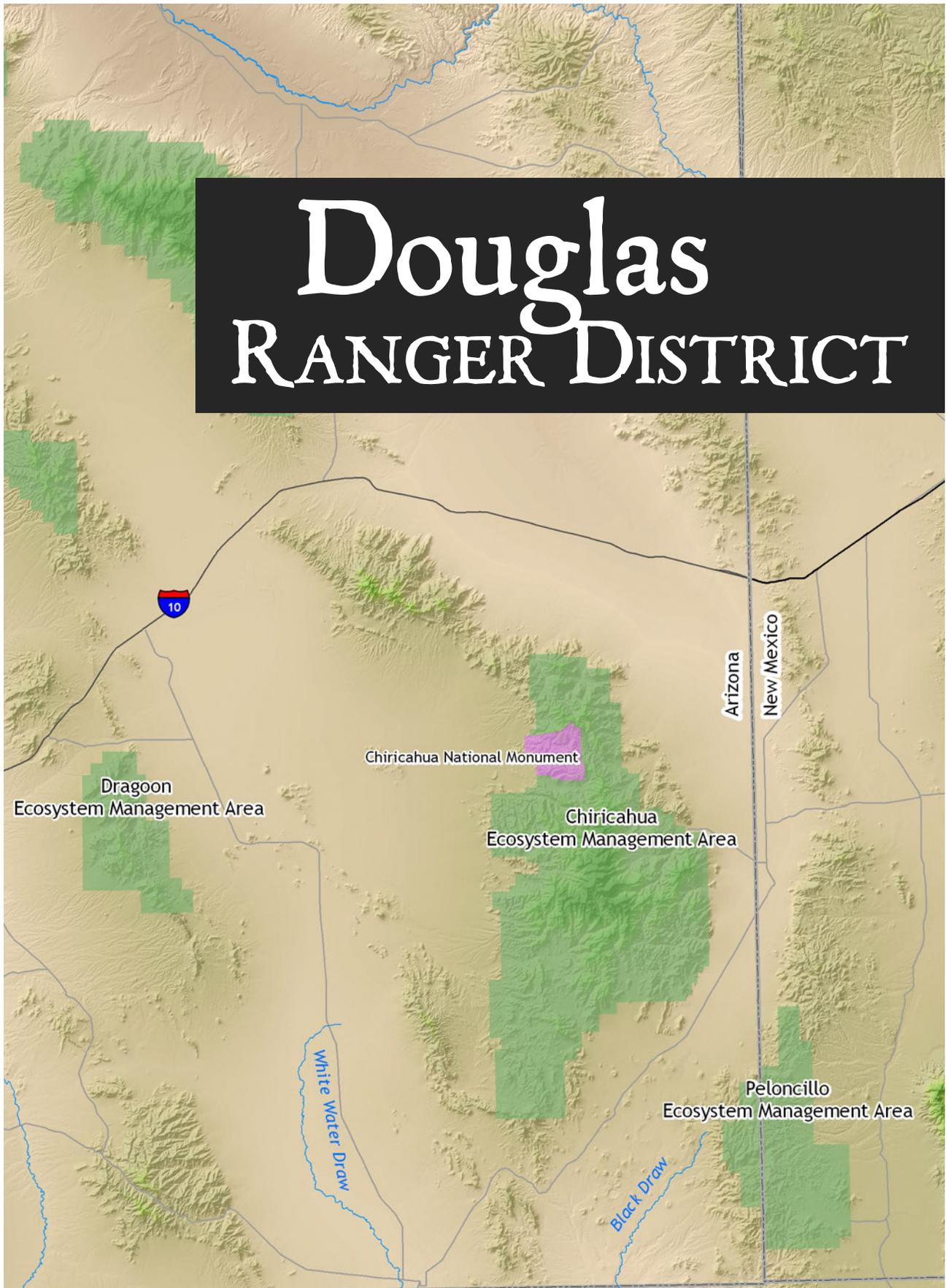
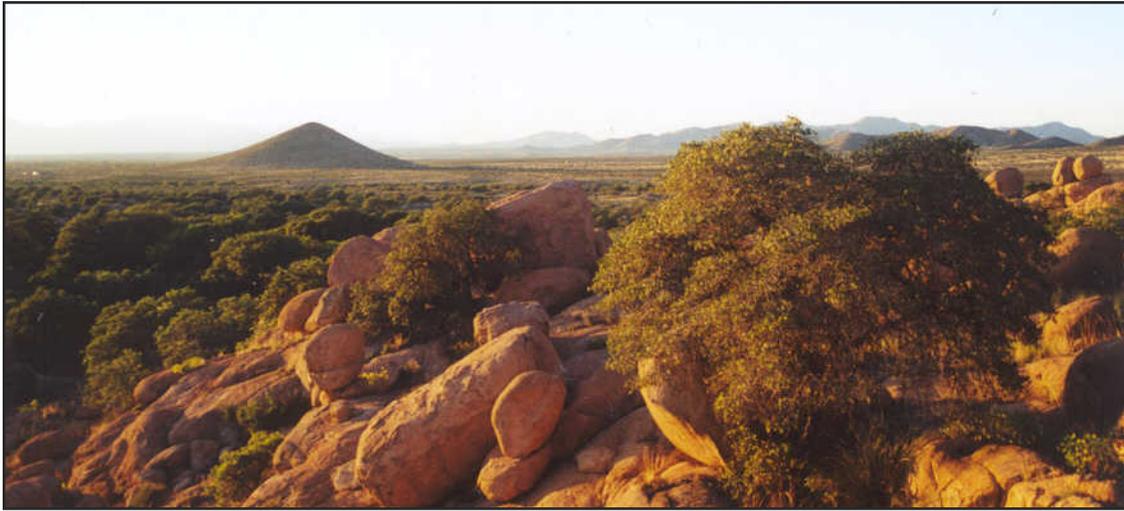


Douglas RANGER DISTRICT





CHAPTER 3 **Dragoon Ecosystem Management Area**

The Dragoon Mountains are located at the heart of the Coronado National Forest. The Forest encompasses 52,411 acres of the mountains in an area some 15 miles long by 6 miles wide. The Dragoon Ecosystem Management Area (EMA) is the smallest on the Forest making it sensitive to activities happening both on the Forest and in lands surrounding the Forest. Elevations range from approximately 4,700 feet to 7,519 feet at the summit of Mount Glenn. (See Figure 3.1 for an overview map of the Dragoon Ecosystem Management Area.)

The Dragoons are approximately sixty miles southeast of Tucson and thirty-five miles northeast of Sierra Vista. Land adjacent to the western boundary of the Management Area is privately owned and remains relatively remote and sparsely roaded compared to the eastern side. Until recently, there were only two houses along this edge, ranch headquarters for the Horse Ranch in west Stronghold Canyon, and the Three Sisters Ranch in Granite Springs Canyon. Lands along the western edge are now being developed for houses and a resort. Two major residential developments are in progress on 19,700 acres adjacent to the west side of the Dragoons.

Moving west from the Dragoons along Slavin Gulch and Stronghold Canyon toward the San Pedro River, one crosses a patchwork of state and private land. These state lands are currently leased for grazing to the owners of the intervening private land but in the future could be available for sale to the highest bidder, at which point they are opened to

development. Crossing Highway 80, one passes through another narrow strip of private land and enters the BLM-managed San Pedro Riparian National Conservation Area. On the west side of the San Pedro River, the valley (mostly under private and state land jurisdiction) slopes up to the Whetstone Mountains, another Ecosystem Management Area of the Coronado National Forest.

Due to the pattern of ecological damage and unmanaged visitor use in the Dragoons, we propose the area be divided into multiple management units (3.2) with a strong focus on changing management in the Dragoon Westside Management Area (DWMA). In order to limit overall impacts on the Westside, a visitor permit system with a cap on daily visitor numbers is recommended. The permit system would only apply to the Westside Management Area, and therefore would contribute to the goal of “multiple use management” by providing opportunities for uses and experiences that are being displaced elsewhere on the Coronado. The proposed DWMA is referred to throughout the document due to the extensive management concerns and proposed actions affecting the area.

Natural History

Geology of the Dragoon mountain range is strikingly beautiful. Huge granite domes, deep canyons, and layers of weathered cliffs and boulder fields baffle the mind’s depth perception. Large, crystallized, granitic domes resulting from complex geologic activity — including 78 million-year-old “Stronghold Granite”¹ — sit atop a layer of limestone

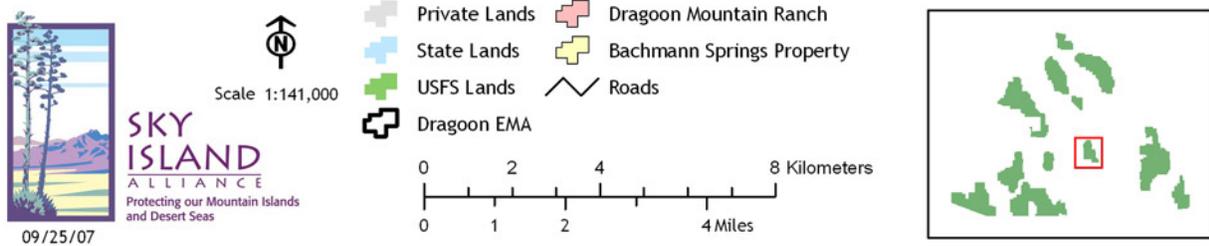
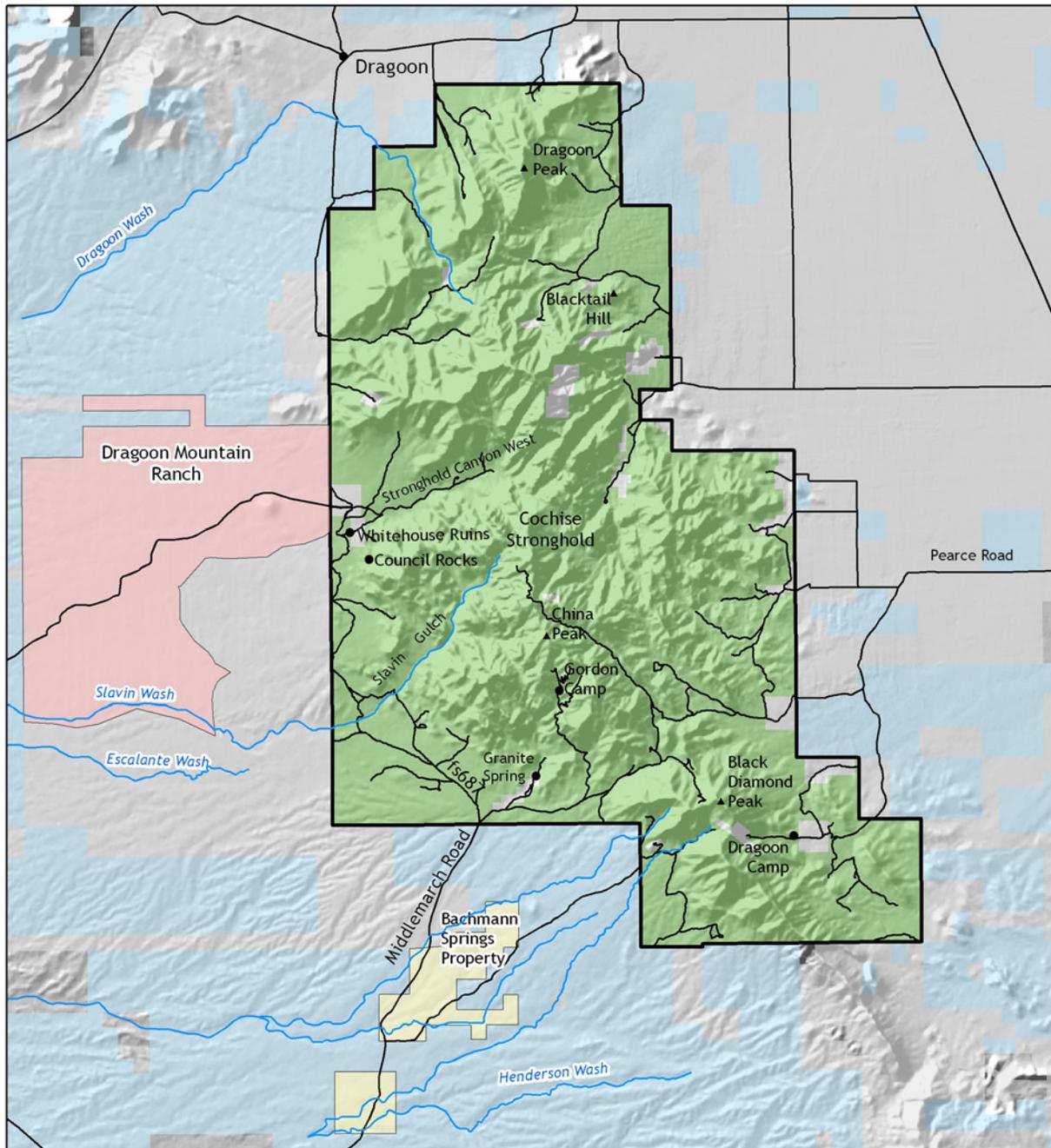


Figure 3.1 Overview of the Drought EMA

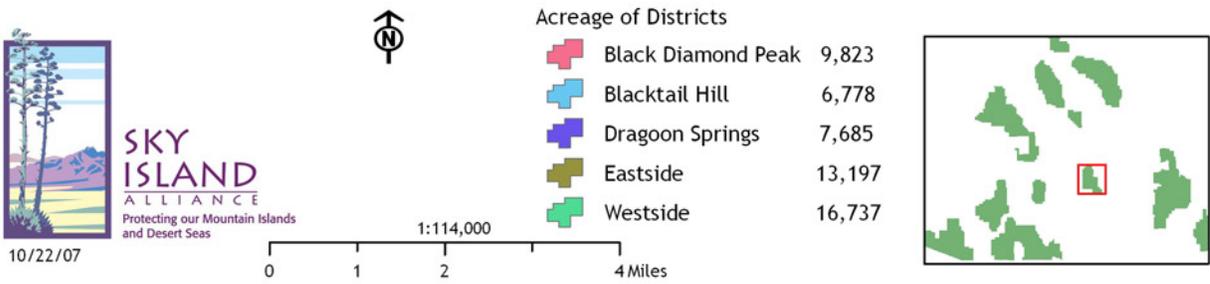
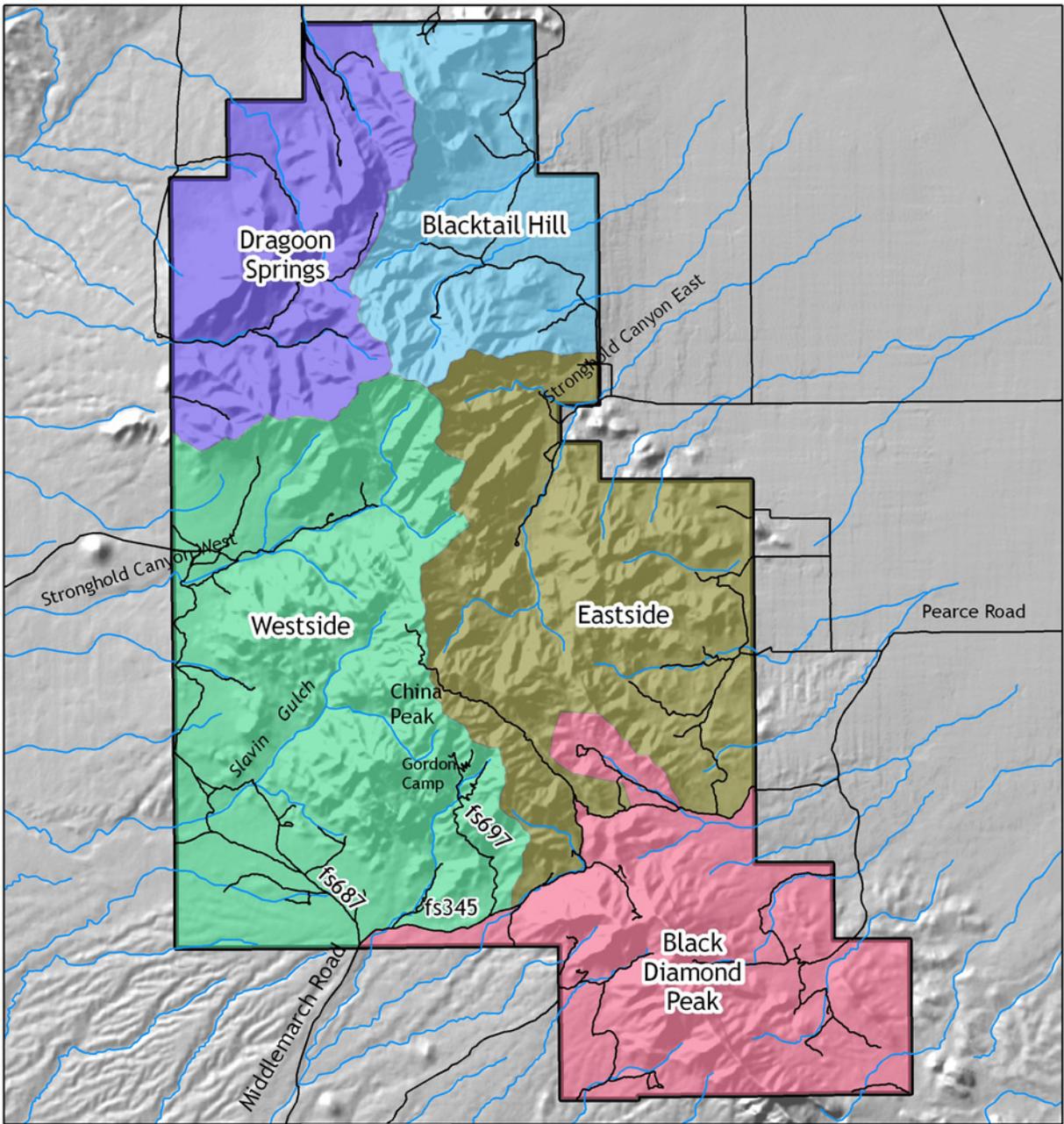


Figure 3.2 Dragoon EMA Proposed Management Districts

sea bottom. This limestone layer reaches the surface south of Middlemarch Pass. When the porous layers of limestone came into contact with the impermeable layers of granite, year-round springs and streams were produced. These springs feed several streams and cienegas throughout the range. The hard rocks at the mountains' core rise abruptly above the alluvial San Pedro Valley, through which winds the renowned San Pedro River. The bulk of the mountain range consists of steep slopes and boulder fields. GIS slope analysis shows only about 3,000 acres (one-tenth) of the range to be less than 10% grade. Most of this flat land is in a narrow band at the base of the western cliffs. Soils in the range are primarily decomposed granite; organic layers easily eroded, leaving them thin and in some areas, and concentrated in rich swales and pockets elsewhere.

Vegetation climbs from desertscrub and semidesert grassland into encinal savanna and mixed pine-oak woodland.² Slavin Gulch and Stronghold Canyon contain examples of the region's distinctive Arizona cypress riparian forests. These are among the best remaining stands of this tree and its floral and faunal associates in the nation. In past eras, mighty forests of Arizona cypress were widely distributed throughout the region.³ These trees are now globally-rare, restricted to relict patches in wet, shady canyons. In contrast encinal savanna and woodland, are widespread at middle elevations in the Sky Island region. In the Dragoons these woodlands form an important foundation for species diversity. The granite sand limestone soils in the range also contribute to biological diversity. In the Mule Mountains, floral surveys found that granite slopes (like those of the northern Dragoons) had particularly strong Madrean affinities, while limestone slopes (like those of the southern Dragoons) tended to have a higher percentage of plant species with Chihuahuan affinities.⁴

The Dragoons contain some of the most intact, species-rich grasslands on the Coronado National Forest. Grasslands and grass-dominated woodlands ("savannas") once clothed some 45% of the Sky Island region, but loss of topsoil, desertification, and shrub encroachment have relegated classical open grassland and savanna to ever smaller and more isolated patches.⁵ These grasslands were once so productive that harvesting wild hay was a major industry throughout the — including the eastern and western

flanks of the Dragoons — until the 1890s.⁶ The extent and health of grasslands was drastically reduced from intensive livestock grazing of the late 1800s, the drought of 1891-1893, and from subsequent overgrazing, fire suppression, and climate change.⁷ The amount of grassland encroached, and/or completely displaced by shrubs appears to have made its biggest increases between 1900 and 1935. The process of encroachment continues today, albeit at a slower pace. The gently sloping grassland areas found along the west flank of the Dragoons are among the best modern-day representatives of this habitat type in all of Arizona and New Mexico. Nevertheless, shrubs in these savannas are growing progressively denser (compare the photos in Figures 3.3), and the lower bajada slopes are now heavily dominated by mesquites and creosote bush.

The diverse Sky Island vegetation communities of the Dragoons are home to fifteen species of threatened, endangered, and officially "special concern" animals and plants. These include animals such as the Peregrine falcon, Chiricahua leopard frog, and various endemic cacti. Jaguars have reportedly been seen in the Dagoon Mountains as recently as 1986 (specimen reportedly chased from Dragoons and killed in Dos Cabezas). One ocelot was trapped on the west side of the range in 1927.⁸

Human Prehistory and History

The first solid archeological evidence of human habitation in this area shows Clovis hunters spearing mammoths in the San Pedro Valley — and doubtless the Dragoons foothills — by 9,000 years B.C.⁹ Next came the long occupancy of the Cochise Culture of hunter-gatherers, eventual introduction of domesticated crop plants, and development of more densely settled networks of farming peoples. In these later times, the Dagoon Mountains sat near the confluence of ranges for the Mogollon, Salado, and Hohokam peoples that populated the region, possibly as early as 200 A.D. and lasting in some form through the arrival of the Apache.¹⁰

History of extant cultures in the Dagoon Mountains dates back at least to the 1500s when Europeans first made contact with the Apache in this region.¹¹ Boundaries of the Sky Island region coincide almost perfectly with the known range of the Chiricahua Apaches, with Chokonon (or Chiricahua), Bedonkohe, Chihenne, and Nedhni bands occupying various subdivisions of the region.¹² The Chokonon



Dragoon Mountains, West Stronghold Canyon. Photo by C.S. Fly, 1885, courtesy of the Arizona Historical Society.



Same site, 2002. Photo by David Hodges.

Figure 3.3 Views of Dragoons West Slope, 1883 and 2002.

range in particular was centered in the Dragoon, Chiricahua, Dos Cabezas, and Peloncillo Mountains on both sides of the present U.S.-Mexico border.¹³ The compressed latitudinal and elevational gradients that characterize the Sky Island region and the area's high productivity provided year-round hunting and gathering opportunities, which enabled Chiricahua Apaches to remain the only entirely non-agricultural culture in the American Southwest during this era.

Written history of the area began with Coronado's 1540 journey from Mexico City to the Zuni area of New Mexico. One proposed route has this epic journey passing up the San Pedro River and along the west side of the Dragoons. Coronado was followed by a series of explorers from Spain and Spanish-ruled Mexico.¹⁴ Nevertheless, the resident Apaches managed to largely hold their own against first Spanish, then Mexican, and later U.S. armed forces and settlers for the next 300 plus years.¹⁵

During recorded history, names for this range have reflected the changing domination of cultural groups in the region. The current name for this range comes from Dragoon Pass at its north end, so named for the U.S. Army's Dragoon regiment that manned many military posts in the late 1850s.¹⁶ With the Gadsden Purchase of 1854, the Dragoons and surrounding area became part of the United States. American-made maps have labeled this range the Dragoon Mountains since the late 1860s. The range was previously referred to as the "Sierra de la Peñascosa," meaning a very rugged, rocky range. Older Apache names for the mountains are not in any of the major published accounts of the area's history, but ethnographer Grenville Goodwin's notes report Apaches using the name *Tsidahólkai* for Cochise's Dragoon Mountains stronghold.

Well-known history of Apaches in the Dragoon Mountains dates back to the mid-1800s, when

Cochise was the chief of the Chokonen band of Chiricahua Apaches. After decades of skirmishes with Mexican soldiers and settlers, 1858 marked Cochise's first (peaceable) interactions with newly arriving white settlers and their military protectors. The peace ended in 1861, when soldiers captured and executed several of Cochise's relatives. This set off eleven years of mutual violence between Anglos and Cochise's Apaches.¹⁷ During this time, Cochise and other Chokonen Apaches split time between the Dragoon, Chiricahua, and Peloncillo Mountains, as well as various sites south of the U.S.-Mexico border, and kept this area relatively free of settlers.

In 1872 Brigadier General O. O. Howard, along with First Lieutenant J.A. Sladen, set out to make peace with Cochise. Guided by Thomas Jeffords (the only white man to befriend and become "blood brother" to Cochise), and joined later by Chie (Cochise's nephew), and Ponce (Chie's brother-in-law and leader of a Chihenne band of Chiricahua Apache), they traced Cochise to his "stronghold" camp in the Dragoons. Making the long journey from Fort Tularosa in New Mexico, they were met on the west side of the Dragoons by members of Cochise's band, and led up a stream-filled gorge that, by Lt. Sladen's description, could only be Slavin Gulch. Several days of meetings in this basin and in west Stronghold Canyon marked one of the greatest accomplishments in the region's history. On October 12, 1872, a peace treaty emerged between the U.S.

Government and Cochise. This treaty gave the Chiricahua Apache a reservation that included much of their original homeland, and comprised much of current-day Cochise County (Figure 3.4).

The U.S. Government rescinded the Chiricahua Reservation designation in 1876, after the death of Cochise. Abolishment of the

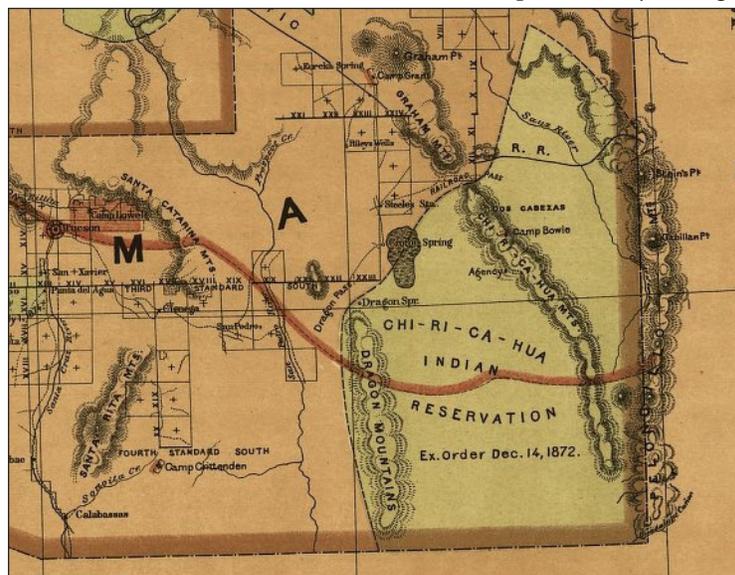


Figure 3.4 Chiricahua Apache Reservation as designated in 1872, rescinded in 1876

reservation seems to have been related to several complex factors. Continued Apache raids in Sonora (some clearly based from the Chiricahua Reservation) strained U.S.-Mexico relations, and added fuel to the ongoing arguments of Anglo Americans such as General George Crook that the U.S. Army should conquer and subjugate the Chiricahua Apaches.¹⁸ Across the west, the government had begun a policy of concentrating Indians on as few reservations as possible to increase control over the Indians, to reduce costs of managing reservations, and to free up lands for white settlers. Previous attempts to force all Chiricahua Apaches on reservations with either Western Apaches (distant relatives) or Mescalero Apaches (with whom they maintained closer relations) had failed, but many government officials still wanted this type of consolidation. Cochise's unusually strong leadership skills enabled him to negotiate effectively for his tribe's own reservation in their traditional homeland, free from subjection to U.S. military control. His consolidation of power then enabled him to maintain peaceful relations in the U.S. by largely controlling the raiding and warfare of other Apache bands on and around the reservation.

When Cochise died, some U.S. leaders saw weakening of centralized power as an opportunity to force relocation. They also found pretexts for this move — no subsequent leader was able to control the actions of a few errant individuals, some who killed a nearby shopkeeper and his associate (who bore some responsibility for their own whisky-borne deaths) and triggered Army action. U.S. Indian agent John Philip Clum, head of the White Mountain/San Carlos Apache Reservation, spearheaded the push to dissolve the Chiricahua Reservation, and forcibly removed the Chiricahua Apaches in 1876. This eventually led to the breakout of many Chiricahua warriors and to the Army's long, frustrating endeavor to capture Geronimo. For the next ten years Geronimo led many raids in the region, occasionally camping in the Dragoons. Geronimo surrendered on September 6, 1886, in the nearby Peloncillo Mountains, ending several centuries of warfare between Apaches and the Europeans and Americans that entered their homelands.

From the peace treaty of 1872 onwards, Anglo-American settlements expanded throughout the region. This expansion has been attributed to the interdependent forces of (1) successive subjugation of

the Apaches, (2) the 1881 arrival of the railroad, (3) development of silver and copper mines in Tombstone and Bisbee respectively, and (4) a boom in the cattle industry.¹⁹ The Dragoons were no exception to these trends. In the early 1880s, this cattle boom brought hundreds of thousands of cattle into Cochise County alone;²⁰ most of these were in the San Pedro and San Simon valleys, west and east of the Dragoons. After 1876, several ranches were headquartered in the Dragoons themselves (see examples below). The first Dragoon mine, the Silver Cloud, began operating around 1879, presumably in the area of Black Diamond Peak. Over the decades that followed, a network of small-scale mines achieved modest production levels of base-metal ores, gold, silver, and later marble.²¹ The Dragoons also shared in the region-wide erosive downcutting, soil loss, and massive livestock die-offs of the early 1890s. This crisis was brought on by the combined influx of huge cattle herds into the area — estimated to include over a million animals in Arizona — and crippling drought from 1891-1893.²²

The personal histories of two well-known Dragoon Mountain area residents, William Fourn and Jonathan A. Rockfellow, reflect trends in Anglo settlement. Both have left visible legacies here. Billy Fourn was born on July 11, 1843, in Prairie Home, Missouri.²³ He spent most of his younger years working as a cattle herder and miner, heading gradually further towards the southwest. In 1878, Fourn and his family settled in the west side of the Dragoon Mountains, where he started a cattle ranch. Fourn also did a small amount of prospecting, which in later years developed into working silver, copper, lead, and gold mines. Fourn's 1400-acre Fourn-F Ranch prospered until his death on January 9, 1935, at which time he was known as Arizona's oldest pioneer.

Fourn's compatriot John Rockfellow followed a similar trajectory. Born in 1858 in Mt. Morris, N.Y., Rockfellow came to Arizona at the age of twenty, where he helped open the Tombstone Mine. Rockfellow worked as a prospector until he had enough money in 1893 to establish his ranch in Cochise Stronghold. During the seventy years he lived in southeastern Arizona, Rockfellow was Justice of the Peace and Cattle Inspector for the town of Willcox, headed the University of Arizona's preparatory department, and maintained an office in Tombstone as a surveyor and civil engineer. He died on May 16,

1948 at the age of ninety.²⁴ His name has remained attached to one of the range's most prominent features, Rockfellow Dome, and his large collection of papers (deposited at the Arizona Historical Society) doubtless contain many unexcavated narrative treasures. Rockfellow's East Stronghold ranch house remains a prominent structure in that canyon.

Management of the bulk of the Dragoons soon became the province of the federal government. The 1890s saw the creation of a nationwide system of "forest reserves," partly in response to destruction of watersheds by free-for-all timber cutting in the eastern United States. The Dragoons were incorporated into this system in 1903, while some inholdings remained private land. In 1907, the Dragoon Forest Reserve management merged with that of the Peloncillo and Animas Forest Reserves. In 1910, the Dragoons became part of the Chiricahua National Forest and remained so until 1917, when the all of southeastern Arizona's federal forest parcels were merged into the Coronado National Forest. Grazing practices continued on these now-public lands. The 1934 Taylor Grazing Act eventually attempted to regulate ongoing watershed damage from overgrazing and to stabilize that part of the livestock industry that depended on public land forage.²⁵ Small-scale mining activity continued into the 1960s but has subsided since.²⁶

However, interest in mineral withdrawal has recently increased and there is currently a proposed alpha-calcite mine threatening the northern slopes of the range.

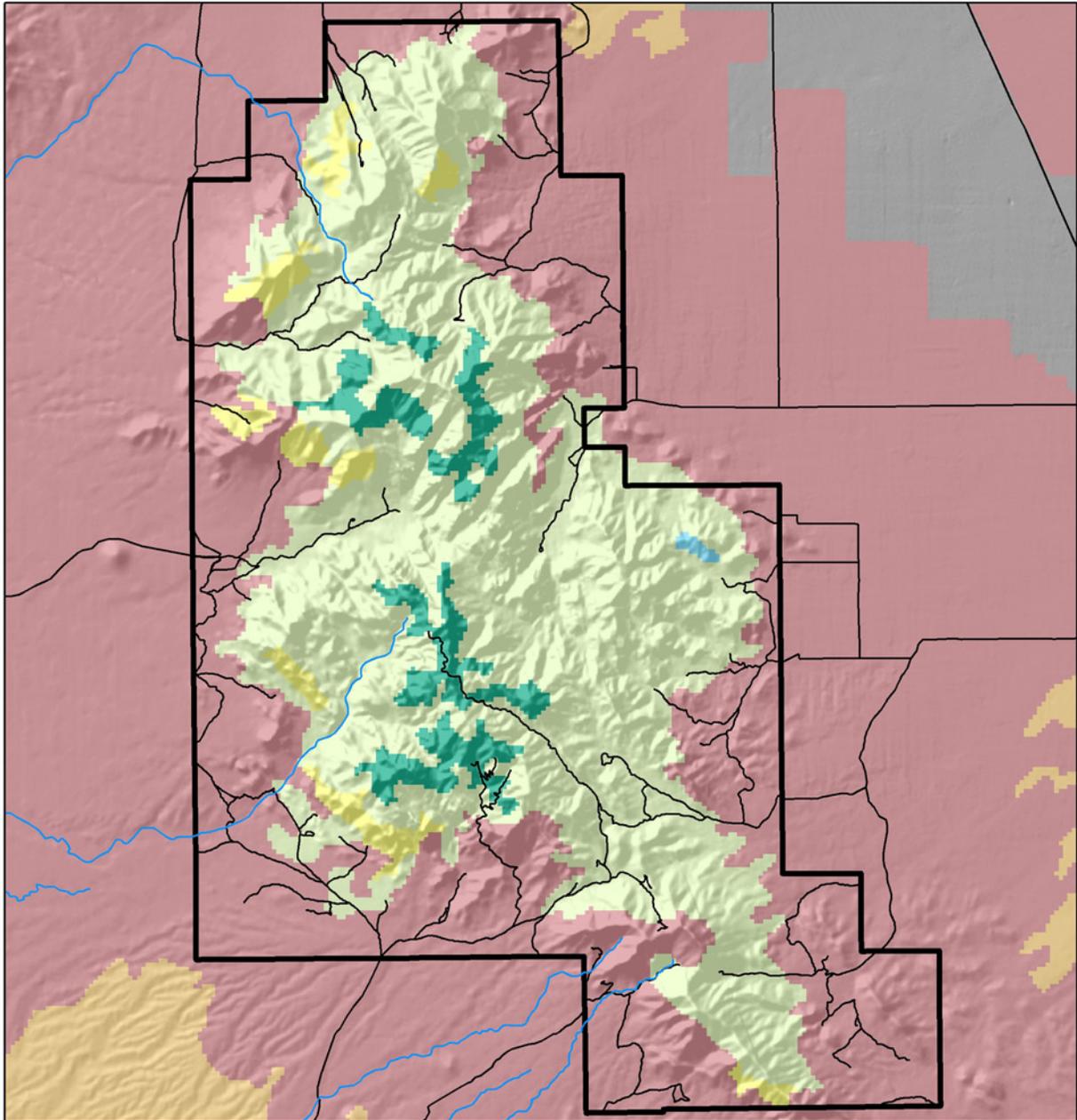
The west slope of the Dragoons retains visible reminders of its complex historical and cultural legacy. Council Rocks, sometimes said to be where the 1872 peace treaty was signed, has a road sign and trail erected by the Coronado. In fact, the treaty was signed to the north of here,²⁷ but this could have been the site of much of the negotiations that led to the treaty. Pictographs, ruins, and grinding stones are scattered throughout the rock outcroppings along this west slope. Abandoned mines are scattered throughout the range, including one visible in the high bluffs above Slavin Creek. The "Whitehouse Ruin," which appears to be remainders of an 1880s ranch house, can be seen near the mouth of west Stronghold Canyon, and has attracted considerable interest due to a case of mistaken identity. An article in *Arizona Highways*²⁸ identified this house as belonging to New York's infamous fraudulent politician William M. "Boss" Tweed. In fact, Boss Tweed never lived in Arizona; he also died in 1878, thus apparently pre-dating the building of the house. Ranchers Henry A. and Hattie K. Tweed (no relation to Boss) did, however, live in the area, and this house may well have belonged to them.²⁹

Elements of Biological Diversity and Cultural Heritage

The Dragoon Ecosystem Management Area harbors a unique combination of vegetation types and species that contribute to the biological diversity of the Coronado National Forest. The Forest Service recognizes that building a framework for ecological sustainability will require management of entire biological communities combined with special management for particular species. For revision of the Forest Plan the Forest Service identified species that will be the focus of planning efforts. Species and vegetation types of management interest found across the Coronado National Forest were described and listed in the Forest Overview (Table 1.1, page 1-11). Described here are species and vegetation types specifically found on the Dragoon Ecosystem Management Area. The Forest Service identified 48 species of plants and animals including 4 Threatened

or Endangered species, along with other species determined to be Species of Concern or Species of Interest due to management issues (Table 3.1). Three of the mollusks listed here are believed by the Forest Service to be found no where else on the Forest. These include Teasing Holospira, Apache Talussnail and Stronghold Canyon Talussnail.

Ecological systems and the processes that sustain them are the foundations of native biological diversity. Vegetation communities and aquatic habitats that are especially species rich, diverse, or threatened; or are endemic to the region or locality are of particular management concern. To evaluate current conditions and management prescriptions for ecological systems the Forest Service is using the framework of Potential Natural Vegetation Types. Potential Natural Vegetation Types are defined as the vegetation that would



SKY ISLAND ALLIANCE
Protecting our Mountain Islands and Desert Seas

10/22/07



1:114,000

- Chihuahuan Desert Scrub
- Madrean Oak-Pine Woodland
- Madrean Encinal
- Pinyon-Juniper Woodland
- Apachean Shrubland
- Apachean Grassland and Savanna
- Apachean Riparian Grassland
- Dagoon EMA
- Roads

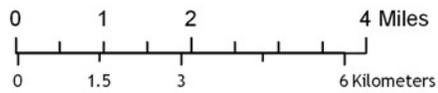


Figure 3.5 Ecological Systems of the Dagoon EMA

Table 3.1 Species Identified by the Forest Service to Guide Management Decisions

Amphibians	
<i>Rana chiricahuensis</i>	Chiricahua Leopard Frog
Insects	
<i>Oligocentria delicata</i>	A Notodontid Moth
Mammals	
<i>Choeronycteris mexicana</i>	Mexican Long-tongued Bat
Mollusks	
<i>Gastrocopta prototypus</i>	Sonoran Snaggletooth
<i>Holospira ferrissi</i>	Stocky Holospira
<i>Holospira tantalus</i>	Teasing Holospira
<i>Sonorella apache</i>	Apache Talussnail
<i>Sonorella dragoonensis</i>	Stronghold Canyon Talussnail
Reptiles	
<i>Sceloporus slevini</i>	Slevin's Bunchgrass Lizard
Plants	
<i>Acacia millefolia</i>	Milfoil Acacia
<i>Apacheria chiricahuensis</i>	Cliff Brittlebush
<i>Bouteloua parryi</i>	Parry's Gramma
<i>Carex ultra</i>	Cochise Sedge
<i>Erigeron arisolius</i>	Arid Throne Fleabane
<i>Erigonum arizonicum</i>	Arizona Wild-buckwheat
<i>Fraxinus papillosa</i>	Chihuahua Ash
<i>Hexalectris spicata</i> var. <i>arizonica</i>	Crested Coralroot
<i>Mammillaria heyderi</i> var. <i>macdougalii</i>	Little Nipple Cactus
<i>Margaranthus solanaceus</i>	Netted Globeberry
<i>Pellaea ternifolia</i> ssp. <i>arizonica</i>	Three-leaved Cliffbrake
<i>Penstemon superbus</i>	Superb Beardtongue
<i>Perityle dissecta</i>	Slimlobe Rockdaisy
<i>Phoradendron bolleanum</i> ssp. <i>pauciflorum</i>	Rough Mistletoe
<i>Plagiobothrys pringlei</i>	Pringle's Popcorn-flower
<i>Rhamnus crocea</i> ssp. <i>pilosa</i>	Redberry Buckthorn
<i>Scutellaria tessellata</i>	Huachuca Mountains Skullcap
<i>Woodsia cochisensis</i>	Cochise Woodsia

Table 3.2 Foundations of Native Biological Diversity

<p>“Potential Natural Vegetation Types” (bold) as they correspond with The Nature Conservancy’s “Ecological Systems”</p> <hr/> <p>Desert Communities Chihuahuan Desert Scrub</p> <p>Madrean Encinal Woodland Madrean Encinal</p> <p>Madrean Pine-oak Woodland Madrean pine-oak Woodland</p> <p>Piñon-Juniper Woodland Piñon-Juniper Woodland</p> <p>Semi-desert Grasslands Apachean Grassland and Savannah Apachean Shrubland Apachean Riparian Grassland</p> <p>Other Vegetation Types</p> <hr/> <p>Arizona cypress riparian forest Grasslands dominated by native grass species</p> <p>Physiographic Features</p> <hr/> <p>Granitic domes Limestone outcroppings Springs</p>
--

dominate a site under natural disturbance regimes and biological processes. Using this classification allows current vegetation to be compared effectively to its historical range of variation. Because Potential Natural Vegetation Types are relatively broad groupings, and because the Forest contains a high diversity of vegetation types, we present ecological systems as a focus for management direction. These ecological systems are cross-walked with the Potential Natural Vegetation Types used by the Forest Service (Table 3.2). Although there are many fine variations in plant communities on the Dragoon Ecosystem Management Areas, ecological systems classify plant communities into broader groups so as to be most useful for management actions such as mapping, land management, and monitoring. Plant communities were grouped based on shared characteristics such as natural processes (e.g. fire and flood), substrates (e.g. shallow soils, limestone outcroppings), and local climate.³⁰ Figure 3.5 shows the distribution of ecological systems in the Dragoons. Through contact with regional scientists and experts, and other people familiar with the Dragoons, we identified ecological systems, physiographic features, additional species and cultural resources that should also be considered in the Forest Plan revision.

Species that will need special management attention include species that are endemic to the region or locality, species that have a restricted distribution within the region, and species dependent on specialized habitat. Other species that will need special consideration are species that are rare, vulnerable or declining throughout their ranges; are rare, imperiled or vulnerable in the U.S. portion of their ranges that overlap the Coronado National Forest; or are harvested for economic interests. These species may not be adequately protected by managing for ecological systems and may require specific management actions or monitoring. Table 3.3 lists additional species whose needs should be assessed during plan revision.

The Dragoon Mountains contains a wealth of prehistoric and historic influences. Visible and physical remnants of previous human habitation of the area include built structures, physical sites, or objects or assemblages of material culture. Human uses of the land compatible with the protection of biological diversity, and traditional Western Apache uses of the land are also an important part of the Cultural Heritage of the area (Table 3.4).

Table 3.3 Additional Species that Require Special Management Consideration

Amphibians	
<i>Rana blairi</i>	Plains Leopard Frog
Birds	
<i>Callipepla squamata</i>	Scaled Quail
Mammals	
<i>Corynorhinus townsendii pallescens</i>	Pale Lump-nosed Bat
<i>Myotis thysanodes</i>	Fringed Myotis
<i>Panthera onca</i>	Jaguar
Plants	
<i>Coryphantha scheeri</i> var. <i>valida</i>	Scheer's Pincushion Cactus
<i>Epithelantha micromeris</i>	Ping-Pong-Ball Button Cactus
<i>Graptopetalum bartramii</i>	Patagonia Mountain Leather-Petal
<i>Lupinus lemmonii</i>	Lemmon's Lupine
<i>Mammillaria wrightii</i>	Wright's Prickly-Pear
<i>Penstemon discolor</i>	Catalina Beardtongue
<i>Sclerocactus erectocentrus</i>	Acuna Cactus

Table 3.4 Elements of Cultural Heritage

Human Prehistory
Pictographs and petroglyphs
Grinding Holes
Human History
Council Rocks
Dragoon Springs
Small, abandoned mines
Whitehouse Ruin
Site of ambush of Mexican troops by Cochise and followers
Social Values
Opportunities for solitude and primitive recreation
Opportunities for quiet recreation

Desired Conditions

Management Vision

The Dragoon EMA shall retain its long-term biological, cultural, historical, recreational, and aesthetic values in the face of changing human use and dynamic ecological cycles. Within the range, the Dragoon Westside Management Area (see Figure 3.2 for map of proposed management area) will be managed for low-intensity use, to provide high-quality backcountry experience to users and to protect its unique natural and cultural resources. Such management will complement higher-use areas elsewhere in the range.

- ★ Traditions of use become established that are compatible with the health of the land and that reduce conflicts among users. Management of this area for low-intensity helps the Forest Service fulfill its multiple use mandate.

- ★ Impacts associated with roads are reduced and stabilized. Illegal, user-created roads and redundant roads are closed and revegetated, and all remaining roads have clear purposes that are balanced against their associated impacts.

- ★ Hiking opportunities are enhanced in both extent and quality, with improved interpretive materials.

- ★ Rock climbing impacts are reduced via educational outreach and active management of numbers and climbing routes. Impacts of commercial and other large group activities are acknowledged, and these activities are redirected to less sensitive areas in other mountain ranges.

- ★ Equestrian impacts are reduced and opportunities for equestrian day-use are enhanced and adequately managed.

- ★ The Slavin grazing allotment in Stronghold and Slavin Canyons is voluntarily retired leading to improved infiltration of water into the soil and

percolation into the San Pedro aquifer, and reduction of erosion of topsoil and sedimentation. Allotment retirement provides opportunities for researchers and other users to compare grazed and ungrazed habitats in the range. Increases in grass density improves habitat for native grazer populations.

- ★ The watershed of the Slavin Gulch drainage is established as a Research Natural Area. Designation of this RNA attracts attention of potential researchers, and helps fulfill the Forest Service's mandate to have all major ecosystem types present on the Coronado represented in RNAs.

- ★ Wildlife monitoring transects provide feedback on movement patterns of target species, and the factors that affect these movements.

- ★ The area maintains its historical habitat structure, in part to benefit wildlife of the region and in part to accurately reflect conditions during the area's historical heyday in the mid to late 1800s.

- ★ The gently-sloping grassland areas found along portions of the west flank of the Dragoons remain among the best representatives of this habitat type in Region 3 of the National Forest. This area thus continues to provide habitat for grassland-dependent species imperiled by loss of habitat elsewhere. Maintenance of open savanna structure also conveys to visitors an accurate sense of what the area was like during the mid to late 1800s, its most important historical and cultural era. Maintenance of open savannah structure also enables visitors an ecologically accurate experience of what the area was like during the historical and cultural era of the mid to late 1800s.

- ★ Spread of invasive species, both native and exotic, is reduced. Invasive exotics are eliminated where possible, and new invasions are actively deterred.

Conservation Assets

Conservation assets work on behalf of desired conditions and against the threats to the ecological and cultural elements of the Dragoons. They will contribute to the Forest Service's ability to maintain ecological sustainability on the Management Area. The following emerged as strengths and opportunities for conservation on the Dragoon Ecosystem Management Area.

Dragoon Conservation Alliance

The Dragoon Conservation Alliance is a group of concerned citizens from northern Cochise County and interested persons around the world. The Alliance is a member of the Arizona Mining Reform Coalition and works in cooperation with Earthworks, Westerners for Responsible Mining, Sky Island Alliance, the Amerind Foundation, and the Coronado Planning Partnership. The Alliance is dedicated to preserving the Dragoon Mountains for present and future generations. The group has been active in addressing potential threats from mineral exploration and reopening of mines in the area. It also participates in landscape-level planning to encourage responsible growth.

Dragoon Mountain Ranch

Immediately adjacent to the proposed Dragoon Westside Management Area is the Dragoon Mountain Ranch (DMR), which encompasses some 18,000 acres of private lands and controls grazing lease and access to approximately 26,000 acres of state land. DMR is zoned for "rural development" at minimum lot size of 36 acres per home; most lots are somewhat larger than this. The current build-out phase includes some 400 lots; most of these are sold, but DMR estimates that full build-out will take 40 years (only a dozen or so houses have been built to date). An adjacent Council Rocks Land and Cattle Co. property of 15,000 acres is slated for either low-density housing (lots \geq 36 acres) or retention as open space in the next phase of development.

DMR planners have been actively involved in mitigating impacts of their development in several ways. DMR has taken conservation easement on some 1,000 acres, including 1,100-foot "conservation greenbelt" buffers along Slavin and Stronghold drainages. To decrease impacts on wildlife movement

and retain a sense of open space for residents, DMR covenants prohibit fencing of more than 5 acres of each property; domestic animals are required to be kept within this fenced area. The Dragoon Mountain Homeowners Association and the Drylands Institute have also begun addressing the very real threats of spreading exotic species, including educational outreach for homebuyers on the values of planting native flora. Most of these studies have dealt with somewhat higher housing densities, but have shown that some wildlife species are affected by development at much greater distances than others.³² Efficacy of DMR's particular mitigation efforts remains to be seen.

Roadless Areas

Most of the interior of this range remains unroaded, largely due to its extremely rugged nature. Federal RARE II (Roadless Area Review and Evaluation) analysis identified approximately 33,000 acres, of roadless acreage north of Middlemarch Pass.³¹ Recent (2000-2002) SIA road inventories mapped the current edges of these roadless areas. These carefully mapped boundaries enclose 35,324 roadless acres.

Sky Island Alliance and Coronado National Forest Collaborative Road Closures

Sky Island Alliance and the Coronado National Forest have worked to reduce the proliferation of illegal roads, and to close and revegetate illegal and redundant roads in ecologically sensitive areas. The first road closure and restoration in the Dragoon Mountains took place in Slavin Canyon in November of 1999 and turned 1.5 miles of canyon-bottom road into hiking and equestrian trail. In March of 2001, an additional six roads (2.1 miles) were closed and restored. By 2002 the total number of closed, revegetated roads reached 9 (6.7 miles). March of 2002 saw follow-up revegetation work and re-closure of one road segment (687g) at a better natural pinch-point after previous closures were breached. Since then, all rigorously closed sections have remained closed although informal closure and revegetation attempts on the tracks to China Peak have been repeatedly breached. Roadbed revegetation success has been striking across the closed segments (Figures 3.6A and 3.6B).

Threats to the Forest: A Need for Change

The Dragoon Ecosystem Management Area has changed dramatically since the Coronado National Forest Plan was enacted in 1986. Management concerns and threats exist in the Dragoons that are not addressed in the Forest Plan, or have not been adequately dealt through management. The plan revision will update existing management direction and add new management direction, both of which should address these concerns.

For most of the last 100 years, the Dragoon Ecosystem Management Area has experienced relatively little human use. Historically far from any sizeable population centers, and off the beaten path of all major user groups, Forest managers have long been justified in paying little attention to the area. Over the last twenty years, use has increased exponentially. The area has been discovered by rock climbers and other recreationists, the local and regional populations have grown rapidly, other nearby recreation areas have become congested with users or subject to new use regulations, and the motorized recreation industry has proliferated throughout the country. The Dragoon EMA is no longer a backcountry site with few management needs.

Particularly in the proposed Dragoon Westside Management Area, use has become a chaotic, unregulated free-for-all. In order to highlight the need for creating the special management area, threats that affect the westside area are treated separately in the site-specific threats section. As a multiple use area, the west side of the Dragoon EMA is utilized by many people engaged in a variety of activities. These include driving of

off-road vehicles, camping, hiking, bird watching, rock climbing, livestock grazing, hunting, equestrian use, mountain biking, and cultural and historical tourism. Management implications of these activities are discussed below. Unless management in the Dragoons, particularly on the west side, is changed, impacts will



Figure 3.6A Slavin Gulch Road immediately before closure, November 1999



Figure 3.6B Slavin Gulch Road after closure, March 2000 (Right track shows areas with, versus without revegetation.)

continue to intensify until they reach a crisis state and cause extensive conflicts among users. Understanding the current status and impacts of various activities is a first step in this process of responsible updating of management.

ADJACENT LAND USES

Land is currently being developed along the western, northern, and eastern boundaries of the Dragoon Ecosystem Management Area. Two major residential developments are being constructed along the west side of the mountains. Immediately adjacent to the proposed DWMA is the Dragoon Mountain Ranch, which encompasses 18,000 acres of private lands and controls grazing lease and access to approximately 26,000 acres of state land. This land is zoned for “rural development,” with a minimum lot size of 36 acres per home. The current build-out phase includes some 400 lots; most of these are sold, but full build-out is estimated at 30 years. An adjacent Council Rocks Land and Cattle Company property of 15,000 acres is slated for either low-density housing (lots >36 acres) or retention as open space in the next phase of development.

The 1,700-acre Bachmann Springs property, just south of Middlemarch Road and very close to the west side of the EMA, has been rezoned to allow for development of higher-density residences and a large resort complex. Over 1,000 homes are slated, at more than one home per acre, along with a 400-room resort hotel, an 18-hole golf course, and 700 acres planned as open space. Construction on this development has just begun. The magnitude of this plan, along with a stated intent to run tours on nearby National Forest, makes for substantial foreseeable impacts. In addition, plans to pave Middlemarch Road from Highway 80 to within a mile of the EMA boundary is virtually

guaranteed to increase visitation pressure on the proposed DWMA and areas south of Middlemarch Pass. Impacts from these developments include:

- ★ Impacts on wildlife composition and movement via activities of loose or feral domesticated animals³³
- ★ Increases in unmanaged visitation from resort-sponsored tours, people entering the Forest from adjacent development, a planned equestrian center, and paved roads
- ★ Loss of grazing practices that keep land open with less damage to wild ecosystems than housing developments

Affected resources include: geological features, springs, ephemeral watercourses, scenic resources, eastside and Westside drainages, all ecological systems, all native vegetation types and their associated flora and fauna, species particularly sensitive to direct human disturbance, prehistoric and historical sites, structures, and artifacts.

DEMOGRAPHICS

The rise in visitation to the west side of the Dragoons reflects increased publicity and human population growth in surrounding towns and cities. Figures 3.7 and 3.8 show overall population growth in Cochise County from year 1900 to 2000 at ten year intervals. The subsequent table shows overall population growth for seven specific towns or cities for 1990 and 2000. At the current growth rate (averaged over the past four decades), the population of Cochise County would double in the next 25 years.

Impacts from an increasing human population in the area include increases in unmanaged visitation and will likely affect the entire Ecosystem

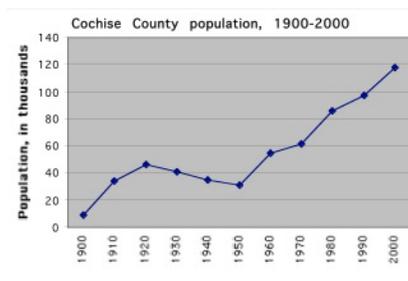


Figure 3.7 Overall Population Growth of Cochise County from 1900 to 2000

Figure 3.8 Overall population growth of Cochise County from 1990 to 2000

Town/City	1990	2000	Percent growth
Benson	3,824	4,711	23%
Bisbee	6,288	6,090	-03%
Huachuca City	1,782	1,751	-02%
Sierra Vista City	32,983	37,775	15%
Sierra Vista Southeast	9,237	14,348	55%
St. David	1,468	1,744	19%
Tombstone	1,220	1,504	23%
Whole Cochise County	97,624	117,755	21%

Management Area, although there is currently a concentration of impacts in the proposed DWMA. Affected resources include all those listed for Land Development.

EXTRACTIVE USES

Livestock Grazing

Livestock grazing has been present in the Dragoon Mountains for some 130 years, at varying levels of intensity and under many different management regimes. With the exception of occasional range conservationists' cursory measurements of forage usage levels, impacts of grazing have never been formally studied in this range.

Particularly obvious cattle impacts have been concentrated in riparian areas and grasslands at the base of the mountain. Negative impacts of poorly managed livestock grazing on arid ecosystems are, by now, both well documented and contentious.

INVASIVE SPECIES

Lehmann lovegrass (*Eragrostis lehmanniana*) which was introduced for erosion control and cattle forage is found on the EMA. It is known to form solid stands that displace native grass species, and continues to spread.³⁴ Lehmann lovegrass is also known to provide lower quality habitat for some native bird and lizard species than do native grass species.³⁵ The diverse stands of native grass on the west side of the Dragoons are threatened by potential establishment of Lehmann lovegrass which can be prevented or slowed by appropriate management.

Bullfrog invasion via human-created water sources both on and off the Forest will lead to competition with and predation on native species. Affected is Chiricahua leopard frog.

NONEXTRACTIVE USES

Campsite Proliferation

The area along FR687 (including its various spur roads) is currently lined with rustic campsites that do not have toilets, piped water or other constructed facilities. A developed campground on the east side of the mountains serves the users that prefer constructed amenities. Most campsites found on the west side of the EMA were established by visitors rather than by Forest Service planners and few have any indications of defined boundaries. Threats in this area include the unmanaged creation of more and larger campsites.

Surveys conducted by Sky Island Alliance in 1998 found twenty-one recognizable campsites along FR687. Since then, this number has more than doubled, with a total of forty-eight as of surveys conducted in March of 2002 (Figures 3.9 and 3.10). Nineteen of these were created since a Forest Service campsite baseline survey was completed 2001. Several of the sites created since 2000 are large pull-through campsites created by bus-sized recreational vehicles or trucks pulling trailers with horses or ORVs.

The overall size of many existing campsites has continued to grow over time as well. This expansion is particularly evident in sites that have been used by group recreational programs such as NOLS (National Outdoor Leadership School), which have turned single-tent sites into multi-acre networks of tent pads and trails.

The user-created campsites vary in the amount and type of use each represents (see CNF report 2001). Overall, however, they have clearly visible evidence of impacts on the landscape, which include:

- ★ Nearby trees and slopes bare of dead and downed wood
- ★ Live branches, or entire trees cut for firewood
- ★ Deposition of trash, including human waste
- ★ Creation of access trails to and from campsites
- ★ Indiscriminate footpaths and off-road vehicle tracks lead up steep hillsides and eroding gullies
- ★ Trampling of vegetation and soil compaction
- ★ Thin granitic soils visibly compacted

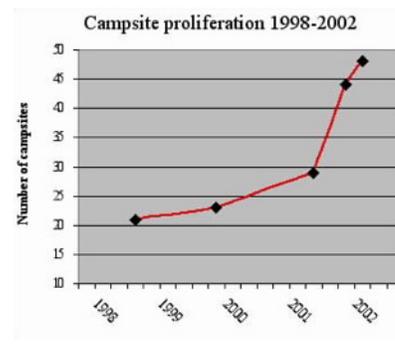


Figure 3.9 **Campsite Proliferation with Years Divided into Quarters.**

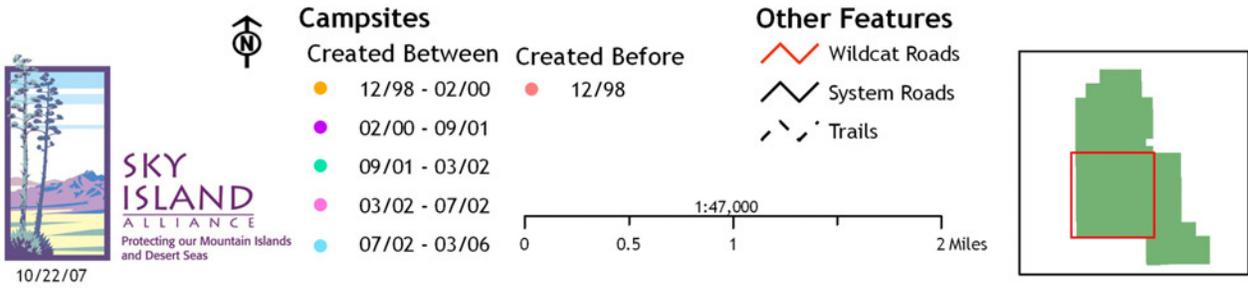
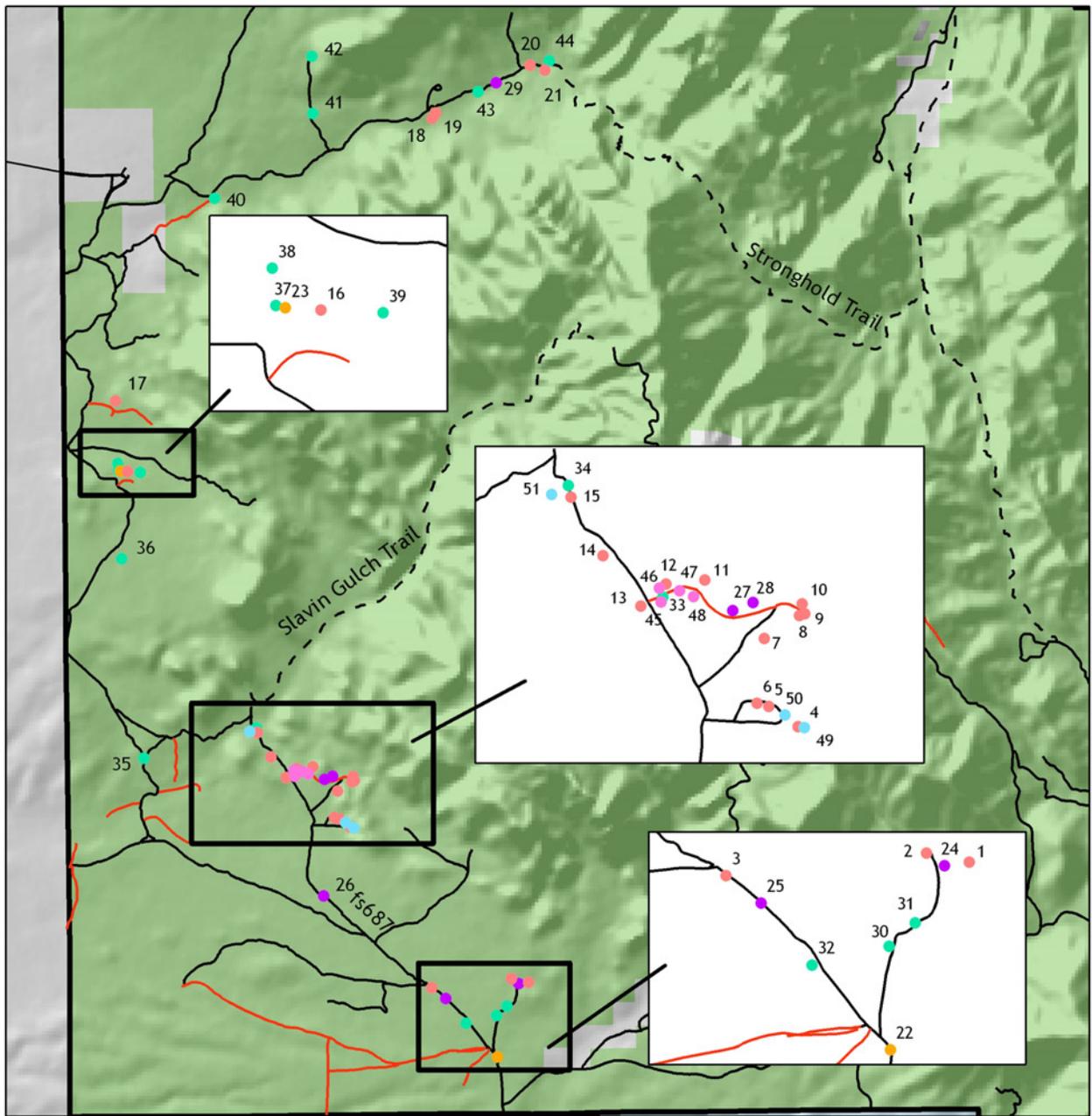


Figure 3.10 Campsite Proliferation on the Dragon EMA

- ★ Conspicuous zones of bare ground due to repeat trampling
- ★ Vulnerability of bare, continually disturbed areas to invasive species³⁶
- ★ Subsequent use of bare areas as established parking or camping areas (which prevents reestablishment of vegetation)

Hiking and Foot Travel

Although remarkably few hiking trails exist in this EMA, pedestrian use has been steadily increasing over the past few decades. Most currently obvious off-trail hiking impacts are associated with rock climbing sites, campsites, and areas used by group programs; these are discussed in their corresponding sections. Impacts from heavy foot traffic include:

- ★ Widening and degradation of trails³⁷
- ★ Contamination of soil and water by human wastes
- ★ Introduction of alien plant seeds³⁸
- ★ Clashes between wildlife and humans, and between wildlife and unleashed dogs

Rock Climbing

The Dragoon Mountains have become well known for their challenging and scenic rock climbing, particularly in the Rockfellow Dome and Sheepshead areas. Climbers have taken part in the forming of new roads and campsites, as well as in the establishment of climber trails to access specific climbs. The terrain found directly below some of these climbs shows high levels of trampling and erosion. Climbing itself can have significant effects on vegetation and wildlife³⁹ however, no monitoring of such impacts has been done in this range.

Over the last decade, climbing in parts of the Dragoons has been restricted during the nesting season (February 15-June 30) of the cliff-nesting Peregrine falcon. With the recovery of peregrine populations and removal from the Endangered Species list, lifting of these restrictions has been discussed, but management agencies have decided to err on the side of caution and leave restrictions in place for the time being. Impacts from unrestricted rock climbing include:

- ★ Creation of new roads, campsites, and “climber trails”

- ★ Soil compaction and erosion
- ★ Damage to vegetation and wildlife on rock faces

Affected resources include: granitic domes, limestone outcroppings, all ecological systems adjacent to climbing cliffs, all native vegetation types and their associated flora and fauna in vicinity of climbing activity, species especially sensitive to direct human disturbance, and the Peregrine falcon.

Cultural and Historical Tourism

Visitors come to the Dragoons from across the U.S. and from overseas to experience the sites where so much important American history played out, and to put themselves into the stage of stories many have heard and read since childhood. Many of these visitors stay in the developed campground in East Stronghold Canyon, or in nearby towns, but some use campsites in this management area. The trail that accesses the historical Council Rocks site obviously receives considerable foot traffic, and yet is poorly delimited and has little interpretive information. The influx of tourists to Karchner Caverns may also be overflowing across the valley to the Dragoons. There is no system in place to assess numbers of visitors or to record what motivations bring them to the area. Impacts of these visitors are likely much the same as for other users (e.g. increased road traffic, campsite proliferation).

Equestrian Use

Significant equestrian use in the Dragoons is fairly new to the area and has notably increased in recent years. Some users are likely coming in from nearby properties along the west side, and at least one set of equestrian users is brought by a commercial tour enterprise, WTE Travel. Plans for the Bachmann Springs development include an equestrian center with opportunities for trail rides to historical sites in the Dragoons. One major threat from equestrian use is the introduction of exotic, invasive species through horse feed and feces. Range fed horses entering the Dragoons from adjacent properties may not be much of a risk, but will still increase the likelihood that exotics established off the Forest would be spread into this management area. Presence of Lehmann lovegrass seeds in the horses’ feces could accelerate invasion of native grass stands. The spread of exotic invasive weeds through horse feed and feces,⁴⁰ which has been so well documented in other parts of the country, has often been addressed by agencies requiring the use of certified weed-free feed before and during a horse’s

presence in a given management areas (e.g. most of USFS Region 1). Establishment of alien seeds in riparian areas is particularly detrimental because these areas are subject to less climatic extremes which tend to prevent exotic plants from establishing in other area. Such impacts need to be more actively monitored in any area receiving significant equestrian use. The proper place of equestrian use in the landscape needs to be addressed directly.

Impacts arising from horse trailers driving off roads include the conversion of relatively bare areas to permanent campsites which become denuded and continue to expand in size. Tethering of horses to picket lines and confining horses to small portable corrals is creating areas where the ground has been trampled to bare dust.

Continued unmanaged equestrian use of the area will contribute to increased erosion and soil compaction on trails⁴¹ and trampling problems off designated trails.⁴²

Special Use Permits

Special use permits are required for all commercial groups using the National Forest and for non-commercial groups over 50 people. The Coronado Forest has provided records of special use permits only as far back as 1997. There appear to be gaps in this information; including the omission of at least one commercial climbing group known to have a special use permit, and at least one actively-advertising tour group that may or may not have the required permits. Nevertheless, National Forest records show 2,518 special use permit user-days approved for the Dagoon Ecosystem Management Area in 1997, rising to 3,625 user-days approved in 2002. Rock climbing-focused groups (NOLS and Colorado Outward Bound) account for 2,068 of these user-days per year since 1997, and equestrian groups increased from 100 user-days in 1997 to 235 user-days in 2002. The number of equestrian users has certainly increased substantially since. These numbers of commercial visitors translates into heavy advertisement for recreation in an area in which indiscriminant use is already taking an unmistakable toll on the landscape. This is compounded by a lack of monitoring of group numbers and impacts.

Impacts from the high number of special use user-days permitted include:

- ★ Direct impacts of repeat visits by large groups in this small area, e.g. campsite proliferation discussed above

- ★ Overall increase in visitor use resulting from the introduction of so many people, and subsequently their acquaintances, to the area

- ★ Granting of special-use permits (e.g., for commercial rock climbing, orienteering) beyond carrying capacity

Affected resources include those listed for campsite proliferation.

Wildcat Trails

Wildcat, or user-created trails, are a major problem in the Dragoons, particularly in the proposed Westside and Eastside Management Districts. The majority of trails are created by equestrian users (Westside) and rockclimbers (East and Westside). The numerous trails created by rockclimbers are to access rock faces on the edges of the Forest, as well as remote interior locations. These have resulted from both commercial and non-commercial use.

Equestrian use has become very heavy recently and has resulted in many impacts, which have been listed above. On the Westside, this use has resulted in a maze of trails, with disastrous results. Miles of trails have been created, many on steep slopes. This combined with the highly erosive nature of the decomposed granitic soils found here, is doing tremendous resource damage. Trails rapidly become trenches on steep slopes, which leads to the creation of even more parallel roads, which then become erosive trenches. All commercial equestrian use on this Dagoon Ecosystem Management Area should be banned. Non-commercial equestrian use on much of this range should be restricted to existing roads, or designated equestrian trails that are located in areas to minimize impact. Some roads that would be closed during the Travel Management process could be converted to equestrian trails.

ROADS AND TRANSPORTATION SYSTEM

Just west of Middlemarch Pass, FR687 heads off to the north, skirting the western slopes. A few miles further east, FR697 climbs from Middlemarch Road up into the high-elevation basin of Gordon Camp, and FR345A climbs from Middlemarch Pass into China Camp. Several small spurs from 687 and 697, which access campsites, trails, and grazing-related structures, are also designated and signed. China

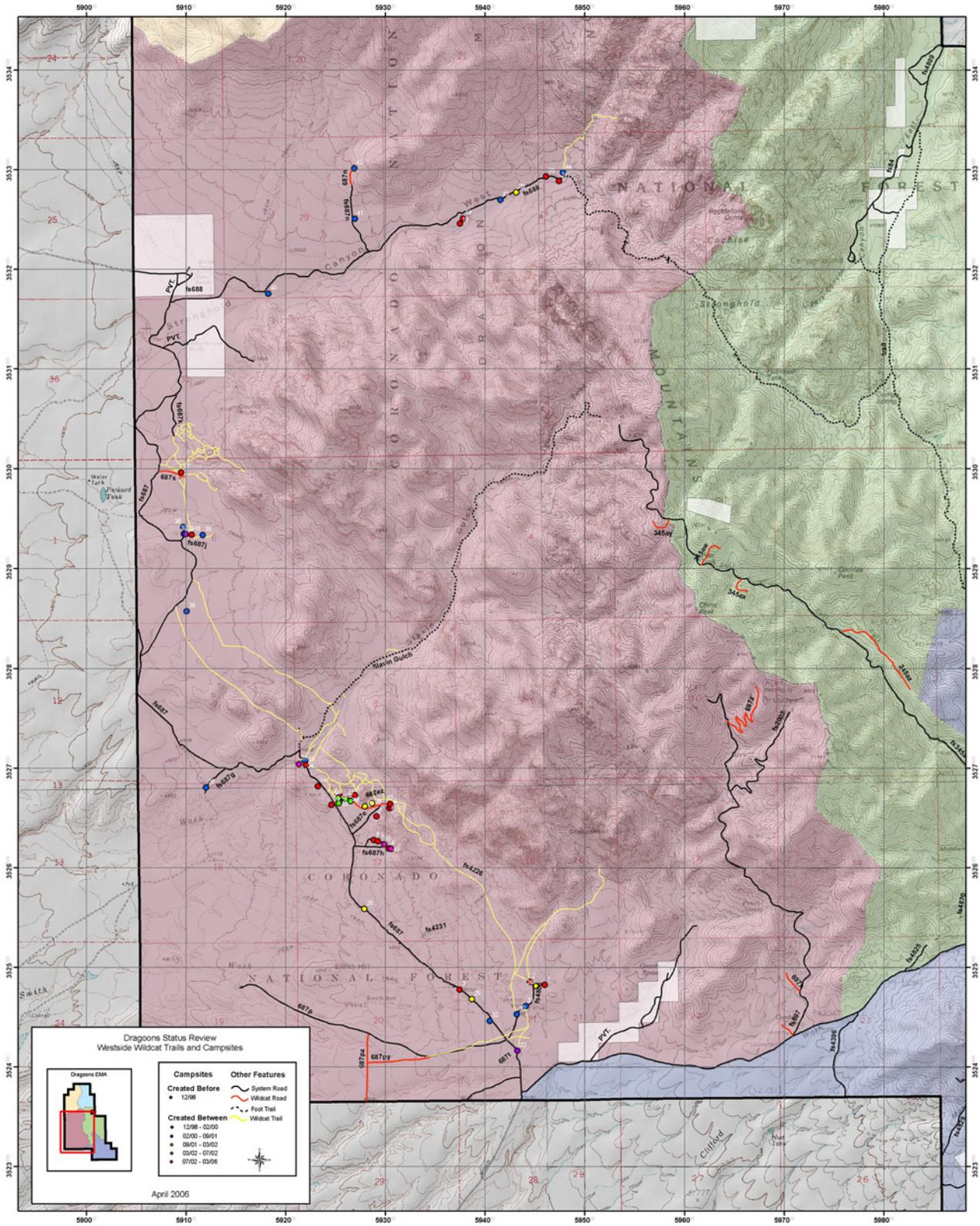


Figure 3.11 Map of Dragoon Westside wildcat roads and trails

Camp road FR345a lies mostly within the East side management area, but ends within the Slavin Canyon watershed in the proposed DWMA. Upper reaches of this road are addressed here.

Gordon Camp and China Camp roads FR697 and 354a penetrate the heart of this small range and despite apparent low usage, threaten to compromise the integrity of the EMAs central roadless area if off-road abuses increase. Despite Forest Service signs stating off-road driving is prohibited, many spur roads have been illegally created or extended by indiscriminant drivers. As of May 2002, road inventories by Sky Island Alliance found 18 illegal, user-created roads (totaling some nine miles) within the proposed westside management area. These roads appear to have been created by recreational users. Wildcat ORV tracks tend to form dead-end spurs from campsites and roads; several have carved gashes in steep slopes and wash sides. One wildcat road has turned a spur-road designed to access a single campsite (FR687e) into a high-use loop road lined with ever-expanding camping areas (see also Campsite Proliferation).

Affected resources include: springs, ephemeral watercourses, scenic resources, eastside and westside drainages, all ecological systems, all native vegetation types and their associated flora and fauna, vegetation types and communities not adapted to frequent fire, riparian vegetation and species, and species especially sensitive to human disturbance.

Gordon Camp Basin

Currently mapped roadless areas that encompass 35,324 acres are being infringed upon by one illegal, user-created road that runs to the top of China Peak from an abandoned mine north of Gordon Camp; such infringement shows the need for formal protection of this roadless area and for continued monitoring of off-road driving impacts.

Gordon Camp and nearby China Camp have not experience much campsite proliferation along roads although considerable accumulation of trash has occurred at some campsites in Gordon Camp. FR345a to China Camp also has small, informal campsites along its margins.

The closure of the road to China Camp from the Gordon Camp area has been breached and closure signs on a road leading to an abandoned mine have been vandalized. From this mine site ORV tracks now lead some 1.1 miles up steep, shallow-soiled slopes of

the Dragoon Inventoried Roadless Area (IRA) to the top of China Peak.

Gordon Camp and China Camp roads 697 and 354a are channeling off road impact into the core of the Dragoon range.

U.S.-MEXICO BORDER

Immigrant and Smuggling Traffic

Foot travel of migrant individuals occurs on the Dragoon Ecosystem Management Area. Many vehicles have been abandoned in the Dragoons in recent years. Recreational users occasionally come in contact with migrant travelers in the range, but to our knowledge no aggressive encounters have been reported by either side.

The impact on the Dragoon Management Area is close to non-existent when the temporary Border Patrol Checkpoint on Highway 80 (just north of Middlemarch Road) is not open. When this Checkpoint is open, the resulting impact is tremendous.

Foot travel of migrating people often occurs along washes and ridges rather than on designated hiking trails. Impacts of this type of foot travel should be generally similar to those of recreational hikers, but steps to mitigate these impacts will necessarily be quite different.

In most cases, foot travel within this area is tied to driving and camping activity, but assessment of impacts of all foot traffic is necessary.

Affected resources include: springs, all ecological systems, all native vegetation types and their associated flora and fauna, grasslands and savannas, lowland flora and fauna, riparian vegetation and species, and vegetation and communities not adapted to frequent fire.

Border Patrol Interdiction Efforts

This EMA receives noticeable traffic related to the U.S.-Mexico border some 30 miles south. The Border Patrol occasionally patrols FR687 and routinely patrols Middlemarch Road, apparently focusing efforts between Highway 80 and the CNF boundary. Unlike other borderland areas on the Coronado, there is no evidence that off-road driving by the Border Patrol has yet contributed significantly to proliferation of illegal roads in the EMA. This is likely due to the fact that the range is not right on the border, and that FR687 provides adequate law enforcement access to the area.

The Border Patrol agency engages in and affects activities on National Forest Land, and therefore needs to be considered in management planning. Strong fluxes in immigrant traffic have been associated with changes in the placement of the Highway 80 Border Patrol checkpoint from Davis Road south of Tombstone to just north of Middlemarch Road. The northern placement has made Middlemarch Road and FR687 part of routes that bypass the checkpoint. Due to the relatively mild topography of the area around FR687, it is unlikely that all possible vehicular bypass routes stemming from FR687 could ever be sealed off. FR687 would therefore be a poor focus for attempts to restrict motorized migrant travel through the area. Management success in this area will require a high-level of coordination with the Border Patrol on the sighting of checkpoints close to the National Forest, as well as integration into a larger management framework for the whole Coronado National Forest.

PROPOSED DRAGON WESTSIDE MANAGEMENT AREA

Within the Dragoon EMA, the proposed DWMA has traditionally been relatively remote and not heavily used. Exits from I-10 leads visitors to the north and east slopes of the range, where they pass the Amerind Foundation museum, the town of Dragoon, scattered tourist shops, and parcels of private land before reaching a developed campground in East Stronghold Canyon. Just east of the campground, the growing community of Sunsites abuts the National Forest boundary, and brings a high density of roads along with increasing density of houses.

Road access to the west side of the Dragons is via the well-graded dirt Middlemarch Road, which runs between the towns of Tombstone and Pierce. Middlemarch Road crosses the Dragoon EMA, running between the northern and southern stands of the Dragons. Off the EMA, Middlemarch Road will soon be paved from Highway 80 near Tombstone to within one mile of the National Forest boundary. Three main dirt roads, designated and signed by the Forest Service, split off Middlemarch Pass and enter the west side of the EMA.

Campsite Proliferation

This problem is most seriously affecting areas in the proposed DWMA most notably along FR687. See the Nonextractive Uses section for further information.

SITE-SPECIFIC THREATS

The invasive exotic “Tree of Heaven” has established a small but expanding population along Slavin Gulch just off of FR687. This stand appears to have been cut at least once, but will require re-treatment and consistent follow-up to prevent a more serious infestation. The tree was planted as an ornamental in nearby communities (abundant in Bisbee, most likely present also in Saint David and/or Tombstone) and escaped from cultivation. Its location along FR687 is no surprise, given the well-documented role that roads play in dispersing alien plants.⁴³

Shrub and tree encroachment into grasslands of lower slopes is an example of one of the most regionally common patterns of invasion by native plant species.⁴⁴ Repeat photography in the area shows the extent of this conversion in some parts of the range (Figure 3.3). Forces and management activities that contribute to shrub encroachment need to be evaluated with an eye towards maintenance and restoration of grassland habitats.

Forest Service grazing allotments on this westside region are the Slavin Allotment, which includes both Stronghold and Slavin Canyons, and the Granite Springs allotment at the southern end of this management area. The permittee of the Slavin allotment took voluntary non-use in Slavin Canyon from 1995 to 2000. During this time, recovery of riparian vegetation was striking. Sky Island Alliance documented the return of a spring that had disappeared so completely as to have had a fire ring built in the center of what is now a cienega. Cattle have since been returned to the Slavin Allotment. Potential impacts of livestock grazing include: damage to riparian vegetation, water diversion and drawdown.

Council Rocks

Heavy visitation in the Council Rocks area, without a clearly marked foot trail, is leading to trampling of vegetation and the spread of a broad network of mini-trails.

Proposed Dragoon Eastside Management Area

Threats include intensive rock-climbing activity in Cochise Stronghold, creation of new roads, campsites, and “climber trails.

Proposed Dragoon Springs and Blacktail Hill Management Areas

The major threat in these areas, are from a proposed Alpha-calcite mine in the north end of the area. Approval of this mine would lead to intense direct human disturbance of the area through the creation of new roads, greatly increased traffic, dust, and groundwater impacts.

Recommended Objectives and Management Actions

Use of the Dragoon Ecosystem Management Area (EMA), particularly in the western portion of the area has grown to a point which demands active management to protect the natural and cultural heritage of this outstanding area. The following proposed actions are a means to transform use of this area from its current free-for-all state into a sustainable pattern that enhances natural and cultural resources of the area while enabling visitors a high-quality wildland experience. Immediate redirecting of destructive uses will avert much future conflict that will continue to develop as a fast-growing population becomes accustomed to unregulated use and quickly comes to view all these uses as inalienable rights. The redirection of use now will establish traditions of use compatible with the health of the land, and that will come to be viewed as inevitable, natural uses of the land. We recommend objectives and management actions that will address these threats if they are incorporated into the revision of the Coronado National Forest's Land and Resource Management Plan, as well as subsequent project-level activities.

Central to the management proposals for the Dragoon EMA is the division of the EMA into management units with a focus on actively managing Dragoon Westside Management Area (see Figure 3.2). The management strategy for this area will be to limit overall impacts by establishing a permit system that provides a cap on daily visitor numbers and provides a low-cost means to monitor use. The proposed permit system would affect only this part of the Dragoon EMA, and would therefore contribute to the goal of "multiple use management" by providing

opportunities here for uses and experiences that are being displaced elsewhere on the Coronado.

A second corner post of this plan is closure of illegal and redundant roads, and enhancement of opportunities for non-motorized recreation. This conversion will contribute to the establishment of a progressive balance between high-impact and low-impact uses, and a better mosaic of opportunities according to the National Forest's "recreational opportunities spectrum." The proposed management actions also provide a proactive plan for integrating management of this area into the dynamics of the entire region. By highlighting ways in which management of this area affects (and is affected by) wildlife movement corridors between Sky Island mountain ranges, watershed protection for the San Pedro River and the communities that depend upon it, and actions of nearby private landowners and other federal and state agencies, the actions pave the way for collaboration with other land managers on shared goals. Managers of public land, for example, often see private land development as a "wild-card" that affects their sphere of duty, but over which they have no influence. Actions are proposed for working with private landowners and with other agencies to minimize impacts of nearby developments on this public land.

The following proposed Objectives and Actions apply to the entire Dragoon EMA. Objectives and actions specific to the proposed Dragoon Westside Management Area (DWMA) are found in the next section.

Adjacent Land Uses

Objectives

Minimize negative impacts of nearby private-land development on the ecological and cultural attributes.

Maintain integrity of wildlife corridors within the Dragoon Ecosystem Management Area, and between the area and the following: San Pedro River, Whetstone Mountains, other key mountain ranges.

Actions

Advocate for and negotiate conservation easements on private lands, focusing on areas deemed particularly important as wildlife habitat and movement corridors.

Advocate for and negotiate protection of key state trust lands from future sale for development, including parcel surrounded by Dragoon Mountain Ranch and parcel that would form a continuous protected corridor from the Dragoons to the San Pedro River.

Ecological Restoration

Objectives

Maintain and restore healthy grasslands.

Maintenance of open savanna structure conveys to visitors an accurate sense of what the area was like during the mid to late 1800s, its most important historical and cultural era. This also enables visitors an ecologically accurate experience of what the area looked like.

Fire

Maintain natural disturbance regimes, especially fire.

Wildlife Movement

Maintain integrity of wildlife corridors within the Dragoons, between the Dragoons and the San Pedro River, and between the Dragoons and other key mountain ranges.

Actions

Reduce shrub encroachment via fire and manual mechanical thinning. Adapt protocols used successfully at Fort Bowie Historical Site, including deployment of volunteer workforce.

Tip competitive balance in favor of grasses over shrubs by removing cattle-grazing pressures in some areas (see Extractive Uses).

Monitor shrub encroachment via repeat photography using points originally photographed as early as 1883. Shrub encroachment is actively managed with a combination of fire and manual thinning. Grassland restoration work conducted at the Fort Bowie National Historic Site (Larry Ludwig, pers. com) provides precedence and experience-based recommendations for safe, effective, small-scale grassland restoration in historically important sites.

Fire

Work with private landowners to build support for prescribed burns. Educate landowners about home fireproofing strategies in construction and landscaping.

Wildlife Movement

Use information gained from wildlife tracking transects between the Dragoons and the San Pedro River (including Slavin and Stronghold drainages) to inform management decisions.

On these surveillance transects, gather data on movement patterns of target species and the variables that affect these movements. Use these data to take site-specific management action.

Extractive Uses

Objectives

Manage grazing on current allotments so that loss of grass cover, soil, and sensitive habitats (e.g., riparian areas) is minimized.

Actions

Facilitate voluntary retirement of the Slavin grazing allotment in Stronghold and Slavin Canyons.

Invasive Species

Objectives

Reduce the spread of invasive species, both native and exotic. Eliminate invasive exotics. Actively deter new invasions.

Actions

Require use of certified weed-free feed before and during presence on the Coronado National Forest.

Eradicate the “tree of heaven” population in Slavin Canyon through immediate removal and continued monitoring.

Engage in cooperative planning with nearby communities and with other agencies to reduce exotic species introductions by promoting native-species landscaping and highlighting the dangers of exotic species introductions.

Engage in cooperative planning to prevent human-made water sources from acting as conduits for bullfrog colonization of waters in the Dragoons that are home to endangered Chiricahua leopard frogs. Include an immediate focus on water traps in the Bachmann Springs golf course.

Involve nearby housing development residents preventing and monitoring alien invasions.

Non-extractive Uses

Objectives

Shift the balance between motorized and nonmotorized recreational opportunities across the range so that the overall level of impact on ecological and cultural attributes of the landscape is reduced.

Promote visitor appreciation of historical, cultural, and ecological resources.

Actions

Regulate use of hiking trails to minimize degradation of the trails themselves and the ecosystems through which they pass.

Convert sections of illegal and redundant road into hiking and equestrian trail

Special Interest Areas

Objectives

Highlight the outstanding natural values of the watersheds for west Stronghold and Slavin drainages. Ensure that protection of these values remains a high priority in management decisions that affect the area, and stimulate research in the processes.

Fulfill the National Forest’s mandate to have all major ecosystem types present on the Coronado represented in RNAs.

Maintain ecological values (including wilderness characteristics and research potential) of the wildest areas in the Dragoon Mountains.

Actions

Establish a Research Natural Area that encompasses the watershed of Slavin Gulch, to the Forest boundary. Include Madrean Encinal and Arizona cypress riparian forest in the RNA. (See Figure 3.2 for a map of the proposed special management area.)

Encourage initiation of new research projects within this RNA by informing research centers of this designation, promoting these research opportunities at scientific meetings, and providing documents of support for researchers’ funding proposals.

Secure formal protection for the 35,324-acre roadless area north of Middlemarch Pass. Close and revegetate the illegal, user-created road that runs from an abandoned mine north of Gordon Camp to China Peak.

Manage 35,562 acres to maintain their wilderness characteristics. (See Figure 3.13 for a map of the area to be managed to maintain wilderness characteristics.)

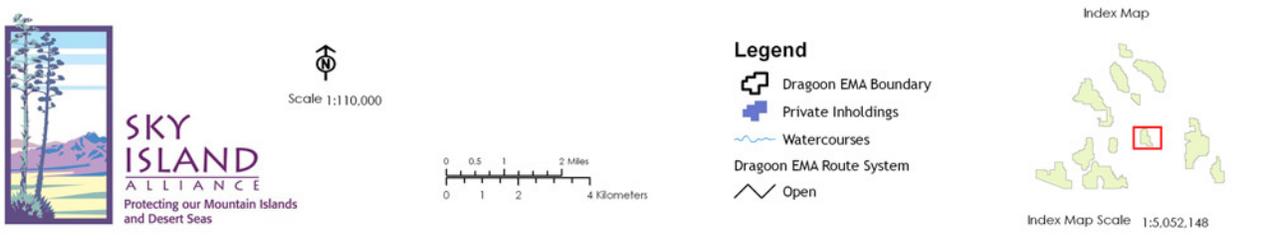
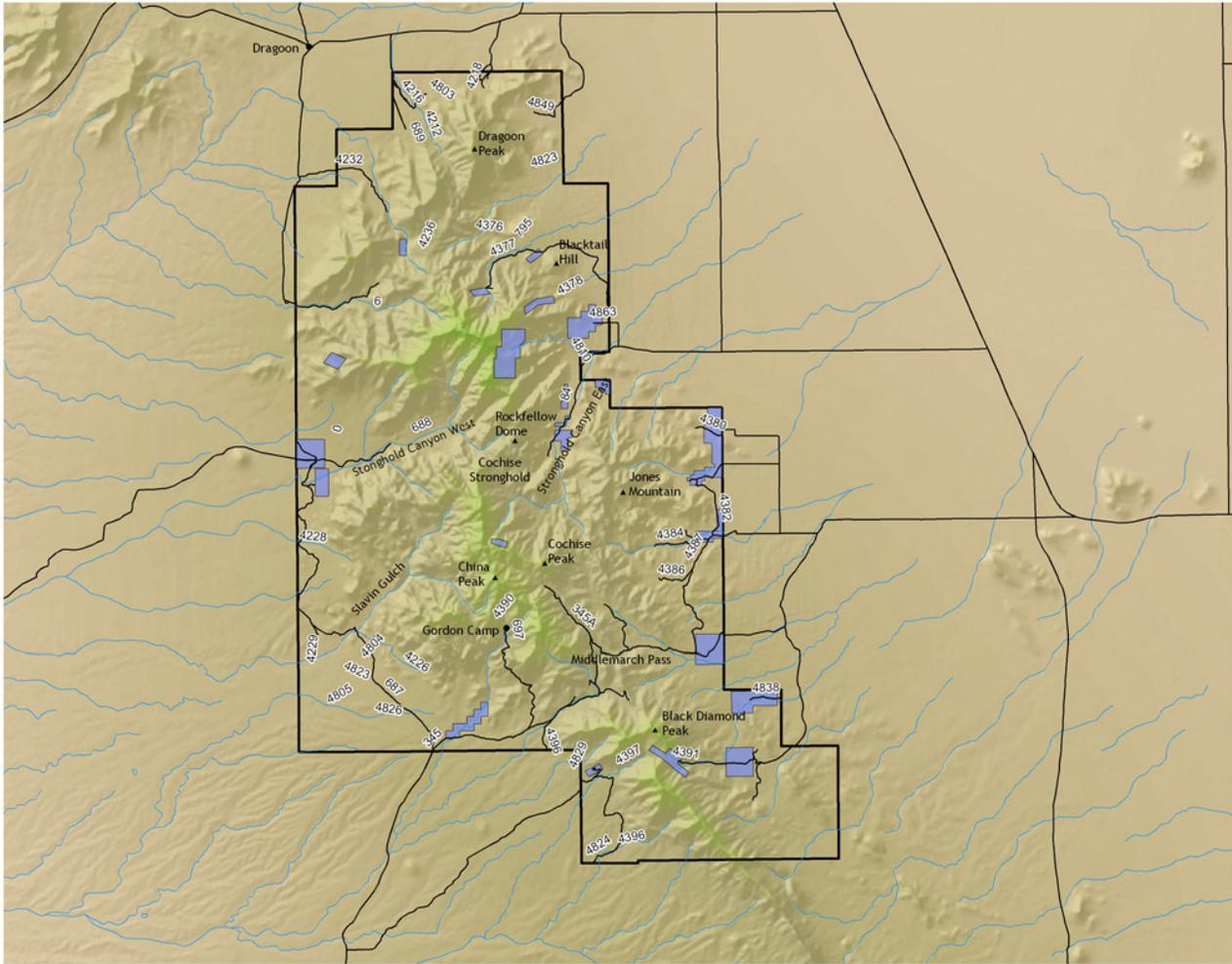


Figure 3.12 **Travel Management Plan and Route Recommendations for the Dagoon EMA**

Roads/Transportation System

Objectives

- Restore roaded areas degraded by indiscriminate driving.
- Improve balance between motorized and non-motorized recreational opportunities.
- Reduce additional proliferation of wildcat roads.
- Relieve pressure of off-road driving on National Forest law enforcement staff.
- Improve overall primitive quality of visitor experiences.

Actions

- Close and revegetate all remaining illegal roads. See Figure 3.12 for the proposed Transportation System.*
- Reduce the road/trail ratio below 5:1 through the conversion of appropriate roads to trails, addition of new trails and closure of wildcat spur roads. (See also road conversions in DWMA)*
- Restore closed roadbeds through erosion control and vertical mulching.*

Proposed Dragoon Westside Management Area

In order to transform the current chaotic free-for-all use on the westside of the Dragoon EMA into a set of user traditions that are sustainable, we recommend a cap on daily visitor numbers in the proposed DWMA through a permit system. There is ample precedence for this user permit framework; sites throughout the country use similar permit systems in some or all of their management areas, including in Arizona: Grand Canyon National Park, Aravaipa Creek, Rincon Wilderness, Chiricahua National Monument, Cabeza Prieta NWR, San Bernardino NWR, recreation areas on Indian reservations, and others.

Unlike most remote sites that use permit systems, the DWMA site is easily accessible from major population centers, entrance does not require high clearance vehicles, and much of the site can be appreciated from designated roads. A backcountry-style permit system here would make a primitive, wildland experience accessible to visitors with restricted mobility and/or limited economic means along with traditional backcountry enthusiasts.

The daily visitor cap in the DWMA would ensure that the Dragoon EMA retains opportunities for high

quality, low-density outdoor experiences (towards the “primitive” end of the USFS “recreational opportunities spectrum”). Because this area has such outstanding historical, ecological, and scenic values and yet is so fragile, reinforces the argument that this area is a particularly good candidate for low-density primitive-area management.

Limiting impacts of all recreational user groups along FR687 without regulating entry would require full-time enforcement personnel and a significant investment in infrastructure which is beyond the Forest’s operating budget. Such funds would be better spent in areas in which high visitor use is more appropriate and more easily managed. Other parts of the Coronado National Forest, including East Stronghold in the Dragoons, are already better equipped to support large numbers of visitors without excessive degradation resources. These other areas already provide opportunities for recreation that can be accommodated in higher-density, more intensively managed areas.

The following proposed objectives and actions are specific to the proposed DWMA.

Non-extractive Uses

Objectives

Camping

Camping in the DWMA should remain primitive and dispersed.

Reduce proliferation of wildcat campsites and continual expansion of existing sites.

Cultural and Historical Tourism

Improve visual aids for visitors; promote visitor appreciation of historical, cultural, and ecological resources.

Equestrian Use

Hold equestrian impacts to a level at which equestrian use can be sustained without damage to the base resource or conflict with other users.

Actions

Camping

Close wildcat campsites created since 1998; determine which remaining campsites would best provide for visitors’ use and enjoyment while minimizing negative impact of visitor activities on the landscape.

Close pre-1998 campsites with unacceptably high impacts.

Clearly define designated campsites with small numbered posts and, where necessary, vehicle barriers. Clearly mark boundaries of designated campsites, focusing on unobtrusive means such as low barriers of rock, railroad ties, or native vegetation.

Assign campsites on a first-come first-served basis when issuing camping permits.

Install formal fire pits in sites with multiple fire rings. Restrict fires to formal fire pits at these sites.

Monitor placement and extent of campsites at least once per year, using the CNF’s 2001 campsite study as a baseline and template.

Bar equestrian camping in this area; redirect equestrian camping and horse tethering into other, less sensitive management areas (e.g. certain designated campsites in the Black Diamond management area just south of Middlemarch road).

continued

Actions

Convert some illegal and/or redundant roads into trails, e.g. end of China Camp road.

Cultural and Historical Tourism

Provide interpretive trail maps that inform users about the area's natural and cultural history while guiding their travel across the landscape.

Establish well-marked and defined trails to historic and cultural sites.

Collaborate with Tribal stakeholders to develop outreach materials for signs and brochures.

Use ecological restoration work to enhance authenticity of the cultural and historic experience.

Equestrian Use

Specify which trails are open to equestrian use. Monitor width, condition, and presence of non-native plant species along these trails. Suspend equestrian use (for whatever time period necessary) if impacts are deemed excessive.

Special-use Permits

Eliminate special-use permits for commercial groups in the DWMA.

Redirect activities of commercial and other large recreational groups to less sensitive areas in other mountain ranges.

Overall Usage of Area

Objectives

Redirect and manage overall human impacts; reduce current and future conflicts among user groups; provide opportunities for low-density, high-quality outdoor experiences.

Actions

Establish a (no-fee) permit system in the DWMA with overall cap on daily visitor numbers. Visitor cap will be based on number of designated campsites and parking spots.

Enforce use of permit system by installing a locked gate at the south end of FR687, with key or combination granted upon procurement of permit.

Eliminate special-use permits for commercial groups in this management area.

Roads/Transportation System

Objectives

Improve balance between motorized and non-motorized recreational opportunities in the DWMA.

Provide incentives for users to respect closures in the remote area of Gordon Camp.

Allow foot, bicycle, and equestrian access to the Gordon Camp basin.

Actions

Exclude all ATV use in the DWMA.

Ban ATV use of FR687.

Convert sections of illegal and redundant road into hiking and equestrian trail including the terminal sections of China Camp Road FR354a and Gordon Camp Road FR697.

Close and revegetate the illegal, user-created road from abandoned mine up to China Peak (Gordon Camp area, off of FR697). Use natural pinch-point along FR697 just north of Gordon Camp to close vehicle access to abandoned mine site from which this track is being entered. Convert the remainder of this dead-end but scenic road section into hiking and equestrian trail.

continued

Actions

Monitor closure of illegal China Peak track and other road closures in the Gordon Camp basin. If closure is violated in this remote area, automatically trigger closure of road to Gordon Camp and install a locked gate at a natural pinch-point near the beginning of this road at FR697.

Advocate against permanent Border Patrol checkpoint on Highway 80 at Middlemarch Road, to reduce creation of wildcat roads and violations of road closures off of FR687.

Wilderness

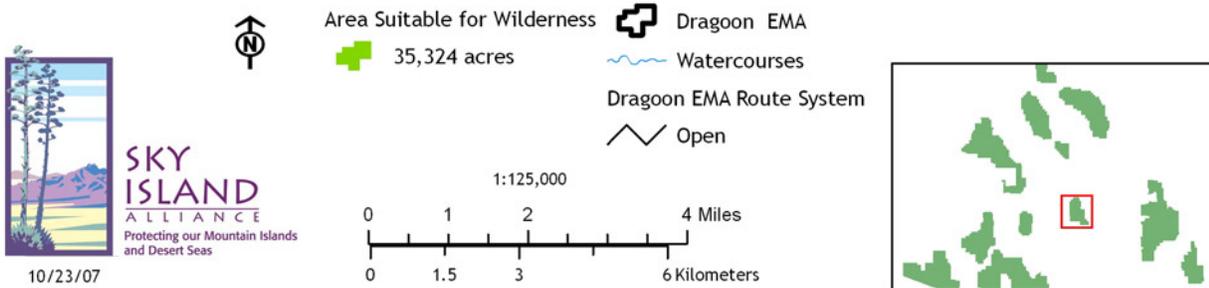
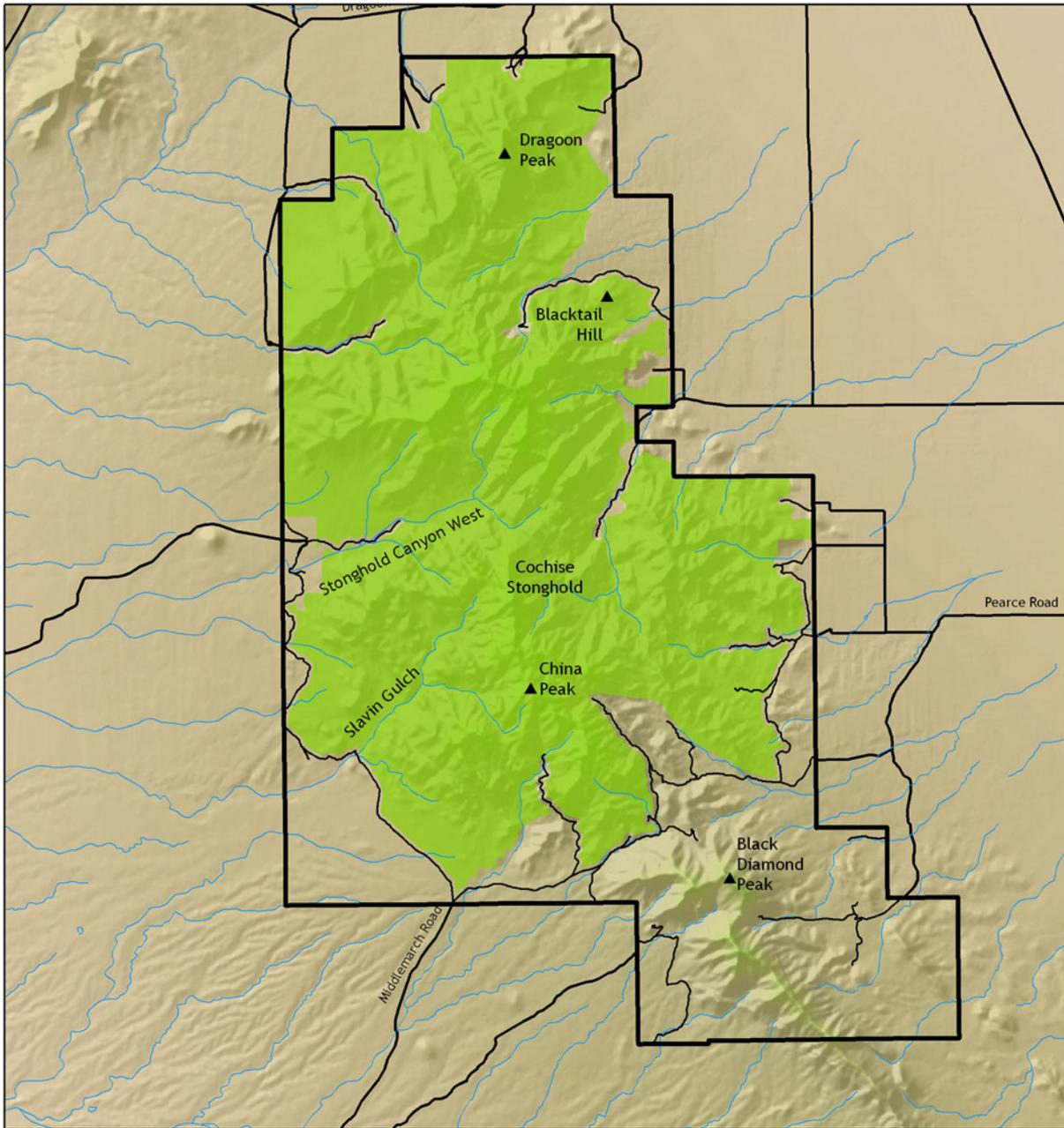
Wilderness is a cornerstone for protecting biological diversity and ecological sustainability on the Forest. Whether designated, or proposed, these areas provide a refuge for many species from large carnivores to small invertebrates. They also provide opportunities for the highest quality primitive recreation including activities such as hiking, backpacking, horsepacking and hunting. As roadless areas become increasingly scarce in the United States, remaining roadless areas on the National Forest that meet wilderness criteria deserve protection.

The Coronado National Forest is required to analyze potential Wilderness Areas during Forest Plan Revision. It is mandated by both statute and regulation that the Forest Plan revisions include wilderness suitability analyses. In this document, areas suitable for wilderness are mapped and described for each Ecosystem Management Area. Lands with wilderness characteristics must be considered for recommendation as potential wilderness areas during plan revision. These areas should be designated as Wilderness Study Areas in recognition of their outstanding qualities and managed to protect their wilderness characteristics. Identification of areas suitable for wilderness should not be influenced by nonwilderness activities or uses that can be seen or heard from areas within the potential wilderness. Protection of wilderness-quality roadless areas through designation as Wilderness Study Areas is key to ensuring the ecological integrity of the Coronado National Forest. Remaining roadless areas with wilderness characteristics are essential tools for the Coronado National Forest to be able to maintain ecological sustainability on each Ecosystem Management Area and across the Forest.

WILDERNESS SUITABILITY

The Dragoon Mountain Roadless Area is situated in the center of the Coronado National Forest of southeastern Arizona, 20 miles northeast of Tombstone in Cochise County. One of the most visually striking and inspirational mountain ranges in the Sky Island region, the Dragoon Mountains are steeped in rich history and prehistory. The sharp granite spires, hoodoos, and deep boulder-filled canyons of the central Dragoons are of the highest scenic quality to be found in the country. The lower elevations, which begin around 4700 feet, contain Madrean Encinal grasslands dotted with evergreen oaks near drainages and outcroppings. From there, vegetation is primarily oak woodlands with piñon-juniper woodlands in higher elevations. Relict populations of Arizona Cypress (*Cupressus arizonica*) are found in larger drainages on both the east and west sides of the mountain and in the Rockfellow Dome area — a rare vegetation association found in relatively few locals. Mount Glenn, at 7,519 feet, towers 2,800 feet above the surrounding valleys. The west slopes feed the San Pedro River while the eastern slopes drain into either the Sulphur Springs Valley or San Bernardino watersheds to the south.

Geologically speaking, the Sky Island landscape began to take form between 70 and 40 million years ago. This was a period of intense folding and faulting. The activity was of volcanic and igneous intrusive origin, and of greatest importance in the placement of major ore bodies. Most of the present ranges were uplifted during the Basin and Range disturbance between 30 and 25 million years ago. Volcanism and sedimentation have led to a complex structural history of the basin range. What resulted from this geologic



10/23/07

Figure 3.13 Area Suitable for Wilderness and to be Managed for Wilderness Characteristics

activity in the Dragoon Mountains are large, crystallized, granitic domes atop a layer of limestone sea bottom. The hard rocks at the mountain's core rise abruptly above the surrounding valley leveled at a great plain by the San Pedro River. When the porous layers of limestone were brought into contact with the impermeable layers of granite, year-round springs and streams were produced. The resulting geologic history of the Dragoon Mountains makes for dramatic rosy granite rock faces with striking visual characteristics.

Throughout this roadless area, outstanding opportunities for solitude and primitive recreation exist. The entirety of this area meets the criteria identified in the 1964 Wilderness Act, which follows:

(1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

As such, the area described below is suitable for addition to the existing National Forest Wilderness system.

Inventoried Roadless Area

The existing Inventoried Roadless Area (IRA) as identified by the Coronado National Forest, via a computer model (Recreation Opportunity Spectrum) not designed to identify roadless areas, and using an outdated transportation system map, identified 14,232 acres in the Dragoon IRA. On-the-ground field checking by Sky Island Alliance has determined that the roadless acreage in the Dragoon EMA is 35,562 acres.

Recreational/Scenic Values

The Dragoons hold a certain air of mysticism within their steep rock ledges and deep canyons. Visitors are awed by the sun-drenched cliffs, walls of upright granite, and surreal landscapes this range offers. Opportunities for solitude and adventure abound. Many small valleys, hidden canyons, and sheer escarpments offer the visitor ample opportunity for wilderness experiences. The west side of the Middle Dragoon Unit is accessible from only one dirt road that leads north from Middlemarch Road. There,

waves of grasses and large oaks stop abruptly at the rock faces of Sheepshead and other steep prominent ridges that soar upward. The east side of the unit is no less striking. Only one primary hiking trail crosses the range, leading from the West Stronghold over a high saddle into East Stronghold Canyon. The Slavin Gulch trail heads east from FR687 towards China Camp.

The rock faces of Cochise Stronghold, Sheepshead, Rockfellow Dome, and others in the middle Dragoons, are a popular rock climbing destination. Climbers from across the world visit the Dragoons each year to climb various routes and relish the incredible views of the Sky Island region from atop many of the spires. The Rockfellow Dome area is closed to climbers during Peregrine Falcon breeding season, March 1 through June 30. The west side of the Unit, on FR687, is a popular deer-hunting destination.

Bird-watching and photography are also popular. Because of the outstanding scenic qualities of Dragoons, professional and amateur photographers flock to the area.

Cultural/Archaeological Values

During the mid-1800s, the Dragoons were the primary residence of the Apache leader Cochise and his band of Chiricahua Apache Indians. During the 1860s, this mountain range was the theater from which many skirmishes and battles took place. On October 12, 1872, a peace treaty was consummated between the U.S. Government and Cochise. Cochise kept the peace until his death in 1874, at which time Taza, Cochise's oldest son, became chief.

Today, one can visit Council Rocks, a reported location of the 1872 peacemaking treaty, and visitors may still explore and discover many artifacts, including grinding mortars, pictographs, and pottery shards. The mountains almost breathe the spirit of an earlier time and offer an outstanding scenic and cultural experience. The remainders of a 1880s era ranch house, belonging to Henry A. and Hattie K. Tweed, can be seen just south of West Stronghold Canyon. Many archeologists and historians visit the Dragoons to search for and experience the numerous places of historical significance.

Watersheds

The north-south orientation of the Dragoons distributes water to watersheds to the east and west of the complex. Stronghold Canyon East and Middlemarch Canyon East both drain into the Lower

Sulphur Springs Valley, providing essential waters to the Willcox Playa, a prime destination for tens of thousands sandhill cranes each winter making their migration south from Canada and Siberia. Across the ridgeline, Stronghold Canyon West, Slavin Gulch, Middlemarch Pass, and Smith Wash provide the means for water transport and serve as important wildlife migration corridors to the middle stretches of the San Pedro River, while also contributing water to meet the demands of the valley's ever-increasing residential population.

Vegetation

Plant communities found here include excellent examples of the region's distinctive Arizona cypress riparian forests and encinal oak savanna. The west side of the unit contains some of the few remaining stands of native grasslands that once reached to the San Pedro River, supporting populations of mule deer, coati, and javelina. Slavin Gulch retains water most of the year with a healthy, grass-laden channel, and sycamore, ash, and cottonwood trees, as well as stands of the rare Arizona cypress. The headwaters of Slavin Gulch contain one of the largest stands of Arizona cypress in southeastern Arizona amidst its rocky canyon walls.

Wildlife

The area as a whole provides a wide variety of habitat for game and non-game species. Animals such as black bear and mountain lion, which favor large areas of relative isolation, have a preference to such areas without roads, within their home ranges. Many other wildlife and game species can be found here, including javelina, mule and white-tail deer, gray fox, and coati. Peregrine falcons soar overhead, hunting for prey.

Wildlife—Common and Sensitive Species

The Dragoon Mountains are home to 15 species of plants and animals that are threatened, endangered, or officially designated as “of special concern” by federal and state agencies. They also harbor large mammals such as mountain lion, black bear, javelina, and coati. A jaguar was reported in the Dragoons as recently as 1986 (an individual killed in the Dos Cabezas Mountains to the east was said to have been chased from the Dragoons). Mexican jays, several species of hummingbirds, and large raptors are among the wildlife easily seen in this mountain range.

The Peregrine falcon occurs here and is listed as a Species of Concern under the Endangered Species Act, as a Sensitive Species by the U.S. Forest Service (USFS), and as Wildlife of Special Concern by the Arizona Game and Fish Department (AZGFD). It inhabits steep, sheer cliffs that overlook woodlands, riparian areas, or other habitats that provide avian prey species.

The Chiricahua Leopard Frog is listed Threatened under the Endangered Species Act, as a Sensitive Species by the USFS, and as Wildlife of Special Concern by the AZGFD. It inhabits aquatic areas in woodlands, grasslands, and deserts in rocky streams with deep pools east and south of the Mogollon Rim. The Chiricahua Leopard Frog has been extirpated from this site. There are 12 known historical sites in the Dragoon EMA, with 2 in the roadless area and the others directly dependent on the roadless area for watershed services. There are a number of appropriate sites that may have extant populations of the frog or have the habitat in place for reintroductions. The Dragoon Mountains has been identified in the Chiricahua leopard frog Recovery Plan as a Management Area in Recovery Unit 4. Management Areas are where recovery actions will be focused.

-
- ¹ Chronic, H. 1983. *Roadside Geology of Arizona*. Mountain Press Publishing Company, Missoula.
- ² Brown, D. E., editor. 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City.
- ³ Brown, D. E., editor. 1994.
- ⁴ Wentworth, T.R. 1981. Vegetation on Limestone in the Huachuca Mountains, Arizona. *The Southwestern Naturalist* (30) pp. 385-395.
- ⁵ Brown, D. E., editor. 1994.
- ⁶ Bahre, C. J. 1995. Human impacts on the Grasslands of southeastern Arizona. In: M.P. McClaran and T.R. Van Devender, eds. *The Desert Grassland*. The University of Arizona Press, Tucson, AZ. p. 230-264.
- ⁷ Summarized in Bahre 1995
- ⁸ Brown, D. E., and C. A. López González. 2001. *Borderland Jaguars*. University of Utah Press, Salt Lake City.
- ⁹ Reid, J., and S. Whittlesey. 1997. *The Archeology of Ancient Arizona*. University of Arizona Press, Tucson.
- ¹⁰ Reid and Whittlesey. 1997.
- ¹¹ Cordell, L. S. 1984. *Prehistory of the Southwest*. Academic Press, Inc., Orlando, and Reid, J., and S. Whittlesey. 1997. *The Archeology of Ancient Arizona*. University of Arizona Press, Tucson.
- ¹² Opler, M. E. 1941. *An Apache Life-Way: The economic, social, and religious institutions of the Chiricahua Indians*. University of Nebraska Press, Lincoln, London.
- ¹³ Sweeney, E. R. 1991. *Cochise: Chiricahua Apache Chief*. University of Oklahoma Press, Norman.
- ¹⁴ Fischer, D. L. 2001. *Early Southwest Ornithologists 1528-1900*. University of Arizona Press., Tucson.
- ¹⁵ Thrapp, D. L. 1967. *The Conquest of Apacheria*. University of Oklahoma Press, Norman.
- ¹⁶ Barnes, Will C. 1988. *Arizona Place Names*. The University of Arizona Press, Tucson.
- ¹⁷ Sweeney, 1991.
- ¹⁸ Sweeney, 1991.
- ¹⁹ Bahre, 1995.
- ²⁰ Bahre, 1995.
- ²¹ Wilson, J.P. 1995. *Islands in the Desert: A History of the Uplands of Southeastern Arizona*. University of New Mexico Press: Albuquerque.
- ²² Bahre, 1995.
- ²³ Gregg, M. 1961. Uncle Billy Fourr: cattlemen extraordinaire. *Arizoniana*. Fall 1961. and Willson, R. G. 1956. *Pioneer and well-known cattlemen of Arizona*. McGrew Commercial Printery, Phoenix.
- ²⁴ Wilson, 1995.
- ²⁵ Bahre, 1995.
- ²⁶ Wilson, 1995.
- ²⁷ Sweeney, E. R. 1997. *Making Peace with Cochise The 1872 Journal of Captain Joseph Alton Sladen*. University of Oklahoma Press, Norman.
- ²⁸ Negri, S. 1992. Boss Tweed's hideout and Cochise's council rocks lure trekkers into the Dragoon Mountains. *Arizona Highways Magazine*.
- ²⁹ Dean, R. 1993. January 11 letter to Arizona Highways' editor, and subsequent March research memo, from Riva Dean, reference librarian at the Arizona Historical Society, in archives of the Arizona Historical Society.
- ³⁰ Marshall, R.M., D. Turner, A. Gondor, D. Gori, C. Enquist, G. Luna, R. Paredes Aguilar, S. Anderson, S. Schwartz, C. Watts, E. Lopez, P. Comer. 2004. *An Ecological Analysis of Conservation Priorities in the Apache Highlands Ecoregion*. Prepared by The Nature Conservancy of Arizona, Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora, agency and institutional partners. 152 pp.
- ³¹ USFS. 1986. *Arizona Supplement to the Draft Environmental Assessment, Roadless Area Review and Evaluation (RAREII)*, USFS
- ³² Clarke, A. L., and T. Pacin. 2002. Domestic cat "colonies" in natural areas. A growing exotic species threat. *Natural Area Journal* 22: 154-159.
- ³³ Odell, E. A., and R. L. Knight. 2001. Songbird and medium-sized mammal communities associated with exurban development in Pitkin County, Colorado. *Conservation Biology* 15:1143-1150. and Clarke, A. L., and T. Pacin. 2002. Domestic cat "colonies" in natural areas: A growing exotic species threat. *Natural Areas Journal* 22:154-159.
- ³⁴ Anable, M.E., M.P. McClaran, and G.B. Ruyle. 1992. Spread of introduced Lehman lovegrass (*Eragrostis lehmanniana* Nees.) in Southern Arizona, U.S.A. *Biological Conservation* 61:181-188.
- ³⁵ Bock, C. E., J.H. Bock, K.L. Jepson, and J.C. Ortega. 1986. Ecological effects of planting African lovegrasses in Arizona. *National Geographic Research* 2:456-463.

³⁶ Masters, R.A., and R.L. Sheley 2001. Principles and practices for managing rangeland invasive plants. *Journal of Range Management* 54(5): 502-517.

³⁷ Leung, Y. F., and J. L. Marion. 1999. Assessing trail conditions in protected areas: application of a problem-assessment method in Great Smoky Mountains National Park, U.S.. *Environmental Conservation* 26:270-279.

³⁸ Tyser, R.W. and C.A. Worley. 1992. Alien Flora in Grasslands Adjacent to Road and Trail Corridors in Glacier National Park, Montana (U.S.). *Conservation Biology* 6: 253-262. and

Campbell, J. E. and D. J. Gibson. 2001. The effect of seeds of exotic species transported via horse dung on vegetation along trail corridors. *Plant Ecology* 157: 23-35.

³⁹ Nuzzo, V. A. 1995. Effects of Rock Climbing on Cliff Goldenrod (*Solidago sciaphila* Steele) in Northwest Illinois. *American Midland Naturalist* 133:229-241. and

Kelly, P. E., and D.W. Larson. 1997. Effects of rock climbing on populations of presettlement eastern white cedar (*Thuja occidentalis*) on cliffs of the Niagara Escarpment, Canada. *Conservation Biology* 11:1125-1132. and

Camp, R. J., and R. L. Knight. 1998. Effects of rock climbing on cliff plant communities at Joshua Tree National Park, California. *Conservation Biology* 12:1302-1306. and

Farris, M. A. 1998. The effects of rock climbing on the vegetation of three Minnesota cliff systems. *Canadian Journal of Botany-Revue Canadienne De Botanique* 76:1981-1990. and

McMillan, M. A., and D.W. Larson. 2002. Effects of rock climbing on the vegetation of the Niagara Escarpment in southern Ontario, Canada. *Conservation Biology* 16:389-398.

⁴⁰ Campbell and Gibson, 2001.

⁴¹ Deluca, T. H., W. A. Patterson, W. A. Freimund, and D. N. Cole. 1998. Influence of llamas, horses, and hikers on soil erosion from established recreation trails in western Montana, U.S.. *Environmental Management* 22:255-262. and

Cole, D. N., and D. R. Spildie. 1998. Hiker, horse and llama trampling effects on native vegetation in Montana, U.S. *Journal of Environmental Management* 53:61-71. and

Leung and Marion, 1999.

⁴² Kutiel, P., H. Zhevelev, and R. Harrison. 1999. The effect of recreational impacts on soil and vegetation of stabilised Coastal Dunes in the Sharon Park, Israel. *Ocean & Coastal Management* 42:1041-1060.

⁴³ Tyser and Worely, 1992.

⁴⁴ McClaran and Van Devender, 1995.