Meeks 2007). During World War II, a period of economic growth and an increased demand for labor led to the creation of the Bracero Program and massive seasonal immigration (Nevins 2002). A shift began in the post-war period where Mexican immigrants began to move to cities and take industrial positions in greater numbers while the relative importance of agricultural industries waned. During the Regan administration an Amnesty program enabled many Mexican immigrants to become legal and begin the citizenship process (Magaña 2003).

Beginning in the 1990s during the Clinton administration, militarization of the border began. This militarization was intended to shift migration traffic away from urban centers to rural areas (Nevins 2002). The basic concept was immigration would slow once immigrants faced the harsh desert high country of Arizona and New Mexico. During the economic boom of

the 1990s, migratory traffic maintained pre-militarization levels and may have even increased. As a result, the number of deaths in the desert began to sky rocket (Doty 2009).

Since September 11th, the focus has once again turned to the US-Mexico border. A growing number of private "border patrol" groups have sprung up seeking to enforce immigration policy, but many, if not most, also have political agendas associated with maintaining an "American culture" and way of life that they believe is threatened by the increasing number of ethnically Hispanic and Spanish speaking immigrants (Doty 2009). With a growing concern over security on the border, George W. Bush's administration waived environmental policies, known as the Chertoff Waiver, to enable the expedient construction of a border road and wall/fence. In recent years, Mexican gangs and cartels have increased their control over human immigration corridors coupling this with their drug smuggling efforts. The threat of violence on the Mexican side of the border has threatened to spill over into the US-causing distress and concern.

There are numerous ways that the border has affected the environment and the natural resource management community, which we will describe in greater detail in the section below. These include the impact of increased traffic over ecologically sensitive landscapes, the increased militarization of border patrol and backlash from smuggler cartels, a fragile sense of community for local residents, and tense relationships between governmental agencies, environmental organizations, and community members.

Natural Resource Managers' Perceptions of "The Border"

Today, due to the US's policy of pushing undocumented migration from the urban centers of San Diego and El Paso, and even from the smaller urban border towns, migration largely occurs in rural corridors on extensive tracts of public land and across isolated ranches. Undocumented immigrants attempt to skirt patrolling BP and BP checkpoints, which are located on state and federal highways approximately twenty miles north of the border. US border policy has focused attention on increased field officers, intensified technology, and most controversially, the construction of the border fence/wall and road. Because of the complexity of this issue and the nuance with which land mangers discussed the sub-topics, we categorized border impacts into four topics – building the fence, militarization of the border, cartelization of drug and human smuggling, and increased levels of migration. In the following subsections, we

describe managers' perception of the indirect and direct impacts on their land management activities and collaborations.

Fence/wall

The human and vehicle barriers, stretching for miles along the border in this region, have perhaps created more division within Arizona than between the two nation-states. The miles of fencing and border roads, constructed to increase the difficulty for crossing migrants, fragments habitat, increases obstacles for crossings of threatened and endangered species, and shapes public opinion on both sides of the border. Additionally, conflict between BP and the federal land and natural resource agencies has intensified in part due to the wall/fence. Because of the Chertoff waiver, the Department of Homeland Security and BP proceeded to construct the wall with limited input from FWS. National Environmental Protection Act (NEPA) policies were waived in order to speed construction. These waivers fundamentally changed the relationships between individuals on the ground in the federal and state land agencies and field officers with BP. According to our participants this new "wall" between agencies was due to the lack of respect that many BP officers now have for land managers within the agencies (and outside the agencies, too). Federal agencies with mandates for multiple land use (BLM), preservation of natural heritage (NPS), protection of biodiversity (FWS), and use of forests and land (FS) are often at odds with BP policies. Recently, Border Patrol and Homeland Security began mending these relationships through mediation and environmental mitigation. But it is unclear whether this message resonates with the field officers in BP or land managers.

Many respondents talked about the "failure" of the border road, which travels parallel to the fence with little regard for topography. The road frequently washes out (something long-time ranchers warned the Army Corps Engineers about), so in 2010 the government began placing costly concrete footing in the washes, yet Border Patrol still does not utilize the road. In fact, several ranchers claimed that the border road has in fact become a corridor for smugglers who previously had to drive across desert, but now have a maintained and unpatrolled road to use. During ranch visits, we were shown locations at almost every mile on the border road where the vehicle barriers have been taken down and repaired by the smugglers in an attempt to cover their tracks. Once the smugglers make it through the vehicle barriers then smugglers use the border road to access ranch roads reducing the need and difficulty of traveling cross country.

Likewise numerous and diverse private landowners and NGOs expressed reservations regarding the expense and usefulness of the fence/wall, as well as the environmental costs. Some of these individuals have worked together to voice objections over the fence/wall and border road either in small meetings with engineers or publicly through letters of formal protest and lobbying. Ranchers loudly voiced objections to the fence and wall construction during our conversations, but also during Congressional testimony in the wake of Robert Krentz's murder. In their eyes, putting up fence and constructing a road does not slow smuggling or migration. If one wants to slow the stem of illegal crossings, in the view of most of our respondents increased monitoring is required not a barrier, but perhaps more fundamentally the system should change to reduce the demand for drugs (potentially through legalization) and increase the ability of migrants to cross legally and safely through ports of entry instead of the remote range.

Militarization

Respondents recognize, and have experienced, the challenges of "increased boots on the ground" on the range. The militarization of the border, referring to the increased field officers and shifting priorities of BP, also caused a number of concerns such as the "green" officers driving all terrain vehicles (ATVs) and trucks across the fragile range and desert when in pursuit of migrants and more frustratingly, according to the managers, officers driving ATVs all over the land even when not in pursuit. Private landowners, especially ranchers, attempt to work with BP, but many noted their frustration with the continual rotation of field officers resulting in never-ending conversations about closing gates and remaining on roads when possible.

Because of the increased traffic associated with militarization, and failure of the BP to use the road expressly created for them, road maintenance on ranch roads and minor county roads is a major expense putting additional burdens on nearby landowners and the county. Likewise, the missions of the land management agencies and BP are quite different, but because of the militarization of the border and the increased drug cartel presence (see next section) management agencies are shifting their focus from preservation, conservation, and multiple uses to security and protection of visitors, officers, and leasees.

Drug and Human Smuggling

Respondents discussed migration in this region in the past fifteen years versus historic migration. In the past fifteen years, an increase in migration associated with the tightening of the borders near major urban centers of El Paso and San Diego has pushed migration into the

deserts of Arizona. Increased patrolling near the smaller urban areas in Santa Cruz and Cochise County shifted migration into narrow corridors of public land, especially Arizona State Trust Land, US National Forests, and private ranchland. Historically, migration in this region was either "mom and pop" crossings of isolated family units or crossings of day-laborers and migrant laborers from Sonora walking to nearby farming communities within Cochise County. The historic level of undocumented migration was low and seemingly an issue of little consequence to landowners and managers. Today, Cochise County is a major thoroughfare for undocumented migration, which occurs on rural corridors, especially the foothills and mountains of the Huachuca and Chiricahua Mountains. The narrow corridors are controlled by smugglers with ties to the drug cartels leading to increases in vandalism and more aggressive encounters on rural properties and open country. Today, field officers in the Forest Service, Bureau of Land Management, and Park Service are required to take armed law enforcement officers with them when working on isolated public lands. Because of the threat of encounters with armed smugglers and the increased pressure to work with BP on border security, public land managers have shifted personnel to law enforcement resulting in increased reliance on private support or volunteers to accomplish the day-to-day land management activities of the agency. Private landowners and NGOs also expressed concern about the increased number of armed individuals, but generally did not have resources to increase security or hire personnel to work specifically on security concerns. There was general agreement among managers that the nature of migration traffic has shifted throughout the county. This tragically was illustrated by the murder of rancher Robert Krentz, an active collaborator within the governance network. The murder still is unsolved, but the general view is that Krentz encountered a smuggler while traveling in a remote area on his ranch. Krentz's friends and family believe that he believed the individual was in distress, based on his brief radio conversation with his brother. Thus, Krentz approached the man unarmed and unprepared for violence, which tragically took his life and that of his beloved ranch dog. Ranchers who live in isolated areas throughout the county are increasingly concerned about their safety and the viability of ranching, which requires individuals to work alone in remote areas, in the wake of increased cartel violence in Mexico and the tragic Krentz murder.

Increased Migration

Although, migrants increasingly cross the Arizonan desert with coyotes linked to drug cartels, the natural resource managers talked about migrants as a different, albeit interrelated,

dimension of the border issue. As mentioned previously, since the Clinton Administration's policy of fencing and policing the urban areas in Texas and California, the flow of migration has largely shifted to rural areas in Arizona. This shift in migration has led to trash accumulation, the development of a network of illegal or unsanctioned trails, and deaths of hundreds of migrants on public and private lands. Migrants discard water bottles, clothing, and garbage along well worn trails creating public health hazards, hazards for livestock, and environmental hazards. In an effort to access clean water migrants damage stock tanks, generators, and pumps resulting in equipment loss, as well as loss of water and declines in livestock health. Managers told us about the thousands of backpacks, water bottles, and food cans that are littered across the landscape. Numerous groups organized trash pickups on public and private land, but much of the burden has been on individual managers. Unplanned trail systems increase soil erosion in a fragile ecosystem. The extreme temperatures, arid conditions, and the need to move surreptitiously have led to the death of the underprepared, the unfit, and the unlucky. Almost every rancher had horrific encounters with migrants that died on their land and most had offered water, food, and medicine to migrants in distress, yet most expressed a growing wariness because of the increased involvement of cartels in migration.

Border Issues Summary

Not all respondents shared the views above regarding the border, although this was the general picture presented during our fieldwork. Among land mangers there is some disagreement about the relative level of environmental costs associated with migration itself or the accompanying militarization. It is clear that both issues create a burden on the local ecosystem. Border security places a heavy burden on public and private land mangers affecting safety and resources for environmental, water, and land management. Some new collaborations between BP and land managers associated with security, trash removal, and brush clearance have emerged, but it is unclear whether these collaborations will continue or change, especially given the shifting perception of security on the border, increased law enforcement focus of all public agencies, and the growing burden on all public and private land managers. Most land managers expressed frustration in their attempts to work with BP; some agencies described improved relations on issues such as law enforcement or an ability to bring together divergent missions to accomplish land management tasks, such as USFS efforts with BP to conduct brush clearance

and controlled burns. Other managers indicated deterioration in collaboration and mutual respect after the Chertoff Waiver.

BORDER IMPACTS ON COLLABORATIVE INSTITUTIONS

Exurbanization

In some ways concerns about the border may be slowing exurbanization, at least of ranch and farmland close to the border, as outsiders fears of the border increase with the recent news coverage. The costs for conservation easements have dropped because of the economic decline and property value declining because of the border, but the distressed economy has made it difficult to raise money to purchase easements. The effort by Sky Island Alliance to establish a Wildlands Network also may be waning because of concerns over the border, specifically some ranchers are concerned about the viability of ranching the wake of border violence and are less willing to participate in this new effort. Overall most natural resource managers, and specifically ranchers, believed that exurbanization was decreasing in importance because of the border crisis coupled with the current economic crisis.

Fire Management

As mentioned earlier, the USFS has found some opportunities to collaborate with BP on fire management. BP uses security justifications (improved line of sight) for brush clearance and prescribed burns while FS is able to obtain much needed resources for its primary objectives. The priority areas for prescribed burns with Homeland Security dollars may not be the same as those identified by USFS, but they may be able to shift resources toward priority areas with the influx of money associated with the security burns and brush clearance. This direct effect was positive, but managers also were concerned about the increased migrant traffic in rural corridors and an inability to make sure that migrants were safely outside prescribed burn areas. There is also growing concern about fires that are intentionally set by migrants or smugglers to deter and distract Border Patrol.

Water Projects

One of the biggest challenges facing water conservation stems from the transboundary nature of both groundwater and surface flows. Border issues have made transboundary partnerships quite fragile. The recent passage of Arizona State Bill 1070 have made many Mexican NGOs and private landowners reluctant to engage across the border. These challenges directly affect programs such as the USGS transboundary aquifer project which attempts to map

the aquifer and work towards sustainable water consumption. Groundwater usage on either side of the border draws down the aquifer in a conical pattern on both sides of the border. With respect to surface water, both the San Pedro and Santa Cruz are transboundary rivers which ultimately require cross-border coordination. In Cochise County, the flow of the San Pedro River is particularly tenuous and is the governing variable in habitat preservation of the Huachuca water umbel, which led to the formation of the Upper San Pedro Partnership. However, the success of this domestic partnership all relies on the northern flow of the river from its source in Mexico.

Biodiversity Conservation

One of the biggest impacts of the wall with respect to biodiversity conservation comes from its ability to completely stop North-South animal migration. This has been particularly contentious in the debate over potential endangered species protection for the jaguar and whether the area directly north of the border should be viewed as historic habitat for the jaguar. Many other species are affected in their migratory and seasonal movements, including honeybees, black bears, and several sub-tropical bird species.

FUTURE DIRECTIONS

In order to understand the responses of the social-ecological governance network to the border crisis, we need to systematically gather data about the actors and structure of the network. The adaptive capacity of a social-ecological system is partially dependent on the underlying social relationships and the social network structure, particularly leadership, information flow through a network, and trust (Walker et al. 2006). The ability of a community to collectively act and solve environmental dilemmas has been linked to a balance of bonding and bridging relationships (Bodin et al. 2006; Crona and Bodin 2006); bonding relationships tie people of similar backgrounds together and can facilitate trust (Granovetter 1973; Coleman 1990) and increase information flow (Weimann 1982), but without bridging ties the diversity of information is limited (Oh et al. 2004, Bodin and Norberg 2005; Crona and Bodin 2006). When confronted with disturbances and new problems, this balance of relationships may facilitate collective action and increases the diversity of solutions to complex problems (Crowe 2007, Walker et al 2006).

As Westley (1997) and Schneider et al. (2003) point out, interorganizational collaborative arrangements leading to the creation of supraorganizations (Gray 1989; Trist 1983) are common

in the natural resource policy arena. These types of collaboratives present a multi-level network with ties between organizations and individuals, yet even among formal organizations informal, sometimes temporary agreements are quite common. Westley (1997) argues that within the formalized collaboratives individual characteristics such as entrepreneurship and leadership are critical for creating and maintaining relationships. Thus in order to understand the adaptive capacity of collaboration we must investigate both the individual and organizational ties. In proposed research, we plan to collect actor and organization level data to evaluate the central and bonding individuals and organizations within the network-those people whose position enables them to share information, broker agreements, and potentially facilitate collective action (Bodin et al. 2006). This provides the opportunity for systematic exploration of the impacts of disturbances on governance networks within a social-ecological system.

CONCLUSION

Land, environmental, and water managers have created an impressive range of collaborations to deal with important natural resource management issues in Cochise County. Range issues and ranchers are central to these collaborative activities in governance network. Although we met managers with diverse backgrounds, missions, and resources, we found a remarkable degree of agreement surrounding definition of "the problems" in the county. Within the network of natural resource managers, debate over the border threatens collaborative efforts that were already tenuous-such as those between private landowners, environmental NGOs, and governmental agencies. Among managers there is disagreement about the relative level of environmental costs associated with migration, such as trash and illegal trails, or the accompanying militarization, which includes more vehicles on fragile desert landscapes. Most managers expressed frustration in their attempts to work with Border Patrol; some agencies described improved relations on issues such as law enforcement or an ability to bring together divergent missions, while more frequently managers discussed concern regarding deterioration of collaborative activities with Border Patrol and decreased mutual respect after the Chertoff Waiver expedited construction of the border fence and road. The border has affected all natural resource managers in the region, as well as their ability to solve environmental problems.

Besides the contribution to the natural resource management and collective action, our work also informs the national and regional border dialogue in two ways: first it evaluates the impact of rural communities and their efforts to solve environmental issues through

collaboration. Second, our work evaluates the perception of a diverse group of individuals: private landowners, NGOs, and government officials on the border crisis. Unlike the black and white rhetoric on the news, people affected in the border region construct a complex, multidimensional view of "the border". Each of these dimensions affects collaborative natural resource management, the environment, managers' day-to-day operations, and the community. Managers recognize that there are no simple solutions, but rather the challenge is multi-level, systematic, and complex, which stands in stark contrast to the simple policy recommendations and rhetoric featured daily within the region and across the country.. Connecting the process of militarization with natural resource management expands our understanding of militarization on the southern border, and provides an example that may be instructive for studies of nature conservation in other border contexts around the world.

Understanding the diverse and unique collaborations of Cochise County also helps us understand how to overcome collective action problems to solve pressing social and ecological problems. It provides information about how governance networks withstand challenges. Based on interviews from ranchers, landowners, public agency representatives, and non-governmental officials and archival sources, we conclude that in the cases where there already were well established relationships and trust ties have strengthened during this period of increased stress. In contrast, relationships between diverse interests that are newly established seem to be more tenuous in the face of the crisis. The relationships between the federal land management agencies and Border Patrol have broken down because of environmental waivers and lack of respect for environmental issues. Within this natural resource management network, ranchers are some of the most directly impacted by the border crisis. Some ranchers' views have shifted after experiencing the tragic loss of a friend and fellow rancher, most strikingly increased support for militarization efforts between 2009 and 2010. Yet in contrast to the rhetoric on the national news, most ranchers involved in the governance network advocate for immigration reform and oppose fence and road construction, which are positions aligned with other diverse interests and stakeholders in the region. Rangeland collaboration on natural resource management issues will surely persist in the face of the border crisis, yet it is clear that ongoing militarization, smuggling, and migration may alter the institutional arrangements and the ability of ranchers, environmentalists, and government agencies to collectively act.

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