

# Santa Catalina RANGER DISTRICT

Santa Catalina  
Ecosystem Management Area

San Pedro River

Saguaro National Park East







## CHAPTER 11 **Santa Catalina Ecosystem Management Area**

The sprawling Santa Catalina Ecosystem Management Area (EMA) encompasses 265,148 acres with elevations ranging from approximately 2,850 feet to 9,150 feet at the summit of Mt. Lemmon. This is one of the largest Management Areas on the Coronado National Forest (Figure 11.1). The Santa Catalina and Rincon Mountain Ranges form the northern and eastern boundary of the Tucson Valley.

The Santa Catalina Management Area experiences the most intense recreational use on the entire Forest. The paved route of General Hitchcock Highway transports visitors into the heart of the Santa Catalina range. Starting in saguaro dotted hillsides at the northeastern edge of Tucson, the highway crisscrosses 25 miles of steep mountain slopes passing numerous developed campgrounds and scenic pullouts along the way. Atop the range, the road continues through mixed conifer forest ending near the summit of Mount Lemmon. Mount Lemmon Ski Valley is an operational ski hill just outside the mountain community of Summerhaven. Summerhaven is a popular summer retreat from the heat of the surrounding desert.

The suburban edges of Tucson reach the very edge of the Forest along the western and southern flanks of the Catalina Mountains. Numerous canyon trails start at these suburban edges and lead up the southern face of the Catalinas into Pusch Ridge Wilderness. Pusch

Ridge Wilderness encompasses 56,933 acres of rugged, steep terrain. Prominent topographical features such as Finger Rock, the Window, and Table Mountain are visible from the Tucson metro area. The northern side of the Catalinas remains much less developed than the southern side. The small town of Oracle sits near the Forest boundary and the rough Oracle Control Road leads up the north slopes connecting with Catalina highway. Most of the Santa Catalina range is managed by the Coronado National Forest except for a small area at the western foothills that is encompassed by Catalina State Park.

The eastern side of the Catalina range remains part of an important wildlife corridor stretching across the San Pedro Valley to the rugged and remote Galiuro Mountains. The northern and eastern slopes of the Catalina Mountains drain into the San Pedro River basin, contributing to the watershed health of one of the most biologically diverse stretches of river in the United States. Northwestern slopes of the range feed into the prominent Cañada del Oro wash that originates near the top of Mount Lemmon and carries water all the way to the Santa Cruz River on the western edge of the Tucson area.

The Santa Catalina Mountains are separated from the Rincon Mountains by a low area on the eastern side of Tucson known as Redington Pass. The Rincon Mountains form the eastern boundary of the Tucson

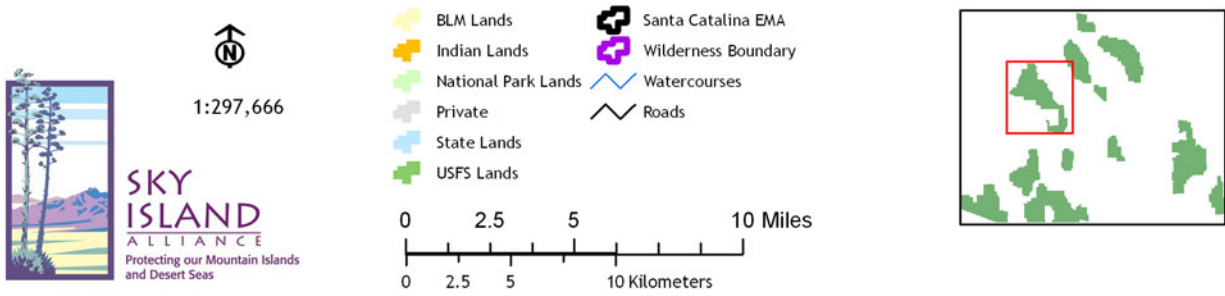
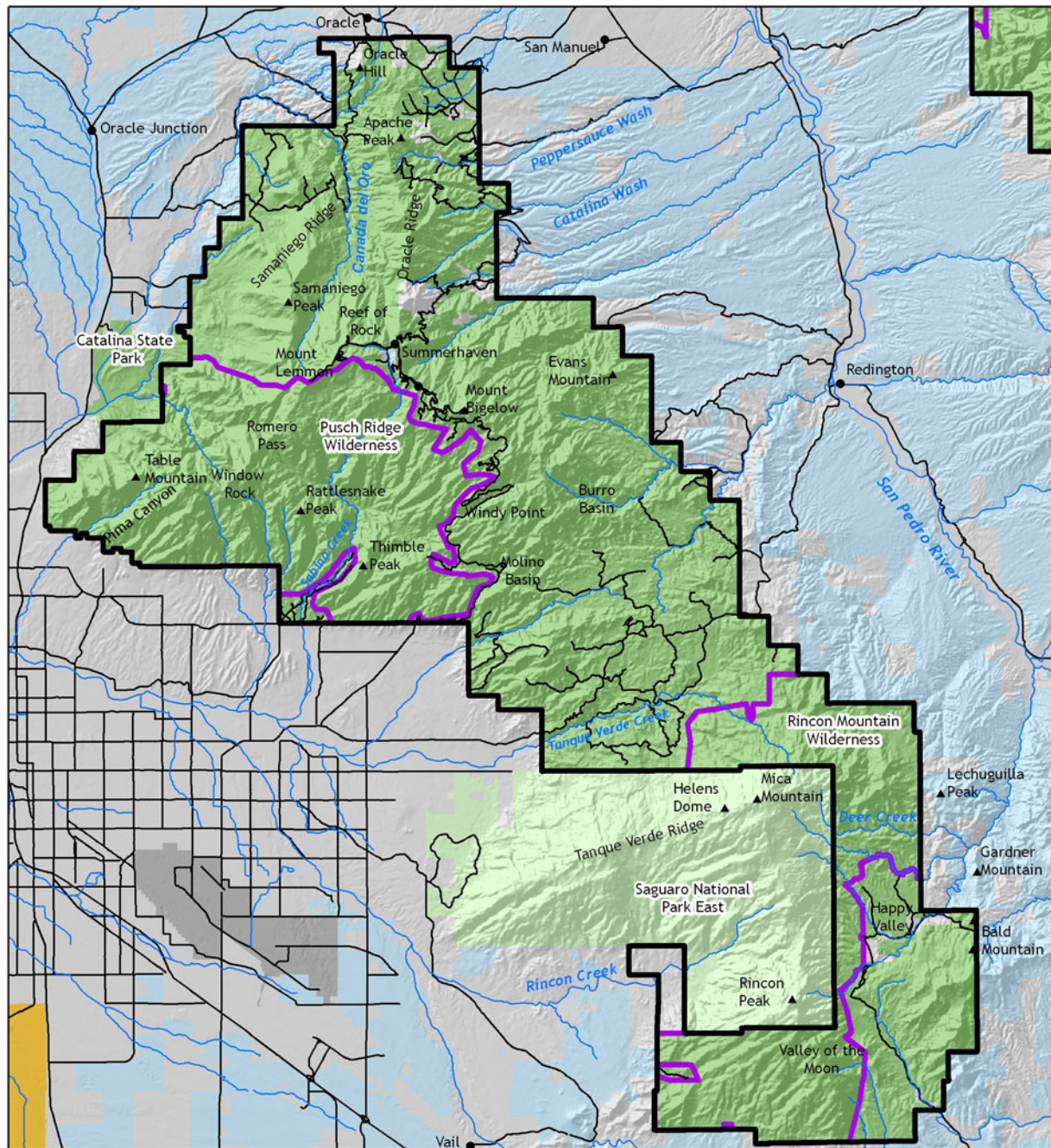


Figure 11.1 Overview of the Santa Catalina EMA

basin. A large portion of the Rincon Mountains, including Helen's Dome and Tanque Verde Ridge lie within the Saguaro National Park's East Unit. Much of the rest of the range is encompassed in Rincon Mountain Wilderness with approximately 38,590 acres located above 3,800 feet elevation. Access to Rincon Wilderness is via two dirt routes that enter the Forest from the east side through Happy Valley. The eastern flanks of the Rincons are part of the same linkage of natural lands that connect wildlife movements across the San Pedro River to the Galiuro and Winchester mountain ranges to the east. Western slopes of the Rincons contribute to the water supply of Tucson while eastern slopes drain to the San Pedro River.

### **Natural History**

The Santa Catalina Ecosystem Management Area encompasses a broad continuum of vegetation types. Traveling up the Santa Catalinas from the mouth of Sabino Canyon to the top of Mount Lemmon one traverses Sonoran desert with saguaro-studded hillsides, Madrean encinal, transition zones with plants and animals characteristic of the Rocky Mountains and ends in montane mixed-conifer forest. Douglas fir and quaking aspen stands occur on the northern slopes of the Santa Catalina's highest peak, Mount Lemmon (9,155 ft.). Downslope from here and on the northern slopes of Butterfly Peak and Mount Bigelow, ponderosa pine dominate the landscape. Between 4,500 and 7,000 feet elevation mixed oak woodlands intersperse with piñon and juniper. Along the lower reaches of western slope of Samaniego Ridge pointleaf manzanita and cat-claw acacia are common species, while stands of Palo Verde and iconic saguaro cactus occur. Along Cañada del Oro, Molino, and La Milagrosa Canyons magnificent stands of Frémont cottonwood are joined by velvet ash and other riparian obligates.

The Santa Catalina and Rincon mountain ranges support permanent and ephemeral streams whose waters flow out into the surrounding lowlands. One of the most prominent and well known perennial waters of the Santa Catalinas is that of Sabino Creek which carries water from the southwestern slopes of the range to the Rillito River. Sabino Canyon is a biological gem that is home to riparian and aquatic vegetation, longfin dace and Gila chub. Sabino Canyon is a popular recreation destination due to its lush riparian habitat, proximity to Tucson, and ease of access with a motorized tram carrying visitors into the canyon on a paved route.

The mountains of the Santa Catalina EMA provide runoff to a number of water courses in the area. Cañada del Oro is the most important and well known riparian area in the northern portion of the Catalina Range. This wash carries runoff north out of the mountains then turns back to the southwest flowing through Catalina State Park. Its route connects a number of side canyons and recharges the stressed aquifer that provides water to the growing population centers of Oro Valley and Catalina. Cañada del Oro and the Tucson water supply is also fed by waters running down westerly canyons from Samaniego Ridge into Sutherland Wash. The lower San Pedro River Valley is fed by Alder, Edgar, and Buehman Canyons that carry water from the upper reaches of the Catalina range near Butterfly Peak out to the east. Further upstream, the San Pedro riverine system is fed by side canyons in the Happy Valley and Little Rincon Mountains that drain into Ash Canyon. At the east end of the Tucson basin, Agua Caliente Canyon and Tanque Verde Canyon travel west from the Santa Catalina and Rincon Mountains providing a source of recharge for the major metropolitan area. During flash flood events these waters make their way across the entire city connecting with the Santa Cruz River.

The front range of the Catalinas south of Romero and Sabino Canyons is of the Catalina gneiss complex, a metamorphic rock. The northern slopes of the range are composed of a mosaic of parent materials that include granite and diorite, schist, andesite, slate and shale, quartzite and limestone.

The Santa Catalina and Rincon Mountains are home to a great diversity of species, many of which are at the northern edges of their range in the United States. Pusch Ridge has a small remnant population of desert bighorn sheep in Arizona. Four animals were observed in the Sabino Canyon area in the Spring of 2004. Nesting Bell's vireo, broad-billed hummingbirds, blue-gray gnatcatchers and a variety of other birds can be spotted in front range canyons of the Catalinas and Rincons. Perhaps the rarest plant in Arizona, *Anoda reticulata*, was found in Finger Rock Canyon in 2007. This plant was first collected in the Catalinas in 1881 and has also been collected in the Pajarita Mountains in 1939 and 1940. The collection of the plant in the Catalinas by David Bertelsen was only the sixth in the United States.<sup>1</sup> Canyon tree frogs and red-spotted toads are often seen near flowing

water in canyon bottoms but can be found up to a mile from water making use of cracks in rocks. Species of special interest such as desert tortoise, Gila monster, coatimundi, and peregrine falcon are found here. In high elevations near Butterfly Peak, Mexican spotted owls and Northern goshawks occur. Along the northwestern slopes of the Catalina Range along Romero Canyon and the Cañada del Oro, yellow-

nosed cotton rat, Mexican long-tongued bat and lesser long-nosed bat are found. Romero Canyon contains permanent pools of water where various amphibians breed. Canyon spotted whiptail lizards are found in the Catalina Mountains in Finger Rock, Pima and Ventana Canyons. They are also found in the Rincon Mountains near Happy Valley along with black hawks and lowland leopard frogs.

## Elements of Biological Diversity and Cultural Heritage

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The Santa Catalina 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 Santa Catalina Ecosystem Management Area. The Forest Service identified 45 species of plants and animals including four Threatened or Endangered species, along with other species determined to be Species of Concern or Species of Interest (Table 11.1). These species will be used to guide management decisions.

Through contact with regional scientists and experts, and other people familiar with the Santa Catalina, we identified ecological systems, physiographic features, additional species and cultural resources that should also be considered in the Forest Plan revision. 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 dominate a site under natural disturbance regimes and biological processes. Using this classification allows current vegetation to be compared effectively to vegetation under historic conditions. 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 11.2). Although there are many fine variations in plant communities on the Santa Catalina Ecosystem Management Area, 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.<sup>2</sup> Figure 11.2 shows the distribution of ecological systems in the Santa Catalina EMA.

While managing for resilient ecological systems will effectively capture most species on the Forest, some species will need special attention. These species may not be adequately protected by managing for ecological systems and may require specific management actions or monitoring. 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

Table 11.1 **Species Identified by the Forest Service to Guide Management Decisions**

<b>Amphibians</b>		<i>Hackelia ursina</i>	Chihuahuan Stickseed
<i>Rana yavapaiensis</i>	Lowland Leopard Frog	<i>Hermannia pauciflora</i>	Santa Catalina Burstwort
<b>Birds</b>		<i>Heuchera glomerulata</i>	Chiricahua Mountain Alumroot
<i>Empidonax fulvifrons pygmaeus</i>	Northern Buff-breasted Flycatcher	<i>Hexalectris spicata</i> var. <i>arizonica</i>	Crested Coralroot
<i>Glaucidium brasilianum cactorum</i>	Cactus Ferruginous Pygmy-owl	<i>Hieracium rusbyi</i>	Rusby's Hawkweed
<i>Meleagris gallopavo mexicana</i>	Gould's Turkey	<i>Imperata brevifolia</i>	California Satintail
<b>Fish</b>		<i>Justicia longii</i>	Long-flower Tubetongue
<i>Agosia chrysogaster</i>	Longfin Dace	<i>Lupinus neomexicanus</i>	New Mexico Lupine
<i>Gila intermedia</i>	Gila Chub	<i>Macromeria viridiflora</i> var. <i>thurberi</i>	Giant-trumpets
<b>Insects</b>		<i>Macromeria viridiflora</i> var. <i>viridiflora</i>	Giant-trumpets
<i>Ameletus falsus</i>	False Ameletus Mayfly	<i>Malacothrix stebbinsii</i>	Stebbins Desert-dandelion
<i>Argia pima</i>	Pima Dancer	<i>Mammillaria heyderi</i> var. <i>macdougalii</i>	Little Nipple Cactus
<i>Argia sabino</i>	Sabino Dancer	<i>Mammillaria mainiae</i>	Main's Nipple-cactus
<i>Ophiogomphus arizonicus</i>	Arizona Snaketail	<i>Manihot davisiae</i>	Arizona Manihot
<i>Speyeria nokomis coerulescens</i>	Bluish Fritillary	<i>Margaranthus solanaceus</i>	Netted Globeberry
<i>Taenionema jacobii</i>	A Stonefly	<i>Muhlenbergia dumosa</i>	Bamboo Muhly
<b>Mammals</b>		<i>Muhlenbergia elongata</i> (=M. <i>xerophila</i> )	Sycamore Muhly
<i>Choeronycteris mexicana</i>	Mexican Long-tongued Bat	<i>Muhlenbergia palmeri</i> (=M. <i>dubioides</i> )	Southwestern Muhly
<i>Macrotus californicus</i>	California Leaf-nosed Bat	<i>Notholaena lemmonii</i>	Lemmon's Cloak-fern
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat	<i>Nothoscordum texanum</i>	Texas False-garlic
<i>Ovis canadensis mexicana</i>	Desert Bighorn Sheep	<i>Opuntia laevis</i>	New Mexico Prickly-pear
<i>Sciurus arizonensis</i>	Arizona Gray Squirrel	<i>Penstemon discolor</i>	Catalina Beardtongue
<b>Mollusks</b>		<i>Penstemon superbus</i>	Superb Beardtongue
<i>Sonorella odorata</i>	Pungent Talussnail	<i>Perityle dissecta</i>	Slimlobe Rockdaisy
<b>Plants: Non-vascular</b>		<i>Phaseolus supinus</i>	Supine Bean
<i>Mannia californica</i>	A liverwort	<i>Phlox tenuifolia</i>	Santa Catalina Mountains Phlox
<b>Plants: Vascular</b>		<i>Phoradendron bolleanum</i> ssp. <i>pauciflorum</i>	Rough Mistletoe
<i>Abutilon parishii</i>	Pima Indian Mallow	<i>Pinaropappus roseus</i> var. <i>foliosus</i>	White Rocklettuce
<i>Acacia millefolia</i>	Milfoil Acacia	<i>Plagiobothrys pringlei</i>	Pringle's Popcorn-flower
<i>Agave schottii</i> var. <i>treleasei</i>	Trelease shindagger	<i>Potentilla thurberi</i> var. <i>thurberi</i>	Thurber's Cinquefoil
<i>Allium gooddingii</i>	Goodding's Onion	<i>Rhamnus crocea</i> ssp. <i>pilosa</i>	Redberry Buckthorn
<i>Anoda abutiloides</i>	False Indian-mallow	<i>Salvia amissa</i>	Catalina Mountain Sage
<i>Arabis tricornuta</i>	Rincon Mountain Rockcress	<i>Samolus vagans</i>	Chiricahua Mountain Brookweed
<i>Arceuthobium blumeri</i>	Southwestern White Pine Dwarf-mistletoe	<i>Scutellaria tessellata</i>	Huachuca Mountains Skullcap
<i>Bouteloua eludens</i>	Santa Rita Gramma	<i>Sisyrinchium arizonicum</i>	Arizona Blue-eyed-grass
<i>Bouteloua parryi</i>	Parry's Gramma	<i>Sisyrinchium cernuum</i>	Nodding Blue-eyed Grass
<i>Cynanchum wigginsii</i> (= <i>Metastelma mexicanum</i> )	Narrow-leaf (Wiggins) Swallow-wort	<i>Sisyrinchium longipes</i>	Timberland Blue-eye-grass
<i>Draba helleriana</i> var. <i>bifurcata</i>	Heller's Whitlow-grass	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Aravaipa Woodfern
<i>Drymaria effusa</i> var. <i>effusa</i>	Pinewood Drymary	<i>Tumamoca macdougalii</i>	Tumamoc Globe-Berry
<i>Eryngium sparganophyllum</i>	Arizona Eryngo	<i>Viguiera dentata</i> var. <i>lancifolia</i>	Sunflower Golden-eye
<i>Escobaria vivipara</i> var. <i>bisbeeana</i>	Bisbee's Pincushion Cactus	<i>Viola umbraticola</i> var. <i>glaberrima</i>	Ponderosa Violet
		<i>Woodsia phillipsii</i>	Phillips' Cliff Fern
		<b>Reptiles</b>	
		<i>Aspidoscelis burti stictogramma</i>	Canyon Spotted Whiptail
		<i>Gopherus agassizii</i>	Desert Tortoise ("Sonoran" population)

interests. Table 11.3 lists additional species whose needs should be assessed during plan revision.

The Santa Catalina Mountains contain 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 uses of the land are also an important part of the Cultural Heritage of the area (Table 11.4).

**Table 11.2 Foundations of Native Biological Diversity**

<p><b>“Potential Natural Vegetation Types” (bold) as they correspond with The Nature Conservancy’s “Ecological Systems”</b></p> <hr/> <p><b>Desert Communities</b>          Sonoran Palo Verde-Mixed Cacti Desert Scrub          Chihuahuan Desert Scrub</p> <p><b>Interior Chaparral</b>          Interior Chaparral</p> <p><b>Madrean Encinal Woodland</b>          Madrean Encinal</p> <p><b>Mixed Broadleaf Deciduous Riparian Forest</b>          Desert Riparian Woodland and Shrubland</p> <p><b>Mixed Conifer Forest</b>          Montane Mixed Forest</p> <p><b>Piñon-Juniper Woodland</b>          Piñon-Juniper Woodland</p> <p><b>Semi-desert Grasslands</b>          Apachean Grassland and Savannah          Apachean Shrubland          Apachean Riparian Grassland</p> <p><b>Wetland/Cienega</b>          Cienega</p>
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**Table 11.3 Additional Species that Require Special Management Consideration**

<b>Birds</b>	
<i>Aimophila botterii</i>	Botteri’s Sparrow
<i>Aimophila carpalis</i>	Rufous-Winged Sparrow
<i>Ammodramus bairdii</i>	Baird’s Sparrow
<i>Athene cunicularia hypugaea</i>	Burrowing Owl
<i>Callipepla squamata</i>	Scaled Quail
<i>Pipilo aberti</i>	Abert’s Towhee
<i>Vireo bellii</i>	Bells Vireo
<b>Insects</b>	
<i>Abedus herberti</i>	Giant Water Bug
<i>Argia sabino</i>	Sabino Canyon Damselfly
<b>Mammals</b>	
<i>Myotis velifer</i>	Cave Myotis
<b>Plants</b>	
<i>Anoda reticulata</i>	
<i>Echinomastus erectocentrus</i> var. <i>erectocentru</i>	Needle-spined cactus
<i>Graptopetalum bartramii</i>	Bartram Stonecrop

**Table 11.4 Elements of Cultural Heritage**

<p>Opportunities for solitude and primitive recreation          Opportunities for quiet recreation</p>
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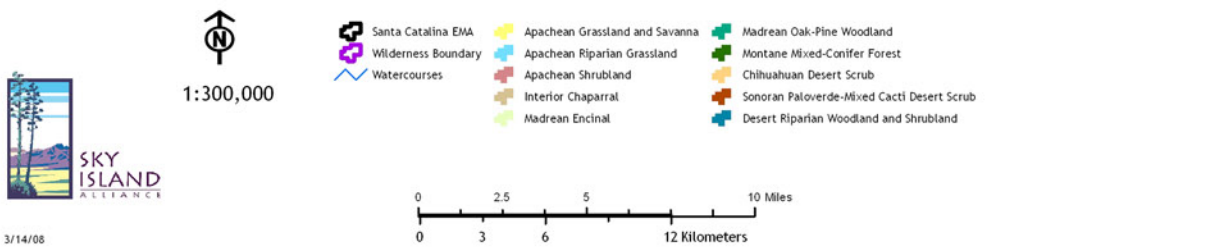
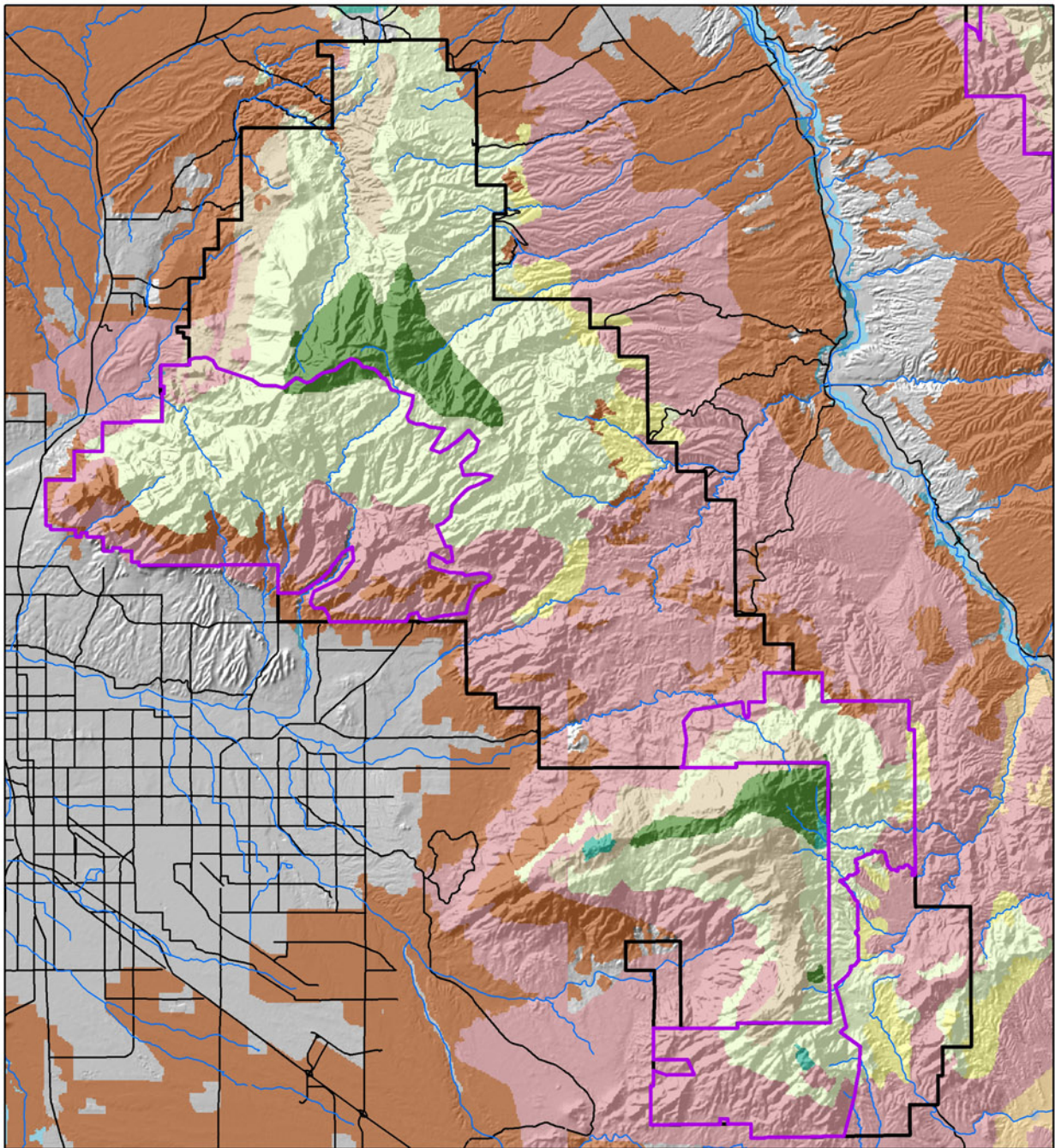


Figure 11.2 Ecological Systems of the Santa Catalina EMA

## Desired Conditions

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- ★ The Santa Catalina EMA remains situated in a landscape in which wide-ranging species (black bear, mountain lion, deer, pronghorn, desert bighorn sheep, Mexican gray wolf, jaguar, coati, and others) are able to move between the Santa Catalina EMA and the following: Galiuro EMA, Winchester EMA, Las Cienegas National Conservation Area, and the Tortolita Mountains and other surrounding wildlands.
- ★ Historical fire patterns are returned to the landscape. They restore a broad mosaic pattern of different habitat types, as well as historical plant

diversity. High-intensity stand-replacing fires occur only at historical intervals due to the composition of fire-adapted vegetation types.

- ★ The Santa Catalina EMA contributes to the health and recharge of the San Pedro River Watershed and the Santa Cruz Watershed.
- ★ The Santa Catalina EMA has areas that offer high quality primitive recreation where quiet and solitude can be experienced. Wildlife and human visitors are free from direct disturbance and noise.

## Conservation Assets

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Conservation assets work on behalf of Forest health on the Santa Catalina Ecosystem Management Area. 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 Santa Catalina Ecosystem Management Area.

### **Sonoran Desert Weedwackers**

The Sonoran Desert Weedwackers started working in 2000 to remove non-native fountain grass and buffelgrass from Tucson Mountain Park. They now work to remove these invasive grasses at Saguaro National Park East, which borders the Santa Catalina EMA on the southwest, and in the Tanque Verde Valley. Although they are not currently working on Forest Service land, their work to eradicate very detrimental species from neighboring lands will contribute to the long-term health of the Forest by

helping prevent further spread of buffelgrass and fountain grass to the Forest.

### **Trees for Mt. Lemmon**

Trees for Mt. Lemmon works to assist the Mt. Lemmon community to recover from the Aspen Fire of 2003. Since the fire the group has worked to educate property owners in the Summerhaven area, and to reforest and re-vegetate burned areas using trees, shrubs and plants of local origin. The group promotes reforestation to FireWise standards for wildland/urban interface. Most recently the group has received a grant from the University of Arizona Cooperative Extension's Forest Health Program to conduct surveys for, and treat areas invaded by cheatgrass. Cheatgrass is a highly flammable grass that would alter fire characteristics and the length of the fire season on Mt. Lemmon if it was to spread.

## Threats to the Forest: A Need for Change

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The Coronado National Forest and surrounding lands have experienced a variety of changes in the twenty plus years since the current Forest Plan was written. Management concerns and threats exist in the Santa Catalina Ecosystem Management Area that are not addressed in the Forest Plan, or have not been adequately dealt with through management. The Forest plan revision will update existing management direction and add new management direction, both of which should address these concerns. The following issues present challenges to ecological sustainability on the Santa Catalina Ecosystem Management Area.

### ADJACENT LAND USES

The Santa Catalina Ecosystem Management Area is already flanked by dense residential development along the southern slopes and most of the western edge of the Catalinas. However, vital wildlife corridors still exist between the western edges of the Santa Catalinas and the Tortolita Mountains. These movement corridors are threatened by suburban development along the western slopes of the Catalinas.

### DEMOGRAPHICS

The surrounding towns of Tucson, Oro Valley, and Vail are growing rapidly which is expected to continue to increase visitor use of the Santa Catalina EMA. Because of the immediate proximity of these Forest lands to the urban center of Tucson, recreational use is both an important resource provided by the Forest and an increasing source of threat to the ecological integrity of the mountains.

Resources likely affected include: wide-ranging species (mountain lion, black bear, coatimundi, pronghorn and deer); species sensitive to human disturbance (e.g., bats, lizards, desert box turtle, jaguar, Mexican spotted owl, desert bighorn sheep, and Coues' white-tailed deer); species vulnerable to trampling; desert tortoise; and all native vegetation types and their associated flora and fauna.

### ECOLOGICAL RESTORATION

In recent years the mountains of the Santa Catalina EMA have experienced intense stand replacing fires. Threats include the suppression of natural fire regimes, and changes in natural watershed function/flow regimes.

### INVASIVE SPECIES

A variety of invasive grass and shrub species are found on the Santa Catalina EMA. Those species currently posing the most serious ecological threat to the area include giant reed grass (*Arundo donax*), fountaingrass (*Pennisetum etaceum*), buffelgrass (*P. ciliare*), red brome (*Bromus rubens*), cheatgrass (*B. tectorum*), Lehmann lovegrass (*Eragrostis lehmanniana*), Asian mustard (*Brassica tournefortii*), Rhus lancea (*Rhus lancea*) and Tamarix species. Other invasive species that are present in the EMA include soft feather pappusgrass (*Enneapogon cenchroides*), stinkgrass (*Eragrostis cilianensis*), weeping lovegrass (*E. curvula* var. *conferta*), rose Natal grass (*Melinis repens*), and common Mediterranean grass (*Schismus barbatus*). Nonnative grass and shrubs compete with native plants for vital nutrients and can crowd out native species. They can also change the fire regime of areas where they are growing leading to more intense or more frequent fires than native plants are adapted to. Invasive plant species can often spread rapidly and aggressively and get out of control if not proactively monitored for and eradicated.

### ROADS/TRANSPORTATION SYSTEM

Much of the front range of the Catalinas is protected by Pusch Ridge Wilderness, steep terrain and the availability of motorized access along the paved General Hitchcock Highway. The area around Redington Pass is a popular destination for motorized recreation. The area has become riddled with illegal user created roads that have opened the way for other unacceptable uses of Forest land such as trash dumping. The roads along the eastern side of Redington Pass affect drainages that feed into the San Pedro River. The eastern slopes of the Rincon Mountains in the area of Happy Valley have also been subject to motorized recreation abuses with new illegal roads being created by off-road driving.

Affected resources include: springs; ephemeral watercourses; seeps; scenic resources, all ecological systems, all native vegetation types and their associated flora and fauna, riparian plant and animal species, species especially sensitive to direct disturbance, wide-ranging species of terrestrial animals, game species; prehistoric and historical sites, structures, and artifacts.

## Recommended Objectives and Management Actions

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The Santa Catalina Ecosystem Management Area (EMA) offers a multitude of outdoor recreation experiences to the nearby urban center of Tucson. It also supports a unique mix of species and habitats that contribute to ecological sustainability on the Coronado National Forest. Maintaining a balance between recreation uses of the area and protection of watersheds and native species in the area should be a major focus and driver for future management. New

management direction that shows foresight and proactively addresses threats will create a long-term framework for ecological health and sustainability in the Santa Catalina EMA. To confront threats and capitalize on conservation assets, we recommend the following objectives and management actions to be incorporated into the revision of the Coronado National Forest Plan and subsequent project level activities.

### Adjacent Land Uses

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#### Objectives

Maintain wildlife corridors between the Santa Catalina EMA and the Galiuro EMA, Winchester EMA, Las Cienegas NCA, San Pedro River Valley, and Tortolita Mountains and other surrounding natural areas.

Maintain the ecological integrity of the Santa Catalina EMA in the face of further development of the surrounding lands and increased visitor use.

Maintain extant species on the Santa Catalina EMA that are sensitive to human disturbance and impacts of increased recreational use of the area.

#### Actions

*Foster public-private partnerships that will lead to landscape-level conservation through coordination of land use across Forest boundaries.*

*Work with neighboring cities and counties to plan for wildlife corridors and influence land use planning that affects Forest lands.*

*Evaluate and monitor current human use of the Santa Catalina EMA. Undertake management planning that specifically addresses recreational use of the area.*

### Ecological Restoration

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#### Objectives

Restore and maintain natural disturbance regimes (e.g., fire, flood), in a manner that promotes naturally functioning ecosystem processes.

Restore Madrean Pine-Oak Woodland and Madrean Encinal to resilient ecological systems that tolerate wildfire, flood and other natural influences.

#### Actions

*Implement wildland fire use for restoring natural fire patterns and for restoring native species. Especially in unroaded portions of the Management Area.*

*Maintain and/or restore natural fire patterns and frequencies.*

### Nonextractive Uses

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#### Objectives

Restore historical native wildlife diversity.

Manage habitat for all wild, native species so that they persist over large scales of time and space.

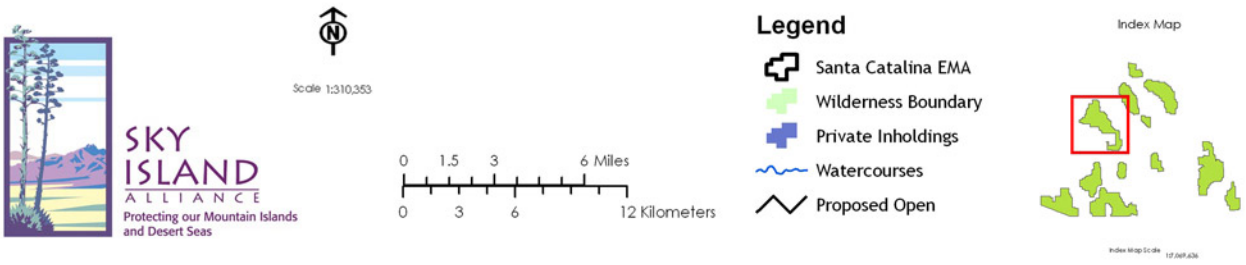
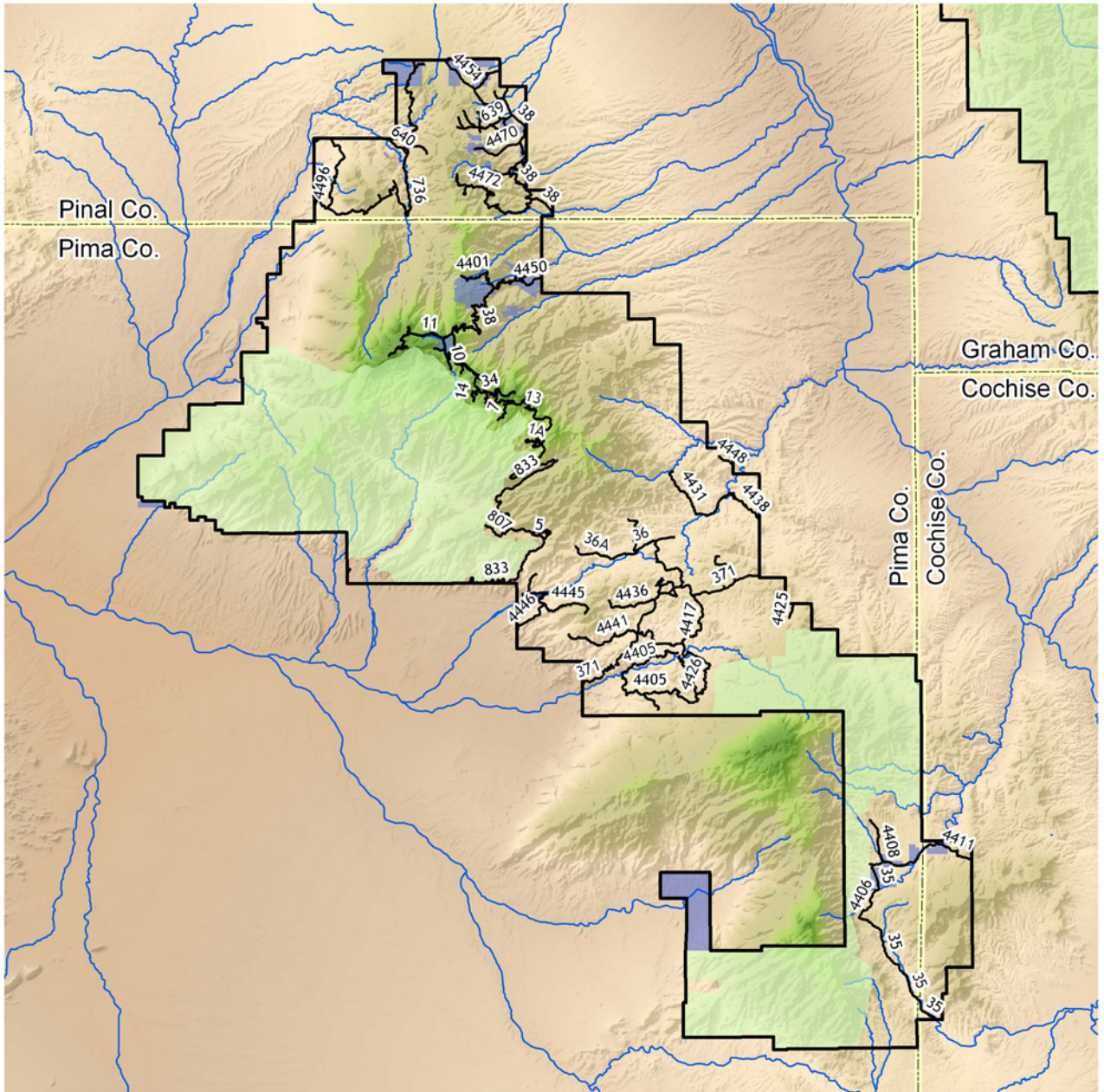
#### RECREATIONAL PLANNING

Minimize wildlife disturbance due to recreational uses of the Forest.

Minimize damage to natural and cultural resources due to recreational uses of the Forest.

Minimize interference with quiet recreation through management of motorized recreation.

#### Actions



**Figure 11.3 Travel Management Plan and Route Recommendations for the Santa Catalina EMA**

## Roads/Transportation System

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### Objectives

Reduce the transportation network to the minimum that is consistent with the Travel Management Rule.

Mitigate impacts of the existing transportation system and of motorized recreation on all physiographic features, species, and ecological systems on the EMA.

### Actions

*Increase proactive law enforcement management of the Redington Pass area. Enforce cross-country travel restrictions.*

*Do not allow any further creation of roads in the Santa Catalina EMA.*

*Monitor closures and restoration efforts. Upgrade barriers where necessary to insure restoration success.*

*See Figure 11.3 for the recommended transportation system for the Santa Catalina EMA.*

## Invasive Species

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### Objectives

Reduce the spread of invasive species, eliminate invasive exotics and actively deter new invasions.

### Actions

*Proactively identify invasive species that may pose a threat to the ecosystem and monitor for their presence before the threat is out of control. Some species to be included on a watch list are *Enneapogon cenchroides*, *Eragrostis cilianensis*, *Melinis repens*, and *Lantana camara*.*

## Special Management Areas

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### Objectives

Protect Roadless area values and characteristics.

Provide opportunities for quiet recreation on the Santa Catalina EMA.

Minimize habitat fragmentation and degradation, and maintain biological corridors and essential habitat for species through the exclusion of roads.

Adequately consider the suitability of national forest system lands for inclusion in the National Wilderness Preservation System.

### Actions

*Correct existing maps of boundaries of inventoried roadless areas to reflect the true boundaries on the ground.*

*Manage 128,986 acres of the Santa Catalina EMA to maintain their current wilderness suitability. See Figure 11.4 for a map of the area to be managed for wilderness suitability.*

*Designate the Agua Caliente Zoological Area to protect the habitat values and unusual species found in the area. (See page 11-18 for further details.)*

*Designate 1,103 acres as Finger Rock Canyon Research Natural Areas to protect the mosaic of vegetative associations found in the area, and to protect ongoing botanical research in the area. (See page 11-16 and Figure 11.5 for further details.)*

## Wilderness

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### Pusch Ridge Wilderness

Pusch Ridge Wilderness was designated in 1978 and consists of 56,933 acres. This Wilderness is the most heavily traveled Wilderness on the Coronado National Forest. It is accessible on the south from a number of trails on the northern edge of Tucson, on the west by trails originating in Catalina State Park, and from trails accessible from the General Hitchcock Highway that ascends to Mt. Lemmon. Pusch Ridge Wilderness is characterized by rocky bluffs, picturesque rock formations, towering peaks and deep canyons.

### Rincon Mountain Wilderness

Rincon Mountain Wilderness consists of 38,590 acres. It borders Saguaro National Park east on three sides and is much less accessible than the nearby Pusch Ridge Wilderness. Access is limited to a several rough dirt roads on the northwest side, trails leading out from the National Park and trails entering from the east side. The Rincon Wilderness is rugged and steep with areas that are difficult to reach on foot and impassable on horseback. This wilderness offers excellent opportunities for solitude despite its close proximity to Tucson.

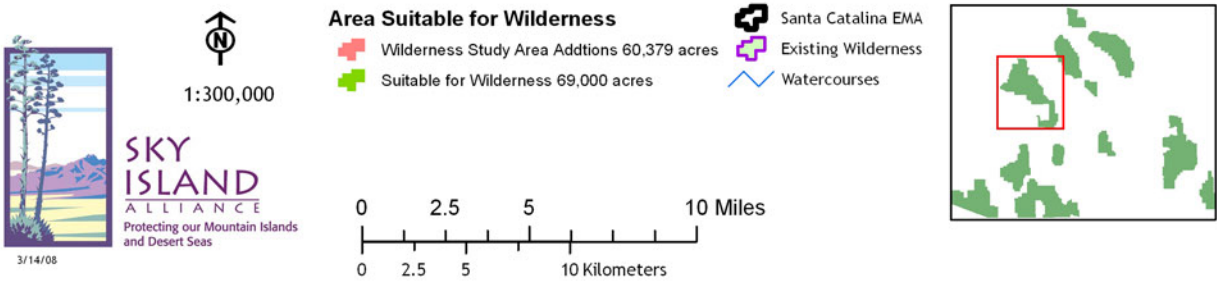
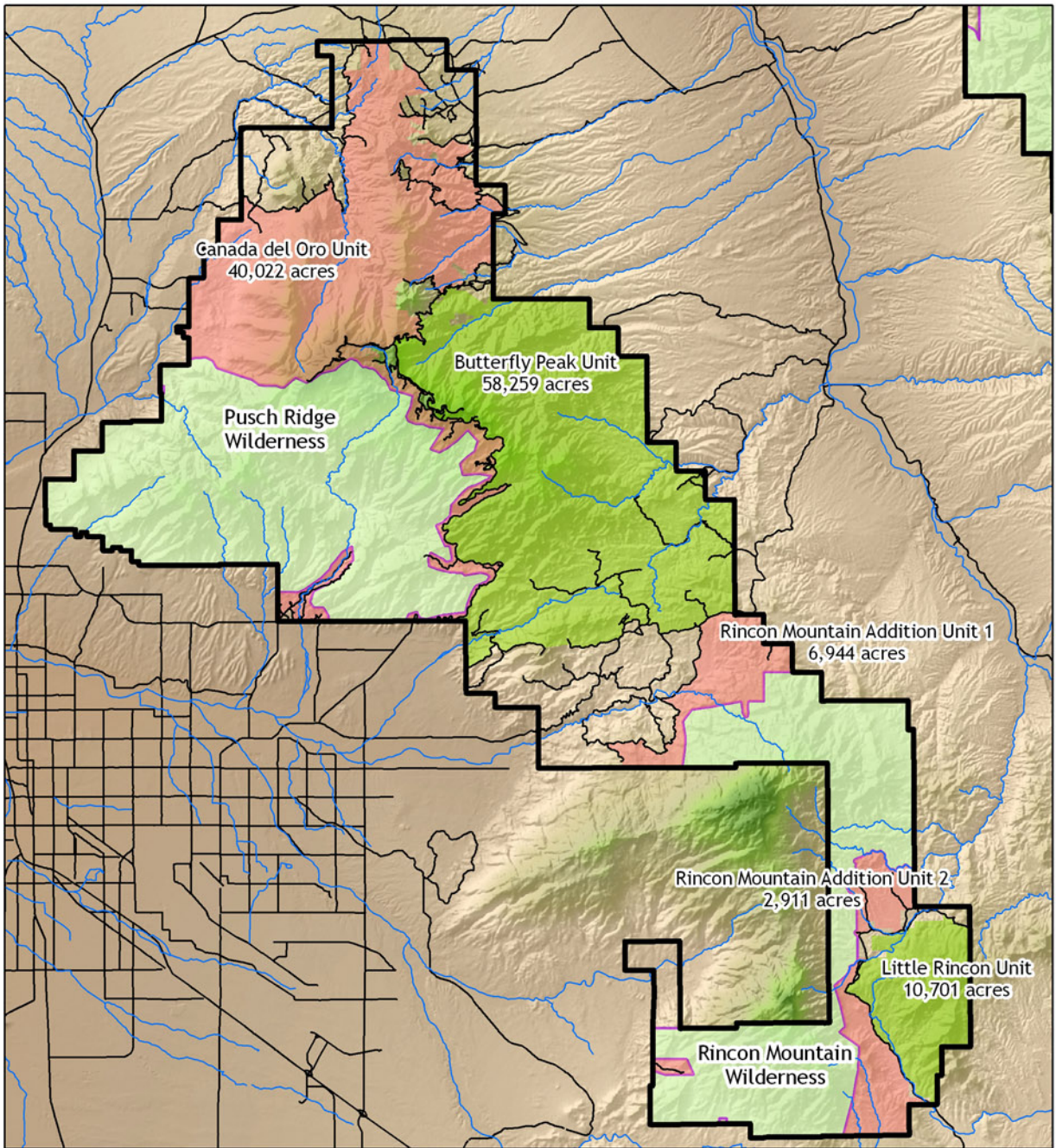


Figure 11.4 Area Suitable for Wilderness and to be Managed for Wilderness Characteristics

## Special Management Areas

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### RESEARCH NATURAL AREAS

Research Natural Areas are special management areas established to protect land in perpetuity as living, learning centers for ecological research and ecosystem restoration. They should include broad representation of the ecological diversity that occurs on the Forest. Two Research Natural Areas currently exist in the Santa Catalina EMA: Butterfly Peak and Santa Catalina. The pristine nature and outstanding biological characteristics of Finger Rock Canyon warrants its designation as a Research Natural Area.

#### **Proposed Finger Rock Canyon Research Natural Area**

The Finger Rock Canyon drainage contains stretches of perennial water and harbors a number of plant species considered Sensitive by the Forest Service. Habitat in the canyon supports a great variety of nesting birds, reptiles and amphibians.

NAME: Finger Rock Canyon Research Natural Area

SIZE: Approximately 1103 acres (446 hectares)

BOUNDARIES: The Research Natural Area (RNA) would be bounded on the southeast, northwest, and north by the ridges that surround the Finger Rock Canyon drainage and on the south, by the Coronado National Forest boundary. It would include Mount Kimball above 6850' elevation (Figure 11.5).

ELEVATION: Approximately 3,120 to 7,255 feet

GENERAL DESCRIPTION OF AREA: The RNA would consist of the Finger Rock Canyon drainage in the Santa Catalina Mountains. The entire proposed RNA is within Pusch Ridge Wilderness and the Bighorn Sheep Management Area.

CURRENT USES: This area is currently used for wildlife viewing, hiking, rock climbing, running, camping, hunting, and botanical research.

JUSTIFICATION FOR DESIGNATION: The Finger Rock Canyon drainage includes an intermittent stream, a spring, and several small pools that contain water year-round in most years. The dominant biotic communities are desert scrub, oak woodland, and oak-pine woodland. Riparian scrub, scrub grassland, and pine forest are much more limited in extent but provide significant habitat for diverse species. Riparian scrub is a common xeroriparian habitat type

in the Coronado National Forest but receives little attention in comparison to vegetative associations supported by perennial water. The area is relatively pristine, has no evidence of major human disturbance in the past fifty years, and has no known conflicting uses.

Certainly there is no area in the Coronado National Forest, and probably in the United States, with more baseline floristic data. Since 1984, Dave Bertelsen has conducted a phenological study of the flora of the drainage (i.e., recorded blooming taxa) and collected specimens of all observed pteridophyta and spermatophyta for identification by the University of Arizona Herbarium. His primary focus has been on the area thirty feet on either side of the route to Mt. Kimball (Trails 42 and 62), resulting in a "transect" of approximately 1.6 million square feet. This study is unique not only in the length of time it has been conducted, the significant elevation gradient, and the size of the study area, but also in that observations have included all spermatophytes — most phenological studies focus on one or a few species. The flora currently consists of 589 taxa, and the number of floristic observations in the first twenty years of the study exceeded 111,000. These observations have been data-based by the U.S. Park Service's Sonoran Desert Network and will be made available to the public through an interactive internet web site.

The flora of the drainage includes seven Forest Service Sensitive plant species: Parish's abutilon (*Abutilon parishii*), Trelease shindagger (*Agave schottii* var. *treleasei*), Chihuahuan stickseed (*Hackelia ursina*), Arizona false pennyroyal (*Hedeoma dentatum*), sparseleaf hermannia (*Hermannia pauciflora*), trumpet morning-glory (*Ipomoea tenuiloba* var. *lemmoni* & var. *tenuiloba*), and weeping muhly grass (*Muhlenbergia xerophila*). Trelease shindagger and weeping muhly (ten known locations) are found only in Arizona. In June 2007, *Anoda reticulata* was observed. This was the first record in the Santa Catalina Mountains since 1881 (when the holotype was collected by Lemmon and Pringle) and the first report in Arizona since 1940.

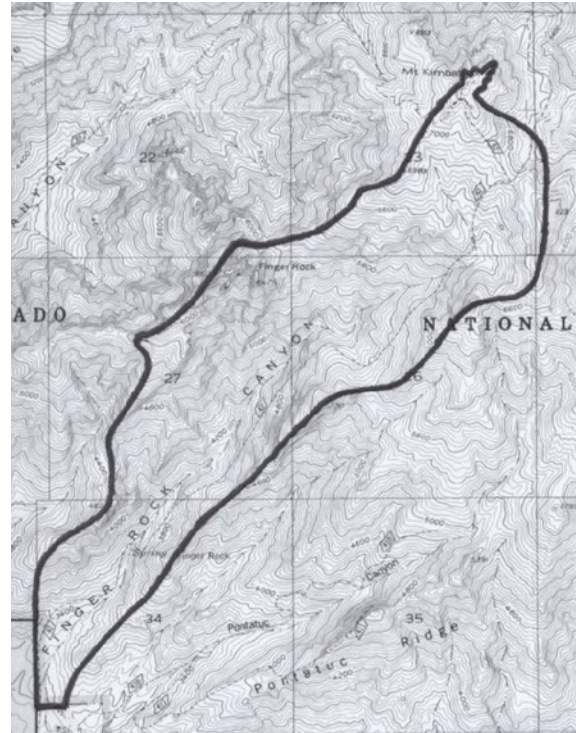
The greatest threats to the proposed RNA are



invasive grasses with the potential to significantly alter the ecosystem, particularly if climate change continues as expected. Of the nineteen non-native grasses found in the area, the following are of particular concern: red brome (*Bromus rubens*), Bermuda grass (*Cynodon dactylon*), soft feather pappusgrass (*Enneapogon cenchroides*), Lehmann lovegrass (*Eragrostis lehmanniana*), Natal grass (*Melinis repens*), buffelgrass (*Pennisetum ciliare*), and fountain grass (*P. setaceum*). Red brome has been found as high as 6200' elevation; pappusgrass, 5900'; Lehmann lovegrass, 7255'; Natal grass, 6200'; buffelgrass, 5200'; and fountain grass, 5750'. With the exception of red brome (which Bertelsen collected in 2006 at a record 8000' in the Catalinas), all are Arizona elevation records for these species.

During the course of the floristic study, Bertelsen also recorded observations of selected fauna. To date, 132 species of birds, 33 species of mammals, 32 species of reptiles, and 5 species of amphibians have been seen. Birds include merlin, band-tailed pigeon, buff-collared nightjar, rufous hummingbird, red-faced warbler, rufous-winged sparrow, and nesting populations of peregrine falcon, spotted owl, varied bunting, Bell's vireo, painted redstart, and Abert's towhee. Black-throated sparrows, verdins, and phainopeplas, which the National Audubon Society reports have experienced population declines of 63% to 65% in the past forty years, are still relatively common. Four skunk species, gray fox, coati, ringtail, Arizona gray squirrel, Merriam kangaroo rat, Mexican woodrat, collard peccary, white-tail deer, desert bighorn sheep (likely extirpated), and occasional black bear and mountain lion are among the mammals that reside in or have used the area. Reptiles and amphibians recorded include desert tortoise, regal & short-horned lizards, canyon spotted whiptail lizard, Madrean alligator lizard, reticulate Gila monster, Smith's black-headed snake, Arizona coral snake, four rattlesnake species (Mohave, black-tailed, tiger, & Arizona black), canyon tree frog, Sonoran desert toad, and lowland leopard frog (probably extirpated).

**RECOMMENDATIONS FOR FUTURE USE:** The area can serve as a significant outdoor laboratory to document and analyze the effects of drought and climate change, the impact of invasive species, and population dynamics of selected flora and fauna. The area could again support a small number of desert bighorn and serve as a lambing area if sheep are re-introduced.



**Figure 11.5 Proposed Finger Rock Canyon Research Natural Area.** Map detail from: U.S. Department of Agriculture, Forest Service. Pusch Ridge Wilderness, Coronado National Forest. 1986, reprinted 1991.

Current uses are compatible with a RNA designation, especially if Bighorn Sheep Management Area regulations continue to be in force and be enforced. A wildcat trail to Finger Rock and numerous spur "social trails" should be eliminated since they are vectors for the spread of invasive species and fragment wildlife habitat. Because one of only five clumps has been killed by trampling, the very rare population of weeping muhly should be protected by redirecting foot traffic, possibly through signage. Efforts should also be made to eliminate fountain grass and buffelgrass while this is still possible; moreover, the spread of Bermuda, Natal, and pappasgrass should be monitored to determine if future action need be taken. Periodic trail maintenance, particularly pruning, would help minimize the "footprint" of the trails and thereby prevent destruction of sensitive or rare plants found along the trails.

PROPOSED BY: David Bertelsen, Associated Researcher, University of Arizona Herbarium

## **SPECIAL INTEREST AREAS**

Special Interest Areas are designated to protect unique values including botanical, zoological, geological, historical, or scenic values. They may also be designated to protect and manage sensitive or imperiled species or other elements of biological diversity. Special Interest Areas help the Forest Service preserve important historic, cultural and natural aspects of our national heritage. The extraordinary characteristics of the Management Area warrant the designation of a new Special Interest Area, the Agua Caliente Zoological Area.

### ***Proposed Agua Caliente Zoological Area***

The watershed of Agua Caliente Creek is home to a variety of unusual plant species and is rich in reptile and amphibian species. The area's great riparian resources can be enhanced through removal of non-native fish species, and restoration of native frogs and fish.

NAME: Agua Caliente Zoological Area

BOUNDARIES: This Zoological Area represents the watershed of Agua Caliente Creek from the National Forest boundary (or the confluence of Agua Caliente and Milagrosa Canyons) to its headwaters in the Redington Pass area.

ELEVATION: Approximately 2,900 to 5,369 feet at the top of Agua Caliente Hill.

GENERAL DESCRIPTION OF AREA: This Zoological Area includes Sonoran Desert cactus forests, sycamore-ash-walnut riparian forests, juniper-oak grasslands, numerous perennial pools and springs. Classic examples of Catalina gneiss and towering cliffs characterize this watershed.

CURRENT USES: This area is currently used for wildlife viewing, rock climbing, and hiking. There are several grazing allotments but cattle are only occasionally present.

JUSTIFICATION FOR DESIGNATION: This area is not heavily used, but is well known to herpetologists for its habitat values, and by botanists for the unusual species found there. In addition to the typical desert canyon bird species such as canyon wrens, prairie falcons, great horned owl, elf owl, red-tailed hawks,

ravens, swallows, Gambel's quail and numerous hummingbird species, many migrating species can be spotted here because of the perennial waters. Mammals include gray fox, coatimundi, deer, javelina, bobcat, raccoon, cottontail, coyote, ringtail cat and numerous species of rodents.

In addition to bird species, the area is rich in reptiles and amphibians. Desert tortoise, Sonoran mud turtle, Gila monsters, western diamond backed rattlesnakes, sand snakes, coral snakes, gopher snakes, black necked garter snakes, Sonoran whipsnake, whiptail lizards, greater earless lizards, zebra-tailed lizards, canyon tree frogs, Sonoran desert toad, red-spotted toads, and lowland leopard frogs have all been observed here.

Unfortunately, the headwaters of Agua Caliente Creek contain a dammed pond that at some point had been stocked with non-native mosquito fish and green sunfish. In recent years, as a result of heavy rains, these fish have washed down into the canyon. As a result, the populations of leopard frogs and canyon tree frogs have diminished.

RECOMMENDATIONS FOR FUTURE USE: Botanical, bird and reptile research should be encouraged within the Zoological Area, especially because there are no comprehensive biological inventories of this area, and rapid change or loss of species could occur due to increased recreational use and global climate change. Wildlife viewing, camping, and hiking should continue to be permitted. Rock climbing should be restricted to non-breeding seasons for any sensitive species, such as prairie falcons.

The Forest Service should initiate a program to eradicate the non-native fish species for the purpose of restoring the leopard frog and canyon tree frog populations, and the functioning of the entire watershed. The treatment applied at Sabino Canyon to protect the native fish species there may be appropriate here, also. Several members of the Tucson Herpetological Society have expressed interest in restoring the amphibian species to these canyons, so support for protection already exists.

PROPOSED BY: Lainie Levick, Hydrologist,  
University of Arizona

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<sup>1</sup> Bertelsen, David. 2008. Personal communication with David Bertelsen, 9/22/08.

<sup>2</sup> 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.