Ecoregional Conservation Analysis of the Arizona - New Mexico Mountains

Arizona - New Mexico Mountains
Ecoregional Conservation Team
The Nature Conservancy

August 1999

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EXECUTIVE SUMMARY
Arizona / New Mexico Mountains Ecoregion Conservation Analysis

The goal of the Arizona / New Mexico Mountains Ecoregional Analysis was to assemble a "portfolio" of conservation sites which, if managed in a manner compatible with biodiversity needs, would ensure the protection of the entire suite of plants, animals, and natural communities of the ecoregion. This analysis was part of The Nature Conservancy's ongoing conservation efforts to develop portfolios for each of the 63 ecoregions in the 48 contiguous United States.

Ecoregions are large, contiguous units of land and water defined by ecological and environmental, not geopolitical, boundaries. The natural boundaries are usually distinguished by similarity in climate, vegetation, soil, geology, and topography. The Conservancy's system of U.S. ecoregions is based on work by Robert Bailey (1995) of the U.S. Forest Service, but modified slightly by the Conservancy for its purposes.

The Arizona / New Mexico Mountains Ecoregional Analysis effort was coordinated by the Conservancy's New Mexico Field Office. The core planning team included eight staff representing the Western Regional Office (WRO), New Mexico Natural Heritage Program (NMNHP), the Arizona Field Office (AZFO), the Arizona Heritage Data Management System (AZHDMS), and the Navajo Nation Natural Heritage Program (NNNHP). The planning effort involved more than 20 Conservancy and Heritage Program personnel.

The Ecoregion encompasses the highlands of eastern Arizona and western and central New Mexico. Much of the land in the ecoregion is under federal ownership, especially by the U.S. Forest Service. Also included with the boundaries are portions of the nations of the White Mountain Apaches, the Mescalero Apaches, the Navajos, and the Zunis.

The ecoregion is one of the ecological treasure troves of the U.S., containing more species of birds and mammals than any other ecoregion in the Southwest. Natural communities typical of the ecoregion are Ponderosa Pine and White Fir forest types above 5,500 feet and piñon pine / juniper savannas at lower elevations, although the ecoregion also includes grasslands, and shrublands. The mountains contain the headwaters for a number of important streams and rivers including the Little Colorado, the Gila, the Mimbres, and the Verde. Ecologically, the ecoregion is an area of big trees. The ecoregion contains more species of birds and mammals than any other place in the southwest. This landscape is home to more than 200 rare plants and animals, more than 30 of them listed as endangered or threatened by the federal or state governments.

The framework of our analysis was traditional Heritage data combined with observations and unpublished data from regional scientists and managers considered experts in their fields. Experts Workshops, in which these scientists and managers came together to identify and nominate potential high priority conservation sites, were a central feature of the portfolio assembly process. Two workshops were held; in Albuquerque in April 1997 and in Flagstaff in June 1997. The two workshops attracted a total of over 100 scientists, including representatives from all of the major land management and administration agencies in the southwest, as well as biologists from a number of regional universities. Experts nominated a total of 248 overlapping sites covering over 40% of the ecoregion. These sites, matched with target occurrences, formed the basis for the final site selection process.

Portfolio assembly was based upon globally imperiled species and subspecies, species that are endemic to the ecoregion, additional species that are declining and are representative of, or peripheral to, the ecoregion, and rare, restricted, or declining natural communities or habitat types of the. In addition the portfolio was designed to include a outstanding examples of all natural communities known to occur within the ecoregion.

To assemble the portfolio we used these conservation targets, including species and natural communities, to identify and select important conservation sites. We required that all selected occurrences of these targets have high conservation quality and viability and, when possible, we selected occurrences which were already on lands that had some level of conservation protection (e.g. nature preserves, refuges, wilderness areas, multiple-use public lands). Sites were required to have high densities of target occurrences. Portfolio assembly combined human input with advanced computer technologies. Our conservation planning team established target and site-selection criteria and gathered data from various databases, experts workshops, agencies and other sources. Computer algorithms were ultimately used to analyze data and select sites. Our goal was a final portfolio that maximized protection of targets and included sufficient examples of all natural communities, while actually minimizing the number of sites and the number of acres in the portfolio.

The final Conservation Portfolio for the Arizona - New Mexico Mountains Ecoregion consists of 52 sites; 37 wholly within New Mexico, 13 wholly within Arizona, and two sites that sit on the border of the two states. The sites within the portfolio range from small, occurrence-specific areas of a few hectares, such as hot springs, to extensive landscape sites of more than half a million acres. However, the actual conservation site boundaries, and thus the area, for any site have yet to be determined through the site conservation planning process. The portfolio captures 3314 occurrences of 376 targets on approximately 7.54 million acres, or about 24% of the land area of the ecoregion. However, since the boundaries of the sites selected are very preliminary, the area of the portfolio is cursory at best.

Most portfolio sites are made up principally of public lands - mostly of National Forest Service lands. Although 42.4% of the ecoregion is federal land, 63.5% of the portfolio is federal ownership, 83% of which is US Forest Service. While more than 34% of the ecoregion is in private ownership, only 14.8% of the final portfolio is privately owned. In other words, the final portfolio had 50% more federal land and about half the private land than would have been expected based upon the proportion of ownerships in the ecoregion. There are two factors that might have contributed to this federal lands bias. First, federal lands tend to be managed for multiple uses, including biodiversity protection, and therefore should be expected to contain more (and better) examples of occurrences of targets. Second, the selection process used land ownership status as a tie-breaker which would tend to favor federal lands over private lands by virtue of their management priority. Yet, despite this strong bias, virtually all sites contain some private lands, often in the form of inholdings within the National Forests boundaries. On the other hand, with the exception of data provided by the Navajo Nation, there is little available data on target occurrences on tribal lands. This has obviously led to a lack of sites on tribal lands in the final portfolio. Again, it is important to emphasize that the site boundaries identified in this first iteration of the portfolio are very preliminary, and the estimates of the areal extent of these sites are very rough. Further analysis is required to determine both the final boundaries for each of the portfolio sites and to develop strategies for conservation action within this diverse set of landscapes and ownerships.

The portfolio is not intended to be a simple list of biologically important sites, but a blueprint for conservation success on those sites as well. To this end an analysis of the major potential stresses on biodiversity at each of sites in the final portfolio was carried out by surveying the scientists and land managers who participated in the experts workshops. The ability of targets to persist on a site is compromised by two types of stress; site-specific stresses (e.g. habitat loss, highway construction, and other local activities) and broad-scale "ecoregional" sources of stress (e.g. altered fire regimes, inappropriate livestock grazing, and changes in regional patterns of human development). The most severe stresses (or sources of stress) were identified for each site, and patterns of stress across the ecoregion were noted. These stress patterns can be used to develop strategies for dealing with broad-scale stresses at the ecoregional, state, or even national levels.

We fully recognize that many areas within the ecoregional portfolio of sites will require site-specific conservation actions by a broad array of organizations and individuals. These types of site-specific actions might include acquisition of conservation easements, changing the management system of selected grazing allotments, element or process-based monitoring programs, ecological restoration, riparian area fencing, or cooperation with private land stewardship efforts.

In this particular ecoregion, as in many of those in the western U.S., conservation success will depend on close cooperation between public land management agencies and private partners. As previously mentioned, roughly 66% of the ecoregion consists of public or tribal lands. In the final portfolio, 85.2% of the selected sites are on public lands, with 63.5% in federal ownership. These sites were selected with strong participation from public agency personnel through the experts workshops, and development and implementation of conservation strategies for many of the sites will require similar involvement or support for planning, management and monitoring.

Involvement of private landowners will also be critical to success. Although private lands represent a small portion of the final portfolio, activities on public lands carried out by private landowners ranks as a high source of stress on selected sites. In particular, historic and current inappropriate grazing practices register as a source of stress in 90% of all sites in the portfolio. Inappropriate grazing also affects other sources of stress, such as altered hydrologic regime (e.g. creation of water-catchment tanks), altered fire regime (e.g. removal of fine fuels such as grasses and herbs), and exotic plants (e.g. introduction of exotic weeds through contaminated feed or through movement of livestock).

The portfolio is not a list of biological "hotspots" that serve as a list of potential projects but, rather, a total package solution for conservation of the biodiversity of this ecoregion. Furthermore, the portfolio depends upon its landscape context within a matrix of largely unfragmented lands for its long-term integrity and survival. The portfolio must not be regarded as a means to mitigate for further fragmentation and degradation of the surrounding matrix lands. Their continued integrity is necessary, and better management of these larger landscapes is encouraged, in order to increase the value and ecological surety provided by the portfolio.

INTRODUCTION AND BACKGROUND

Ecoregional Conservation was initiated by The Nature Conservancy in 1996 based on guidelines for a large-scale and ecologically-based approach to setting conservation goals outlined in A Geography of Hope (1997). The Arizona - New Mexico Mountains Ecoregional Analysis is one of the first ecoregional projects to turn these guidelines into conservation action.

Ecoregions are large, contiguous units of land and water defined by ecological and environmental, not geopolitical, boundaries. The natural boundaries are usually distinguished by similarity in climate, vegetation, soil, geology, and topography. The Conservancy's system of U.S. ecoregions is based on work by Robert Bailey (1995) of the U.S. Forest Service, but modified slightly by the Conservancy for its purposes.

The Arizona - New Mexico Mountains ecoregion is largely within public ownership, and is biologically one of the richest areas on the continent. There are myriad challenges to conservation within the ecoregion; a history of poor land management, altered hydrological and fire regimes, and anti-environmental conflict. Conservation success in this ecoregion clearly requires a broad, inclusive, and cooperative approach – a toolbox of conservation actions. Ecoregional conservation provides an opportunity to characterize the biological resources of the Arizona - New Mexico Mountains, outline the suite of sites necessary to protect these resources, and formulate a set of solutions, or management options, that have the greatest probability of ensuring success.

The goal of ecoregional conservation is the protection of all viable species and natural communities within the ecoregion. Within this ecoregion this clearly requires a suite of strategies and a partnership among land management entities – including government agencies, private conservation organizations, and private land owners and managers. The biodiversity of this ecoregion is too complex and too dispersed for all of the responsibility to fall to any one entity. As a result, what follows must necessarily be viewed, not as the Conservancy's portfolio, but as everyone's portfolio of sites for the Arizona – New Mexico Mountains Ecoregion. It may be regarded as a prescription for conservation action across the breadth of the ecoregion that offers the best hope for success in protecting the area's biodiversity.

The goals of the Ecoregional Analysis were:

1. To identify a means of representing the biodiversity of the ecoregion for analysis and site selection by building a list of target species, natural communities, and surrogates.

2. To identify a suite of sites, the "first credible iteration" that, collectively, would ensure the long-term survival of all viable species and natural communities within the ecoregion if they were managed appropriately.

3. To identify the stresses and threats that are impediments to the successful management and long-term survival of those targets, and

4. To develop a set of management options for land managers to address stresses and threats, on a site-by-site and an ecoregion-wide basis, in order to ensure the long-term survival of the targets and the suite of biodiversity that they represent.

ECOREGIONAL OVERVIEW

The Arizona / New Mexico Mountains Ecoregion encompasses the highlands of eastern Arizona and western and central New Mexico (Figure 1). The ecoregion covers some 46,800 square miles (29,952,000 acres) stretching from Flagstaff, Arizona, to Albuquerque, New Mexico, and south and southwest to near Carlsbad, New Mexico, and Guadalupe Mountains National Park, Texas. More than 78% of the area of the ecoregion is in New Mexico, 20% in Arizona, and about 1% is in Texas.

TABLE 1. State Representation Within the Arizona / New Mexico Mountains Ecoregion

State	Area (mi^2)	Area (acres)	% Ecoregion	% State
New Mexico	36,848	23,582,464	78.73	30.3
Arizona	9,439	6,040,719	20.17	8.3
Texas	514	328,800	1.1	0.2

Physiographic Setting

The ecoregion is based upon the oldest mountains in the southwest, containing Precambrian igneous rocks as old as 1.5 billion years. These older volcanics are overlain with more recent sediments (including important fossil deposits from the Jurassic and Triassic) and volcanics (including volcanic flows and calderas from as recently as 600 years ago). The result is an extremely diverse physiographic region with elevations ranging from about 5,000 to more than 10,000 feet above sea level. One of the most prominent features of the region is the Mogollon (Mug-ee-yawn) Rim, which stretches almost 200 miles from Flagstaff, Arizona to near Silver City, New Mexico. The rim defines the southern edge of much of the ecoregion (Figure 2).

Land Ownership

Much of the land in the ecoregion is under federal ownership, especially the U.S. Forest Service. Approximately 30% of the ecoregion is managed by the Forest Service within the jurisdiction of seven National Forests: Kaibab, Coconino, Tonto, Apache-Sitgreaves (A-S), Gila, Cibola, and Lincoln. Smaller, but still significant, proportions of the ecoregion are also owned by the Bureau of Land Management and the states of Arizona and New Mexico. Also included within the boundaries are portions of the nations of the White Mountain Apaches, the Mescalero Apaches, the Navajos, the Zunis, and the Acoma, Laguna, Cañoncito, Isleta, Jemez, Zia, San Felipe, Santo Domingo, and Sandia Pueblos (Figure 3).

Figure 1. Ecoregions of the Southwestern United States and Northern Mexico

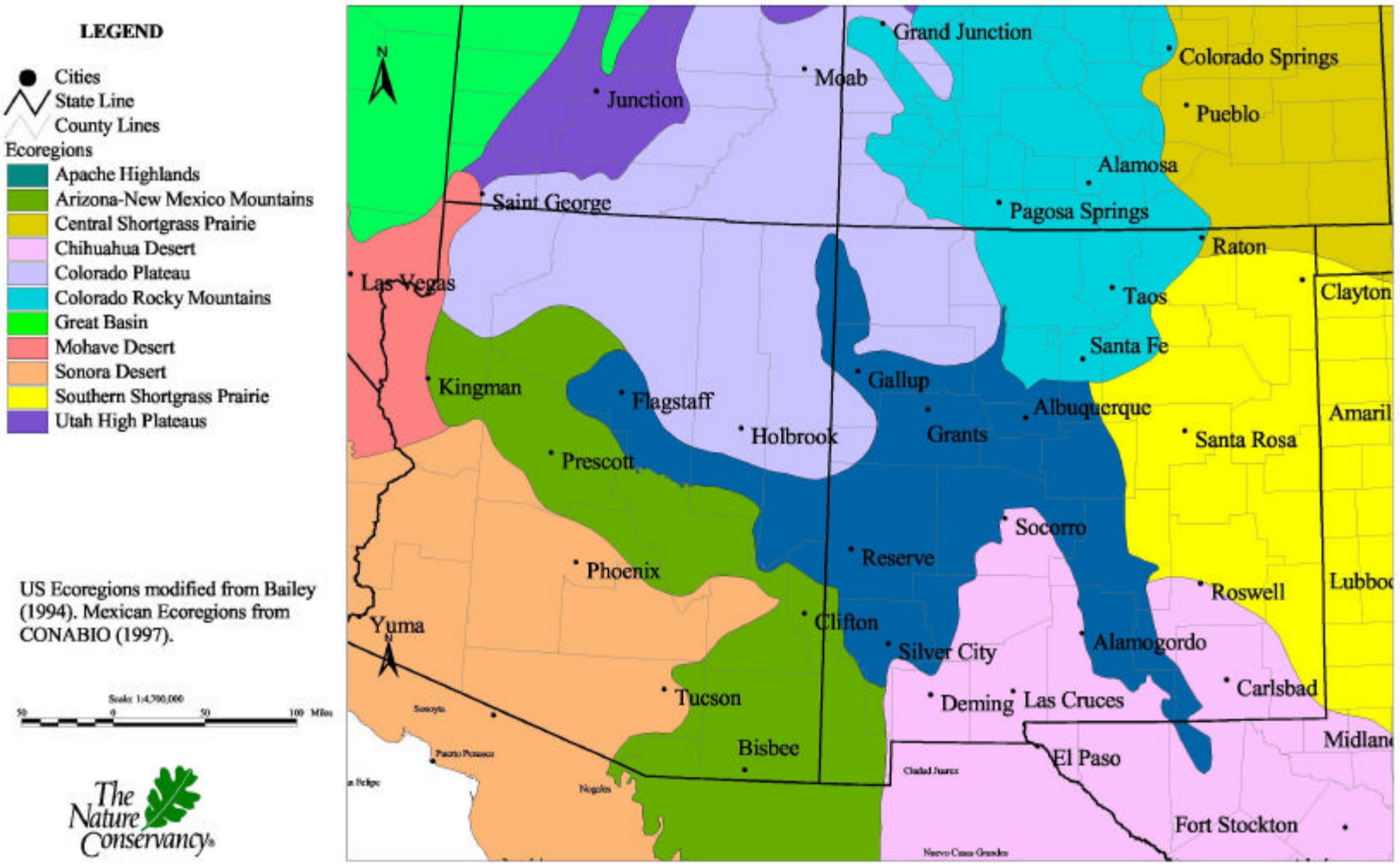


Figure 2. Arizona / New Mexico Mountains Ecoregion - Topography

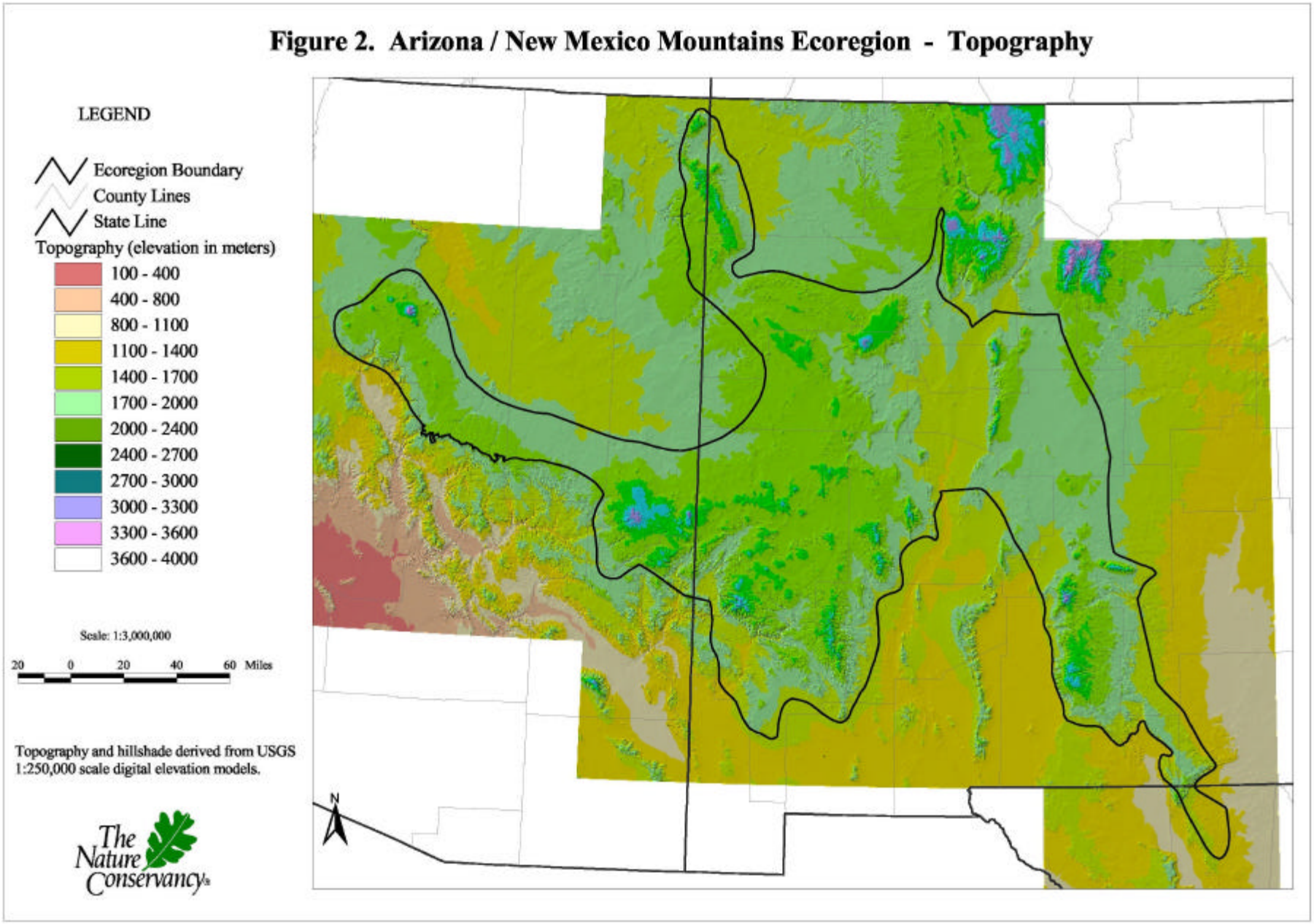


Figure 3. Arizona / New Mexico Mountains Ecoregion Land Ownership Status

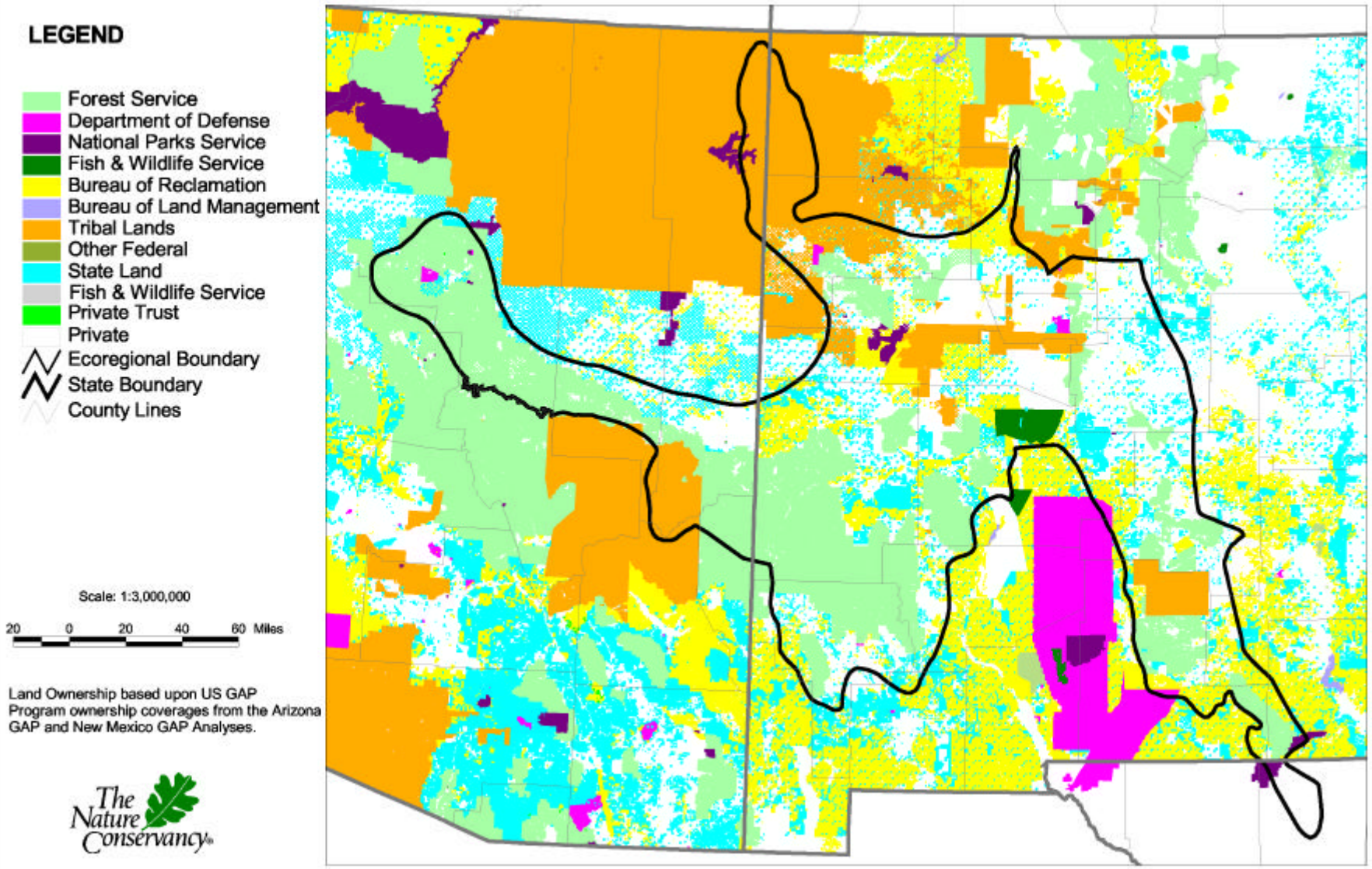
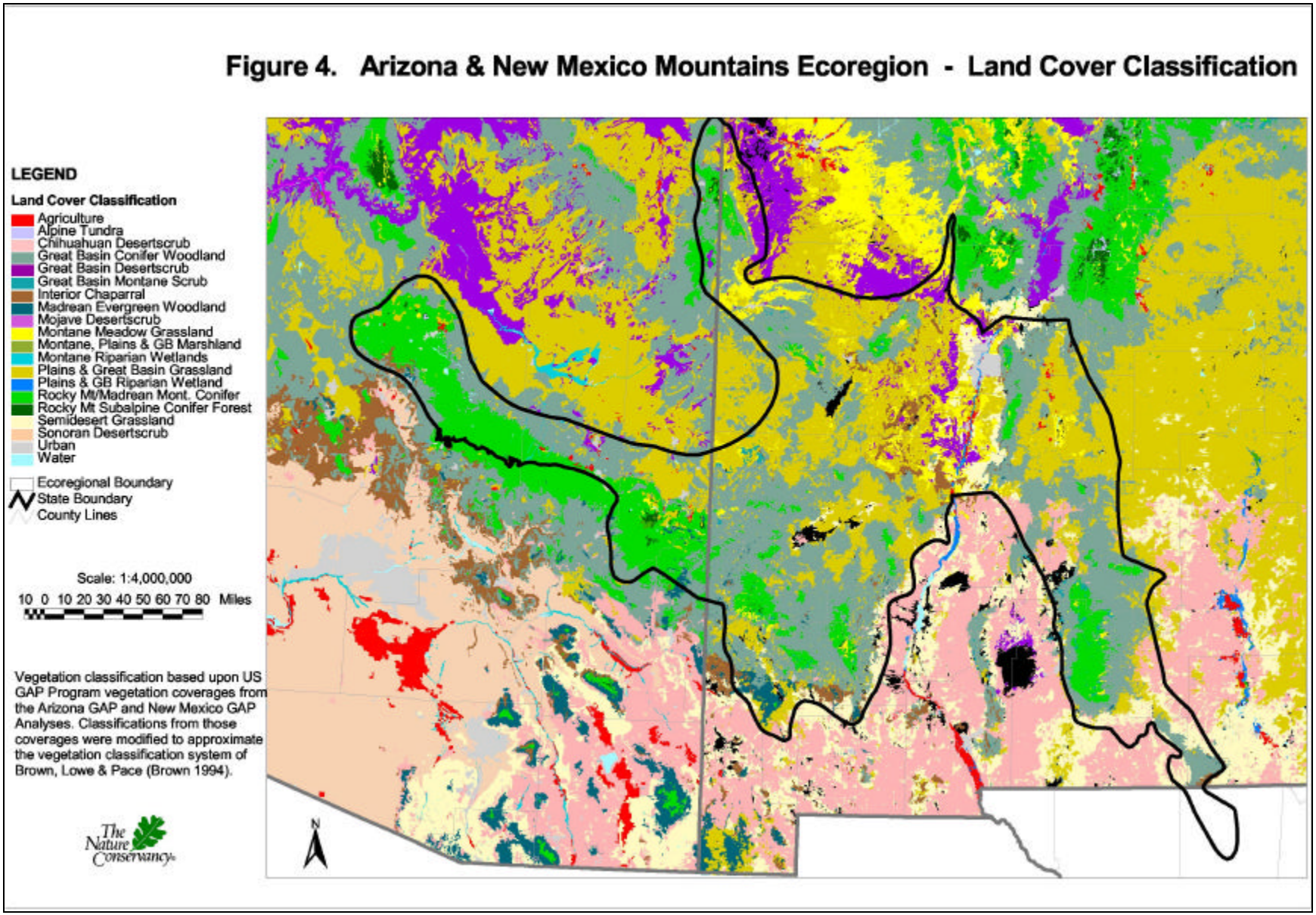


Figure 4. Arizona & New Mexico Mountains Ecoregion - Land Cover Classification



Biological Values

The Arizona / New Mexico Mountains is an area of plateaus and mountains rising above the surrounding desert plains. It is best known as an area of big trees, especially ponderosa pine. Natural communities are typically ponderosa pine and white fir forest types above 5,500 feet and piñon pine savannas at lower elevations, although the ecoregion also includes grasslands, shrublands, and riparian forests (Figure 4). The mountains contain the headwaters for a number of important streams and rivers including the Little Colorado, the Gila, the Mimbres, and the Verde. These riparian areas are the life-blood of the southwest, but all are badly compromised through decades of abuse.

The ecoregion is one of the ecological treasure-troves of the United States, containing more species of birds and mammals than any other place in the southwest. By conservative estimates there are more than 110 species of mammals (Findley 1975; Hoffmeister 1986), 210 species of breeding birds, 67 species of reptiles, 19 species of amphibians (Degenhardt, Painter & Price 1996), and 20 species of fish (Sublette, Hatch & Sublette 1990) extant and native to this ecoregion. This landscape is home to more than 200 rare plants and animals, more than 30 of them listed as endangered or threatened by the federal or state governments. Of special concern are some of the most critically imperiled aquatic species in these two states, including the Gila chub, the Chihuahua chub, the Gila trout, the Apache trout, the roundtail chub, the loach minnow, the spikedace, and the Chiricahua leopard frog. The Mimbres was also home to the beautiful shiner, a species extirpated from the wild in the United States.

The rugged landscape is subject to the large-scale processes of fire and flood. Winter snows and summer “monsoon” rains feed the river systems. These processes are critically imperiled through long histories of fire suppression, poorly-managed livestock grazing, and alteration of the hydrologic regime of virtually every river and stream in the ecoregion. Other stresses upon biodiversity within the ecoregion include logging, second-home development, and inappropriate types, locations, and levels of recreational activities.

TEAM STRUCTURE AND DATA SOURCES

Team Structure

This effort was coordinated by the New Mexico Field Office. The core planning team included eight to ten staff representing the Western Regional Office (WRO), New Mexico Natural Heritage Program (NMNHP), the Arizona Field Office (AZFO), the Arizona Heritage Data Management System (AZHDMS), and the Navajo Nation Natural Heritage Program (NNNHP). The planning effort involved more than 20 Conservancy and Heritage Program personnel.

The Core Team consisted of team leader Gary Bell (NMFO), Jeff Baumgartner (WRO), Andy Laurenzi (AZFO), Patrick McCarthy (NMFO), Patricia Mehlhop (NMNHP), Kevin Rich (NMNHP), Shelley Silbert (AZFO), Edward Smith (AZFO), Barry Spicer (AZHDMS), and Steven Yanoff (NMNHP).

A broader team was consulted which included Dennis Donald (WRO), Jim Findley (NMFO Board Member), Dave Gori (AZFO), John Humke (WRO), John Karges (TXFO/Trans-Pecos), Jack Meyer (NNNHP), Este Muldavin (NMNHP), Marion Reid (WRO), Peter Russell (NMFO/SWNM), Terry Sullivan (NMFO), Bill Waldman (NMFO), Dave Walker (AZHDMS), and Peter Warren (AZFO) and many other staff and volunteers.

The team also benefited from the expertise of two task-specific "consultants" from the NMNHP: Keith Elliot, who assisted in the design of the database, and Teri Bennett, who provided support in GIS and portfolio assembly methodology.

Data Sources

A variety of data sources were used in assembling the portfolio. Element occurrence data, generalized to one minute accuracy, and natural lands boundaries were transferred from AZHDMS and NNNHP to the NMNHP for compilation. Arizona GAP and New Mexico GAP data were also acquired to augment the Heritage data, although the quality of the GAP data was so variable as to prove of limited value. Although it was the desire of the team to use a coarse-filter approach in assembling the portfolio, we found that there was insufficient data to do so. The framework of our analysis was traditional Heritage data combined with expert data gathered through workshops.

Experts Workshops

Experts workshops were a central feature of the portfolio assembly process. Two workshops were held: in Albuquerque in April 1997 and in Flagstaff in June 1997. The two workshops attracted a total of almost 100 scientists and land managers, including representatives from all of the major land management and administration agencies in the Southwest, as well as biologists from a number of regional universities.

The primary goal of the Experts Workshops was to develop a list of sites in the Arizona - New Mexico Mountains Ecoregion that, if managed for conservation values, will protect the biodiversity of the ecoregion. The Albuquerque workshop was conducted over the course of two days. The Flagstaff workshop, which built upon the results of the Albuquerque session, was completed in a single day.

Participants were broken into seven panels organized around taxonomic and/or ecological areas of expertise: birds; mammals; herptiles; fish, aquatic invertebrates and aquatic habitats; terrestrial invertebrates; plants; and natural communities and landscape processes. Each panel had a facilitator and a recorder. The facilitator's role was to keep the participants focused on the goals while encouraging creativity and lively discussion. Recorders took notes on the panel discussions, site selection rationale, and issues that related to taxa, data gaps, and conservation priorities.

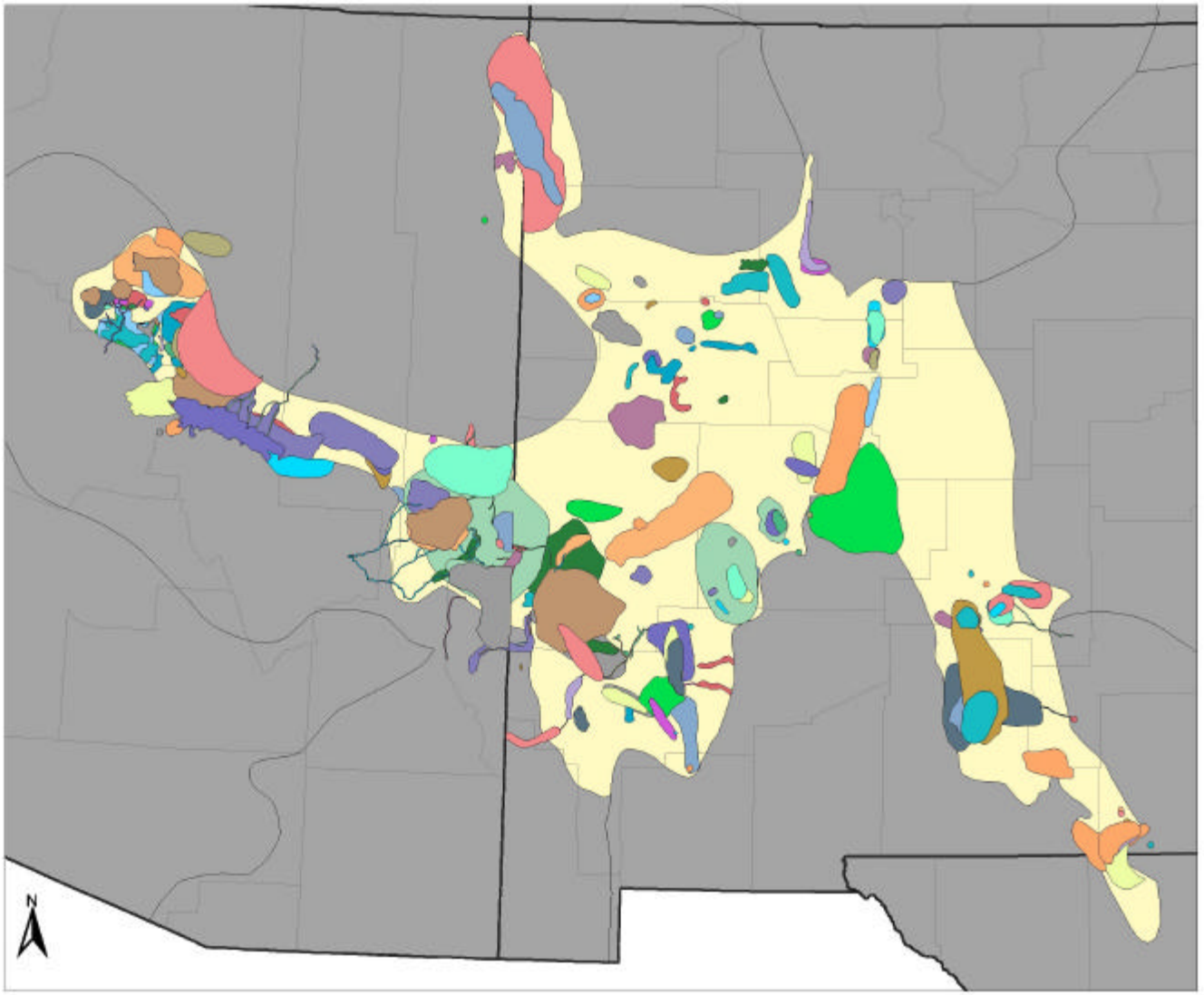
All participants were provided with a preliminary list of target species and natural communities and special habitats for the ecoregion and were asked to come to the workshop prepared to identify sites for conservation of these targets. At the beginning of each panel session the experts were asked to edit the target list, to recommend adding to or subtracting from this list, and were asked to provide supporting data for their edits. The result of this process was a final list of target species (Appendix II) and communities (Appendix III) used for portfolio assembly.

Each panel then developed its own portfolio of sites with high biodiversity values for their conservation targets (e.g. birds or natural communities). Each participant in these panels was asked to nominate a site or sites that, based upon their knowledge and experience, contained important occurrences of the targets with which they were familiar. As sites were nominated the experts, working with the facilitators, drew site polygons for the sites on mylar at a scale of 1:500,000. To the extent possible, site polygon boundaries were based upon landscape features and habitat requirements of the targets for which the sites were nominated. These polygons were later digitized and brought into the GIS to serve as the basic site layer for portfolio assembly (Figure 5).

For each nominated site the nominating expert completed a site nomination form (Appendix IV) providing information on site location, size, targets, ownership, viability of the targets, and site integrity. These data were later transcribed into a Microsoft Excel spreadsheet, and were ultimately converted into a Microsoft Access database which was used, together with the GIS, for portfolio assembly.

The panels were then reorganized into regional groups. These groups worked within each subregion to find consensus on the taxonomic sites, and to provide perspective on threats and opportunities within their regions.

Figure 5. Arizona / New Mexico Mountains Ecoregion - Experts Workshop Sites



CONSERVATION GOALS AND PORTFOLIO DESIGN

This section summarizes the target selection and portfolio assembly rules and procedures formulated for the Arizona / New Mexico Mountains ecoregional conservation analysis. The goal of this approach was to derive a minimal set of sites (the conservation portfolio) that would ensure the long-term existence of the entire suite of biological diversity of the entire ecoregion. The conservation portfolio for the ecoregion was derived from four major datasets: (1) input from experts on different taxonomic groups and ecological systems within the ecoregion obtained through a series of Experts Workshops and personal interviews; (2) species and natural community occurrence data stored in the Heritage databases of New Mexico Natural Heritage Program, the Arizona Heritage Data Systems, and the Navajo Heritage Program; (3) derived land management status and vegetation layers of the Gap Analysis Program of New Mexico and Arizona; and (4) forest habitat plot data from the U.S. Forest Service.

Portfolio assembly was based upon selected target species and natural communities found within the ecoregion that included: (1) all G1-G2 species and T1 and T2 subspecies; (2) all species that are endemic to the ecoregion; (3) selected G3-G5 species that are declining and are representative of, or peripheral to, the ecoregion; and (4) rare, restricted, or declining natural communities or habitat types of the ecoregion. In addition, the portfolio encompasses outstanding examples and a representative and viable percentage of all natural communities known to occur within the ecoregion.

In portfolio assembly the conservation targets which were identified for the ecoregion were used to select sites. Targets not captured by these sites or inadequately represented were then added to the portfolio. Target occurrences used for site selection were required to have high conservation priority and quality and (when possible) to occur in more protected lands. In addition, sites were favored which had high target occurrence densities.

Assumptions and Data Management

I. Site Parameters

The focus of the portfolio assembly effort goes beyond the natural community and species targets to the inherent large-scale systems as a whole. This enables a meaningful discussion of species with large ranges which may be overlooked in the target discussion and the processes that maintain the system as a whole. We have little or no data on habitat quality, occurrence rank, or population viability for any of these targets within the ecoregion. Implicit within the goals of the portfolio assembly is the assumption that this suite of sites will include the best occurrences and viable populations; however, in most cases this assumption is based upon best professional judgement rather than empirical evidence. Because of this lack of direct viability information, our assumption is that larger and less impacted is better for any site included within the portfolio.

1. Long-term viability potential for a given target occurrence increases proportionately with the size of the natural areas within which the target is imbedded. This tends to be true for natural communities as well as species.

> *[Rationale: The viability of species and natural communities is tied to an array of natural processes that operate at a range of scales, from the very small to the extensive. Many of the defining ecosystem forces, such as fire and flooding, operate at the scale of the landscape. Larger natural landscapes tend to have more intact natural processes; therefore, protecting larger sites affords a better chance of capturing or restoring this full array of ecological processes and the long-term viability of target occurrences. Larger sites also have a better chance of capturing species and ecological processes which we know little about (e.g., invertebrates, nutrient cycling).]*

2. Landscape size, intactness, and context may be better predictors of long-term viability than occurrence or population quality (EORANK).

> *[Rationale: Over the long term, a lesser-quality occurrence within a large site has a greater chance of survival than a higher-quality example at a smaller site, even if both sites meet the established minimum viability criteria for that target.]*

II. Fine-grained vs. Coarse-grained Approach

Our original intention was to drive the portfolio assembly process from a landscape (or coarse-grained) scale, using detailed vegetation coverages in our GIS to assemble an initial portfolio of sites, then use species and vegetation association occurrences to fill in any gaps. However, we determined early in the process that the available vegetation coverages were insufficient in either detail (e.g., Dick-Peddie 1993; Brown and Lowe 1977) or in reliability (New Mexico GAP products) to take this approach. As a result, we fell back to a fine-grained approach to portfolio assembly, relying upon occurrences of selected declining and representative species and vegetative associations as surrogates for the biodiversity of the ecoregion.

> *[Rationale: In the absence of adequate landscape-scale ecological data, the locations of high-quality occurrences of target species, especially sites that contain multiple occurrences of multiple target species, serve as a surrogate for such landscape information. Ensuring that such sites also contain high-quality occurrences of diverse vegetation associations helps to assure that selected portfolio sites are meeting the goals of the assembly process.]*

III. Data Management

Portfolio assembly combined human input with advanced computer technologies. Data were stored and manipulated using the Microsoft Access database management program, Microsoft Excel, a spreadsheet program, and a GIS (Geographic Information System) using ESRI's ArcInfo for Windows (ver. 3.5.1) and ArcView (ver. 3.1).

IV. Data Gathering

1. Selection of Targets

From Heritage element occurrence data and other sources, we identified species and vegetation associations that would serve as conservation targets for ecoregion-based conservation. Targets included: (1) all G1-G2 species and T1 and T2 subspecies; (2) all species that are endemic to the ecoregion; (3) selected G3-G5 species that are declining and are representative of, or peripheral to, the ecoregion; and (4) rare, restricted, or declining natural communities or habitat types of the ecoregion. In addition our goal was to select outstanding examples and a representative and viable percentage of all natural communities known to occur within the ecoregion. Natural community requirements were based on the alliance level, but vegetation data were managed, and portfolio assembly decisions made, at the association level.

> *[Rationale: This is a fine filter approach to biodiversity conservation, but we have attempted to maintain landscape-scale decision making . The inherent assumptions made by taking this approach need to be verified at the end of site selection to ensure that all elements of biodiversity are in fact addressed.]*

Product A: List of all conservation targets for the ecoregion.

2. Prioritization of Targets

From the list of all conservation targets (Product A), we identified 444 priority targets (i.e. targets which will drive the site selection process). This identification was based on the rangewide distribution of each target relative to the ecoregion (endemic, widespread or peripheral), global rarity and other factors (Appendix II & Appendix III).

149 Priority 1 targets, which were used to actually select portfolio sites during the site assembly iterative process, included:

a) All G1 & G2 species and natural community associations in the ecoregion
b) All ecoregional endemic species
c) All endemic T1 subspecies within the ecoregion

282 Priority 2 targets, which were used after initial portfolio assembly to check for inclusiveness, included:

a) T2 ecoregional endemics
b) G3 or G4 disjunct peripherals
c) Representative declining species of which the ecoregion contains the "motherlode"; in other words, while they occur outside the ecoregion, more than 80% of the occurrences or the range occurs within the Arizona / New Mexico Mountains Ecoregion
d) Species with additional characteristics which we felt make them important representatives of diversity in the ecoregion

e) All declining fish species. Most fish species within the ecoregion seem to be under-ranked. In the absense of aquatic community information, we use them to serve as surrogates to capture aquatic representativeness which we might otherwise miss.
f) All alliance-level natural communities known to occur within the ecoregion

13 Priority 3 targets, consisting of G4 and G5 birds which were used as a representativeness data check for intact forest landscapes. Priority 3 targets were not used for site selection.

Product B: List of priority 1 and priority 2 conservation targets.

3. Compilation of Target Occurrences

Target data meeting assembly rules criteria (see Portfolio Assembly below) were compiled from six datasets. The result was the identification of 361 targets and 3,609 target occurrences within the Arizona-New Mexico Mountains Ecoregion (AZNMM). Target species are listed in Appendix II. natural community alliances and associations for the ecoregion are listed in Appendix III. Some targets were represented by as few as one occurrence, others by hundreds. Occurrences within AZNMM were identified in a GIS and entered into a Microsoft Access database:

a) BCD Element Occurrences (EOs: geographic point data)
b) Expert Workshop target element occurrences (site-scale polygon data)
c) Expert Workshop habitat target occurrences (site-scale polygon data)
d) USFS Forest Habitat Community Occurrences (geographic point data)
e) NMNHP Riparian Community Occurrences (geographic point data)
f) NMNHP Sevilleta NWR Community Occurrences (geographic point data)

Using Forest Service, NMNHP, and Sevilleta community data, we identified vegetation community occurrences as part of the Priority 2 dataset. While our goal was only to include all vegetation alliances within the final portfolio, we retained vegetation association information and used this knowledge in assembly to maximize representativeness in the portfolio.

[Rationale: We had insufficient site information on vegetation community types to do portfolio assembly based upon a coarse filter approach. GAP vegetation data were not reliable enough to use vegetation types as surrogates for including all natural community types within the portfolio. Forest Service plot data allow the inclusion of specific vegetation types as targets within the portfolio assembly process.]

Product C: GIS coverages of 3,609 target occurrences for the ecoregion.

V. Assessing Viability

We ranked all target occurrences as highly viable (EORANK A or B), minimally viable (EORANK C) and non-viable (EORANK D). Rankings were based on standard Heritage guidelines. Only 5% of Heritage element occurrences had existing EORANKS and, of course, there was no quantitative measure of site quality and viability for any of the expert occurrences. Therefore, EORANK was estimated for all occurrences used in portfolio assembly based upon

existing information. For most occurrences we assumed that the target was at least minimally viable since the EO was in BCD and we had geographic coordinates. Unranked BCD occurrences and non-BCD occurrences with inadequate ranking information were ranked as Unknown. Expert EORANKS were based upon information provided by the experts. EORANKS were based upon the quality of an occurrence, as well as upon information on immediate impacts.

[Rationale: This process will delineate the core pool of best sites from which the majority of ecoregional conservation sites will be selected in the portfolio design process.]

EORANK was coded into a site quality rank (Table 2). Note that Unknowns accounted for 67% of all target occurrences, and were ranked between B and C-ranked occurrences.

Table 2. Site Quality Rankings Based upon EORANKs.

Site Quality Rank	EORANK (#Occ)
1	A (526)
2	B (694)
3	Unknown (2,926)
4	C (229)

Product D: List of best-known occurrences and high-ranked occurrences by conservation target for the ecoregion.

VI. Site Identification

Conservation sites are the physical units that comprise the conservation portfolio for the ecoregion. Assembling a portfolio of sites required that we be able to contrast and compare potential sites qualitatively and quantitatively across the ecoregion. Therefore it was important to delineated site boundaries sufficiently prior to portfolio design in order to assess what targets are found at each site, the quality of those occurrences, and their potential for long-term viability. Site boundaries derived through this planning process are, nevertheless, considered to be preliminary. Final site boundaries will require gathering more detailed information through the Site Conservation Planning process.

Using expert opinion, through Experts Workshops and interviews, we identified those areas within the ecoregion that contained high quality occurrences of the biodiversity represented by the target elements. We supplemented this set of potential sites with EOR data from Heritage to identify target gaps not identified by the experts. Site boundaries were, to the extent possible, based upon landscape elements and processes necessary for the long-term survival of the targets. The critical boundaries provided by the experts were, in most cases, the final site boundaries used in site comparison and portfolio assembly.

[Rationale: Field biologists are the experts with first-hand knowledge of the locations of viable populations and exemplary occurrences of native species and natural communities. Neither Heritage nor GAP data provide the site-specific, value-based assessment of the biodiversity of the ecoregion that is provided by direct consultation with field experts. While other site boundary models, such as element occurrence boundaries and the USGS Hydrologic Unit Classification "hucs", were considered, only the expert site boundaries exhibited the necessary boundary characteristics for all targets and were inclusive as required by our conservation goals.]

Product E: GIS coverage of taxonomically determined, ecologically defined potential conservation sites within the ecoregion (Figure 5).

VII. Site Stewardship Assessment

Using Arizona and New Mexico Gap Analysis Programs (GAP) and other data, we identified the location and level of resource management and protection on all lands within the ecoregion. For our purposes we relied upon the definition and delineation of management classification developed and used by the Gap Analysis Program (Crist et al. 1998: Table 3).

Table 3. Gap Analysis Program (GAP) Land Management Status Classification.

Status 1	An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.
Status 2	An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.
Status 3	An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type (e.g., logging) or localized intense type (e.g., mining). It also confers protection to federally listed endangered and threatened species throughout the area.
Status 4	There are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout.

[Rationale: Land management and protection is a strong indicator of the degree of viability of target occurrences on a site. Lands that are already under a high degree of protection (e.g., nature preserves, refuges, some wilderness areas) afford much greater likelihood of target viability than unprotected and/or poorly managed lands. Choosing target occurrences on more protected lands increases the probability of selecting sites that are already protected. In this way, a more efficient portfolio results since costs for conservation of protected sites are less than protecting those that require intensive management or intervention to ensure their survival.]

Product F: GIS coverage of land use/land management ranked by degree of protection (Figure 6).

PORTFOLIO ASSEMBLY

Portfolio assembly involved identifying the best set of sites representing the biodiversity of the ecoregion based upon analysis of our target, viability, and site quality assessment. Target occurrences were identified, assessed for viability, and matched with site polygons within a GIS database. These occurrences were then ranked. In this way the highest ranked or "best known" occurrences, those with the best chance of long-term survival were identified.

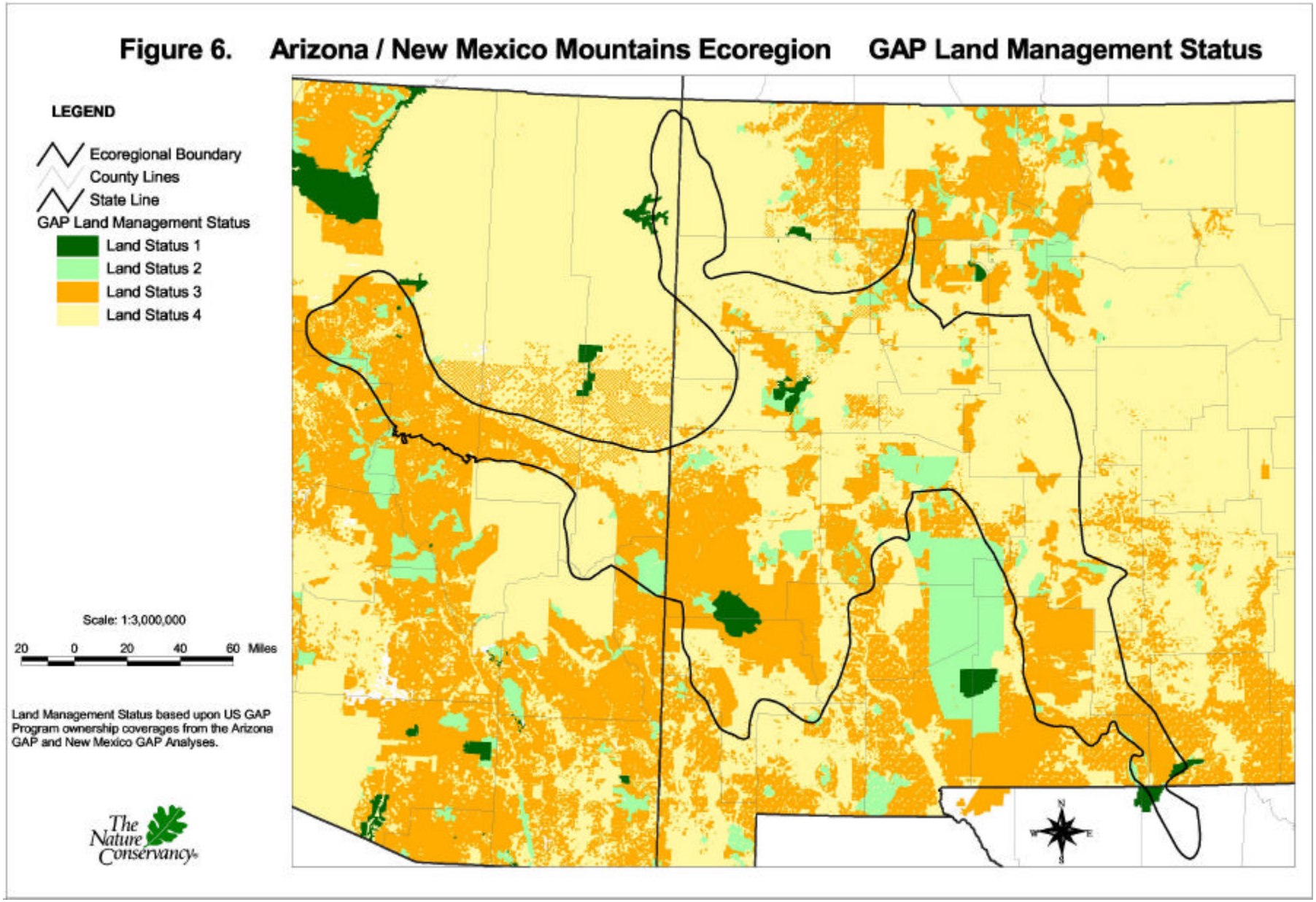
Our goal through this approach was to create a final portfolio that maximized protection of targets and included sufficient examples of all natural communities while actually minimizing the number of sites and the number of acres in the portfolio. Our primary conservation goal in portfolio assembly was to capture at least five occurrences, or all occurrences, of each Priority 1 target, whichever was greater. In appraising the portfolio, we considered the distribution of multiple occurrences to ensure that target sites were stratified across the breadth of their distribution within the ecoregion. In those cases where we had range-wide information on a target indicating that it was extremely threatened throughout its range, additional sites (or all viable sites) were included. Our secondary goal was to include at least one occurrence of each Priority 2 target; however, we made the decision not to add sites to the portfolio based wholly upon the inclusion of a single vegetative community.

In the description of portfolio assembly that follows it is important to distinguish between targets and target occurrences. Targets are the particular species or community types. The fish, Gila chub, and the riparian community, Arizona sycamore-Arizona alder, are targets. All records of Gila chub sightings or Arizona sycamore-Arizona alder stands are occurrences.

I. Ranking of Target Occurrences (the TOC)

A three-digit target occurrence rank (TOC) was established for all target occurrences based on: (1) target conservation priority (Product B); (2) target occurrence quality (Product D); and (3) GAP land management status (Product F). Target occurrences were then sorted by rank. TOC ranks ranged from a best possible score of 111 (i.e., Priority 1 target, high target occurrence quality, and land managed for biodiversity protection) to a worst possible score of 244 (Priority 2

Figure 6. Arizona / New Mexico Mountains Ecoregion GAP Land Management Status



target, low occurrence quality, no special management status. Ranks with the lowest values for any particular target are referred to as "best ranks". Target occurrences with best ranks were used in subsequent steps to select sites (see Steps IV and V).

II. Identification of Target Occurrences within Expert Sites

All target occurrences that occurred within expert sites were identified in a GIS. Of the 361 targets in 3,609 target occurrences in the ecoregion, 340 targets in 3,220 occurrences were within expert sites. Expert sites represented our best effort to identify areas that capture multiple occurrences of multiple targets. Occurrences outside of experts sites were retained to add to the robustness of the portfolio after the potential of the experts sites was tapped.

III. Selecting the Best Ranked Target Occurrences

The best-ranked occurrences, matched with their corresponding site polygons, were used to select conservation sites with the greatest densities of target occurrences. Sites containing the best-ranked Priority 1 target occurrences were initially selected. These sites were then ranked in order from highest to lowest density of target occurrences. Next, a computer algorithm iteratively selected the most dense sites until 100% of best-ranked Priority 1 targets occurring within sites were represented.

Using the above TOC ranking criteria, the best-ranked occurrence of each Priority 1 (but not G-rank 1) target was selected from the 3,220 occurrences from Step III. G-rank 1 targets were excluded at this step to focus the assembly process on landscape-level targets and avoid capturing small sites (often associated with G-rank 1 species, especially plants and invertebrates) early in the assembly process. When multiple occurrences of a single target were tied with the same ranking code, all were selected (Table 4). This process resulted in 93 best ranked Priority 1 (but not G1) occurrences, representing 115 targets (87 species, 21 associations, and 7 habitats).

Table 4. Example of Using the TOC Ranking to Select Best Ranked Occurrences of Priority 1 Targets.

Target:	Rank:	Action:
Arizona sycamore-Arizona alder	111	SELECTED
Arizona sycamore-Arizona alder	114	NOT SELECTED
Spikedace	114	SELECTED
Spikedace	133	NOT SELECTED
Guadalupe cliffdaisy	114	SELECTED
Guadalupe cliffdaisy	114	SELECTED
Guadalupe cliffdaisy	114	SELECTED

IV. Site Selection- Using Best-Ranked Targets

Those expert sites that contained the best-ranked Priority 1 (but not G1) occurrences were selected. The 93 occurrences from Step 4 were matched to their corresponding expert sites. This was not a one-to-one process since multiple occurrences often occurred in one expert site and single occurrences often occurred in more than one site (many expert sites spatially overlap). Thus, of the 248 expert sites containing 3,220 target occurrences and 340 targets (Step II above), 77 sites containing 2512 occurrences and 279 targets were selected (Table 5).

Table 5. Example of Matching Target Occurrences to Site Polygons

Target Name	Best Rank Occurrence	Corresponding Site Name
Arizona sycamore-Arizona alder	111	Mogollon Mountains
Spikedace	113	Gila River Headwaters
Guadalupe cliffdaisy	114	Guadalupe Mountains
Guadalupe cliffdaisy	114	Guadalupe Mountains
Guadalupe cliffdaisy	114	Sitting Bull Falls

V. Ordering Sites by Density

The 77 sites selected in Step IV were ordered by decreasing target occurrence density ("Site Density", Formula 1 below). Sorting by density is a way of correcting site priorities for size. Some expert sites were extremely large and therefore enclosed large numbers of target occurrences. Dividing by area leveled the playing field for sites of different sizes while still taking into account the biodiversity density of individual sites. Removing G1 targets earlier in the process prevented the inclusion of very local endemics associated with very small site polygons (area) from being included and biasing this result.

$$\text{Site Density} = \frac{\text{Total \# Target Occurrences per Site}}{\text{Site Area}} \qquad (1)$$

Table 6. Example of Ranking Selected Sites by Site Density.

Site Rank	Site:	Density (# occurrences per decimal degree area)
1	Pines Campground	10008.3
2	Fort Stanton/Rio Bonito Area	9432.3
3	Nutrioso River/Rudd Creek	8777.9
. . .	. . .	. . .
77	Sevilleta Transition Area	120.4

VI: Tabulating Cumulative Percent of Targets Captured.

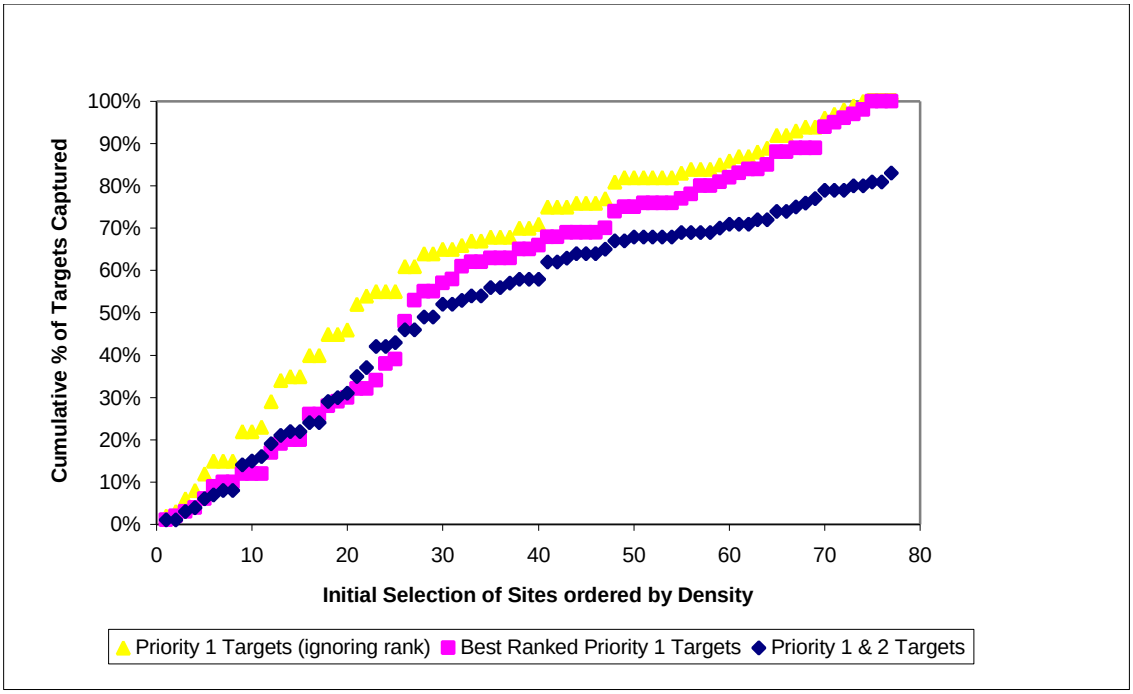
We next tablulated the cumulative percent of all best ranked Priority 1 targets captured by the 77 density-ordered sites of Step V (Table 7). Note that these tabulations only reflect the targets captured, regardless of the number of target occurrences. The cumulative percent of all Priority 1 targets, and of all targets, was also tabulated for comparison.

Table 7. Cumulative % of All Best Ranked Priority 1 Targets Captured.

Site Rank	Site Name	Cumulative Percent of Best-Ranked Priority 1 Targets Captured
1	Pines Campground	1%
2	Fort Stanton/Rio Bonito Area	2%
3	Nutrioso River/Rudd Creek	3%
. . .	. . .	. . .
77	Sevilleta Transition	100%

Figure 7 summarizes the biodiversity gradient across the 77 sites. Note that 100% of the 115 Priority 1 (not G1) targets were captured in only one less site than was needed to capture the best ranked Priority 1 targets and that 81% of all targets were captured by the selected sites.

Figure 7. Cumulative Percent of Targets Captured by Preliminary Portfolio of Sites.



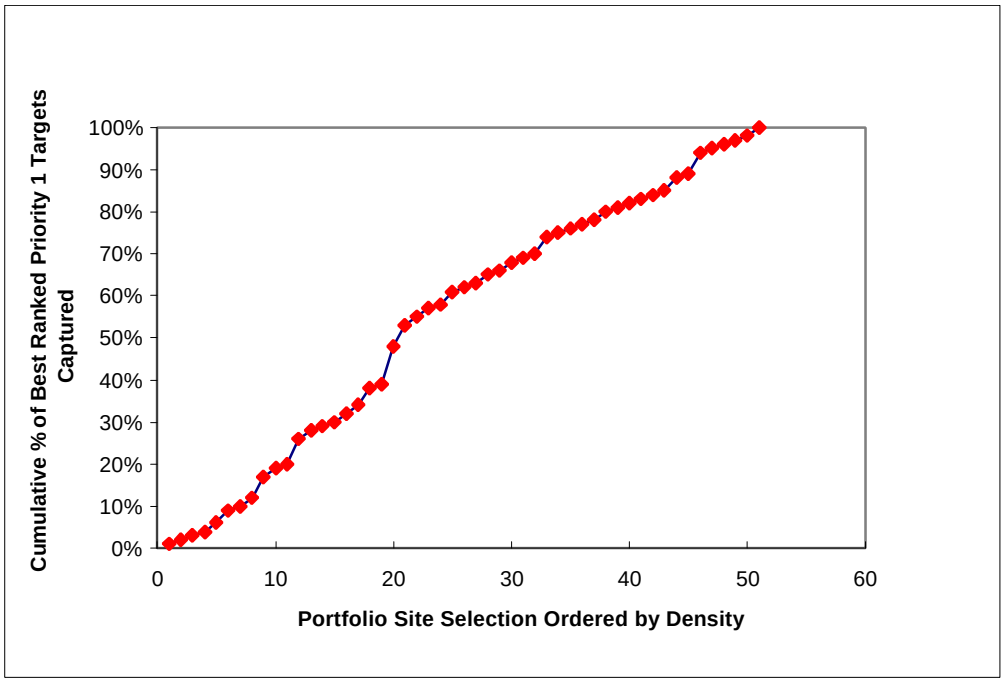
VII. Using Site Density To Streamline The Portfolio

We streamlined the portfolio by eliminating ties for cumulative percent of best-ranked Priority 1 targets, retaining those sites that had the highest site density. In Step VI there were numerous instances where more than one site in the sequence had the same cumulative percent of targets caught; i.e. no new targets were captured by adding the next site to the portfolio, even though that site had a higher density rank than sites below it in the table.

For example, the first seven sites selected progressively captured 10% of targets. However, the eighth site, KLY02, added no new targets and so its cumulative percent was also 10%. In such cases, the sites with redundant cumulative percents that had lower target occurrence densities were eliminated. This streamlining reduced the number of sites from 77 to 51. While this streamlining also resulted in a reduction from 2512 target occurrences and 279 targets to 2142 occurrences and 263 targets in the portfolio, these "lost" targets, none of which were Priority 1 targets, were re-captured later in the assembly process.

The results of this streamlining the portfolio are summarized in Figure 8 by plotting cumulative percent of best-ranked Priority 1 targets captured as a function of density-sorted sites. Note that the using a cumulative percent of 100 as a threshold insures that at least one each of all best ranked Priority 1 targets is captured by the final group of sites.

Figure 8. Cumulative Percent of Priority 1 Targets Captured in the Streamlined Portfolio.



VIII. Identifying Missing Targets and Adding Occurrence Redundancy.

The preliminary portfolio was then assessed for targets that were not captured or that were inadequately represented in the 51 sites. Using the threshold assembly process in Step VII assured that the preliminary portfolio contained at least one highest quality example of each Priority 1 (but not G1) target that occured within expert sites. Due to multiple target occurrences within each site and the emphasis on dense sites, uncaptured or inadequately represented targets were relatively few. However, missed targets included: (1) some Priority 1, G1 targets located on small expert sites; (2) some Priority 1 (but not G1) targets which did not occur on expert sites; and (3) some Priority 2 targets since these targets did not drive site selection

To ensure that all species and community targets were captured and that species targets were adequately represented, additional occurrences were identified to achieve the portfolio assembly goals of: (1) at least one occurrence of each Priority 1 and 2 target, and (2) five or all occurrences for each species target, whichever was greater. These occurrences were selected hierarchically based on highest target occurrence rank (i.e., the TOC). Existing sites were expanded or new sites were added to incorporate these additional occurrences. This was achieved using a GIS and expanding existing site boundaries to capture proximal occurrences. Several new sites were added to capture occurrences that were not spatially or physiographically related to existing sites. At this stage we also looked for occurrences of Priority 3 bird targets as a final check for representativeness.

IX. Merging Overlapping Sites.

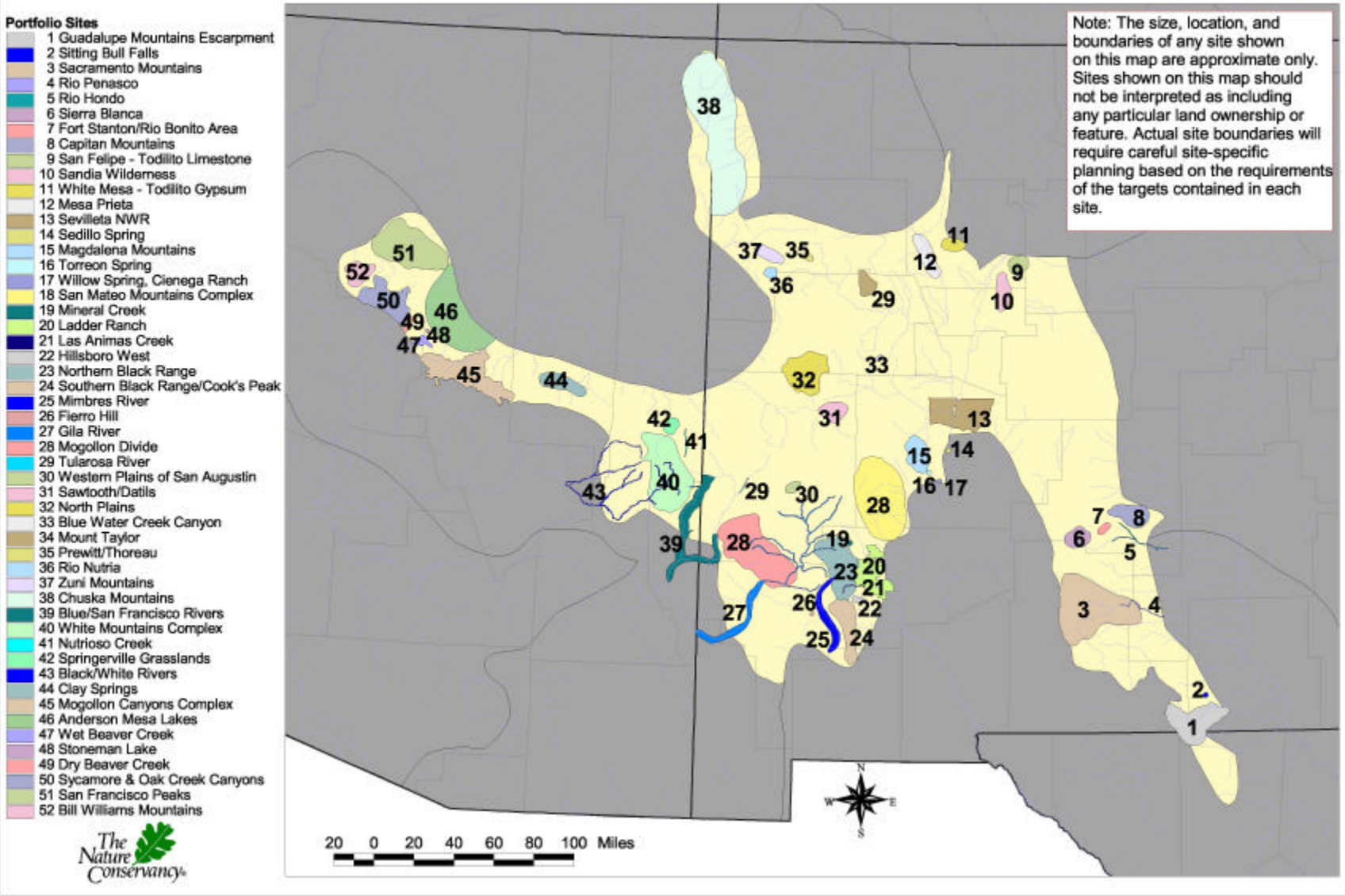
Finally, spatially overlapping sites were merged. For example, the four sites in the Sacramento Mountains were collapsed into a single site. All the target attributes of each of the component expert sites were combined into a single set of attributes for the new merged sites. Major riverine sites were kept as a separate coverage since the targets, stresses, and management options and strategies might differ greatly between river and terrestrial sites. Thus a number of riverine sites, including the Rio Hondo and the Gila, overlap terrestrial sites without merging. In this way the portfolio was finalized at 42 terrestrial and 10 riverine sites, for a total of 52 sites. Of these, 13 sites are wholly within Arizona, 36 are wholly within New Mexico, two sites (the Chuska Mountains and the Blue/Sacramento Rivers) occur in both states, and one site (the Guadalupe Mountains Escarpment) occurs in both New Mexico and Texas. The resultant portfolio captures 3314 occurrences of 348 targets on approximately 2.97 million hectares (7.54 million acres), or about 24% of the land area of the ecoregion.

Product G: Draft biological portfolio of sites (Figure 9).

X. Summarizing the Site Selection.

Summary data were calculated for each selected site and the combined portfolio of sites. This information was used for portfolio evaluation. The summary data are included in Appendices V and VI.

Figure 9. Arizona / New Mexico Mountains Ecoregion Portfolio of Biodiversity Sites



The Conservation Portfolio

The final conservation portfolio for the Arizona / New Mexico Mountains Ecoregion consists of 52 sites: 37 wholly within New Mexico; 13 wholly within Arizona; and two sites that sit on the border of the two states (Figure 9, Table 8). Sites range from small, occurrence-specific areas of a few hectares (such as hotsprings) to extensive, landscape-scale sites of a million acres (Table 8); however, it is important to understand that actual conservation site boundaries, and thus the area, for any site, have yet to be determined through the site conservation planning process. This portfolio captures 3314 occurrences of 348 targets (Table 9) on approximately 7.5 million acres, about 24% of the land area of the ecoregion (Table 10). In terms of our conservation goals we captured 93% of all species targets and 63% of vegetation association targets, but the portfolio contains at least 85% of vegetative alliances (see Data Gaps, page 65).

Most sites contain a significant proportion of public lands, mostly Forest Service. While 42.4% of the ecoregion is federal land, 63.5% of the portfolio (4.7 million acres) is in federal ownership (Table 11), 83% of which is Forest Service. More than 34% of the ecoregion is in private ownership, but only 14.8% (1.1 million acres) of the portfolio is privately owned. In other words the portfolio had 50% more federal land and about half the private land that would have been expected based upon the proportion of ownerships in the ecoregion. There are three factors that might have contributed to this bias: First, federal lands tend to be managed for multiple uses, including biodiversity protection, and therefore should be expected to contain more and better examples of occurrences of targets. In fact, 73.8% of all target occurrences are on federal land (Table 12) and 63.2% on Forest Service holdings (Table 13), although only 42.4% of the ecoregion is in federal ownership. Second, the selection process used GAP Land Status as a tie-breaker which would tend to favor federal lands over private lands by virtue of their management priority. Thus only 10.4% of occurrences are on GAP status 4 lands (Table 14). And third, in most cases private lands have not been surveyed for biodiversity value, and occurrences of targets on these lands is generally not known. Nevertheless, virtually all sites contain some private lands within their boundaries. Ownership of each site within the portfolio is summarized in Table 15.

A summary of the taxonomic distribution of the targets and occurrences is shown in Table 16. The taxonomic distribution within sites is summarized in Table 17. While more than 25% of all targets and nearly 35% of target occurrences are of plant species, a few sites were very heavily biased toward rare plants, especially the Guadalupe Mountains Escarpment (14 species) and the Sacramento Mountains (22 species). The Black Range sites had the highest proportion of invertebrate sites due to the high endemism of snails in this mountain range. The White Mountains of Arizona and the Gila River of New Mexico had the greatest assemblages of threatened fish occurrrences. The Mogollon Divide, the Sevilleta NWR, and the San Mateo Mountains had particularly high numbers of vegetation associations.

Table 18 summarizes the distribution of targets in the portfolio sites. The White Mountains, Mogollon Divide, Gila River, Mogollon Canyons Complex, and the Sacramento Mountains had the highest numbers of targets. Only eight sites were selected to represent a single target species. Occurrence distribution is summarized in Table 19. The top five sites again include the Sacramento Mountains, Mogollon Divide, Mogollon Canyons Complex, and White Mountains Complex, as well as the San Francisco Peaks area of Arizona.

Table 8. Area Site Summary for the Arizona / New Mexico Mountains Portfolio Sites (acreages approximate).

Site Name	Map Code	Area (Acres)	Area Rank	% Ecoregion	% Portfolio
Guadalupe Mountains Escarpment	1	247279	10	0.8	3.4
Sitting Bull Falls	2	3063	49	0.0	0.0
Sacramento Mountains	3	578087	2	1.9	7.9
Rio Penasco	4	6691	41	0.02	0.1
Rio Hondo	5	10941	38	0.04	0.1
Sierra Blanca	6	65708	27	0.2	0.9
Fort Stanton/Rio Bonito Area	7	14841	36	0.05	0.2
Capitan Mountains	8	107041	19	0.4	1.5
San Felipe - Todilto Limestone	9	50520	30	0.2	0.7
Sandia Wilderness	10	71794	24	0.2	1.0
White Mesa - Todilto Gypsum	11	41294	31	0.1	0.6
Mesa Prieta	12	94965	21	0.3	1.3
Sevilleta NWR	13	243107	11	0.8	3.3
Sedillo Spring	14	3081	48	0.01	0.0
Magdalena Mountains	15	107179	18	0.4	1.5
Torreon Spring	16	3082	46	0.01	0.0
Willow Spring, Cienega Ranch	17	3081	47	0.01	0.0
San Mateo Mountains Complex	18	545117	3	1.8	7.4
Mineral Creek	19	3087	45	0.01	0.0
Ladder Ranch	20	183228	15	0.6	2.5
Las Animas Creek	21	3601	44	0.01	0.0
Hillsboro West	22	10134	40	0.03	0.1
Northern Black Range	23	262649	9	0.9	3.6
Southern Black Range/Cook's Peak	24	151383	17	0.5	2.1
Mimbres River	25	84010	22	0.3	1.1
Fierro Hill	26	2167	51	0.01	0.0
Gila River	27	173300	16	0.6	2.4
Mogollon Divide	28	482337	5	1.6	6.6
Tularosa River	29	2301	50	0.01	0.0
Western Plains of San Augustin	30	21218	33	0.1	0.3
Sawtooth/Datils	31	70273	25	0.2	1.0
North Plains	32	224705	12	0.7	3.1
Blue Water Creek Canyon	33	5643	42	0.02	0.1
Mount Taylor	34	52682	29	0.2	0.7
Prewitt/Thoreau	35	10876	39	0.04	0.1
Rio Nutria	36	16191	35	0.1	0.2
Zuni Mountains	37	53602	28	0.2	0.7
Chuska Mountains	38	930631	1	3.1	12.7
Blue River/San Francisco River	39	212211	13	0.7	2.9
White Mountains Complex	40	421084	6	1.4	5.7
Nutrioso Creek	41	4350	43	0.01	0.1
Springerville Grasslands	42	29593	32	0.1	0.4
Black River/White River Headwaters	43	69314	26	0.2	0.9
Clay Springs	44	99248	20	0.3	1.4
Mogollon Canyons Complex	45	344167	8	1.1	4.7
Anderson Mesa Lakes	46	489791	4	1.6	6.7
Wet Beaver Creek	47	19914	34	0.1	0.3
Stoneman Lake	48	1905	52	0.01	0.0
Dry Beaver Creek	49	12638	37	0.04	0.2
Sycamore & Oak Creek Canyons	50	209254	14	0.7	2.9
San Francisco Peaks	51	400125	7	1.3	5.5
Bill Williams Mountains	52	82383	23	0.3	1.1

Table 9. Summary of Numbers of Targets and Target Occurrences in the Final Portfolio of Sites*.

	# Targets	# Occurrences	% Targets	% Occurrences
All targets	348	3314	-	-
Priority 1 targets	135	1364	38.8	41.2
Priority 2 targets	200	1880	57.5	56.7
Priority 3 targets	13	70	3.7	2.1
Species targets (BCD & Expert)	199	2642	57.2	79.7
Community targets (BCD, NMNHP, USFS, Expert)	149	672	42.8	20.3

**tabulates each target and occurrence once for the portfolio*

Table 10. Summary of Land Ownership Status of the Arizona/New Mexico Mountains Ecoregion and the Portfolio of Sites.

	Ecoregion	Portfolio	Federal	State	Native American	Private (incl. trusts)	Unknown
Area in Ecoregion (ha)	12,171,257	2,969,189	5,155,137	987,139	1,725,100	4,166,579	137,144
% of Ecoregion	-	24.4	42.4	8.1	14.2	34.2	1.13
Area in Portfolio (ha)	-	2,969,189	1,884,298	90,566	435,633	438,861	119,534
% of Portfolio	-	-	63.5	3.1	14.7	14.8	4.0

Table 11. Summary of Land Ownership Status of Federal Lands Within the Arizona/New Mexico Mountains Ecoregion and the Final Portfolio of Sites.

	BLM	BOR	BLM/USFS	Military	NPS	USFS	USFWS
Area in Ecoregion (ha)	1,145,957	154	136,348	58,728	71,109	3,632,409	110,432
% of Ecoregion	9.4	0.001	1.1	0.5	0.6	29.8	0.9
Area in Portfolio (ha)	105,707	35	95,624	5,665	20,927	1,565,808	90,530
% of Portfolio	3.6	0.001	3.2	0.2	0.7	52.7	3.0

Table 12. Summary of Numbers of Target Occurrences, and Land Status* for All Portfolio Sites.

	Federal	State	Native American	Private (includes trusts)	Unknown
# all Occurrences	2446	19	104	263	482
% all Occurrences	73.8	0.6	3.1	7.9	14.5
# P1 Occurrences	944	14	37	144	225
% P1 Occurrences	69.2	1.0	2.7	10.6	16.5
# P2 Occurrences	1472	5	62	115	226
% P2 Occurrences	78.3	0.3	3.3	6.1	12.0
# P3 Occurrences	30	-	5	4	31
% P3 Occurrences	42.9	-	7.1	5.7	44.3

*most expert targets have unknown land status- they usually overlap several land status classes; some land is not classified by Gap

Table 13. Summary of Numbers of Target Occurrences, and Land Status* for Portfolio Sites on Federal Lands.

	BLM	BLM/USFS	Military	NPS	USFS	USFWS
# all Occurrences	124	118	3	59	2094	48
% all Occurrences	3.7	3.6	0.1	1.8	63.2	1.4
# P1 Occurrences	99	40	2	29	770	4
% P1 Occurrences	7.3	2.9	0.1	2.1	56.5	0.3
# P2 Occurrences	25	68	1	28	1306	44
% P2 Occurrences	1.3	3.6	0.1	1.5	69.5	2.3
# P3 Occurrences	-	10	-	2	18	-
% P3 Occurrences	-	14.3	-	2.9	25.7	-

*most expert targets have unknown land status- they usually overlap several land status classes; some land is not classified by Gap.

Table 14. Summary of Numbers of Occurrences and Percent of Occurrences Based on Gap Protection Status*:

	Gap Status 1	Gap Status 2	Gap Status 3	Gap Status 4	Unknown
% all Occurrences	3.6	10.0	60.6	10.4	15.3
# all Occurrences	119	333	2009	345	508
% P1 Occurrences	3.9	8.1	57.5	13.2	17.3
# P1 Occurrences	53	111	784	180	236
% P2 Occurrences	3.4	11.2	64.5	8.3	12.6
# P2 Occurrences	64	211	1213	156	236
% P3 Occurrences	2.9	15.7	17.1	12.9	51.4
# P3 Occurrences	2	11	12	9	36

*Status 1 is most protected, 4 is least protected. Expert targets have unknown Gap status; they usually overlap several Gap classes:

Connectivity

The portfolio of sites described here must not be thought of as a list of biological hotspots identified for their high biodiversity, which can serve as a menu from which to choose conservation projects. By its very purpose and design, the portfolio is a set solution. Each site, regardless of its total biodiversity, is equally important to the portfolio, and conservation action based upon this portfolio involves conservation action on each portfolio site. Indeed, the portfolio does not include some sites of high biodiversity and high conservation value. Rather, it achieves a complete package encompassing all the biodiversity of the ecoregion in a minimum set of sites.

In a similar vein, this portfolio must be considered in the context in which it was identified. The conservation value and integrity of most of the sites that make up the portfolio are dependent upon the largely unfragmented landscape within which the sites occur. We did not identify specific corridors or connections between these sites, and the long-term integrity of these sites and the long-term survival of the species that they contain depends upon this continuity. In other words, this portfolio is not a prescription for mitigation which allows the further fragmentation of the surrounding matrix. Indeed, the viability and conservation value of the portfolio would be strengthened by improved management on these matrix lands.

Table 15. Land Area Summary for All Sites in the Arizona/New Mexico Mountains Portfolio.

	Federal		State		Tribal		Private	
Site	**Area (ac)**	**% of Site**	**Area (ac)**	**% of Site**	**Area (ac)**	**% of Site**	**Area (ac)**	**% of Site**
Guadalupe Mtns. Escarpment	199563	80.7	11,843	4.8			23,390	9.5
Sitting Bull Falls	2,830	92.4					232	7.6
Sacramento Mountains	360,074	62.3	19,376	3.4	81,409	14.1	114,519	19.8
Rio Penasco	1,343	20.1	87	1.3			5,261	78.6
Rio Hondo	795	7.3	440	4.0			9,706	88.7
Sierra Blanca	42,011	63.9			17,078	26.0	6,619	10.1
Fort Stanton/Rio Bonito Area	11,644	78.5	416	2.8			2,798	18.9
Capitan Mountains	82,154	76.7	1,808	1.7			22,910	21.4
San Felipe - Todilto Limestone	8,014	15.9	713	1.4	7,909	15.7	33,884	67.1
Sandia Wilderness	48,858	68.1	1,746	2.4	428	0.6	20,762	28.9
White Mesa - Todilto Gypsum	24,737	59.9	705	1.7	13,857	33.6	1,995	4.8
Mesa Prieta	31,444	33.1	7,222	7.6	478	0.5	55,944	58.9
Sevilleta NWR	230,552	94.8	3,499	1.4			9,057	3.7
Sedillo Spring							3,081	100.0
Magdalena Mountains	82,992	77.4	2,790	2.6			21,441	20.0
Torreon Spring	677	22.0	27	0.9			2,378	77.2
Willow Spring, Cienega Ranch	32	1.1					3,049	98.9
San Mateo Mountains Complex	403,203	74.0	28,273	5.2	3,178	0.6	110,222	20.2
Mineral Creek	2,933	95.0					154	5.0
Ladder Ranch	12,560	6.9	19,123	10.4			151,310	82.6
Las Animas Creek	2,178	60.5					1,423	39.5
Hillsboro West	3,461	34.2	1,928	19.0			4,750	46.9
Northern Black Range	258,779	98.5					3,867	1.5
Southern Black Range	101,596	67.1	16,309	10.8			33,478	22.1
Mimbres River	24,381	29.0	8,837	10.5			50,785	60.5
Fierro Hill	1,493	68.9					674	31.1
Gila River	109,004	62.9	9,760	5.6			54,378	31.4
Mogollon Divide	476,919	98.9					5,407	1.1
Tularosa River	1,663	72.3					637	27.7
Western Plains of San Augustin	3,473	16.4	15,616	73.6			2,127	10.0
Sawtooth/Datils	64,255	91.4	40	0.1			5,978	8.5
North Plains	31,614	14.1	23,094	10.3	25	0.01	169,896	75.6
Blue Water Creek Canyon	800	14.2			4,843	85.8		
Mount Taylor	44,358	84.2			888	1.7	7,443	14.1
Prewitt/Thoreau			459	4.2	8,485	78.0	1,757	16.2
Rio Nutria	4,646	28.7	491	3.0	2,425	15.0	8,619	53.2
Zuni Mountains	46,767	87.2			3,879	7.2	2,952	5.5
Chuska Mountains					930,631	100.0		
Blue River/San Francisco River	197,341	93.0	2,081	1.0			12,891	6.1
White Mountains Complex	402,373	95.6	5,343	1.3	5,315	1.3	7,998	1.9
Nutrioso Creek	2,537	58.3					1,813	41.7
Springerville Grasslands			487	1.6			28,749	97.1
Black/White River Headwaters	14,524	21.0			54,671	78.9	106	0.2
Clay Springs	77,704	78.3	6,151	6.2			15,304	15.4
Mogollon Canyons Complex	321,384	93.4					21,161	6.1
Anderson Mesa Lakes	399,953	81.7	39,039	8.0			48,409	9.9
Wet Beaver Creek	19,696	98.9					171	0.9
Stoneman Lake	1,664	87.3					239	12.5
Dry Beaver Creek	12,628	99.9					10	0.1
Sycamore/Oak Creek Canyons	197,561	94.4	1,425	0.7			6,846	3.3
San Francisco Peaks	368,760	92.2	2,181	0.5			27,657	6.9
Bill Williams Mountains	77,769	94.4	166	0.2			4,251	5.2

Table 15 (continued)

Site	USFS		BLM		BLM/USFS		USFWS	
	Area (ac)	% of Site	Area (ac)	% of Site	Area (ac)	% of Site	Area (ac)	% of Site
Guadalupe Mtns. Escarpment	68,068	27.5	64,924	26.3				
Sitting Bull Falls	1,156	37.7	1,674	54.7				
Sacramento Mountains	329,858	57.1	30,216	5.2				
Rio Penasco	536	8.0	807	12.1				
Rio Hondo	607	5.6	188	1.7				
Sierra Blanca	42,011	63.9						
Fort Stanton/Rio Bonito Area			11,644	78.5				
Capitan Mountains	82,115	76.7	40	0.04				
San Felipe - Todilto Limestone			8,014	15.9				
Sandia Wilderness	48,231	67.2	627	0.9				
White Mesa - Todilto Gypsum			24,737	59.9				
Mesa Prieta	2	0.002	31,355	33.0				
Sevilleta NWR			9,145	3.8			221,407	91.1
Sedillo Spring								
Magdalena Mountains	79,512	74.2	3,480	3.2				
Torreon Spring			677	22.0				
Willow Spring, Cienega Ranch							32	1.1
San Mateo Mountains Complex	377,895	69.3	25,309	4.6				
Mineral Creek	2,933	95.0						
Ladder Ranch	158	0.09	12,402	6.8				
Las Animas Creek	2,178	60.5						
Hillsboro West	3,461	34.2						
Northern Black Range	258,771	98.5	8	0.003				
Southern Black Range	86,305	57.0	15,291	10.1				
Mimbres River	23,907	28.5	474	0.6				
Fierro Hill	940	43.4	553	25.5				
Gila River	70,130	40.5	38,873	22.4				
Mogollon Divide	476,919	98.9						
Tularosa River	1,663	72.3						
Western Plains of San Augustin			3,473	16.4				
Sawtooth/Datils	64,137	91.3	119	0.2				
North Plains			31,402	14.0				
Blue Water Creek Canyon			800					
Mount Taylor	43,947	83.4	411	0.8				
Prewitt/Thoreau								
Rio Nutria	4,646	28.7						
Zuni Mountains	33,287	62.1	331	0.6				
Chuska Mountains								
Blue River/San Francisco River	133,385	62.9	6,014	2.8	57,942	27.3		
White Mountains Complex	359,199	85.3			43,174	10.3		
Nutrioso Creek	2,537	58.3		0.0				
Springerville Grasslands								
Black/White River Headwaters	13,627	19.7			897	1.3		
Clay Springs	77,565	78.2	139	0.1				
Mogollon Canyons Complex	316,014	91.8			5,370	1.6		
Anderson Mesa Lakes	399,912	81.6	41	0.01				
Wet Beaver Creek	17,141	86.1			2,555	12.8		
Stoneman Lake	1,664	87.3						
Dry Beaver Creek	4,693	37.1			7,935	62.8		
Sycamore/Oak Creek Canyons	102,644	49.1			94,917	45.4		
San Francisco Peaks	339,614	84.9			26,085	6.5		
Bill Williams Mountains	77,769	94.4						

Table 16. Summary of the Taxonomic Distribution of Targets and Occurrences in the Final Portfolio.

	Plants	Invertebr.	Fish	Herps	Birds	Mammals	Habitat	Commun.
#. Taxon Targets	96	35	21	10	19	18	18	131
% of Taxon Targets	27.6	10.1	6.0	2.9	5.5	5.2	5.2	37.6
#. Taxon Occurrences	1158	124	195	279	766	122	4	666
% of Taxon Occurrences	34.9	3.7	5.9	8.4	23.1	3.7	0.1	20.1

Table 17. Taxonomic Summary for the Arizona/New Mexico Mountains Portfolio Sites.

	#	#	Plants		Invertebrates		Herptiles	
Site	**Assoc.**	**Habitats**	#	%	#	%	#	%
Guadalupe Mountains Escarpment	2		14	60.9	3	13.0	1	4.3
Sitting Bull Falls								
Sacramento Mountains	12		22	44.9			1	2.0
Rio Penasco			11	84.6				
Rio Hondo			1	50.0				
Sierra Blanca	6		10	45.5	2	9.1	1	4.5
Fort Stanton/Rio Bonito Area	1	1	1	33.3				
Capitan Mountains	2		5	55.6	1	11.1	1	11.1
San Felipe - Todilto Limestone			3	100.0				
Sandia Wilderness	8		4	25.0				
White Mesa - Todilto Gypsum		1	4	80.0				
Mesa Prieta	2		4	57.1				
Sevilleta NWR	31		2	5.6				
Sedillo Spring	1				1	50.0		
Magdalena Mountains	8				1	8.3		
Torreon Spring					1	100.0		
Willow Spring, Cienega Ranch					1	100.0		
San Mateo Mountains Complex	23		5	13.5	3	8.1	2	5.4
Mineral Creek		1	5	71.4	1	14.3		
Ladder Ranch	16				4	15.4	1	3.8
Las Animas Creek		1	5	31.3			2	12.5
Hillsboro West					1	100.0		
Northern Black Range	14	1	7	16.3	5	11.6	2	4.7
Southern Black Range/Cook's Peak			1	5.9	5	29.4	2	11.8
Mimbres River	8	1	8	25.0	1	3.1	2	6.3
Fierro Hill			3	37.5	1	12.5		
Gila River	19	1	12	21.1	3	5.3	3	5.3
Mogollon Divide	40		11	12.9	5	5.9	1	1.2
Tularosa River								
Western Plains of San Augustin	3		1	20.0	1	20.0		
Sawtooth/Datils			1	100.0				
North Plains								
Blue Water Creek Canyon			1	100.0				
Mount Taylor	8		2	15.4				
Prewitt/Thoreau			2	100.0				
Rio Nutria	6							
Zuni Mountains	2		3	50.0				
Chuska Mountains	6		5	21.7	1	4.3		
Blue River/San Francisco River	19		8	17.0			6	12.8
White Mountains Complex	20		11	12.0	3	3.3	5	5.4
Nutrioso Creek	1		2	20.0			1	10.0
Springerville Grasslands	1							
Black River/White River Headwaters	1		9	25.0	2	5.6	3	8.3
Clay Springs			1	14.3			5	71.4
Mogollon Canyons Complex	17		6	11.5	1	1.9	7	13.5
Anderson Mesa Lakes	14		8	21.1			5	13.2
Wet Beaver Creek	1		3	60.0				
Stoneman Lake	2		2	50.0				
Dry Beaver Creek	1							
Sycamore & Oak Creek Canyons	5	1	8	28.6	1	3.6	5	17.9
San Francisco Peaks	13		12	31.6			1	2.6
Bill Williams Mountains	6	1	3	18.8			1	6.3

Table 17 (continued).

	Fish		Birds		Mammals	
Site	#	%	#	%	#	%
Guadalupe Mountains Escarpment			3	13.0		
Sitting Bull Falls	1	100.0				
Sacramento Mountains	1	2.0	2	4.1	4	8.2
Rio Penasco	1	7.7	1	7.7		
Rio Hondo	1	50.0				
Sierra Blanca	1	4.5	1	4.5	1	4.5
Fort Stanton/Rio Bonito Area						
Capitan Mountains						
San Felipe - Todilto Limestone						
Sandia Wilderness			3	18.8	1	6.3
White Mesa - Todilto Gypsum						
Mesa Prieta			1	14.3		
Sevilleta NWR			2	5.6	1	2.8
Sedillo Spring						
Magdalena Mountains			3	25.0		
Torreon Spring						
Willow Spring, Cienega Ranch						
San Mateo Mountains Complex	1	2.7	3	8.1		
Mineral Creek						
Ladder Ranch	1	3.8	3	11.5		
Las Animas Creek	1	6.3	7	43.8		
Hillsboro West						
Northern Black Range	3	7.0	8	18.6		
Southern Black Range/Cook's Peak			7	41.2		
Mimbres River	2	6.3	8	25.0		
Fierro Hill			4	50.0		
Gila River	8	14.0	9	15.8	1	1.8
Mogollon Divide	8	9.4	5	5.9	2	2.4
Tularosa River	4	100.0				
Western Plains of San Augustin						
Sawtooth/Datils						
North Plains					1	100.0
Blue Water Creek Canyon						
Mount Taylor			1	7.7	2	15.4
Prewitt/Thoreau						
Rio Nutria	1	12.5	1	12.5		
Zuni Mountains			1	16.7		
Chuska Mountains	1	4.3	7	30.4	3	13.0
Blue River/San Francisco River	7	14.9	5	10.6	2	4.3
White Mountains Complex	10	10.9	8	8.7	7	7.6
Nutrioso Creek	5	50.0	1	10.0		
Springerville Grasslands	3	42.9	2	28.6	1	14.3
Black River/White River Headwaters	6	16.7	6	16.7	4	11.1
Clay Springs			1	14.3		
Mogollon Canyons Complex	6	11.5	4	7.7		
Anderson Mesa Lakes	4	10.5	5	13.2	2	5.3
Wet Beaver Creek						
Stoneman Lake						
Dry Beaver Creek						
Sycamore & Oak Creek Canyons	2	7.1	4	14.3	2	7.1
San Francisco Peaks			3	7.9	4	10.5
Bill Williams Mountains	2	12.5	3	18.8		

Table 18. Target Summary for the Arizona/New Mexico Mountains Portfolio ites

				Target Density	Density
Site	**# Targets**	**Rank**	**% All Targets**	targets/100km2	**Rank**
Guadalupe Mountains Escarpment	23	14	6.6	2.3	41
Sitting Bull Falls	1	29	0.3	8.1	14
Sacramento Mountains	49	5	14.1	2.1	42
Rio Penasco	13	18	3.7	48.0	6
Rio Hondo	2	28	0.6	4.5	27
Sierra Blanca	22	15	6.3	8.3	12
Fort Stanton/Rio Bonito Area	3	27	0.9	5.0	24
Capitan Mountains	9	21	2.6	2.1	43
San Felipe - Todilto Limestone	3	27	0.9	1.5	49
Sandia Wilderness	16	17	4.6	5.5	21
White Mesa - Todilto Gypsum	5	25	1.4	3.0	35
Mesa Prieta	7	23	2.0	1.8	46
Sevilleta NWR	36	10	10.3	3.7	32
Sedillo Spring	2	28	0.6	16.0	8
Magdalena Mountains	12	19	3.4	2.8	37
Torreon Spring	1	29	0.3	8.0	16
Willow Spring, Cienega Ranch	1	29	0.3	8.0	15
San Mateo Mountains Complex	37	9	10.6	1.7	48
Mineral Creek	7	23	2.0	56.0	4
Ladder Ranch	26	13	7.5	3.5	33
Las Animas Creek	16	17	4.6	109.8	1
Hillsboro West	1	29	0.3	2.4	39
Northern Black Range	43	7	12.4	4.0	30
Southern Black Range/Cook's Peak	17	16	4.9	2.8	36
Mimbres River	31	11	8.9	9.1	11
Fierro Hill	8	22	2.3	91.2	2
Gila River	57	3	16.4	8.1	13
Mogollon Divide	85	2	24.4	4.4	29
Tularosa River	4	26	1.1	43.0	7
Western Plains of San Augustin	5	25	1.4	5.8	20
Sawtooth/Datils	1	29	0.3	0.4	51
North Plains	1	29	0.3	0.1	52
Blue Water Creek Canyon	1	29	0.3	4.4	28
Mount Taylor	13	18	3.7	6.1	18
Prewitt/Thoreau	2	28	0.6	4.5	26
Rio Nutria	8	22	2.3	12.2	10
Zuni Mountains	6	24	1.7	2.8	38
Chuska Mountains	23	14	6.6	0.6	50
Blue River/San Francisco River	47	6	13.5	5.5	22
White Mountains Complex	92	1	26.4	5.4	23
Nutrioso Creek	10	20	2.9	56.8	3
Springerville Grasslands	7	23	2.0	5.8	19
Black River/White River Headwaters	36	10	10.3	12.8	9
Clay Springs	7	23	2.0	1.7	47
Mogollon Canyons Complex	52	4	14.9	3.7	31
Anderson Mesa Lakes	38	8	10.9	1.9	45
Wet Beaver Creek	5	25	1.4	6.2	17
Stoneman Lake	4	26	1.1	51.9	5
Dry Beaver Creek	1	29	0.3	2.0	44
Sycamore & Oak Creek Canyons	28	12	8.0	3.3	34
San Francisco Peaks	38	8	10.9	2.3	40
Bill Williams Mountains	16	17	4.6	4.8	25

Table 18 (continued).

	Priority 1 Targets		Priority 2 Targets		Priority 3 Targets	
Site	**#**	**%**	**#**	**%**	**#**	**%**
Guadalupe Mountains Escarpment	8	34.8	13	56.5	2	8.7
Sitting Bull Falls			1	100.0		
Sacramento Mountains	25	51.0	24	49.0		
Rio Penasco	10	76.9	3	23.1		
Rio Hondo	1	50.0	1	50.0		
Sierra Blanca	11	50.0	11	50.0		
Fort Stanton/Rio Bonito Area	2	66.7	2	66.7		
Capitan Mountains	6	66.7	3	33.3		
San Felipe - Todilto Limestone	1	33.3	2	66.7		
Sandia Wilderness	2	12.5	13	81.3	1	6.3
White Mesa - Todilto Gypsum	2	40.0	3	60.0		
Mesa Prieta	2	28.6	4	57.1	1	14.3
Sevilleta NWR	3	8.3	32	88.9	1	2.8
Sedillo Spring	1	50.0	1	50.0		
Magdalena Mountains	1	8.3	9	75.0	2	16.7
Torreon Spring	1	100.0				
Willow Spring, Cienega Ranch	1	100.0				
San Mateo Mountains Complex	7	18.9	29	78.4	1	2.7
Mineral Creek	5	71.4	2	28.6		
Ladder Ranch	11	42.3	11	42.3	4	15.4
Las Animas Creek	5	31.3	7	43.8	4	25.0
Hillsboro West	1	100.0				
Northern Black Range	15	34.9	23	53.5	5	11.6
Southern Black Range/Cook's Peak	7	41.2	6	35.3	4	23.5
Mimbres River	12	37.5	15	46.9	4	12.5
Fierro Hill	4	50.0	2	25.0	2	25.0
Gila River	27	47.4	25	43.9	5	8.8
Mogollon Divide	30	35.3	53	62.4	2	2.4
Tularosa River	1	25.0	3	75.0		
Western Plains of San Augustin	1	20.0	4	80.0		
Sawtooth/Datils	1	100.0				
North Plains			1	100.0		
Blue Water Creek Canyon	1	100.0				
Mount Taylor	1	7.7	12	92.3		
Prewitt/Thoreau	1	50.0	1	50.0		
Rio Nutria	2	25.0	6	75.0		
Zuni Mountains	2	33.3	4	66.7		
Chuska Mountains	6	26.1	13	56.5	4	17.4
Blue River/San Francisco River	23	48.9	22	46.8	2	4.3
White Mountains Complex	42	45.7	46	50.0	4	4.3
Nutrioso Creek	7	70.0	3	30.0		
Springerville Grasslands	6	85.7	2	28.6	1	14.3
Black River/White River Headwaters	19	52.8	15	41.7	2	5.6
Clay Springs	2	28.6	5	71.4		
Mogollon Canyons Complex	17	32.7	33	63.5	2	3.8
Anderson Mesa Lakes	9	23.7	26	68.4	3	7.9
Wet Beaver Creek	2	40.0	3	60.0		
Stoneman Lake	2	50.0	2	50.0		
Dry Beaver Creek	1	100.0				
Sycamore & Oak Creek Canyons	6	21.4	20	71.4	2	7.1
San Francisco Peaks	8	21.1	29	76.3	1	2.6
Bill Williams Mountains	3	18.8	12	75.0	1	6.3

Table 19. Occurrence Summary for the Arizona/New Mexico Mountains Portfolio Sites.

				Occ. Density
Site	**# Occ.**	**Rank**	**% all Occ.**	occs/100 km2
Guadalupe Mountains Escarpment	162	6	4.9	16.2
Sitting Bull Falls	1	37	0.0	8.1
Sacramento Mountains	637	1	19.2	27.2
Rio Penasco	13	30	0.4	48.0
Rio Hondo	2	36	0.1	4.5
Sierra Blanca	59	14	1.8	22.2
Fort Stanton/Rio Bonito Area	57	15	1.7	94.9
Capitan Mountains	41	20	1.2	9.5
San Felipe - Todilto Limestone	39	22	1.2	19.1
Sandia Wilderness	54	16	1.6	18.6
White Mesa - Todilto Gypsum	21	26	0.6	12.6
Mesa Prieta	20	27	0.6	5.2
Sevilleta NWR	57	15	1.7	5.8
Sedillo Spring	2	36	0.1	16.0
Magdalena Mountains	21	26	0.6	4.8
Torreon Spring	2	36	0.1	16.0
Willow Spring, Cienega Ranch	2	36	0.1	16.0
San Mateo Mountains Complex	149	7	4.5	6.8
Mineral Creek	8	32	0.2	64.0
Ladder Ranch	40	21	1.2	5.4
Las Animas Creek	17	29	0.5	116.6
Hillsboro West	3	35	0.1	7.3
Northern Black Range	80	13	2.4	7.5
Southern Black Range/Cook's Peak	52	17	1.6	8.5
Mimbres River	41	19	1.3	12.1
Fierro Hill	9	31	0.3	102.6
Gila River	116	10	3.5	16.5
Mogollon Divide	278	3	8.4	14.2
Tularosa River	4	34	0.1	43.0
Western Plains of San Augustin	9	31	0.3	10.5
Sawtooth/Datils	30	24	0.9	10.5
North Plains	1	37	0.0	0.1
Blue Water Creek Canyon	2	36	0.1	8.8
Mount Taylor	30	24	0.9	14.1
Prewitt/Thoreau	7	33	0.2	15.9
Rio Nutria	13	30	0.4	19.8
Zuni Mountains	21	26	0.6	9.7
Chuska Mountains	84	12	2.5	2.2
Blue River/San Francisco River	120	9	3.6	14.0
White Mountains Complex	449	2	13.5	26.3
Nutrioso Creek	21	26	0.6	119.3
Springerville Grasslands	18	28	0.5	15.0
Black River/White River Headwaters	50	18	1.5	17.8
Clay Springs	24	25	0.7	6.0
Mogollon Canyons Complex	202	4	6.1	14.5
Anderson Mesa Lakes	95	11	2.9	4.8
Wet Beaver Creek	7	33	0.2	8.7
Stoneman Lake	4	34	0.1	51.9
Dry Beaver Creek	1	37	0.0	2.0
Sycamore & Oak Creek Canyons	121	8	3.7	14.3
San Francisco Peaks	196	5	5.9	12.1
Bill Williams Mountains	35	23	1.1	10.5

Table 19 (continued).

	Occurrences					
Site	**# P1**	**% P1s**	**# P2**	**% P2s**	**# P3**	**% P3s**
Guadalupe Mountains Escarpment	95	58.6	65	40.1	2	1.2
Sitting Bull Falls			1	100.0		
Sacramento Mountains	298	46.8	339	53.2		
Rio Penasco	10	76.9	3	23.1		
Rio Hondo	1	50.0	1	50.0		
Sierra Blanca	27	45.8	32	54.2		
Fort Stanton/Rio Bonito Area	55	96.5	2	3.5		
Capitan Mountains	37	90.2	4	9.8		
San Felipe - Todilto Limestone	4	10.3	35	89.7		
Sandia Wilderness	3	5.6	49	90.7	2	3.7
White Mesa - Todilto Gypsum	10	47.6	11	52.4		
Mesa Prieta	14	70.0	5	25.0	1	5.0
Sevilleta NWR	6	10.5	50	87.7	1	1.8
Sedillo Spring	1	50.0	1	50.0		
Magdalena Mountains	1	4.8	18	85.7	2	9.5
Torreon Spring	2	100.0				
Willow Spring, Cienega Ranch	2	100.0				
San Mateo Mountains Complex	47	31.5	101	67.8	1	0.7
Mineral Creek	6	75.0	2	25.0		
Ladder Ranch	17	42.5	18	45.0	5	12.5
Las Animas Creek	5	29.4	7	41.2	5	29.4
Hillsboro West	3	100.0				
Northern Black Range	19	23.8	55	68.8	6	7.5
Southern Black Range/Cook's Peak	26	50.0	21	40.4	5	9.6
Mimbres River	18	42.8	18	42.9	5	11.9
Fierro Hill	4	44.4	3	33.3	2	22.2
Gila River	72	62.1	35	30.2	9	7.8
Mogollon Divide	85	30.6	191	68.7	2	0.7
Tularosa River	1	25.0	3	75.0		
Western Plains of San Augustin	5	55.6	4	44.4		
Sawtooth/Datils	30	100.0				
North Plains			1	100.0		
Blue Water Creek Canyon	2	100.0				
Mount Taylor	2	6.7	28	93.3		
Prewitt/Thoreau	6	85.7	1	14.3		
Rio Nutria	7	53.8	6	46.2		
Zuni Mountains	15	71.4	6	28.6		
Chuska Mountains	21	25.0	56	66.7	7	8.3
Blue River/San Francisco River	57	47.5	60	50.0	3	2.5
White Mountains Complex	232	51.7	209	46.5	8	1.8
Nutrioso Creek	18	85.7	3	14.3		
Springerville Grasslands	14	77.8	3	16.7	1	5.6
Black River/White River Headwaters	27	54.0	21	42.0	2	4.0
Clay Springs	2	8.3	22	91.7		
Mogollon Canyons Complex	57	28.2	141	69.8	4	2.0
Anderson Mesa Lakes	12	12.6	80	84.2	3	3.2
Wet Beaver Creek	2	28.6	5	71.4		
Stoneman Lake	2	50.0	2	50.0		
Dry Beaver Creek	1	100.0				
Sycamore & Oak Creek Canyons	30	24.8	80	66.1	11	9.1
San Francisco Peaks	58	29.6	136	69.4	2	1.0
Bill Williams Mountains	8	22.9	26	74.3	1	2.9

Analysis Of Conservation Stressors

This phase of site selection enables a critical review of the selected portfolio, allowing for modifications based on both scientific and political factors. This is also the point where biological data gaps are assessed in order to develop a plan for addressing those needs prior to the next iteration of the conservation design effort. Throughout the portfolio assessment and design phases, data gaps which impede the development of a comprehensive, effective ecoregion-based conservation design were also identified.

I. Portfolio Review

The draft portfolio (Product G) was reviewed by design team members (including the state directors), to ensure that the portfolio met both biological goals and programmatic needs and realities. This review did not result in any changes to portfolio site selection or site boundaries.

> *[Rationale: Portfolio selections based on defined steps and procedures are seldom perfect. This step allows for a certain amount of flexibility to occur without undermining the integrity of the selection process. One important factor to note: modifications to the portfolio should be made with an ecoregional view, without a state program bias.]*

II. Stress Analysis

The initial step in developing site conservation strategies is to determine the stresses and the sources of stress that might reduce or prevent the long-term survival of targets at sites. Stresses (or "threats") are factors which could result in the loss or reduction in the number, distribution, or extent of a target or which could reduce the ability of land managers to adequately protect targets or sites. For example, stresses include reductions in water quality or quantity, the loss of flood peaks or the alteration in seasonal stream flows, direct loss of habitat, killing of target species, and the fragmentation of habitat.

Some stresses have many sources, and it is the sources of stress, not the stresses themselves, that must be addressed. Thus, for example, loss of dry-season stream flow may be the result of stream channelization, dam construction, increased flashiness of the stream due to increases in imperviousness in the watershed from development or inappropriate grazing, or may be due to changes in the dominant vegetation of the watershed through agriculture, grazing, climate change, or alteration in the fire regime. Successful management and protection of the portfolio of sites requires the removal, reduction, or mitigation of key stresses by identifying and addressing the sources of stress. Table 20 below identifies 14 distinct potential sources of stress and their resultant potential stresses on the portfolio of sites.

To evaluate the potential effect of these stresses and sources of stress, we canvassed our ecoregional experts. A blank table arraying the 52 sites in the draft portfolio and the 14 major sources of stress considered important in the ecoregion was sent out to the experts who had participated in our earlier data gathering. Each expert was asked to evaluate the stresses for sites with which they were familiar, providing ranking information for three parameters at each site.

Table 20. Stresses And Sources Of Stress Matrix

Source of Stress:	Stresses:								
	Habitat Desruction	Habitat Fragmentation	Altered Flow Regime	Lowered Water Table	Altered Erosion/Sediment	Reduced Water Quality	Altered Fire Regime	Altered Species Composition	Wi ldlife Harassment/ Predation
Urban Development	*	*	*	*	*	*	*	*	*
Floodplain Farming	*	*	*	*	*	*		*	*
Channelization			*	*	*	*		*	
Dams	*	*	*		*			*	
Surface Water Diversions	*		*	*	*	*		*	
Water Extraction (Wells)			*	*					
Fire Suppression	*	*	*	*	*	*	*	*	
Inappropriate Grazing	*	*	*	*	*	*	*	*	
Exotic Plants	*	*	*	*	*	*	*	*	*
Exotic Animals								*	*
Recreation	*	*			*	*	*	*	*
Mining	*	*	*	*	*	*		*	
Military Activity	*	*	*		*	*	*		*

a) Severity. Severity is the degree to which an identified source of stress actually threatens the integrity of a site and the targets it contains. For example, altered fire regime may have no impact on an aquatic site but may be a severe threat to fire-adapted communities such as ponderosa pine woodland or bunchgrass prairie. For each threat we asked the experts to rank severity as; 0 (None), 1 (Low), 2 (Medium), or 3 (High).

b) Immediacy. Immediacy is the likelihood that a particular source of stress will affect a site regardless of the severity. We asked the experts to rank immediacy as; 0 (not likley to occur), 1 (likley to occur in the next 20 years), 2 (likley to occur in the next five years), or 3 (occurring now).

c) Reversibility. This is the degree to which a source of stress can be removed, its effects erased, and a site restored. For example, loss of a natural fire regime might be highly to moderately reversible in some systems through the introduction of fuel management and prescribed fire. On the other hand, the loss of habitat through urbanization or the construction of highways is not likely to be reversed. We asked the experts to rank each source of stress at each site as; 1 (easily reversed), 2 (can be reversed with high cost and effort), or 3 (effects irreversible).

Table 21. Site Detail Results of Ecoregional Stress Analysis.

	Urban Development			Floodplain Farming			Channelization			Dams			Water Diversion		
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility
Blue Water Creek Canyon	2.0	2.0	2.0	2.0	2.0	2.0							2.0	2.0	2.0
Capitan Mountain	1.3	1.7	2.3				1.0	1.0	1.0						
Chuska Mountains	1.4	2.1	2.1	1.0	3.0	1.0				1.0	3.0	1.5	1.5	2.5	1.3
Fiero Hill	1.0	2.0	2.0												
Fort Stanton/Rio Bonito Area	2.0	2.0	1.5	1.5	3.0	1.5	2.0	2.0	1.5	2.0	3.0	1.5	1.5	2.0	1.5
Gila River	1.8	2.3	2.3	2.5	2.3	1.4	2.7	2.5	1.6	2.4	1.3	2.3	2.3	2.2	1.3
Guadalupe Mountains Escarpment													1.0	1.0	3.0
Hillsboro West	2.0	1.0	3.0												
Ladder Ranch															
Las Animas Creek	1.5	3.0	2.0	2.5	2.0	1.5	1.0	2.0	1.3				1.0	3.0	2.0
Magdalena Mountains	1.0	2.0	1.0												
Mesa Prieta															
Mimbres River	2.2	2.3	2.5	2.1	2.4	1.6	1.2	1.6	1.4	1.7	2.3	1.7	2.1	2.6	1.4
Mineral Creek	3.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	1.5				3.0	3.0	2.0
Mogollon Divide	1.0	2.0	1.3	1.0	2.0	1.0	1.3	2.0	1.3				1.0	1.5	1.0
Mount Taylor	1.0	1.0	1.5				1.0	1.0	3.0						
North Plains															
Northern Black Range	2.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0				1.0	1.0	1.0
Prewitt/Thoreau	1.8	1.0	2.8												
Rio Hondo	1.9	2.0	1.7	2.3	2.5	1.3	2.0	2.0	1.5	3.0	3.0	2.0	2.33.	2.5	1.2
Rio Nutria	2.0	2.0	2.5	2.5	3.0	1.5	2.5	2.5		3.0	3.0	2.0	3.0	3.0	1.0
Rio Penasco	2.3	2.7	2.3	2.3	2.5	1.2	2.0	2.0	2.0	3.0	3.0	2.0	2.3	2.5	1.3
Sacramento Mountains	1.8	2.3	2.2	1.8	1.5	2.0	2.0	1.7	2.3	2.0	1.0	1.0	2.4	2.2	1.8
San Felipe - Todilto Limestone															
San Mateo Mountains Complex	1.0	2.0	1.0	1.0	1.0	1.0				1.0	1.0	1.0	2.0	1.6	2.2
Sandia Wilderness	1.9	1.6	1.4										1.0	2.0	1.3
Sawtooth/Datils													1.0	3.0	1.0
Sedillo Spring	1.0	1.0	1.0										1.0	1.0	1.0
Sevilleta NWR		1.5	1.0	1.0	2.0	1.0	1.0	2.0	1.5				1.0	2.0	1.5
Sierra Blanca	2.3	2.3	2.8						1.0						1.0
Sitting Bull Falls	1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0
So. Black Range/Cooke's Peak	1.0	1.0	1.0						1.0				1.0	2.0	1.5
Torreon Spring															
Tularosa River	2.0	2.5	2.0	1.3	2.0	1.3	2.0	2.5	1.7	2.0	2.0	2.5	2.0	2.8	1.5
W. Plains of San Augustin				1.0	1.0	1.0									
White Mesa - Todilto Gypsum															
Willow Spring, Cienega Ranch															
Zuni Mountains	1.3	2.3	1.8	1.0	1.7	1.3	2.5	2.0	1.7	1.7	2.7	2.3	1.7	3.0	1.5
Subtotal Per Category	45	53	52	29	36	24	29	32	28	23	25	20	36	49	35
Stress Totals			149			88			89			68			120

	Water Extraction			Fire Suppression			Inappropriate Grazing			Exotic Plants			Exotic Animals		
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility
Blue Water Creek Canyon	1.0	1.0	1.0	1.0	1.0	1.0	1.8	1.7	1.3	1.0	1.0	1.0			
Capitan Mountain	1.0	1.0	1.0	1.8	2.1	1.3	1.7	1.3	1.0	2.0			2.0	1.5	2.0
Chuska Mountains	2.0	2.0	1.8	2.8	1.7	1.8	3.0	2.7	2.0	2.2	2.3	2.3	3.0	3.0	1.7
Fiero Hill	1.0	1.0	1.0	2.5	2.5	2.0	2.0	2.0	2.0	1.0	1.0	1.0			
Fort Stanton/Rio Bonito Area	3.0	1.0	2.5	3.0	2.0	2.5	2.8	2.4	1.2						
Gila River	1.3	1.8	1.2	1.9	2.3	1.4	2.3	2.3	1.7	2.3	2.3	1.8	2.8	3.0	1.7
Guadalupe Mountains Escarpment	2.0	2.0		1.8	1.8	1.0	1.5	1.8	1.3	1.0	1.0	1.0	1.8	1.8	1.0
Hillsboro West							1.0	1.0	1.0						
Ladder Ranch							1.0	2.0	1.0	1.0	1.0	1.0	2.0	3.0	1.0
Las Animas Creek	1.5	2.0	1.25	1.67	1.7	1.0	2.0	2.2	1.0	2.3	2.3	1.3	1.7	1.7	1.3
Magdalena Mountains				1.5	1.8	1.2	2.3	2.0	1.3	1.0	1.0	1.5	1.0	1.0	1.0
Mesa Prieta															
Mimbres River	1.6	1.8	1.4	2.4	3.1	1.1	2.4	2.4	1.3	3.0	2.3	2.0	1.4	1.9	2.0
Mineral Creek	2.0	2.0	1.0	2.8	2.3	1.3	2.5	3.0	1.5	2.5	3.0	2.5	1.0	3.0	1.5
Mogollon Divide	1.0	1.0	1.0	2.5	2.6	1.7	2.6	3.0	2.0	2.0	3.0	2.5	1.0	3.0	1.0
Mount Taylor	1.0	2.0	3.0	1.5	2.0	1.3	2.3	3.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0
North Plains															
Northern Black Range	1.0	1.0	1.0	2.2	2.0	1.3	2.0	2.6	1.4	3.0	3.0	3.0			
Prewitt/Thoreau							1.8	2.3	1.0						
Rio Hondo	2.0	3.0	1.5	2.0	3.0	1.0	3.0	3.0	1.5	1.3	1.5	2.0	2.0	3.0	2.0
Rio Nutria	2.5	3.0	1.5	2.0	2.4	1.0	2.4	2.4	1.4	1.5	3.0	1.5	2.0	3.0	2.0
Rio Penasco	1.7	2.3	1.3	2.0	3.0	1.0	2.3	2.3	1.3	2.0	3.0	2.0	2.0	3.0	2.0
Sacramento Mountains	1.0	2.3	1.7	1.9	2.2	1.4	2.3	2.2	1.4	1.9	1.9	1.7	1.0	2.5	1.5
San Felipe - Todilto Limestone							1.0	3.0	1.0						
San Mateo Mountains Complex	2.0	1.0	2.0	1.5	1.8	1.2	2.3	2.0	1.3	1.0	1.0	1.5	1.0	1.0	1.0
Sandia Wilderness	1.0	2.0	2.0	2.0	2.4	1.9	1.0	1.0	1.0	1.0	2.0	1.5	1.0	2.0	1.5
Sawtooth/Datils				1.5	2.2	1.2	2.0	2.2	1.2	1.0	3.0	3.0			
Sedillo Spring	2.0	2.0	1.3										1.0	1.0	1.0
Sevilleta NWR	1.0	2.5	1.5	2.2	2.4	1.0	2.0	1.0	1.0	1.5	2.0	1.5	1.0	2.0	1.3
Sierra Blanca	1.5	2.0	1.5	2.4	2.4	1.4	2.3	1.5	1.3	1.8	2.3	1.3	2.0	3.0	2.0
Sitting Bull Falls	1.5	1.0	1.3	1.0	2.0	1.0	2.0	3.0	1.0	1.3	1.5	1.3	1.0	1.5	1.3
So. Black Range/Cooke's Peak	1.0	1.5	1.3	2.7	1.8	1.8	2.3	2.3	1.7	3.0	3.0	1.0	1.0	3.0	1.0
Torreon Spring	2.0	2.0	1.0												
Tularosa River	3.0	3.0	2.5	2.3	1.5	1.5	3.0	3.0	2.0	2.5	3.0	2.5	1.5	2.0	1.5
W. Plains of San Augustin	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0			
White Mesa - Todilto Gypsum							1.0	3.0	1.0						
Willow Spring, Cienega Ranch	3.0	3.0	1.0												
Zuni Mountains	1.7	3.0	2.0	2.0	3.0	1.4	2.2	3.0	1.8	1.0	3.0	2.0	1.5	3.0	2.0
Subtotal Per Category	47	54	40	56	61	39	68	75	45	47	55	46	37	55	35
Stress Totals			142			156			188			148			127

	Recreation			Mining			Military Activity			Logging			Site Summary Totals			
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Site Total
Blue Water Creek Canyon	2.0	2.0	2.0	1.0	1.0	1.0				1.0	1.0	1.0	15	15	14	44
Capitan Mountain	1.2	2.0	1.1	2.0	1.8	2.3	2.0	2.0	1.0	1.5	1.8	1.2	17	16	14	48
Chuska Mountains	1.8	2.3	2.0	1.8	1.5	1.3				2.8	2.5	1.8	24	29	20	73
Fiero Hill	1.0	2.0	2.0	2.0	2.0	2.0							11	13	12	35
Fort Stanton/Rio Bonito Area	3.3	3.0	1.0			1.0	2.0	3.0	1.0				23	23	17	63
Gila River	1.3	1.9	1.3	3.0	1.5	1.8				1.7	1.8	1.6	28	27	21	77
Guadalupe Mountains Escarpment	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0	14	14	12	41
Hillsboro West				2.0	2.0	3.0							5	4	7	16
Ladder Ranch													4	6	3	13
Las Animas Creek	1.0	2.5	1.0	2.0	3.0	2.0				1.5	1.0	1.3	19	26	16	61
Magdalena Mountains	2.0	2.0	1.7	1.5	1.5	1.5				1.5	1.5	1.5	12	13	11	35
Mesa Prieta													0	0	0	0
Mimbres River	1.2	1.2	1.3	2.3	2.1	1.3				1.3	2.0	1.4	25	28	20	73
Mineral Creek	2.0	2.5	1.5	2.0	2.5	2.0				1.0	1.0	1.0	25	27	19	71
Mogollon Divide	1.4	2.6	1.8	1.8	2.3	1.5				1.5	2.0	1.3	18	27	17	62
Mount Taylor	1.7	2.3	1.3	1.5	1.5	2.0	1.0	1.0	1.0	1.3	2.0	1.8	14	19	18	51
North Plains													0	0	0	0
Northern Black Range	1.0	1.0	1.0	1.5	1.5	1.5				1.0	1.0	1.0	18	18	16	52
Prewitt/Thoreau				2.0	3.0	3.0							6	6	7	19
Rio Hondo	1.0	2.5	1.0	1.0	3.0	2.0	1.0	3.0	1.0	1.0	2.5	1.5	23	37	21	81
Rio Nutria	1.0	2.0	1.5	1.0	3.0	3.0				1.5	2.5	1.5	27	35	20	82
Rio Penasco	1.0	2.0	1.0	1.0	1.0	2.0	1.0	3.0	1.0	1.5	2.5	1.5	26	35	22	83
Sacramento Mountains	2.1	2.3	1.2	2.0	2.1	2.1	1.0	2.0	1.0	1.8	2.1	1.3	25	28	23	76
San Felipe - Todilto Limestone				2.0	2.0	3.0							3	5	4	12
San Mateo Mountains Complex	2.0	2.0	1.7	1.5	1.5	1.5	1.0	1.0	1.0	1.5	1.5	1.5	19	18	18	55
Sandia Wilderness	1.8	1.6	1.2				1.0	3.0	1.0				12	18	13	42
Sawtooth/Datils	1.0	1.0	1.0	1.0	1.0	2.0				1.0	2.0	1.0	9	14	10	33
Sedillo Spring	1.0	1.0	1.0	1.0	1.0	1.0							7	7	6	20
Sevilleta NWR	1.0	2.3	1.3		2.0	1.0	1.0	2.5	1.0				13	24	15	52
Sierra Blanca	2.0	1.8	1.2	2.0	2.0	2.3	1.0	3.0	1.0	1.8	2.3	1.0	19	22	18	59
Sitting Bull Falls	2.4	3.0	1.8							1.0	1.0	1.5	13	16	12	41
So. Black Range/Cooke's Peak	2.0	3.0	1.0	3.0	3.0	1.5										
Torreon Spring													2	2	1	5
Tularosa River	1.7	3.0	1.7	1.0	2.0	1.0				1.5	2.5	1.3	26	32	23	80
W. Plains of San Augustin													7	7	7	21
White Mesa - Todilto Gypsum				2.0	2.3	3.0							3	5	4	12
Willow Spring, Cienega Ranch													3	3	1	7
Zuni Mountains	1.2	3.0	1.4	1.0	2.7	2.3				2.3	2.5	1.5	22	35	23	80
Subtotal Per Category	43	59	38	47	57	56	14	26	12	33	40	29				
Stress Totals			140			159			52			102				

	Urban Development			Floodplain Farming			Channelization			Dams			Water Diversion		
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility
Anderson Mesa Lakes	1.7	1.7	1.7	1.0	2.0	1.5			1.0	1.0	1.0	2.0	1.5	2.0	2.5
Bill Williams Mountains	2.5	2.0	3.0						3.0			3.0	2.0	1.0	1.0
Black River/White River Headwa	1.5	3.0	2.0	1.5	3.0	1.0	1.0	2.0	1.5	1.5	1.0	2.3	2.0	3.0	1.5
Blue River/San Francisco River	2.0	2.5	1.5	2.0	3.0	2.0	2.5	3.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0
Clay Springs	1.0	1.0	2.0		1.0	1.0			1.0			1.0	2.0	3.0	2.0
Dry Beaver Creek	2.0	2.5	2.5	1.5	3.0	1.0	2.0	3.0	3.0			3.0	1.0	3.0	1.0
Mogollon Canyons Complex	1.3	1.0	1.5				1.0	1.0	1.0	3.0	3.0	2.0	1.5	2.0	1.0
Nutrioso Creek	2.0	3.0	2.0	2.5	3.0	2.0	2.0	3.0	2.0	3.0	3.0	2.5	2.5	3.0	1.0
San Francisco Peaks	2.0	1.9	2.2				1.0	1.0	1.0			1.0	2.0	2.0	1.3
Springerville Grasslands	2.0	2.3	1.8	2.5	3.0	2.0	3.0	2.0	1.5			1.0	2.0	3.0	2.0
Stoneman Lake	2.7	3.0	2.3						1.0			1.0			
Sycamore & Oak Creek Canyons	1.0	1.0	1.0												
Wet Beaver Creek	2.7	3.0	2.3	1.7	2.3	2.0	2.0	2.0	2.0	3.0		3.0	2.3	3.0	2.7
White Mountains Complex	1.3	1.8	1.8	2.0	3.0	2.0	2.0	3.0	2.0	1.0	1.0	1.0	2.0	3.0	2.0
Subtotal Per Category (AZ)	26	30	28	15	23	15	17	20	22	16	12	25	24	31	20
Stress Totals (AZ)			83			53			59			52			75

Subtotal Per Category (Comb.)	70	82	80	43	59	38	46	52	50	38	37	45	60	80	55
Stress Total (Combined			232			141			148			120			195

	Water Extraction			Fire Suppression			Inappropriate Grazing			Exotic Plants			Exotic Animals		
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility
Anderson Mesa Lakes	1.5	2.0	2.3	1.7	3.0	1.0	2.4	3.0	1.8	1.0	2.0	2.3	2.5	3.0	2.0
Bill Williams Mountains	2.0	2.0	2.5	2.3	2.5	1.5	2.5	2.5	1.2	2.0	2.0	1.7	2.0	2.0	2.0
Black River/White River Headwa	1.3	3.0	2.0	1.8	2.8	1.0	2.6	2.6	1.0	1.5	2.5	2.0	3.0	3.0	2.0
Blue River/San Francisco River	1.0	2.3	2.3	2.3	2.8	1.3	2.6	2.7	1.2	2.0	2.7	2.0	3.0	3.0	2.0
Clay Springs	2.0	3.0	2.0	2.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0		2.0		
Dry Beaver Creek	1.8	3.0	2.0	1.0	2.7	1.5	1.5	3.0	1.0	1.5	2.3	2.3	3.0	3.0	2.0
Mogollon Canyons Complex	2.0	1.5	2.0	2.8	3.0	1.5	2.5	3.0	1.3	1.7	3.0	2.3	2.7	3.0	2.0
Nutrioso Creek	1.5	3.0	2.0	1.0	3.0	1.0	2.6	2.6	1.4	3.0	3.0	2.5	3.0	3.0	1.5
San Francisco Peaks	2.2	3.0	2.0	2.6	2.4	2.0	1.4	2.0	2.1	1.5	2.3	2.0	1.6	2.0	1.6
Springerville Grasslands	2.0	3.0	1.5	2.3	3.0	2.0	2.5	2.5	1.8	2.0	2.3	1.3	1.0	1.0	1.0
Stoneman Lake	1.3	1.5	1.7	1.5	2.3	1.3	1.5	3.0	1.0	1.0	2.5	2.5	1.0	3.0	3.0
Sycamore & Oak Creek Canyons	1.0	1.0	1.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0	3.0	1.5			
Wet Beaver Creek	2.5	1.8	2.5	1.0	2.3	1.5	2.7	3.0	1.0	1.3	2.0	2.0	1.0	2.0	1.5
White Mountains Complex	1.7	2.3	2.0	2.4	2.7	1.4	2.4	3.0	1.7	1.6	2.6	1.6	2.3	3.0	1.8
Subtotal Per Category (AZ)	24	32	28	27	38	20	31	39	19	24	35	26	28	31	22
Stress Totals (AZ)			84			85			89			85			82

Subtotal Per Category (Comb.)	71	87	68	83	99	59	99	114	64	71	90	71	65	86	58
Stress Total (Combined			226			241			277			233			208

	Recreation			Mining			Military Activity			Logging			Site Summary Totals			
Site Name	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Severity	Immediacy	Reversibility	Site Total
Anderson Mesa Lakes	2.6	2.6	1.8	2.0	2.0	1.5			2.0	1.7	2.7	1.7	21	27	25	73
Bill Williams Mountains	2.0	2.5	1.5	2.0	1.5	2.0	2.0	3.0	3.0	2.3	2.0	1.7	24	23	27	74
Black River/White River Headwa	2.8	3.0	2.0	1.0	1.0	1.5		1.0	1.0	2.3	2.3	1.7	24	33	23	79
Blue River/San Francisco River	2.0	2.7	2.3	2.0	3.0	2.5		1.0	1.0	1.7	1.7	1.7	29	36	26	91
Clay Springs		1.0	3.0	2.0	1.0	3.0	2.0		1.0	1.0	2.0	3.0	20	21	23	64
Dry Beaver Creek	2.3	3.0	2.0	1.0	3.0	2.0			2.0				19	31	25	75
Mogollon Canyons Complex	2.3	3.0	1.8	3.0	1.0	2.5	3.0			2.0	2.5	1.5	29	27	20	76
Nutrioso Creek	2.0	3.0	2.7		1.0	1.0		1.0	1.0	1.0	1.0	1.0	26	36	24	85
San Francisco Peaks	1.6	2.8	3.0	2.6	2.7	2.0	3.0		2.5	2.6	2.6	1.9	24	25	25	73
Springerville Grasslands	1.3	2.3	1.7	1.0	2.5	2.0		1.0	1.0	1.0	3.0	2.0	23	31	23	76
Stoneman Lake	1.8	3.0	2.3			2.0			2.0	1.0	1.0	2.0	12	19	22	53
Sycamore & Oak Creek Canyons	1.0	2.5	1.0							2.0	3.0	2.0	9	17	9	34
Wet Beaver Creek	2.3	2.8	2.3			2.0			2.0	1.0	1.0	1.0	23	25	28	76
White Mountains Complex	2.5	3.0	2.3	1.0	3.0	2.0		1.0	1.0	2.3	2.5	1.5	24	35	24	83
Subtotal Per Category (AZ)	26	37	30	18	22	26	10	8	20	22	27	23				
Stress Totals (AZ)			93			65			38			72				

Subtotal Per Category (Comb.)	69	96	67	64	78	82	24	34	32	55	67	52
Stress Total (Combined			233			225			89			174

We received responses from 35 experts with stress information for 50 of the 52 portfolio sites. In some cases we received information from only one expert for some sites, while we received as many as 11 responses for others . We averaged the response for each site from all responses for that site. The results of this compilation for each site are shown in Table 21.

III. Ecoregion-wide Stresses

The stress analysis for the 52 portfolio sites was used to determine patterns of threats across the ecoregion. While most sources of stress were identified as occurring, or potentially occurring, on most sites within the portfolio, we counted the number of sites in which a source of stress occurred with at least moderate severity (Severity Code > 1.9) to identify those stresses that could be considered widespread and pervasive within the ecoregion (Table 22). This, in turn, helps us to identify those stresses for which multi-site or ecoregion-wide strategies would be necessary to ensure protection of the sites and targets.

Table 22. Summary of Multi-site Stresses, showing the number of sites within the ecoregion in which each source of stress occurs with at least moderate severity (Severity Code > 1.9).

Source of Stress	Sites
Inappropriate Grazing	34
Altered Hydrologic Regime	32
Altered Fire Regime	27
Exotic Plants & Animals	25
Mining	19
Urban Development (incl. 2nd homes)	18
Recreation	17
Floodplain Farming	11
Logging	8
Military Activity	7

The following are identified as the principle multi-site sources of stress:

1. **Inappropriate grazing**. Identified as an issue on 90% of all the sites in the portfolio, but identified as being of at least moderate severity on 65% of the sites. Grazing includes domestic livestock, largely cattle and sheep and, in some cases, elk (especially in the White Mountains of Arizona). Inappropriate grazing may include too many animals, grazing at an inappropriate time, poorly distributed animals, or grazing in inappropriate habitats.

Forty sites within the portfolio are entirely or partially within Forest Service grazing allotments (Appendix VIII), representing at least 343 individual allotments, totaling some 7.8 million acres, and managed by seven different National Forests. In addition, several sites contain BLM and/or State Trust Land grazing allotments.

2. **Altered hydrologic regime**. This was identified as having some impact on 83% of the portfolio sites but as occurring with at least moderate severity on 62% of the sites. Hydrologic alteration includes stream channelization, levee construction, damming, water diversion, and other actions that change patterns of flood, flow, seasonality, and water quality in streams. It may also be tied to other sources of stress including urban development, inappropriate grazing, floodplain farming, logging, mining, and altered fire regime.

3. **Altered fire regime**. Identified as having some effect on 85% of all sites in the portfolio and as being of at least moderate severity on 52% of the sites. Most sites within the southwest have suffered from an intense program of fire suppression by public agencies for almost 100 years. In many cases, fire suppression is also closely linked with grazing practices which remove fine fuels necessary to carry fire. Fire suppression affects most terrestrial habitats, from grasslands to closed-canopy forests, although the effects may be quite different. While fire suppression and grazing may keep fire from grasslands (which may, in turn, result in invasion by woody shrubs and trees), the effect on forested habitats may be a tendency toward more extreme fire events with catastrophic results for species, habitats, soil structure, and watersheds.

4. **Exotic plants & animals.** Identified as impacting at least 83% of all sites but being of at least moderate severity on 48% of all sites in the portfolio. A wide range of exotic species has both direct and indirect impacts on a variety of native species, natural communities, and natural processes; however, the bulk of the impact is to riparian and aquatic systems. The most important exotic plants are phreatophytes, especially saltcedar (*Tamarix* spp.). The greatest impacts from animals are from non-native fish. In fact, there are nearly as many introduced fish species as natives in the streams systems of New Mexico and Arizona. Other introduced species which may have major effects on natives include the bullfrog (*Rana catesbeiana*), various species of crayfish (Decapoda), and a variety of rangeland weeds including both grasses (e.g. cheatgrass, *Bromus tectorum*) and forbs (e.g., leafy spurge (*Euphorbia esula*), yellow star-thistle (*Centaurea solstitialis*), and Russian thistle (*Salsola iberica*)).

These top four stresses affect almost twice as many sites as the next highest scoring stress. Therefore, these are clearly stresses which should, if possible, be addressed in a broad-scale strategic approach.

IV. Site Prioritization

The portfolio of sites represents a “package deal," not a list of potential sites from which to choose. Conservation success in implementing the portfolio requires seeing conservation action on all the portfolio sites and with all the conservation targets. The concept of an ecoregional portfolio means that even a small site with a single target species is just as important in completing the portfolio as a large site with many targets. Nevertheless, the team recognized that some degree of prioritization was required to differentiate those sites that needed immediate action from those that we could wait before acting on. Understanding the significance of the total portfolio concept means that there are really only two measures which contribute to the priority of a site within the portfolio: the degree of immediate threat to the site, and the uniqueness, or irreplaceability, of the that site. Thus, while the numbers of targets or numbers of occurrences on a

site may be a measure of the biological richness and value of a particular site, within the currency of a portfolio a site only has a higher priority than another site if it is more threatened and if there are fewer options for finding an alternative site or sites which contain the target or targets contained within that site.

We used the stress analysis to determine the degree of threat to each portfolio site. Degree of threat was considered to be a function of the severity of threat and the immediacy of that threat. Since we had severity and immediacy values for a number of sources of stress for each site, we selected the largest value for the product of severity X immediacy for each source of stress for each site. Using these values we ranked the sites in order of degree of threat, maintaining ties (Table 23).

We then used portfolio site information to rank the 52 sites of the portfolio based on irreplaceability. The degree of irreplaceability was based upon the extent to which targets on a site are known to occur on other sites. We ranked sites based on their numbers of unique to less unique targets. We counted unique targets per site and ranked sites based on this count in descending order. Thus a site with 5 unique targets is ranked higher than one with 2 unique targets. If a site has no unique targets, it is ranked by the count of its targets occurring on only 2 sites, then three, four, five, or more than five sites, again in descending count order.

Raw rank values for degree of threat and degree of irreplaceability were then translated into high, medium, and low based upon natural breaks in the rank order. The sites were then arrayed in a three-by-three rank matrix (Table 24).

Seven sites were considered to be of both high irreplaceability and under high threat; The Blue /San Francisco Rivers and the Chuska Mountains (both in both Arizona and New Mexico), the Mogollon Canyons Complex in Arizona, and the Gila River, Mogollon Divide, Rio Nutria, and the Southern Black Range / Cooke's Peak in New Mexico.

We used the nine matrix categories in Table 24 to create the following five priority categories:

1. **High priority** = High Threat *and* High Irreplaceability
2. **Medium high priority** = High Threat *and* Medium Irreplaceability., *or* Medium Threat *and* High Irreplaceability.
3. **Medium priority** = High Threat *and* Low Irreplaceability *or* High Irreplaceability *and* Low Threat OR Medium Threat *and* Medium. Irreplaceability.
4. **Medium low priority** = Low Threat *and* Medium Irreplaceability *or* Low Irreplaceability *and* Medium Threat.
5. **Low priority** = Low Threat *and* Low Irreplaceability.

These priorities are represented in the Prioritization Map in Figure 10.

Table 23. Maximum Threat Parameters for All Sites.

Site Code	Site Name	# Responses	Severity	Immediacy	Reversibility
1	Guadalupe Mountains Escarpment	6	2.0	2.0	3.0
2	Sitting Bull Falls	4	2.4	3.0	1.8
3	Sacramento Mountains	9	2.4	2.5	2.3
4	Rio Penasco	8	3.0	3.0	2.3
5	Rio Hondo	6	3.0	3.0	2.0
6	Sierra Blanca	5	2.4	3.0	2.8
7	Fort Stanton/Rio Bonito Area	5	3.3	3.0	2.5
8	Capitan Mountain	7	2.0	2.1	2.3
9	San Felipe - Todilto Limestone	1	2.0	3.0	3.0
10	Sandia Wilderness	8	2.0	3.0	2.0
11	White Mesa - Todilto Gypsum	1	2.0	3.0	3.0
12	Mesa Prieta	0	0.0	0.0	0.0
13	Sevilleta NWR	6	2.2	2.5	1.5
14	Sedillo Spring	2	2.0	2.0	1.3
15	Magdalena Mountains	5	2.3	2.0	1.7
16	Torreon Spring	1	2.0	2.0	1.0
17	Willow Spring, Cienega Ranch	1	3.0	3.0	1.0
18	San Mateo Mountains Complex	7	2.3	2.0	2.0
19	Mineral Creek	3	3.0	3.0	2.5
20	Ladder Ranch	3	2.0	3.0	1.0
21	Las Animas Creek	7	2.5	3.0	2.0
22	Hillsboro West	3	2.0	2.0	3.0
23	Northern Black Range	6	3.0	3.0	3.0
24	So. Black Range/Cooke's Peak	6	3.0	3.0	1.8
25	Mimbres River	10	3.0	3.1	2.5
26	Fiero Hill	3	2.5	2.5	2.0
27	Gila River	9	3.0	3.0	2.3
28	Mogollon Divide	8	2.6	3.0	2.5
29	Tularosa River	7	3.0	3.0	2.5
30	W. Plains of San Augustin	3	2.0	2.0	2.0
31	Sawtooth/Datils	6	2.0	3.0	3.0
32	North Plains	0	0.0	0.0	0.0
33	Blue Water Creek Canyon	4	2.0	2.0	2.0
34	Mount Taylor	4	2.3	3.0	3.0
35	Prewitt/Thoreau	2	2.0	3.0	3.0
36	Rio Nutria	5	3.0	3.0	3.0
37	Zuni Mountains	8	3.3	3.0	2.3
38	Chuska Mountains	11	3.0	3.0	2.3
39	Blue River/San Francisco River	9	3.0	3.0	2.5
40	White Mountains Complex	10	2.5	3.0	2.3
41	Nutrioso Creek	7	3.0	3.0	2.7
42	Springerville Grasslands	4	3.0	3.0	2.0
43	Black River/White River Headwaters	8	3.0	3.0	2.3
44	Clay Springs	1	3.0	3.0	3.0
45	Mogollon Canyons Complex	4	3.0	3.0	2.5
46	Anderson Mesa Lakes	8	2.6	3.0	2.5
47	Wet Beaver Creek	7	3.0	3.0	3.0
48	Stoneman Lake	4	2.7	3.0	3.0
49	Dry Beaver Creek	4	3.0	3.0	3.0
50	Sycamore & Oak Creek Canyons	2	2.0	3.0	2.0
51	San Francisco Peaks	11	3.0	3.0	3.0
52	Bill Williams Mountains	7	2.5	3.0	3.0

Table 24. Prioritization Matrix of the 52 Portfolio Sites Within the Arizona / New Mexico Mountains Ecoregion Portfolio.

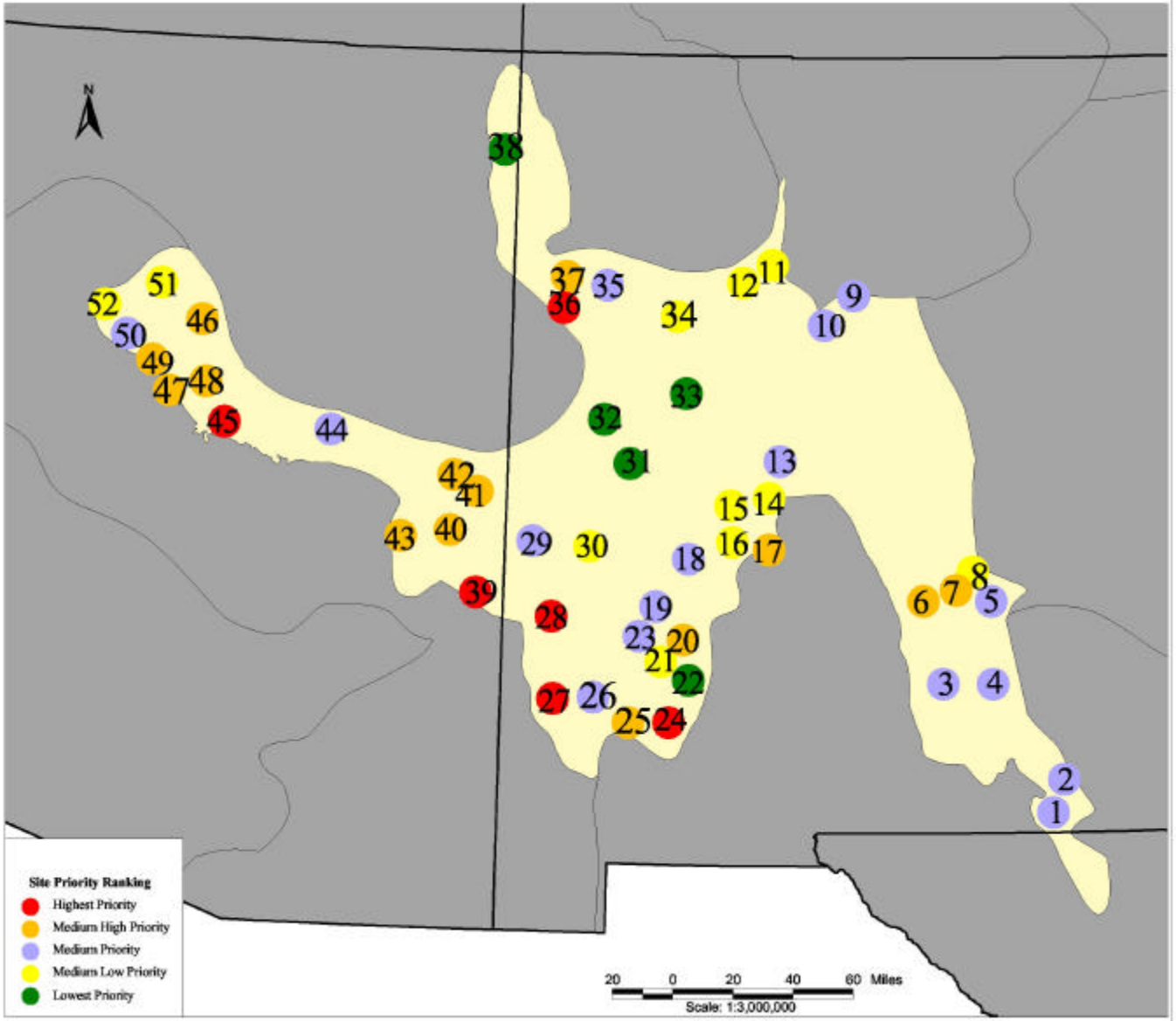
DEGREE OF	DEGREE OF IRREPLACEABILITY		
THREAT	**High**	**Medium**	**Low**
High	**Blue River/San Francisco River** **Chuska Mountains** **Gila River** **Mogollon Canyons Complex** **Mogollon Divide** **Rio Nutria** **Southern Black Range/Cooke's Peak**	Anderson Mesa Lakes Black River/White River Headwaters Dry Beaver Creek Fort Stanton/Rio Bonito Area Nutrioso Creek Springerville Grasslands Stoneman Lake Wet Beaver Creek Willow Spring, Cienega Ranch Zuni Mountains	Clay Springs Mineral Creek Northern Black Range Rio Hondo Rio Penasco Tularosa River
Medium	Ladder Ranch Mimbres River Sierra Blanca White Mountains Complex	Fierro Hill Prewitt/Thoreau Sitting Bull Falls Sycamore & Oak Creek Canyons	Bill Williams Mountains Las Animas Creek Mount Taylor San Francisco Peaks
Low	Guadalupe Mountains Escarpment Sacramento Mountains San Felipe - Todilto Limestone San Mateo Mountains Complex Sandia Wilderness Sevilleta NWR	Capitan Mountains Magdalena Mountains Mesa Prieta* Sedillo Spring Torreon Spring Western Plains of San Augustin White Mesa - Todilto Gypsum	Blue Water Creek Canyon Hillsboro West North Plains* Sawtooth/Datils

* No threat data was captured for these sites; therefore, their prioritization in this table requires further investigation

Figure 10. Arizona / New Mexico Mountains Ecoregion Portfolio Site Status

Site Legend

1 Guadalupe Mountains Escarpment
2 Sitting Bull Falls
3 Sacramento Mountains
4 Rio Penasco
5 Rio Hondo
6 Sierra Blanca
7 Fort Stanton/Rio Bonito Area
8 Capitan Mountains
9 San Felipe - Todilto Limestone
10 Sandia Wilderness
11 White Mesa - Todilto Gypsum
12 Mesa Prieta
13 Sevilleta National Wildlife Refuge
14 Sedillo Spring
15 Magdalena Mountains
16 Torreon Spring
17 Willow Spring, Cienaga Ranch
18 San Mateo Mountains Complex
19 Mineral Creek
20 Ladder Ranch
21 Las Animas Creek
22 Hillsboro West
23 Northern Black Range
24 Southern Black Range/Cook's Peak
25 Mimbres River
26 Fierro Hill
27 Gila River
28 Mogollon Divide
29 Tularosa River
30 Western Plains of San Augustin
31 Sawtooth/Datils
32 North Plains
33 Blue Water Creek Canyon
34 Mount Taylor
35 Prewitt/Thoreau
36 Rio Nutria
37 Zuni Mountains
38 Chuska Mountains
39 Blue River/San Francisco River
40 White Mountains Complex
41 Nutrioso Creek
42 Springerville Grasslands
43 Black/White River Headwaters
44 Clay Springs
45 Mogollon Canyons Complex
46 Anderson Mesa Lakes
47 Wet Beaver Creek
48 Stoneman Lake
49 Dry Beaver Creek
50 Sycamore & Oak Creek Canyons
51 San Francisco Peaks
52 Bill Williams Mountains



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V. Data Gaps

As a final step in portfolio analysis we identified the data gaps that we had encountered throughout the ecoregional planning process. There are two types of data gaps: (1) sites identified as potentially important by the experts but for which we have no target data; and (2) target species, natural communities, or special habitats for which we have no occurrence information.

Two sites were identified during the Experts Workshop in Albuquerque as probably being of high biological value but for which there was insufficient data to warrant including the sites in the portfolio: the Playa Lakes of the Estancia Basin in Torrance County, New Mexico, and the Plains of St. Augustin in Catron and Socorro Counties, New Mexico. The Estancia Basin playas are probably an important migratory bird stopover site, and may have additional diversity value for invertebrates and other species, but the nomination of the site was based upon hunch alone, not upon hard data. A small Plains of San Augustin site was subsequently identified to capture an occurrence of *Orehelix littoralis*, but the site was not demarcated in order to capture the vast grassland system identified by the experts as the major biological feature of this large area. Both these sites deserve further investigation prior to future iterations of this ecoregional plan.

Two additional sites were identified for having special habitat or species assemblages but were not included in the portfolio for a lack of data which could verify the importance of these features in an ecoregional context. These sites are the Big Mule Mountains in Grant County, identified for a bat wintering site, and a system of ice caves in the El Malpais area of Cibola County.

Few target species were not captured during the assembly process. Most species or subspecies targets were missed because, while the target was identified as being of high priority, there were no corroborating data on the occurrence of these targets on any specific sites which could be identified. Data on these missed species should be acquired prior to assembling any future iteration of the portfolio. At least 77 plant associations were not captured due to a lack of specific target occurrence data or because we purposefully did not add sites to the portfolio based solely on the occurrence of Priority 2 plant association targets; but almost all of these were captured at the alliance-level. More significantly, eight plant alliances were not captured; however, this is likely because these alliances are common and therefore are not represented by EO data, and we are fairly confident that we actually captured multiple occurrences of these alliances within the 52 portfolio sites. A list of species, alliance, and habitat targets missed in the portfolio is provided in Table 25 together with the comments on their omission.

Table 25 Data Gaps: Targets Without Representation in the Final Portfolio Sites.

Target Name	Priority	Comments
Species targets:		
Adenophyllum wrightii	1	syn = A. wrightii var. wrightii. The only EO is from 1800s
Asplenium adiantum nigrum	1	no BCD EL Code; no Expert occurrences
Astragalus eggelstonii	2	no BCD EL Code; no Expert occurrences
Carex mckitterickensis	2	no BCD EL Code; no Expert occurrences
Erigeron anchana	1	there is a BCD Code but no BCD or Expert occurrences
Escobaria duncanii	1	there is a BCD Code but no BCD or Expert occurrences
Heuchera wootonii	1	there is a BCD Code but no BCD or Expert occurrences
Tamias minimus arizonensis	2	there is a BCD Code but no BCD or Expert occurrences
Thomomys talpoides fossor	1	there is no BCD Code for the sbsp., Probably captured in Chuska site.
Alliances not captured:		
Quercus turbinella	2	No EO data: probably captured in several sites
Eleocharis palustris	2	No EO data: probably captured in several sites
Juncus balticus	2	No EO data: probably captured in several sites
Scirpus americanus	2	No EO data: probably captured in several sites
Scirpus tabernaemontani	2	No EO data: probably captured in several sites
Typha latifolia	2	No EO data: probably captured in several sites
Festuca arizonica	2	No EO data: probably captured in several sites
Muhlenbergia montana	2	No EO data: probably captured in several sites
Special Habitat Targets:		
Shorebirds, waterfowl, crustaceans, mammals, plants.	2	Insufficient data to define a site.
Unique plant communities of ice caves, kipukas of varying ages, substrates, & degrees of isolation.	2	Insufficient data to define a site.
Winter site for 7 bat species.	2	Insufficient data to define a site.
Very important ephemeral wetlands	2	Insufficient data to define a site.

VI. Conservation Strategies

Conservation strategies to address multi-site threats in the Arizona New Mexico Mountains ecoregion were developed by a sub-committee of the planning team in a series of meetings and discussions. This section of the report will focus on multi-site conservation strategies in an effort to achieve the broadest conservation effect with the most efficient use of resources. Many sites within the ecoregional portfolio require site-specific conservation actions by land owners, managers and partners, such as; acquisition of conservation easements, modification of management of public lands, element or process-based monitoring programs, ecological restoration, riparian area fencing, or cooperation with private land stewardship efforts. Site-specific strategies will need to be identified and developed through more detailed site planning.

1. Opportunities for broad-scale changes in land management

In this particular ecoregion, as in many of those in the western U.S., conservation success will depend on close cooperation with public land management agencies. As previously mentioned, roughly 66% of the ecoregion consists of public or tribal lands. In the final portfolio, 85.2% of the selected sites are on public lands, with 63.5% in federal ownership. These sites were selected with strong participation from public agency personnel through the experts workshops, and development and implementation of conservation strategies for many of the sites will require similar involvement or support for planning, management and monitoring.

Involvement of private landowners will also be critical to success. Although private lands represent a small portion of the final portfolio, activities on public lands carried out by private landowners rank as high sources of stress on selected sites. In particular, historic and current inappropriate grazing practices register as sources of stress in 90% of all sites in the portfolio. Inappropriate grazing also affects other sources of stress, such as altered hydrologic regime (e.g. creation of water-catchment tanks), altered fire regime (e.g. removal of fine fuels such as grasses and herbs), and exotic plants (e.g. introduction of exotic weeds through contaminated feed or through movement of livestock).

Currently, livestock grazing allotments are the unit of measure by which the majority of significant land management decisions are made on National Forests in the southwest. Grazing allotments cover approximately 7.8 million acres of the ecoregion. In the National Forests of the AZ/NM Mountains Ecoregion, grazing has been the predominant extractive use. From the early days of cattle and sheep grazing (in the 1850's), until the Taylor Grazing Act was passed in 1934, unmanaged grazing in combination with fire suppression significantly altered the southwestern landscape. Stocking rates have declined recently as range land conditions have deteriorated and prescribed burns are now utilized to some degree on USFS lands. Still, improvements will have to be made to poor grazing methods employed on many USFS allotments before major improvements are seen in the condition of these landscapes.

2. Broad-based Conservation Strategies at Multiple Portfolio Sites

Examples of multi-site conservation strategies which might be applied across the ecoregion are given below.

A. Changes in Land Use.

Land use and economics in the ecoregion are shifting from traditional resource extraction activities (e.g. logging and ranching) to such service-based activities as tourism, recreation and second-home development. Land values have risen dramatically in some areas. At the same time, public land management agencies have changed their emphasis to multiple-use and ecosystem management approaches. This has led to historic policy shifts, such as Forest Service Chief Dombeck's order in January 1998, calling an eighteen month halt to all new road construction. Lawsuits have paralyzed the forest planning process, while internal conflict within the USFS has become more and more obvious, as old guard staff vie with an emerging constituency that is seemingly more open to change. These and related demographic and technological changes alter land use, and thus present different threats to portfolio sites and ecological processes. Only by understanding present and future directions in these trends and evaluating their ecological implications can we create a protection scheme that will succeed in conserving target sites.

While the scientific information gathered in this ecoregional analysis process identifies protection needs, we often lack the social, economic and political evaluations to develop a clear, effective conservation approach. Gathering and analyzing information on land-use trends requires a small amount of effort in comparison to the threates which need to be overcome. The most challenging aspect of this strategy will be the development of an approach that can overcome legal or policy impediments within the social context of this ecoregion. Economic and political shifts will be a strong motivating force for development of alternative land uses.

B. Landscape Level Fire.

Altered fire regimes proved to be of at least moderate severity in 52% of selected portfolio sites. While this phenomenon has become widely accepted by ecologists and land managers in the southwest, communication and administrative mechanisms are not often in place to promote prescribed burning across the wider landscape. We need to encourage practical discussions to increase knowledge and cooperation among land managers and researchers, to understand and develop methods to overcome the barriers to prescribed burning, and to research the effects of fire on rare species and conservation targets. Much of the ecoregion consists of ponderosa pine and mixed conifer habitats, in which the need for thinning prior to burning can be a significant economic barrier. In grassland and piñon - juniper woodlands, prescribed fire may be more easily implemented, but fuel loads may be

insufficient to carry a burn. These and other related topics require joint examination by scientific and management staff.

Increasing communication and coordination on prescribed burning and fire ecology could lead to major improvements in fire implementation on the ground. The scientific need for re-introduction of fire is well proven, although some issues such as invasion of exotics and protection of rare species need to be further addressed. Legal and policy impediments will need to be addressed at a higher level.

C. Monitoring

Through the target selection and portfolio assembly, we have attempted to develop a set of sites that, if appropriately protected, would ensure the long-term viability of the ecoregion's biological diversity. These sites serve as a microcosm for the health of the entire ecoregion. By developing a method for long-term monitoring of conservation targets and the ecological processes that support them, we can gauge the success or failure of conservation strategies and readjust the approach as needed.

Implementation of a monitoring program would be an enormous contribution towards conservation in the ecoregion, and the need for such monitoring is scientifically clear. The strategy requires a large and consistent level of effort, but monitoring activities would lead to substantial public education and would also be enjoyable for volunteers. Legal and policy impediments may not be large, but the effort to maintain reliable, well-trained volunteers would be substantial.

D. Alternative Land Management

Scientists in the ecoregion recognize inappropriate grazing as a source of stress in 90% of the portfoliosites. However, even with the current shifts in public and private land use, landowners holding public grazing allotments may find it difficult to make a transition to more ecologically sound grazing practices or other sustainable uses of grazing allotments. There may be ways of effectively protecting sites by improving livestock management, allowing alternative means of income production on grazing allotments, or by acquiring grazing allotments from willing sellers.

If successful transitions could be made, this strategy would have a highly significant effect on conservation of portfolio sites and the general landscape. The level of effort would be large, and success will require political support from many groups and individuals. Legal and policy impediments will have to be overcome, but political trends are already moving the pendulum in a favorable direction.

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Appendices

Appendix I.

Changes Made to the Arizona / New Mexico Mountains Ecoregion Boundary by the Ecoregional Planning Team.

Early in the planning process the planning team made some small but important adjustments to the ecoregional boundary for the Arizona / New Mexico Mountains. These changes were made in coordination with the US Forest Service Regional Office which has been responsible for much of the original ecoregion boundary derivation. Refer to the map to identify the adjustments described.

1. Chuska Mountains. The boundary was narrowed to reflect the actual mountain front which differentiates this unique range from the surrounding Colorado Plateau.

2. Jemez-Rio Puerco area. Increased the precision of the location of the Jemez Mountain mass and the actual limits of the Rio Puerco watershed.

3. Sacramento Mountains western front. Increased precision in the location of the Tularosa Basin graben and the mountain front.

4. Capitan Mountains. The boundary was moved east to include the entire crest of this unique mountain mass.

5. Guadalupe Mountains. Removed a large area of Chihuahuan Desert lowlands from the southeast corner of the ecoregion in the area of Carlsbad Canyon National Park.

6. Guadalupe Mountains west rim. An area of Chihuahuan Desert lowlands, including gypum dunes, was removed from the ecoregion.

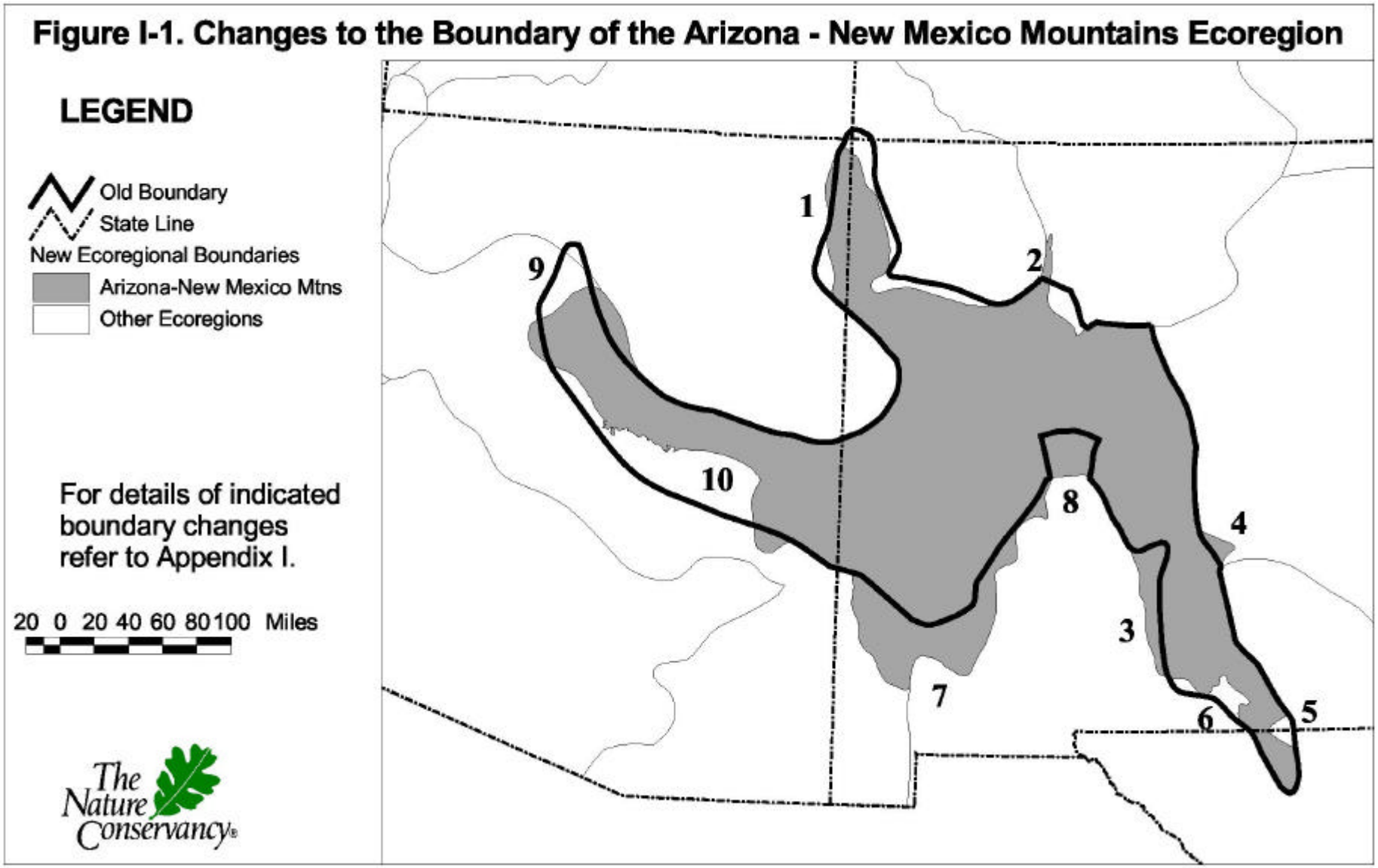
7. Gila Mountains. Increased the precision of the location of the mountain front by moving the ecoregional boundary south within the watersheds of the Mimbres and Gila Rivers and to include the southern Black Range and the Cooke's Peak area.

8. Sevilleta National Wildlife Refuge. Sevilleta is truly transitional between the Chihuahuan Desert, Arizona / New Mexico Mountains, the Colorado Rocky Mountains, and the Southern Shortgrass Prairie. The entire transition area was included within the Arizona /New Mexico Mountains.

9. Coconino Plateau. Adjusted the ecoregional boundary to the south to exclude portions of the Kaibab Plateau from the ecoregion.

10. Mogollon Rim. Moved the boundary to correspond to the Mogollon Rim's actual location across the Coconino Plateau; this is a major feature which differentiates the Arizona / New Mexico Mountains from the Apache Highlands ecoregions.

Figure I-1. Changes to the Boundary of the Arizona - New Mexico Mountains Ecoregion



Appendix II: Target Species in the Arizona / New Mexico Mountains.

Part 1. Target Plant Species of the Arizona / New Mexico Mountains.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes:
Priority 1 species:								
Adenophyllum wrightii var. Wrightii (=Dysodia neomexicana)	Wright's dogweed	P?	SC		G2	R	1	
Allium gooddingii	Goodding onion	E	C	HS	G3	S3	1	
Apacheria chiricahuensis	Cliff brittlebush	E, GR			G3	S2	1	Very limited distribution
Asplenium adiantum nigrum					G2Q	SU	1	Mt. Eldon
Astragalus atlus	Tall milkvetch	E			G2	S2	1	Sacramento mtns.
Astragalus chuskanus	Chuska mt milkvetch	E			G2	S2	1	Chuska endemic
Astragalus feensis	Santa fe milkvetch	E			G3	S3	1	
Astragalus kerrii	Kerr's milkvetch	E			G3	S3	1	Capitan mtns.
Astragalus knightii	Knight milkvetch	E/P			G2	S2	1	
Astragalus micromeris	Chaco milkvetch	E/P			G2	S2	1	
Astragalus naturitensis	Naturita milkvetch	E			G2	S2	1	
Astragalus neomexicanus	New mexico milk-vetch	E			G3	S3	1	Sacramento mtns.
Astragalus nutriosensis	Nutrioso milk-vetch		SC	SR	G1	S1	1	Sacramento mountains, sierra blanca
Besseya oblongifolia	Sierra blanca kittentails	E			G2	S2	1	
Brickellia modesta		GR			G2	S2	1	Sacramento mtns.
Castilleja mogollonica	White mountains paintbrush		SC	SR	G1	S1	1	
Chaetopappa elegans syn=ionactis elegans	Sierra blanca cliffdaisy	E	SC		G2	S2	1	
Chaetoppa hersheyi	Guadalupe cliffdaisy	E	SC		G3	S3	1	
Cimicifuga arizonica	Arizona bugbane		C	HS	G2G3	S2S3	1	
Cirsium parryi mogollonicum	Mogollon thistle		SC	SR	G4T1	S1	1	
Cirsium vinaceum	Sacramento mountains thistle	E	SC		G2	S2	1	
Crataegus wootoniana	Wooton's hawthorn				G2	S2	1	Pinos altos & sacramento mts.
Delphinium novomexicana	New mexico larkspur	E			G2	S2	1	Sacramento mts., Riparian
Echinocereus fendleri var. Kuenzleri	Kuenzler's hedgehog cactus	E			G4G5T1	S1	1	
Erigeron acomanus	Acoma fleabane	E	SC		G1G2	S1S2	1	
Erigeron anchana	Mogollon fleabane		SC		G2	S2	1	
Erigeron hessii	Hess's fleabane	E	SC		G1	S1	1	
Erigeron rhizomatous	Rhizome fleabane	E			G2	S2	1	
Erigeron saxatilis					G2	S2	1	
Erigeron scopulinus	Winn falls fleabane	E			G3	S3	1	
Erigeron sivinskii	Sivinski's fleabane	E	SC		G2	S2	1	
Escobaria duncanii	Duncan's pincushion cactus	R			G1G2	S1	1	
Escobaria villardii	Villard's pincushion cactus	E			G2	S2	1	
Hedeoma apiculata	Mckittrick pennyroyal	E			G3	G3	1	
Hedeoma pulcherrima	White mt. False-penny-royal	E			G2	S2	1	
Hedeoma todsenii	Todsen's pennyroyal	E			G2	G2	1	
Helianthus paradoxus	Puzzle sunflower	P	SC		G2	S2	1	
Heuchera pulchella	Sandia mountain alumroot	E			G2	S2	1	
Heuchera wootoni	Wooton's alumroot				G2	S2	1	Sacramento mtns.
Hymenoxys brachyactis					G2	S2	1	Gallinas, manzano mtns.
Lesquerella aurea	Golden bladderpod	E			G3	S3	1	
Lupinus sierrae blanca	White mountain lupine	E			G3	S3	1	
Pedicularis angustissima	Narrow leaf lousewort	GR			G2	S2	1	Gila wilderness
Penstemon alamosensis	Alamo penstemon	E	SC		G3	S3	1	
Penstemon clutei	Sunset crater beardtongue		SC	SR	G2	S2	1	
Penstemon neomexicanas	New mexico beardtongue	E			G4T2	S3	1	Sacramento mtns.
Phacelia serrata	Cinder phacelia	E	SC		G2	S2	1	
Potentilla sierra blancae	Sierra blanca cinquefoil	E				S2	1	
Puccinellia parishii	Parish alkali grass				G1	S1	1	
Rumex orthoneurus	Chiricahua dock		C	HS	G2	S2	1	

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes:
Salix arizonica	Arizona willow			HS	G2	S2	1	
Scrophularia macrantha	Mimbres figwort				G2	S2	1	Cookes pk & s. Pinos mts.
Senecio franciscanus	San francisco peaks groundsel		LT	HS	G1	S1	1	
Senecio quaerens	Gila groundsel	E	SC	SR	G2	S1/S2	1	
Senecio sacramentanus	Sacramento mtn. Groundsel	E				S2	1	Sacramento mtns.
Sophora gypsophila var. guadalupensis	Guadalupe mescalbean	GR			G1T1	S1	1	
Stellaria porsildii	Porsild's starwort	E	SC		G1	S1	1	
Streptanthus sparsiflorus	Sparsely flowered jewelflower	E	SC		S2	G2	1	
Talinum validulum	Tusayan flame flower		SC	SR	G2	S2	1	
Townsendia gypsophila	Gypsum townsend's aster	E	SC		G2	S2	1	
Trifolium longipes var neurophyllum	White mountains clover	E	SC		G2	S2?	1	
Valeriana texana	Guadalupe valerian	E			G3	S3	1	
Zigadenus mogollonansis	Green death camas			SR	G2	S2	1	Old growth - gila wilder.
Priority 2 species:								
Abronia bigelovii	Galisteo sand verbena	R			G3	S3	2	
Agastache rupestris	Thread-leaf giant-hyssop	R			G3?	S2	2	
Aquilegia chrysantha var chaplinei	Chapline's columbine	E			G4T2	S2	2	
Argemone pleicantha ssp pinnatisecta	Sacramento prickly-poppy	GR			G5T2	S2	2	
Astragalus accumbens					G3	S3	2	
Astragalus eggelstonii					G3	S3	2	Plains of san augustine
Astragalus troglodytus	Creeping milk vetch				G3	S3	2	
Botrychium crenulatum	Crenulate moonwort		SC		G3?	S?	2	
Carex mckitterickensis	Guadalupe sedge						2	
Chrysothamnus molestus	Tusayan rabbitbrush		SC		G3	S3	2	
Cirsium wrightii	Wright's marsh thistle				G3	S2	2	
Clematis palmeri	Palmer leather flower				G3	S1	2	
Corypantha sneedii var. Leei	Lee's pincushion cactus	E			G2	S2	2	Guadalupe mtns.
Draba mogollonica						S3	2	Mogollon mtns.
Erigeron rybius	Sacramento mtn. Fleabane						2	Sacramento mtns.
Eriogonum jamesii var wootonii						S3	2	Sacramento mtns.
Escobaria guadalupensis	Guad. Mtn. Pincushion cactus						2	Guadalupe mtns.
Gentiana barbellata	Bearded gentian				G3?	S2	2	
Hedeoma diffusum	Flagstaff pennyroyal			SR	G3	S3	2	
Heuchera eastwoodiae	Eastwood alum root				G3	S3	2	
Hymenopappus biennis		R			G3	(S3)	2	
Hymenoxys helenioides	Intermountain bitterweed				G3Q	SU	2	
Lesquerella gooddingii	Goodding's bladderpod	E			G2	S2	2	Black range endemic
Lesquerella valida					G2	S2	2	Capitan, guadalupe mts.
Parthenium alpinum var alpinum	Plains feverfew	GR			G3T2	S2	2	
Penstemon cardinalis	Cardinal beardtongue	E			G3	S3	2	
Penstemon cardinalis ssp regalis	Guadalupe beardtongue	E			G3T2	S2	2	
Penstemon pseudoparvus	San mateo beardtongue					S2	2	
Philadelphis argyrocalyx	Mock orange					S3	2	
Pinus aristata	Rocky mtn bristlecone pine			SR	G3	S2	2	
Polygala rimulicola var. rimulicola	Guadalupe milkwort	R			G3T3	S2	2	
Potentilla multifoliolata	Arizona cinquefoil				G3	S3	2	
Ribes mescalerium	Mescalero gooseberry					S2	2	
Salvia dorrii mearnsii	Verde valley sage		SC	SR	G5T2	S2	2	
Senecio cardamine	Bitter-cress groundsel				G3	S2	2	
Senecio cynthioides	White mountain groundsel	GR			G3?	S3?	2	
Senecio neomexicanus var metcalfei	Metcalfe's groundsel				G3?	S2	2	Gila, mogollon, white mts.
Sibara grisea		GR			G3?	S3?	2	
Silene plankii	Plank's catchfly	GR			G3	S3	2	
Silene wrightii	Wright's catchfly	GR			G3	S3	2	
Toumeya papyracanthus	Paper-spined cactus		SC	SR	G2G3	S2S3	2	
Townsendia formosa		R, D			G3	(S3)	2	Wet habitats

Part 2. Target Invertebrate Species of the Arizona / New Mexico Mountains.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes
Priority 2 species:								
Agathon arizonicus		E			G1	S?	1	
Ashmunella binneyi		E			G1	S1	1	
Ashmunella carlsbadensis	Guadalupe woodland snail	E			G1	S1	1	
Ashmunella cockerelli		E			G1	S1	1	
Ashmunella macromphala	Cook's peak woodland snail	E			G1	S1	1	
Ashmunella mendax		E			G1	S1	1	
Ashmunella mogollonensis	Mogollon Mtns woodland snail	E			G1	S1	1	
Ashmunella pseudodonta	Capitan woodland snail	E			G2	S2	1	
Ashmunella rhyssa altissima		E			G1	S1	1	
Ashmunella rhyssa rhyssa		E			G1	S1	1	
Ashmunella tetrodon	Woodland snail	E			G1	S1	1	
Deroceras heterura	Marsh slug	E			G1	S1	1	
Holospira cockerelli	Cockerell holospira	E			G1	S1	1	
Holospira montivaga	Vagabond holospira	E			G2	S2	1	
Humboltiana ultima	Northern threeband	E			G2	S2	1	
Lachlania dencyanuae	Gila river mayfly	E			G?	S?	1	
Metrichia volada	Page spring micro caddisfly	E	SC		G?	S?	1	
Oregohelix confrugosa	Pinos altos mountainsnail	E			G1	S1	1	
Oreohelix littoralis	San augustin mountainsnail	E			G1	S1	1	
Oreohelix magdalenae	Magdalena mountainsnail	E			G1	S1	1	
Oreohelix metcalfi	Metcalf's mountainsnail	E			G1	S1	1	
Oreohelix nogalensis	Sierra blanca mountainsnail	E			G1	S1	1	
Oreohelix pilsbryi	Chloride mountainsnail	E	SC	E2	G1	S1	1	
Psephenus montanus	White mountains water penny	E	SC		G2?	S2?	1	
Pyrgulopsis chupaderae	Chupadera spring snail	E	C	E2	G1	S1	1	
Pyrgulopsis gilae	Gila springsnail	E	C	E2	G1	S1	1	
Pyrgulopsis neomexicana	Socorro spring snail	E	LE	E1	G1	S1	1	
Pyrgulopsis sp 2	Unnamed spring snail	E	LE	E1	G1	S1	1	
Pyrgulopsis thermalis	New mexico hot spring snail	E	C	E2	G1	S1	1	
Pyrgulopsis trivialis	Three forks springsnail	E	SC	WC	G1	S1	1	
Thermosphaeroma thermophilum	Socorro isopod	E	LE	E1	GXC	S1	1	
Tryonia alamosae	Alamosa springsnail	E	LE	E2	G1	S1	1	
Anodonta californiensis	California floater		SC	WC	G4	S1S2	2	
Cicindela oregona maricopa	Maricopa tiger beetle		SC		G5T3	S3	2	
Polites mystic ssp. dakota	Skipper				G5T2	?	2	
Speyeria nokomis nokomis	Nokomis fritillary	E	SC		G4T2	S1	2	

Part 3: Target Fish Species of the Arizona / New Mexico Mountains Ecoregion.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes
Priority 1 species:								
Catostomus discobolus yarrowi	Zuni bluehead sucker	E	SC	E1	G5T1	S1	1	
Catostomus sp 3	Little colorado sucker	?	SC		G2	S2	1	
Gila intermedia	Gila chub	R,D,XT	SC	E	G2	S2	1	
Gila nigrescens	Chihuahua chub	GR	LT	E1	G1	S1	1	
Lepidomeda vittata	Little colorado spinedace	?	LT	WC	G1G2	S1S2	1	
Meda fulgida	Spikedace	E	LT	E2	G2	S1	1	
Oncorhynchus apache	Apache (arizona) trout	E	LT	WC	G3Q	S3	1	
Oncorhynchus gilae gilae	Gila trout	E	LE	T	G3T1	S1	1	
Rhinichthys cobitis	Loach minnow	E	LT	T	G2	S2	1	
Priority 2 species:								
Catostomus (pantosteus) clarki	Desert sucker	R	SC		G4	S3S4	2	
Catostomus discobolus discobolus	Bluehead sucker	D			G5		2	
Catostomus insignis	Sonora sucker	R	SC		G4	S2	2	
*Catostomus plebeius (*Mimbres pop.)	Rio grande sucker	R			G4	S3SE	2	
Cyprinella formosa	Beautiful shiner	XT,P	LT		G3	S1	2	Potential habitat only - extirpated
Etheostoma lipidum	Greenthroat darter	D		E	G4	S2	2	
Gila pandora	Rio grande chub	D			G3	S3	2	
Gila robusta	Roundtail chub	D	SC	E	G3	S2	2	
Ictalurus lupus	Headwater catfish	D			G3	S1	2	
Oncorhynchus clarkii virginalis	Rio grande cutthroat trout	D			G4T2	S2SE	2	
Rhinichthys (Agosia) chrysogaster	Longfin dace	R	SC		G4	S3SE	2	Native Populations Only
Rhinichthys osculus	Speckled dace	R	SC		G5	S3S4	2	

Part 4: Reptile and Amphibian Species Targets of the Arizona / New Mexico Mountains Ecoregion.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes
Priority 1 species:								
Aneides hardii	Sacramento mtn. Salamander	E	SC	E2	G3	S3	1	
Bufo microscaphus microscaphus	Arizona toad	GR	SC		G4T3	S2?	1	extreme decline
Rana chiricahuensis	Chiricahua leopard frog	GR	C	WC	G2	S2?	1	extreme decline
Rana yavapaiensis	Lowland leopard frog	GR	SC	E1	G2	S1	1	extreme decline
Priority 2 species:								
Cnemidophorus flagellicaudus	Gila spotted whiptail	E?			G4	S1S2	2	
Hyla eximia	Mountain treefrog	R, disj			G4	S2	2	
Lampropeltis alterna	Gray-banded kingsnake	P, disj			G5	S1	2	
Lampropeltis pyromelana	Sonoran mountain kingsnake	R, disj			G5	S3	2	motherload in the ecoregion
Thamnophis eques megalops	Mexican garter snake	P, disj	SC	WC	G4T3	S2S3	2	
Thamnophis rufipunctatus	Narrowhead garter snake		SC	E2	G4	S2	2	motherload in the ecoregion

Part 5: Mammal species targets of the Arizona / New Mexico Mountains Ecoregion.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes
Priority 1 species:								
Canis lupus baileyi	Mexican gray wolf	GR,XT			G4T1	SH	1	
Lutra canadensis sonora	Sonoran river otter	E, D			G5T1	S1	1	
*Neotoma mexicana (*Chuska sbsp?*)*	MEXICAN WOODRAT	GR, E			G5T?	S?	1	
Sciurus arizonensis	Arizona gray squirrel	R			G4	S2	1	RIPARIAN
Sorex neomexicanus	New mexico shrew	E			G2	?	1	
Tamias minimus chuskensis	Chuska mountains chipmunk	E			G5T1		1	ENDEMIC TO CHUSKA MTNS
Tamias minimus atristriatus	Penasco chipmunk	GR, E		E1	G5TX	SX	1	Extirpated?
Thomomys talpoides fossor	Chuska mountains pocket gopher	E (P, disj)			G5T	S4	1	
Priority 2 species:								
Corynorhinus townsendii pallescens	Pale townsend's big-eared bat	D	SC	WC	G4T4	S3S4	2	Extremely site sensitive
Cynomys gunnisoni	Gunnison's prairie dog	D, P,disj			G5	S2	2	
Microtus montanus arizonensis	Arizona montane vole	E, GR		E1	G5T3	S1	2	
Microtus pennsylvanicus	Meadow vole	P, disj			G4	S4/SP	2	
Mustela frenata arizonensis	Longtailed weasel	GR			G5T	S4	2	motherload
Myotis lucifugus occultus	Occult little brown bat	E,R	SC		G5T3T4	S3	2	
Ovis canadensis mexicana	Desert bighorn sheep	P,GR,D	E				2	
Perognathus flavus goodpasteri	Springerville pocket mouse	E, D	SC		G5T3	S3	2	
Sciurus aberti chuskensis	Chuska tassel-eared squirrel	E			G5T1	S1	2	
Sorex nanus	Dwarf shrew	P, DISJ			G4	S1S2	2	Coarse filter - tundra indicator?
Sorex palustris navigator	Water shrew	P, disj		WC	G5T	S1	2	
Spermophilus tridecemlineatus monticola	White mountains ground squirrel	GR,P,E, disj			G5T3	S3	2	
Tamias minimus arizonensis	White mountains chipmunk	E			G5T2		2	
Zapus hudsonius luteus	New mexican jumping mouse	GR, P, disj	SC	E2	G5T3	S2	2	

Part 6: Bird species targets of the Arizona / New Mexico Mountains Ecoregion.

Scientific name	Common name	Status	Fed	St	Global	Srank	Priority	Notes
Priority 1 species:								
Charadrius montanus	Mountain plover	P, disj	C		G2	S?B,S2N	1	
Empidonax traillii extimus	Southwestern willow flycatcher	GR	LE	E2	G5T2	S2B,S3N	1	Extreme decline
Priority 2 species:								
Caprimulgus vociferus	Whip-poor-will	PIF			G5	S4B,S4N	2	
Cinclus mexicanus	American dipper	R			G5	S4B,S4N	2	Non-fish lotic indicator
Petrochelidon fulva	Cave swallow	P,disj			G5	S3	2	
Pinicola enucleator	Pine grosbeak	P,disj			G5	S2	2	
Accipiter gentilis	Northern goshawk	D	SC		G4	S2B,S2N	2	Indicator of Mgmt
Strix occidentalis lucida	Mexican spotted owl	GR	LT		G3T3	S2B,S2N	2	Indicator of Mgmt
Priority 3 Species (Final Check Only):								
Cardellina rubrifrons	Red-faced warbler	PIF			G5	S4B,S4N	3	Flag-final check
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	PIF			G5T3	S4B,S4N	3	Flag-final check
Columba fasciata	Band-tailed pigeon	R			G5	S4B,S4N	3	Flag-final check
Contopus borealis	Olive-sided flycatcher	PIF, R			G4	S4B,S4N	3	Flag-final check
Dendroica graciae	Grace's warbler	PIF, R			G5	S5B,S5N	3	Flag-final check
Empidonax hammondii	Hammond's flycatcher	PIF, R					3	Flag-final check
Empidonax wrightii	Gray flycatcher	PIF, R			G5	S4B,S4N	3	Flag-final check
Falco peregrinus anatum	American peregrine falcon	GR	LE		G4T4	S4	3	Flag-final check
Haliaeetus leucocephalus	Bald eagle	GR			G4	S2	3	Flag-final check
Oporornis tolmiei	MacGillivray's warbler	PIF			G5	S5B,S5N	3	Flag-final check
Otus flammeolus	Flammulated owl	R			G4	S4B,S4N	3	Flag-final check
Vireo bellii	Bell's vireo	PIF, D		E2	G5T4	S2B,S2N	3	Flag-final check
Vireo vicinior	Gray vireo	PIF, D		E2	G5	S4B,S3N	3	Flag-final check

Legend for Species Target Tables

STATUS = Status of the species within the ecoregion as determined by the ecoeregional planning team and/or other experts

E = Endemic to the Ecoregion
D = Declining
GR = Globally rare
P = Peripheral to the Ecoregion
P, disj = Disjunct peripheral to the Ecoregion
R = Representative species of the Ecoregion
PIF = PARTNERS IN FLIGHT priority bird species

FED = **Federal Legal Status**

LE = Listed as Endangered under the Endangered Species Act
LT = Listed as Threatened under the Endangered Species Act
SC = Species of Concern / Former Candidate species, etc.

STATE = State Legal Status

E1 = Endangered, group 1 (immediate jeopardy; New Mexico)
E2 = Endangered, group 2 (jeopardy w/in forseeable future; New Mexico)
E = Endangered (New Mexico)
T = Threatened (New Mexico)
E = Wildlife of Special Concern (Arizona)
SR = Salvage Restricted (collection with permit only: Arizona)
HS = Highly Safeguarded Plant Species (Arizona)

GLOBAL RANKING: The global rank (G-rank) was developed by Heritage and The Nature Conservancy as an objective code to reflect the overall condition of an element throughout its global range.

Species level:

G1 = Less than 6 viable EOs OR less than 1,000 individuals OR less than 2,000 acres.
G2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.
G3 = 21-100 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres.
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat or somewhat narrow habitat.
G5 = Population demonstrably secure to ineradicable due to being commonly found in the world.

Subspecies level: Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the whole species, whereas the T-rank reflects the Global situation of just the subspecies.

S-RANKING: The state rank is assigned in much the same way as the global rank, except state ranks in Arizona, New Mexico, and Texas often contain a threat number attached to the S-rank. Where the Srank differs between the the states the highest rank is used.

S1 = Less than 6 EOs OR less than 1,000 individuals OR less than 2,000 acres

S1.1 = very threatened
S1.2 = threatened
S1.3 = no current threats known

S2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres
S2.1 = very threatened
S2.2 = threatened
S2.3 = no current threats known

S3 = 21-100 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres
S3.1 = very threatened
S3.2 = threatened
S3.3 = no current threats known

S4 Apparently secure within the state; this rank is clearly lower than S3 but factors exist to cause some concern; there is some threat, or somewhat narrow habitat. No threat number.

S5 Demonstrablty secure to ineradicable in the state. No threat number.

Note: 1**.** Uncertainty about the rank of an element is expressed in two ways:
By expressing the rank as a range of values: i.e., S2S3 means the rank is something between S2 and S3.

By adding a "?" to the rank:
i.e., S2? This represents more certainty than S2S3.

2. Q = Some taxonomic question associated with the element.

PRIORITY = Ecoregional Portfolio Site Selection Ranking
P1 = Priority 1. Drives the site selection process
P2 = Priority 2. Used to round out the portfolio sites.
P3 = Priority 3. Birds only. Used as a data-check only; not used to select sites.

Appendix III: Natural Community Classification for the Arizona / New Mexico Mountains

Part 1. Natural Community Alliances and Associations:

Tundra
Alpine Tundra
Rocky Mountain Alpine Tundra

No alliance Specified – See Habitats

Forest
Cold Temperate Forest
Rocky Mountain Subalpine Forest
Subalpine Conifer Forest

Picea engelmannii Alliance
Picea engelmannii/Acer glabrum
Picea engelmannii/Erigeron eximius
Picea engelmannii/Heracleum maximum
Picea engelmannii/Moss
Picea engelmannii/Saxifraga bronchialis
Picea engelmannii/Senecio cardamine, Abies concolor phase
Picea engelmannii/Senecio cardamine, Abies lasiocarpus phase
Picea engelmannii/Vaccinium myrtillus

Abies lasiocarpa Alliance
Abies lasiocarpa/Acer glabrum
Abies lasiocarpa/Erigeron eximius
Abies lasiocarpa/Holodiscus dumosus
Abies lasiocarpa/Lathyrus arizonicus
Abies lasiocarpa/Rubus parviflorus
Abies lasiocarpa/Saxifraga bronchialis
Abies lasiocarpa/Senecio sanguisorboides
Abies lasiocarpa/Vaccinium myrtillus
Abies lasiocarpa/Vaccinium myrtillus/Rubus parviflorus

Pinus aristata Alliance

Rocky Mountain Montane Forest
Rocky Mountain Upper Montane
Conifer Forest

Picea pungens Alliance
Picea pungens
Picea pungens/Carex foenea
Picea pungens/Cornus sericea
Picea pungens/Erigeron eximius
Picea pungens/Festuca arizonica
Picea pungens/Fragaria virginiana ssp. virginiana
Picea pungens/Poa pratensis
Picea pungens/Pseudotsuga menziesii
Picea pungens/Senecio cardamine

Psuedotsuga menziesii Alliance
Pseudotsuga menziesii
Pseudotsuga menziesii/Acer grandidentatum
Pseudotsuga menziesii/Bromus ciliatus
Pseudotsuga menziesii/Festuca arizonica
Pseudotsuga menziesii/Holodiscus dumosus
Pseudotsuga menziesii/Muhlenbergia montana
Pseudotsuga menziesii/Muhlenbergia virescens
Pseudotsuga menziesii/Physocarpus monogynus
Pseudotsuga menziesii/Quercus gambelii
Pseudotsuga menziesii/Quercus hypoleucoides

Abies concolor Alliance
Abies concolor/Acer glabrum
Abies concolor-Acer glabrum, Holodiscus dumosus phase
Abies concolor/Acer glabrum, Mahonia repens phase
Abies concolor/Acer glabrum, Riparian phase
Abies concolor/Acer grandidentatum
Abies concolor/Erigeron eximius
Abies concolor/Festuca arizonica
Abies concolor/Jamesia americana
Abies concolor/Juglans major
Abies concolor/Lathyrus arizonicus
Abies concolor/Leymus triticoides
Abies concolor/Mahonia repens
Abies concolor/Muhlenbergia virescens
Abies concolor/Quercus gambelii
Abies concolor/Quercus gambelii, Festuca arizonica phase
Abies concolor/Robinia neomexicana
Abies concolor/Vaccinium myrtillus

Rocky Mountain Montane Deciduous Forest

Populus tremuloides Alliance
Populus tremuloides Monotypic

Rocky Mountain Lower Montane Conifer Forest

Pinus ponderosa Alliance
Pinus ponderosa
Pinus ponderosa/Arctostaphylos pungens
Pinus ponderosa/Artimesia arbuscula
Pinus ponderosa/Bouteloua gracilis
Pinus ponderosa/Bouteloua gracilis, Pinus edulis phase
Pinus ponderosa/Cinder soils
Pinus ponderosa/Festuca arizonica
Pinus ponderosa/Muhlenbergia montana
Pinus ponderosa/Muhlenbergia virescens
Pinus ponderosa/Oryzopsis hymenoides
Pinus ponderosa/Poa fendleriana
Pinus ponderosa/Purshia mexicana
Pinus ponderosa/riparian
Pinus ponderosa/Quercus gambelii
Pinus ponderosa/Quercus gambelii, Pinus edulis phase
Pinus ponderosa/Quercus riseus
Pinus ponderosa/Quercus x pauciloba
Pinus ponderosa/Ribes inerme

Cold Temperate Riparian/Wetlands
Rocky Mountain Montane Forested Wetlands
Broad/Leaved Deciduous Series Group

Alnus incana ssp. tenuifolia Alliance
Alnus incana ssp. tenuifolia/Salix lucida ssp. lasiandra
Alnus incana ssp. tenuifolia/Cornus sericea ssp. sericea

Populus angustifolia Alliance
Populus angustifolia
Populus angustifolia/Acer negundo, Poa pratensis
Populus angustifolia/Alnus oblongifolia
Populus angustifolia/Alnus oblongifolia, Brickellia californica
Populus angustifolia/Forestiera pubescens
Populus angustifolia/Juniperus scopulorum
Populus angustifolia/Poa pratensis
Populus angustifolia/Prunus virginiana
Populus angustifolia/Salix exigua
Populus angustifolia/Salix irrorata

Southwest Montane Forested Wetlands
Broad/Leaved Deciduous Series Group

Alnus oblongifolia Alliance
Alnus oblongifolia/Baccharis salicifolia
Alnus oblongifolia/Leersia oryzoides
Alnus oblongifolia/Salix gooddingii
Alnus oblongifolia/Salix irrorata
Alnus oblongifolia/Populus angustifolia, Brickellia californica

Warm Temperate Riparian/Wetlands
Southwest Lowland Forested Wetlands
Broad/Leaved Deciduous Series Group

Juglans major Alliance
Juglans major/Acer negundo/Rhus trilobata var. trilobata
Juglans major/Bouteloua curtipendula
Juglans major/Celtis laevigata var. reticulata, Brickellia californica
Juglans major/Forestiera pubescens var. pubescens

Platanus wrightii Alliance
Platanus wrightii/Alnus oblongifolia
Platanus wrightii/Baccharis salicifolia
Platanus wrightii/Bouteloua curtipendula
Platanus wrightii/Brickellia californica
Platanus wrightii/Celtis laevigata
Platanus wrightii/Quercus emoryi
Platanus wrightii/Sporobolus cryptandrus

Populus fremontii Alliance
Populus fremontii/Baccharis salicifolia
Populus fremontii/Fraxinus velutina
Populus fremontii/Juniperus deppeana, Bromus tectorum
Populus fremontii/Platanus wrightii
Populus fremontii/Platanus wrightii, Baccharis salicifolia
Populus fremontii/Salix exigua
Populus fremontii/Baccharis salicifolia
Populus fremontii/Salix gooddingii
Populus fremontii/Salix gooddingii, Baccharis salicifolia
Populus fremontii/Salix gooddingii, Salix exigua
Populus fremontii/Sparse

Southwest Arroyo Forested Wetlands
Broad/Leaved Deciduous Series Group

Celtis laevigata Alliance
Celtis laevigata var. reticulata/Brickellia californica
Celtis laevigata var. reticulata/Rhus trilobata var. trilobata

Chilopsis linearis Alliance
Chilopsis linearis/Chrysothamnus nauseosus

Woodland
Cold Temperate Woodland
Rocky Mountain/Great Basin Lower Montane / Foothill Woodland
Rocky Mountain/Great Basin Closed Conifer Woodland

Pinus edulis Alliance
Pinus edulis/Artemisia tridentata
Pinus edulis/Bouteloua gracilis
Pinus edulis/Festuca arizonica
Pinus edulis/Juniperus monosperma
Pinus edulis/Muhlenbergia montana
Pinus edulis/Purshia mexicana
Pinus edulis/Stipa neomexicana
Pinus edulis/Stipa scribneri
Pinus edulis/Yucca baccata

Rocky Mountain/Great Basin Open Conifer Woodland

Juniperus monosperma Alliance
Juniperus monosperma/Bouteloua eriopoda
Juniperus monosperma/Bouteloua gracilis
Juniperus monosperma/Artemisia bigelovii
Juniperus monosperma/Artemisia confertifolia
Juniperus monosperma/Artemisia tridentata
Juniperus monosperma/Chrysothamnus nauseosus
Juniperus monosperma/Krascheninnikovia lanata
Juniperus monosperma/Stipa neomexicana
Juniperus monosperma/Stipa scribneri
Juniperus monosperma/Yucca baccata

Scrub/Shrub Class / Shrublands
Cold Temperate Riparian/Wetlands
Rocky Mountain Montane Scrub/Shrub Wetlands
Broad/Leaved Deciduous Series Group

Salix irrorata Alliance
Salix irrorata/Carex rostrata
Salix irrorata/Cornus sericea ssp. sericea
Salix irrorata/Eleocharis palustris
Salix irrorata/Salix exigua
Salix irrorata/Salix lucida

Salix lucida ssp. lasiandra Alliance
Salix lucida ssp. lasiandra/Salix irrorata

Warm Temperate Riparian/Wetlands
Southwest Lowland Scrub/Shrub Wetlands
Broad/Leaved Deciduous Series Group

Salix exigua Alliance
Salix exigua/Agrostis gigantea
Salix exigua/Anemopsis californica
Salix exigua/Baccharis salicifolia
Salix exigua/Carex lanuginosa
Salix exigua/Carex nebraskensis
Salix exigua/Chrysothamnus nauseosus
Salix exigua/Eleocharis palustris
Salix exigua/Equisetum laevigatum
Salix exigua/Panicum obtusum
Salix exigua/Scirpus americanus

Baccharis salicifolia Alliance
Baccharis salicifolia/Platanus wrightii
Baccharis salicifolia/Scirpus americanus
Baccharis salicifolia/Scirpus pungens
Baccharis salicifolia/Sphenopholis obtusata

Southwest Arroyo Scrub/Shrub Wetlands
Broad/Leaved Deciduous Series Group

Chrysothamnus nauseosus Alliance
Chrysothamnus nauseosus/Sporobolus cryptandrus

Rocky Mountain Montane Scrub/Interior Chaparral
Rocky Mountain Montane Deciduous Scrub

Cercocarpus montanus Alliance
Cercocarpus montanus/Bouteloua gracilis
Cercocarpus montanus/Stipa neomexicana

Quercus turbinella Alliance
Quercus turbinella/Bouteloua curtipendula
Quercus turbinella/Bouteloua gracilis

Quercus gambelli Alliance
Quercus gambelii/
Quercus gambelii/Bouteloua curtipendula
Quercus gambelii/Bouteloua gracilis
Quercus gambelii/Symphoricarpus oreophyllus

Xerophytic Shrubland
Great Plains Desert Scrub
Great Basin Microphyllous Sand/Scrub

Atriplex canescens Alliance
Atriplex canescens/Sparse
Atriplex canescens/Sporobolus airoides

Chihuahuan Desert Scrub
Chihuahuan Broadleaf Evergreen Desert Scrub

Larrea tridentata Alliance
Larrea tridentata
Larrea tridentata/Bouteloua eriopoda
Larrea tridentata/Erioneuron pulchellum
Larrea tridentata/Muhlenbergia porteri

Chihuahuan Broadleaf Deciduous Desert Scrub

Prosopis glandulosa Alliance
Prosopis glandulosa/Bouteloua eriopoda
Prosopis glandulosa/Sporobolus flexuosus
Prosopis glandulosa/Atriplex canescens

Persistent/Emergent Wetland Class / Herbaceous Wetlands
Cold Temperate Persistent Emergent Riparian/Wetlands
Rocky Mountain Montane Persistent/Emergent Wetlands
Persistent/Emergent Series Group

Carex aquatilis Alliance
Carex aquatilis/Equisetum laevigatum

Eleocharis palustris Alliance
Eleocharis palustris/Anempsis californica
Eleocharis palustris/Leersi oryzoides
Eleocharis palustris/Equisetum laevigatum

Glyceria borealis Alliance
Glyceria borealis/Eleocharis bella

Juncus balticus Alliance
Juncus balticus/Eleocharis palustris
Juncus balticus/Equisetum laevigatum
Juncus balticus/Scirpus americanus

Scirpus americanus Alliance
Scirpus americanus/Eleocharis palustris
Scirpus americanus/Equisetum laevigatum

Scirpus tabernaemontani Alliance
Scirpus tabernaemontani/Typha latifolia

Typha latifolia Alliance
Typha latifolia/Leersia oryzoides
Typha latifolia/Scirpus americanus

Warm Temperate Persistent Emergent Riparian/Wetlands
Rio Grande/Great Plains Herbaceous Wetlands

Scirpus pungens Alliance
Scirpus pungens/Eleocharis palustris
Scirpus pungens/Equisetum laevigatum

Equisetum laevigatum Alliance
Equisetum laevigatum/Poa pratensis

Grassland
Mesophytic Grassland
Rocky Mountain Subalpine and Montane Grassland
Rocky Mountain Montane Grassland

Festuca arizonica Alliance
Festuca arizonica/Muhlenbergia montana

Muhlenbergia montana Alliance
Muhlenbergia montana/Trisetum montanum

Plains/Mesa Grasslands
Short Grass Grassland

Bouteloua gracilis Alliance
Bouteloua gracilis

Bouteloua hirsuta Alliance
Bouteloua hirsuta/Dalea formosa

Mid/grass Grassland

Stipa neomexicana Alliance
Stipa neomexicana/Bouteloua eriopoda

Xerophytic Grassland
Chihuahuan Desert Grassland
Chihuahuan Foothill/Piedmont Grassland

Bouteloua eriopoda Alliance
Bouteloua eriopoda/Ephedra torreyana
Bouteloua eriopoda/Parthenium incanum
Bouteloua eriopoda/Aristida purpurea
Bouteloua eriopoda/Bouteloua curtipendula
Bouteloua eriopoda/Bouteloua gracilis
Bouteloua eriopoda/Hilaria jamesii
Bouteloua eriopoda/Muhlenbergia torreyi

Sporobolus airoides Alliance
Sporobolus airoides/Monotypic

Chihuahuan Lowland Swale Desert Grassland

Sporobolus wrightii Alliance
Sporobolus wrightii/Monotypic

Scleropogon brevifolius Alliance
Scleropogon brevifolius

Part 2: Priority 1 Communities and Priority 1 and Priority 2 Habitats[1] Identified for the Arizona / New Mexico Mountains.

Target	Priority	Grank - NM, AZ, TX	Target Type
Priority 1 Community Associations:			
Alnus oblongifolia/Leersia oryzoides	1	G2	Community
Bouteloua eriopoda/Ephedra torreyana	1	G2	Community
Eleocharis palustris/Anemopsis californica	1	G2	Community
Glyceria borealis/Eleocharis bella	1	G2	Community
Juglans major/Forestiera pubescens var. pubescens	1	G2G3	Community
Picea engelmannii/Senecio cardamine, Abies concolor phase	1	G2	Community
Picea engelmannii/Senecio cardamine, Abies lasiocarpa phase	1	G2	Community
Platanus wrightii/Alnus oblongifolia	1	G2	Community
Platanus wrightii/Baccharis salicifolia	1	G2	Community
Platanus wrightii/Bouteloua curtipendula	1	G2	Community
Platanus wrightii/Brickellia californica	1	G2	Community
Platanus wrightii/Quercus emoryi	1	G2	Community
Platanus wrightii/Sporobolus cryptandrus	1	G2	Community
Populus fremontii/Baccharis salicifolia	1	G2	Community
Populus fremontii/Platanus wrightii/Baccharis salicifolia	1	G2	Community
Populus fremontii/Salix exigua	1	G2	Community
Populus fremontii/Salix gooddingii	1	G2	Community
Populus fremontii/Salix gooddingii	1	G2	Community
Populus fremontii/Salix gooddingii/Baccharis salicifolia	1	G2	Community
Populus fremontii/Salix gooddingii/Salix exigua	1	G2	Community
Populus fremontii/Sparse	1	G2G3	Community

Target	Priority	Grank - NM, AZ, TX	Target Type
Priority 1 Habitats[1]:			
Important ephemeral wetland that is seasonally wet and dry.	1	G4	Habitat
Natural Lakes	1	G4	Habitat
Riparian habitat and watershed, springs.	1	G4	Habitat
Riparian habitat and watershed.	1	G4	Habitat
Riparian habitat, connect with large primitive area	1	G4	Habitat
Springs	1	G4	Habitat
Wetland, grassland mosaic. Ephemeral.	1	G4	Habitat
Priority 2 Habitats[1]:			
15 Coexisting bat species.	2	G4	Habitat
ACEC important wetland; neo-tropical birds, natural communities	2	G4	Habitat
Gypsum outcrops with related plant species; saline springs/seeps with restricted plant species.	2	G4	Habitat
High diversity high elevation forests and meadows of and critical headwaters of Mimbres River; outliers of Madrean forests; important migration and dispersal corridors.	2	G4	Habitat
Intermontane grassland vegetation of the San Augustin Plains.	2	G4	Habitat
Lake and wetland habitat for migratory waterfowl, shorebirds	2	G4	Habitat
Pronghorn summer range	2	G4	Habitat
Site for 7 overwintering bat species	2	G3	Habitat
Shorebirds, waterfowl, crustaceans, mammals, plants	2	G3	Habitat
Unique Pinyon pine-Texas madrone in regards to the composition of plant species and their elematic niche.	2	G3	Habitat
Unique plant assoc. of P. pine- Dunn Oak of limited extent.	2	G3	Habitat
Unique plant community that exhibits chaparral (Gawr/ Cemo/Quqr3) not found elsewhere in the state	2	G4	Habitat
Unique plant communities of ice caves	2	G3	Habitat
Very important ephemeral wetlands	2	G4	Habitat

[1.] Habitats are special landscape, site, and vegetation features that do not necessarily match standard vegetation classification categories but which are recognized as important for the survival of particular species, groups of species, or vegetation communities. These habitats were identified by experts through the experts workshops.

Appendix IV. Site Nomination Form Blank Used During Experts Workshop

INSTRUCTIONS:
Arizona / New Mexico Mountains Ecoregion
SITE NOMINATION FORM

Please complete as much of the attached site nomination form as possible BEFORE you come to the April 8-9 workshop. Attach a site map (on a 7.5' USGS topographic quad or other USGS map) to the form, if possible. We also encourage you to attach additional information in support of this site (e.g. survey forms, field notes, references). The more documentation you provide on the ecological values of the site, the easier it will be for your colleagues to evaluate its significance during the workshop.

Site Name: The name that you and/or local residents call the site, or a site name from a USGS topographic map.

Nominator's Name, Address, Phone, and E-Mail: Self-explanatory.

Site Code: Your three-letter initials and a two-digit number, e.g. GPB-01. We will use this code to map the site you nominate.

County: The county or counties within which the site is located.

Site Location: The location of the site with respect to towns or other cultural or natural features (e.g. distance along state or county highway, with road numbers). Provide road directions, if possible.

Ownership of Site: Circle all that apply. For public lands identify site managers, if known. For Other Federal or State provide the agency name. For private lands, provide name of owner(s) if known.

Nearest known managed areas (e.g., national parks, wildlife management areas): Self-explanatory.

Approximate acreage: The area, in acres, of the area of land and/or water that supports the species or natural community found at this site. Circle the appropriate range of acreages and/or provide the approximate actual acreage if you know it. For aquatic or riparian species the miles of stream may be a more appropriate or valuable additional measure.

Have you personally visited this site? Self-explanatory.

Description of conservation targets (i.e., species and/or natural communities) at this site: Estimate the percentage of the site occupied or utilized by each target species, if possible. Please attach as much supporting information relating to specific species or communities as possible (e.g., source(s) of information about this species or natural community occurrence, date last seen, and number of individuals, for each target).

Viability of conservation targets: The ability of this population to persist for many generations or, for natural communities, the likelihood of indefinite persistence. Please provide a brief explanation of how you arrived at this assessment (e.g., formal population viability analysis, seat-of-the-pants guess).

Management challenges at this site: Management that is required if the conservation target is to survive at the site. Examples are control of non-native species (tamarisk, introduced fishes, etc.), reintroduction of fire, construction of fences, and restoration of hydrologic regime.

Arizona / New Mexico Mountains Ecoregion
SITE NOMINATION FORM

Site Name:

Nominator's Name, Address, Phone, and E-Mail:

Site Code (for mapping; your three-letter initials and a two-digit number, e.g. GPB-01):

Counties:

Approximate acreage: 1-100 101-1,000 1,001-3,000 3,001-10,000 10,000+

Have you personally visited this site? (Y/N) **Date last visited**

Site Location:

Ownership of Site (circle all that apply; provide name of owner if known**):** Forest Service Nat Park Service BLM Fish & Wildlife Service Other Federal Dept Game & Fish Other State Private

Ownership Details:

Nearest known managed areas:

Description of conservation targets:

Viability of conservation targets at this site (circle one)**:** LOW MEDIUM HIGH

Brief explanation of how you arrived at this assessment:

Management challenges:

Appendix V. Targets Contained within the Portfolio Sites.

Site	Target
Anderson Mesa Lakes	*Accipiter gentilis*
	Botrychium crenulatum
	Bufo microscaphus microscaphus
	Cardellina rubrifrons
	Catostomus sp 3
	Cirsium parryi ssp mogollonicum
	Columba fasciata
	Gila robusta
	Hedeoma diffusum
	Hyla eximia
	Lampropeltis pyromelana
	Lepidomeda vittata
	Mustela frenata arizonensis
	Myotis lucifugus occultus
	Otus flammeolus
	Penstemon clutei
	Phacelia serrata
	Pinus aristata
	Potentilla multifoliolata
	Quercus gambelii
	Rana chiricahuensis
	Rhinichthys osculus
	Senecio franciscanus
	Strix occidentalis lucida
	Thamnophis rufipunctatus
	Pinus ponderosa
	Pinus ponderosa/Bouteloua gracilis
	Pinus ponderosa/Bouteloua gracilis, Pinus edulis phase
	Pinus ponderosa/Bouteloua gracilis, Quercus gambelii phase
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Festuca arizonica, Bouteloua gracilis phase
	Pinus ponderosa/Festuca arizonica, Quercus gambelii phase
	Pinus ponderosa/Poa fendleriana
	Populus tremuloides
	Lake and wetland habitat for migratory waterfowl, shorebirds
	Pronghorn summer range
	Rocky Mountain Upper Montane Conifer Forest
	Wetland, grassland mosaic. Ephemeral.
Bill Williams Mountains	*Accipiter gentilis*
	Catostomus insignis
	Cimicifuga arizonica
	Falco peregrinus anatum
	Gila robusta
	Hyla eximia
	Potentilla multifoliolata

Bill Williams Mountains (cont.)	*Strix occidentalis lucida* *Talinum validulum* Pinus ponderosa/Arctostaphylos pungens Pinus ponderosa/Bouteloua gracilis, Quercus gambelii phase Pinus ponderosa/Festuca arizonica, Bouteloua gracilis phase Pinus ponderosa/Festuca arizonica, Quercus gambelii phase Populus tremuloides Rocky Mountain Upper Montane Conifer Forest Important ephemeral wetland that is seasonally wet and dry.
Black /White River Headwaters	*Accipiter gentilis* *Allium gooddingii* *Anodonta californiensis* *Astragalus naturitensis* *Besseya oblongifolia* *Cardellina rubrifrons* *Castilleja mogollonica* *Catostomus insignis* *Catostomus sp 3* *Cinclus mexicanus* *Clematis palmeri* *Corynorhinus townsendii pallescens* *Empidonax traillii extimus* *Gila robusta* *Hyla eximia* *Lepidomeda vittata* *Myotis lucifugus occultus* *Oncorhynchus apache* *Otus flammeolus* *Pyrgulopsis trivialis* *Rana chiricahuensis* *Rhinichthys cobitis* *Salix arizonica* *Senecio quaerens* *Sorex nanus* *Strix occidentalis lucida* *Thamnophis rufipunctatus* *Trifolium longipes var neurophyllum* *Zapus hudsonius luteus*
Blue River/San Francisco River	*Accipiter gentilis* *Allium gooddingii* *Astragalus naturitensis* *Besseya oblongifolia* *Bufo microscaphus microscaphus* *Canis lupus baileyi* *Castilleja mogollonica* *Catostomus clarki* *Catostomus insignis* *Cnemidophorus flagellicaudus*

Blue /San Francisco River (cont.)	*Empidonax traillii extimus*
	Falco peregrinus anatum
	Gila intermedia
	Haliaeetus leucocephalus
	Lampropeltis pyromelana
	Oncorhynchus apache
	Rana chiricahuensis
	Rana yavapaiensis
	Rhinichthys chrysogaster
	Rhinichthys cobitis
	Rhinichthys osculus
	Salix arizonica
	Senecio neomexicanus var metcalfei
	Senecio quaerens
	Strix occidentalis lucida
	Thamnophis rufipunctatus
	Trifolium longipes var neurophyllum
	Zapus hudsonius luteus
	Baccharis salicifolia/Scirpus pungens
	Celtis laevigata var. reticulata/Brickellia californica
	Chrysothamnus nauseosus/Sporobolus cryptandrus
	Juglans major/Foresteria pubescens var. pubescens
	Pinus ponderosa/Bouteloua gracilis
	Pinus ponderosa/Quercus gambelii
	Pinus ponderosa/Quercus grisea
	Pinus ponderosa/Ribes inerme
	Platanus wrightii/Sporobolus cryptandrus
	Populus fremontii/Baccharis salicifolia
	Populus fremontii/Sparse
	Populus fremontii-Salix gooddingii
	Populus fremontii-Salix gooddingii-Salix exigua
	Pseudotsuga menziesii-Quercus gambelii
	Salix exigua/Eleocharis palustris
	Salix irrorata/Eleocharis palustris
	Scirpus pungens-Equisetum laevigatum
	Rocky Mountain Upper Montane Conifer Forest
Blue Water Creek Canyon	*Erigeron acomanus*
	Aneides hardii
Capitan Mountains	*Ashmunella pseudodonta*
	Astragalus kerrii
	Echinocereus fendleri var kuenzleri
	Hedeoma pulcherrima
	Lesquerella valida
	Valeriana texana
	Abies concolor-Quercus gambelii
	Pseudotsuga menziesii-Quercus gambelii
	Accipiter gentilis

Chuska Mountains	*Allium gooddingii*
	Astragalus chuskanus
	Astragalus micromerius
	Cinclus mexicanus
	Cynomys gunnisoni
	Empidonax hammondii
	Hymenoxys helenioides
	Oporornis tolmiei
	Otus flammeolus
	Puccinellia parishii
	Rhinichthys osculus
	Sciurus aberti chuscensis
	Speyeria nokomis nokomis
	Strix occidentalis lucida
	Tamias minimus chuskaensis
	Vireo vicinior
	Alnus incana ssp. tenuifolia/Salix lucida ssp. lasiandra
	Alnus incana ssp. tenuifolia-Cornus sericea ssp. sericea
	Equisetum laevigatum/Poa pratensis
	Glyceria borealis-Eleocharis bella
	Populus angustifolia-Juniperus scopulorum
	Scirpus pungens-Equisetum laevigatum
Clay Springs	*Bufo microscaphus microscaphus*
	Hyla eximia
	Lampropeltis pyromelana
	Rana chiricahuensis
	Strix occidentalis lucida
	Thamnophis rufipunctatus
	Toumeya papyracantha
Dry Beaver Creek	Springs
Fierro Hill	*Accipiter gentilis*
	Cardellina rubrifrons
	Crataegus wootoniana
	Oreohelix confragosa
	Otus flammeolus
	Pedicularis angustissima
	Stellaria porsildii
	Strix occidentalis lucida
Fort Stanton/Rio Bonito Area	*Echinocereus fendleri var kuenzleri*
	ACEC, important wetland; neo-tropical birds
	Pinus edulis-Juniperus monosperma

Gila River

Accipiter gentilis
Allium gooddingii
Apacheria chiricahuensis
Caprimulgus vociferus
Cardellina rubrifrons
Catostomus insignis
Contopus borealis
Draba mogollonica
Empidonax traillii extimus
Empidonax wrightii
Erigeron hessii
Gila intermedia
Gila robusta
Haliaeetus leucocephalus
Hyla eximia
Junonia coenia nigrosuffusa
Lachlania dencyanuae
Lesquerella gooddingii
Limenitis archippus obsoleta
Lutra canadensis sonora
Meda fulgida
Oncorhynchus gilae gilae
Pedicularis angustissima
Pyrgulopsis gilae
Pyrgulopsis thermalis
Rana yavapaiensis
Rhinichthys chrysogaster
Rhinichthys cobitis
Rhinichthys osculus
Rumex orthoneurus
Senecio cynthioides
Senecio quaerens
Stellaria porsildii
Strix occidentalis lucida
Thamnophis rufipunctatus
Trifolium longipes var neurophyllum
Vireo bellii
Zigadenus mogollonensis
Alnus oblongifolia/Leersia oryzoides
Chilopsis linearis-Chrysothamnus nauseosus
Chrysothamnus nauseosus/Sporobolus cryptandrus
Eleocharis palustris/Anemopsis californica
Juglans major-Acer negundo/Rhus trilobata var. trilobata
Juglans major-Celtis laevigata var. reticulata/Brickellia californica
Pinus ponderosa/
Pinus ponderosa/Quercus grisea
Platanus wrightii-Quercus emoryi
Populus fremontii-Platanus wrightii/Baccharis salicifolia
Populus fremontii-Salix gooddingii
Populus fremontii-Salix gooddingii/Baccharis salicifolia

Gila River (continued)	Pseudotsuga menziesii-Quercus gambelii Scirpus pungens-Eleocharis palustris Scirpus tabernaemontani/Typha latifolia Southwest Lowland Broad-Leaved Deciduous Riparian/Wetland Forests Subalpine Conifer Forest Rocky Mountain Montane Forest High diversity high elevation forests and meadows of critical headwaters of Mimbres River; Madrean forests; migration / dispersal corridors.
Guadalupe Mnts Escarpment	*Aquilegia chrysantha var chaplinei* *Ashmunella carlsbadensis* *Chaetopappa hersheyi* *Coryphantha sneedii var leei* *Escobaria guadalupensis* *Falco peregrinus anatum* *Hedeoma apiculata* *Holospira montivaga* *Humboldtiana ultima* *Hymenopappus biennis* *Lampropeltis alterna* *Lesquerella valida* *Penstemon cardinalis* *Penstemon cardinalis ssp regalis* *Polygala rimulicola var rimulicola* *Sibara grisea* *Sophora gypsophila var guadalupensis* *Streptanthus sparsiflorus* *Strix occidentalis lucida* *Valeriana texana* *Vireo vicinior* Unique Pinyon pine-Texas madrone in regard to the composition of plant species and their elematic niche. Unique plant assoc. of P. pine- Dunn Oak of limited extent.
Hillsboro West	*Holospira cockerelli*
Ladder Ranch	*Ashmunella tetrodon* *Coccyzus americanus occidentalis* *Gila pandora* *Haliaeetus leucocephalus* *Holospira cockerelli* *Oreohelix metcalfei* *Rana chiricahuensis* *Vireo vicinior* Alnus oblongifolia/Baccharis salicifolia Alnus oblongifolia-Salix gooddingii Baccharis salicifolia/Sphenopholis obtusata Celtis laevigata var. reticulata/Rhus trilobata var. trilobata Juglans major/Bouteloua curtipendula Platanus wrightii/Bouteloua curtipendula

Ladder Ranch (cont.)	Platanus wrightii-Alnus oblongifolia
	Platanus wrightii-Baccharis salicifolia
	Populus angustifolia-Alnus oblongifolia
	Populus angustifolia-Alnus oblongifolia/Brickellia californica
	Populus fremontii/Baccharis salicifolia
	Populus fremontii/Salix exigua
	Populus fremontii/Salix gooddingii
	Populus fremontii-Fraxinus velutina
	Populus fremontii-Salix gooddingii
	Scirpus pungens-Eleocharis palustris
Las Animas Creek	*Accipiter gentilis*
	Apacheria chiricahuensis
	Caprimulgus vociferus
	Cardellina rubrifrons
	Columba fasciata
	Dendroica graciae
	Lampropeltis pyromelana
	Lesquerella gooddingii
	Oncorhynchus clarki virginalis
	Otus flammeolus
	Rana chiricahuensis
Las Animas Creek (cont.)	*Senecio cynthioides*
	Senecio quaerens
	Stellaria porsildii
	Strix occidentalis lucida
Magdalena Mountains	*Cardellina rubrifrons*
	Empidonax wrightii
	Oreohelix magdalenae
	Strix occidentalis lucida
	Abies concolor/Festuca arizonica
	Abies concolor/Jamesia americana
	Pinus edulis-Juniperus monosperma
	Pinus ponderosa/
	Pseudotsuga menziesii/Bromus ciliatus
	Pseudotsuga menziesii/Festuca arizonica
	Pseudotsuga menziesii-Quercus gambelii
	Subalpine Conifer Forest
Mesa Prieta	*Abronia bigelovii*
	Astragalus knightii
	Columba fasciata
	Puccinellia parishii
	Toumeya papyracantha
	Pinus edulis-Juniperus monosperma
	Pinus ponderosa

Mimbres River	*Accipiter gentilis* *Apacheria chiricahuensis* *Caprimulgus vociferus* *Cardellina rubrifrons* *Catostomus plebeius* *Columba fasciata* *Crataegus wootoniana* *Cyprinella formosa* (habitat only) *Dendroica graciae* *Gila nigrescens* *Junonia coenia nigrosuffusa* *Lampropeltis pyromelana* *Lesquerella gooddingii* *Otus flammeolus* *Pedicularis angustissima* *Puccinellia parishii* *Pyrgulopsis* n. sp. *Rana chiricahuensi* *Senecio cynthioides* *Senecio quaerens* *Stellaria porsildii* *Strix occidentalis lucida* Juglans major-Acer negundo/Rhus trilobata var. trilobata Picea pungens/Erigeron eximius Pinus ponderosa/Quercus gambelii Populus angustifolia-Acer negundo/Poa pratensis Populus angustifolia-Alnus oblongifolia/Brickellia californica Populus fremontii-Juniperus deppeana/Bromus tectorum Pseudotsuga menziesii-Quercus gambelii High diversity high elevation forests and meadows of and critical headwaters of Mimbres River; outliers of Madrean forests; important migration and dispersal corridors.
Mineral Creek	*Apacheria chiricahuensis* *Lesquerella gooddingii* *Oreohelix pilsbryi* *Senecio cynthioides* *Senecio quaerens* *Stellaria porsildii*
Mogollon Canyons Complex	*Accipiter gentilis* *Bufo microscaphus microscaphus* *Catostomus clarki* *Catostomus insignis* *Catostomus sp 3* *Cicindela oregona maricopa* *Cimicifuga arizonica* *Cirsium parryi ssp mogollonicum* *Cnemidophorus flagellicaudus*

Mogollon Canyons Complex (cont.)	*Columba fasciata*
	Erigeron saxatilis
	Falco peregrinus anatum
	Gila robusta
	Heuchera eastwoodiae
	Hyla eximia
	Lampropeltis pyromelana
	Lepidomeda vittata
	Polites mystic ssp dacotah
	Potentilla multifoliolata
	Rana chiricahuensis
	Rana yavapaiensis
	Rhinichthys osculus
	Rumex orthoneurus
	Strix occidentalis lucida
	Thamnophis rufipunctatus
	Abies concolor/Erigeron eximius
	Abies concolor/Festuca arizonica
	Abies concolor/Muhlenbergia virescens
	Abies concolor-Mahonia repens
	Abies concolor-Quercus gambelii
	Abies lasiocarpa/Vaccinium myrtillus
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Muhlenbergia virescens
	Pinus ponderosa/Muhlenbergia virescens
	Pinus ponderosa/Muhlenbergia virescens-Festuca arizonica
	Pinus ponderosa/Poa fendleriana
	Riparian habitat and watershed.
	Rocky Mountain Upper Montane Conifer Forest
	Wetland, grassland mosaic. Ephemeral.
Mogollon Divide	*Accipiter gentilis*
	Agastache rupestris
	Allium gooddingii
	Ashmunella mogollonensis
	Ashmunella tetrodon
	Caprimulgus vociferus
	Cardellina rubrifrons
	Catostomus insignis
	Contopus borealis
	Deroceras heterura
	Draba mogollonica
	Erigeron hessii
	Erigeron scopulinus
	Gila intermedia
	Gila robusta
	Hyla eximia
	Meda fulgida
	Myotis lucifugus occultus
	Oncorhynchus gilae gilae

Mogollon Divide (cont.)	*Pedicularis angustissima*
	Pyrgulopsis gilae
	Pyrgulopsis thermalis
	Rhinichthys chrysogaster
	Rhinichthys cobitis
	Rhinichthys osculus
	Rumex orthoneurus
	Sciurus arizonensis
	Senecio quaerens
	Silene wrightii
	Strix occidentalis lucida
	Trifolium longipes var neurophyllum
	Zigadenus mogollonensis
	Abies concolor/Erigeron eximius
	Abies concolor/Festuca arizonica
	Abies concolor/Muhlenbergia virescens
	Abies concolor-Acer glabrum
	Abies concolor-Acer grandidentatum
	Abies concolor-Juglans major
	Abies concolor-Mahonia repens
	Abies concolor-Quercus gambelii
	Abies lasiocarpa/Erigeron eximius
	Abies lasiocarpa/Lathyrus arizonicus
	Abies lasiocarpa/Rubus parviflorus
	Abies lasiocarpa/Saxifraga bronchialis
	Abies lasiocarpa/Vaccinium myrtillus
	Abies lasiocarpa/Vaccinium myrtillus-Rubus parviflorus
	Picea engelmannii/Erigeron eximius
	Picea engelmannii/Senecio cardamine
	Picea pungens/Erigeron eximius
	Picea pungens/Festuca arizonica
	Picea pungens/Poa pratensis
	Pinus ponderosa
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Muhlenbergia montana
	Pinus ponderosa/Muhlenbergia virescens
	Pinus ponderosa/Muhlenbergia virescens-Festuca arizonica
	Pinus ponderosa/Quercus gambelii
	Pinus ponderosa/Quercus grisea
	Pinus ponderosa/Ribes inerme
	Platanus wrightii/Brickellia californica
	Platanus wrightii-Alnus oblongifolia
	Platanus wrightii-Baccharis salicifolia
	Pseudotsuga menziesii/Bromus ciliatus
	Pseudotsuga menziesii/Holodiscus dumosus
	Pseudotsuga menziesii/Muhlenbergia virescens
	Pseudotsuga menziesii/Quercus hypoleucoides
	Pseudotsuga menziesii-Quercus gambelii
	Rocky Mountain Montane Forest
	Subalpine Conifer Forest

Mount Taylor	*Puccinellia parishii*
	Sorex nanus
	Spermophilus tridecemlineatus monticola
	Strix occidentalis lucida
	Toumeya papyracantha
	Abies lasiocarpa/Erigeron eximius
	Abies lasiocarpa/Vaccinium myrtillus
	Picea engelmannii/Moss
	Picea pungens/Carex foenea
	Pinus ponderosa/Festuca arizonica
	Populus tremuloides
	Pseudotsuga menziesii/Festuca arizonica
North Plains	*Cynomys gunnisoni*
Northern Black Range	*Accipiter gentilis*
	Apacheria chiricahuensis
	Caprimulgus vociferus
	Cardellina rubrifrons
	Columba fasciata
	Dendroica graciae
	Deroceras heterura
	Erigeron scopulinus
	Gila pandora
	Haliaeetus leucocephalus
	Holospira cockerelli
	Lampropeltis pyromelana
	Lesquerella gooddingii
	Oncorhynchus clarki virginalis
	Oncorhynchus gilae gilae
	Oreohelix pilsbryi
	Otus flammeolus
	Pyrgulopsis gilae
	Pyrgulopsis thermalis
	Rana chiricahuensis
	Scrophularia macrantha
	Senecio cynthioides
	Senecio quaerens
	Stellaria porsildii
	Strix occidentalis lucida
	Abies concolor/Erigeron eximius
	Abies concolor/Muhlenbergia virescens
	Abies concolor-Mahonia repens
	Abies concolor-Quercus gambelii
	Abies lasiocarpa/Erigeron eximius
	Abies lasiocarpa/Vaccinium myrtillus-Rubus parviflorus
	Picea engelmannii/Erigeron eximius
	Picea pungens/Erigeron eximius
	Pinus ponderosa/Ribes inerme
	Pseudotsuga menziesii/Muhlenbergia virescens

Northern Black Range (cont.)	Pseudotsuga menziesii-Quercus gambelii High diversity high elevation forests and meadows; outliers of Madrean forests; migration and dispersal corridors.
Nutrioso Creek	*Allium gooddingii* *Astragalus nutriosensis* *Catostomus discobolus discobolus* *Catostomus sp 3* *Empidonax traillii extimus* *Lepidomeda vittata* *Oncorhynchus apache* *Rana chiricahuensis* *Rhinichthys osculus* Pinus edulis-Juniperus monosperma
Prewitt/Thoreau	*Erigeron acomanus* *Parthenium alpinum var alpinum*
Rio Hondo	*Echinocereus fendleri var kuenzleri* *Gila pandora*
Rio Nutria	*Catostomus discobolus yarrowi* *Empidonax traillii extimus* Alnus incana ssp. tenuifolia/Salix lucida ssp. lasiandra Populus angustifolia Populus angustifolia/Prunus virginiana Salix irrorata-Cornus sericea ssp. sericea Salix irrorata-Salix exigua Salix lucida ssp. lasiandra-Salix irrorata
Rio Penasco	*Astragalus altus* *Astragalus neomexicanus* *Brickellia modesta* *Cirsium vinaceum* *Crataegus wootoniana* *Echinocereus fendleri var kuenzleri* *Empidonax traillii extimus* *Escobaria villardii* *Etheostoma lepidum* *Penstemon cardinalis* *Penstemon neomexicanus* *Ribes mescalerium* *Senecio sacramentanus*

Sacramento Mountains	*Accipiter gentilis*
	Aneides hardii
	Argemone pleiacantha ssp pinnatisecta
	Astragalus altus
	Astragalus neomexicanus
	Brickellia modesta
	Cirsium vinaceum
	Cirsium wrightii
	Crataegus wootoniana
	Delphinium novomexicanum
	Echinocereus fendleri var kuenzleri
	Erigeron rybius
	Escobaria villardii
	Etheostoma lepidum
	Hedeoma pulcherrima
	Hedeoma todsenii
	Lesquerella aurea
	Lupinus sierrae-blancae
	Myotis lucifugus occultus
	Penstemon alamosensis
	Penstemon cardinalis
	Penstemon neomexicanus
	Philadelphus argyrocalyx
	Ribes mescalerium
	Senecio sacramentanus
	Sibara grisea
	Sorex neomexicanus
	Strix occidentalis lucida
	Tamias minimus atristriatus
	Zapus hudsonius luteus
	Abies concolor/Acer grandidentatum
	Abies concolor-Acer glabrum
	Abies concolor-Quercus gambelii
	Picea engelmannii/Acer glabrum
	Picea pungens/Fragaria virginiana ssp. virginiana
	Picea pungens-Pseudotsuga menziesii, Valeriana acutiloba
	Pinus ponderosa/Quercus x pauciloba
	Pseudotsuga menziesii
	Pseudotsuga menziesii-Quercus gambelii
	Rocky Mountain Upper Montane Conifer Forest
San Felipe - Todilto Limestone	*Abronia bigelovii*
	Astragalus feensis
	Toumeya papyracantha
San Francisco Peaks	*Accipiter gentilis*
	Astragalus troglodytus
	Botrychium crenulatum
	Botrychium crenulatum

San Francisco Peaks (cont.)	*Chrysothamnus molestus*
	Cynomys gunnisoni
	Erigeron saxatilis
	Falco peregrinus anatum
	Gentiana barbellata
	Hyla eximia
	Hymenoxys helenioides
	Mustela frenata arizonensis
	Myotis lucifugus occultus
	Penstemon clutei
	Penstemon clutei
	Phacelia serrata
	Phacelia serrata
	Pinus aristata
	Pinus aristata
	Potentilla multifoliolata
	Senecio franciscanus
	Senecio franciscanus
	Sorex nanus
	Strix occidentalis lucida
	Talinum validulum
	Pinus ponderosa/Bouteloua gracilis
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Muhlenbergia montana
	Pinus ponderosa/Muhlenbergia virescens-Festuca arizonica
	Pinus ponderosa/Purshia mexicana
	Populus tremuloides
	Psuedotsuga menziesii
	Alpine Tundra
	Rocky Mountain Upper Montane Conifer Forest
San Mateo Mountains Complex	*Accipiter gentilis*
	Apacheria chiricahuensis
	Ashmunella rhyssa rhyssa
	Ashmunella tetrodon
	Bufo microscaphus microscaphus
	Cardellina rubrifrons
	Erigeron scopulinus
	Gila pandora
	Penstemon pseudoparvus
	Rana chiricahuensis
	Senecio cynthioides
	Silene wrightii
	Strix occidentalis lucida
	Tryonia alamosae
	Abies concolor/Erigeron eximius
	Abies concolor/Jamesia americana
	Abies concolor-Acer glabrum
	Abies concolor-Quercus gambelii
	Picea engelmannii/Moss

San Mateo Mountains (cont.)	Picea engelmannii/Vaccinium myrtillus
	Picea pungens/Fragaria virginiana ssp. virginiana
	Pinus edulis-Juniperus monosperma
	Pinus ponderosa
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Muhlenbergia montana
	Pinus ponderosa/Muhlenbergia virescens
	Pinus ponderosa/Quercus grisea
	Populus tremuloides
	Pseudotsuga menziesii/Bromus ciliatus
	Pseudotsuga menziesii/Festuca arizonica
	Pseudotsuga menziesii/Muhlenbergia montana
	Pseudotsuga menziesii/Muhlenbergia virescens
	Pseudotsuga menziesii-Quercus gambelii
	Intermontane grassland vegetation
	15 Coexisting bat species.
Sandia Wilderness	*Accipiter gentilis*
	Astragalus feensis
	Cynomys gunnisoni
	Heuchera pulchella
	Silene plankii
	Strix occidentalis lucida
	Toumeya papyracantha
	Vireo vicinior
	Abies concolor-Acer glabrum
	Abies concolor-Quercus gambelii
	Abies lasiocarpa/Erigeron eximius
	Abies lasiocarpa-Acer glabrum
	Pinus ponderosa/Bouteloua gracilis
	Pinus ponderosa/Quercus gambelii
Sawtooth/Datils	*Erigeron rhizomatus*
Sedillo Spring	*Thermosphaeroma thermophilum*
	Pinus edulis-Juniperus monosperma
Sevilleta NWR	*Columba fasciata*
	Empidonax traillii extimus
	Hymenoxys brachyactis
	Ovis canadensis mexicana
	Silene plankii
	Atriplex canescens/Sparse
	Atriplex canescens/Sporobolus airoides
	Bouteloua eriopoda/Ephedra torreyana
	Bouteloua eriopoda/Parthenium incanum
	Bouteloua eriopoda-Aristida purpurea
	Bouteloua eriopoda-Bouteloua curtipendula
	Bouteloua eriopoda-Bouteloua gracilis

Sevilleta NWR (cont.)	Bouteloua eriopoda-Hilaria jamesii
	Bouteloua eriopoda-Muhlenbergia torreyi
	Bouteloua gracilis
	Bouteloua hirsuta/Dalea formosa
	Cercocarpus montanus/Bouteloua gracilis
	Cercocarpus montanus/Stipa neomexicana
	Juniperus monosperma/Bouteloua eriopoda
	Juniperus monosperma/Bouteloua gracilis
	Larrea tridentata
	Larrea tridentata/Bouteloua eriopoda
	Larrea tridentata/Erioneuron pulchellum
	Larrea tridentata/Muhlenbergia porteri
	Pinus edulis/Bouteloua gracilis
	Pinus edulis/Muhlenbergia montana
	Pinus edulis-Juniperus monosperma
	Prosopis glandulosa/Bouteloua eriopoda
	Prosopis glandulosa/Sporobolus flexuosus
	Prosopis glandulosa-Atriplex canescens
	Quercus turbinella/Bouteloua curtipendula
	Quercus turbinella/Bouteloua gracilis
	Scleropogon brevifolius/Sparse
	Sporobolus airoides/Monotypic
	Sporobolus wrightii/Monotypic
	Stipa neomexicana-Bouteloua eriopoda
Sierra Blanca	*Allium gooddingii*
	Aneides hardii
	Ashmunella rhyssa altissima
	Astragalus neomexicanus
	Besseya oblongifolia
	Crataegus wootoniana
	Eriogonum jamesii var wootonii
	Ionactis elegans
	Lupinus sierrae-blancae
	Oncorhynchus clarki virginalis
	Oreohelix nogalensis
	Philadelphus argyrocalyx
	Potentilla sierrae-blancae
	Ribes mescalerium
	Sorex neomexicanus
	Strix occidentalis lucida
	Abies concolor-Acer glabrum
	Abies concolor-Juglans major
	Abies concolor-Mahonia repens
	Abies concolor-Quercus gambelii
Sitting Bull Falls	*Ictalurus lupus*

S. Black Range/Cook's Peak	*Accipiter gentilis*
	Ashmunella binneyi
	Ashmunella cockerelli
	Ashmunella macromphala
	Ashmunella mendax
	Caprimulgus vociferus
	Cardellina rubrifrons
	Columba fasciata
	Dendroica graciae
	Lampropeltis pyromelana
	Oreohelix metcalfei
	Otus flammeolus
	Rana chiricahuensis
	Scrophularia macrantha
	Strix occidentalis lucida
Springerville Grasslands	*Catostomus sp 3*
	Charadrius montanus
	Haliaeetus leucocephalus
	Lepidomeda vittata
	Oncorhynchus apache
	Perognathus flavus goodpasteri
	Pinus edulis-Juniperus monosperma
Stoneman Lake	*Cirsium parryi ssp mogollonicum*
	Potentilla multifoliolata
	Pinus ponderosa/Festuca arizonica
	Natural Lakes
Sycamore / Oak Creek Canyons	*Accipiter gentilis*
	Astragalus troglodytus
	Catostomus insignis
	Cimicifuga arizonica
	Erigeron saxatilis
	Falco peregrinus anatum
	Gila robusta
	Hedeoma diffusum
	Heuchera eastwoodiae
	Hyla eximia
	Lampropeltis pyromelana
	Metrichia volada
	Mustela frenata arizonensis
	Myotis lucifugus occultus
	Otus flammeolus
	Potentilla multifoliolata
	Rana yavapaiensis
	Salvia dorrii ssp mearnsii
	Strix occidentalis lucida
	Talinum validulum
	Thamnophis eques megalops

Sycamore / Oak Creek (cont.)	*Thamnophis rufipunctatus* Pinus ponderosa/Bouteloua gracilis Pinus ponderosa/Festuca arizonica Pinus ponderosa/Muhlenbergia virescens Pinus ponderosa/Poa fendleriana Important ephemeral wetland that is seasonally wet and dry.
Torreon Spring	*Pyrgulopsis neomexicana*
Tularosa River	*Catostomus insignis* *Rhinichthys chrysogaster* *Rhinichthys cobitis* *Rhinichthys osculus*
Western Plains of San Augustin	*Oreohelix littoralis* Pinus edulis-Juniperus monosperma Sporobolus airoides
Wet Beaver Creek	*Astragalus troglodytus* *Cirsium parryi ssp mogollonicum* *Potentilla multifoliolata* Riparian habitat and watershed, springs.
White Mesa - Todilto Gypsum	*Abronia bigelovii* *Puccinellia parishii* *Toumeya papyracantha* *Townsendia gypsophila* Gypsum outcrops with related plant species; saline springs/seeps with restricted plant species.
White Mountains Complex	*Accipiter gentilis* *Allium gooddingii* *Anodonta californiensis* *Astragalus naturitensis* *Astragalus nutriosensis* *Besseya oblongifolia* *Bufo microscaphus microscaphus* *Cardellina rubrifrons* *Castilleja mogollonica* *Catostomus clarki* *Catostomus insignis* *Catostomus sp 3* *Cinclus mexicanus* *Empidonax traillii extimus* *Falco peregrinus anatum* *Gila robusta* *Haliaeetus leucocephalus* *Hyla eximia* *Lepidomeda vittata* *Microtus montanus arizonensis*

White Mountains Complex (cont.)	*Myotis lucifugus occultus*
	Oncorhynchus apache
	Otus flammeolus
	Psephenus montanus
	Pyrgulopsis trivialis
	Rana chiricahuensis
	Rana yavapaiensis
	Rhinichthys cobitis
	Rhinichthys osculus
	Rumex orthoneurus
	Salix arizonica
	Senecio cardamine
	Senecio quaerens
	Sorex nanus
	Sorex palustris navigator
	Spermophilus tridecemlineatus monticola
	Strix occidentalis lucida
	Thamnophis rufipunctatus
	Trifolium longipes var neurophyllum
	Zapus hudsonius luteus
	Abies concolor/Muhlenbergia virescens
	Abies concolor-Acer glabrum
	Abies concolor-Mahonia repens
	Abies concolor-Quercus gambelii
	Abies lasiocarpa/Erigeron eximius
	Abies lasiocarpa/Vaccinium myrtillus
	Picea engelmannii/Senecio cardamine
	Picea pungens/Carex foenea
	Picea pungens/Festuca arizonica
	Picea pungens/Senecio cardamine
	Pinus ponderosa/Arctostaphylos pungens
	Pinus ponderosa/Muhlenbergia virescens
	Pinus ponderosa/Muhlenbergia virescens-Festuca arizonica
	Pseudotsuga menziesii/Festuca arizonica
	Pseudotsuga menziesii/Muhlenbergia virescens
	Rocky Mountain Upper Montane Conifer Forest
Willow Spring, Cienega Ranch	*Pyrgulopsis chupaderae*
Zuni Mountains	*Accipiter gentilis*
	Astragalus accumbens
	Erigeron rhizomatus
	Erigeron sivinskii
	Pinus ponderosa/Festuca arizonica
	Pinus ponderosa/Quercus gambelii

Appendix VI. Portfolio Sites Containing Selected Targets.

(some expert target ocurrences overlap more than one site)

Species Targets:	**Site**
Abronia bigelovii	Mesa Prieta
	San Felipe - Todilto Limestone
	White Mesa - Todilto Gypsum
Accipiter gentilis	Anderson Mesa Lakes
	Bill Williams Mountains
	Black River/White River Headwaters
	Blue River/San Francisco River
	Chuska Mountains
	Fierro Hill
	Gila River
	Las Animas Creek
	Mimbres River
	Mogollon Canyons Complex
	Mogollon Divide
	Northern Black Range
	Sacramento Mountains
	San Francisco Peaks
	San Mateo Mountains Complex
	Sandia Wilderness
	Southern Black Range/Cook's Peak
	Sycamore & Oak Creek Canyons
	White Mountains Complex
	Zuni Mountains
Agastache rupestris	Mogollon Divide
Allium gooddingii	Black River/White River Headwaters
	Blue River/San Francisco River
	Chuska Mountains
	Gila River
	Mogollon Divide
	Nutrioso Creek
	Sierra Blanca
	White Mountains Complex
Aneides hardii	Capitan Mountains
	Sacramento Mountains
	Sierra Blanca
Anodonta californiensis	Black River/White River Headwaters
	White Mountains Complex

Apacheria chiricahuensis	Gila River Las Animas Creek Mimbres River Mineral Creek Northern Black Range San Mateo Mountains Complex
Aquilegia chrysantha var chaplinei	Guadalupe Mountains Escarpment
Argemone pleiacantha ssp pinnatisecta	Sacramento Mountains
Ashmunella binneyi	Southern Black Range/Cook's Peak
Ashmunella carlsbadensis	Guadalupe Mountains Escarpment
Ashmunella cockerelli	Southern Black Range/Cook's Peak
Ashmunella macromphala	Southern Black Range/Cook's Peak
Ashmunella mendax	Southern Black Range/Cook's Peak
Ashmunella mogollonensis	Mogollon Divide
Ashmunella pseudodonta	Capitan Mountains
Ashmunella rhyssa altissima	Sierra Blanca
Ashmunella rhyssa rhyssa	San Mateo Mountains Complex
Ashmunella tetrodon	Ladder Ranch Mogollon Divide San Mateo Mountains Complex
Astragalus accumbens	Zuni Mountains
Astragalus altus	Rio Penasco Sacramento Mountains
Astragalus chuskanus	Chuska Mountains
Astragalus feensis	San Felipe - Todilto Limestone Sandia Wilderness
Astragalus kerrii	Capitan Mountains
Astragalus knightii	Mesa Prieta
Astragalus micromerius	Chuska Mountains

Astragalus naturitensis	Black River/White River Headwaters Blue River/San Francisco River White Mountains Complex
Astragalus neomexicanus	Rio Penasco Sacramento Mountains Sierra Blanca
Astragalus nutriosensis	Nutrioso Creek White Mountains Complex
Astragalus troglodytus	San Francisco Peaks Sycamore & Oak Creek Canyons Wet Beaver Creek
Besseya oblongifolia	Black River/White River Headwaters Blue River/San Francisco River Sierra Blanca White Mountains Complex
Botrychium crenulatum	Anderson Mesa Lakes San Francisco Peaks
Brickellia modesta	Rio Penasco Sacramento Mountains
Bufo microscaphus microscaphus	Anderson Mesa Lakes Blue River/San Francisco River Clay Springs Mogollon Canyons Complex San Mateo Mountains Complex White Mountains Complex
Canis lupus baileyi	Blue River/San Francisco River
Caprimulgus vociferus	Gila River Las Animas Creek Mimbres River Mogollon Divide Northern Black Range Southern Black Range/Cook's Peak
Cardellina rubrifrons	Anderson Mesa Lakes Black River/White River Headwaters Fierro Hill Gila River Las Animas Creek Magdalena Mountains Mimbres River Mogollon Divide

Cardellina rubrifrons (cont.)	Northern Black Range San Mateo Mountains Complex Southern Black Range/Cook's Peak White Mountains Complex
Castilleja mogollonica	Black River/White River Headwaters Blue River/San Francisco River White Mountains Complex
Catostomus clarki	Blue River/San Francisco River Mogollon Canyons Complex White Mountains Complex
Catostomus discobolus discobolus	Nutrioso Creek
Catostomus discobolus yarrowi	Rio Nutria
Catostomus insignis	Bill Williams Mountains Black River/White River Headwaters Blue River/San Francisco River Gila River Mogollon Canyons Complex Mogollon Divide Sycamore & Oak Creek Canyons Tularosa River White Mountains Complex
Catostomus plebeius	Mimbres River
Catostomus sp 3	Anderson Mesa Lakes Black River/White River Headwaters Mogollon Canyons Complex Nutrioso Creek Springerville Grasslands White Mountains Complex
Chaetopappa hersheyi	Guadalupe Mountains Escarpment
Charadrius montanus	Springerville Grasslands
Chrysothamnus molestus	San Francisco Peaks
Cicindela oregona maricopa	Mogollon Canyons Complex
Cimicifuga arizonica	Bill Williams Mountains Mogollon Canyons Complex Sycamore & Oak Creek Canyons

Cinclus mexicanus	Black River/White River Headwaters Chuska Mountains White Mountains Complex
Cirsium parryi ssp mogollonicum	Anderson Mesa Lakes Mogollon Canyons Complex Stoneman Lake Wet Beaver Creek
Cirsium vinaceum	Rio Penasco Sacramento Mountains
Cirsium wrightii	Sacramento Mountains
Clematis palmeri	Black River/White River Headwaters
Cnemidophorus flagellicaudus	Blue River/San Francisco River Mogollon Canyons Complex
Coccyzus americanus occidentalis	Ladder Ranch
Columba fasciata	Anderson Mesa Lakes Las Animas Creek Mesa Prieta Mimbres River Mogollon Canyons Complex Northern Black Range Sevilleta NWR Southern Black Range/Cook's Peak
Contopus borealis	Gila River Mogollon Divide
Corynorhinus townsendii pallescens	Black River/White River Headwaters
Coryphantha sneedii var leei	Guadalupe Mountains Escarpment
Crataegus wootoniana	Fierro Hill Mimbres River Rio Penasco Sacramento Mountains Sierra Blanca
Cynomys gunnisoni	Chuska Mountains North Plains San Francisco Peaks Sandia Wilderness
Cyprinella formosa habitat	Mimbres River

Delphinium novomexicanum	Sacramento Mountains
Dendroica graciae	Las Animas Creek Mimbres River Northern Black Range Southern Black Range/Cook's Peak
Deroceras heterura	Mogollon Divide Northern Black Range
Draba mogollonica	Gila River Mogollon Divide
Echinocereus fendleri var kuenzleri	Capitan Mountains Fort Stanton/Rio Bonito Area Rio Hondo Rio Penasco Sacramento Mountains
Empidonax hammondii	Chuska Mountains
Empidonax traillii extimus	Black River/White River Headwaters Blue River/San Francisco River Gila River Nutrioso Creek Rio Nutria Rio Penasco Sevilleta NWR White Mountains Complex
Empidonax wrightii	Gila River Magdalena Mountains
Erigeron acomanus	Blue Water Creek Canyon Prewitt/Thoreau
Erigeron hessii	Gila River Mogollon Divide
Erigeron rhizomatus	Sawtooth/Datils Zuni Mountains
Erigeron rybius	Sacramento Mountains
Erigeron saxatilis	Mogollon Canyons Complex San Francisco Peaks Sycamore & Oak Creek Canyons

Erigeron scopulinus	Mogollon Divide Northern Black Range San Mateo Mountains Complex
Erigeron sivinskii	Zuni Mountains
Eriogonum jamesii var wootonii	Sierra Blanca
Escobaria guadalupensis	Guadalupe Mountains Escarpment
Escobaria villardii	Rio Penasco Sacramento Mountains
Etheostoma lepidum	Rio Penasco Sacramento Mountains
Falco peregrinus anatum	Bill Williams Mountains Blue River/San Francisco River Guadalupe Mountains Escarpment Mogollon Canyons Complex San Francisco Peaks Sycamore & Oak Creek Canyons White Mountains Complex
Gentiana barbellata	San Francisco Peaks
Gila intermedia	Blue River/San Francisco River Gila River Mogollon Divide
Gila nigrescens	Mimbres River
Gila pandora	Ladder Ranch Northern Black Range Rio Hondo San Mateo Mountains Complex
Gila robusta	Anderson Mesa Lakes Bill Williams Mountains Black River/White River Headwaters Gila River Mogollon Canyons Complex Mogollon Divide Sycamore & Oak Creek Canyons White Mountains Complex

Haliaeetus leucocephalus	Blue River/San Francisco River Gila River Ladder Ranch Northern Black Range Springerville Grasslands White Mountains Complex
Hedeoma apiculata	Guadalupe Mountains Escarpment
Hedeoma diffusum	Anderson Mesa Lakes Sycamore & Oak Creek Canyons
Hedeoma pulcherrima	Capitan Mountains Sacramento Mountains
Hedeoma todsenii	Sacramento Mountains
Heuchera eastwoodiae	Mogollon Canyons Complex Sycamore & Oak Creek Canyons
Heuchera pulchella	Sandia Wilderness
Holospira cockerelli	Hillsboro West Ladder Ranch Northern Black Range
Holospira montivaga	Guadalupe Mountains Escarpment
Humboldtiana ultima	Guadalupe Mountains Escarpment
Hyla eximia	Anderson Mesa Lakes Bill Williams Mountains Black River/White River Headwaters Clay Springs Gila River Mogollon Canyons Complex Mogollon Divide San Francisco Peaks Sycamore & Oak Creek Canyons White Mountains Complex
Hymenopappus biennis	Guadalupe Mountains Escarpment
Hymenoxys brachyactis	Sevilleta NWR
Hymenoxys helenioides	Chuska Mountains San Francisco Peaks
Ictalurus lupus	Sitting Bull Falls

Ionactis elegans	Sierra Blanca
Lachlania dencyanuae	Gila River
Lampropeltis alterna	Guadalupe Mountains Escarpment
Lampropeltis pyromelana	Anderson Mesa Lakes Blue River/San Francisco River Clay Springs Las Animas Creek Mimbres River Mogollon Canyons Complex Northern Black Range Southern Black Range/Cook's Peak Sycamore & Oak Creek Canyons
Lepidomeda vittata	Anderson Mesa Lakes Black River/White River Headwaters Mogollon Canyons Complex Nutrioso Creek Springerville Grasslands White Mountains Complex
Lesquerella aurea	Sacramento Mountains
Lesquerella gooddingii	Gila River Las Animas Creek Mimbres River Mineral Creek Northern Black Range
Lesquerella valida	Capitan Mountains Guadalupe Mountains Escarpment
Lupinus sierrae-blancae	Sacramento Mountains Sierra Blanca
Lutra canadensis sonora	Gila River
Meda fulgida	Gila River Mogollon Divide
Metrichia volada	Sycamore & Oak Creek Canyons
Microtus montanus arizonensis	White Mountains Complex
Mustela frenata arizonensis	Anderson Mesa Lakes San Francisco Peaks Sycamore & Oak Creek Canyons

Myotis lucifugus occultus	Anderson Mesa Lakes Black River/White River Headwaters Mogollon Divide Sacramento Mountains San Francisco Peaks Sycamore & Oak Creek Canyons White Mountains Complex
Oncorhynchus apache	Black River/White River Headwaters Blue River/San Francisco River Nutrioso Creek Springerville Grasslands White Mountains Complex
Oncorhynchus clarki virginalis	Las Animas Creek Northern Black Range Sierra Blanca
Oncorhynchus gilae gilae	Gila River Mogollon Divide Northern Black Range
Oporornis tolmiei	Chuska Mountains
Oreohelix confragosa	Fierro Hill
Oreohelix littoralis	Western Plains of San Augustin
Oreohelix magdalenae	Magdalena Mountains
Oreohelix metcalfei	Ladder Ranch Southern Black Range/Cook's Peak
Oreohelix nogalensis	Sierra Blanca
Oreohelix pilsbryi	Mineral Creek Northern Black Range
Otus flammeolus	Anderson Mesa Lakes Black River/White River Headwaters Chuska Mountains Fierro Hill Las Animas Creek Mimbres River Northern Black Range Southern Black Range/Cook's Peak Sycamore & Oak Creek Canyons White Mountains Complex
Ovis canadensis mexicana	Sevilleta NWR

Parthenium alpinum var alpinum	Prewitt/Thoreau
Pedicularis angustissima	Fierro Hill Gila River Mimbres River Mogollon Divide
Penstemon alamosensis	Sacramento Mountains
Penstemon cardinalis	Guadalupe Mountains Escarpment Rio Penasco Sacramento Mountains
Penstemon cardinalis ssp regalis	Guadalupe Mountains Escarpment
Penstemon clutei	Anderson Mesa Lakes San Francisco Peaks
Penstemon neomexicanus	Rio Penasco Sacramento Mountains
Penstemon pseudoparvus	San Mateo Mountains Complex
Perognathus flavus goodpasteri	Springerville Grasslands
Phacelia serrata	Anderson Mesa Lakes San Francisco Peaks
Philadelphus argyrocalyx	Sacramento Mountains Sierra Blanca
Pinus aristata	Anderson Mesa Lakes San Francisco Peaks
Polites mystic ssp dacotah	Mogollon Canyons Complex
Polygala rimulicola var rimulicola	Guadalupe Mountains Escarpment
Potentilla multifoliolata	Anderson Mesa Lakes Bill Williams Mountains Mogollon Canyons Complex San Francisco Peaks Stoneman Lake Sycamore & Oak Creek Canyons Wet Beaver Creek
Potentilla sierrae-blancae	Sierra Blanca
Psephenus montanus	White Mountains Complex

Puccinellia parishii	Chuska Mountains Mesa Prieta Mimbres River Mount Taylor White Mesa - Todilto Gypsum
Pyrgulopsis chupaderae	Willow Spring, Cienega Ranch
Pyrgulopsis gilae	Gila River Mogollon Divide Northern Black Range
Pyrgulopsis n. Sp.	Mimbres River
Pyrgulopsis neomexicana	Torreon Spring
Pyrgulopsis thermalis	Gila River Mogollon Divide Northern Black Range
Pyrgulopsis trivialis	Black River/White River Headwaters White Mountains Complex
Rana chiricahuensis	Anderson Mesa Lakes Black River/White River Headwaters Blue River/San Francisco River Clay Springs Ladder Ranch Las Animas Creek Mimbres River Mogollon Canyons Complex Northern Black Range Nutrioso Creek San Mateo Mountains Complex Southern Black Range/Cook's Peak White Mountains Complex
Rana yavapaiensis	Blue River/San Francisco River Gila River Mogollon Canyons Complex Sycamore & Oak Creek Canyons White Mountains Complex
Rhinichthys chrysogaster	Blue River/San Francisco River Gila River Mogollon Divide Tularosa River

Rhinichthys cobitis	Black River/White River Headwaters Blue River/San Francisco River Gila River Mogollon Divide Tularosa River White Mountains Complex
Rhinichthys osculus	Anderson Mesa Lakes Blue River/San Francisco River Chuska Mountains Gila River Mogollon Canyons Complex Mogollon Divide Nutrioso Creek Tularosa River White Mountains Complex
Ribes mescalerium	Rio Penasco Sacramento Mountains Sierra Blanca
Rumex orthoneurus	Gila River Mogollon Canyons Complex Mogollon Divide White Mountains Complex
Salix arizonica	Black River/White River Headwaters Blue River/San Francisco River White Mountains Complex
Salvia dorrii ssp mearnsii	Sycamore & Oak Creek Canyons
Sciurus aberti chuscensis	Chuska Mountains
Sciurus arizonensis	Mogollon Divide
Scrophularia macrantha	Northern Black Range Southern Black Range/Cook's Peak
Senecio cardamine	White Mountains Complex

Senecio cynthioides	Gila River Las Animas Creek Mimbres River Mineral Creek Northern Black Range San Mateo Mountains Complex
Senecio franciscanus	Anderson Mesa Lakes San Francisco Peaks
Senecio neomexicanus var metcalfei	Blue River/San Francisco River
Senecio quaerens	Black River/White River Headwaters Blue River/San Francisco River Gila River Las Animas Creek Mimbres River Mineral Creek Mogollon Divide Northern Black Range White Mountains Complex
Senecio sacramentanus	Rio Penasco Sacramento Mountains
Sibara grisea	Guadalupe Mountains Escarpment Sacramento Mountains
Silene plankii	Sandia Wilderness Sevilleta NWR
Silene wrightii	Mogollon Divide San Mateo Mountains Complex
Sophora gypsophila var guadalupensis	Guadalupe Mountains Escarpment
Sorex nanus	Black River/White River Headwaters Mount Taylor San Francisco Peaks White Mountains Complex
Sorex neomexicanus	Sacramento Mountains Sierra Blanca
Sorex palustris navigator	White Mountains Complex
Spermophilus tridecemlineatus monticola	Mount Taylor White Mountains Complex

Speyeria nokomis nokomis	Chuska Mountains
Stellaria porsildii	Fierro Hill Gila River Las Animas Creek Mimbres River Mineral Creek Northern Black Range
Streptanthus sparsiflorus	Guadalupe Mountains Escarpment
Strix occidentalis lucida	Anderson Mesa Lakes Bill Williams Mountains Black River/White River Headwaters Blue River/San Francisco River Chuska Mountains Clay Springs Fierro Hill Gila River Guadalupe Mountains Escarpment Las Animas Creek Magdalena Mountains Mimbres River Mogollon Canyons Complex Mogollon Divide Mount Taylor Northern Black Range Sacramento Mountains San Francisco Peaks San Mateo Mountains Complex Sandia Wilderness Sierra Blanca Southern Black Range/Cook's Peak Sycamore & Oak Creek Canyons White Mountains Complex
Talinum validulum	Bill Williams Mountains San Francisco Peaks Sycamore & Oak Creek Canyons
Tamias minimus atristriatus	Sacramento Mountains
Tamias minimus chuskaensis	Chuska Mountains
Thamnophis eques megalops	Sycamore & Oak Creek Canyons

Thamnophis rufipunctatus	Anderson Mesa Lakes Black River/White River Headwaters Blue River/San Francisco River Clay Springs Gila River Mogollon Canyons Complex Sycamore & Oak Creek Canyons White Mountains Complex
Thermosphaeroma thermophilum	Sedillo Spring
Toumeya papyracantha	Clay Springs Mesa Prieta Mount Taylor San Felipe - Todilto Limestone Sandia Wilderness White Mesa - Todilto Gypsum
Townsendia gypsophila	White Mesa - Todilto Gypsum
Trifolium longipes var neurophyllum	Black River/White River Headwaters Blue River/San Francisco River Gila River Mogollon Divide White Mountains Complex
Tryonia alamosae	San Mateo Mountains Complex
Valeriana texana	Capitan Mountains Guadalupe Mountains Escarpment
Vireo bellii	Gila River
Vireo vicinior	Chuska Mountains Guadalupe Mountains Escarpment Ladder Ranch Sandia Wilderness
Zapus hudsonius luteus	Black River/White River Headwaters Blue River/San Francisco River Sacramento Mountains White Mountains Complex
Zigadenus mogollonensis	Gila River Mogollon Divide

Natural Community Targets:

Abies concolor-Acer glabrum	Mogollon Divide San Mateo Mountains Complex Sandia Wilderness White Mountains Complex
Abies concolor-Acer grandidentatum	Mogollon Divide Sacramento Mountains
Abies concolor-Juglans major	Mogollon Divide Sierra Blanca
Abies concolor-Mahonia repens	Mogollon Canyons Complex Mogollon Divide Northern Black Range Sierra Blanca White Mountains Complex
Abies concolor-Quercus gambelii	Capitan Mountains Mogollon Canyons Complex Mogollon Divide Northern Black Range Sacramento Mountains San Mateo Mountains Complex Sandia Wilderness Sierra Blanca White Mountains Complex
Abies concolor/Erigeron eximius	Mogollon Canyons Complex Mogollon Divide Northern Black Range San Mateo Mountains Complex
Abies concolor/Festuca arizonica	Magdalena Mountains Mogollon Canyons Complex Mogollon Divide
Abies concolor/Jamesia americana	Magdalena Mountains San Mateo Mountains Complex
Abies concolor/Muhlenbergia virescens	Mogollon Canyons Complex Mogollon Divide Northern Black Range White Mountains Complex
Abies lasiocarpa-Acer glabrum	Sandia Wilderness

Abies lasiocarpa/Erigeron eximius	Mogollon Divide Mount Taylor Northern Black Range Sandia Wilderness White Mountains Complex
Abies lasiocarpa/Lathyrus arizonicus	Mogollon Divide
Abies lasiocarpa/Rubus parviflorus	Mogollon Divide
Abies lasiocarpa/Saxifraga bronchialis	Mogollon Divide
Abies lasiocarpa/Vaccinium myrtillus	Mogollon Canyons Complex Mogollon Divide Mount Taylor Northern Black Range White Mountains Complex
ACEC, important wetland; neo-tropical birds, natural communities	Fort Stanton/Rio Bonito Area
Alnus incana ssp. tenuifolia-Cornus sericea ssp. sericea	Chuska Mountains
Alnus incana ssp. tenuifolia/Salix lucida ssp. lasiandra	Chuska Mountains Rio Nutria
Alnus oblongifolia-Salix gooddingii	Ladder Ranch
Alnus oblongifolia/Baccharis salicifolia	Ladder Ranch
Alnus oblongifolia/Leersia oryzoides	Gila River
Atriplex canescens/Sparse	Sevilleta NWR
Atriplex canescens/Sporobolus airoides	Sevilleta NWR
Baccharis salicifolia/Scirpus pungens	Blue River/San Francisco River
Baccharis salicifolia/Sphenopholis obtusata	Ladder Ranch
Bouteloua eriopoda-Aristida purpurea	Sevilleta NWR
Bouteloua eriopoda-Bouteloua curtipendula	Sevilleta NWR
Bouteloua eriopoda-Bouteloua gracilis	Sevilleta NWR
Bouteloua eriopoda-Hilaria jamesii	Sevilleta NWR
Bouteloua eriopoda-Muhlenbergia torreyi	Sevilleta NWR

Bouteloua eriopoda/Ephedra torreyana	Sevilleta NWR
Bouteloua eriopoda/Parthenium incanum	Sevilleta NWR
Bouteloua gracilis	Sevilleta NWR
Bouteloua hirsuta/Dalea formosa	Sevilleta NWR
Celtis laevigata var. reticulata/Brickellia californica	Blue River/San Francisco River
Celtis laevigata var. reticulata/Rhus trilobata var. trilobata	Ladder Ranch
Cercocarpus montanus/Bouteloua gracilis	Sevilleta NWR
Cercocarpus montanus/Stipa neomexicana	Sevilleta NWR
Chilopsis linearis-Chrysothamnus nauseosus	Gila River
Chrysothamnus nauseosus/Sporobolus cryptandrus	Blue River/San Francisco River Gila River
Eleocharis palustris/Anemopsis californica	Gila River
Equisetum laevigatum/Poa pratensis	Chuska Mountains
Glyceria borealis-Eleocharis bella	Chuska Mountains
Juglans major-Acer negundo/Rhus trilobata var. trilobata	Gila River Mimbres River
Juglans major-Celtis laevigata var. reticulata/Brickellia californica	Gila River
Juglans major/Bouteloua curtipendula	Ladder Ranch
Juglans major/Foresteria pubescens var. pubescens	Blue River/San Francisco River
Juniperus monosperma/Bouteloua eriopoda	Sevilleta NWR
Larrea tridentata	Sevilleta NWR
Larrea tridentata/Bouteloua eriopoda	Sevilleta NWR
Larrea tridentata/Erioneuron pulchellum	Sevilleta NWR
Larrea tridentata/Muhlenbergia porteri	Sevilleta NWR
Natural Lakes	Stoneman Lake

Picea engelmannii/Acer glabrum	Sacramento Mountains
Picea engelmannii/Erigeron eximius	Mogollon Divide Northern Black Range
Picea engelmannii/Moss	Mount Taylor San Mateo Mountains Complex
Picea engelmannii/Senecio cardamine	Mogollon Divide White Mountains Complex
Picea engelmannii/Vaccinium myrtillus	San Mateo Mountains Complex
Picea pungens-Pseudotsuga menziesii, Valeriana acutiloba	Sacramento Mountains
Picea pungens/Carex foenea	Mount Taylor White Mountains Complex
Picea pungens/Erigeron eximius	Mimbres River Mogollon Divide Northern Black Range
Picea pungens/Festuca arizonica	Mogollon Divide White Mountains Complex
Picea pungens/Fragaria virginiana ssp. virginiana	Sacramento Mountains San Mateo Mountains Complex
Picea pungens/Poa pratensis	Mogollon Divide
Picea pungens/Senecio cardamine	White Mountains Complex
Pinus aristata	Western Plains of San Augustin
Pinus edulis-Juniperus monosperma	Fort Stanton/Rio Bonito Area Magdalena Mountains Mesa Prieta Nutrioso Creek San Mateo Mountains Complex Sedillo Spring Sevilleta NWR Springerville Grasslands Western Plains of San Augustin
Pinus edulis/Bouteloua gracilis	Sevilleta NWR
Pinus edulis/Muhlenbergia montana	Sevilleta NWR

Pinus ponderosa	Anderson Mesa Lakes Gila River Magdalena Mountains Mesa Prieta Mogollon Divide San Mateo Mountains Complex
Pinus ponderosa/Arctostaphylos pungens	Bill Williams Mountains White Mountains Complex
Pinus ponderosa/Bouteloua gracilis	Anderson Mesa Lakes Bill Williams Mountains Blue River/San Francisco River San Francisco Peaks Sandia Wilderness Sycamore & Oak Creek Canyons
Pinus ponderosa/Festuca arizonica	Anderson Mesa Lakes Bill Williams Mountains Mogollon Canyons Complex Mogollon Divide Mount Taylor San Francisco Peaks San Mateo Mountains Complex Stoneman Lake Sycamore & Oak Creek Canyons Zuni Mountains
Pinus ponderosa/Muhlenbergia montana	Mogollon Divide San Francisco Peaks San Mateo Mountains Complex
Pinus ponderosa/Muhlenbergia virescens	Mogollon Canyons Complex Mogollon Divide San Francisco Peaks San Mateo Mountains Complex Sycamore & Oak Creek Canyons White Mountains Complex
Pinus ponderosa/Poa fendleriana	Anderson Mesa Lakes Mogollon Canyons Complex Sycamore & Oak Creek Canyons
Pinus ponderosa/Purshia mexicana	San Francisco Peaks
Pinus ponderosa/Quercus gambelii	Mimbres River Mogollon Divide Blue River/San Francisco River Sandia Wilderness Zuni Mountains

Pinus ponderosa/Quercus grisea	Blue River/San Francisco River San Mateo Mountains Complex Gila River Mogollon Divide
Pinus ponderosa/Quercus x pauciloba	Sacramento Mountains
Pinus ponderosa/Ribes inerme	Blue River/San Francisco River Mogollon Divide Northern Black Range
Platanus wrightii-Alnus oblongifolia	Ladder Ranch Mogollon Divide
Platanus wrightii-Baccharis salicifolia	Ladder Ranch Mogollon Divide
Platanus wrightii-Quercus emoryi	Gila River
Platanus wrightii/Bouteloua curtipendula	Ladder Ranch
Platanus wrightii/Brickellia californica	Mogollon Divide
Platanus wrightii/Sporobolus cryptandrus	Blue River/San Francisco River
Populus angustifolia	Rio Nutria
Populus angustifolia-Acer negundo/Poa pratensis	Mimbres River
Populus angustifolia-Alnus oblongifolia	Ladder Ranch Mimbres River
Populus angustifolia-Juniperus scopulorum	Chuska Mountains
Populus angustifolia/Prunus virginiana	Rio Nutria
Populus fremontii-Fraxinus velutina	Ladder Ranch
Populus fremontii-Juniperus deppeana/Bromus tectorum	Mimbres River
Populus fremontii-Platanus wrightii/Baccharis salicifolia	Gila River
Populus fremontii-Salix gooddingii	Blue River/San Francisco River Gila River Ladder Ranch
P. fremontii-S. gooddingii-Baccharis salicifolia	Gila River

Populus fremontii-Salix gooddingii-S.exigua	Blue River/San Francisco River
Populus fremontii/Baccharis salicifolia	Blue River/San Francisco River Ladder Ranch
Populus fremontii/Salix exigua	Ladder Ranch
Populus fremontii/Salix gooddingii	Ladder Ranch
Populus fremontii/Sparse	Blue River/San Francisco River
Populus tremuloides	Anderson Mesa Lakes Bill Williams Mountains Mount Taylor San Francisco Peaks San Mateo Mountains Complex
Prosopis glandulosa-Atriplex canescens	Sevilleta NWR
Prosopis glandulosa/Bouteloua eriopoda	Sevilleta NWR
Prosopis glandulosa/Sporobolus flexuosus	Sevilleta NWR
Pseudotsuga menziesii	Sacramento Mountains San Francisco Peaks
Pseudotsuga menziesii-Quercus gambelii	Blue River/San Francisco River Capitan Mountains Gila River Magdalena Mountains Mimbres River Mogollon Divide Northern Black Range Sacramento Mountains San Mateo Mountains Complex
Pseudotsuga menziesii/Bromus ciliatus	Magdalena Mountains Mogollon Divide San Mateo Mountains Complex
Pseudotsuga menziesii/Festuca arizonica	Magdalena Mountains Mount Taylor San Mateo Mountains Complex White Mountains Complex
Pseudotsuga menziesii/Holodiscus dumosus	Mogollon Divide
Pseudotsuga menziesii/Muhlenbergia montana	San Mateo Mountains Complex

Pseudotsuga menziesii/Muhlenbergia virescens	Mogollon Divide Northern Black Range San Mateo Mountains Complex White Mountains Complex
Pseudotsuga menziesii/Quercus hypoleucoides	Mogollon Divide
Quercus gambelii	Anderson Mesa Lakes
Quercus turbinella/Bouteloua curtipendula	Sevilleta NWR
Quercus turbinella/Bouteloua gracilis	Sevilleta NWR
Rocky Mountain Alpine Tundra	San Francisco Peaks
Rocky Mountain Montane Forest	Gila River Mogollon Divide
Rocky Mountain Upper Montane Conifer Forest	Anderson Mesa Lakes Bill Williams Mountains Black River/White River Headwaters Blue River/San Francisco River Mogollon Canyons Complex Sacramento Mountains San Francisco Peaks White Mountains Complex
Salix exigua/Eleocharis palustris	Blue River/San Francisco River
Salix irrorata-Cornus sericea ssp. sericea	Rio Nutria
Salix irrorata-Salix exigua	Rio Nutria
Salix irrorata/Eleocharis palustris	Blue River/San Francisco River
Salix lucida ssp. lasiandra-Salix irrorata	Rio Nutria
Scirpus pungens-Eleocharis palustris	Gila River Ladder Ranch
Scirpus pungens-Equisetum laevigatum	Blue River/San Francisco River Chuska Mountains
Scirpus tabernaemontani/Typha latifolia	Gila River
Scleropogon brevifolius/Sparse	Sevilleta NWR
Southwest Lowland Broad-Leaved Deciduous Riparian/Wetland Forests	Gila River

Sporobolus airoides	Western Plains of San Augustin Sevilleta NWR
Stipa neomexicana-Bouteloua eriopoda	Sevilleta NWR
Subalpine Conifer Forest	Gila River Magdalena Mountains Mogollon Divide

Special Habitats:

15 Coexisting bat species.	San Mateo Mountains Complex
Alpine Tundra	San Francisco Peaks Western Plains of San Augustin
Gypsum outcrops with related plant species; saline springs/seeps with restricted plant species.	White Mesa - Todilto Gypsum
High diversity high elevation forests and meadows of and critical headwaters of Mimbres River; outliers of Madrean forests; important migration and dispersal corridors.	Gila River Mimbres River Northern Black Range
Important ephemeral wetland that is seasonally wet and dry.	Bill Williams Mountains Sycamore & Oak Creek Canyons
Intermontane grassland vegetation of the San Augustin Plains.	San Mateo Mountains Complex
Lake and wetland habitat for migratory waterfowl, shorebirds	Anderson Mesa Lakes
Pronghorn summer range	Anderson Mesa Lakes
Riparian habitat and watershed, springs.	Wet Beaver Creek
Riparian habitat and watershed.	Mogollon Canyons Complex
Riparian habitat, connect with large primitive area	Blue River/San Francisco River
Springs	Dry Beaver Creek
Unique Pinyon pine-Texas madrone in regards to the composition of plant species and their elematic niche.	Guadalupe Mountains Escarpment
Unique plant assoc. of P. pine- Dunn Oak of limited extent.	Guadalupe Mountains Escarpment
Wetland, grassland mosaic. Ephemeral.	Anderson Mesa Lakes Mogollon Canyons Complex

Appendix VII. Forest Service Grazing Allotments in Portfolio Sites.

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Anderson Mesa Lakes	Anderson Springs	Coconino	44,347
Anderson Mesa Lakes	Angell	Coconino	59,948
Anderson Mesa Lakes	Bar T Bar	Coconino	168,680
Anderson Mesa Lakes	Beaver Creek	Coconino	59,726
Anderson Mesa Lakes	Clear Creek	Coconino	17,329
Anderson Mesa Lakes	Deep Lake	Coconino	10,947
Anderson Mesa Lakes	Mud Springs/Tinny	Coconino	75,474
Anderson Mesa Lakes	Padre Canyon	Coconino	21,255
Anderson Mesa Lakes	Pickett Lake	Coconino	34,344
Anderson Mesa Lakes	Walnut Canyon	Coconino	27,724
Anderson Mesa Lakes	Willow Valley	Coconino	13,277
Anderson Mesa Lakes	Youngs Canyon	Coconino	8,965
Bill Williams Mountains	Cameron/NPS	Kaibab	114,818
Bill Williams Mountains	Chalender	Kaibab	15,260
Bill Williams Mountains	Seven C Bar	Kaibab	21,842
Black River/White River Headwaters	Beaver Creek	Apache-Sitgreaves	12,951
Black River/White River Headwaters	Black River	Apache-Sitgreaves	14,292
Black River/White River Headwaters	Burro Creek	Apache-Sitgreaves	100
Black River/White River Headwaters	Fish Creek	Apache-Sitgreaves	11,265
Black River/White River Headwaters	Foote Ck/Cow Flat	Apache-Sitgreaves	24,067
Black River/White River Headwaters	Hayground	Apache-Sitgreaves	6,407
Black River/White River Headwaters	KP/Raspberry	Apache-Sitgreaves	45,134
Black River/White River Headwaters	P.S.	Apache-Sitgreaves	6,529
Black River/White River Headwaters	Reservation	Apache-Sitgreaves	2,255
Black River/White River Headwaters	Sprucedale/Reno	Apache-Sitgreaves	46,929
Black River/White River Headwaters	Udall	Apache-Sitgreaves	10,525
Black River/White River Headwaters	Upper Cmpbell Blue	Apache-Sitgreaves	19,938
Black River/White River Headwaters	West Fork	Apache-Sitgreaves	18,924
Black River/White River Headwaters	Williams Valley	Apache-Sitgreaves	2,452
Blue River/San Francisco River	Alma Mesa	Apache-Sitgreaves & Gila	45,366
Blue River/San Francisco River	Bobcat Johnson	Apache-Sitgreaves	15,480
Blue River/San Francisco River	Copperas	Apache-Sitgreaves	9,084
Blue River/San Francisco River	Coyote Whitmer	Apache-Sitgreaves	14,416
Blue River/San Francisco River	Dillman Creek	Apache-Sitgreaves/Gila	4,127
Blue River/San Francisco River	Dry Creek	Apache-Sitgreaves/Gila	44,843
Blue River/San Francisco River	Fierro	Apache-Sitgreaves	514
Blue River/San Francisco River	Foote Ck/Cow Flat	Apache-Sitgreaves	22,591
Blue River/San Francisco River	Harden Cienega	Apache-Sitgreaves	36,487
Blue River/San Francisco River	Harve Gulch/RP	Apache-Sitgreaves	7,459
Blue River/San Francisco River	Hickey	Apache-Sitgreaves	23,987
Blue River/San Francisco River	Holt Gulch	Apache-Sitgreaves/Gila	13,944

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Blue River/San Francisco River	Johnson	Apache-Sitgreaves	9,443
Blue River/San Francisco River	Lightning Mesa/Pleasont	Apache-Sitgreaves	29,677
Blue River/San Francisco River	Lower Campbell Blue	Apache-Sitgreaves	13,474
Blue River/San Francisco River	Pigeon	Apache-Sitgreaves	31,715
Blue River/San Francisco River	Pleasant Valley	Apache-Sitgreaves	13,548
Blue River/San Francisco River	Potholes	Apache-Sitgreaves	7,589
Blue River/San Francisco River	Pueblo Creek	Apache-Sitgreaves/Gila	57,549
Blue River/San Francisco River	Red Hill	Apache-Sitgreaves	6,798
Blue River/San Francisco River	Roberts Park/HG	Apache-Sitgreaves	20,183
Blue River/San Francisco River	Sandrock	Apache-Sitgreaves	62,998
Blue River/San Francisco River	Sardine	Apache-Sitgreaves	7,693
Blue River/San Francisco River	Steeple Mesa-Fish Hook	Apache-Sitgreaves	24,537
Blue River/San Francisco River	Trout Creek	Apache-Sitgreaves	5,913
Blue River/San Francisco River	Wildbunch	Apache-Sitgreaves	23,384
Blue Water Creek Canyon	None		0
Capitan Mountains	Arabella	Lincoln	1,929
Capitan Mountains	Arroyo Seco	Lincoln	6,495
Capitan Mountains	Baca	Lincoln	13,246
Capitan Mountains	Block	Lincoln	17,444
Capitan Mountains	Brill	Lincoln	1,531
Capitan Mountains	Capitan Gap	Lincoln	2,374
Capitan Mountains	Capitan Wildlife	Lincoln	42,739
Capitan Mountains	Divide 2	Lincoln	7,964
Capitan Mountains	Latham	Lincoln	2,365
Capitan Mountains	Matney Springs	Lincoln	12,537
Capitan Mountains	Merchant	Lincoln	3,893
Capitan Mountains	Salazar	Lincoln	2,179
Capitan Mountains	VI	Lincoln	16,442
Chuska Mountains	None		0
Clay Springs	Buskin ANC	Apache-Sitgreaves	62,226
Clay Springs	Clay Springs	Apache-Sitgreaves	13,011
Clay Springs	Cottonwood	Apache-Sitgreaves	7,842
Clay Springs	Dodson	Apache-Sitgreaves	21,186
Clay Springs	Linden	Apache-Sitgreaves	34,205
Clay Springs	Park Day Wash	Apache-Sitgreaves	25,099
Clay Springs	Pierce Wash	Apache-Sitgreaves	7,702
Clay Springs	Show Low	Apache-Sitgreaves	24,226
Clay Springs	Sundown	Apache-Sitgreaves	9,340
Clay Springs	Willow Wash	Apache-Sitgreaves	41,622
Dry Beaver Creek	Horse Mesa	Coconino	7,359

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Fierro Hill	Fierro	Gila	10,787
Fort Stanton/Rio Bonito Area	None		0
Gila River	Black Mountain	Gila	48,896
Gila River	Corduray	Gila	29,999
Gila River	Cow Creek	Gila	5,153
Gila River	Diamond Bar	Gila	141,999
Gila River	Gila River	Gila	17,625
Gila River	Jordan Mesa	Gila	39,637
Gila River	Little Rough	Gila	2,903
Gila River	Mangus Valley	Gila	16,930
Gila River	O Bar O	Gila	69,568
Gila River	Redstone	Gila	62,670
Gila River	Sapillo	Gila	63,244
Gila River	V + T	Gila	90,908
Gila River	Watson Mountain	Gila	6,470
Guadalupe Mountains Escarpment	Bd.Tree/Last Chance	Lincoln	26,944
Guadalupe Mountains Escarpment	Black River	Lincoln	1,104
Guadalupe Mountains Escarpment	Dark Canyon	Lincoln	8,548
Guadalupe Mountains Escarpment	McCollaum	Lincoln	16,788
Guadalupe Mountains Escarpment	Sitting Bull	Lincoln	12,591
Guadalupe Mountains Escarpment	Soldier Springs	Lincoln	18,648
Hillsboro West	Cave Creek	Gila	50,744
Hillsboro West	Kingston	Gila	26,034
Ladder Ranch	None		0
Las Animas Creek	Cave Creek	Gila	50,744
Magdalena Mountains	Baldy	Cibola	26,059
Magdalena Mountains	Gap	Cibola	6,437
Magdalena Mountains	Hop Canyon	Cibola	5,917
Magdalena Mountains	Kelly	Cibola	5,954
Magdalena Mountains	Muleshoe	Cibola	20,451
Magdalena Mountains	Palome	Cibola	5,741
Magdalena Mountains	Ryan Hill	Cibola	1,696
Magdalena Mountains	Sawmill	Cibola	4,098
Magdalena Mountains	Tip Top	Cibola	3,412
Magdalena Mountains	Water Canyon	Cibola	13,748
Mesa Prieta	None		0

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Mimbres River	Allie	Gila	10,601
Mimbres River	Carrizo	Gila	1,052
Mimbres River	East Canyon	Gila	11,663
Mimbres River	Fierro	Gila	10,787
Mimbres River	Mimbres	Gila	32,529
Mimbres River	Powderhorn	Gila	37,191
Mimbres River	Shingle Canyon	Gila	1,072
Mineral Creek	Black Range	Gila	43,202
Mogollon Canyons Complex	Bar T Bar	Coconino	35,529
Mogollon Canyons Complex	Buckhorn	Coconino	27,073
Mogollon Canyons Complex	Chevelon Canyon	Apache-Sitgreaves	43,146
Mogollon Canyons Complex	Clear Creek	Apache-Sitgreaves	17,329
Mogollon Canyons Complex	Gentry	Apache-Sitgreaves	22,736
Mogollon Canyons Complex	Hberry/Pivot Rock	Coconino	30,155
Mogollon Canyons Complex	Limestone	Apache-Sitgreaves	49,428
Mogollon Canyons Complex	Long Tom	Apache-Sitgreaves	75,385
Mogollon Canyons Complex	Payson	Tonto	37,030
Mogollon Canyons Complex	Walker Basin	Coconino	71,942
Mogollon Canyons Complex	Wallace	Apache-Sitgreaves	42,920
Mogollon Canyons Complex	Wildcat	Apache-Sitgreaves	45,544
Mogollon Canyons Complex	Willow Valley	Coconino	13,277
Mogollon Divide	Alma	Gila	20,252
Mogollon Divide	Cedar Breaks	Gila	11,407
Mogollon Divide	Copper Creek	Gila	26,634
Mogollon Divide	Corner Mountain	Gila	12,654
Mogollon Divide	Cow Creek	Gila	13,213
Mogollon Divide	Davis Canyon	Gila	7,695
Mogollon Divide	Deep Creek	Gila	26,578
Mogollon Divide	Devils Park	Gila	19,686
Mogollon Divide	Dry Creek	Apache-Sitgreaves/Gila	44,843
Mogollon Divide	Glenn	Gila	237,022
Mogollon Divide	Holt Gulch	Apache-Sitgreaves/Gila	13,944
Mogollon Divide	Los Olmas	Gila	44,622
Mogollon Divide	Mogollon	Gila	15,530
Mogollon Divide	Rain Creek /74 Mtn.	Gila	17,689
Mogollon Divide	Reading Mtn.	Gila	17,412
Mogollon Divide	Redstone	Gila	62,670
Mogollon Divide	Roberts Park/HG	Gila	20,183
Mogollon Divide	Rough Canyon	Gila	5,565
Mogollon Divide	Sacaton	Gila	5,479
Mogollon Divide	Shingle Canyon	Gila	1,873
Mogollon Divide	Spar Canyon	Gila	10,366
Mogollon Divide	T Bar	Gila	92,498

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Mogollon Divide	Watson Mountain	Gila	6,470
Mogollon Divide	XSX	Gila	21,690
Mogollon Divide	Y Canyon	Gila	59,037
Mogollon Divide	Yeguas	Gila	11,636
Mount Taylor	American Ranch	Cibola	10,475
Mount Taylor	Cubero	Cibola	25,719
Mount Taylor	El Rito	Cibola	40,571
Mount Taylor	La Jara	Cibola	7,070
Mount Taylor	Private	Cibola	0
Mount Taylor	Village	Cibola	6,944
North Plains	None		0
Northern Black Range	Alexander	Gila	36,825
Northern Black Range	Black Range	Gila	43,202
Northern Black Range	Cave Creek	Gila	50,744
Northern Black Range	Diamond Bar	Gila	141,999
Northern Black Range	East Canyon	Gila	11,663
Northern Black Range	Hermosa	Gila	61,807
Northern Black Range	Noonday/Gallinas	Gila	9,880
Northern Black Range	North Palomas	Gila	14,374
Northern Black Range	Powderhorn	Gila	37,191
Northern Black Range	South Fork	Gila	37,161
Northern Black Range	Taylor Creek	Gila	42,788
Northern Black Range	Turkey Run	Gila	17,458
Nutrioso Creek	Molina Spring	Apache-Sitgreaves	3,464
Nutrioso Creek	Picnic	Apache-Sitgreaves	2,283
Nutrioso Creek	Rudd Creek	Apache-Sitgreaves	19,899
Nutrioso Creek	South Escudillo	Apache-Sitgreaves	28,827
Prewitt/Thoreau	None		0
Rio Hondo	Baca	Lincoln	13,246
Rio Hondo	Devil's Canyon	Lincoln	5,149
Rio Hondo	East Hale Lake	Lincoln	2,341
Rio Hondo	Salazar	Lincoln	2,179
Rio Hondo	South Coe	Lincoln	4,275
Rio Hondo	Tully	Lincoln	537
Rio Hondo	VI	Lincoln	16,442
Rio Nutria	Brennan	Cibola	3,836
Rio Nutria	Prewitt/6A	Cibola	39,847

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Rio Penasco	Burnt Canyon	Lincoln	10,214
Rio Penasco	Cox	Lincoln	4,000
Rio Penasco	Jackson	Lincoln	2,089
Sacramento Mountains	Agua Chiquita	Lincoln	31,183
Sacramento Mountains	Akers	Lincoln	5,278
Sacramento Mountains	Bear Creek	Lincoln	21,784
Sacramento Mountains	Bonito watershed	Lincoln	11,856
Sacramento Mountains	Bounds	Lincoln	1,840
Sacramento Mountains	Burnt Canyon	Lincoln	10,214
Sacramento Mountains	Cox	Lincoln	4,000
Sacramento Mountains	Cridebring	Lincoln	3,741
Sacramento Mountains	Cuevo	Lincoln	17,701
Sacramento Mountains	Curtis Canyon	Lincoln	8,603
Sacramento Mountains	Davis	Lincoln	5,256
Sacramento Mountains	Dry Canyon	Lincoln	16,913
Sacramento Mountains	Ehart	Lincoln	4,235
Sacramento Mountains	EK/North Bluewater	Lincoln	5,950
Sacramento Mountains	Escondido	Lincoln	12,315
Sacramento Mountains	Hunter	Lincoln	11,662
Sacramento Mountains	Hyatt	Lincoln	2,526
Sacramento Mountains	Jackson	Lincoln	2,089
Sacramento Mountains	James Canyon	Lincoln	14,374
Sacramento Mountains	La Borcita	Lincoln	11,814
Sacramento Mountains	Lewis	Lincoln	7,231
Sacramento Mountains	Lower 16 Springs	Lincoln	6,333
Sacramento Mountains	Miller Flats	Lincoln	4,735
Sacramento Mountains	Mule Canyon	Lincoln	7,834
Sacramento Mountains	Nogal	Lincoln	2,513
Sacramento Mountains	Pendleton	Lincoln	4,129
Sacramento Mountains	Perk	Lincoln	4,502
Sacramento Mountains	Potter Hill	Lincoln	3,233
Sacramento Mountains	Prather	Lincoln	2,937
Sacramento Mountains	Pumphouse	Lincoln	5,956
Sacramento Mountains	Russia Canyon	Lincoln	4,377
Sacramento Mountains	Sacramento	Lincoln	119,094
Sacramento Mountains	San Andreas	Lincoln	1,454
Sacramento Mountains	Scott Able	Lincoln	12,353
Sacramento Mountains	Smith	Lincoln	711
Sacramento Mountains	Solar	Lincoln	54,622
Sacramento Mountains	South La Luz	Lincoln	5,766
Sacramento Mountains	Turpin	Lincoln	1,137
Sacramento Mountains	Upper 16 Springs	Lincoln	10,484
Sacramento Mountains	Upper Burnt	Lincoln	6,702
Sacramento Mountains	Walker CC	Lincoln	7,825
Sacramento Mountains	Wooten	Lincoln	7,881

Site Name	Grazing Allotments[1]	Forest	Acres[2]
San Felipe - Todilito Limestone	none		0
San Francisco Peaks	A-1	Coconino	7,931
San Francisco Peaks	Angell	Coconino	59,948
San Francisco Peaks	Blackbill/Summit	Coconino	163,941
San Francisco Peaks	Cameron	Kaibab	14,548
San Francisco Peaks	Cosnino	Coconino	3,317
San Francisco Peaks	Crater	Coconino	1,879
San Francisco Peaks	Dog Knobs	Kaibab	5,229
San Francisco Peaks	Dog Knobs/cof	Coconino	258
San Francisco Peaks	Fossil Creek	Coconino	2,454
San Francisco Peaks	Irishman Dam	Kaibab	35,893
San Francisco Peaks	Moritz Lake/cof	Coconino	80
San Francisco Peaks	Peaks	Coconino	4,066
San Francisco Peaks	Ryan/BLM	Kaibab	20,233
San Francisco Peaks	Slate Mtn	Coconino	45,709
San Mateo Mountains Complex	Bear	Cibola	27,779
San Mateo Mountains Complex	Beartrap	Cibola	46,323
San Mateo Mountains Complex	Big Rosa	Cibola	35,178
San Mateo Mountains Complex	Deep Canyon	Cibola	22,793
San Mateo Mountains Complex	Durfee	Cibola	30,483
San Mateo Mountains Complex	East Monticello	Cibola	7,664
San Mateo Mountains Complex	Horse Mtn	Cibola	31,138
San Mateo Mountains Complex	Madera	Cibola	4,533
San Mateo Mountains Complex	Monica	Cibola	10,163
San Mateo Mountains Complex	Nogal	Cibola	30,483
San Mateo Mountains Complex	North Canyon	Cibola	5,705
San Mateo Mountains Complex	OJ Caliente	Cibola	30,211
San Mateo Mountains Complex	Penasco	Cibola	36,657
San Mateo Mountains Complex	Private	Cibola	0
San Mateo Mountains Complex	San Juan	Cibola	22,009
San Mateo Mountains Complex	San Mateo	Cibola	31,802
San Mateo Mountains Complex	West Monticello	Cibola	11,290
San Mateo Mountains Complex	West Red	Cibola	19,969
Sandia Wilderness	None	Cibola	0
Sawtooth/Datils	Flying V	Cibola	20,790
Sawtooth/Datils	Private	Cibola	0
Sawtooth/Datils	Sawtooth	Cibola	14,041
Sawtooth/Datils	Whitehouse	Cibola	104,575
Sedillo Spring	None		0
Sevilleta NWR	None		0

Site Name	Grazing Allotments[1]	Forest	Acres[2]
Sierra Blanca	Alto	Lincoln	11,330
Sierra Blanca	Cedar Creek	Lincoln	4,646
Sierra Blanca	Loma Grande	Lincoln	5,451
Sierra Blanca	Lower Bonito	Lincoln	9,156
Sierra Blanca	Nogal	Lincoln	7,049
Sierra Blanca	Three Rivers	Lincoln	7,748
Sierra Blanca	White Mtn Park	Lincoln	2,807
Sierra Blanca	Wilderness	Lincoln	16,450
Sitting Bull Falls	Montgomery	Lincoln	8,726
Southern Black Range/Cook's Peak	Berenda	Gila	26,338
Southern Black Range/Cook's Peak	Carrizo	Gila	7,496
Southern Black Range/Cook's Peak	Cave Creek	Gila	50,744
Southern Black Range/Cook's Peak	Cold/Hot Springs		18,318
Southern Black Range/Cook's Peak	Kingston		26,034
Southern Black Range/Cook's Peak	Mud Springs	Gila	1,975
Southern Black Range/Cook's Peak	Noonday/Gallinas	Gila	9,880
Springerville Grasslands	None		0
Stoneman Lake	Apache Maid	Coconino	169,626
Sycamore & Oak Creek Canyons	Boynton Canyon	Coconino	4,992
Sycamore & Oak Creek Canyons	Casner Park/Kelly	Coconino	29,150
Sycamore & Oak Creek Canyons	Manterola	Coconino	10,661
Sycamore & Oak Creek Canyons	Sedona	Coconino	18,025
Torreon Spring	None		0
Tularosa River	Alexander	Gila	24,696
Tularosa River	Deep Canyon	Gila	22,404
Tularosa River	Eagle Peak/McCartey	Gila	25,973
Western Plains of San Augustin	None		0
Wet Beaver Creek	Apache Maid	Coconino	169,626
Wet Beaver Creek	Beaver Creek	Coconino	59,726
White Mesa - Todilito Gypsum	None		0
White Mountains Complex	Alpine	Apache-Sitgreaves	7,983
White Mountains Complex	Beaver Creek	Apache-Sitgreaves	12,951
White Mountains Complex	Bee Hive	Apache-Sitgreaves	9,802
White Mountains Complex	Benton Creek	Apache-Sitgreaves	694
White Mountains Complex	Big Lake	Apache-Sitgreaves	8,368
White Mountains Complex	Black River	Apache-Sitgreaves	14,292
White Mountains Complex	Bobcat Johnson	Apache-Sitgreaves	15,480

Site Name	Grazing Allotments[1]	Forest	Acres[2]
White Mountains Complex	Boneyard	Apache-Sitgreaves	4,210
White Mountains Complex	Burk	Apache-Sitgreaves	1,787
White Mountains Complex	Burro Creek	Apache-Sitgreaves	22,035
White Mountains Complex	Bush Creek	Apache-Sitgreaves	483
White Mountains Complex	Cross Bar	Apache-Sitgreaves	10,519
White Mountains Complex	East Eagle	Apache-Sitgreaves	36,869
White Mountains Complex	Fish Creek	Apache-Sitgreaves	11,265
White Mountains Complex	Greens Peak	Apache-Sitgreaves	11,706
White Mountains Complex	Greer	Apache-Sitgreaves	26,485
White Mountains Complex	Hall	Apache-Sitgreaves	14,762
White Mountains Complex	Hannagan	Apache-Sitgreaves	10,588
White Mountains Complex	Hayground	Apache-Sitgreaves	6,407
White Mountains Complex	KP/Raspberry	Apache-Sitgreaves	45,134
White Mountains Complex	Lower Campbell Blue	Apache-Sitgreaves	13,474
White Mountains Complex	Molina Spring	Apache-Sitgreaves	3,464
White Mountains Complex	Murray Basin	Apache-Sitgreaves	3,396
White Mountains Complex	North 7 Spr.	Apache-Sitgreaves	1,487
White Mountains Complex	Nutrioso Summer	Apache-Sitgreaves	15,265
White Mountains Complex	P.S.	Apache-Sitgreaves	6,529
White Mountains Complex	Pool Corral	Apache-Sitgreaves	15,647
White Mountains Complex	Red Hill	Apache-Sitgreaves	6,798
White Mountains Complex	Reservation	Apache-Sitgreaves	4,123
White Mountains Complex	Reservation	Apache-Sitgreaves	2,255
White Mountains Complex	Rud Knoll	Apache-Sitgreaves	7,803
White Mountains Complex	Sheep Spring	Apache-Sitgreaves	15,804
White Mountains Complex	South Escudilla	Apache-Sitgreaves	28,827
White Mountains Complex	Sprucedale/Reno	Apache-Sitgreaves	46,929
White Mountains Complex	Steeple Mesa-Fish Hook	Apache-Sitgreaves	24,537
White Mountains Complex	Strayhorse	Apache-Sitgreaves	25,868
White Mountains Complex	Table Top	Apache-Sitgreaves	4,966
White Mountains Complex	Udall	Apache-Sitgreaves	10,525
White Mountains Complex	Upper Cmpbell Blue	Apache-Sitgreaves	19,938
White Mountains Complex	Voight/rcrk sum	Apache-Sitgreaves	6,195
White Mountains Complex	Water Canyon	Apache-Sitgreaves	4,078
White Mountains Complex	West Fork	Apache-Sitgreaves	18,924
White Mountains Complex	Williams Valley	Apache-Sitgreaves	13,431
Willow Spring, Cienega Ranch	None		0
Zuni Mountains	Prewitt/6A	Cibola	39,847
Zuni Mountains	Wingate	Cibola	28,499
		Total Acreage	**7,790,315**

1. Allotments are not necessarily entirely contained within a site.
2. Acreages approximate, calculated from GIS.

Appendix VIII. Arizona and New Mexico GAP Vegetation Types Coded to Brown, Lowe, and Pase (Brown 1994) used to match vegetation coverages in the ecoregion-wide vegetation map (Figure 4).

Brown, Lowe & Pase	New Mexico Gap Vegetation Types	Arizona Gap Vegetation Types
Agriculture	Dryland Agriculture Irrigated Agriculture	Agriculture
Alpine Tundra	Rocky Mountain Alpine Forb Tundra Rocky Mountain Alpine Graminoid Tundra	Rocky Mt. Lichen-Moss
Barren	Barren Mine/Quarries Rock Outcrop	
Chihuahuan Desertscrub	Chihuahuan Broadleaf Deciduous Desert Scrub Chihuahuan Broadleaf Evergreen Desert Scrub Chihuahuan Desert Grassland Chihuahuan Desert Scrub	Chihuahuan Creosotebush-Tarbush Scrub Chihuahuan Mesquite Shrub Hummock Chihuahuan Whitethorn Scrub Chihuahuan Mixed Scrub
Great Basin Conifer Woodland	Rocky Mtn/Great Basin Closed Conifer Woodland Rocky Mtn/Great Basin Open Conifer Woodland	Pj-Shrub/Ponderosa Pine-Gambel Oak-Juniper Pj/Sagebrush/Mixed Grass-Scrub Pinyon-Juniper-Shrub Live Oak-Mixed Shrub Pj (Mixed)/Mixed Chapparal-Scrub Pinyon-Juniper-Mixed Shrub Pinyon-Juniper-Mixed Grass-Scrub Pinyon-Juniper (Mixed) Great Basin Juniper
Great Basin Desertscrub	Great Basin Broadleaf Deciduous Desert Scrub Great Basin Microphyllous Desert Scrub	Great Basin Sagebrush Great Basin Big Sagebrush-Juniper-Pinyon Great Basin Sagebrush-Mixed Grass-Mixed Scrub Great Basin Shadscale-Mixed Grass-Mixed Scrub Great Basin Greasewood Scrub Great Basin Saltbush Scrub Great Basin Blackbrush-Mixed Scrub Great Basin Mormon Tea-Mixed Scrub Great Basin Winterfat-Mixed Scrub Great Basin Mixed Scrub Great Basin Mormon Tea/Pinyon-Juniper
Great Basin Montane Scrub	Rocky Mountain Montane Deciduous Scrub	
Interior Chaparral	Broadleaf Evergreen Interior Chaparral Rocky Mountain Montane Scrub & Interior Chaparral	Interior Chapparal-Shrub Live Oak-Pointleaf Manzanita Interior Chaparral-Mixed Evergreen Sclerophyll Interior Chaparral (Mixed)/Sonoran Paloverde-Mixed Cacti Interior Chapparal (Mixed)/Mixed Grass-Scrub Complex

Madrean Evergreen Woodland	Madrean Closed Conifer Woodland Madrean Open Oak Woodland (Encinal)	Arizona Cypress Encinal Mixed Oak Encinal Mixed Oak-Pinyon-Juniper Encinal Mixed Oak-Mexican Pine-Juniper Encinal Mixed Oak-Mexican Mixed Pine Encinal Mixed Oak-Mesquite Encinal Mixed Oak/Mixed Chapparal/Semidesert Grassland-Mixed Scrub
Mojave Desertscrub		Mohave Creosotebush Scrub Mohave Creosotebush-Bursage-Mixed Scrub Mohave Creosotebush-Yucca Spp. (Incl. Joshuatree) Mohave Blackbrush-Mixed Scrub Mohave Blackbrush-Yucca Spp. (Incl. Joshuatree) Mohave Saltbush-Mixed Scrub Mohave Brittlebush-Creosotebush Scrub Mohave Creosotebush-Brittlebush/Mohave Globemallow Scrub Mohave Catclaw Acacia-Mixed Scrub Mohave Joshuatree Mohave Mixed Scrub
Montane Meadow Grassland	Great Basin Foothill-Piedmont Grassland Great Basin Lowland/Swale Grassland Rocky Mountain Subalpine & Montane Grassland	Rocky Mt/Great Basin Dry Meadow Madrean Dry Meadow
Montane Riparian Wetlands	Rocky Mountain Montane Forested/Shrub Wetlands	
Montane, Plains & Great Basin Marshland	Graminoid Wetlands	Madrean Riparian/ Wet Meadow
Plains & Great Basin Grassland	Mid-Grass Prairie Plains-Mesa Broadleaf Sand-Scrub Short Grass Steppe Tall Grass Prairie	Great Basin Mixed Grass Great Basin Mixed Grass-Mixed Scrub Great Basin Mixed Grass-Sagebrush Great Basin Mixed Grass-Saltbush Great Basin Mixed Grass-Mormon Tea
Plains & Great Basin Riparian Wetland	Southwest & Plains Forested/Shrub Wetland	Great Basin Riparian/Cottonwood-Willow Forest Great Basin Riparian Forest/Mixed Riparian Scrub Great Basin Riparian/Sacaton Grass Scrub Great Basin Riparian/Reed-Cattail Marsh Great Basin Riparian/Wet Mountain Meadow Interior Riparian/Cottonwood-Willow Forest Interior Riparian/Mixed Broadleaf Forest Interior Riparian/Mesquite Forest Interior Riparian/Mixed Riparian Scrub Sonoran Riparian/Cottonwood-Willow Forest Sonoran Riparian/Cottonwood-Mesquite Forest

Plains & Great Basin Riparian Wetland (Cont.)		Sonoran Riparian/Mixed Broadleaf Forest Sonoran Riparian/Mesquite Forest Sonoran Riparian/Leguminous Short-Tree Forest/Scrub Sonoran Riparian/Mixed Riparian Scrub Sonoran Riparian/Sacaton Grass Scrub Sonoran Riparian/Low-Lying Riparian Scrub Sonoran/Chih. Riparian/Reed-Cattail Marsh Riparian/Flood-Damaged 1993 Interior Riparian/Mixed Riparian Strand
Rocky Mountain & Madrean Montane Conifer Forest	Madrean Lower Montane Conifer Forest Rocky Mountain Lower Montane Conifer Forest Rocky Mountain Upper Montane Conifer Forest Upper Montane Open Conifer Woodland	Douglas Fir-Mixed Conifer Ponderosa Pine Ponderosa Pine-Mixed Conifer Ponderosa Pine-Gambel Oak-Juniper/Pinyon-Juniper Complex Ponderosa Pine/Pinyon-Juniper Ponderosa Pine-Mixed Conifer/Shrub Live Oak-Sagebrush Scrub Ponderosa Pine-Mixed Oak-Juniper
Rocky Mountain Subalpine Conifer Forest	Subalpine Broadleaf Forest Subalpine Conifer Forest	Englemann Spruce-Mixed Conifer
Semidesert Grassland	Chihuahuan Foothill-Piedmont Desert Grassland Chihuahuan Lowland/Swale Desert Grassland	Semidesert Tobosa Grass-Scrub Semidesert Mixed Grass-Yucca-Agave Semidesert Mixed Grass-Mesquite Semidesert Mixed Grass-Mixed Scrub Sonoran Creosotebush Scrub Sonoran Creosotebush-Bursage Scrub Sonoran Creosotebush-Mesquite Scrub Sonoran Creosotebush-Bursage-Paloverde-Mixed Cacti (Wash) Sonoran Brittlebush-Mixed Scrub Sonoran Saltbush-Creosote Bursage Scrub Sonoran Paloverde-Mixed Cacti-Mixed Scrub Sonoran Paloverde Mixed Cacti/Sonoran Creosote-Bursage Sonoran Paloverde-Mixed Cacti/Semidesert Grassland-Mixed Scrub Sonoran Crucifixion Thorn Sonoran Smoketree Sonoran Catclaw Acacia
Urban	Urban Urban Vegetated	Urban Industrial Mixed
Water	Basin/Playa Riverine/Lacustrine	Playa Water