
Protected Area Mosaics and Cooperative Ecosystem-Based Land-Use and Conservation Planning: Four Case Studies in the U.S. West

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Abstract

Protected area mosaics and related ecosystem-based planning are analyzed in a preliminary way for the Great Sand Dunes, the El Malpais, the San Pedro and Las Cienegas areas in Colorado, New Mexico and Arizona. These case studies show how different types of protected areas are fitted together by various government agencies and non-government organizations to protect water, wildlife, grasslands, riparian woodlands and other natural resources and habitats and also to meet land-use demands in the semi-arid and arid southwest of the United States. A broad protected area mosaic and ecosystem-based planning and management approach seems to be less competitive and conflicting and more effective and equitable than previous approaches which stressed the role of single agencies. More research on the use and effects of protected area mosaics is needed to verify these initial findings.

Keywords: *protected area mosaics, US west, collaborative ecosystem based planning and management*

Research Context

Interest in more comprehensive and cooperative planning has been growing globally since the 1980's for a number of reasons. These include the introduction of new theory and method in landscape ecology, conservation biology, interactive, adaptive and collaborative planning and management, land-use analysis and other relevant fields (Nelson, *et al.*, 2003). These advances make it possible to apply protected area systems, such as the basic

framework of the World Conservation Union, in an adaptive and interrelated manner. In particular, the advances have stimulated more thought about using a range of protected area types to link conservation needs with land-use patterns in areas with highly valued natural resources or environments. In particular, the advances have facilitated the creation of interrelated mosaics or “packages” of different types of protected areas. The array of protected areas is matched with varying ecosystem characteristics and land-use activities in an area of conservation interest. Careful use of the array can work to protect many valued natural features and processes while also dealing with demands for land use and socio-economic opportunities in such an area.

The resulting packages of protected areas are frequently managed by different federal, state and local government agencies which can work together in a variety of informal to formal ways. The packages can also be the arena for various kinds of supportive public and private stewardship. The methods here include: senior or local government zoning and land-use regulations; tax and other incentives for conservation on private lands; land purchase and resale; land swaps, land trusts; transfer of development rights and private ownership of conservation lands, for example by The Nature Conservancy (TNC). Overall, the development of different types of protected areas – as part of a supportive and cooperative land use and conservation planning process – contrasts with previous often competitive and exclusive planning approaches.

Four Case Studies: The Great Sand Dunes, El Malpais, San Pedro and Las Cienegas

In this broad context, the objective is to present results of a preliminary comparison of four ecosystem based cooperative land use and conservation planning initiatives involving the development of protected area mosaics or “packages” in the western US. The four initiatives are the Sand Dunes National Monument and Preserve in the San Luis Valley of southern Colorado, the El Malpais National Monument and National Conservation Area in central New Mexico, the San Pedro National Riparian Conservation Area and Las Cienegas National Conservation Area in southern Arizona (Figure 1). The study involved one to several weeks of field research in each area during the last decade. These efforts included reconnaissance field research, collection and analysis of an array of public and private reports and other documents, and open ended discussions with staff and other knowledgeable people in the four case study areas. Two previous reports have been published on the San Pedro and Sand Dunes cases respectively (Nelson, 2003a, 2003b).

Enough information has now been obtained on all four cases to be able to paint a general picture of the development of the protected area mosaics and associated ecosystem-based, cooperative land-use and conservation planning. All the cases involve some cooperation among government and private groups. They are basically exercises in public and private stewardship. Many details about them do, however, remain to be determined, for example, in relation to specific planning processes.

The Geographical and Planning Context

The historic tendency has generally been for one type of protected area to be applied to a conservation challenge under the direction of a legally and/or administratively responsible government agency. The decision to give the job primarily or solely to one agency and protected area type often caused disagreement and conflict among contending agencies and protected area types. This competitive approach contrasts with the cooperation underlying the creation of protected area mosaics and related ecosystem-based land-use and conservation planning.

Examples of the major federal protected area types, their general purposes, and the responsible agencies involved in the four case studies are set forth below. These types are more specific than, but generally correspond with, the World Conservation Union Protected Area Management categories (Table 1).

Figure 1. Location of case studies: The Great Sand Dunes, El Malpais, San Pedro and Las Cienegas.

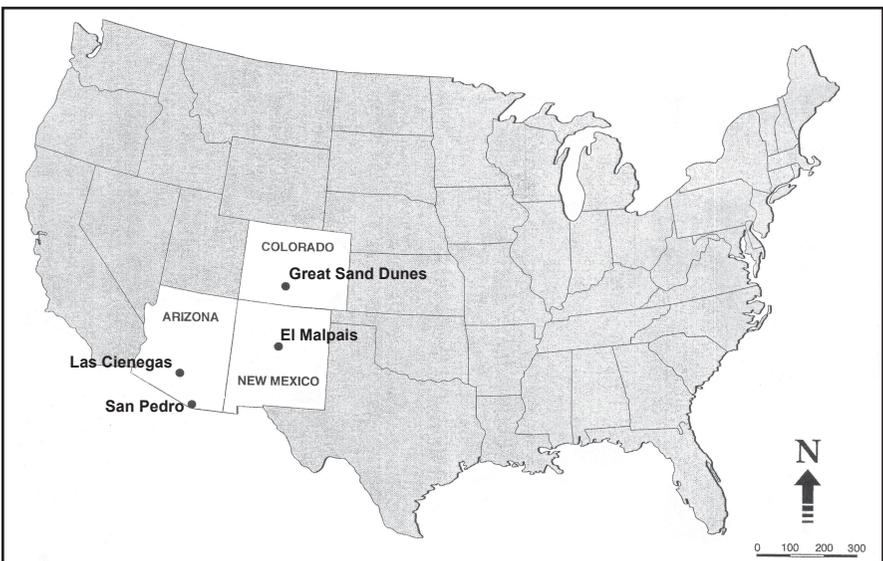


Table 1. IUCN Protected Area Management Categories (McNeely 1994).

Category I Strict Nature Reserve/Wilderness Area:

- areas of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features, and/or species
- large areas of unmodified or slightly modified land, and/or sea, which retain their natural character and influence
- primarily areas for scientific research and/or environmental monitoring
- areas without permanent or significant habitation
- protected and managed to preserve their natural condition

Category II National Park:

- areas managed mainly for ecosystem conservation and recreation
- areas designated to:
 - protect the ecological integrity of one or more ecosystems over the long term
 - exclude exploitation or incompatible occupation
 - provide a foundation for spiritual, scientific, education, recreational, and visitor opportunities, all of which must be environmentally and culturally compatible

Category III National Monument:

- areas managed mainly for conservation of specific features
- areas containing one or more specific natural or natural/cultural features which are of outstanding or unique value because of their inherent rarity, representative, or aesthetic qualities or cultural significance

Category IV Habitat/Species Management Area:

- areas managed mainly for conservation through management intervention
- areas of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species

Category V Protected Landscape/Seascape:

- areas managed mainly for landscape/seascape conservation and recreation
- areas of land, with coasts and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, cultural, and/or ecological value, and often with high biodiversity
- protection, maintenance, and evolution of the area requires conserving the integrity of the traditional interaction between people and nature

Category VI Managed Resource Area:

- areas managed mainly for the sustainable use of natural ecosystems
- areas containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biodiversity while providing for a sustainable flow of natural products and services to meet community needs

For example, a US National Preserve can be compared to a Habitat/Species Management Area and a National Conservation Area (NCA) to a Managed Resource Area although the distinctions are not always precise.

- National Monuments involve a very high level of protection of the geological, biological, archaeological or other features for which they are established under the US National Park Service. The Monuments are similar to National Parks which do, however, have a wider commitment to protect entire ecosystems and are generally considerably larger than Monuments. Both Monuments and National Parks are intended to provide recreation and education opportunities to the public.
- National Preserves may provide a high level of overall ecosystem protection. According to *The National Parks: Index 2001-1003*, they are intended primarily for the protection of specific resources. Activities such as hunting, fishing or the extraction of minerals and fuels may be permitted if they do not “jeopardize natural values” (US Department of Interior National Park Service, n.d). They are the responsibility of the US National Park Service.
- National Conservation Areas (NCA) are a more recent type of protected area that emerged in the 1980s. They are intended to protect critical ecosystems in areas of conservation interest while allowing for grazing, hunting, and other uses on a sustainable basis, guided by a management plan directed by the US Bureau of Land Management (BLM).
- US Wildlife Refuges are intended to conserve water and habitat for waterfowl and other animals while allowing for some uses such as grazing and hunting on a sustainable basis under the direction of the US Wildlife Service.
- Wilderness is a protected area type that provides for a very high level of ecosystem protection in areas intended to remain “largely untrammelled by humans”. Some grazing or other uses can be allowed on an environmentally sustainable basis especially where they predate the creation of the federal 1960's *Wilderness Areas Act*. Wilderness Areas can be set up and managed on appropriate lands and waters owned by an array of federal agencies such as the Forest Service (FS), the National Park Service (NPS), the Fish and Wildlife Service (FWS), and the Bureau of Land Management (BLM).

The US decision to allow Wilderness Areas to be set up by a number of major agencies, rather than one prime manager, has undoubtedly lessened interagency competition and led to the creation of more Wilderness Areas than would have otherwise been the case. The US *Endangered Species Act* also applies to all public lands as well as much private land in the US.

It is worth noting at this point that Canada and other countries have fewer federally protected area types than the US. Canada, for example, lacks National Monuments, which in the US often serve as the lynch-pin for protected area mosaics and broad ecosystem-based planning. An effort to set up comparable National Landmarks in Canada was set aside in the 1980s. Canada also lacks a strong Forest Service comparable to the US at the federal level, this being a responsibility of the provinces.

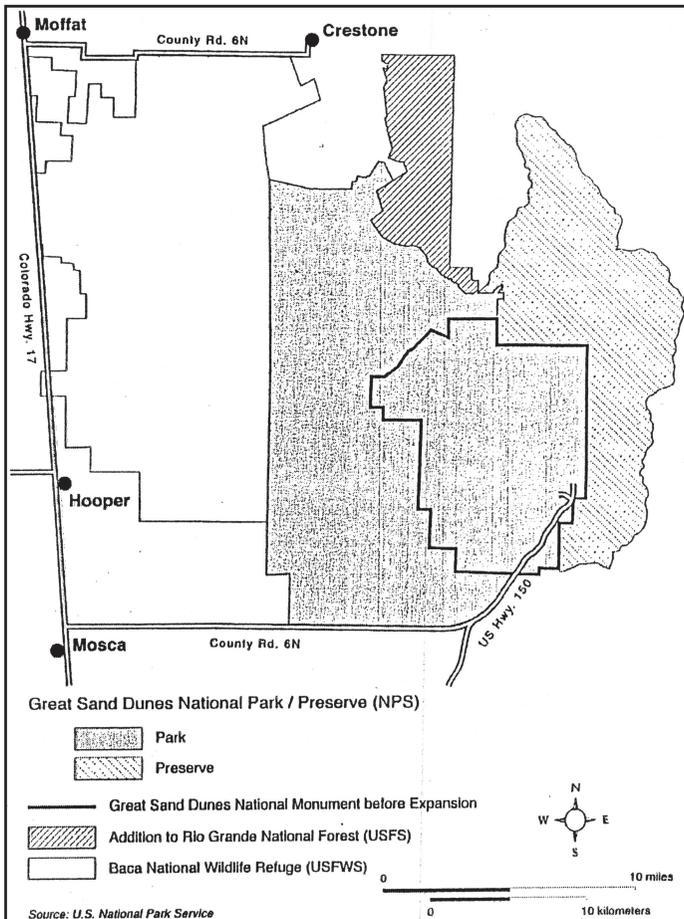
Canada also does not have a federal agency comparable to the BLM since the Canadian government surrendered the bulk of undesignated public lands to the provinces about 1930. The situation with respect to undesignated public or Crown land at the provincial level in Canada needs further research. Endangered species legislation now applies to National Parks and other Crown lands in Canada. The status of such legislation or policy at provincial levels is beyond the scope of this paper.

State governments in the US often provide for protected area types that are generally similar to those at the federal level. Examples are State Parks and Wildlife Refuges. However, these areas tend to be generally smaller than their federal counterparts and more oriented to recreation, tourism, hunting, grazing and other uses. Municipal governments can provide for protection of floodplain, wetland and other habitats in the US although these systems are generally not known to have legislation and policies comparable to those at the municipal, conservation authority and provincial level in Ontario.

Analysis

Figures 2, 3, 4 and 5 show the protected areas and related public and private conservation arrangements applying to the four case study areas. The following are among the generalizations that apply to all study areas:

- All the protected area mosaics are built around National Monuments and/or National Conservation Areas.
- Each is located in a semi-arid or arid area with annual average precipitation below 15" and with high evapotranspiration rates.
- Each is located amid an array of vegetation and habitat types usually including desert grasses and scrub, savannah, juniper, oak and pine woodlands and in mountainous areas ponderosa pine, Douglas fir, spruce, and other forests.
- All the areas exceed 100 square miles in area but vary in shape from the linear San Pedro Riparian National Conservation Area through the uneven El Malpais to the rectangular Great Sand Dunes and Las

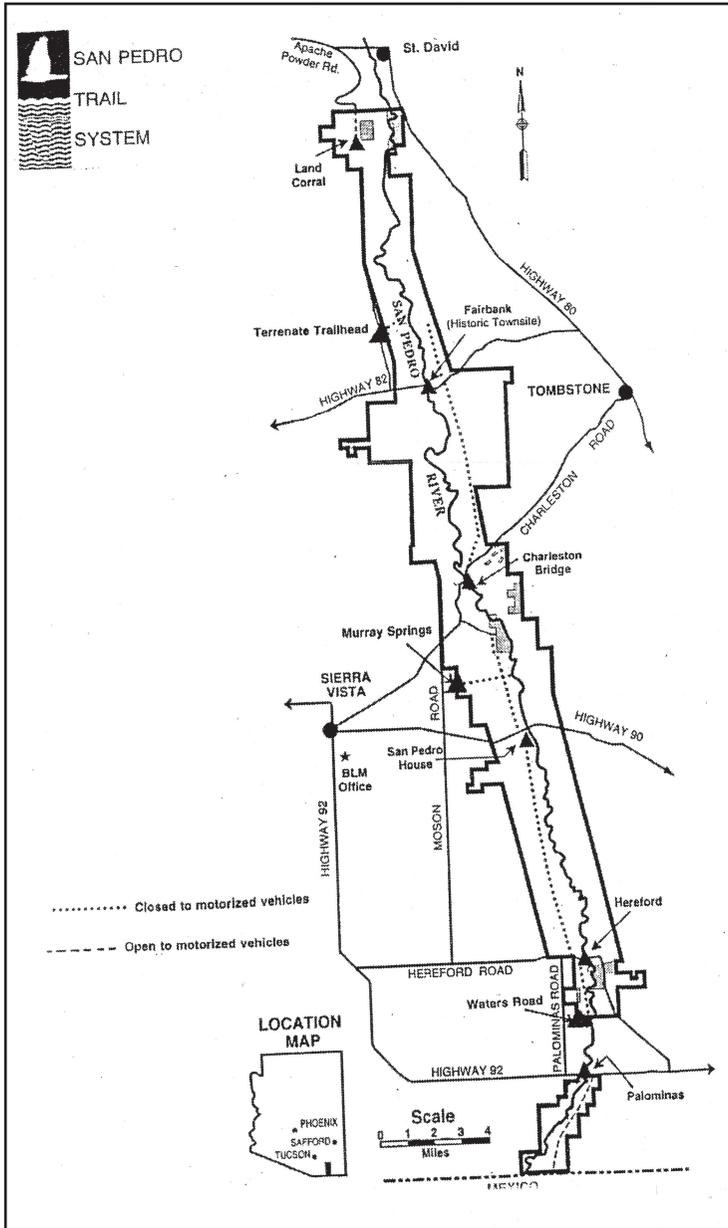
Figure 2. Great Sand Dunes National Park.

Cienegas areas. Accessibility tends to be easiest and management more difficult in the small and more irregular areas, the San Pedro and El Malpais. Accessibility and management of the Las Cienegas is also challenging because of the recency of the creation of the protected area arrangements and the proliferation of old ranching roads.

- All the areas are subject to a wide range of historic land uses including mining, grazing and agriculture, water extraction, transport and commercial corridors, hunting, fishing, camping, hiking, biking, all terrain vehicles, and other recreation and tourism. The number and intensity of these uses varies among the four areas and is influenced by the stage of development of the protected area package and associated land-use and conservation planning.
- Each of the four areas has a range of ecosystems, species, rock types

and landforms, water, archaeological, historic, scenic and other features that give them high conservation value. The salience of these features varies. The Great Sand Dunes are valued highly for their unique landforms, the El Malpais for extensive basalts and other recent volcanic deposits, the San Pedro for riparian forest which has

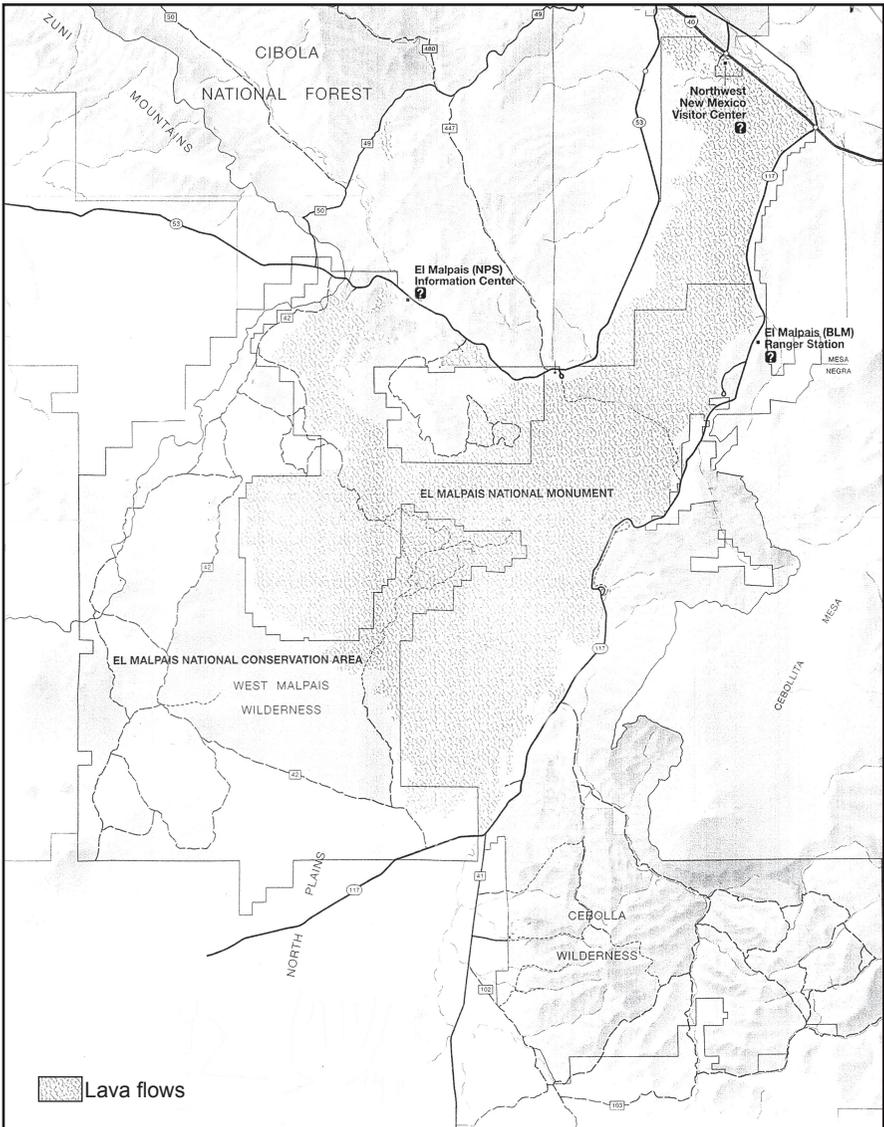
Figure 3. San Pedro Riparian National Conservation Area



been destroyed or heavily damaged in most other valleys in the US Southwest, and Las Cienegas for its extensive natural grasslands, and the historic great Empire Ranch (US Department of Interior Bureau of Land Management, 2002).

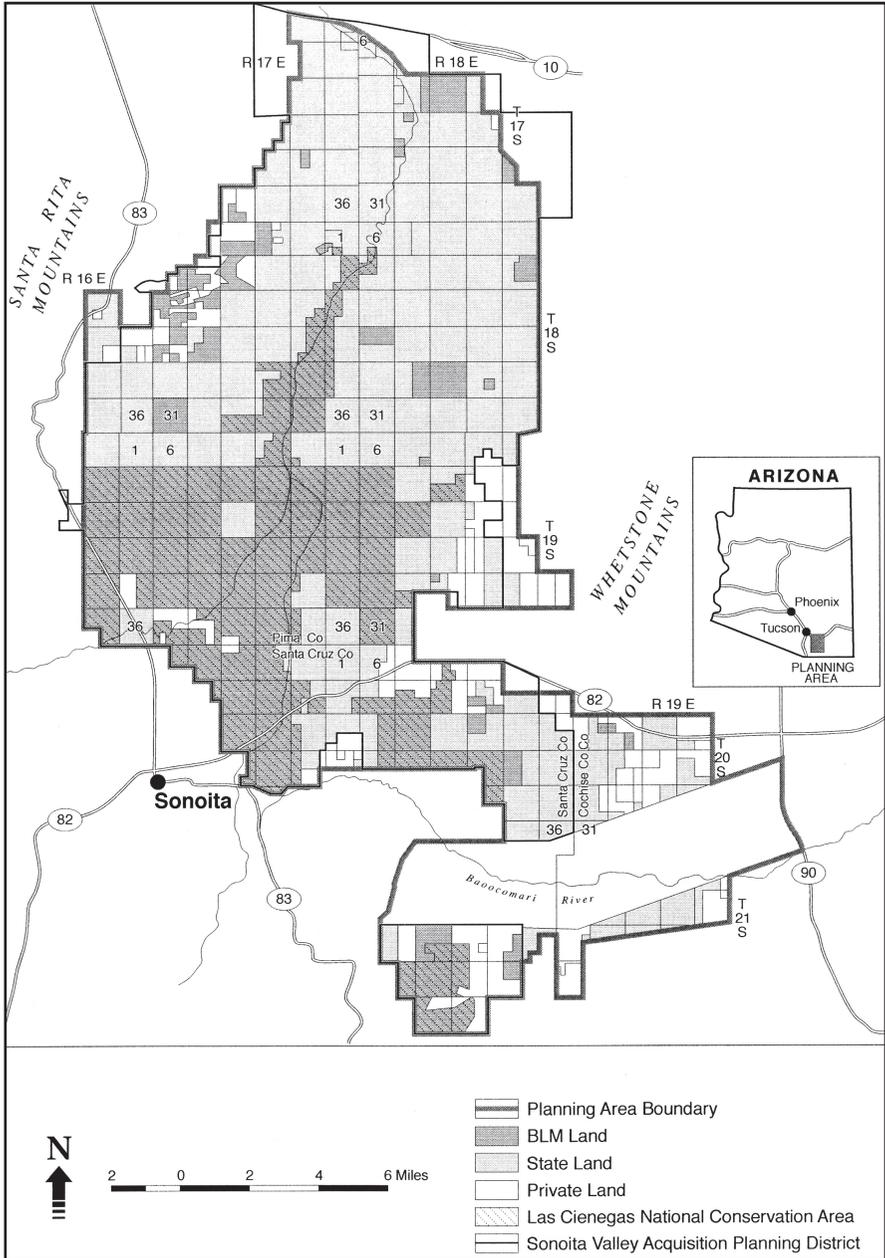
- All four case study areas are also valued as sources of high quality water. In at least three cases water has been a prime reason for the creation of the current protected areas and associated private stewardship arrangements. Water is important for two main reasons

Figure 4. El Malpais National Conservation Area.



in the Great Sand Dunes. Drought and increasing water consumption in surrounding lands have been drying out and destabilizing the dunes. Large scale proposals for the mining of groundwater in surrounding lands for shipment across the Rockies to Denver and the eastern slope

Figure 5. Las Cienegas planning area with overlay of land disposition.



Service Wilderness Area. The private Nature Conservancy also owns and manages thousands of acres of adjacent land for conservation of elk, deer, and waterfowl. Within the last year or so the US Congress has created a National Park which involves the Monument and adjoining areas but the details are not known to me.

- The El Malpais consists of a National Monument and a National Conservation Area. Both were set up at about the same time by the NPS and BLM in the mid 1990s. The El Malpais NCA includes a Wilderness Area and abuts on the Cibolla Wilderness Area on National Forest land as well as an Indian Reservation. Las Cienegas is a NCA under the control of the BLM. A study is underway to determine if part of these lands should become a Wilderness Area. This would be controlled by BLM but require a higher level of conservation than the rest of the NCA. The San Pedro is one of a small number of Riparian Conservation Areas in the US. BLM is the manager, although agencies such as the US Geological Survey are heavily involved in groundwater research in support of BLM and other cooperating agencies, including local, municipal, and NGO groups. The State has been cooperating in selling or swapping land with BLM for the NCA. Private owners have also sold or swapped land with BLM for similar purposes. In this respect, Las Cienegas NCA basically came about because of the opportunity for a sale and land exchange between private owners of the large Empire Ranch and BLM.

It is not possible to go into more detail about the four case studies at this time. Most of the basic philosophical, theoretical and planning ideas and principles have been dealt with generally. Further research is needed on the details of planning. How do the various federal, state, and local governments and private groups work together? Cooperation among the National Monument and other agencies and groups often seems to be mainly through managers.

In the San Pedro case, a formal advisory committee was created by BLM at the time of establishment of the NCA. Cooperation has moved to the sharing or collaborative level in that a few agencies contribute funding in support of all group activities. BLM is one of the major financial contributors along with the US Geological Survey, the Sierra Vista municipality, and one or two others. Some NGO and other organizations participate on the basis of interest and without making a direct financial contribution. The work of the advisory committee and related groups has led to the formation of the upper San Pedro Partnership. This is a consortium of twenty local, state, federal,

NGO and private organizations whose goal is meeting the long-term water needs of area residents and the San Pedro Riparian National Conservation Area. Among the most important tasks of the partnership are: developing a “working” conservation plan; reducing water consumption; reclaiming used water; augmenting existing water resources; and finding ways to collaborate with Mexico, which owns the head-waters of the San Pedro River (Upper San Pedro Partnership, n.d.)

The working arrangements are not so well understood for the El Malpais. Las Cienegas arrangements seem to have grown out of cooperative planning efforts among BLM, local government and private groups. A special planning area was set up through cooperative work by BLM and local groups prior to the creation of Las Cienegas NCA. The arrangements include a regular local forum for exchange of views and a cooperative planning group. New organizations can join if they wish.

In all four cases, research is a fundamental part of planning, management and decision making, although to a greater extent in some cases than others. Both the Great Sand Dunes and San Pedro have longstanding and wide ranging research programs, with considerable focus on water as well as controlled burns, beaver reintroduction and other manifestations of active management. (See for example, Schenk, 1999.)

Conclusion

Much can be learned from the cases discussed here, about the role of protected area mosaics in ecosystem based cooperative land-use and conservation planning. More research is needed on the details of planning, especially in comparison with similar approaches in Canada. Large scale efforts at linked protected area and regional planning have been undertaken in British Columbia and Ontario, for example, in the northern Rockies and Ontario’s Boreal forest.

The four cases suggest that the US approach has something to offer Canadians in terms of multi-level planning among different government and private organizations. Of particular interest here is the federal role in facilitating cooperative approaches through establishment of relatively small National Monuments and NCAs. Private groups such as The Nature Conservancy have state-wide plans for protected areas and other conservation initiatives. Within this general plan, the Conservancy prepares local plans for sites such as the Great Sand Dunes.

Another item of considerable interest in the US is the difference in the decision-making system in comparison to Canada. Each of the four case studies in this paper involved specific legislation or policy arrangements. Overall the process seems to be much more local and political than in Canada. No systems plan or other general technical screening is known to have been applied to the San Pedro, El Malpais, Las Cienegas or the Great Sand Dunes. Linked NGO and local, state and national support seems to have been a major force behind the creation of these four protected area mosaics.

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