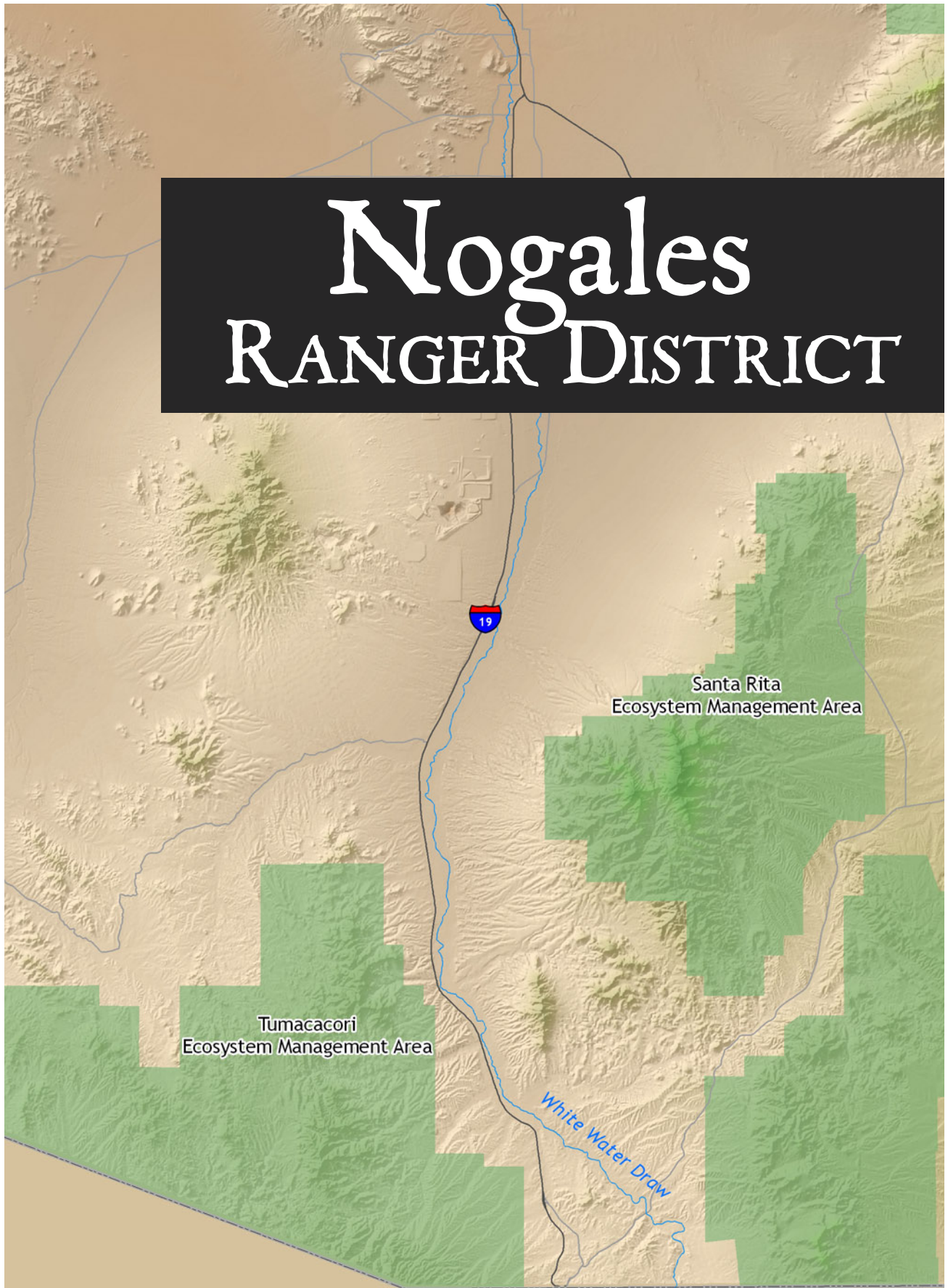


Nogales RANGER DISTRICT





CHAPTER 6 **Tumacacori Ecosystem Management Area**

The Tumacacori Ecosystem Management Area (EMA) encompasses rolling hills and steep, rough canyons in the southwestern portion of the Coronado National Forest. The Management Area contains 203,799 acres encompassing the Tumacacori, Atascosa, Pajarita, and San Luis mountain ranges. The Tumacacori Mountains rise from low-lying desert grasslands to 5,736 feet of elevation at an unnamed high point. The Tumacacoris are the northernmost range in the Management Area and run north-south roughly parallel to the Santa Cruz River. The Pajarita range also tops out at an unnamed high point at a slightly lower elevation of 5,460 feet. The Pajaritas are at the southern boundary of the Management Area. Along with the Atascosa and Tumacacori Mountains, they form a stretch of intensely rugged country that extends across the border into Mexico. Much of the land on the Mexican side of the border consists of private ranches. The Atascosa Mountains boast a high point of 6,422 feet at the prominent Atascosa Peak. The San Luis Mountains are in the far western portion of the management area, nearly adjacent to the Buenos Aires National Wildlife Refuge. This range is the smallest and the lowest of the four with a high point of 4,797 feet (Figure 6.1).

Approximately 10 miles southeast of the mountain ranges is the population center of Nogales, a hub of international commercial traffic. Interstate 19 starts in Nogales and is a major corridor for traffic traveling

north and south between Tucson and the U.S.-Mexico border. To the northeast of the Forest along the Interstate 19 corridor lies the small community of Tubac, Arizona.

The Arivaca Creek portion of the Buenos Aires National Wildlife Refuge borders part of the western edge of the Management Area. Arivaca Creek supports important riparian habitat fed by runoff from western slopes of the San Luis Mountains. Gray hawks and Yellow-billed Cuckoos can be found nesting in the riparian gallery along the waterway. The northwest side of the Management Area is bordered by the unincorporated village of Arivaca and by private ranch land that has the potential to be sold for development. Rio Rico residential area and a resort have already been developed along the eastern boundary of the Management Area. Other such developments are in the works near the northeastern portion of the area. Beyond the eastern boundary of the Forest lies the Santa Cruz River Valley, a major corridor of wildlife movement between the Tumacacori Mountains and the Santa Rita Mountains to the northeast that is fed by runoff from the Tumacacori and Atascosa ranges.

Natural History

The mountain ranges of the Tumacacori Ecosystem Management Area are at the western edge of the Sky Island bioregion. They support large

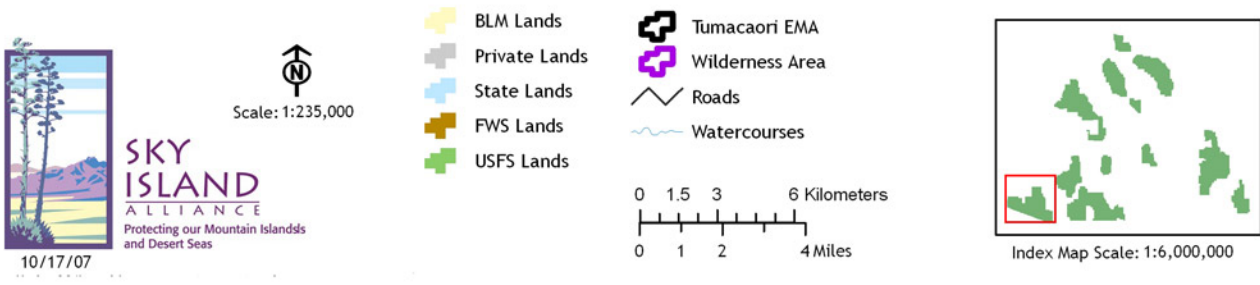
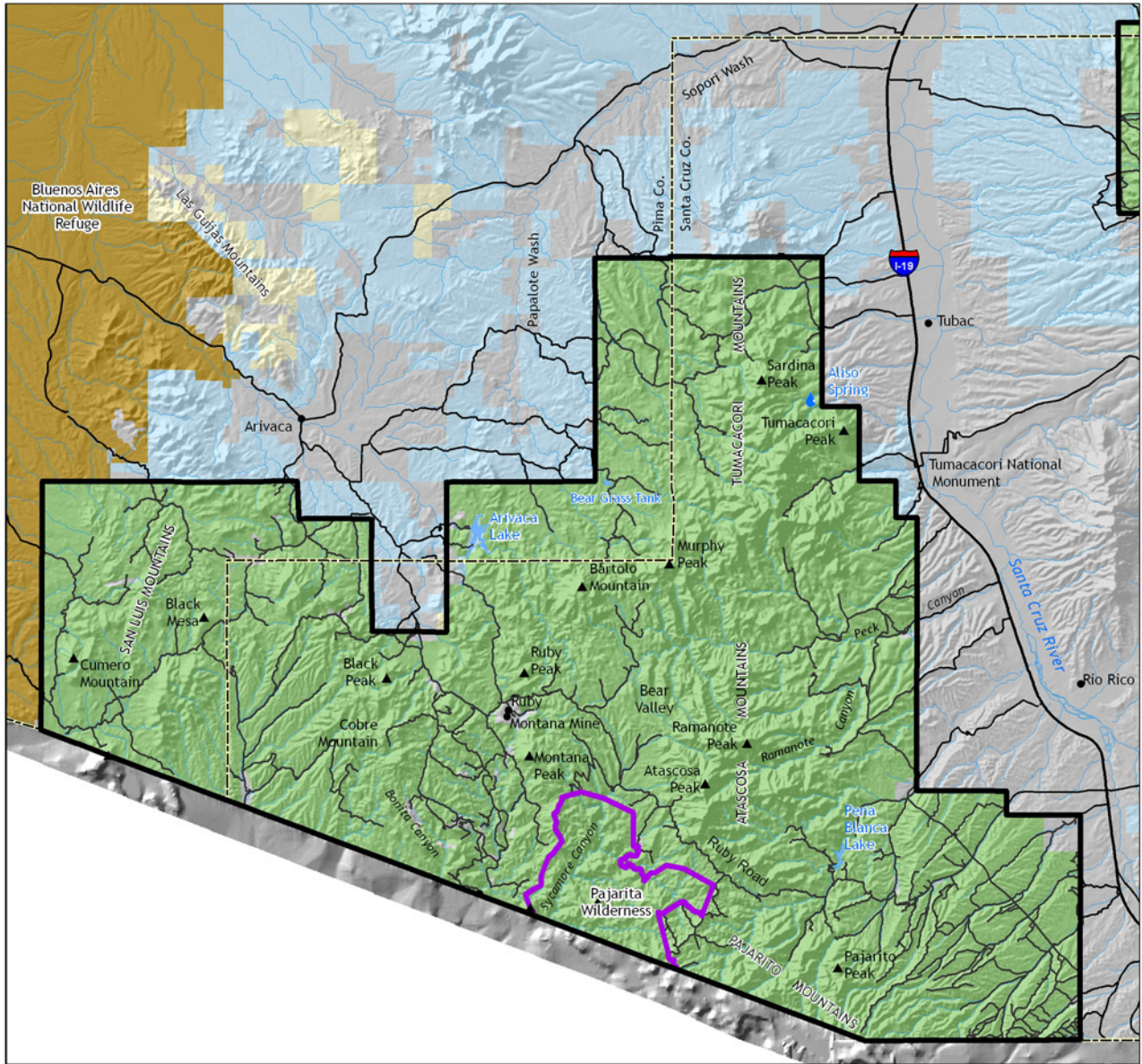


Figure 6.1 Overview of the Tumacacori EMA

acreage of Madrean evergreen woodland mingled with semidesert grasslands that bear strong affinities with flora of Sierra Madre and are strikingly different from oak communities found elsewhere in the United States. Although these Madrean woodlands are found across middle elevations of the Coronado National Forest, the mountains of the Tumacacori Ecosystem Management Area support an exceptional amount of these woodlands that are topographically connected to Mexican sky islands.

The varied habitats of the Tumacacori, Atascosa and Pajarita Mountains support high quality invertebrate, reptile and bird assemblages representative of the Sierra Madre Occidental in Mexico. The area is an arena for the intermingling of subtropical and northern species of plants and animals. Madrean oak savannahs, well-watered deep canyons, and high cliffs provide a number of microclimates. These features and their connection to Sierra Madre flora and fauna, combine to create habitat for a number of plants and animals occurring nowhere else on the Coronado National Forest. The management area is outstanding in its biological distinctness, supporting exceptional and intact habitat for 74 species listed for their rarity by federal and state governments. The area also supports popularly hunted species including white-tailed deer, javelina, and quail.

Subtropical vertebrate species such as the Mexican vine snake, Northern Mexican garter snake and the occasional jaguar reside here. Wild chiltepin, the rare native ancestor of all chilies now produced, is known to occur here and has been officially protected from overharvesting by a special Botanical Area.

Vegetation in the area ranges from desert scrub and semidesert grassland, to mixed pine-oak woodland at mid elevations, to Chihuahuan pine stands near the top of Ramanote Peak, and Pine Canyon in the Tumacacori Mountains. Plants with very different geographical origins such as the Utah serviceberry, and a subtropical bromeliad found nowhere else in the United States, grow near one another in canyon habitats. Canyons and drainages such as Peck, Ramanote, Walker, Fresno, Cedar, and California Gulch contain precious riparian strips of velvet ash, Bonpland's and desert willow, Arizona black walnut, Fremont cottonwood, and netleaf hackberry among others. The endangered Chiricahua leopard frog has been observed in the waterway of Ramanote Canyon

and a smaller tributary, Lion Canyon. Lowland leopard frogs are known to occur in Walker, Peña Blanca and Sycamore Canyon. The Forest Service considers the riparian habitats of Cedar, Peck and Pine Canyon, and the formation of Atascosa Ridge special ecological and geological features of the area. North-facing Pine Canyon in the Atascosa Mountains boasts a stand of Chihuahuan pines at its upper reaches.

Drainages of the Pajarita-Atascosa mountain complex support pine-oak woodland at exceptionally low elevations in canyon bottoms. Canyons here open south into Mexico supporting precious strips of riparian habitat. Bird species including the elegant trogon, rose-throated becard and five-striped sparrow reach their northernmost extent in the excellent riparian habitat, brushy hillsides and oak-sycamore canopy lining Sycamore Canyon. The canyon has been designated an Important Bird Area by the Audubon Society for its breeding species in unique habitats and its status as an outstanding landbird stopover. The canyon also supports an amazing diversity of plants, exemplified with 593 species recorded in Sycamore Canyon alone.¹ The Threatened Sonora chub can be found in pools along Sycamore Creek and California Gulch, and Mexican long-tongued bats feed on the nectar, and pollen of flowers and agaves growing in or near the canyon. At least 200 species of butterfly have been observed in the canyon along with unusual invertebrate species such as *Diplocentrus spitaeri*, an endemic scorpion.

The main spine of the Tumacacori Mountain range resides in the largest remaining unprotected roadless area of National Forest land in Arizona. Hiking trails in the area are sparse creating a large core of undisturbed area that offers opportunities for solitude and quiet recreation. This area lies adjacent to the 7,529-acre Pajarito Wilderness that encompasses much of the western portion of the Pajarita Mountains including the biological gem of Sycamore Canyon.

Human Prehistory and History

The mountains of the Tumacacori Ecosystem Management Area bound the west side of the Upper Santa Cruz River Valley. The Santa Cruz River valley has been a center of cultural overlap extending back more than 12,000 years. Indigenous cultures gathered food plants and hunted animals in the surrounding hillsides. Following domestication of crops such as corn, beans and squash, cultures formed the American

Southwest's first permanent year-round settlements. The valley is the homeland of the Tohono O'odham (the Desert People) since very ancient times.

The Tumacacori EMA lays within the historic tribal territories of the Upper Pima and Tohono O'odham. Signs of these early inhabitants can be found across the Management Area in the form of rock art, grinding stones, pottery, and other instruments. The native people living along this part of the Santa Cruz Valley, when Spaniards first arrived were the Sobaipuri, a branch of O'odham. The O'odham visited foothills of the Tumacacori, Atascosa and Pajarita mountains to make mescal, collect wild foods such as agave and chiltepin, and occasionally seek refuge from their enemies.² Ramanote Cave on the eastern side of the Tumacacori Range was the site of an archeological find of human remains and associated funerary objects from the proto-historic period with affiliation to historic and present day Piman and O'odham cultures³.

In 1687 Father Eusebio Francisco Kino, a Jesuit missionary, traveled from the headwaters of the Río Altar (a few miles south of the present day Arizona border) through the present day Tumacacori Ecosystem Management Area, by way of Sycamore Canyon and Bear Valley to the ranch of San Cayetano de Tumacacori. In 1691 the Tumacacori Mission was first established here, several miles east of the Forest boundary. The mission was an all-encompassing program of directed culture change designed to transform the way natives in the area lived. In the later 1720s Spanish settlers began building ranches in the San Luis Valley, along the Santa Cruz. In another decade miners were exploring the sky islands of southern Arizona. Starting in the 1700s, the Tumacacori, Pajarita, Atascosa and San Luis Mountains were host to multiple mining ventures. Near the old Sopori Ranch northwest of Tubac, miners worked gold placers and silver mines until Apaches ran them out in 1767.

Apache considered the forested uplands to be their domain and from these mountains they raided across the northern frontier of Mexico. Offers of peace treaties in the late 1700s led some Apache bands to move to peace settlements, and the Sonoran frontier entered a period of relative calm during the 1790s. This more or less ended 40 years later when deteriorating economic and political conditions in Mexico led to the discontinuation of rations at peace settlements.

Apaches began leaving the settlements, resumed raiding, and began driving out ranchers in southern Arizona.⁴ In 1872, General Otis Howard of the United States Army negotiated a peace with the Chiricahua Apache Chief Cochise. The resulting treaty included the conveyance of lands east of the San Pedro River and south of the Gila River to the Apaches as a reservation. President Grant voided the treaty and reservation in 1776, two years after the death of Cochise and soon after gold and silver were discovered near present-day Tombstone. Eventually, the Chiricahua Apaches were rounded up and sent to reservations in Florida, then Oklahoma. Today, a Chiricahua Apache tribal reservation still exists at Fort Sill, Oklahoma, in addition to many Chiricahua being relocated to the Mescalero Reservation in New Mexico.

In 1912 the old Montana Camp (the principal mining town in the Oro Blanco district) became the mining town of Ruby when a post office was established. The town lies at the bottom of the 5,370-foot Montana Peak. The town passed through multiple owners, was the site of two episodes of murder that brought Ruby briefly into the headlines, and supported a population of more than 1000 in the 1930s with 350 employed at the mine. Ruby was the largest producer of lead and zinc in Arizona from 1935 to 1939 until ore gave out in 1940 and the mine closed.⁵

Although the Tumacacori, Atascosa and Pajarita Mountains have seen little mining activity at any period, the Tumacacori EMA encompasses the townsite of Ruby which was once the largest producer of lead and zinc in Arizona. Ruby, one of the best preserved ghost towns in southern Arizona, is now privately owned and managed for historic preservation. Because of its contribution to the economic, cultural and historical development of the area, Ruby was listed on the National Register of Historic Places in 1975.

The names Pajarita and Atascosa seem to date from the eighteenth and nineteenth centuries and are Spanish meaning little bird, and bogged down or miry, respectively. The Tumacacori Mountains share their name with the former Sobaipuri village of San Cayetano de Tumacacori. A Jesuit father wrote that Tumacacori meant, "pepper bush, place where the little round pepper is found in abundance." Populations of chiltepin plants are found in the eastern portion of the Tumacacori Management Area. It is also claimed that the term translates to "land of flat rocks."

Elements of Biological Diversity and Cultural Heritage

The Tumacacori 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 Tumacacori Ecosystem Management Area. The Forest Service identified 96 species of plants and animals including seven Threatened or Endangered species, along with other species determined to be Species of Concern or Species of Interest (Table 6.1). These species will be used to guide management decisions.

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 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 6.2). Although there are many fine variations in plant communities on the Tumacacori Ecosystem Management Area, the broader classifications of ecological systems are grouped 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.⁶ Protection of ecological systems will help ensure the protection of biological diversity in the Tumacacoris. Because of the great diversity of species, it will be particularly important to manage for the health of ecological systems in order to successfully manage as much species diversity as possible. Figure 6.2 shows the distribution of ecological systems in the Tumacacoris. Through contact with regional scientists and experts, and other people familiar with the Tumacacori, we identified ecological systems, physiographic features, additional species and cultural resources that should also be considered in the Forest Plan revision.

In addition to the species already identified by the Forest Service as being Species of Interest, there are 37 other species that should be focused on in planning efforts (Table 6.3). 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 6.3 lists additional species whose needs should be assessed during plan revision.

The Tumacacori Ecosystem Management Area 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, as well as traditional uses of the land are also an important part of the Cultural Heritage of the area (Table 6.4).

Table 6.1 Species Identified by the Forest Service to Guide Management Decisions

Amphibians			
<i>Eleutherodactylus augusti cactorum</i>	Western Barking Frog	<i>Fraxinus gooddingii</i>	Goodding's Ash
<i>Rana chiricahuensis</i>	Chiricahua Leopard Frog	<i>Fraxinus papillosa</i>	Chihuahua Ash
<i>Rana yavapaiensis</i>	Lowland Leopard Frog	<i>Graptopetalum bartramii</i>	Bartram's Stonecrop
		<i>Heterotheca rutteri</i>	Rutter's Golden-aster
		<i>Hexalectris spicata</i> var. <i>arizonica</i>	Crested Coralroot
		<i>Ipomoea plummerae</i> var. <i>cuneifolia</i>	Huachuca Mountain Morning-glory
Birds		<i>Ipomoea tenuiloba</i> var. <i>lemmonii</i>	Lemmon's Morning-glory
<i>Ammodramus savannarum</i>	Arizona Grasshopper Sparrow	<i>Ipomoea thurberi</i>	Thurber's Morning-glory
<i>ammolegus</i>		<i>Laennecia eriophylla</i>	Cochise Woolwort
<i>Colinus virginianus ridgewayi</i>	Masked Bobwhite	<i>Lotus alamosanus</i>	Sonoran Trefoil
<i>Cyrtonix montezumae</i>	Montezuma Quail	<i>Mammillaria grahamii</i> var. <i>oliviae</i>	
<i>Meleagris gallopavo mexicana</i>	Gould's Turkey	<i>Mammillaria heyderi</i> var. <i>macdougalii</i>	Little Nipple Cactus
<i>Pachyrhamphus aglaiae</i>	Rose-throated Becard	<i>Mammillaria mainiae</i>	Main's Nipple-cactus
<i>Poliioptilla nigriceps</i>	Black-capped Gnatcatcher	<i>Mammillaria wrightii</i> var. <i>wrightii</i>	Wright Fishhook Cactus
<i>Trogon elegans</i>	Elegant Trogon	<i>Muhlenbergia dumosa</i>	Bamboo Muhly
		<i>Muhlenbergia elongata</i> (=M. <i>xerophila</i>)	Sycamore Muhly
Fish		<i>Muhlenbergia palmeri</i> (=M. <i>dubioides</i>)	Southwestern Muhly
<i>Agosia chrysogaster</i>	Longfin Dace	<i>Notholaena lemmonii</i>	Lemmon's Cloak-fern
<i>Catostomus insignis</i>	Sonora Desert Sucker	<i>Opuntia laevis</i>	New Mexico Prickly-pear
<i>Gila ditaenia</i>	Sonora Chub	<i>Paspalum virletii</i>	Virlet's Paspalum
		<i>Passiflora foetida</i> (assume var. <i>arizonica</i>)	Foetid Passionflower
Insects		<i>Penstemon discolor</i>	Catalina Beardtongue
<i>Argia sabino</i>	Sabino Dancer	<i>Phoradendron bolleanum</i> ssp. <i>pauciflorum</i>	Rough Mistletoe
		<i>Psilotum nudum</i>	Whisk Fern
Mammals		<i>Roldana hartwegii</i> (=Senecio <i>hartwegii</i> , with syn = <i>S. seemannii</i> , <i>S. carlomasonii</i> , and <i>R. carlomasonii</i>)	Seemann (Hartweg's) Groundsel
<i>Choeronycteris mexicana</i>	Mexican Long-tongued Bat	<i>Samolus vagans</i>	Chiricahua Mountain Brookweed
<i>Lasiurus blossevillii</i>	Western Red Bat	<i>Scutellaria tessellata</i>	Huachuca Mountains Skullcap
<i>Macrotus californicus</i>	California Leaf-nosed Bat	<i>Sisyrinchium cernuum</i>	Nodding Blue-eyed Grass
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat	<i>Viguiera dentata</i> var. <i>lancifolia</i>	Sunflower Golden-eye
<i>Panthera onca</i>	Jaguar	<i>Woodsia cochisensis</i>	Cochise Woodsia
<i>Sciurus arizonensis</i>	Arizona Gray Squirrel		
<i>Thomomys umbrinus intermedius</i>	Southern Pocket Gopher	Reptiles	
		<i>Aspidoscelis burti stictogramma</i>	Canyon Spotted Whiptail
Plants		<i>Aspidoscelis burti xanthonota</i>	Red-backed Whiptail
<i>Abutilon parishii</i>	Pima Indian Mallow	<i>Gopherus agassizii</i>	Desert Tortoise ("Sonoran" population)
<i>Agastache rupestris</i>	Thread-leaf Giant-hyssop		
<i>Agave parviflora</i>	Small-flower Agave	<i>Gyalopion quadrangulare</i>	Thornscrub Hook-nosed Snake
<i>Agave parviflora</i> ssp. <i>parviflora</i>		<i>Tantilla wilcoxi</i>	Chihuahuan Black-headed Snake
<i>Amsonia grandiflora</i>	Arizona Slimpod	<i>Tantilla yaquia</i>	Yaqui Black-headed Snake
<i>Astragalus allochrous</i> var. <i>playanus</i>	Halfmoon Milk-vetch	<i>Thamnophis eques megalops</i>	Northern Mexican Gartersnake
<i>Bouteloua eludens</i>	Santa Rita Grama		
<i>Capsicum annuum</i> var. <i>glabriusculum</i>	Chiltepin		
<i>Carex ultra</i>	Cochise Sedge		
<i>Choisya dumosa</i> var. <i>mollis</i>	Soft Mexican-orange		
<i>Coryphantha recurvata</i>	Recurved Corycactus		
<i>Cynanchum wigginsii</i> (=Metastelma <i>mexicanum</i>)	Narrow-leaf (Wiggins) Swallow-wort		
<i>Dalea tentaculoides</i>	Gentry's Indigobush		
<i>Drymaria effusa</i> var. <i>effuse</i>	Pinewood Drymary		
<i>Erigeron arisolius</i>	Arid Throne Fleabane		
<i>Escobaria vivipara</i> var. <i>bisbeeana</i>	Bisbee's Pincushion Cactus		

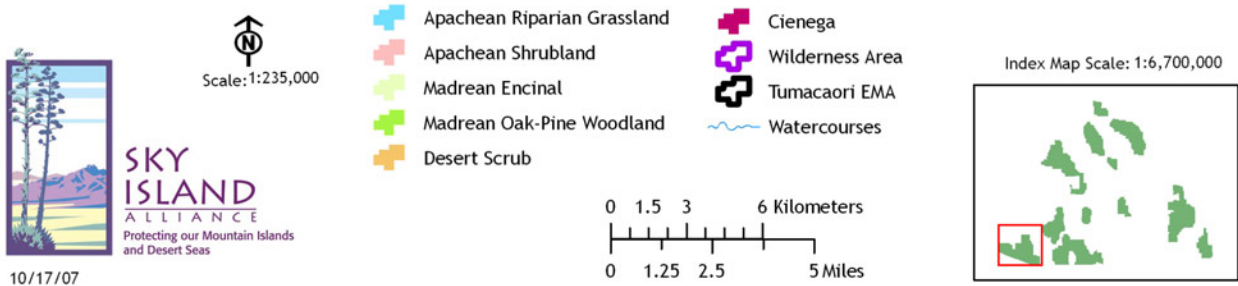
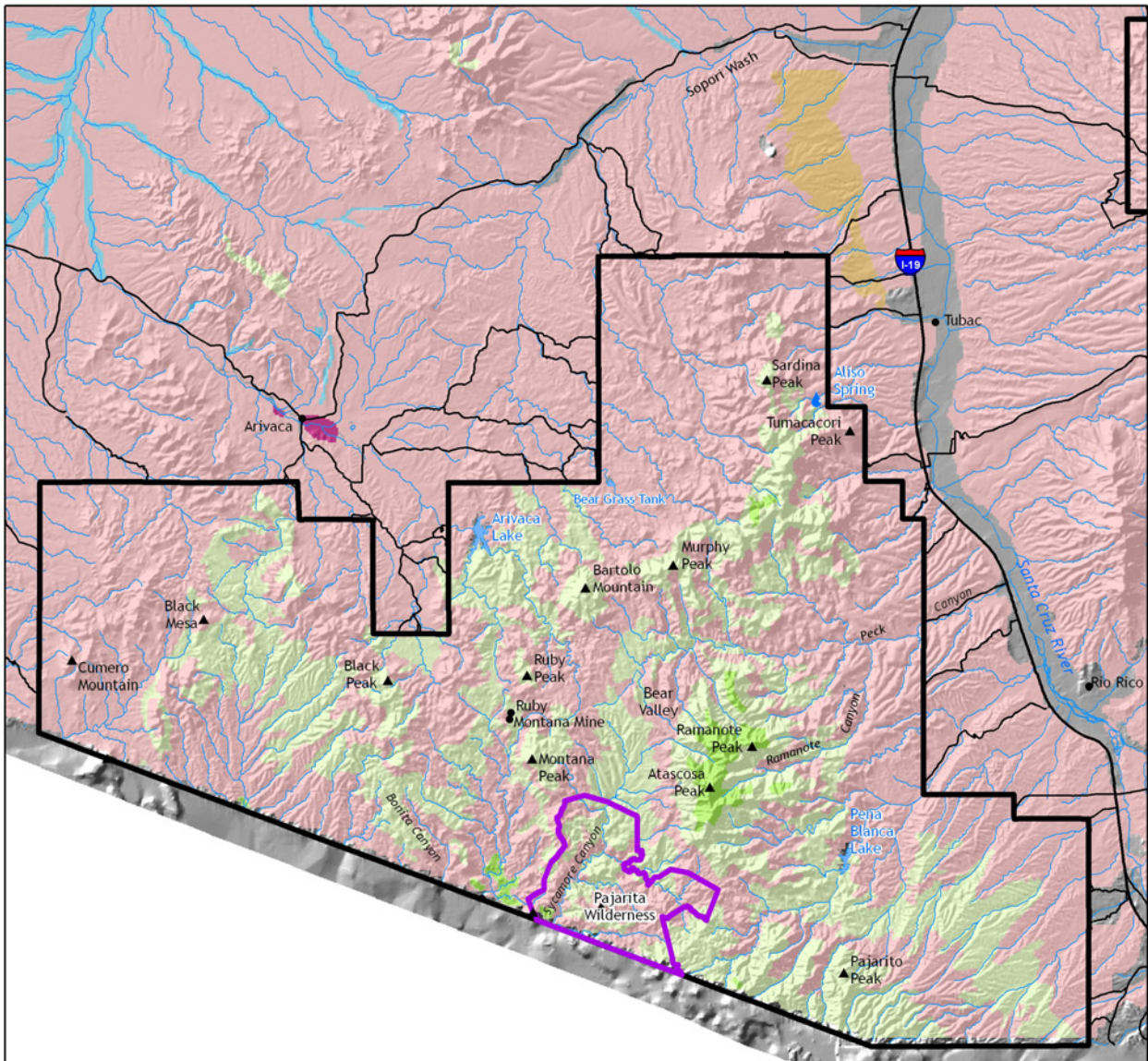


Figure 6.2 Ecological Systems of the Tumacacori EMA

Table 6.2 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 Sonoran Paloverde Mixed-Cacti Desert Scrub</p> <p>Madrean Encinal Woodlands Madrean Encinal</p> <p>Madrean Pine-Oak Woodlands Madrean Pine-Oak Woodlands</p> <p>Semi-desert grasslands Apachean Shrubland</p> <p>Wetland/Cienega Cienega</p> <hr/> <p>Other Vegetation Types</p> <p>Riparian Scrub in Sycamore Canyon</p> <hr/> <p>Physiographic Features</p> <p>Atascosa Peak Limestone Outcroppings</p> <hr/> <p>Community</p> <p>Chihuahuan Pine Stands</p>
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Table 6.4 Elements of Cultural Heritage

<p>Human History Atascosa Lookout Town site of Ruby Petroglyphs (at Hells Gate and Peñasco Canyon) Trenchera site (Tumacacori Peak) Historic mine sites in Peck Canyon</p> <p>Other Values Opportunities for quiet and solitude Opportunities for primitive recreation</p>
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Table 6.3 Additional Species That Require Special Management Consideration

<p>Amphibians <i>Bufo retiformis</i> <i>Gastrophryne olivacea</i> <i>Pternohyla fodiens</i> <i>Rana tarahumarae</i></p> <p>Birds <i>Aimophila botterii</i> <i>Aimophila carpalis</i> <i>Aimophila quinquestrata</i> <i>Asturina nitida maxima</i> <i>Buteo albonotatus</i> <i>Camprimulgus ridgwayi</i> <i>Camptostoma imberbe</i> <i>Glaucidium brasilianum cactorum</i> <i>Micrathene whitneyi</i> <i>Passerina versicolor</i> <i>Picoides stricklandi</i> <i>Progne subis</i> <i>Tyrannus melancholicus</i> <i>Vermivora luciae</i> <i>Vireo bellii</i></p> <p>Insects <i>Abedus herberti</i> <i>Amblyscirtes elissa</i> <i>Atrytonopsis cestus</i> <i>Calephelis arizonensis</i> <i>Heliopetes laviana</i></p> <p>Mammals <i>Leopardus pardalis</i> <i>Myotis velifer</i> <i>Sigmodon ochrognathus</i></p> <p>Reptiles <i>Eumeces callicephalus</i> <i>Gyalopion canum</i> <i>Lampropeltis pyromelana</i> <i>Lampropeltis getula nigrita</i> <i>Oxybelis aeneus</i> <i>Senticolis triaspis</i></p> <p>Plants <i>Amsonia grandiflora</i> <i>Anoda reticulata</i> <i>Dalea tentaculoides</i> <i>Pectis imberbis</i> <i>Phaseolus supinus</i></p>	<p>Sonoran Green Toad Great Plains Narrowmouth Toad Lowland Burrowing Treefrog Tarahumara Frog</p> <p>Botteri’s Sparrow Rufous-winged Sparrow Five-striped Sparrow Northern Gray Hawk Zone-Tailed Hawk Buff-collared Nightjar Northern Beardless- Tyrannulet Cactus Ferruginous Pygmy Owl Elf Owl Varied Bunting Arizona Woodpecker Purple Martin Tropical Kingbird Lucy’s Warbler Bell’s Vireo</p> <p>Giant Water Bug Elissa Roadside-skipper Cestus Skipper Arizona Metalmark Laviana White-skipper</p> <p>Ocelot Cave Myotis Bat Yellow-Nosed Cotton Rat</p> <p>Mountain Skink Chihuahuan Hook-nosed Snake Mountain Kingsnake Black Kingsnake Brown Vinesnake Green Ratsnake</p> <p>Arizona Blue Star Netted Anota Gentry Indigo Bush Beardless Chinch Weed Supine Bean</p>
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Desired Conditions

Management Vision

The Tumacacori Ecosystem Management Area maintains its long-term biological, cultural, historical, recreational and aesthetic values in the face of changing human use and dynamic ecological cycles. It continues to support nationally and internationally recognized biodiversity and continues to harbor subtropical species at the northern limit of their range.

★ The Tumacacori EMA is situated in a landscape in which wide-ranging species (black bear, mountain lion, deer, pronghorn, Mexican gray wolf, jaguar, coati, and others) are able to move between the Tumacacori EMA and the following: Santa Rita EMA, wildlands to the south in Mexico, the Buenos Aires National Wildlife Refuge and other surrounding wildlands.

★ Use and impacts are monitored and actively managed.

★ Impacts associated with human immigration, drug smuggling and associated interdiction efforts are reduced.

★ Aliso Spring is established as a riparian preserve where a healthy population of lowland leopard frogs persists. Lowland leopard frog habitat in Walker and Peña Blanca Canyons is also protected.

★ The Tumacacori Highlands continue to be a high quality location for primitive recreation with opportunities to experience quiet and solitude. Wildlife and human visitors are free from direct disturbance and noise.

Conservation Assets

Conservation assets work on behalf of desired conditions and against the threats to the ecological and cultural elements of the Tumacacori 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 in the area.

Atascosa Ridge

Atascosa ridge is the predominant topographic feature of the Tumacacori Highlands and is protected by vehicle incursion due the surrounding rugged landscape.

Bear Valley Ranch

Bear Valley Ranch (ZZ Cattle Co.) and the associated allotments are a premier example of environmentally responsible ranching practices. The allotments have excellent native grass cover and demonstrate general landscape health. The ranching practices here set an example for ecological sustainability on the Tumacacori EMA and across the rest of the Forest.

Canyon Topography

Most canyons along a north-south axis in the Tumacacori EMA are rugged and naturally impassable by vehicles. These canyons are somewhat protected from vehicular traffic traveling north-south. East-west trending canyons in the Pajarita Mountains also tend to be rugged and naturally impassable. In combination with east-west trending ridges, these canyons deter the northward movement of foot traffic and vehicles.

Friends of the Tumacacori Highlands

The Friends are a coalition of organizations, businesses and landowners who approached Representative Grijalva in 2003 seeking Congressional protection for the Tumacacori Highlands in the form of Wilderness designation. This coalition collaborates with area stakeholders and seeks local support for the designation of wilderness in the Tumacacori Highlands. Ongoing advocacy for protection of the Tumacacori Highlands brings attention to the biological and cultural importance of the area.

National Recognition of Conservation Value

Sycamore Canyon has been declared an Important Bird Area (IBA) by the National Audubon Society.

This designation takes into account state or federally listed endangered and threatened species, rare, unique or representative habitats, and significant concentrations of species or assemblages, among other qualities. Sycamore canyon has one of the highest breeding bird diversity concentrations in Arizona. It supports the lowest elevation breeding populations of many avian species in Arizona.

California Gulch has also been declared an IBA. This canyon hosts a perennial spring-fed stream that drains into Mexico and supports multiple Species of Conservation Status. California Gulch supports a small but consistent population of Five-striped Sparrows, a Species of Conservation Status. This species has the smallest regularly occupied breeding range of any bird in the United States (excluding island nesters), and is localized to the Pajarita and Patagonia Mountains.

Pajarito Wilderness and Goodding Research Natural Area

The Pajarito Wilderness encompasses 7,420 acres of rolling hills covered by desert savanna and oak woodland. Despite being the smallest Wilderness in the Coronado National Forest, the Pajarito Wilderness is home to an amazing diversity of species including more than 660 species of plants, 17 of which are found nowhere else on earth. The rugged canyons of the area open south to the subtropical environments of Mexico and Central America. The area's most prominent feature is Sycamore Canyon which is known for its diversity of plants, animals, and insects. Part of the

Wilderness lies within the Goodding Research Natural Area which was established because of the rich biological diversity found here.

Topographical Connection to Wildland Complex South of the International Boundary

The rugged and wild landscape found in the Pajarito Wilderness does not stop at the U.S.-Mexico border. The Tumacacori and Pajarita Mountains are contiguous with a larger wildland complex south of the border including the Sierra Cibuta. The Tumacacori and Pajarita Mountains are directly connected with a mega-complex of Madrean oak woodland and other high elevation wildlife habitat extending south into Mexico. This contiguous tract of relatively open land creates habitat with added resiliency, and habitat for larger numbers of species.

Tumacacori Highlands Wilderness Proposal

The Tumacacori Highlands have been recognized as a tremendous asset to the Tumacacori Ecosystem Management Area and the greater Coronado National Forest. The area is the largest remaining unprotected roadless area of National Forest land in Arizona and is adjacent to the Pajarito Wilderness. In August of 2007 Representative Raul Grijalva introduced the Tumacacori Highlands Wilderness Act to seek designation of approximately 84,000 acres as Wilderness. This proposal was initiated by a coalition of organizations, businesses, and landowners who approached Representative Grijalva in 2003 seeking congressional protection for the Highlands.

Threats to the Forest: A Need for Change

The Coronado National Forest and surrounding lands have experienced a variety of changes in the twenty years since the current Forest Plan was written. Management concerns and threats exist in the Tumacacori Ecosystem Management Area (EMA) 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. The following issues present challenges to ecological sustainability on the EMA.

ADJACENT LAND USES

Explosive growth in Sahuarita, Green Valley, Rio Rico, and Tubac threaten to isolate the Tumacacori EMA from the Santa Rita EMA, and other surrounding natural areas. Planned construction of up to 2,000 new homes on land owned by First United Realty adjacent to the northern EMA boundary allotment will also lead to a loss of wildlife corridors between the Tumacacori EMA and surrounding habitat. The Tumacacori EMA is also bordered by ranch land that is being sold to developers, and state trust land which can be sold for development. This type of development along foothills and in floodplains fragments wildlife corridors and creates large areas of wildland-urban interface. Motorized access from these developments directly into the Forest are causing proliferation of user-created roads.

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

ROADS/TRANSPORTATION SYSTEM

Motorized recreation in the area continues to grow with much of the impacts concentrated in lowland areas where terrain allows for easier cross-country travel. The increase in volume of users and user irresponsibility is creating an expanding network of illegal user-created routes. Off-road vehicles are creating unauthorized routes onto the Forest from

neighboring private developments along the eastern boundary. Threats include existing illegal user-created routes and creation of new non-system unauthorized routes, routes creating exclusive access, and lack of enforcement of the legal authorized transportation system.⁷

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.

EXTRACTIVE USES

Commercial/cultural collection of plants and non-game animals threaten to deplete species populations. These acts are greatly aided by both system and non-system roads. Affected resources include: recurved corycactus (especially near roads), and green ratsnake.

Mining in the Oro Blanco Mining District

Current and future mining for opal (common and precious), gold, silver, and sand and gravel threaten to contaminate water and cause other ecological damage associated with mining operations.⁸ Remnants from past mining ventures continues to pollute a number of waterways in the Management Area.

NONEXTRACTIVE USES

Recreational shooting, especially in Ramanote Canyon is causing impacts to wildlife, and to people recreating, through the disturbance of quiet recreation opportunities. This also leads to trash and bullet shell deposition. Affected are species sensitive to human disturbance and the opportunity for quiet recreation.

U.S.-MEXICO BORDER

The creation of walls or other structures to impede human movement across the border, along with the construction of associated roads will create impediments to local and long-distance movement of species across the border.⁹ Affected are species dependent on permeability of the border including: jaguar, ocelot, pronghorn, black bear, coatimundi, deer, and low flying bird species.

Creation of new roads by border enforcement activities¹⁰ is leading to:

- ★ Soil erosion
- ★ Invasion of exotic/invasive species that are aided by the presence of roads
- ★ Physical barriers to wildlife movement
- ★ Direct mortality to wildlife
- ★ Barriers to natural spread of fire

Increase in traffic of immigrants and drug smugglers through the Tumacacori EMA is occurring due to avoidance of border checkpoints and more populous areas. This is leading to the creation of new roads and trails.

Migrant and smuggling foot traffic causes trampling of vegetation deposition of litter, campfire ignition of wildfires in riparian habitat or ignition at unnatural times of the year, and livestock damage to riparian areas due to cut fences. Affected is montane riparian woodland.

INVASIVE SPECIES

Nonnative fish, bullfrog and crayfish competition with, and predation on native species threatens populations of native fish, gartersnakes, Chiricahua leopard frog and lowland leopard frog.

SITE-SPECIFIC THREATS

Sycamore Canyon

Migrant foot traffic in the canyon is trampling of sensitive and rare vegetation. Deposition of litter, and campfire ignition of wildfires in riparian habitat especially at unnatural times of the year is of great concern. The ecological health of montane riparian woodland and shrubland is threatened by this activity.

Unmanaged high numbers of Forest visitors in the area are also trampling of sensitive riparian vegetation, and may disturb wildlife sensitive to human disruption or damage natural resources in other ways.

Bullfrogs are a serious problem in the riparian habitat of the canyon where they compete with native species and prey on them. Populations of Chiricahua leopard frog, gartersnakes and lowland leopard frog are greatly threatened by bullfrogs. The soon to be reintroduced Tarahumara frog will suffer the same consequences.

California Gulch

Livestock grazing in the area is leading to soil erosion, degradation of stream water quality, and the trampling of native plants. Riparian vegetation, five-striped sparrow, and recurved corycactus are being particularly negatively affected. Migrant foot traffic, and illegal drug smuggling is creating similar erosion and trampling damage. Mining on private parcels and Forest lands within or adjacent to the canyon is leading to soil and water contamination.

Aliso Spring

Aliso Spring is directly affected by immigrant and smuggling traffic that is channeled into the area by checkpoints along the Interstate 19 corridor and by people attempting to avoid more populous areas. This is damaging riparian vegetation and negatively affecting the extant population lowland leopard frog. Livestock use of the spring (especially during times of drought) is depleting the water source (for local flora/fauna and wildlife that use as a drinking source) and leading to consumption/trampling of native flora. This affects the local population of lowland leopard frog along with far ranging wildlife including mountain lion, jaguar, ocelot, black bear, white-nosed coati, deer.

Wise Mesa Area

Heavy recreational use of Pipeline Road is leading to campsite proliferation, soil erosion, and proliferation of user-created roads.

Ruby Road

Creation of illegal roads off of Ruby Road is leading to soil erosion, indiscriminate driving in riparian areas, and the spread of exotic/invasive species. Proliferation of user-created unauthorized roads is creating physical barriers to wildlife movement, barriers to the natural spread of fire and increased opportunities for poaching and collection of species.

Rock Corral Canyon

Rock hounding and prospecting activities are leading to proliferation of user created roads in order to access desired resources

The Hunter Access Road on north side of the Tumacacori range is receiving heavy traffic from motorized vehicles, especially from people bringing in ATVs. Lots of illegal spurs are being created all along the road¹¹.

Recommended Objectives and Management Actions

The Tumacacori Ecosystem Management Area (EMA) contains some of the greatest concentration of diversity of species, especially subtropical species, on the Coronado National Forest. This needs to be a major focus and driver for future management of the area. New management direction that shows foresight and proactively addresses threats will create a long-

term framework for ecological health and sustainability in the Tumacacori 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

Objectives

Maintain wildlife corridors between the Tumacacori EMA and the Santa Rita EMA, the Buenos Aires National Wildlife Refuge, and other surrounding natural areas including neighboring areas in Mexico.

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

Minimize user impacts from private developments adjoining the EMA.

Actions

Eliminate illegal user-created roads that emanate from housing developments on the national forest boundary. Do not allow the creation of new user-created roads into the Forest from adjoining subdivisions.

Close routes that enter the Forest from adjoining private property.

Invasive Species

Objectives

Maintain Sycamore Canyon free from bullfrogs.

Actions

Continue to monitor for bullfrog invasions into Sycamore Canyon and to eradicate invaders.

Nonextractive Uses

Objectives

Protect wildlife and opportunities for quiet recreation in Ramanote Canyon.

Protect sensitive riparian habitat and wildlife species in Sycamore Canyon, Pine Canyon, Walker Canyon and Peña Blanca Canyon.

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

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 and other incompatible recreational activities.

Actions

Ban recreational target shooting in the Ramanote Canyon area.

Monitor human use of the Sycamore Canyon area.

Monitor the Wise Mesa Area for user-created road proliferation

Protect historic and prehistoric cultural resources that have been identified to date (e.g., Atascosa Lookout, petroglyphs at Hell's Gate and Peñasco Canyon).

Roads/Transportation System

Objectives

Preserve backcountry touring experiences offered by the Ruby Road corridor.
Mitigate impacts of the existing transportation system and of motorized recreation on all physiographic features, species, and ecological systems.

Actions

Maintain Ruby Road as a dirt road (Class 3 maintenance level) with rustic and rural character.
Establish a clearly defined Transportation System for both Forest users and the Border Patrol

U.S.-Mexico Border

Objectives

Maintain the connectivity of mountains in the Tumacacori EMA to lands in Mexico.
Minimize the proliferation of non-system roads created by law enforcement interdiction efforts.
Minimize the ecological impacts of human immigration, smuggling and interdiction activity.

Actions

Do not allow construction of a border wall on Forest lands.
Strengthen cooperation with law enforcement agencies to mitigate impacts associated with undocumented immigration and interdiction.
Monitor for, and respond to ecological damage in areas of human immigration and interdiction activity.

Special Management Areas

Objectives

Maintain ecological values, including wilderness characteristics of the wildest areas in the Tumacacori EMA, the Tumacacori Highlands.
Protect the riparian habitat and population of lowland leopard frogs located at Aliso Spring.

Actions

Support the designation of the Tumacacori Highlands Wilderness.
Manage approximately 84,000 acres outlined in the Tumacacori Highlands Wilderness proposal to maintain its wilderness suitability (See Figure 6.3).
Designate Aliso Spring as a Riparian Preserve to be managed to protect the extant population of lowland leopard frogs. (See Figure 6.4)

Wilderness

Tumacacori Highlands Proposed Wilderness

The roadless area of the Tumacacori Highlands is the largest remaining unprotected roadless area on Forest land in the state of Arizona. The Wilderness encompasses the Pajarita, Atascosa and Tumacacori mountains ranges, which form a contiguous chain of mountains not separated by significant valleys. It is an exceptional arena for the intermingling of sub-tropical and northern species of plants and animals, including the jaguar, elegant trogon, tropical kingbird and five-striped sparrow, and also hosts a great diversity of cultural and historic sites. The proposal protects the deep recesses of Peck Canyon, Bartolo Canyon, Ramanote Canyon, and Hell's Gate, trickling with pools of precious water in the Santa Cruz River watershed.

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 roadless area described below is suitable for addition to the Wilderness system of the

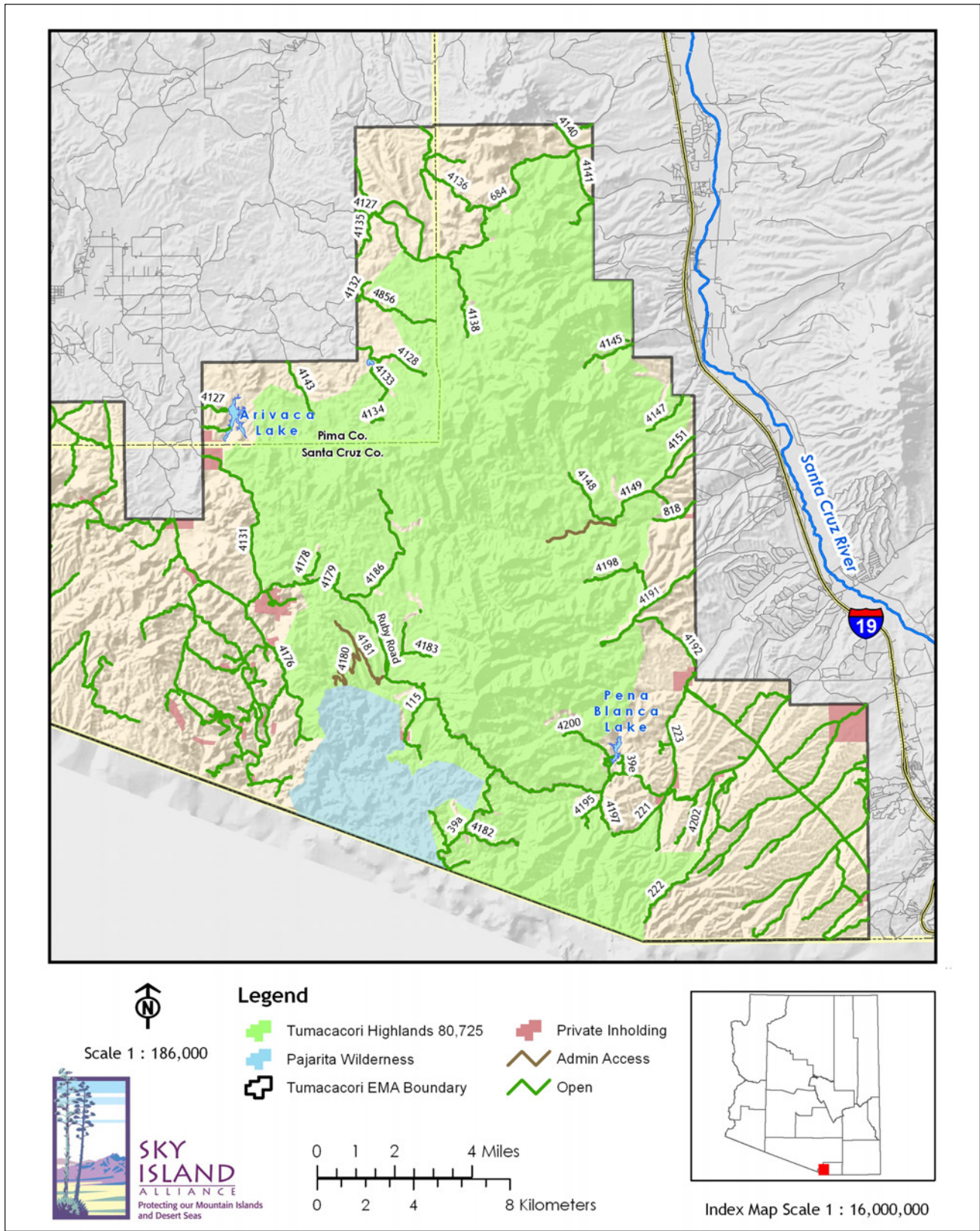


Figure 6.3 Proposed Tumacacori Highlands Wilderness

Coronado National Forest. Representative Raul Grijalva introduced the Tumacacori Highlands Wilderness Act in August of 2007. The proposed

Tumacacori Highlands Wilderness Area would designate approximately 81,000 acres of the Coronado National Forest as Wilderness (Figure 6.3).

Special Management Areas

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. The designation of Special Interest Areas help the Forest Service preserve important historic, cultural and natural aspects of our national heritage. Two special interest areas currently exist on the Tumacacori Ecosystem Management Area, Wild Chile Botanical Area and Sycamore Canyon/Goodding Research Natural Area. The extraordinary characteristics of the Management Area warrant the designation of a third Special Interest Area, Aliso Spring Riparian Reserve.

Wild Chile Botanical Area

The Wild Chile Botanical Area consists of 2,500 acres where the largest population of wild chiltepin chile peppers grows north of Mexico. The area is collaboratively managed by the U.S. Forest Service, Native Seeds/SEARCH and the Center for Sustainable Environments. This is the first botanical area set aside to protect wild relatives of domesticated crops.

Sycamore Canyon/Goodding Research Natural Area

Sycamore Canyon extends south of Ruby Road for five miles to the U.S.-Mexico Border. White-barked Arizona sycamore tress line parts of the creek and oak woodland covers the canyon walls. Over 625 species of plants have been identified in Sycamore Canyon including Goodding ash, Utah shadbush, trailing rhynchosia, butterfly pea, spleenwort and Gentry indigo bush. The canyon also supports 130 species of birds, the Mexican vine snake, and Sonora chub.

Proposed Aliso Spring Riparian Preserve

OVERVIEW: Aliso Spring is located in Aliso Canyon on the northwest slope of the Tumacacori Mountains. The spring which flows year round, supports one of four known wild populations of lowland leopard frogs in the Santa Cruz Valley in the United States. Due to the isolation of the spring, the frogs have been

protected from invasive predators and diseases. This population of frogs represents an excellent genetic source for potential re-establishment efforts in the Santa Cruz Valley

The proposed riparian preserve consists of a core area of approximately 75 meters by 50 meters of canyon bottom perennial stream and gallery forest, with a surrounding buffer. This section of stream is small enough that wildlife depending on it will not persist with the stress of human and pet disturbance. This perennial water in Aliso Canyon is the only such habitat between Nogales and Tucson for certain aquatic plants and animals on the west side of the Santa Cruz Valley and is a unique habitat worthy of special protections.

NAME: Aliso Spring Riparian Preserve

SIZE, CORE: Approximately 75 meters by 50 meters (41 acres) of canyon bottom perennial stream and gallery forest; surrounding buffer: 1,046 acres (See Map)

BOUNDARIES, CORE: From the upper most pool of the perennial reach to where the surface flow disappears. Entire Preserve: 1,046 acres delineated by watershed boundaries.

ELEVATION: Approximately 3,826 feet

GENERAL DESCRIPTION OF AREA: Aliso Spring is located in Aliso Canyon on the northwest slope of the Tumacacori Mountains. This small, fragile riparian area includes a gallery forest of mesquite, ash, walnut, netleaf hackberry and large sycamore trees. The spring, which flows year round, supports one of only about four known wild populations of lowland leopard frogs in the Santa Cruz Valley in the United States. These frogs have been protected by isolation from people and invasive predators like non-native fish, crayfish and bullfrogs, and possibly from the diseases they carry as well.

CURRENT USES: This area is currently off limits to the general public because of private property holdings restricting access to the canyon. Livestock is

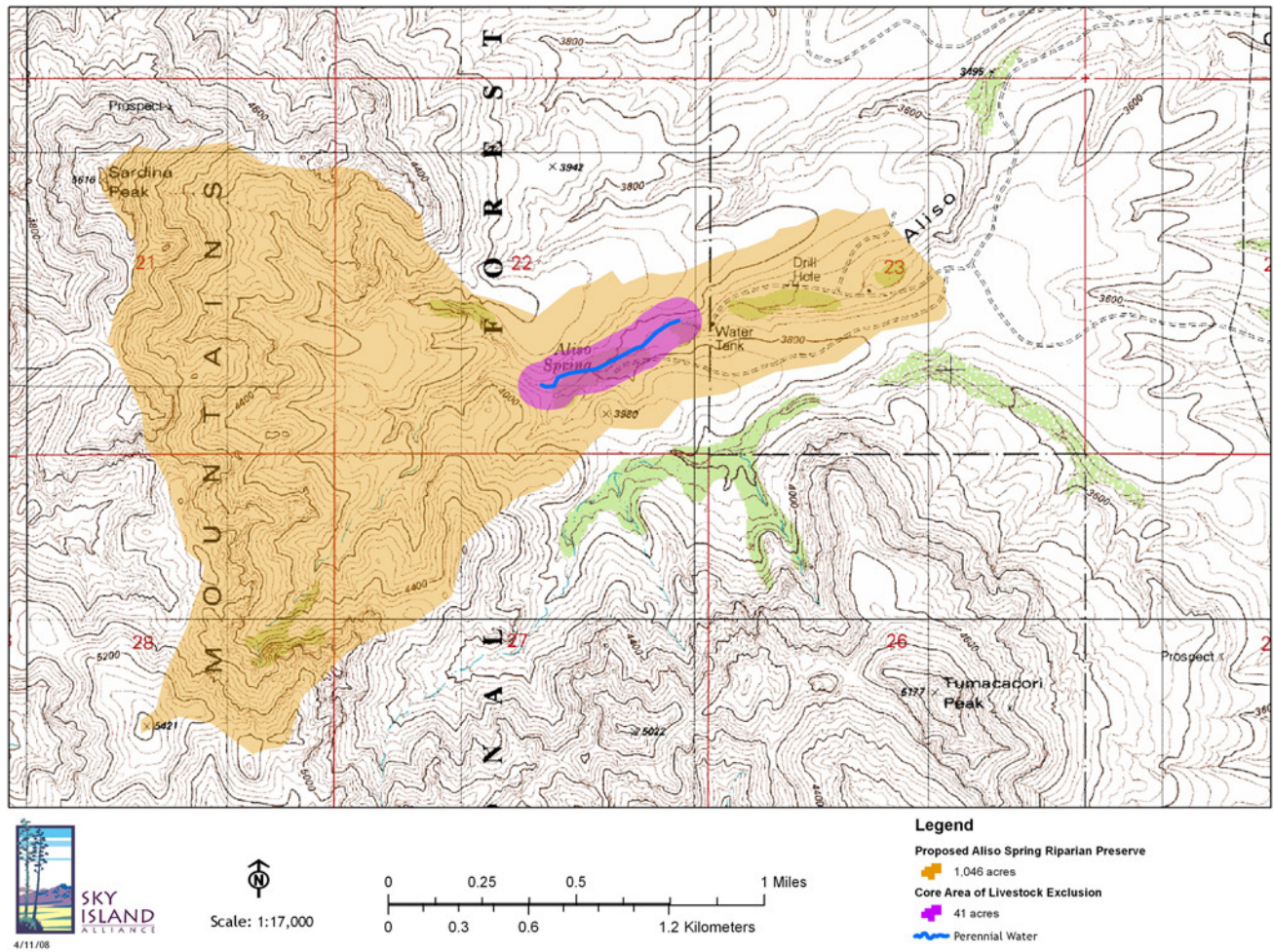


Figure 6.4 Proposed Aliso Spring Riparian Preserve

using the spring for grazing and watering and causing heavy stress to the native fauna and flora of the canyon especially during times of drought.

JUSTIFICATION FOR DESIGNATION: Due to a growing human population in the lower canyon and the continued livestock uses, this small population of lowland leopard frogs could easily be extirpated. The lowland leopard frog is a State-protected species and may be proposed for federal listing under the Endangered Species Act in the future. If re-establishment efforts are to be implemented in the Santa Cruz Valley, where lowland leopard frogs were once common, the Aliso population will likely be the best genetic source. The perennial water in Aliso Canyon is the only such habitat between Nogales and Tucson for certain aquatic plants and animals on the west side of the Santa Cruz Valley, and is a watering

site for far-ranging wildlife.

The canyon is already isolated from the general public by private property holdings at the mouth of the canyon along the east boundary of the National Forest and by large cliffs and difficult terrain to the north, south and west. This should make it relatively easy to protect without much financial obligation.

The Tumatadori Mountains are unique and species-rich due to their location in the transition between the Rocky Mountain species to the north and the subtropical thornscrub and Sierra Madrean species to the south. It is likely that plant and animal species will be discovered at this site that reach their northern most distribution making them rare in Arizona.

RECOMMENDATIONS FOR FUTURE USE: A livestock exclusion should be constructed for the perennial

reach of the stream. With careful monitoring of the flood and drought cycles of the canyon, livestock could be allowed in to help maintain some open water to add diversity to the spring, cienega and stream habitat. If necessary, livestock water could be piped in from downstream or elsewhere, or a small livestock access could be created if the number of cattle is managed to avoid directly depleting the water source. This small and fragile stream habitat should remain relatively secluded from the public and the growing local population should be discouraged from recreating in the canyon for the time being. The stream only flows for approximately 50 meters on

average and during the dry season may be reduced to a couple small pools and a seep. The wildlife depending on this small isolated habitat will not persist with the stress of human and pet disturbance. Stewardship of the spring could be solicited from the private landholders bordering the site. They could be educated on the stressors threatening the preserve to help them reduce their impact on the preserve and in effect, creating a buffer between the preserve and the neighboring community.

PROPOSED BY: Dennis Caldwell, Tucson Herpetological Society, and Philip C. Rosen, University of Arizona

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² Wilson, J.P. 1995. Islands in the Desert A History of the Uplands of Southeastern Arizona. University of New Mexico Press, Albuquerque.

³ Federal Register. 62 FR 49025.

⁴ Wilson, 1995.

⁵ Wilson, 1995.

⁶ 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.

⁷ All of the impacts listed for this threat come from Trombulak, S. C., and C. Frissell. 2000. Review of ecological effects of roads on terrestrial and aquatic ecosystems. *Conservation Biology* 14; 18-30.

⁸ United States Bureau of Mines. 1994. Mineral Appraisal of Coronado National Forest, Part 13: Atascosa-Pajarito-San Luis-Tumacacori Mountains Unit. Intermountain Field Operations, Denver, Colorado. 33 p + Appendices.

⁹ Segee, B. P., and J. L. Neeley. 2006. On the Line: The Impacts of Immigration Policy on Wildlife and Habitat in the Arizona Borderlands. *Defenders of Wildlife*, 2006. Washington, D.C. 40 pp.

¹⁰ All of the impacts listed for this threat come from: Trombulak et al. 2000.

¹¹ This threat is from personal communication with Birdie Stabel. 25 July 2007.