

Chapter 10:
**Ecological & Biological Diversity of the Cibola National Forest,
Mountain Districts**
In
Ecological and Biological Diversity of National Forests in Region
3

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SAVING THE LAST GREAT PLACES ON EARTH

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Introduction

The Cibola National Forest is one of 11 National Forests of the U.S. Forest Service (USFS) Southwestern Region (Region 3) and comprises approximately 9% of the total area of Region 3 Forests, not including the Cibola National Grasslands. The Mountain (Mtn.) Districts of the Cibola National Forest encompass approximately 1,750,200 acres in central New Mexico. Elevation on the forest ranges from approximately 5,000 ft. to approximately 11,300 ft. Notable mountain ranges include the Datil, Gallinas, Magdalena, Bear, Manzano, Sandia, San Mateo, Mt. Taylor, and Zuni Mountains.

The goal of this chapter is to synthesize information from existing regional-scale assessments to identify important ecological and biological values that occur on the Mountain Districts of the Cibola National Forest and highlight information that may be pertinent to forest plan revision. The Mountain Districts include: Mt. Taylor, Mountainair, Magdalena, and Sandia Ranger Districts. Information from three assessments was synthesized and includes:

- Distribution and extent of potential natural vegetation types (PNVTs)
- Plant and animal species richness and their conservation statuses
- Conservation areas and targets associated with Ecoregional Assessments

These types of information may be useful within the forest plan revision process for evaluating the suitability of current management activities and land management designations, identifying ecological characteristics that may be considered in developing desired conditions, and identifying species that may need special consideration because of continuing threats to their existence. Detailed descriptions of these datasets and the methods used to analyze them are available in Chapter 2. A summary and analysis of these assessments and comparisons of the Cibola National Forest to other major landowners in the Southwest (Arizona and New Mexico) and National Forests in Region 3 is provided in Chapter 3.

Results

I. Potential Natural Vegetation Types within the Cibola National Forest

Data from the Southwest Regional Gap Analysis Project (SWReGAP; USGS National Gap Analysis Program 2004) were used to characterize the extent of potential natural vegetation types (PNVTs) on the Mtn. Districts of the Cibola National Forest. PNVTs represent the climax vegetation type that would dominate a site under natural disturbance regimes and biological processes. PNVTs were used to summarize vegetation for this analysis because of their relevance to the characterizations of historic range of variability and vegetation models being developed for PNVTs in preparation for forest plan revision. For this analysis, the extent and proportion of each PNVT on the Cibola National Forest Mtn. Districts were summarized, as well as the proportion of each PNVT within Region 3 that occurs on the Cibola Mtn. Districts. The National Grasslands of the Cibola National Forest are address in Chapter 5. More detailed information on the data and methods used in this analysis can be found in Chapter 2, and information comparing PNVTs on the Cibola to other major landowners in the Southwest and National Forests within Region 3 is available in Chapter 3.

Twenty-one PNVTs were identified on the Cibola National Forest Mtn. Districts (Figure 10-1). Of the 21 PNVTs identified, three PNVTs comprise 81.5% of the Cibola (Table 10-1). These include pinyon-juniper (41%), ponderosa pine (29.1%), and Great Plains grassland (11.0%). Great Basin/Colorado Plateau grassland and steppe cover the next largest area on the Cibola (6.5%), followed by mixed conifer forest (4.2%). The remaining 16 PNVTs combined comprise 7.8% of the Forest.



Figure 10-1. Distribution of potential natural vegetation types on the Mountain Districts of the Cibola National Forest. Map was created using data from the Southwest Regional Gap Analysis Project (SWReGAP; U.S. Geological Survey National Gap Analysis Program, 2004). SWReGAP vegetation types were aggregated and converted to potential natural vegetation types. See Chapter 2 for more information regarding methods used. SWReGAP data have not been accuracy tested and are based on satellite imagery. Therefore, SWReGAP may not be appropriate at fine spatial scales.

Table 10-1. Approximate area (in acres) and percent of total area of each potential natural vegetation type on the Cibola National Forest, Mountain Districts. Areas were calculated using data from the Southwest Regional Gap Analysis Project (SWReGAP). SWReGAP land cover types were aggregated and converted to potential natural vegetation types. See Chapter 2 for more details on methods utilized.

Potential Natural Vegetation Type	Total Area (acres)	Percent of Total Area (%)
Aspen Forest and Woodland	13,500	0.8
Cottonwood Willow Riparian Forest	1,000	0.1
Desert Communities	19,900	1.1
Disturbed/Altered (quarries and mines)	100	<0.1
Great Basin/ Colorado Plateau Grassland and Steppe	113,400	6.5
Great Plains Grassland	191,900	11.0
Interior Chaparral	9,500	0.5
Madrean Encinal Woodland	18,900	1.1
Madrean Pine-Oak Woodland	600	<0.1
Mixed Broadleaf Deciduous Riparian Forest	14,300	0.8
Mixed Conifer Forest	74,100	4.2
Montane Willow Riparian Forest	2,700	0.2
Pinyon-juniper Woodland	724,800	41.4
Ponderosa Pine	508,900	29.1
Sagebrush Shrubland	700	<0.1
Semi-desert Grassland	41,000	2.3
Spruce-fir Forest	10,700	0.6
Sub-alpine Grassland	1,600	0.1
Urban and Agricultural Area	1,200	0.1
Water	300	<0.1
Wetland/ Cienega	1,100	0.1
Total	1,750,200	

The Cibola is responsible for managing large proportions of certain PNVTs found throughout Region 3 National Forests. For example, 61% of all Great Plains grasslands on Region 3 Forests (not including the Cibola National Grasslands) can be found on the Mtn. Districts of the Cibola. Furthermore, 34% of mixed broad-leaf deciduous riparian forests, 21% of pinyon-juniper, 17% of Great Basin/Colorado Plateau grassland and steppe, and 13% of wetland/cienegas on Region 3 lands are found on the Mtn. Districts of the Cibola National Forest (Figure 10-2).

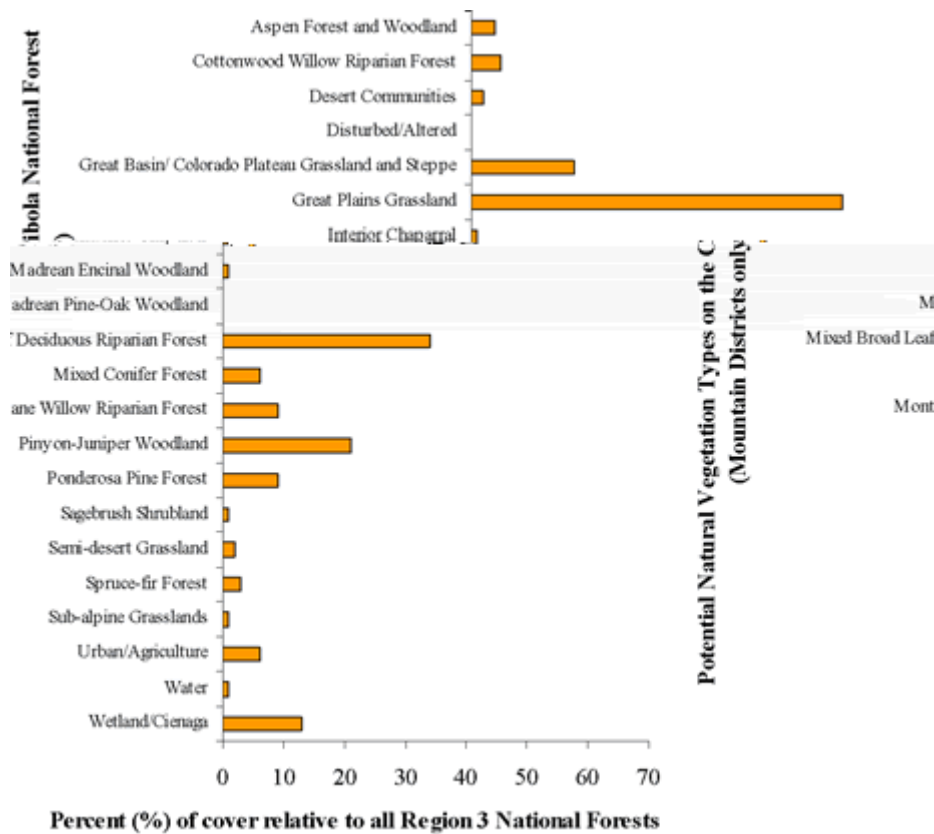


Figure 10-2. Percent area of cover of each potential natural vegetation type that occurs on the Cibola National Forest (Mtn. Districts only) in relation to all Region 3 National Forests combined. Analysis was conducted using data from the Southwest Regional Gap Analysis Project (SWReGAP). See Chapter 2 for information regarding the limitations of SWReGAP.

II. Plant and Animal Species

The R3 Species Database was used to determine plant and animal species richness on the Cibola National Forest Mtn. Districts and to characterize the conservation status of these species. The R3 Species Database was created by combining several existing datasets into a single database that provides updated and consistent attributes for species that occur on Region 3 Forests, including taxonomy, NatureServe conservation status rankings, state and federal endangered species listings, and other pertinent conservation status rankings. The database includes all known terrestrial and aquatic vertebrate species that inhabit the Forest, along with plant and invertebrate species that may be of conservation concern. However, non-native aquatic vertebrate species were not included in these analyses. The database also includes several species that are considered ‘accidental’ and may occasionally be found on the forest, but do not depend on habitats on the forest for their survival. Such accidental species were not included in the analyses for this report. The dataset of species used in the following analyses were checked for accuracy by Cibola National Forest biologists, and is provided in Appendix 10-A. More detailed information on the data and methods used for analyses in this section of the report can be found in Chapter 2.

Species Richness — According to the R3 Species Database, at least 400 animal and plant species representing nine distinct taxonomic groups inhabit the Mtn. Districts of the Cibola National Forest (Figure 10-3). This number is likely conservative in terms of overall species diversity as it does not account for all plant and animal species that may occur in this area. Also, this does not include two species known to be extirpated on the Forest: Mexican Wolf (*Canis lupus baileyi*) and Black-footed Ferret (*Mustela nigripes*). It is also important to note that the number and type of species inhabiting the Cibola National Forest likely changes over time.

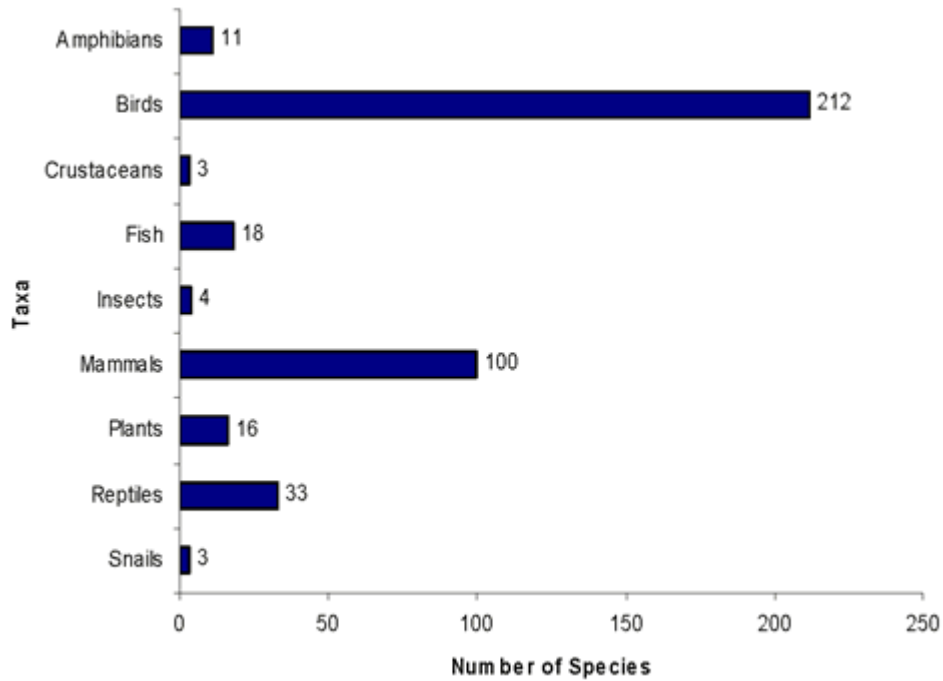


Figure 10-3. Number of species, by taxon, that inhabit the Mountain Districts of the Cibola National Forest based on data from the R3 Species Database. The R3 Species Database includes all known terrestrial and aquatic vertebrates, along with invertebrates and plants of management concern that inhabit Region 3 Forests. For this analysis, of the aquatic vertebrates, only native species were included. Due to the limitations of the R3 Species Database (see Chapter 2 for a complete description of the database), the numbers reported in these results are conservative.

Threatened and Endangered Species Listings

Federal listing under the Endangered Species Act— The U.S. Fish and Wildlife Service determines those species that have federal status as either endangered or threatened. The agency also lists species as candidate species when there is sufficient information to support a proposal for the endangered or threatened status. Currently, the Mtn. Districts of the Cibola National Forest manage one federally listed endangered species and three threatened species. Also, two candidate species occur on the Forest. Refer to Appendix 10-A for a list of threatened and endangered species.

New Mexico state conservation status — Nine species that are designated by the New Mexico Game and Fish Department as threatened or endangered occur on the Cibola National Forest. Refer to Appendix 10-A for a complete list of those species. Currently, there are three animal and one plant species designated by the state as endangered and 5 animal species that are listed as threatened on the Forest. Birds comprise the largest proportion (44.4%) of these species.

NatureServe Conservation Status Rankings

NatureServe global conservation status rankings — Thirty-four species (8.7%) were ranked with a global conservation status of G1, G2, G3, T1, T2 or T3, indicating conservation concern across their range (Table 10-2). Results indicate 354 species (90.8%) were ranked as G4/T4 or G5/T5 species. These are species whose populations are considered ‘apparently secure’ or ‘secure’, respectively. Ten species (2.5%) of 400 were not included in this analysis because they were not assigned a NatureServe global conservation rank. The remaining two species were considered not rankable, according to NatureServe.

Table 10-2. Number of species, by taxon, that inhabit the Cibola National Forest Mountain Districts with the various global rankings assigned by NatureServe. Ten species were not included in this table because they were not assigned global rankings. G1 = critically imperiled; G2 = imperiled; G3 = vulnerable; G4 = apparently secure; G5 = secure; TNR = not ranked; TU = unrankable; T = infraspecific taxon (subspecies or varieties).

Global Ranking	Amphibian	Bird	Crustacean	Fish	Insect	Mammal	Plant	Reptile	Snail	Total
G1	0	0	0	0	0	0	0	0	2	2
G2	0	0	0	0	0	1	6	0	0	7
G3	0	0	0	1	2	3	10	0	0	16
G4	0	12	0	2	0	10	0	1	0	25
G5	11	193	0	14	0	70	0	28	1	317
T1	0	1	0	1	0	0	0	0	0	2
T2	0	1	0	0	1	1	0	0	0	3
T3	0	2	0	0	1	1	0	0	0	4
T4	0	1	0	0	0	2	0	1	0	4
T5	0	1	0	0	0	4	0	3	0	8
TNR	0	0	0	0	0	1	0	0	0	1
TU	0	1	0	0	0	0	0	0	0	1

National conservation status rankings (N-ranks) — Thirty-nine species (10.0%) were ranked with a national conservation status of N1, N2, or N3, indicating conservation concern at the national level (Table 10-3). Three hundred forty-three species on the Forest (87.7%) were ranked as N4 or N5 species, whose populations are considered ‘apparently secure’ or ‘secure’, respectively. Eight species were not considered rankable by NatureServe, and nine species were not assigned a NatureServe national rank. One insect, Bluish Fritillary (*Speyeria nokomis coerulescens*), is presumed extirpated in the area (NX) according to NatureServe.

Table 10-3. Number of species, by taxon, that inhabit the Mountain Districts of the Cibola National Forest with national rankings assigned by NatureServe. Nine species are not included because they do not have an assigned rank. N1 = critically imperiled; N2 = imperiled; N3 = vulnerable; N4 = apparently secure; N5 = secure; NNA = not applicable; NNR = not ranked, NX = presumed extirpated.

National Ranking	Amphibian	Bird	Crustacean	Fish	Insect	Mammal	Plant	Reptile	Snail	Total
N1	0	1	0	1	0	0	0	0	2	4
N2	0	0	1	0	0	2	7	0	0	10
N3	0	4	0	1	3	7	9	1	0	25
N4	0	22	0	2	0	10				

Birds of Conservation Concern — According to the R3 Species Database, the Mtn. Districts of the Cibola National Forest are home to at least 212 birds, of which 17 (8.0%) are listed by the U.S. Fish and Wildlife Service as a Bird of Conservation Concern (Table 10-5). In all, the U.S. Fish and Wildlife Service lists 131 species of Birds of Conservation Concern, and 13.0% of these inhabit the Cibola Mtn. Districts. Two of these species are considered threatened by the New Mexico Department of Game and Fish under the Wildlife Conservation Act (1978): American peregrine falcon and gray vireo. Additionally, one of these species is also considered candidate species for federal listing (Table 10-6) - western yellow-billed cuckoo.

Partners in Flight Watch List — Currently, Partners in Flight lists 100 species on their Watch List, of which 22 (22%) can be found on the Cibola National Forest Mountain districts (Table 10-5). This comprises approximately 10% of the known 221 bird species that inhabit the Cibola. Eight of these species overlap with the U.S. Fish and Wildlife Service Birds of Conservation Concern list, and one of these species is also considered threatened by the New Mexico Department of Game and Fish under the Wildlife Conservation Act (1978).

Table 10-5. Bird species on the Partners in Flight Watch list or the U.S. Fish and Wildlife Service Birds of Conservation Concern list that inhabit the Mountain Districts of the Cibola National Forest. P = Species on the Partners in Flight Watch list; CC = USFWS Bird of Conservation Concern; * = New Mexico Department of Game and Fish Threatened Species; species on both lists are in bold.

<p><i>Diurnal Raptors</i> American peregrine falcon* (CC) Northern harrier (CC)</p> <p><i>Cuckoos and Allies</i> Western yellow-billed cuckoo (CC)</p> <p><i>Upland Game Birds</i> Blue grouse (P) Montezuma quail (P) Scaled quail</p> <p><i>Pigeons and Doves</i> Band-tailed pigeon (P)</p> <p><i>Owls</i> Elf owl Flammulated owl</p> <p><i>Goatsuckers and Swifts</i> White-throated swift (P)</p> <p><i>Hummingbirds</i> Calliope hummingbird (P) Rufous hummingbird (P)</p> <p><i>Woodpeckers</i> Lewis's woodpecker</p> <p><i>Tyrant Flycatchers</i> Olive-sided flycatcher (P)</p>	<p><i>Shrikes and Vireos</i> Gray vireo* Loggerhead shrike (CC)</p> <p><i>Jays, Crows, and Allies</i> Pinyon jay (P)</p> <p><i>Mimids – Catbirds, Mockingbirds, Thrashers</i> Bendire's thrasher Crissal thrasher (CC)</p> <p><i>Wood Warblers</i> Black-throated gray warbler (CC) Grace's warbler Olive warbler (CC) Red-faced warbler Virginia warbler</p> <p><i>Tanagers, Cardinals and Allies</i> Painted bunting (P)</p> <p><i>Emberizine Sparrows and Allies</i> Black-chinned sparrow Brewer's Sparrow Harris's sparrow (P) Lark bunting (CC) Sage sparrow (CC)</p> <p><i>Finches and Old World Sparrows</i> Black rosy finch (P)</p>
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Potential Species Lists for Forest plan revision

The R3 Species Database was used to identify species that are potential species-of-concern and species-of-interest as defined in the USFS planning directives. For the purposes of this analysis, the definitions used to categorize species were similar, but not identical, to the definitions provided in the directives.

1. Threatened and Endangered Species
 - a. Listed as a threatened or endangered species under the Federal Endangered Species Act.
2. Species-of-concern were defined as species that fall in one or more of the following categories:
 - a. NatureServe G/T-rank of 1, 2, or 3.
 - b. Proposed or candidate species under the Federal Endangered Species Act
 - c. Recently (<5 years) de-listed under the Federal Endangered Species Act
 - d. Has been petitioned for federal listing and for which a positive “90-day finding” has been made
3. Species-of-interest were defined as species that fall in one or more of the following categories:
 - a. NatureServe N-rank or S-rank of 1 or 2 in New Mexico
 - b. Listed as threatened or endangered species in New Mexico
 - c. Identified a priority species in the New Mexico Comprehensive Wildlife Conservation Strategy
 - d. On the U.S. Fish and Wildlife Service Birds of Conservation Concern National Priority List

In particular, the directives provide further criteria that can be used in considering species-of-interest, such as trends, rarity, ranges, and public interest. However, this information was not available in the R3 Species Database and is beyond the scope of this analysis.

Extirpated Species — Some species are known to have inhabited the Mountain Districts of the Cibola National Forest, but have since been extirpated. While the cause of extirpation for each species may not be fully understood, it is well accepted that major threats to species’ existence can include loss or alteration of habitat, competition and/or predation by non-native species and poaching. Mexican wolf (*Canis lupus baileyi*) and black-footed ferret (*Mustela nigripes*) are known to have existed historically on the Cibola National Forest, but are now considered extirpated. These species are not considered in the species diversity analysis for the Cibola National Forest.

Threatened and Endangered Species – Four species from two taxa that occur on the Forest are listed by the U.S. Fish and Wildlife Service as endangered or threatened under the Endangered Species Act (Table 10-6).

Table 10-6. Endangered or threatened species designated under the Federal Endangered Species Act of 1993 that currently inhabit the Cibola National Forest Mountain Districts. The table includes common names that are recognized by NatureServe.

Taxonomic Group	Endangered	Threatened
Bird	Southwestern willow flycatcher	Bald Eagle
		Mexican spotted owl
Plant		Rhizome fleabane

Potential species-of-concern — The Cibola National Forest is home to at least 31 potential species-of-concern across six distinct taxonomic groups (Table 10-7). Plants (48%), mammals (19%) and insects (13%) comprise the largest proportion of potential species-of-concern. Birds, fish and snails each represent approximately 6% of the total (Figure 10-4). Two candidate species for federal listing that inhabit the Cibola National Forest, the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) and Zuni bluehead sucker (*Catostomus discobolus jarrovii*), and one recently delisted species, the American peregrine falcon (*Falco peregrinus anatum*), are included in the list of potential species-of-concern. The R3 Species Database, which does not incorporate all species inhabiting the Cibola National Forest, was used to derive these results. Therefore, it is feasible that some species may be absent from these results.

Among both potential species-of-concern and ESA listed threatened and endangered species, plants continue to comprise almost half of all listed species on the Forest (approximately 45.7%); mammals (17.1%) and birds (14.3%) make up the next largest proportions (Figure 10-4).

Table 10-7. Potential species-of-concern on the Mountain Districts of the Cibola National Forest. Species with NatureServe G-ranks/T-ranks of 1, 2 or 3, listed as candidate or proposed species under the Federal Endangered Species Act, or have been recently (<5 years) de-listed were identified as potential species-of-concern.

Taxa Scientific Name	Common Name	G/T rank	ESA status	Recently delisted
Bird				
<i>Coccyzus americanus occidentalis</i>	Western Yellow-Billed Cuckoo	T2	C	
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	T3		X
Fish				
<i>Catostomus discobolus jarrovii</i>	Zuni Bluehead Sucker	T1	C	
<i>Catostomus plebeius</i>	Rio Grande Sucker	G3		
Insect				
<i>Amblycheila picolomini</i>	Plateau Giant Tiger Beetle	G3		
<i>Callophrys fotis</i>	Desert Elfin	G3		
<i>Speyeria nokomis coerulescens</i>	Bluish Fritillary	T2		
<i>Speyeria nokomis nitocris</i>	Nitocris Fritillary	T3		
Mammal				
<i>Idionycteris phyllotis</i>	Allen's Big-Eared Bat	G3		
<i>Myotis occultus</i>	Occult Little Brn. Myotis Bat	G3		
<i>Sorex neomexicanus</i>	New Mexico Shrew	G2		
<i>Spermophilus tridecemlineatus monticola</i>	White-Mountain Ground Squirrel	T3		
<i>Tamias canipes</i>	Gray-Footed Chipmunk	G3		
<i>Thomomys bottae paguatae</i>	Cebolleta Pocket Gopher	T2		
Plant				
<i>Astragalus accumbens</i>	Zuni Milkvetch	G3		
<i>Astragalus feensis</i>	Santa Fe Milkvetch	G3		
<i>Astragalus micromerius</i>	Chaco Milkvetch	G2		
<i>Astragalus nutriosensis</i>	Nutrioso Milkvetch	G3		
<i>Draba mogollonica</i>	Mogollon whitlowgrass	G3		
<i>Draba standleyi</i>	Standley's Whitlowgrass	G2		
<i>Erigeron scopulinus</i>	Winn Falls Fleabane	G3		
<i>Erigeron sivinskii</i>	Sivinski's Fleabane	G2		
<i>Heuchera pulchella</i>	Sandia Mountain Alum Root	G2		
<i>Hymenoxys brachyactis</i>	Tall Bitterwood	G3		
<i>Packera cynthioides</i>	White Mountain Groundsel	G3		
<i>Penstemon deaveri</i>	Mt. Graham beardtongue	G3		
<i>Penstemon pseudoparvus</i>	San Mateo Penstemon	G3		
<i>Silene plankii</i>	Plank's Catchfly	G2		
<i>Silene wrightii</i>	Wright's Catchfly	G3		
Snail				
<i>Oreohelix magdalanae</i>	Magdalena Mountainsnail	G1		
<i>Pyrgulopsis neomexicana</i>	Socorro Springsnail	G1		

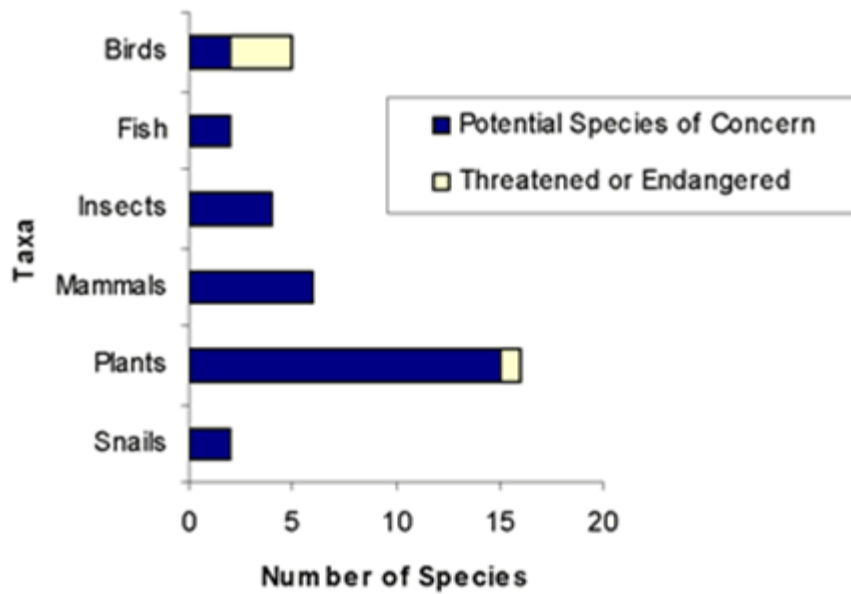


Figure 10-4. Number of potential species-of-concern (in blue) and federally listed endangered and threatened species (yellow) by taxon that currently inhabit the Mountain Districts of the Cibola National Forest. Potential species-of-concern include species with NatureServe global ranks (G/T-ranks) of three or less, species that are listed as candidate or proposed under the Federal Endangered Species Act (ESA), have been recently de-listed under ESA, or species which have been petitioned for listing under ESA and for which a positive ‘90 day finding’ has been made.

Potential species-of-interest — At least 67 potential species-of-interest representing six taxonomic groups currently inhabit the Cibola National Forest Mtn. Districts (Figure 10-5). Birds comprise the largest proportion (approximately 72%) of potential species-of-interest. Mammals comprise the next largest percentage (21%), while fish, reptiles, and snails each makeup approximately 3%. Appendix 10-A lists all known terrestrial vertebrates, native aquatic vertebrates, and plants and invertebrate species of management concern on the Cibola National Forest Mtn. Districts and identifies those determined as potential species-of-interest.

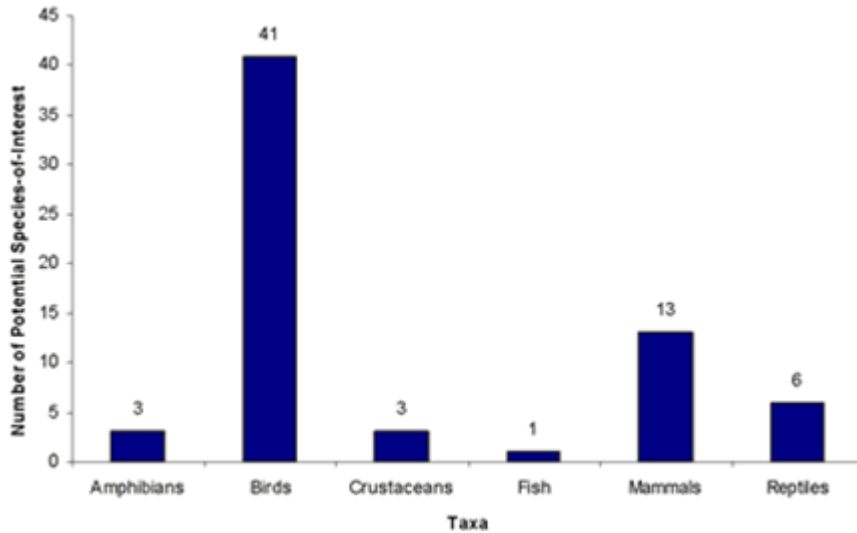


Figure 10-5. The number of potential species-of-interest, by taxon, that currently inhabits the Cibola National Forest Mountain Districts. Species were considered potential species-of-interest if they fell into one or more of the following categories: special state conservation status (endangered or threatened in New Mexico); listed as a species of concern or priority species in the NM State Comprehensive Wildlife Conservation Strategy; on the U.S. Fish and Wildlife Service Birds of Conservation Concern National Priority list; and NatureServe subnational conservation rank of S1 or S2. These are the criteria listed in the published Forest Service directives (90 Fed. Reg.14639) for determining species-of-interest. Species that were federally listed as endangered or threatened, or that were determined to be potential species-of-concern were not included as potential species-of-interest.

III. Ecoregional Assessment Conservation Areas and Conservation Targets

Ecoregional assessments are science-based efforts to identify the minimum set of areas (conservation areas) on the landscape that are necessary to maintain the biological diversity of the ecoregion. The ecoregional assessment process includes the identification of conservation targets (including species, ecological systems, and important biological features) that represent the biological diversity within the ecoregion. Conservation goals (including distribution, size and minimum number of viable occurrences) are established for each conservation target within the ecoregion. An iterative process is used to identify a suite of conservation areas that most efficiently meets the conservation goals for all conservation targets within the ecoregion. A more detailed explanation of the ecoregional assessment process is provided in Chapter 2. For this report, the results of these ecoregional analyses were used to identify the extent and distribution of overlap between conservation areas and ranger districts, roadless areas, and wilderness areas on the Cibola National Forest. The conservation targets associated with each overlapping conservation areas were also identified. For this analysis, only the mountain districts of the Cibola National Forest are considered. The National Grasslands of the Cibola National Forests are addressed in Chapter 5.

Seven individual conservation areas from ecoregional assessments overlap the Cibola National Forest (Figure 10-6, Table 10-8), totaling 703,100 acres, or 33.4% of the Forest. Conservation area overlap on individual districts ranged from 50.7% on the Magdalena District to no overlap on the Mountianair District (Table 10-9). Overall, 76.4% of the total area of these seven conservation areas overlaps the Cibola National Forest. The Cibola National Forest is somewhat unique in that the majority of each of these conservation areas overlaps the Forest, (Table 10-8), demonstrating the Cibola has the primary responsibility for managing these areas to sustain the biodiversity within them.

Approximately two-thirds (66.2%) of the area of the Cibola National Forest overlapped by conservation areas does not have specific land use designations (Table 10-11), while approximately 19.5% of the overlap area is roadless area and 14.3% is wilderness area. A higher percentage of wilderness areas (72.9%) and roadless areas (55.5%) are overlapped by conservation areas with no designations (16.4%).

Conservation targets were summarized for all seven conservation areas that overlap the Cibola National Forest. A total of 39 conservation targets occur within these conservation areas (Figure 10-7). Of these, 12 (30.8%) are coarse filter targets (ecological systems, communities or features), while 27 (69.2%) are individual species. Eight (20.5%) targets are associated with riparian and aquatic systems, while 31 (79.5%) are associated with terrestrial habitats (Table 10-10). A complete listing of all conservation targets by taxonomic group for the Cibola is provided in Appendix 10-B and conservation targets for each conservation area are provided in Appendix 10-C.

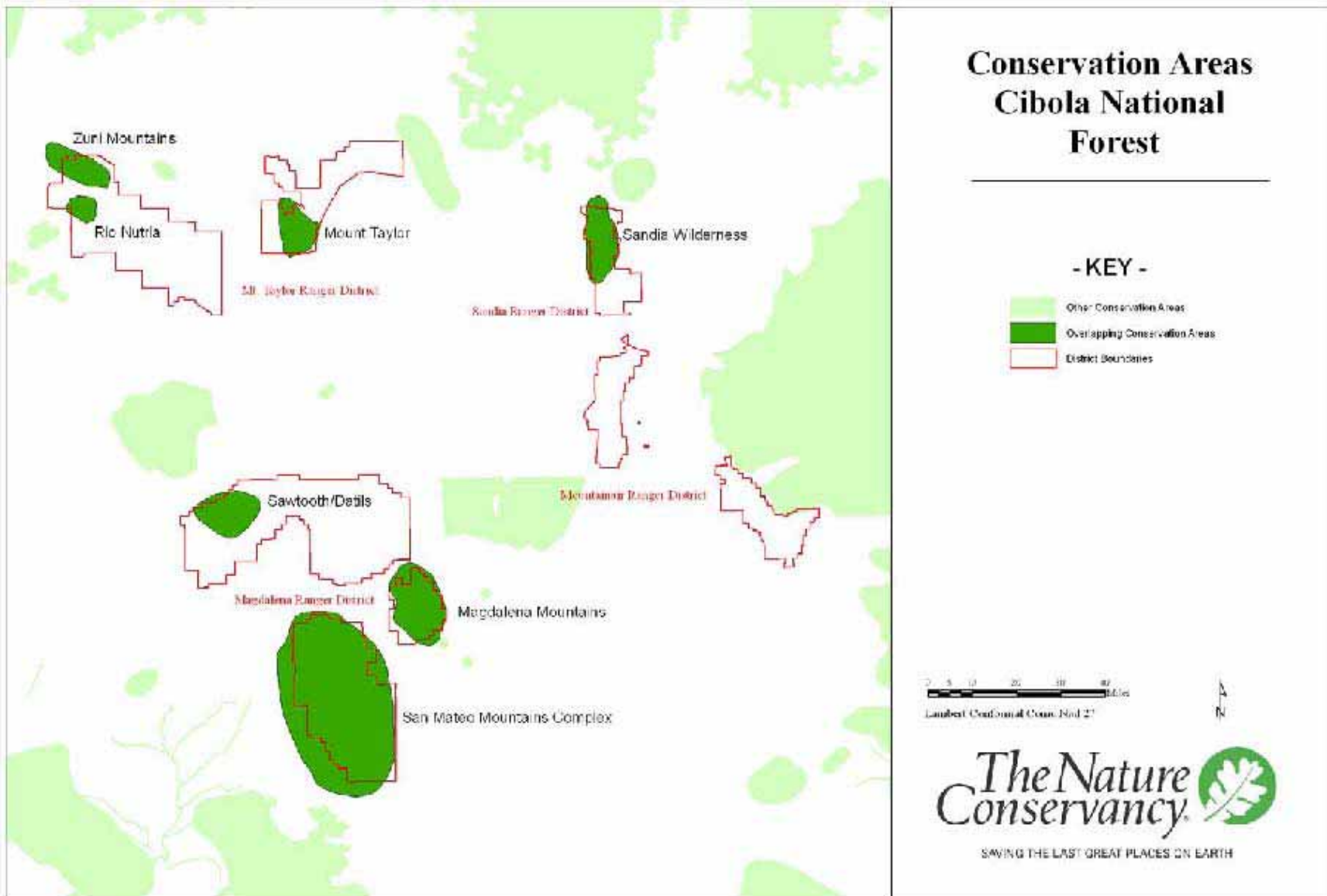


Figure 10-6. Conservation areas (N=7) that overlap four ranger districts on the Cibola National Forest in New Mexico. 10-23

Table 10-8. Conservation areas (N=7) that overlap three ranger districts on the Cibola National Forest in New Mexico.

Conservation Area	Ranger Districts ^A	Overlap (Acres)	% of Conservation Area
Magdalena Mountains	Mag	85,500	79.8
Mount Taylor	MT	45,200	85.8
Rio Nutria	MT	19,000	95.5
San Mateo Mountains Complex	Mag	393,900	72.3
Sandia Wilderness	S	58,500	81.5
Sawtooth/Datils	Mag	65,700	93.6
Zuni Mountains	MT	35,200	65.8

^AMag = Magdalena, MT = Mt. Taylor, S = Sandia

Table 10-9. Extent of overlap between ecoregional conservation areas and three ranger districts on the Cibola National Forest in New Mexico.

District	Number of Conservation Areas	Overlap (Acres)	Percent of District
Magdalena	3	545,200	50.7%
Mountainair	0	0	0.0%
Mt. Taylor	3	99,400	15.2%
Sandia	1	58,500	48.1%
Cibola N.F Total	7	703,100	33.4%

Table 10-10. Number of conservation targets associated with aquatic/riparian and terrestrial habitats for seven conservation areas that overlap the Cibola National Forest in New Mexico.

Conservation Area	Habitat		
	Aquatic/ Riparian	Terrestrial	Total
Magdalena Mountains	0	10	10
Mount Taylor	1	12	13
Rio Nutria	5	2	7
San Mateo Mountains Complex	4	32	36
Sandia Wilderness	0	15	15
Sawtooth/Datils	0	1	1
Zuni Mountains	0	6	6

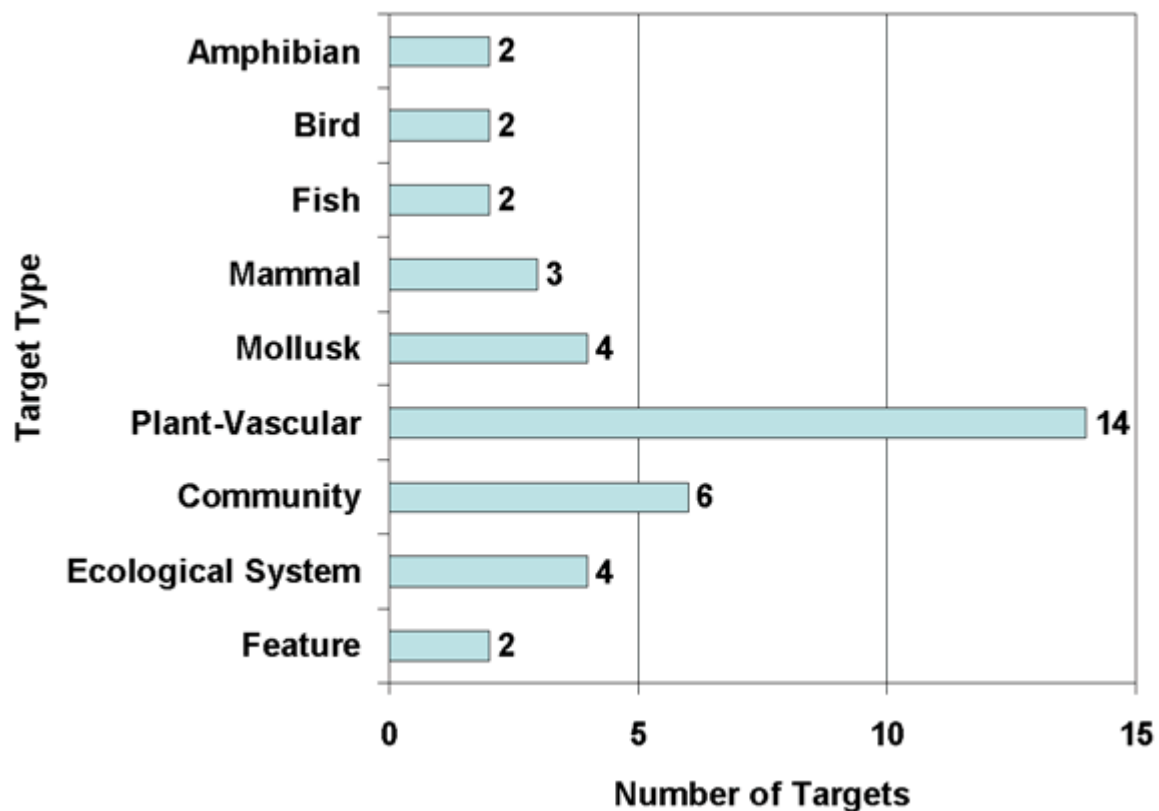


Figure 10-7. Number of conservation targets, by type, that occur on seven conservation areas that overlap the Cibola National Forest in New Mexico.

Table 10-11. Overlap between conservation areas and areas with special designations on the Cibola National Forest in New Mexico.

Designation	Acres within Conservation Areas	% of Conservation Areas	% of Designated Areas
Wilderness Areas	100,400	14.3	72.9
Roadless Areas	136,200	19.5	55.5
No Designation	463,300	66.2	16.4

Discussion

Systems Diversity

Three PNVTs dominate the Mountain Districts of the Cibola National Forest: ponderosa pine forests, pinyon-juniper woodlands, and Great Plains grasslands. In total, they comprise approximately 1,425,600 acres or 81.5% of the Forest. All three systems are biologically important to the Region, support a host of distinct organisms, and face a variety of conservation threats.

For example, ponderosa pine forests are primarily restricted to western North America. Abert's squirrel (*Sciurus aberti*) is one example of a species dependent upon this system. Some species that utilize ponderosa pine forests are of state or federal conservation concern, such as the Northern goshawk (*Accipiter gentilis*) and the Mexican spotted owl (*Strix occidentalis lucida*), respectively. Currently, research efforts on Southwest forests have largely focused on threats that ponderosa pine systems face, especially that of catastrophic fires. The Cibola National Forest manages 16% of the ponderosa pine on Region 3 lands, and therefore, has a unique opportunity to use current scientific knowledge and methodologies to help guide management practices to ensure the health of this system and abate threats like catastrophic fires.

Pinyon-juniper woodlands, which encompass the second largest area on the Cibola Mtn. Districts, are unique to southwestern United States (primarily found in Arizona, Colorado, New Mexico, Nevada, and Utah), and also support a host of distinct organisms. For example, pinyon-juniper woodland provides critical habitat for the pinyon jay (*Gymnorhinus cyanocephalus*). In return, the pinyon jay plays an important role for dispersing seeds for this system. Currently, the health of pinyon-juniper woodlands faces threats across Region 3 Forest Service lands, primarily due to the combined interactions of drought, bark beetle invasions, and altered fire regimes. Such threats to the system also endanger the existence of species like the pinyon jay and others that depend upon the health of this system. The Cibola manages approximately 11% of all pinyon-juniper woodlands across Region 3 Forest Service lands.

Great Plains grasslands comprise approximately 11% of the Cibola Mtn. Districts. This represents 61% of Great Plains grasslands found on all Region 3 National Forests (not including the Cibola National Grasslands). This system supports a wide variety of vegetation assemblages and important wildlife species, many of which are of federal and state concern, such as the Lesser prairie-chicken and the Black-tailed prairie dog. Furthermore, according to Texas Parks and Wildlife Department (2005), Great Plains Grasslands system is also home to the fastest declining bird populations on the continent. Threats to this system include degradation, fragmentation or elimination of grasses through urbanization, conversion to agriculture and altered fire regimes.

Species Richness and Conservation Status

The R3 Species Database includes conservation status information for 400 species that inhabit the Mountain Districts. Because the database is not comprehensive for plants and invertebrates, this does not represent the overall diversity of the grasslands. However, the database does serve as a useful tool for identifying species that might, because of their conservation status, need to be addressed within forest planning. While only four species listed under the Endangered Species Act were identified, 31 species were identified as potential species-of-concern. Species-of-concern are those for which ‘management actions may be necessary to prevent listing under the Endangered Species Act’ according to forest planning directives. An additional 67 species were identified as potential species-of-interest, which, according to the directives, are species for which ‘management actions may be necessary or desirable to achieve ecological or other multiple-use objectives.’

Overall, almost one-third (25.5%) of the species that inhabit the Mountain Districts were identified as species that might need to be considered within forest planning. It is important to note that this was only an initial assessment based on information in the R3 Species Database, and the actual species to be considered will be based on additional information. Many of these species could be on more than one agency or organization conservation list. All of the species on the current Region 3 Sensitive Species List that inhabit the Cibola National Forest were captured within the categories defined by the directives.

Maintaining healthy vegetation systems that support these species should be an important component in sustaining viable populations of species of conservation concern on the Cibola National Forest. The assessments in this report provide important information on the systems and locations on the Cibola that are important for maintaining system and species diversity. For instance, the analysis of PNVTs highlighted the important vegetation systems that occur on the Cibola, which include ponderosa pine, pinyon-juniper, Great Plains grasslands, and mixed broadleaf deciduous riparian forests. In addition, conservation areas, identified through ecoregional assessments, identify and delineate areas on the landscape that provide the greatest opportunity for sustaining these systems and species.

The Cibola National Forest has the largest proportion of overlap with ecoregional conservation areas of all National Forests within Region 3. These conservation areas include 39 conservation targets, including 27 individual species. The specific locations where conservation areas overlap the Cibola highlight important places for the conservation of ecosystem and species diversity on the Forest and within the region. These areas of overlap represent the most viable locations on the Cibola for sustaining this suite of species, ecological systems, and biological process that are represented by the conservation targets associated with each conservation area that overlaps the Cibola National Forest.

Relevance to Forest Plan Revision

This analysis of existing regional assessment information identifies important biological and ecological characteristics of the Cibola National Forest. This information serves as an important baseline for addressing the ecological sustainability component of the forest plan process under the new National Forest Management Act planning regulation, both in terms of ecosystem and species diversity. It may also be useful in understanding the current condition of ecological resources on the Cibola, identifying ecological characteristics that may be useful in defining desired future conditions, and identifying changes in management necessary to sustain biodiversity. For example, the analysis of ecosystem data demonstrates the variety of systems that occur on the Cibola, and identifies systems (and their associated species diversity) for which the Cibola has disproportionate responsibility within the context of Region 3, such as Great Plains Grasslands, pinyon-juniper forests, and mixed broad-leaf deciduous riparian forests. Along with ecosystems, these results demonstrate the diversity of species that occur on the Cibola. The identification of a suite of potential species-of-concern and species-of-interest suggests there are many species whose habitat needs and viability under possible ecosystem and species management scenarios may need to be addressed. The specific needs of these species, as well as their distribution at regional scales, may need to be considered to sustain them.

Ecoregional assessments provide a strategic, regional perspective on maintaining biodiversity at large, ecoregional scales that may be useful in forest plan revision. The suite of conservation areas identified in the ecoregional assessments represents the minimum area on the landscape needed to maintain the region's biodiversity and may serve as priority areas for considering the impacts of management on ecological sustainability. Used within a forest plan revision context, consideration of conservation areas incorporates, by default, a regional perspective on ecological sustainability and demonstrates consideration of sustainability issues at scales beyond its boundaries.

Within the forest plan revision framework, it may be useful to evaluate currently allowable land uses and activities within conservation areas and determine associated impacts to biodiversity. A synthesis of conservation area overlap with areas with wilderness and roadless areas on the Cibola demonstrates the wide variety of current management emphases and activities that occur within conservation areas. The largest proportion of conservation area overlap falls on areas with no special designations, although significant areas also overlap wilderness and roadless areas. It is apparent that achieving biodiversity sustainability on the Cibola National Forest cannot be accomplished entirely within existing designated special areas, and must be accomplished within the varied uses and activities that occur on the Forest. For forest plan revision purposes, it may be useful to determine the compatibility of forest management and uses within conservation areas with desired biodiversity goals, and identify changes that may be needed to achieve sustainability within these areas.

It is important to note that conservation areas do not imply the need for special protections or blanket restriction of activities. Rather, conservation areas can be viewed as priority areas, based on the large scale perspective of ecoregional assessments, for assessing the impacts of ongoing

or planned uses and activities in regards to their compatibility with sustaining biodiversity at regional scales. To aid in these planning efforts, each conservation area has associated with it a suite of conservation targets (species, vegetation communities, and ecological systems, and features) that are representative of the biodiversity in that area. Evaluation of the environmental and ecological needs of these conservation targets, including both the habitats and ecological processes that support them, as well as identifying threats to their sustainability can be used to assess the compatibility of ongoing or planned uses or activities in these areas.

For example, the Magdalena Mountains conservation area encompasses 107,000 acres, of which 85,500 (79.8%) fall on the Magdalena Ranger District of the Cibola National Forest. Seven conservation targets, including two individual species and five communities, ecological systems, and features (see Appendix 10-C), are associated with the Magdalena Mountains conservation area. These targets can be used as a tool to assess the compatibility of current or planned activities within the conservation area with sustainability goals. For example, it may be useful to evaluate current conditions of the forest communities within this conservation area relative to the historic range of variability and, if necessary, identify potential changes in management that may move these systems to within historic ranges. Similarly, by identifying the ecological needs of species conservation targets (Mexican spotted owl and Magdalena mountainsnail) and threats to their sustainability, the compatibility of current activities can be assessed. It may be useful to evaluate management prescriptions within the conservation area and if necessary, identify changes in allowed activities or uses that may reduce or mitigate these threats.

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