

Restoring Connections



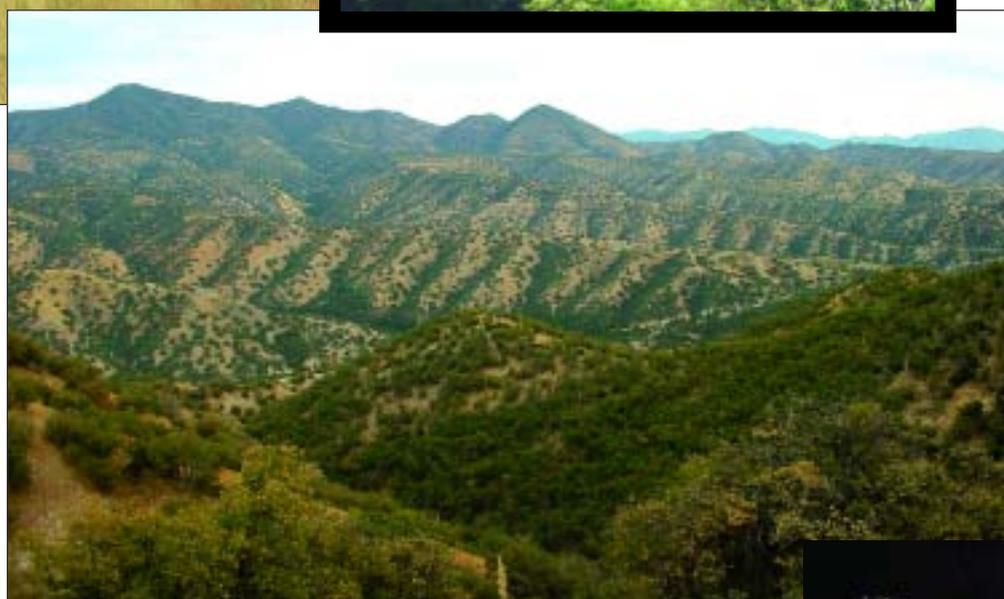
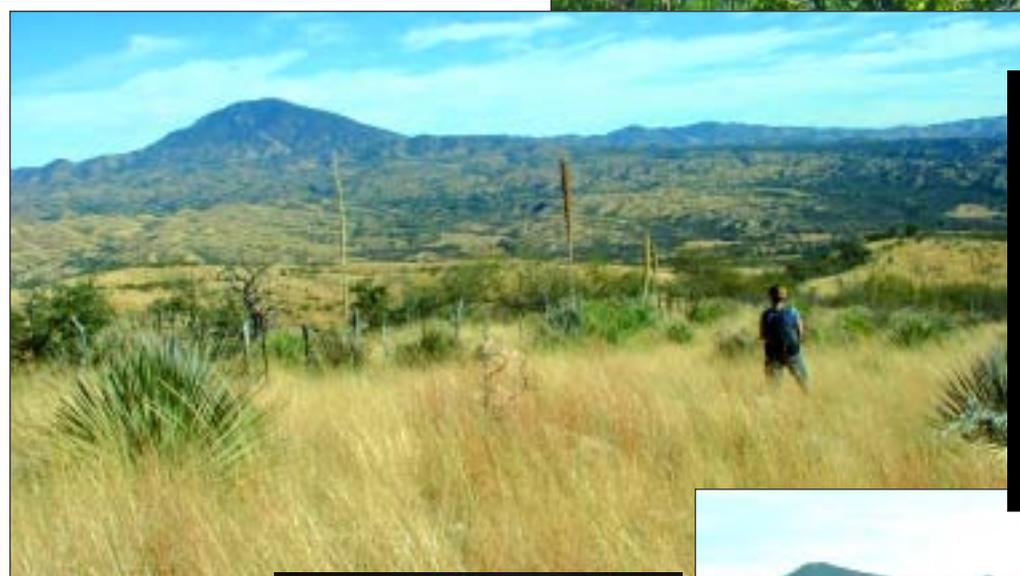
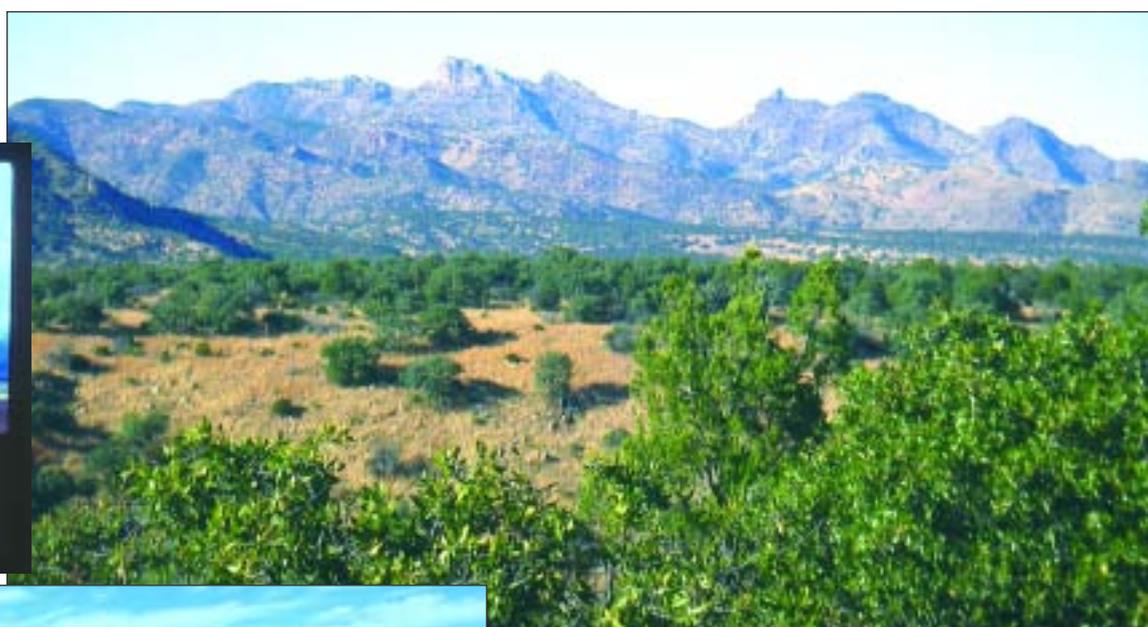
SKY
ISLAND
ALLIANCE

Protecting our Mountain Islands
and Desert Seas

Newsletter of the Sky Island Alliance

Vol. 9 Issue 1 Spring 2006

The Mexican Sky Islands



Photos courtesy Northern Jaguar Project/Naturalia, A.C., Matt Skroch, Sergio Avila, and Octavio Rosas Rosas.



Sky Island Alliance is a non-profit membership organization dedicated to the protection and restoration of the rich natural heritage of native species and habitats in the Sky Island region of the southwestern United States and northwestern Mexico. Sky Island Alliance works with volunteers, scientists, land owners, public officials and government agencies to establish protected areas, restore healthy landscapes and promote public appreciation of the region's unique biological diversity.

520.624.7080 • fax 520.791.7709
 info@skyislandalliance.org
 www.skyislandalliance.org
 PO Box 41165
 Tucson, AZ 85717

Staff

Matt Skroch

Executive Director
 matt@skyislandalliance.org

Acasia Berry

Associate Director
 acasia@skyislandalliance.org

David Hodges

Policy Director
 dhodges@skyislandalliance.org

Trevor Hare

Field Coordinator
 trevor@skyislandalliance.org

Janice Przybyl

Wildlife Monitoring Program
 janice@skyislandalliance.org

Mike Quigley

Wilderness Campaign Coordinator
 mike@skyislandalliance.org

Cory Jones

GIS Specialist
 cory@skyislandalliance.org

Sergio Avila

Wildlife Biologist & Outreach Specialist
 sergio@skyislandalliance.org

Nicole Urban-Lopez

Membership & Outreach Coordinator
 nicole@skyislandalliance.org

Sky Jacobs

Office Assistant
 sky@skyislandalliance.org

Jennifer Shopland

Conservation Associate
 jennifer@skyislandalliance.org

Newsletter

Julie St. John, *Editor & Designer*

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From the Director's Desk:

We were in one of the most remote areas of North America, and had just spent eight strenuous hours manually draining the twenty-five foot deep well that provided water for the small ranch outpost. No electricity for 100 miles — although



an energy of a different sort pulsed through these sheer cliffs, jagged canyons, and oak-tipped sierras of northern Mexico. As we limped back up the hill to the ranchita, a couple of us found enough energy to hike a sharp ridgeline to watch the sun slip beneath the horizon. Under the orange and purple sky, we could peer far into the deep canyons of the Rio Bavispe... we saw nothing but wilderness.



The place is Rancho Los Pavos in east-central Sonora, where the Sky Islands fade into the western foothills of the mighty Sierra Madre Occidental. If you ask someone about the area in the nearest rural town of Sahuaripa — a bone-jarring eight hours away — they may say “oh, where the jaguars are” or “Ah, donde estan los tigres.” We didn't find any jaguars at the bottom of that well, but we did get it cleaned out and in proper condition so that future visitors could draw water without hauling up the heavy buckets.

What brought me to Rancho Los Pavos was the fact that it was recently purchased by the successful Mexican conservation organization Naturalia (www.naturalia.org.mx) for the purpose of conserving the outstanding wildlife heritage there. They and the Northern Jaguar Project (www.northernjaguarproject.org) are teaming up to conduct research, work with the ranching community to conserve jaguars, and purchase additional lands. Sky Island Alliance has supported their important efforts over the years and I was hoping to contribute some sweat equity as well. This trip and many others made by SIA staff over recent years have helped shaped a new perspective on — and new commitments to — our conservation efforts in Mexico.

The Sky Islands and Sierra Madre of northeastern Sonora and northwestern Chihuahua host a beautiful assemblage of people and places. It is a culture of carne asada and chiltepins, where time is reported to stand still, and where the Virgin of Guadalupe smiles at every roadside stand. From the pines of Sierra de los Ajos, to the Sinaloan thornscrub of the Rio Sonora, the southern Sky Islands share many of the same characteristics as those in Arizona and New Mexico — they are in fact the same bioregion — yet, there's something entirely different about them as well. The myriad of differences in culture, population, and land use between the U.S. and Mexico no doubt contribute to this contrast.

Whatever the differences, there are many more similarities. These mountain islands and valley seas south of the border form a critical continental link between the temperate and tropical zones of North America. Naturally, we find more sub-tropically oriented species in the southern portions of the Sky Island bioregion, but the ubiquitous presence of Madrean oaks — and many other species — bind us together as a unique place on earth.

Conservation threats and opportunities south of the border can be dissimilar to those on federal, state, and private lands in the U.S. At Sky Island Alliance, we recognize that our successful conservation approach north of the

border will not yield the same results in Mexico. Our role is different there, and we understand that our Mexican conservation partners are often more appropriate entities to engage in a variety of issues. We continue our efforts in the Mexican Sky Islands with humbleness and a yearning for collaboration with landowners, government agencies, and other stakeholders. Ultimately, we look to building a stronger connection between the people and places of the Sky Islands — north and south. With our on-the-ground restoration expertise and large community of volunteers, we look forward to working with folks south of the border in protecting and restoring the wildlife and wildlands that we share, while also exchanging perspective, laughter, and friendship. The more we understand and appreciate our region as a whole, the more prepared and effective we are in protecting it.

This issue of *Restoring Connections* attempts to highlight just some of the many wonderful attributes, projects, and people of the Mexican Sky Islands. Look forward to more opportunities to explore and learn about these places in the coming year, as we have several exciting projects already initiated with our partners to the south. Please also consider a special donation to our efforts there — your contribution goes a long way, and is a critical component of our shared success. Thank you.

Matt Skroch

When I was in grade school and the Midwest weather was keeping us inside at recess, a group of us would inevitably begin playing the Map Game — draw down the huge world map, stealthily locate an exotic name and challenge your friends to find it. Yes, there ARE two Christmas Islands. At home, I was the great and intrepid explorer of the creek and the woods behind our house.

Now, miracle of miracles, I live on a real-scale topo map. I can lace up my hiking boots, throw water, food, binocs and a bird book into my backpack, and sail my truck to the manzanita- or cholla-studded shores of the Catalinas, the Huachucas, the Chiricahuas, the Pinalenos... And, if my heart is pure (and even when it's not), enter Geologic Time.

I have not explored the Mexican Sky Islands... yet. I certainly will, as soon as possible, after working with such an inspiring group of contributors. Many thanks to Sergio Avila for bridging our initial crossing over that very straight line. For those of you, like me, who don't speak or read Spanish *yet*, you can find a version in English on our website. I am indebted to Sky Island founders David Yetman and Richard Felger for the years of exploration, wonder and insights they graciously distilled into crystalline prose. *Mil gracias* to Sergio (again), Octavio Rosas-Rosas, and Juan Carlos Bravo for the journey into the lands of *El Tigre* — an emblem of our common ground. Deep appreciation also goes to Laura Arriaga, Sonja Macys, Jean-Luc Cartron, Horacio de la Cueva, Michael Wilson, Robert Villa, Paul Condon, Citlali Montañó, Jason Zuzga and Sky Island Alliance staff for making this such a great first issue. And a round of applause to Cory Jones for a terrific map to inspire future explorations... *Julie julie@skyislandalliance.org*

México: un hermoso país megadiverso

Por M.C. Sergio Avila, Biólogo de Sky Island Alliance y M.C. Héctor Avila, Herpetólogo

¿Qué piensa Usted cuando escucha la palabra “México”? ¿Quizá una amplia diversidad de excelente comida, música, gente amigable, paisajes maravillosos, fútbol, sombreros o tequila? Todo esto es cierto, pero en términos ambientales, México representa mucho más que playas y bosques: México ocupa un sitio importante como uno de los países con mayor diversidad biológica en el mundo. México es un país “megadiverso” porque en él existe una gran variedad de ecosistemas en los que vive una gran cantidad de organismos. Este país alberga al 10% del total de especies de plantas en el mundo, de las cuales 40% son endémicas; en México existen 803 especies de reptiles y 361 anfibios, 64% de las cuales son endémicas; también existen 450 especies de mamíferos, 29% endémicas. Esta riqueza biológica se presenta gracias a la combinación de factores geográficos (México se sitúa justo en la confluencia de las regiones biogeográficas neártica y neotropical), geológicos y topográficos, y a sus casi 2 millones de km² de superficie y 12,000 kilómetros de costas.

La gran biodiversidad en México trae consigo la diversidad cultural, con más de 50 etnias indígenas y sus idiomas, comida, vestido, formas de vida e interpretación de la naturaleza. México debe su gran riqueza cultural y étnica a su patrimonio natural, gracias al cual las culturas mesoamericanas florecieron antes de la llegada de los españoles.

Sin embargo, la forma en que el manejo y la conservación de los recursos naturales se hace en México presenta diferencias con base principalmente en el acelerado crecimiento poblacional, el bajo nivel educativo de la sociedad, el rezago tecnológico, la política interna, y la creciente urgencia de satisfacer necesidades básicas (alimento, vivienda, salud, educación, etc.). Todos estos aspectos provocan un inadecuado y desorganizado aprovechamiento de los recursos naturales, que repercute también en la economía. Por esto, mientras que en otros países ya se tienen cubiertas estas necesidades básicas (ya sea con recursos propios o comprados), en México es un problema que dificulta los esfuerzos por conservar la riqueza biológica. Estos problemas y los beneficios por el uso de los recursos naturales no son exclusivos de México, sino que se presentan en otros países megadiversos: Colombia, Venezuela, Perú, Ecuador, Brasil, Indonesia, Filipinas, Nueva Guinea e India.

Un gran porcentaje de la población mexicana no tiene casa propia, trabajo o servicios, de tal forma que se valen de los recursos naturales para sobrevivir. Talan bosques para construir sus casas; utilizan los árboles como leña para cocinar, iluminarse y calentarse; y usan la tierra para cultivar su alimento. Otros cazan la fauna silvestre para alimentarse, lo cual ha puesto en riesgo de desaparecer a muchas especies. Finalmente, otros más han optado por comercializar ilegalmente diversas especies animales y vegetales, impulsados por la fuerte demanda de países más ricos, y comprometiendo fuertemente este patrimonio tan importante del país.

Para entender mejor las diferencias entre el manejo de los recursos naturales en México y los Estados Unidos, es importante comparar el uso de estos con relación a la economía de ambos países. En los Estados Unidos existe un extraordinario crecimiento de las áreas naturales protegidas en los últimos 100 años, y la mayoría de los recursos naturales no se usa para cubrir las necesidades más básicas y elementales

de una población que es dos veces mayor que la de México.

En México ocurre lo contrario: la superficie boscosa disminuye significativamente cada año, además de que la población vive y se mantiene de las áreas naturales al obtener recursos elementales para su subsistencia en cantidades que no pueden ser sustentables a largo plazo. El uso de recursos naturales para recreación es poco considerado; esto es evidente en el desarrollo de términos como *Wilderness, hiking, backpacking* que definen un uso en inglés, pero que cuyo concepto es difícilmente traducido al español.

Actualmente en México se observan avances en términos de conservación pues existen instituciones como la Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO), que promueve acciones relacionadas con el uso y aprovechamiento sustentable de los recursos naturales, y apoya económicamente la ejecución de proyectos de investigación científica. El gobierno federal, a través de la Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT), ha fomentado el aprovechamiento sustentable de los recursos naturales al implementar las Unidades de Manejo y Aprovechamiento de los Recursos Naturales (UMA), que permite a individuos o agrupaciones vender, exhibir o utilizar la flora y fauna presente en sus propiedades, funcionando bajo un programa de manejo y de manera sustentable. La Comisión Nacional de Áreas Naturales Protegidas (CONANP) administra las 150 áreas naturales de carácter federal que representan más de 17.8 millones de hectáreas en el país, clasificadas en 6 categorías: Reservas de la Biosfera, Parques Nacionales, Monumentos Naturales, Áreas de Protección de Recursos Naturales, Áreas de Protección de Flora y Fauna y Santuarios. La Procuraduría Federal de Protección al Ambiente (PROFEPA) es la agencia federal de aplicación de las leyes ambientales, tales como la Ley General del Equilibrio Ecológico y Protección al Ambiente, y la NOM-059-ECOL-2001. Organizaciones no gubernamentales, como Naturalia, CEDO, Pronatura, Hojanay y Pro-Península y universidades y centros educativos realizan investigación, esfuerzos de conservación, educación y divulgación del conocimiento sobre los recursos naturales. Sierra Madre Alliance en Chihuahua y Culturas Nativas en Baja California, son agrupaciones que enlazan la preservación de culturas indígenas con la protección de la biodiversidad en estas se encuentran. Todas estas organizaciones son sólo algunos ejemplos del avance en los esfuerzos de México por proteger sus recursos naturales, sin embargo, aún falta mucho por hacer a favor de la conservación de sus riquezas naturales, así como en favor del desarrollo económico y social de sus pobladores.

Los esfuerzos de conservación en México presentan un gran reto, ya que deben estar ligados a promover oportunidades de educación y desarrollo económico y social en zonas rurales, principalmente. El uso y aprovechamiento de los recursos naturales en México son una necesidad socioeconómica histórica y actual. Nuestros conocimientos sobre manejo de recursos naturales deben ser actualizados con conocimientos sociales, entendimiento de las necesidades locales y regionales y respeto por los usos tradicionales en comunidades rurales.

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Send us your poetry, your words of wisdom, your art!

We want to keep this newsletter filled with inspirational, informative material, and we'd like your help! Do you write poetry? Draw, sketch, paint or photograph? Like to address regional conservation issues? Review books or websites? Anything that related to the Sky Islands region is fair game! You can respond to items in our recent newsletter, comment on your experiences as a volunteer or conference-goer, etc. Or give your favorite small-town restaurant a boost by writing a review and letting us promote it! Also, let us know if you are interested in being a regular contributor, e.g. with a column each issue.

Restoring Connections is published three times a year and the deadline for our next newsletter is April 25, 2006. Material submitted after that date may be saved for subsequent issues.

Please email submissions to: newsletter@skyislandalliance.org, or mail them to Sky Island Alliance, PO Box 41165, Tucson, AZ 85717. Resolution of digital images should be at least 300 dpi if possible.

A Geological Diversity to Celebrate

By David Yetman

From Monte Vista Lookout in the Chiricahua Mountains on a clear day, one can get a mighty fair glimpse of mountains south in Mexico. The vague jumble of the Sierra San Luis is usually visible slightly to the southeast. Even farther south, on days of clarity that almost never happen any more and with a little luck one can discern the Sierra El Tigre, nearly a hundred miles away from Monte Vista. Easier to make out to the southwest are the Sierra Santa Cruz, the monolithic hump not far south of the Mule Mountains and Bisbee, and the long, convoluted Sierra de los Ajos that is home to Sonora's highest peak.

I used to tell people with me on Monte Vista that all those mountains were part of the Sierra Madre. Now I wish I hadn't been so confident. Not that it matters, but the Sierra Madre Occidental probably ends south of the Sierra San Luis, excludes the Sierra El Tigre, and doesn't include Mexican ranges to the west, or the Chiricahuas, either. Geologists have made the case that independent, Sky Island-type mountain ranges and those assuming the caterpillar shape on satellite photos are appropriately part of the Basin and Range Province, not the Sierra Madre. The latter has a basement of granite tough enough to have resisted the stretching that produced Basin and Range block faulting fifteen or so million years ago, and so is more or less a single unit, jumbled though it may be. Sky Islands, including their Mexican associates, are geologically un-Madran.

The continuity of the Sierra Madre mass is symbolized by one fact: Until the 1970s no paved road crossed the cordillera between Sonora and Chihuahua. Today there

are two, one so close to the U.S. border that from Arizona and New Mexico one can see trucks along the highway. The other, constructed at great cost with access to Sonora's beaches by Chihuahuans in mind, requires a minimum of ten hours to connect Hermosillo, Sonora with Ciudad Cuauhtémoc, Chihuahua. It is one heck of a ride.

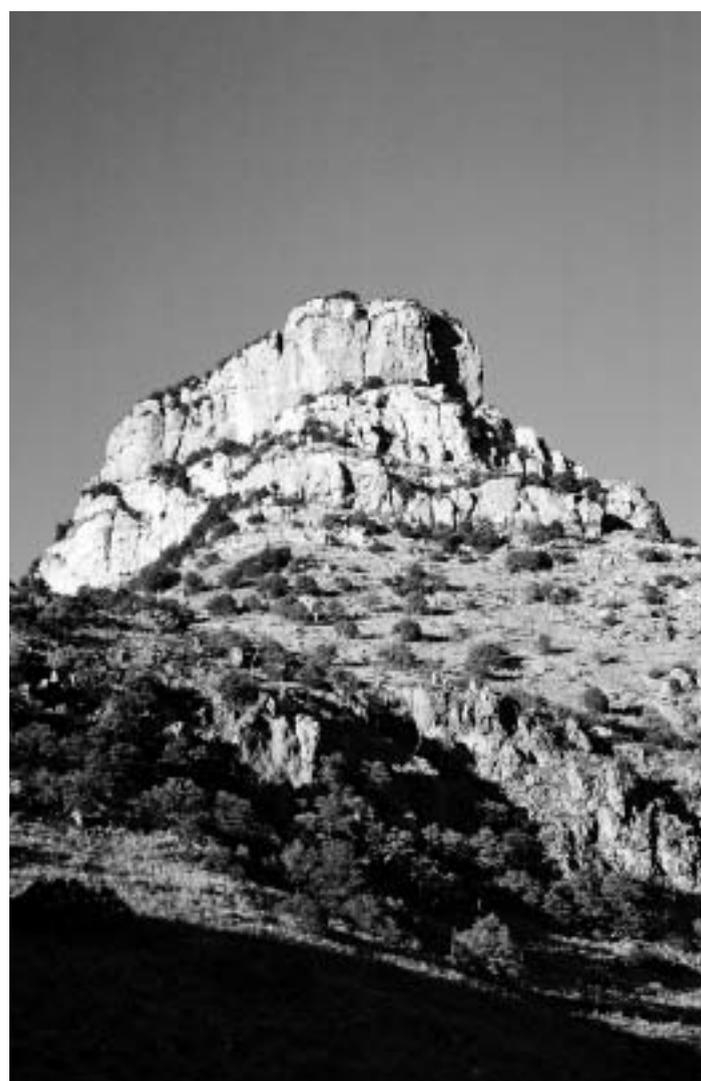
Whether or not the Madran-Sky Island distinction makes geological sense, it doesn't seem to affect the life forms that reach their southernmost, northernmost, easternmost, and westernmost range limits in the Sky Islands. It is the confrontation of four regimes and elevational changes that produces the diversity we celebrate in these ranges, whether Madran or not. We can still refer to their flora as containing strong Madran components. The Sierra Madre is very long and relatively moist: Basaseáchic, Chihuahua, at 8000 feet elevation, averages more than 1100 mm of rain a year, wetter than any place in Arizona; while Yécora, Sonora, at about 5000 feet, averages nearly 1000 mm, nearly twice that of

Prescott, Arizona, which lies at the same elevation. This moisture, the relative warmth, and the wealth of cloistered canyons within the ranges, made possible the continuity southern species required in establishing their outliers in the Sky Islands. The hospitality offered to southern outliers served to ostracize cold weather species from the north. Some examples are the stuff of textbooks: after the warming climate forced the retreat of northern glaciers along with their cooling and dampening effects, some plants (and animals depending on them) were left stranded. In southern Arizona, cold and snow-loving Englemann spruce needed a large, relatively flat area well over 9,000 ft. to accommodate groves large enough to survive at 32 degrees north latitude and the Chiricahuas have become the southernmost range to offer the needed refuge. The spruces' northerly retreat was matched by a northern advance by more tropical trees. Feather trees (*Lysiloma watsonii*) and coral beans (*Erythrina flabelliformis*) staked out turf in the Santa

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Chiricahua Roadless Area. Photograph by Paul Condon.



Roadless Protection for Our Future

By Nicole Urban-Lopez with contributions from the Arizona Wilderness Coalition.

The Roadless Area Conservation Rule, originally enacted in 2001 under the Clinton Administration, was a brief victory for recreationists, conservationists, wildlife, and the general public. After years of research and public input, this Rule was developed to protect 58.5 million acres of pristine National Forest land throughout the United States as a home for wildlife, a haven for recreation, and a heritage for future generations. The protected roadless areas, also known as IRAs (Inventoried Roadless Areas), are considered by the Forest Service to be important biological strongholds and places of refuge for a number of diverse species. Nationwide, these IRAs provide habitat for, or otherwise affect, more than 220 threatened, endangered, and proposed species, and 1,930 sensitive species.

In May 2001, under pressure from Congress and the public, who recognized the importance of roadless protection, the Bush administration pledged to uphold the Rule, promising only minor changes. Since that

time, however, the administration has taken a series of actions that violate its promise, and the Rule was eventually repealed in May 2005. Under the new policy, state governors must proceed through a petition process in order to reinstate roadless protections in each individual state. This places protection of federal land in the hands of state governors and provides the opportunity for states to opt-out of protecting roadless areas simply by choosing not to petition for roadless protection.

This new plan encourages public input, but once the petitions are submitted, governors' proposals can be both modified and overridden by the U.S. Forest Service. Thus, while appearing to give forest management an element of local control, Bush's plan inherently undermines the states' ability to protect their remaining roadless lands. In addition, the new policy ignores the fact that National Forests are treasures shared by people across state boundaries.

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Atascosa Peak in the Tumacacori Roadless Area. Photograph by Mike Quigley.

A Geological Diversity to Celebrate *continued*

Catalina and Rincon Mountains some time in the last ten millennia. Both are solid trees in Mexico but wimpy shrubs in Arizona, a compromise to cold weather.

Other equally revealing stories weave a picture of dramatic convergence and divergence of species derived from incompatible climates. Discovering new northern and southern limits of plants advancing or retreating or marking time is a pastime that will entertain botanists for decades to come. A prominent Arizona botanist told me some years ago that the flora of the Chiricahuas is finished, a statement I found disquieting. However, I can guarantee field botanists that for most of the Madrean ranges and Mexican Sky Islands, huge amounts of exploration remain.

The limits of species distribution between east and west are less obvious and, so far as I can tell, yield less charismatic results. The Sierra Madre and, farther north, the Continental Divide at the Deming Gap, tend to act as a dike keeping frigid Arctic air masses to the east and making for vast floristic differences on each side. The sorting of species east to west and vice-versa involves temperature, but often seems to involve more subtle factors, perhaps literally physical barriers, so east-west swings are more complicated than the tropical-boreal contests. Saguaro clearly cannot tolerate the cold and cloudy days of the Chihuahuan Desert. (Nor can any other columnar cacti except in the extreme southern and lower reaches, in Durango and San Luis Potosí.) That is simple enough. But why Sandpaper oak (*Quercus pungens*) exhibits an affinity for limestones of the Chihuahuan Desert, but not of the Sonoran Desert is less clear. Massasauga rattlesnakes (*Sistrurus catenatus*) seem to flourish in the bajadas east of Portal, Arizona, but have not managed (or cared) to cross the Chiricahuas and stake out territory in the bajadas of the Sulphur Springs Valley. Jaguars, to our great enjoyment, wander into the Sky Islands in

Arizona, but to my knowledge, bison and wolverines have never penetrated the Plains of Sonora division of the Sonoran Desert. These are part of the unraveling natural history of the Sky Islands.

Madrean ranges, including Sky Islands, are specialists in oaks, the outstanding indicator of tropical sorting. It is in the Madrean oak woodland that the greatest plant diversity occurs in northwest Mexico and Arizona, and in their species numbers oaks demonstrate the species richness of the tropics and the hardiness of plants of cooler climates. Richard Spellenberg writes that while Arizona boasts fifteen species of oaks, most of them small (less than 10 meters in height), the Sierra Madre of Chihuahua/Sonora is home to at least thirty-two species, many of them exceeding fifteen meters in height. In the Río Mayo region alone about twenty-three species grow. One, in particular is impossible to ignore: *Quercus tarahumara*, the handbasin oak, a small oak confined to soils of indurated ash and similar acid substrates. Its leaves are circular, concave, and enormous, so large that when shed and lying on the ground they collect usable amounts of rainwater, and so stiff that stepping on the dead leaves produces a loud crunch audible from a distance.

Howard Scott Gentry, in describing the plants of the Río Mayo Basin in Sonora, mentioned stepping out of tropical deciduous forest into “the pleasant land of the oaks,” a feat that is literally possible at that boundary. The oak woodlands at times resemble savannahs and, where exempt from the depredations of cattle, are a most agreeable and friendly mix of individual trees, grasses, annuals, and shrubs, usually quite welcoming to the foot traveler. Even infestations of chiggers during the summer monsoons seem tolerable in the presence of so many graceful trees and the immense variety of plants associated with them. The oak woodland is also the best place to encounter wildlife of all forms. (During acorn season

in the Chiricahuas I have been astounded at the massive piles of bear scat composed almost entirely of acorn shells.)

As vast as the Sky Islands and the Sierra Madre may be, extending from Nayarit in the south nearly to the Mogollon Rim in the north, the threats to their integrity are many and pernicious. Oaks, once spurned by lumberers, are now felled in great numbers for pulp mills. Small to medium size sawmills still decimate the remaining Madrean pine forests and an expanding Mexican population continuously competes with nature for natural resources. As Asian economies expand in increase demand for metals, more mines are being exploited in the mineral-rich zones of northwestern Mexico. By law in both Mexico and the United States, mining outweighs all other considerations. Wilderness is a concept alien to Spanish and Mexican law (no word for wilderness exists in Spanish). “Unused” lands are an anathema to the Spaniard and that tradition continues in Mexican law. Neither Mexico nor the United States officially recognizes the economic value of environmental services. Rather than emotional appeals to values dear to many North Americans but unintelligible to Mexicans, our attempts to preserve biological diversity must rest upon shared goals. Expanded knowledge of what lives and grows in the mountains is the foundation of all attempts to maintain the values of wildness and diversity. As more studies reveal the extent to which the Pinalteños and the Sierra Charuco (near Alamos, Sonora) are biologically connected, those who hope to preserve the immense diversity of our region will be better informed, and thus better armed.

David Yetman is research social scientist at the Southwest Center of the University of Arizona. He is also host of the PBS program, The Desert Speaks. He has written extensively on people and plants of the Sierra Madre of Sonora, including Guarijios of the Sierra Madre, Hidden People of Northwest Mexico.

Benefits of Roadless protection

In Arizona there are about 1,174,000 acres of IRAs on forest lands. Protecting this land would provide a critical refuge for the 71 species of plants and animals that are currently listed as threatened, endangered, or that have been proposed for listing under the Endangered Species Act in Arizona. Some of these species include the Mexican Spotted Owl, the Sonoran Desert Tortoise, and the Jaguar. Because roads sever open landscapes into smaller parcels, Roadless protection would help reduce habitat fragmentation, encourage the return of native species that once flourished in many of these areas, and would help protect the land from invasive non-native species by encouraging a balanced ecosystem that acts as a natural barrier against threats.

In Arizona, where forest fires have endangered many families and destroyed thousands of acres, roadless areas actually serve as forest fire deterrents. According to the Forest Service, approximately 12 million acres of National Forests are at risk of fire, while only about 300,000 acres — less than three percent — of IRAs are at risk. This is because roadless areas generally see less human traffic and are therefore at a lower risk for human-caused fires. Statistically, 92% of fires started by lightning strikes occur outside of roadless areas.

Roadless areas, being generally devoid of houses, buildings, and other installations, also provide the best opportunities for allowing wildfire to play a more natural role within ecosystems. For instance, in eastern Arizona numerous fires have been allowed to burn in the Blue Range Primitive Area and surrounding roadless lands. Since 1979, some areas have burned as many as five separate times, similar to what was once the frequency of natural fire. As a result, there is a diverse mosaic of vegetation associations throughout that area and it is one of the only places in the state where young stands of aspen are regenerating.

Protecting roadless areas also safeguards clean water emerging from forest headwaters and flowing in streams. Nationwide, there are more than 2,000 major watersheds in IRAs that collectively provide water to over 60 million people across the United States. Arizona has experienced drought conditions for most of the last decade. With dozens of watersheds in Arizona’s IRAs, protecting these areas will help ensure that they continue to provide clean water to areas that depend on them.

In addition to providing critical ecological forest protection, Roadless protection provides full access for recreational activities such as backpacking, camping, hunting, and fishing. Under Roadless protection, no existing road or trail will be closed, therefore, these pristine areas will remain accessible

to the general public. For these reasons, roadless protection is a fair and balanced way to preserve our landscape for the future while continuing to permit responsible use of the land.

What does this mean for Arizona?

At the time of this writing, conservationists, including Sky Island Alliance, are working with Governor Napolitano to protect the state’s Inventoried Roadless Areas. We are fortunate to have a Governor who listens and who recognizes the value of protecting our roadless areas. Well over 19,000 Arizona residents commented in support of the 2001 Roadless Rule, 93.2% of the total number of comments from Arizona.

We need to show Governor Napolitano that we still support Roadless protection. In compliance with the petition process, public input will be gathered through a series of public meetings. We must take full advantage of this opportunity and ensure that our last wild forest lands are protected. **SIA members, please stay tuned to this issue and plan to attend public meetings this Spring and Summer to advocate for the protection of our remaining roadless areas in Arizona.** We are committed to making Roadless protection in Arizona a reality, and we will keep you updated on the meeting schedule as soon as it is finalized.

Botanical Treasures of the Northern Sierra Madre Occidental

©Richard Felger, Drylands Institute, Tucson, AZ

Cycads, orchids up in trees and hanging on cliffs with bromeliads and palms, oak leaves as big as a sombrero, magnolias, subtropical pines, and much more. Does that sound like something next door? Well, it is, and all those treasures and more are in the great mountain chains of northwestern Mexico next door to the Sky Island mountains of the southwestern United States.

When I think of the Sky Islands, I first think of Joe Marshall's *Birds of the Pine-Oak Woodland*. (If you are a card-carrying member of the Sky Island Alliance and have not seen this great work, then your education is not complete.) Joe Marshall elegantly described the plant and bird life of the Sky Island mountain chain strewn along the northernmost spine of the Sierra Madre Occidental in northeastern Sonora and northwestern Chihuahua as it marches into adjacent northeastern Arizona and southwestern New Mexico. As a student at the University of Arizona, I had the privilege to accompany Joe on field trips to northern Sonora. Joe recorded birds and I pressed plant specimens. We usually went during summer vacation—often in June when it was hot and dusty, and we naturally gravitated to riparian canyons full of interesting birds and plants. That's where the action is in early summer at the height of the pre-monsoon dry season.

One late June day we ended up at Nacori Chico, in northeastern Sonora about 175 km south of the Arizona border, then at the end of a seemingly endless dusty dirt road. On the way we went by brown hills and mountains of scruffy scrub, exhibiting patchworks of elements from the northernmost tropical thornscrub, northern mesquite-grassland, borderlands oak-grassland, Sonoran and Chihuahuan deserts, and northern and southern riparian elements along the occasional canyon-bottom crossings. At Nacori Chico we hired a local guide to take us the next day to canyons along

the Río Sátachi. It was already hot in the early morning as we piled up sleeping gear, plant presses, water cans, and some food to stuff into gunnysacks. I helped tie the gunnysacks into a balanced load for the ever-patient burro. By nightfall we reached the river and made camp along the canyon bottom in a place just below 700 m that defies the usual simplistic classification of vegetation. It was a place where the north truly meets the south. Northern, temperate-deciduous trees like bigtooth maples (*Acer grandidentatum*) mixed with sycamores (*Platanus racemosa*) along the trickling streambed, and subtropical southern elements such as organpipe cacti (*Stenocereus thurberi*) and palms (*Brahea nitida*) were on south-facing slopes. I was already out collecting plants while Joe stayed in his hammock recording birds during the dawn bird chorus.



In the checklists of Sky Island plants along the north-south Sonora-Chihuahua borderlands, there are hundreds of “southern tropical” species and genera, and dozens of plant families, at their northern limits but relatively few “northern temperate” taxa at their southern limits. (I am using the term “tropical” to denote taxa of subtropical or tropical affinity, i.e., Neotropical affinity.) Two major factors help define the northern limits for the tropical plants—drought and freezing. The increasing drought westward and northward as you approach the U.S.-Mexico borderlands pushes tropical plants up along the mountain regions to the east of the Sonoran Desert. So at higher elevations and northward you come into that invisible place where freezing weather becomes a real factor. Drought and frost stop the march northward, but the southern march is not so sharply defined because precipitation is the overriding factor and winter freezing is not. The southward march can be accomplished by plants extending their geographic ranges inland at higher elevations. On the eastern

flanks of the Sierra Madre Occidental are high plateaus and mountains where strong winter freezing is commonplace, and there is strong northern, or Nearctic, affinity for plants in grasslands and the once near-continuous oak and conifer forests. In contrast, the western or Pacific flanks of the Sierra Madre Occidental are incredibly rugged, broken mountains cut by endless series of great canyons. South of the rather fuzzy freezing line, the western flanks support tropical deciduous forests at lower elevations and complex zones of oaks and pines at higher elevations where winters are mild. In such complex topography, however, even at higher elevations there are often frost-free niches among rocks, on slopes, and in places of thermal inversions.

The northern limits of these tropical elements relate to the shape of the continent. Look at the North American Turtle Island map, in which the shape of the continent is compared to that of a great mythical turtle. It's a male turtle because the tail, represented by Mexico, is big and thick (a feature of male turtles). The base of the tail is just below the international border—and near its western edge is the Sierra Madre Occidental. The hind end of this huge turtle carapace sits right along the U.S.-Mexico borderlands. So what do you see? You see the tail extending into the tropics, getting narrow southward and surrounded by warm ocean that ameliorates the climate, making it more tropical and generally eliminating frost except at the highest elevations. The places of increasing frost to the north are farther and farther away from the ocean, where the continent or turtle's body widens abruptly—in other words, a more continental climate and winter freezing.

It is well known among those of us who have grown desert and tropical deciduous forest plants from Sonora that many of them tend to be highly frost-sensitive as compared to their counterparts (or vicariad taxa) in northeastern Mexico. Such plants in northeastern Mexico, including the Sierra Madre Oriental, have evolved to withstand the occasional northers that sweep down through the Great Plains into Mexico from high latitudes. (It is said that the only thing between Texas and the North Pole is a barbed wire fence.) In contrast, there are near-continuous mountains in the West to help block the

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Bobcat track found during training workshop on the Rancho San Bernardino in Sonora, Mexico.

Photo by Matt Skroch

Wildlife Monitoring Program: Expanding our horizons, north and south

By Janice Przybyl, Wildlife Monitoring Program Coordinator

Sky Island Alliance's Wildlife Monitoring Program is unique in its incorporation of “citizen science,” which builds grassroots support for protection campaigns that is dovetailed with conservation biology research. By training and mobilizing concerned citizens and volunteers, Sky Island Alliance is able to shed light on little-known movement patterns of specific species within the Sky Island region. Until recently Monitoring Program volunteers adopted tracking transects within four established project areas: the Tumacacori-Santa Rita Linkage, the Cienega Creek Watershed, the Dragoon-Whetstone Linkage, and in the Peloncillo Mountains that meander along the New Mexico/Arizona border. Now, we are broadening our scope and exploring two new areas: the Sky Islands of northern Sonora and the urban fringes of northwest Tucson.

Sky Islands of Northern Sonora

Last November, fifteen students; three instructors, and three staff members from Sky Island Alliance gathered on Rancho San Bernardino in Sonora, Mexico for the Wildlife Monitoring

tracking workshop. As the ninth workshop conducted by Sky Island Alliance, this event held special significance as the first to be held in Mexico and represents our interest in learning more about cross-border movement by wildlife and the importance of Rancho San Bernardino as a wildlife movement linkage. The Ranch — privately-owned and about 20 miles east of Aqua Prieta — was a very exciting locale for our workshop, with two drainages, Silvercreek (originating in the Chiricahuas) and Black Draw (from the Peloncillos) coming together on the Ranch as the Rio San Bernardino. The ranch provides habitat for a variety of mammals and tracks were plentiful: mountain lion, bobcat, raccoon, skunk. Plans are to return this year to conduct more formal wildlife surveys.

In addition, in 2005 we launched the Jaguars of the Sonoran Sky Islands project. As lead investigator, Sergio Avila conducted a feasibility study to evaluate the possibility of doing ongoing research related to the presence and movement

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***Dioon sonorensis* and Damián Saavedra on a sky island in Sonora, Mexico.** Photo by Jesús Sánchez-Escalante.

Botanical Treasures continued

northers. For example, the cycad *Dioon edule*, from northeastern Mexico, is quite frost-hardy in cultivation in Tucson, but *D. sonorensis*, from northwestern Mexico, is relatively more frost-sensitive.

Since I am pressed for time and space (like my herbarium specimens), I will end the general discussion and tell you something about a few favorite plants of the northern extension of the Sierra Madre Occidental in eastern Sonora and westernmost Chihuahua.

Cycads, those so-called primitive plants that conjure up late Mesozoic visions of seed plants that preceded flowering plants, encircle the tropics of the world. One cycad species, *Dioon sonorensis*, called *palma de la virgen* in southeastern Sonora, is the poleward representative in western Mexico. Like a giant tortoise, its progress in life is slow, and these cycads probably can live even longer than a giant tortoise. The trunks are short, usually less than one meter long, thick and scaly (reminiscent of a fat reptile), and often fire-scarred. One plant was found with a trunk nearly four meters long growing up and hanging over huge rocks on the side of a canyon.

of jaguars in northern Sonora, Mexico. During four fieldtrips to the project area, Avila led a small team of volunteers to assess habitat. Groundtruthing land status was another objective, but equally important was meeting and greeting landowners and rancheros. (Please see Sergio's recount of their adventures on page 8). Sky Island Alliance's long-term goal is to build a cooperative relationship with landowners in the Sky Island mountains south of Nogales, Sonora in order to promote jaguar conservation and to facilitate research in an area possibly used as a wildlife movement corridor to the United States.

Back in the USA

On Tucson's northwest side lay the extremely tenuous wildlife linkages between the Santa Catalina, Tortolita and Tucson Mountains. Rapid population growth and the consequential infrastructure improvements in Oro Valley and Marana are changing the landscape and diminishing the ability of wildlife to safely move between the mountains. The need is urgent and we are in the initial stages of creating a project to investigate where critters cross the roads, specifically North Oracle Road and under

Male and female cones are produced on separate plants, and seed cones take about a year to ripen. Each year, around the onset of the summer rains, a crown of leaves emerges and quickly expands to full-sized firm, spinescent leaves.

Sonoran cycad populations tend to be small and occur in isolated pockets, most often at a surprisingly sharp boundary between the upper elevation limit for tropical deciduous forest and lower limit for oaks. On one mountain in southeastern Sonora, I found several dozen *Dioon* plants on a steep, rocky canyon slope. Most were fire-scarred and I inferred that the upper limit of the tropical deciduous forest here was kept in check by the periodic fires that one sees just before the summer rains-low, creeping fires carried by dry grasses and fallen oak leaves. The oaks were "tropical" species like *Quercus tuberculata*, which become drought-deciduous before the summer rains. Other tropical species in the narrow cycad zone, also at their northernmost limits, included the cowhorn orchid, *Cyrtopodium punctatum*, with its large pseudobulbs and anchored in rock crevices among *Brahea dulces* palms, and the red-flowered bromeliad *Pitcairnia palmeri*. Clinging to sheer rock faces were other pseudobulb orchids such as the yellow-flowered *Oncidium cebolleta* and the fragrant-flowered *Encyclia*

Interstate 10 in Avra Valley. Through data collected by our volunteer trackers, we hope to provide land managers and highway engineers with information they need to determine effective methods of creating safe passageways for wildlife.

The land between the mountain ranges is expansive and filled with other obstacles beside major roads: railroad tracks, the Central Arizona Project, fences, walls, lights, parking lots and more. For now, the landscape remains fairly permeable to wildlife movement between the mountain ranges. Last October the Arizona Daily Star published a story with an accompanying map depicting the travels of a male mountain lion. The lion moved back and forth between the two ranges, crossing Oracle Road three times within a 10-day period. Glad tidings, but we must work hard to ensure safe passage for this lion and other wildlife throughout the Sky Island region. If you are interested in helping, please contact me at 520.624.7080 x203 or janice@skyislandalliance.org. I will send you detailed information about the program and the training workshop. Currently, only the new Tortolita Mountain Project and the other four project areas in Arizona and New Mexico are open for new volunteers.

adenocarpum; *Tillandsia cretacea*, a "tank-type" bromeliad that can hold about a liter of water cupped in its leaf bases; and *Tillandsia capitata*, which turns almost red in the dry season. The cycads are vulnerable to overcollecting for the landscape trade in Sonora and by plant enthusiasts. They are generally available in the specialty nursery trade from nursery-propagated plants, and it is decidedly incorrect as well as illegal to rip them off in the wild.

Ascending to the upper edge of the tropical oaks and the lower pines in southeastern Sonora, near the often lawless Chihuahua border, are some scattered riparian canyons in the oak-pine zone where *Magnolia pacifica* var. *tarahumara* finds its northern limit. These magnolias are tall trees bearing large waxy white flowers typical of more familiar members of the genus. The red seeds, in cone-like fruiting structures, are evolved for bird dissemination. In one magnolia canyon I found a large patch of the spectacular *Stanhopea* orchid on a rock face jutting out between two forks of a small waterfall. There is no other record of this orchid so far north. These and hundreds of other species and genera of tropical affinity in the northern Sierra Madre Occidental range southward into the American tropics.

I could go on and tell you about half a dozen species of palms in three genera, a similar number of giant tropical figs (*Ficus*), five subtropical pines, more than two dozen species of oaks including the Tarahumar oak (*Quercus tarahumara*) with hat-sized leaves, and hundreds of other subtropical/tropical plants. But you can also see some of these plants growing at the Arizona-Sonora Desert Museum and in images on their website, read about them in the books listed below, or go to the Sierras. And please stay involved in Sky Island conservation.

Selected suggested reading:

- Charles Bowden, Jack W. Dykinga, & Paul S. Martin. 1993. *The Secret Forest*. University of New Mexico Press, Albuquerque.
- Jean-Luc E. Cartron, Gerardo Ceballos, & Richard S. Felger, editors. 2005. *Biodiversity, Ecosystems, and Conservation in Northern Mexico*. Oxford University Press, New York.
- Richard S. Felger, Mathew B. Johnson, & Michael F. Wilson. 2001. *Trees of Sonora, Mexico*. Oxford University Press, New York.
- Joe T. Marshall, Jr. 1957. *Birds of Pine-Oak Woodland in Southern Arizona and Adjacent Mexico*. Pacific Coast Avifauna no. 22. Cooper Ornithological Society, Berkeley.
- Paul S. Martin, David Yetman, Mark Fishbein, Phil Jenkins, Thomas R. Van Devender, & Rebecca K. Wilson. 1998. *Gentry's Río Mayo Plants: The Tropical Deciduous Forest and Environs of Northwest Mexico*. University of Arizona Press, Tucson.

A trip to Alamos, traveling across the Sonoran Desert with my beloved high school biology teacher, Nancy Thomas Neely, and her husband, Peter, fueled my interest in the Sonoran mountains. I went to the University of Arizona because it was close to the splendors of the Sierra Madre Occidental and the Sonoran Desert. Later I worked at the University of Colorado at Boulder and then the Natural History Museum in Los Angeles, but was soon back in Tucson for all the obvious reasons. I worked in research at the Arizona-Sonora Desert Museum and the Environmental Research Laboratory, University of Arizona, and continue my association with both places. In the early 1990s I founded Drylands Institute in Tucson (see Drylandsinstitute.org). During 1991 a small group of us met in the living room of Susie Brandes' apartment near the University of Arizona and formed the Sky Island Alliance. Drylands Institute served as the non-profit umbrella until Sky Island obtained its own status. David Yetman was made president and I was the default veep. Viva Sky Island!

On the Ground in Sonora

By Sergio Avila, M.S., Sky Island Alliance Conservation Biologist

It was a cold afternoon of early December in the Sierra Azul; we had been driving most of the day trying to get our permits to drive south of the border and looking for roads that would take us to the east side of Sierra La Madera, a mountain range east of Highway 15, part of the beautiful Mexican Sky Islands. We finally decided to camp at this grassy spot with scattered junipers and an amazing view of a beautiful sunset, with reds and oranges reflecting on Sierra Azul, clouds brushing the sky and a soft and chilly wind blowing. We gathered some firewood, set up the tents, made the fire ring, started the fire and cracked the first beer. My chicken was marinating in a spicy chipotle-and-onion sauce, and Trica was working on her vegetables and salad. Elissa and Steve were taking care of the bedding arrangements. Yes! It was the perfect spot, the perfect day and the perfect group.

When I saw a cowboy riding on the road to our campsite, I walked towards him to say hello, and as he turned towards me, I waved at him. His face was tense and his eyes were spitting fire. “*This is private property, get out of this land!*” he said angrily, adding, “*Put that fire out, you’ll burn my ranch!*” We were apparently camping on his private ranch where he protects game for hunting and raises cattle. I was afraid we were going to get shot at by this angry rancher! So we put the fire out, broke camp down, put our tents away and my spicy chicken back in the cooler, and shoveled everything back in the truck, including some firewood, since we didn’t know where we would go. The car was a mess, there were sleeping bags and food everywhere; I couldn’t see anything in the mirror and firewood was stuck under my seat. We drove off the perfect campsite.

On our way out, we stopped to apologize to the owner for the one hundredth time and explained who we were and what we were doing. We chatted for some minutes and we both learned about the other’s doings in the world. Then all of the sudden he understood: “*Oh, you’re not hunters? Go back to that campsite and make yourself at home,*” he said, pointing in the direction where we had dismantled our campsite 30 minutes earlier. So we did. And my spicy chicken was so good.



Working in the backcountry in Mexico is always an amazing adventure. I can remember many camping spots from Baja California to Chiapas, the desert in Durango and the Sierra Madre of Chihuahua and Sonora, all of them under the same sky, with the smell of firewood, with friends of similar interests and dreams. And some of these spots have been in the Sonoran Sky Islands in the last months of 2005.

In October 2005, Sky Island Alliance’s Wildlife Monitoring Program decided to do the “big jump” and become “international” — Wildlife Monitoring Program Coordinator Janice Przybyl and other SIA staff decided to have a Volunteer Training Tracking Workshop in Sonora. We found a great place (the San Bernardino Ranch), we had the perfect facility, and a big group of people, volunteers and tracking instructors. However, we also faced a challenge: the lack of electric power, and when a workshop is based on computer presentations, this is quite a challenge!

Then, in December of 2005, the Wildlife Monitoring Program undertook another new effort in Mexico, a feasibility study we’re calling “Jaguars of the Sonoran Sky Islands.” Our goal is to find suitable habitat for jaguars in mountain ranges south of the border and

possibly the corridors for those cats “spotted” in southern Arizona.

Accompanied by fifteen of our finest volunteers, I conducted four field visits for this project, exploring roads, seeing new canyons, mountains and forests, looking for wildlife sign and meeting local people — one of them, our friend from our camping adventure. We saw different *Sierras* in Sonora, from the grassy “La Madera,” to the highly forested “Cibuta,” to the inaccessible “Sierra Azul,” to the Organ-pipe cactus in “La Jojoba,” and to the place where we all want to retire — “Sierra El Pinito,” a true naturalist’s paradise.

Pine trees and junipers, oak woodlands, hip-high grasses, agaves and yucca trees; yellow Sycamores and dormant cottonwood trees along the Santa Cruz and Magdalena rivers; clear water ponds and small springs, and remains of ancient cultures like the Yaquis; the Sonoran Sky Islands represent the Sky Island region with their own touch and flavor.

The small ranches, the old trucks loaded with firewood, the roads that seem to go nowhere and the cowboys riding peacefully. People seem to live at a different speed here, they take the time to eat their breakfast, milk their cows and prepare flour tortillas before each meal; they take the time to talk to unknown people lost in one of those roads, and offer coffee or tortillas to the visitors. We met all kinds of people, from the ones surprised to see so many *gringos* following a Mexican through the mountains, to the ones offering a place to stay, carne asada tacos and coffee, to the ones not very happy to see us in their land. We hiked in canyons, on mesas and around water ponds looking for animal sign; we drove many miles on dirt roads; we opened dozens of gates (and closed them too); we camped in beautiful places, enjoyed a fire at night and sometimes woke up with ice on our sleeping bags in the morning.

During these trips, we identified an array of animal species and sign (tracks, scats and scrapes), such as: jaguar, mountain lion, bobcat, black bear, coati, coyote, gray fox, skunks, raccoon, white-tailed deer, collared peccary, rabbits, jackrabbits and ground squirrels. All these species are potential prey for jaguars, so their existence in the area raises the chances for jaguar presence. Moreover, we found a set of jaguar tracks approximately 20 miles south of the border (which confirms the existence, at least temporarily, of jaguars in the area). Some of the bird species we identified: a family of Montezuma quail, Gould’s turkey’s tracks, the big Great blue heron and the little Green heron, interesting raptors like Cooper’s hawk, Northern goshawk and Red-tailed



Tracking in Sierra Cibuta.
Photo by Sergio Avila.

hawk, the noisy Mexican jay, the colorful Elegant trogon, the tiny Green kingfisher and the Belted kingfisher, roadrunners, nighthawks and chatty ravens. All in our search of the secretive jaguar, its habitat and sign.

The photo-documentation of jaguars in Arizona over the last ten years suggests that individual jaguars are traveling from source populations in northern Mexico to the United States, via the Sky Islands of Sonora. While data exists on the assumed origin of these dispersing cats in Sonora and information is emerging on their northern reach in Arizona, little data exist on the presence of jaguars within the 150 miles of habitat between these two areas. Furthermore, in addition to being a wildlife linkage, the Sonoran Sky Islands may support a resident breeding population of jaguars, and I would love to find some of those secret places!

The need for additional jaguar research in the Sonoran Sky Islands is evident not only for the immediate protection of individuals moving northward, but also for generating a better informed conservation strategy that integrates the scientist, landowner and other stockholder’s perspectives. Lack of knowledge related to the jaguar’s ecology is a conservation threat! Through research efforts, working with landowners, and conservation actions will we be able to generate and implement sound conservation strategies in the southwestern United States and northern Mexico.

Our initial contact in an area such as the Sonoran Sky Islands, with its new conservation challenges and alternatives, opens the door for opportunities in conservation and restoration of wildlife and their habitats in the region as a whole. The objectives established for this feasibility study recognize the need for ecological information and the importance of landowners’ participation as part of the natural resources system management. While building a cooperative relationship with landowners, we will begin the use of non-invasive research techniques, such as remote cameras, track surveys and scat collection.

There is great potential in this project and I am honored to be part of this effort, to travel with volunteers, and have unexpected adventures, drive unknown roads, see beautiful areas and meet friendly people, and to share a piece of my country with everybody at Sky Island Alliance. Based on our common interests and approaches, innovative scientific-based work and with the strong support of our volunteers and members, we have started to plant the seeds that will grow into a healthy harvest: the preservation of the Mexican Sky Islands.

A New Alternative for Jaguars in Northern Sonora, Mexico

By Octavio C. Rosas Rosas¹ and Raul Valdez, Department of Fishery & Wildlife Sciences, New Mexico State University, Las Cruces, NM, USA. ¹Present Address: Colegio de Postgraduados, Campus San Luis Potosi, Mexico, 78600, octaviocrr@colpos.mx

Jaguars (*Panthera onca*) are endangered and protected in Mexico and the United States. In northeastern Sonora, the northernmost breeding population of jaguars in the Americas inhabits the mountainous ranges of the Sierra Madre Occidental in the municipality of Nacori Chico.

This population is probably the source of recently recorded jaguars in the U.S. In northeastern Sonora, illegal killing of jaguars because of livestock predation is probably the main threat to these felids. Since 1999, eleven known jaguars have been illegally killed in this area due to livestock predation. We conducted a four-year study of jaguars in the northern Sierra Madre Occidental, which is the largest mountain range in northwestern Mexico. It encompassed approximately 400 km², included 11 private ranches, and was located about 60 km southwest of Nacori Chico, a municipality approximately 270 km south of the Mexico-U.S. border.

Ninety percent of the land in northeastern Sonora is private and most of the rest consists of communal lands (*ejidos*). Cattle ranching, which became established in the 18th century, is the main rural land use in northeastern Sonora. Prices of cattle depend on the beef market and fluctuate annually, and profitability depends on those fluctuations, weather, and marketing policies between Mexico and the U.S. Despite the tenuous profitability, the inherited tradition of cattle ranching is strong in northeastern Sonora and ranchers continue to be engaged in livestock enterprises despite droughts, fluctuating beef markets, and predators. For many cattle operations, however, especially smaller ones, jaguar or puma predation on livestock can be an economic problem difficult to overcome.

Jaguars and pumas (*Puma concolor*) have been recorded as serious predators of livestock throughout the Americas. Past research suggests that jaguar predation on livestock occurs because of learned behavior of specific individuals, injuries to jaguars, lack of appropriate cattle management strategies, lack of natural prey, local habitat attributes, weather, and human tolerance including local culture and government policies.

Past solutions to prevent or minimize predation on livestock included compensatory payments, translocation of individual felids, electric fences, guard dogs, and taste-aversion collars fitted to livestock. These alternatives must be carefully studied before their use. Some of these solutions are too expensive for an average Mexican cattle rancher. Consequently, in northern Mexico, predators such as pumas or jaguars are eliminated simply for being a potential threat to livestock or game species. For many communities, this has often been the easiest solution.

Each country and region has its own unique culture and policies, and even though jaguars are protected throughout Mexico, predator control is commonly practiced because of fears of economic harm. The Mexican government has not developed economic alternatives for landowners to compensate or mitigate predation on livestock. Further, Latin American

countries including Mexico have human quality-of-life problems to solve, such as education, food, and housing for communities in remote areas. Because of the complexity of both the human social situation and the myriad of factors influencing jaguar or puma depredation on livestock, predation problems should be managed according to each local situation. Understanding in detail the circumstances surrounding jaguar and puma attacks on livestock and preventing or mitigating them is a crucial issue for managing and conserving large predators and their habitats, as well as for developing tolerance and an appreciation of large predators in rural agrarian communities.

Jaguar Conservation Action

Since the beginning of our project, we have conducted meetings, workshops, and talks among landowners of Nacori Chico, Sonora. Public meetings were conducted at cattle ranches, the headquarters of Nacori Chico, and Hermosillo, capital of Sonora. Public meetings included federal and state authorities, landowners, and researchers from several institutions and organizations. In early meetings in 1999, landowners and researchers agreed to look for solutions to mitigate and compensate jaguar predation on livestock and cooperate with basic information on cattle operation. In July 2002, in agreement with eight landowners, we submitted to the chair of the wildlife offices of SEMARNAT in Mexico City the official request to initiate a jaguar conservation plan in northeastern Sonora — establishing a wildlife management unit to initiate sustainable conservation and manage exclusively the species listed as game species, with the jaguar as flagship species.

In January 2003, the Unit of Conservation and Wildlife Management (UMA) “Programa de Conservación del Jaguar en la Sierra Alta de Sonora” was officially established. Species authorized to be managed and hunted were determined by a management plan, which was submitted along with the official request to initiate a UMA. The management plan of the UMA was approved for sport hunting, research, and ecotourism. Sport hunting is strictly regulated by a general management plan for the UMA and individual plans for each species, including close monitoring to determine harvest quotas. The status of the species was determined by field research conducted as part of the jaguar research program and was part of a doctoral and two master research programs. The UMA was established for an initial period of three years and species authorized for sustainable use include: white-tailed deer, collared peccary, coyote, cottontail, wild turkey, Gambel's quail, elegant quail, Moctezuma's quail, white-winged dove and mourning dove. Field surveys demonstrated that these species were common and abundant within the study site.



Adult male jaguar photographed in semitropical-thornscrub habitat in the municipality of Nacori Chico, northeastern Sonora, Mexico. Photo courtesy Octavio Rosas Rosas.

A new American outfitter organization named “Primero Conservation Outfitters, L.L.C.” was created to promote sport hunting. This organization is the first outfitter organization of its kind in the southwestern United States, due to the fact that its goal is promoting sport hunting for conservation, and marketing specifically to people who will pay for a hunt of a white-tailed deer, knowing that the hunt is not guaranteed. Whether or not the hunter gets his trophy, his money will be declared as a donation, with a certificate given from the Jaguar Conservation Association, and the money paid goes to support the conservation of jaguars in northeastern Sonora, Mexico. These earnings were used to establish a new non-profit organization in Sonora — the “Asociación para la Conservación del Jaguar en la Sierra Alta de Sonora A.C.”

Established in February of 2004, the Asociación is an organization initiated by the landowners who composed the jaguar wildlife management unit. The association meets every time it is needed, its members voting to decide new activities on their land including cattle management strategies to prevent predation, white-tailed deer hunt prices, alternatives to race funds for enhancing cattle operations, tours for getting to know other ranches with wildlife enterprises, and for addition of other members. In creating this organization, the landowners that composed the wildlife management unit are able to have control of the decision-making process for conservation strategies in their properties and wildlife enterprises. The members of this non-profit organization committed to raise funds for jaguar conservation and at the same time enhance their economies through wildlife management strategies.

The jaguar represents an excellent choice for a flagship species because of its widespread appeal to the general public in Mexico and the United States. Any effort to restore jaguars in the southwestern United States is dependent on maintaining and establishing viable populations and dispersal corridors in northwestern Mexico. We would like to acknowledge the Jaguar Conservation Program of the Wildlife Conservation Society, SEMARNAT-Mexico, CONACyT-Mexico: National Council of Science and Technology, the New Mexico-USGS Cooperative Wildlife Research Unit, the municipality of Nacori Chico, and the landowners, for all the technical support, funding and patience during the development of this project.

Octavio C. Rosas Rosas was born in Puebla Mexico, he obtained his bachelor's degree in Biology at Universidad Autonoma de Nuevo Leon, Monterrey, Mexico, his master's and Ph.D. degrees at New Mexico State University, Las Cruces, NM. Currently is Wildlife Researcher and Professor at Colegio de Postgraduados, Campus San Luis Potosi, and is conducting research with jaguars, pumas and other small felids in Sonora, San Luis Potosi, Aguascalientes and Zacatecas.



Home of the Jaguar

Juan Carlos G. Bravo, Representative for Northwestern Mexico, Naturalia, A.C.

The rugged hills of eastern Sonora jut upwards, creating a maze of valleys, canyons and cliffs that defy any form of settlement. Life clings to this arid landscape in the shape of thorny bushes, almost naked during the dry season; cacti of several shapes and sizes; and surreal, lush palm trees, marking the occasional oasis. The dust roads and meandering footpaths challenge vehicles and hikers alike, offering another deterrent for any traveler wishing to explore the northernmost stronghold of an enigmatic and powerful feline: the jaguar (*Panthera onca*).

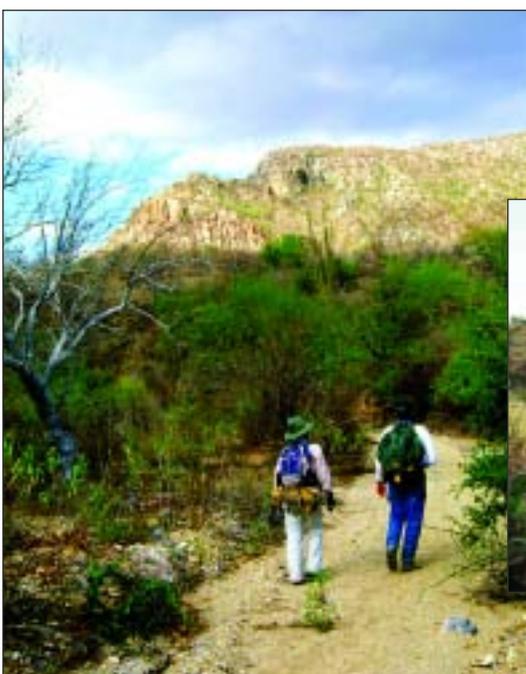
It is in this remote region of northern Mexico where, three years ago, Naturalia, a Mexican conservation group founded in 1991 to preserve endangered species and ecosystems in Mexico, purchased a 10,000-acre ranch called Los Pavos to preserve, what may turn out to be, the last chance for jaguars to recover their former range in Northwest Mexico and the south of Arizona and New Mexico. But Naturalia's interest in this region extends far beyond this purchase to 1997, when it launched an effort to identify priority Conservation Areas in North portion of the states of Sonora and Chihuahua. The results of this study made obvious two hard facts that called us to action: 1) there still remained in the Northern Sierra Madre and its adjacent flatlands several areas worth preserving, with enough of their

original vegetation and wildlife to make the effort feasible, and 2) that there were insufficient reserves established in the region to guarantee their long-term conservation.

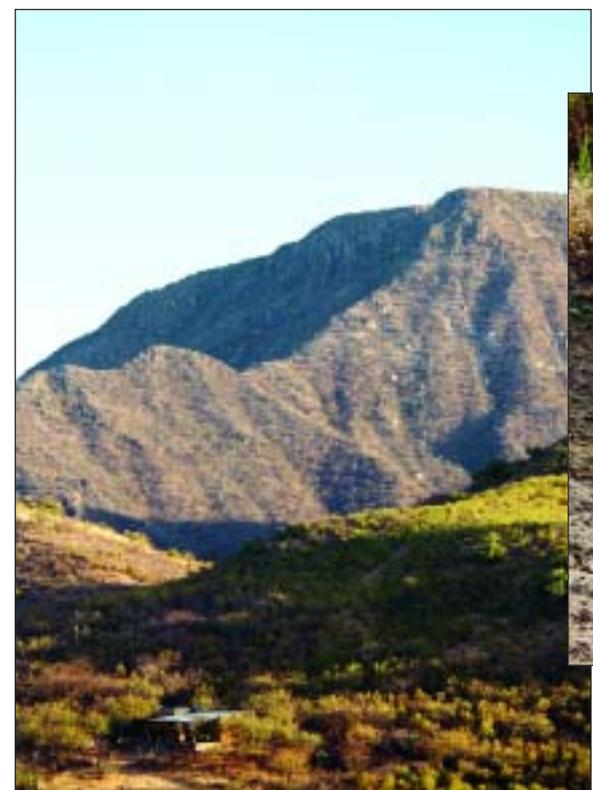
Thus started our interest in creating more reserves that could safeguard species that few people even realized existed in this part of the world. It would take us five years, after the study was finished, to raise sufficient funds to take the next daring step: buy land to make a private reserve, hopefully the first of several. By March 2003 we were ready, but the decision was still pending: Which of the 32 identified areas was to be the starting point for our most ambitious project? The choice was not easy. As if to symbolize the mosaic of habitats that Mexico holds, this region of the country is characterized by diversity: grasslands, thorn bush, pine-oak forests, wetlands, you name it. And of course we had to pick a single place that could also offer certainty, not a common trait when it comes to long-term conservation.

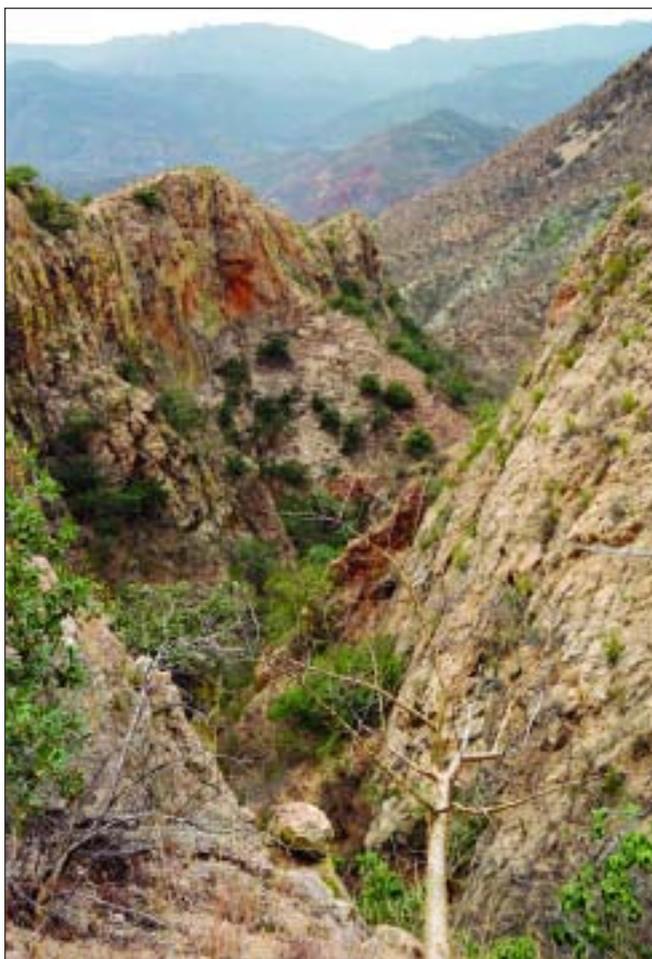


It was then that Dr. Carlos López approached us with the wonderful tale of his research on jaguars at 4,000 feet above sea level, in the arid mountainous region of Sonora called Sahuaripa (Opatá for *Yellow ant*). Sightings and well-documented records were reported in an arm of land that stretched northwards, bordered on its eastern side by the river Aros flowing north, which then turns west to meet the Bavispe. The two rivers join to become the Yaqui that flows southwest from the river crossing, thus enclosing the upland on all sides but south. A sierra divides this stretch from north to south, the eastern side only accessible by a single dirt road that starts in the town of Sahuaripa and ends a few miles south of the river in "Rancho Los Pavos." If enough land was secured within this peninsula, the jaguar population stood a good chance of making it into the next century. The rivers and a few pools had been the source of year-round water for breeding populations of jaguars, pumas (*Puma concolor*), river otters (*Lontra longicaudis*), and several other species, making this region unique within the arid surroundings. All these geographical circumstances have made this the perfect sanctuary for jaguars, yet like all large



Close-up of captive jaguar (top left) courtesy Oscar Moctezuma O. / Naturalia, A.C.; camera-trap photo of jaguar (bottom right) courtesy Northern Jaguar Project/Naturalia, A.C.; all other photos in essay courtesy Juan Carlos G. Bravo/ Naturalia, A.C.





carnivores, they are still far from safe.

Cattle ranching has been the main activity in northern Mexico for over a century, and it is no secret that ranchers and big predators have a history of conflict in every corner of the world where they meet. During the nineties as many as 40 jaguars were killed, including females with cubs, by ranchers and their *vaqueros* as a result of both real and alleged cattle predation and regardless of legal protection. If the poaching continues at this rate, the jaguars' chance of survival will diminish.

The choice of where and how to start our land-conservation efforts suddenly became clearer. If we bought Los Pavos we could create a sanctuary for the jaguar, restore crucial habitat for its prey species and set a foothold in the region that would allow us to work with local communities in a joint effort to protect the emblematic cats. We would also be able to provide protection to the other predators including bald eagles, ocelots (*Leopardus pardallis*) and boas (*Boa constrictor*); as well as to important species like military macaws (*Ara militaris*) and elegant trogons (*Trogon elegans*). So it was that in July 2003 Naturalia purchased the ranch as a first step to preserve and

restore an almost forgotten population of jaguars, estimated at around 120 animals.

Since then our influence on the land and our capability have been steadily growing; thanks in no small part to an American group called Northern Jaguar Project, which, from the beginning, has helped us manage the property and fundraise north of the border. Together we have found what jaguars have known all along, that borders are of little relevance when common ground is shared.

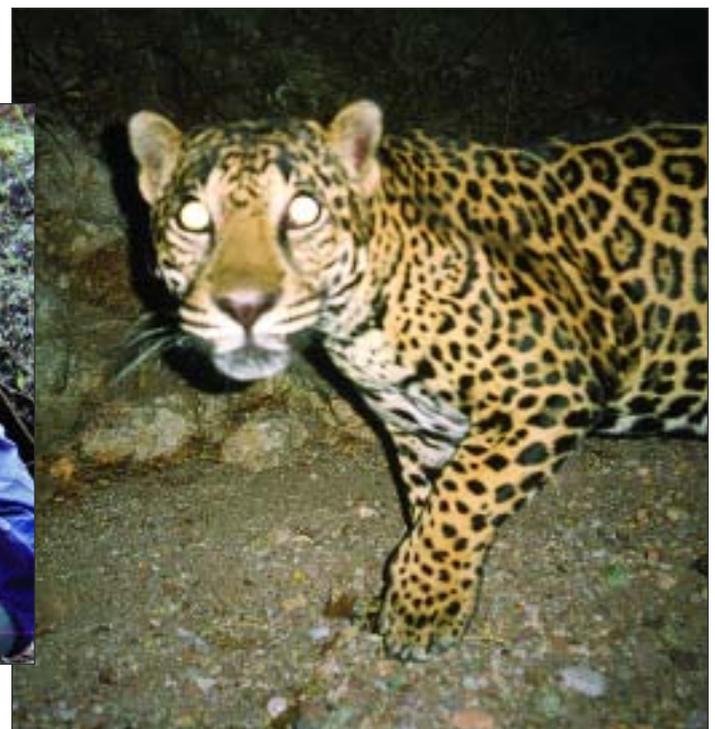
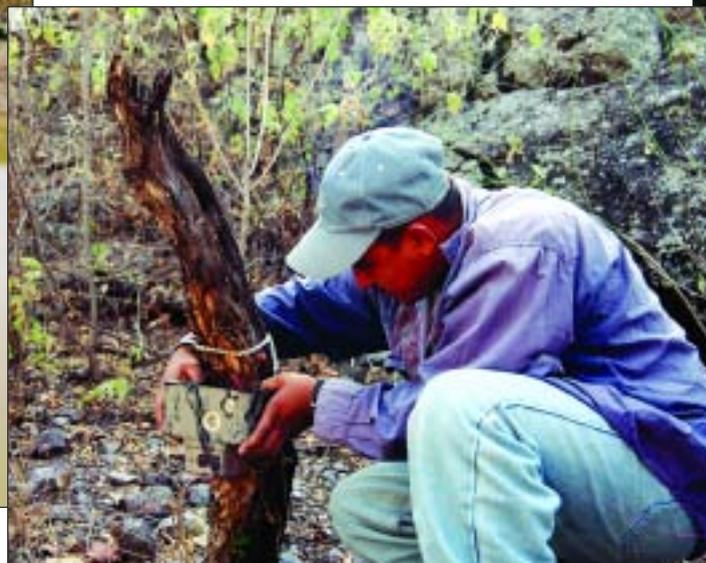
Along with our allies we have continued the monitoring project and set up a guardian program to ensure constant vigilance. Within our sanctuary, jaguars, pumas, ocelots and bobcats wander freely as the camera traps testify. Their monthly catch gives us interesting and puzzling results. Since Los Pavos was purchased there seems to have been a change of habits in wildlife. Either because all cows have been removed or because human presence has become less disruptive, we are capturing images of the two big felines not only at night but also in broad daylight. Pumas seem to wander at times when jaguars show little or no activity and jaguars still rule the night hours and the twilights of dusk and dawn. Jaguars may find it easier to catch prey at night or perhaps there's some other reason, but the fact is that

they seem strong and well fed, even chubby, in some pictures. Pumas, in contrast, look thin and famished. And yet they seem to be doing well enough because they appear more often in our remote pictures, and studies (based on tracks and scats) have found them to be more abundant. So far we have at least three pictures of puma cubs versus one of a jaguar juvenile. It is a fact that both species are breeding in the area, but with what level of success? How many felines share Los Pavos? How far are they traveling? Are jaguars bullying pumas into hunting in daylight, when it's harder to sneak on prey? These are all questions we are still trying to answer.

We are fully aware that 10,000 acres are insufficient for this wide-ranging species, our long-term plans include the purchase of nearly 33,000 more acres adjacent to Los Pavos, a strong outreach campaign with local ranchers, environmental education in communities, the creation of an officially recognized private reserve and strategic alliances with all stakeholders. As interest in the jaguar grows in the US we hope to make this a bi-national quest for a creature that symbolizes wilderness in all its might, an animal that was regarded as a deity by our ancestors, and that embodies the strength, beauty and fierceness of a landscape that, against all odds, has become the ideal *home of the jaguar*.

Naturalia is currently fundraising for the purchase of 33,000 acres of prime jaguar habitat in Sonora, all donations, however small, are kindly welcomed and can be made in the USA through our American partner's web page: www.northernjaguarproject.org.

Born in Mexico City in 1976, Juan Carlos G. Bravo has been interested in science and nature since childhood. Upon finishing Art school he was attracted to conservation through his interest in nature photography. He began working for Naturalia in outreach and environmental education projects, particularly in consolidating the image of Especies magazine, the group's main communications project. Six years later, having grown with the institution, he now represents Naturalia in its Sonoran office and is in charge of promoting Naturalia's conservation and environmental education projects in Northwestern Mexico.



An Integrated Watershed Management Vision for the Upper Conchos

By Citlali Cortés Montaña, World Wildlife Fund Chihuahuan Desert Program

Integrated Watershed Management in the Sierra Tarahumara has been the emphasis of the WWF-Chihuahuan Desert Program Office in Chihuahua City since 2003. A significant part of our work focuses on the Conchos River, where we have assisted in implementing a number of demonstration projects. The headwaters of the Rio Conchos lie south of the Mexican Sky Islands and share their ecological significance. Within the Sierra Tarahumara, the headwaters encompass a mountainous region of approximately 60,000 km² located in the Mexican state of Chihuahua, in the heart of the Sierra Madre Occidental.

The landscape in this region is dissected by canyons — called *barrancas* — and winding streams, and it is dominated by large stands of mixed conifers, pine and oak forests. The Sierra Tarahumara is the headwaters of the most ecologically and culturally important rivers in northern México: the rivers Yaqui, Mayo, Fuerte and Conchos. The first three systems drain into the Gulf of California, while the Conchos drains into the Rio Bravo/Rio Grande basin. The water that originates in the forests of the Sierra Tarahumara is used to irrigate more than 600,000 hectares (1.5 million acres) of agricultural land in the Mexican states of Chihuahua,

Sonora, and Sinaloa. These river systems also supply potable water for over 1.5 million people that live in some of the most important cities of Northwest México. Thus, the forested headwaters of these rivers are crucial — ensuring stable water supplies to support vibrant ecological systems and healthy human communities downstream.

WWF's work in the headwaters of the Rio Conchos aims to improve the livelihoods of local people through the implementation of sustainable natural resource management practices that help to maintain the biodiversity and ecosystems of this beautiful region. Our approach incorporates an integrated watershed management vision focused in maintaining the land cover through sustainable management activities or restoring the land cover to provide environmental services such as maintenance of water quantity and quality. In order to achieve this, we are currently working with four agrarian communities (three *ejidos* and one *comunidad indígena*) that have prioritized their development and resource management agendas through participatory processes. Demonstration projects



Sojávachi, one of the largest settlements of Ejido Panalachi. Conchos headwaters, Sierra Tarahumara. Photo courtesy Citlali Cortés Montaña.

are then implemented, in collaboration with federal and state governments. In this way, WWF expects to create a model that can be adapted to other parts of the Sierra Madre Occidental, engaging decision-makers at different levels, such as the federal, state and municipal governments as well as *ejidos* and private landowners.

Citlali Cortés Montaña is the daughter of a Sonoran mother and a Chihuahuan father that was born in the beautiful state of Jalisco. She knew that she would eventually come back to her parents' homeland after a backpacking trip brought her to the Sierra Tarahumara in 1998. She has been working with WWF since 2004. (She also has a B.Sc. in natural resource management from the University of Guadalajara, and an M.F. from Yale.)

Plant Specimen Records, Land Use and Biodiversity Loss in Mexican AridAmerica

By Laura Arriaga, Centro de Investigaciones Biológicas del Noroeste (CIBNOR).
Apdo. Postal 128, La Paz, 23000, Baja California Sur, México. larriaga04@cibnor.mx

Arid regions are characterized by relatively fewer species than those found in more humid environments. In the arid and semiarid regions of northern Mexico, plants have evolved into a moderately rich and distinctive flora with specialized growth forms that are often unique (Rzedowski 1992). Therefore, biodiversity in these regions must be given high priority, since each

species lost from an arid region represents a higher percentage loss of the region's biodiversity than in more speciose regions (McNeely, 2003).

Biological inventories have traditionally been considered the most extensive means to document species biodiversity. Herbaria harbor vast information of large geographical areas that are quite useful to describe regional floras and to review phytogeographic patterns. Although inventories are the first step in biodiversity assessment and in many other approaches to biological conservation, taxonomically complete inventories are rarely conducted. In Mexico, botanists have carried out biological inventories for almost two centuries. The native phanerogamic flora of Mexico is estimated at roughly 304 families, 2,804 genera, and 23,424 species (Villaseñor 2004). Additionally, alien species recorded in Mexico include 618 species grouped in 355 genera (Villaseñor & Espinosa-García 2004). Based on previous data, one could think sampling efforts account for most of the plant species diversity distributed in the country.

An historical analysis of the field inventories carried out by botanists in Mexican AridAmerica, based on taxonomic databases compiled in the Mexican National Biodiversity Information System (www.conabio.gob.mx) from 1827 to 1998, account for 96,302 records. The results of the digitization of specimen records and their projection onto the land use and vegetation map are shown in Fig. 1 (Arriaga et al. 2005). Although the analyzed specimen records are very numerous, their spatial distribution is heterogeneous and clustered within a few geographical areas, few of them occurring on the Mexican Sky Island region. Most of the records come from the northern and southern parts of the Baja California Peninsula, while other areas showing high concentrations of sampled specimens occur in some parts of the states of Nuevo León, Tamaulipas, and eastern San Luis Potosí. Likewise, the northern portions of the states of Guanajuato, Querétaro, and Hidalgo also show areas where plant specimens have been collected more thoroughly. Specimens collected in the central parts of Sonora, Chihuahua, Coahuila, Sinaloa, Durango, Zacatecas, and western San Luis Potosí are completely skewed and incomplete. These were obtained following the highways and road networks and do not represent the flora of broad landscape units. Few interpretations and inferences concerning species richness, distribution, and biodiversity patterns can be derived from these data, since sampling efforts have neither been exhaustive nor intensive in the arid and semiarid regions of northern Mexico.

Changes in land use have been considered one of the greatest threats to biodiversity, globally. The analysis for northern Mexico illustrates this same issue at a local approach. The highest species

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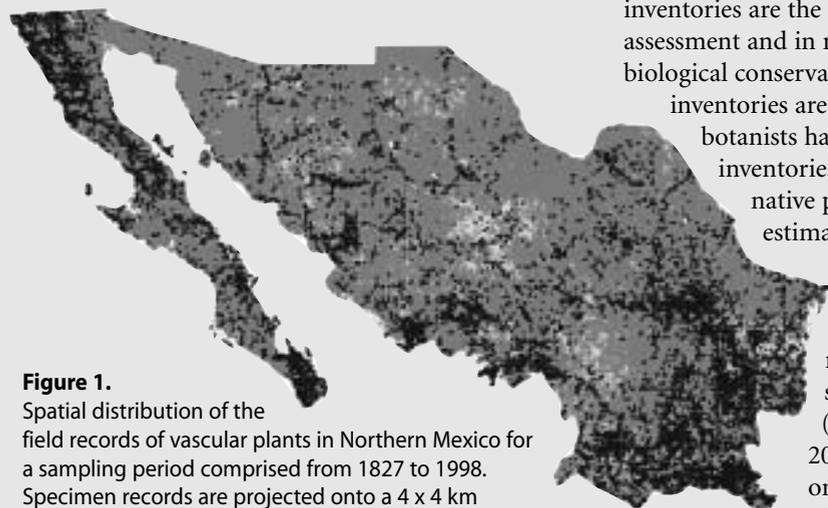


Figure 1. Spatial distribution of the field records of vascular plants in Northern Mexico for a sampling period comprised from 1827 to 1998. Specimen records are projected onto a 4 x 4 km grid—black stands for those areas where at least one specimen record has been collected, gray represents natural vegetation areas, and the lightest areas show human use, whether agricultural, urban or somehow cultivated.

México Lindo y Querido

By Sonja Macys, Executive Director, Tucson Audubon Society

It is a privilege to contribute to Sky Island Alliance's newsletter. I continue to believe, as I did when I joined as a member and donor, that SIA is a lean and mean conservation organization doing good work for our Sky Islands. Some years ago, Tucson Audubon honed its geographic conservation priority to riparian systems. Our decision was not solely based on their importance. They are important, providing food, shelter and cover for 60-75% of Arizona's species. Nor was it solely based on the fact that only 4% of riparian systems remain intact. Much of our decision was based on where we were most needed and could uniquely add value. With SIA thriving, we felt confident that the Sky Islands were covered.

We have much in common, Tucson Audubon and SIA, with our geographic conservation priorities. Riparian areas Sky Islands represent only a fraction of Arizona's land cover, but a critically important fraction for the many and varied species that call these unique systems home. Both riparian areas and Sky Islands are severely affected by drought and have been altered by human interference. Lastly, both extend south through sovereign nations into our neighboring country, Mexico.

For me, Mexico is, and always will be, "Mexico Lindo y Querido." A decade plus of conservation work across the border has created a special place in my heart for Mexico, its people, their astounding commitment to the conservation of natural resources, and their emerging ethic of philanthropy and volunteerism.

But how did I get to Mexico? Like so many people, my fate was sealed in a singular moment, at a college party. The burning question was, "now what?" Perhaps you remember that moment in your life? After four years (mas o menos) of training yourself in a field that you love, you must decide...for what practical purpose?

I was fortunate to have a friend who had spent a year in Mexico and met an amazing woman, Joann Andrews. Joann had founded a chapter of Pronatura— Mexico's oldest private not-for profit conservation organization — on the Yucatan Peninsula. To boot, she was a horseback rider (needless to say, so was I!). I faxed my resume and was accepted as a volunteer for Pronatura Peninsula de Yucatan, A.C. where I ended up working for half a decade. Living on, and loving, the Yucatan Peninsula.

That was some time ago. Between then and now, my cross-border work has been with sea turtles and Parks and Protected Area Management. Most recently, it has been with bi-national bird conservation through the Sonoran Joint Venture and Tucson Audubon. Times have changed in Mexico's management of parks and protected areas and the biodiversity they house. Since the early 1990s the country has achieved much with its dedicated focus on conservation.

When I moved to Yucatan, in 1993, what little proactive conservation occurred was managed under a variety of obscure government departments, with

richness of vascular plants of these data was recorded in disturbed habitats including areas of seasonal (3,979 species) and irrigated (2,476) agriculture, urban zones (3,100), and induced (1,661) and cultivated grasslands (787). At present, these records account only as historical. The natural vegetation classes recording the highest species richness are oak forests (2,522 species), deciduous seasonal forest (2,405), pine (1,988) and pine-oak forests (1,924), submontane scrub (1,824), chaparral (1,562), and microphyllous desertscrub (1,525). Other vegetation types such as sarcocaulous desertscrub, oak-pine forest, rosetophyllous desertscrub, and natural grasslands also have more than 1,000 species, while the remainder vegetation classes are less rich.

These results show that sampling efforts do not account for most of the plant species diversity distributed in Mexican Aridamerica and that most of the available specimen records in Mexican and foreign herbaria are now historical records that no longer occur in natural habitats, because of changes in land use. It is widely recognized that taxonomic information is a prerequisite to understanding biodiversity. Unfortunately, this discipline is not currently being fully supported in the universities and research institutions. The lack of enough taxonomists and the rapid changes in land use could, in the short term, prevent documentation of the distinctive flora of the unique desert and Madrean Archipelago habitats of northern Mexico.

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Laura Arriaga is a plant ecologist and a Researcher in the Environmental Planning and Conservation Program at CIBNOR, S.C. Her scientific interests are in conservation ecology, biodiversity assessments, and regeneration processes of natural and disturbed arid and subtropical ecosystems. Previously she was Director of Analysis and Planning at Mexico's National Commission for the Knowledge and Use of Biodiversity, CONABIO, and Director of the Terrestrial Division at CIBNOR, S.C. She has published 66 papers and 9 books in plant ecology, biodiversity, and conservation biology. She has played important roles in the establishment of biosphere reserves in northern Mexico.

little coordination between them. Law enforcement was handled under PROFEPA, an agency rife with "compadrazgo" or a "good old boys network" that often hindered prosecution of environmental crimes. Non-profit conservation organizations had begun to spring up just a decade prior, and the citizenry still did not quite understand their role. With so many people starving, impoverished and without basic human comforts— like running water— how could people take time for "los animalitos?" Biodiversity conservation and ecosystem services are terms that, only now, *may* make the news.

In contrast, today, Mexico has a strong governmental focus on conservation. Entities that were previously on their own have been brought under the umbrella of SEMARNAT. New areas of focus have emerged, providing new dedication and funding to important conservation priorities like biodiversity conservation and parks management.

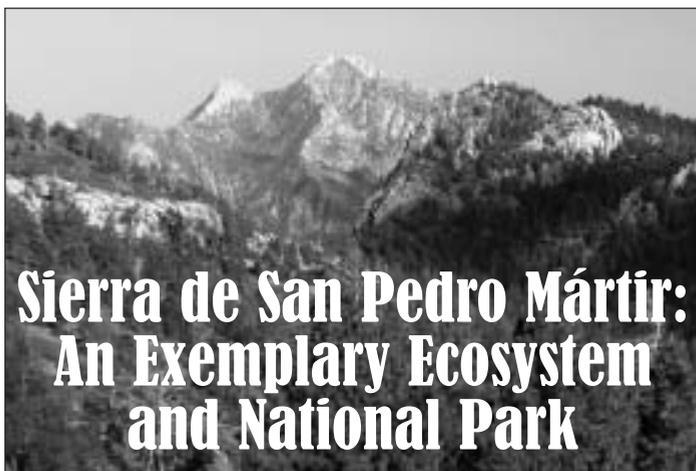
In 1992, CONABIO was created to "promote, coordinate, support and carry out activities aimed at improving our understanding of biological diversity, as well as its conservation and sustainable use for the benefit of society." It is the Mexican entity that houses the North American Bird Conservation Initiative (NABCI). In 2000, CONANP was created to "conserve the natural heritage of Mexico through Protected Areas and Sustainable Regional Development Programs in Priority Regions for Conservation." The creation of these two entities is an important stride in conservation.

Civil society has also advanced. Where non-profit conservation organizations were once the exception, now they are the rule. Names like Pronatura, Naturalia and a variety of "Amigos de..." are working diligently in biodiversity conservation, environmental education, and land management. Conservation easements and transfer of development rights are being used as tools to advance conservation. Sadly enough, this is still not the case in some areas of rural Arizona.

As non-profit organizations have emerged, the philanthropic sector of Mexico has grown to support them. As well, funding mechanisms for non-profits have improved. In 1994, the Fondo Mexicano para la Conservación de la Naturaleza (FMCN) was formed to serve as "a liaison between different funding sources and the conservation community." Their mission is to "conserve Mexico's biodiversity and assume the sustainable use of natural resources." You may be surprised to learn that Mexico is fourth in the world for millionaires per capita. The money is there to support civil society. And the people are beginning to believe that it is worth the investment.

In short, it is an exciting time to be working with Mexico on biodiversity conservation and parks management. We have much to learn from our sister nation. Mexico safeguards some of the species that we share with her and, in some cases, is doing a better job than we are. That is most certainly the case with the Cactus-ferruginous pygmy-owl and Gray hawk. In 2005, Mexico's federal government declared the year of the Jaguar. In that same year, our federal government was working hard to remove the Cactus-ferruginous pygmy-owl from the endangered list. But civil society in the U.S. is strong. Despite our federal government, we will continue to collaborate with Mexico on shared species of conservation concern. Our pygmy-owls, jaguars and a slew of migratory birds, butterflies and other pollinators are depending on us.

¹ For an excellent synthesis of philanthropy in Mexico see www.fas.harvard.edu/~drclas/publications/revista/Volunteering/mexicophil.html



Sierra de San Pedro Mártir: An Exemplary Ecosystem and National Park

By Horacio de la Cueva, Head, Departamento de Biología de la Conservación, CICESE, cuevas@cicese.mx

If you were a space traveller and looked down at the night on planet Earth, you would know there is an active, energy-hungry civilization; the planet is full of lights everywhere. Well, almost everywhere. The Sierra de San Pedro Mártir is one of those dark spots on the planet.

Sierra de San Pedro Mártir National Park was declared a Forest Reserve in the first half of the last century, when its biological uniqueness were brought to the attention of Mexican Federal authorities. But it wasn't until 1996 that staff was hired on a permanent basis to manage the park. In 2005, after many years of work and intense political haggling, a management plan was submitted to federal authorities for final approval and publication. Although *National Park* is the highest conservation status in Mexico, an ongoing debate to change its status to a *Biosphere Reserve* might help not only the land, but also the traditional cattle ranchers that use it as their summer rangelands.

The most important factor in conservation is the degree of isolation. Ecosystems that are hard to reach, but not necessarily far from the well travelled road are the best conserved. Sierra de San Pedro Mártir sits in the Northern part of the Baja California peninsula — not far from the large human population of Southwestern California comprised by Los Angeles, San Diego and the growing cities of Tijuana, Mexicali, and Ensenada in Baja California, México — but has been isolated for many years. Pavement is getting closer to the park, and better protection measures will be needed.

Until 1930, the California Condor flew in these mountains. The California Condor Recovery Team plan includes the reintroduction of this large carrion-feeding bird to the Sierra. To date, eighteen condors can be found in these environs or in specially designed aviaries in the Northwestern area of the park. We use the aviaries to recapture the birds periodically for a medical and equipment check-up, and as a quarantine holding area before they are released to the wild. Their flights are taking them as far North as the Tecate-San Diego border, more than 200 km North.

Because of its isolation, Sierra San Pedro Mártir has been able to keep its ecosystems unchanged since the arrival of humans to the peninsula. This park is also one of the few remaining unlogged forests of North America. Its forests are open and park-like with many mature and old trees and just a few sapling; unlike dense forests of similar areas in Southern California. One out of every thousand seedlings reaches maturity; the rest die of water stress, insect infestation, or fire. Thus, natural selection has been at work every day most likely since before the last ice age, and only the best adapted trees have been contributing to new generations.

The vegetation mosaic created by the mixed conifer, pinyon pine, and quaking aspen forests, along with the high chaparral (*manzanita*), and extensive meadows provide an ecosystem with high habitat diversity, along with a large number of animal species. This makes the Sierra not only the best example of how to manage a forest, but also a fireproof ecosystem whose vegetation mosaic regulates its fire frequency and intensity.

The Desert at the Edge of the Tropics

By Michael Wilson, Research Director, Drylands Institute

In one small canyon complex in the Rincon Mountains of southeastern Arizona, a plant grows that is found nowhere else in the United States. There the plant, *Lysiloma watsoni*, grows as frost-stunted shrubs among the heat-reservoirs of rocks and canyon walls that keep these subtropical legumes from freezing to death. At warmer elevations in the metropolitan areas of Tucson and Phoenix, the plant develops into an attractive tree and feathertrees, as they are known in the nursery trade, are valued as landscape subjects around grocery stores and subdivisions and auto dealerships. Such a place can be found at the corner of a busy intersection in Tucson. Lawyers, mortgage brokers and merchants strolling between the buildings of this office complex may possibly appreciate the shade of these trees, but I doubt they ever notice the large orange butterflies flitting among the plantings and automobiles. They certainly aren't aware of the story that, for me, is an example of one of the more important phenomena of our Sky Islands.

So, here is the story, told in the years we will call "good years" when the monsoon has blessed us with abundant rain, when the brutal foresummer has not been so brutal and our winter is the dream of snow-weary tourists from the Midwest. It is repeated with thousands of creatures time and time again, year after year. The names and many details change but this particular case — even with its artificial elements — is as good as any. In fact, it is because the situation is somewhat artificial that we understand more about it. Every so often this butterfly, known as the large orange sulphur, *Phoebis agarithe*, makes its way into Arizona from green subtropical areas to the south. A gravid female will wander into a hostile desert. Often by no luck at all, she might find the shade and relatively cool canyons and cliff faces of those stucco buildings. There, she will deposit just enough eggs on *Lysiloma*, the only native Arizonan foodplant of her caterpillars, so that a small population will be established. Normally not able to survive the rigors of winter at higher elevations here, her progeny will persist for some time and then will die out — casualties of too much cold or heat, too much inbreeding, too-efficient predators, too much or too little of something. Right at this moment, somewhere on a Sky Island, a small population of some small creature or another is perishing. I say this with certainty because our winter has been just cold enough and dry enough to cause local extinctions of some tropical bug that holds onto a few remnants of some subtropical plant that itself may be barely holding on. For a biologist, this very instability and changeability is a major reason why our region is so very intriguing and so very important.

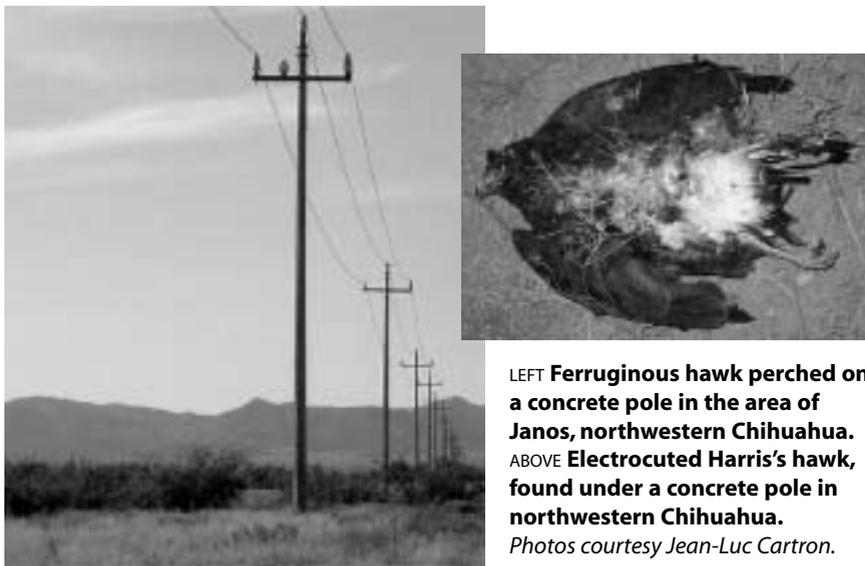
Sonora, the Mexican state just south of Arizona, is a transition zone for temperate and tropical faunas and floras. Within this state occur the northernmost tropical deciduous forests in the world and the northern reaches of the great coniferous forests of the Sierra Madre Occidental all bordering some of the driest and hottest areas in North America. Whatever else they are, the mountain islands of northern Sonora and southern Arizona are stepping stones. Fragmented isolates of habitat surrounded by lowlands with a very different environment, they are outposts of plants and animals that are at the very limits of their ranges. Bean-counter conservationists who want to make a case for regional protection always want to find areas with high endemism — meaning that there are a lot of animals and plants found nowhere else but in the region at hand. The truth of the matter, however, is that the endemism of the sky islands is not particularly high. Rather, many of our plants and animals — from jaguars and hummingbirds to more than 60% of Sonoran trees — are the northernmost examples of the mega-diversity of the American tropics. Either these organisms were marooned in the shrinking mosaic of amenable environments when the climate began changing thousands of years ago or they have traveled to our mountain islands in recent times. Many of them, like the large orange sulphur, test the limits of occupation constantly. The whole region is a natural laboratory that constantly challenges the adaptability of organisms. It is natural selection more raw and real than any other place I can think of.

In southwestern North America the transitioning, establishment and extinction of local populations can be incredibly rapid and surprising. What is here today can certainly be gone tomorrow. But the chances are that if you wait long enough, if there haven't been too many houses built, too much bulldozing, too many corridors cut, that — just like jaguars — they will all come back again. Vampire bats, boa constrictors, macaws, freshwater crabs, orchid bees, strangler figs, ocelots, leaf-cutter ants, burrowing tree frogs, cycads, sleeper gobies. It is deeply thrilling to discover some animal or plant on a mountain island that one associates more with Amazonia than a desert or oak and pine forest. Every year something turns up, some strange bird, or plant, or snake or beetle that will make some specialist take in a sharp breath of surprise. This is particularly true for those of us who study the smaller organisms. Partly because there are just more of them. Partly because they are just easier to miss. Most of the time these unexpected things are not new species, but an organism that you believe to be from *somewhere else*. Yet these creatures from somewhere else are right here. And perhaps they have been here all along, nothing new except to those of us who poke at them and measure them and put them in small bottles. The survivors, the plants and animals that have remained from before the time of the last glaciation, are no less remarkable than those that have recolonized recently. It is the seeming *unlikeliness* of these things that I am reminded of every time I see those subtropical butterflies darting about the Hummers and Volvos and Mercedes. I marvel at the fortitude that sends these creatures hurtling off in new directions, sometimes a hit and sometimes a miss, resilient in total but ephemeral in the specifics. It is some sort of miracle really. And it is for these reasons that the Sky Islands are so terribly, terribly important.

Michael Wilson has served as Research Director of Drylands Institute since 1993. He has been involved in environmental and public health, agriculture and horticulture. Mr. Wilson's primary areas of interest are entomology and botany. He is a coauthor of Trees of Sonora, and is writing a series of articles on the insect life of Sonora. A current project is the Medicinal Plants of Arizona and Sonora co-authored with Richard Felger, a book that will cover nearly 1000 species of plants with medicinal uses.

A Losing Situation for Raptors

By Jean-Luc E. Cartron, Drylands Institute



LEFT **Ferruginous hawk perched on a concrete pole in the area of Janos, northwestern Chihuahua.**

ABOVE **Electrocuted Harris's hawk, found under a concrete pole in northwestern Chihuahua.**

Photos courtesy Jean-Luc Cartron.

Crossing the border into Mexico, one hardly notices them, much less thinks of them as killing hundreds if not thousands of raptors and ravens every year. They are the concrete poles, fitted with steel cross-arms and standing along many of Mexico's roads and highways. They have been designed largely on the model of U.S. wooden poles, all based on the assumption that a bird cannot be electrocuted without having to span the distance between two energized wires. However, concrete and steel are conductive. Birds that land on the steel cross-arms of concrete poles are grounded and subject to mortality by electrocution when touching only one energized wire...

The first concrete poles were installed during the 1970s and 1980s, but it was not until 1999 that trained biologists first detected electrocuted birds, in northwestern Chihuahua. Since then we have found the remains of hundreds of electrocuted birds, mainly Chihuahuan ravens but also many red-tailed hawks, ferruginous hawks, and golden eagles. The list of species incurring mortality on concrete poles is impressive, including also peregrine and prairie falcons, American kestrels, turkey vultures, great-horned and short-eared owls, and great blue herons. Electrocuted birds have been found not only in Chihuahua but also in Sonora and Baja California Sur. In Chihuahua, the problem seems to be most acute from the town of Janos west to the state boundary with Sonora. Here is one of the largest remaining prairie dog town complexes in North America, with high diversity and abundance of raptors. Between December 2000 and November 2001, monthly surveys of the local power-lines led to the discovery of 177 birds under concrete power-poles, many remains showing telltale signs of electrocution (singed feathers and burn marks). Over the course of that year, one power-line in particular had a rate of mortality of one bird for every two poles!

My research on the impact of concrete power-poles has been conducted in collaboration with many individuals and institutions (UNAM, CIBNOR, Agrupación Dodo, Profauna, University of Chihuahua, and EDM International). In Mexico, Patricia Manzano-Fischer (Agrupación Dodo) spearheads a collaborative program with the Mexican utility company CFE to better track the impact of power-lines on birds in Mexico, and to implement retrofitting in areas where problems are detected. On the initiative of the North American Bird Conservation Initiative (NABCI), the Instituto Nacional de Ecología (INE), Unidos para la Conservación, and Agrupación Dodo, Patricia Manzano-Fischer organized a workshop on power-lines and their impacts on birds in Mexico City in 2002, with strong representation of academic institutions, conservation NGOs, Mexico's Environmental Department (SEMARNAT), and CFE engineers. Funding for monitoring of power-lines has since come from APLIC and the Mexican federal government. And in some areas of Sonora and Chihuahua, CFE has begun to retrofit power-lines, mainly along highways and in urban areas. In Chihuahua, CFE experimented with the use of PVC covering and plastic perch guards — both of which, as it turned out, did not last long under the effect of UV radiation — and is now replacing steel cross-arms with wooden cross-arms. In Sonora, CFE engineers use thick, yellow PVC, which they install directly around the steel cross-arms, commenting to us that the results are very effective and long-lasting.

Yet, despite all the attention now focused on the concrete poles in Mexico, retrofitting remains limited to a few areas. Meanwhile, concrete power-poles continue to kill large numbers of raptors and ravens. The problem is not indifference but lack of money and lack of information. With a new study launched last year, we are in the process of identifying the best, most cost-effective retrofitting techniques and materials for CFE to use. Wooden cross-arm retrofits appear to be effective for raptors, but less so for ravens, which often build their nests on concrete poles. Funding is needed to increase the scope of our research to also evaluate the effectiveness of PVC in Sonora.

A medical doctor as well as holding a Ph.D. in biology, Jean-Luc Cartron is a major contributor to the field of raptor biology and conservation in southwestern North America, and heads Drylands Institute's New Mexico Office.

Rambling Rants: Misguided Priorities

By David Hodges, SIA Policy Director

“The Department's mission is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation and use of present and future generations.”

— *Mission statement of the Arizona Game & Fish Department*

One has to wonder when, and why, AZ Game and Fish made the decision that facilitating Off-highway recreation was a part of their larger mission to protect our state's wildlife. One can also see in a recent report from G&F, how this clouds their judgment when it comes to making meaningful decisions.

In 2004, G&F chartered a group — the Hunter and Shooting Sports Retention Team (HRR Team) — to examine barriers to hunting and provide recommendations to the department, as a part of a strategy to increase retention and recruitment of hunters within the state.

During the assessment phase, G&F prepared an online survey that was distributed to 50,000 individuals and received a response from 7,000. The majority of the respondents were active hunters from Arizona.

According to Game and Fish, “the survey participants identified several factors that represented “barriers” to their participation in hunting, including:

- ❖ Not getting drawn for a big game tag: 90 percent;
- ❖ Urbanization/development of hunting areas: 65 percent;
- ❖ Lack of time: 59 percent;
- ❖ **Off-highway vehicle disruption: 54 percent;** [*Emphasis added*]
- ❖ Overcrowding: 51 percent”

The HRR Team provided 12 steps (yes, yet another G&F 12-step program!) as a part of a retention and recruitment program. Among these were promoting small game opportunities and providing a venue for hunter recruitment/retention activities, obtaining access to private lands for small game hunting, enhancement of the Hunter Education Program to promote convenience and flexibility, improve the delivery of hunting information, evaluate big-game draw and hunt structures, provide special licenses to promote participation of new hunters through family/friend social structures, expand public information programs, coordinate shooting range development, initiate public outreach effort to promote hunter recruitment/retention, update strategic planning address urban encroachment, and apply adaptive management practices to recruitment/retention programs.

Even though Off-highway vehicle disruption was one of the most mentioned problems, G&F surprisingly, chose to ignore this important issue in dealing with retention and recruitment. Unfortunately, this is in line with the philosophy of many within Game and Fish, who seem to feel as if they have an obligation to the ORV community at the expense of wildlife.

The negative effects on wildlife by motorized recreation is well researched and well documented. The results of G&F's own survey shows that a majority of the states hunters recognize this problem as well.

Curiously, with the exception of ORV access groups, Game and Fish remains the most aggressive entity in the state in demanding access for motorized recreation. When questioned about this, they invariably fall back on the mantra of “hunter access.” We now see, from their own study, that this is just a bunch of nonsense. Selective use of information is not leadership.

It's past time that the Arizona Game and Fish Department gets back to its mission of protecting our state's wildlife, and stops working so hard to guarantee ORV access and motorized recreation opportunities. Their primary goals should be protecting wildlife and habitat, a side benefit of which is the enhancement of both hunting opportunities and the experience. If you agree, please take a few minutes and send a letter to the folks in charge at: Commissioners Melton, Golightly, McLean, Hernbrode, and Gilstrap, 2221 W. Greenway Rd. Phoenix, AZ 85023-4399. Feel free to forward any response you may receive to me.

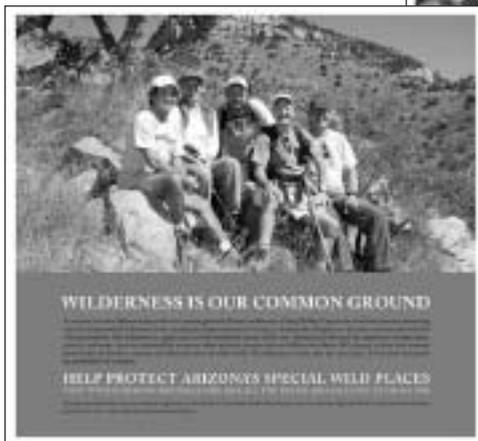
Public Lands, Common Ground

By Mike Quigley, Wilderness Campaign
Coordinator

What do Saguaro National Park, Mount Lemmon, the National Mall, Central Park, and the Pajarita Wilderness all have in common? They are all public lands — real places, places of importance, that we as a people have set aside for all to enjoy and to preserve for the future.

That's pretty remarkable. In our capitalist society, in what some call an "ownership" society, in a time when real estate prices are skyrocketing and the average American is struggling for a tenth-acre piece of the pie, we have these fantastic places that are not owned by any one person or corporation, but are owned collectively by all Americans of past, present and future generations. Millions of acres of forest, desert, seashore, mountains, and prairie lands that are ours to enjoy. Want to walk the beach? Go visit Assateague Island National Seashore or Acadia National Park. Prefer mountain views? Go see your Great Smoky Mountains National Park or the nearby Miller Peak Wilderness in the Huachucas. Whether one is a billionaire or a busboy, a CEO or a conservationist, we can go there — because they are public lands. We'll be able to go there in 2020 too — because they are public lands.

What do environmentalists, ranchers, hunters, hikers, software designers, retail salespeople, teachers, and Members of Congress have in common? Indeed, what do we all have in common? We all enjoy our public lands. At the very least, we all have the opportunity to enjoy our public lands. And the vast majority of us support preserving our public lands in the strongest ways possible — regardless of political party affiliation, socioeconomic position, or choice of recreational pursuit. That's pretty remarkable. In a time when we see division and polarization around the major issues of the day, in a time when important laws are passed on party-line votes, in a time where a



51-49 percent election victory is considered a mandate, most of us — 75, 85 percent, maybe more — strongly agree on the importance of our public lands.

How can this be? Perhaps it is the lands, the experiences they provide us — the centering, reconnecting, and challenging opportunities for growth they afford us. Different, maybe, for each of us, but with the same effect.

A backcountry hunter friend tells me about the experience of scouting an area, looking at the topography of the land, understanding the natural history of game, feeling for the direction of the wind. He tells me it's a different experience than when he is just out hiking with a few friends, looking around and admiring the scenery. He tells me that even if he comes back from a hunt empty-handed, he doesn't come back empty.

A photographer friend tells me about anticipating where the sun will be later — imagining the future shadows and highlights the textures of the land will make, considering which lens, which filter, which angle, which composition will produce a fine image. She tells me that it's a different experience looking at a landscape and looking at the smallest elements of the landscape — but that every time it encourages her creativity.

When I birdwatch, or survey riparian areas for tamarisk, or just hike, they are all different experiences for me — what I focus on, how my mind wanders or doesn't, even what gear I carry in my pack. And when I hike alone it's a different experience than when I hike the same land with others. But every time it is a renewing and rewarding experience.

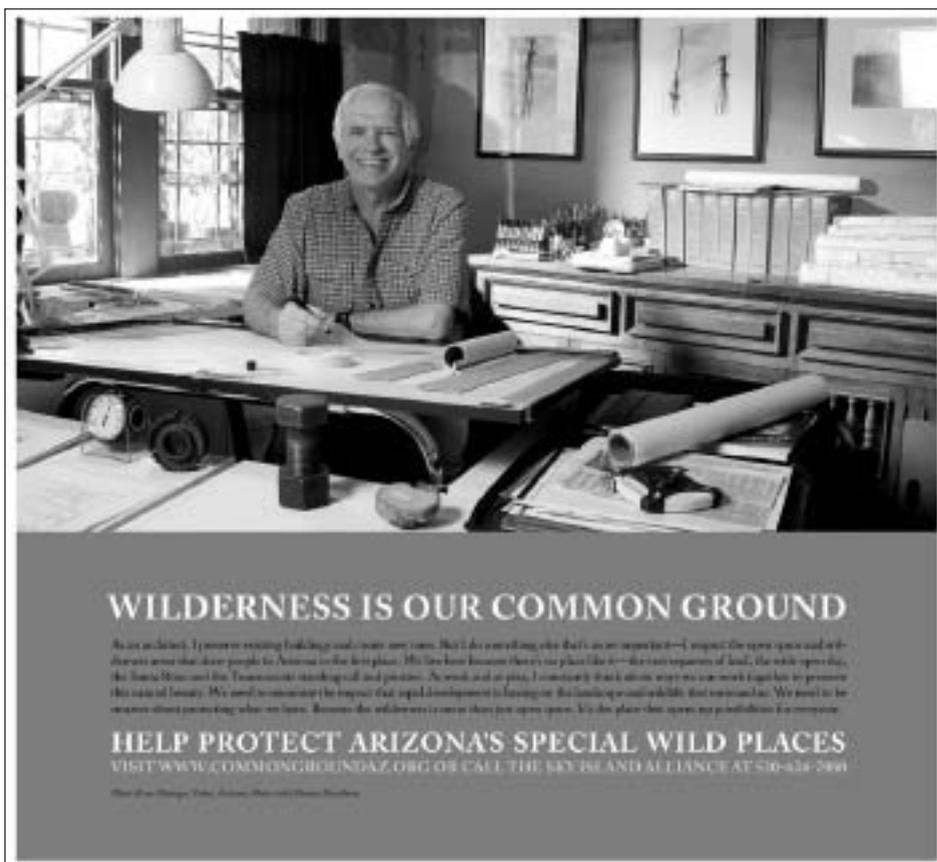
I get to talk to a lot of people in my work — some people who seem kindred spirits almost immediately, some who likely hold very different views than I do on a number of topics. It fascinates me that we all get enjoyment from our public

lands; that we all get different enjoyment at different times; and that we all understand the value of that and want to preserve those possibilities for the future. It's something we have in common.

America's public lands are our common heritage and birthright — they are literally our common ground. They are also metaphorically and politically our common ground. Survey after survey of Americans shows strong support for preserving our public lands for the future. Public comments on the Forest Service's Roadless Area Conservation Rule have consistently favored preservation. In the initial round of hearings, 95% of the record-shattering 1.7 million official comments received supported the strongest possible protection for all of our nation's remaining roadless areas. Closer to home, a 2005 survey of voters in Pima and Santa Cruz counties showed strong support for a Tumacacori Highlands Wilderness designation — support that was overwhelmingly positive and also overwhelmingly transcended demographic, ethnic, political, and recreational divisions. For example, self-identified conservative voters support Wilderness — 75 percent of them when informed about the issue. Republicans, Democrats, and Independents all favored preservation by at least 75 percent. Seventy-one percent of hunters, 86 percent of anglers, and 74 percent of off-road vehicle drivers support a Tumacacori Highlands Wilderness.

Environmentalists, hunters, ORV drivers, Republicans, Democrats — all agree on something? Yes! The majority agrees that we should be preserving our common ground, protecting our public lands. Sky Island Alliance has launched an advertising campaign in southern Arizona to highlight this very fact. The ads, called "Common Ground" feature real southern Arizonans from various walks-of-life talking about how they enjoy our public lands and why they want them preserved. For Tubac architect Bruce Pheneger (left), it's the open space that draws people to Arizona in the first place. For a group of Nogales teachers who often hike together (above), it's a great place to learn important lessons of life: our connection to the land, the importance of open space, and our responsibility to protect these precious resources.

Check out the ads at www.commongroundaz.org. And get out and enjoy our public lands — enjoy and respect and marvel at our common ground.



The Bell-tailed Serpents of the Sierra Madre Occidental of Sonora and Chihuahua

By Robert Villa, Tucson Herpetological Society,
herpsandviolin@aol.com

In this article, I hope to inform you about the three high elevation endemic sky island (montane) rattlesnakes of Sonora and Chihuahua. These species can also be found in Arizona and New Mexico. Range at the subspecies level only covers the region of Sonora and Chihuahua (and in some subspecies, their range enters Arizona or New Mexico). Subspecies are only subtly different and identifiable by range. Rattlesnakes in general are discussed in relation to the species of the article. I give an etymology of the name, where possible, and general range. In most cases, the English name is fully descriptive of the animal.

Please note: When in rattlesnake country, wear long pants, sturdy hiking boots or shoes. Don't place hands or feet where you can't see or tell with a walking stick where a rattlesnake is hiding. Usually a snake will flee if given ample space. Neither the photographer nor I suggest handling rattlesnakes without proper experience. If one is bitten in the wilderness, one risks amputation and/or debilitation of the bitten extremity — *time is of the essence in treating rattlesnake bites*. Appreciate these snakes from a distance in their natural setting. One can enjoy great behavior and natural history simply by observing.

Rattlesnakes, Genus *Crotalus*

What's in a name? The English name is from the rattle at the end of the tail which grows a segment with each shedding of skin. The rattle is used as a warning mechanism and probably developed with the first rattlesnakes, in the Central Mexican Plateau, who were exposed by foraging carnivores that flipped rocks that the snakes were under (Greene, 1997.)

From the Greek *krotalon*, meaning "rattle" or "castanet." Named by the great taxonomist Carolus Linnaeus (Latinized from Carl Linne) in 1758.

Behavior and Description: A stout-bodied snake with a triangular head. The montane species rarely exceed 40.7 cm (16 in.)

Rattlesnakes are effective predators. They find prey trails by using a combination of taste and smell. Using cryptic pattern and coloration, rattlesnakes sit in ambush of passing prey. In less than a second a rattlesnake can: 1) visually and thermally detect passing prey using heat detecting pits located between the eyes and the nostril and 2) open its mouth and strike the prey with its erected fangs in hypodermic needle fashion. Once the prey is dead, the rattlesnake follows the scent trail of the venom or saliva (more research is needed) on its prey and proceeds to ingest it in the remarkable ophidian (snake) fashion of disarticulation of the jaws to swallow large food items. For example, where humans have a fused chin snakes have "mandibular liberation" (Greene, 1988.) Usually a snake will eat one to two times a year.

Prey preference varies with species and age of rattlesnake. Lizards, small mammals and birds, young of small mammals and ground nesting birds and insects (particularly centipedes) are eaten by montane species.

Because of elevation, montane rattlesnakes are slightly more tolerant of cold climate than other snakes but brumate (become inactive during the winter months) and emerge with warm temperatures and monsoon rains.

Upon emergence from brumation, mating occurs and young are born in late summer and early fall. The mother snake and her young will stay together for up to a week and there is some scientific evidence that mother and young rattlesnakes seek each other's scents for at least a week after birth occurs (Greene *et. al.*, 2002.)

Apart from humans, king snakes, birds of prey, bears, big cats, raccoons, skunks and coatis are predators upon montane rattlesnakes.

Range: Rattlesnakes can be found from southern Canada to Central Argentina.



C. pricei. Photo by Paul Condon, Tucson Herpetological Society, ptcondon@comcast.net

Rock Rattlesnake, *C. lepidus*

What's in a name?: The English name comes from their preferred habitat of rocky areas. The scientific species name is from the Greek, *lepidotos*, meaning "covered with scales."

Behavior and Description: An avid herper once called these snakes the "kung-fu rattler" for their short temper, readiness to bite and toxicity of venom. The bright yellow tail coloration of the young of this and other species is thought to be used to lure prey. The tail coloration fades into adulthood. In general these snakes are gray with black mottling and/or banding. In the region, males have infusion of green, while females are only gray or have infusion of pink. In one population, individuals rarely exceed 30.5 cm (1 ft.)

Range: From Arizona to the Mexican state of Jalisco.

Subspecies: Of the four subspecies, two are found in the region. Sometimes it is difficult to tell the two subspecies apart since their patterns vary in intensity of the others pattern:

❖ Banded Rock Rattlesnake, *C. l. klauberi*

What's in a name?: Named after the famous rattlesnake scientist Laurence M. Klauber.

Range: The sky islands of Arizona, New Mexico, Chihuahua and eastern Sonora.

❖ Mottled Rock Rattlesnake, *C. l. lepidus*

Range: Southeastern New Mexico and east central Chihuahua.

Twin-spotted Rattlesnake, *C. pricei*

What's in a name?: The scientific species name is after W. W. Price.

Range: By elevation, this is the highest ranging rattlesnake. It can be found in alpine meadows or clearings and rock slides. Can be found from Arizona to the Mexican state of Aguascalientes.

Subspecies: Of two subspecies, one is found in the region:

❖ Western Twin-spotted Rattlesnake, *C. p. pricei*

Range: Arizona, Chihuahua and eastern Sonora.

Ridge-nosed Rattlesnake, *C. willardi*

What's in a name?: The English name of this rattlesnake is due to the well defined and raised ridge that occurs on the edge of the snout. The species scientific name was given in honor of Frank C. Willard, collector of the first specimen in the Huachuca Mountains.

Range: From Arizona to the Mexican state of Zacatecas. By elevation, this is the lowest ranging of the montane rattlesnakes, preferring the grassy oak woodland and the lower ponderosa pine forest.

Subspecies: Of five subspecies, four are found in the region:

❖ Sierra del Nido Ridge-nosed Rattlesnake, *C. w. amabilis*

Range: Known from a few canyons in the Sierra del Nido in the northwestern portion of the Mexican state of Chihuahua.

❖ New Mexico Ridge-nosed Rattlesnake, *C. w. obscurus*

What's in a name?: Named for the indistinct facial stripes that herpetologists use to identify the Ridge-nosed Rattlesnake subspecies.

Range: Found in the Animas and Peloncillo mountains of Arizona and New Mexico and the Sierra San Luis of Sonora and Chihuahua.

❖ Chihuahuan Ridge-nosed Rattlesnake, *C. w. silus*

Range: Occurs in the Sierra del Tigre, Sierra de Oposura, Sierra Aconchi and Sierra Purica as well as to the south in the Sierra Madre Occidental where at one point the range turns into that of the Zacatecan Ridge-nosed Rattlesnake, *C. w. meridionalis*.

❖ Arizona Ridge-nosed Rattlesnake, *C. w. willardi*

Range: Occurs in the Huachuca, Patagonia and Santa Rita mountain ranges of Arizona and the Sierra de los Ajos, Sierra de Cananea and Sierra Azul mountain ranges of northern Sonora.

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Rattlings

By Trevor Hare, Field Coordinator

Here I sit all broken-hearted... no, no, no. Here I sit in the Arizona Corporation Commission hearing room, listening to big money and shiny suits say that they only have our welfare in mind, when we all know it's about the duckets. It's not about the impacts of a giant powerline through the Tumacacori, Pajarito and Atascosa Mountains, it's not about the impacts to the folks and critters, it's not about providing reliable electricity. It's about making big money at the expense of the Chiricahua leopard frog, the Mexican spotted owl, the jaguar, the cowboy and poet, the artists, retirees and hikers, the hunters and picnickers, the amazing oak savannas. It's like they tried to fart but really took a crap.

Here I sit all dumfounded... I've often told my wife that someday we are going to walk all the way from Mowry to Bahia Kino where along the way we will celebrate the Sky Islands and the Sonoran Desert with cactus fruit and bacanora, with oak leaves, Bursera, and epiphytes above our heads, with dirt and rock and sand under our feet, and with spines in our skin and love in our hearts. The only place we would see the heavy hand of man was crossing Mexican Highway 2 some 150 kilometers south of Mowrey and the Arivaca Road. Now with a powerline proposed and an improved Highway 2 and a coastal highway and a string of Marinas my dream is fading quickly, while the dream of a new Mexico is chased.

I guess my fall back will have to suffice, perhaps even wilder than the Pinacate or more beautiful than the Seri Coast, the Walk from Steins Pass to Sahuaripa down the spine of the Peloncillos, the Sierra San Luis, the Sierra Xitahuca, the Sierra El Tigre, the Sierra El Oso, the Sierra El Gato, the Rio Bavispe, and the Sierra Los Pavos. You can walk 500 kilometers, and again only once will you see black top — on ol' Mexican #2. Here you can walk in the track of the jaguar with parrots flying about, swim in el rio o cal, where la cuelabra will warn you and otters will chirp, fantastic creatures and amazing plants will slowly pass by, the quetzl, the wild orchids, palo santo, gauyacan, el ocelote, and los tecolotes.

Well this may not happen for me this year but we (Mis Voluntarios y Yo) will be visiting the Mexican Sky Islands this year to explore, to chase critters, to eat carne asada and drink bacanora, and to hopefully hear the roaring cat! It wont be easy, mi familia has a lot to say about how many weekends, time away from them, I spend in the field, but Mexico holds an allure, a challenge, a wild wild landscape that is irresistible.

What is also irresistible, to volunteers (I hope!), is the ongoing work we have been up to lately and which continues through 2006. We have closed roads leading to a creek crossing on Las Cienegas National Conservation Area, prioritized a bunch of resource-damaging roads for closure in the Santa Rita Mountains, and we have continued the riparian monitoring and restoration planning in the Huachuca Mountains. We also have started a wash restoration project in the Peloncillos in conjunction with an outfit called Stream Dynamics out of New Mexico. We are very excited about this as their methods of simple rock placements, called Induced Meandering, has broad applications in both our Road Closure and Riparian Restoration programs.

For spring and beyond we have some exciting work planned including Road closures! Riparian restoration! Trips to Mexico to explore and chase critters! Bullfrog control work! A Final Narrows closure! And More! In March we will be in the grasslands and oak savannas of Las Cienegas and the Santa Rita Mountains protecting our investment in intact ecosystems and wide-open spaces by closing roads. In April we travel to New Mexico to close roads and protect riparian areas in a big joint event with the New Mexico Wilderness Alliance and the Upper Gila Watershed Alliance. Also in April we will revisit the Huachuca Mountains to check on our restoration site and look for the nasty nasty bullfrog. Then as a reward to the volunteers we will hold a fun trip to a beautiful area just south of the border in Sierra El Pinito to explore, relax, meet the locals, and have fun.

There of course be lots of other goodies packed into the field schedule in the upcoming year so stay tuned and please let us know if there's a special place that needs protecting, that needs fieldwork or we should visit and explore.

See page 19 over yonder for our **Spring into Summer!** field schedule.

Restaurant Review:

The Longhorn Grill

Review by Jason Zuzga, Poet and SIA Volunteer

We stumbled out into the hot night from a building which could have been the skull of Babe the Blue Ox. The strong margaritas should not be held responsible for our vertiginous feelings as we exited the restaurant through the brightly lit nasal cavity of the giant white cattle skull. This was no hallucination. Perhaps the tequila encouraged a few feeble attempts to climb up toward one of the spiraling, pointed horns. The skull's eye sockets, big as wagon wheels, glowed red down at us. The stars over the Santa Rita Mountains crowned the monstrous structure as we walked backwards toward the car. Four of us had just enjoyed a dinner at the Longhorn Grill. We had eaten our fill, the meat eaters and vegetarians both.

You may have seen the skull yourself, while driving down I-19 from Tucson toward Nogales or on your way for a hike off Ruby Road into the Tumacacori Highlands. The skull faces away from the highway, toward the Highlands, but its fifteen-foot tall horns stand up clearly from the brush. You may have seen the skull in one of the various films shot outside and in: "*Alice Doesn't Live Here Anymore*," "*The Vanishing Point*," "*Boys on the Side*." The Longhorn has been featured in ads for Jack Daniels, Choice Hotels, the Honda Element, and in the genteel pages of *Hustler Magazine*.

In *Alice Doesn't...*, filmed entirely in the vicinity of Tucson (the Old Pueblo starring in the roles of Phoenix and Socorro, NM, in addition to playing itself), Ellen Burstyn's Alice finds momentary solace within this molded concrete structure. You may too. Be sure, if you stop by, to request a table in the bar room — in 2003 the owners built a large dining room addition, which I and my fellow diners felt to lack the somewhat more rugged character and warmth of the old bar.

We spoke with one of the owners, Al Reynolds, who told us that the theme of the place is "Spaghetti Western." Upon opening our menus, we saw he meant this literally. In addition to the steaks and burgers, one can order pizza, lasagna, ravioli, and even the "Sonoran Spaghetti." How the option of chopped clams on that dish equals Sonora is, I suppose, a closely guarded secret. If you are a vegetarian, we recommend dining on Monday night for that night's specials, all-you-can-eat pizza and all-you-can-eat spaghetti with marinara sauce. Those options in large portions are still available on all the other nights, and several other meat-free options can be found: fried zucchini, quesadillas, and a large garden salad with spinach, mushrooms, olives, and cucumbers. The best vegetarian item of all was the extraordinary chips with homemade guacamole. We consumed several creamy, silky bowlfuls.

As for the meat, two of my companions ordered the Longhorn rib-eye steak, and both ordered it "medium." One steak arrived well done, the other rare. Mindy, our superb, world-weary waitress, sang along with Bette Midler: "Do you, do you want to dance?" as she brought over another round of margaritas. Think Flo from Mel's Diner — as played by Dianne Ladd in the movie (not Polly Holiday's Flo from *Alice* the TV series). My two carnivorous friends ate their mismatched steaks with only a bit of grousing. The chicken fried steak and that night's (Sunday's) special, the Barbeque Pork Ribs, were devoured with joy. We may have over-ordered. If you prefer fish, Friday's special, according to the menu, is all-you-can-eat, beer-battered catfish.

The marina sauce on my spaghetti could have used a bit more flavor, but I have to say that eating a plate of spaghetti in a giant concrete bovine skull is something that I never expected to do.

We left and felt like we were on some sort of film set. We were. A few miles beyond, though, actual bones and animals roamed far from the lights of the highway, prowling in the darkness among rocks that would dwarf this building.

Directions: take the Amado/Arivaca exit west from I-19 and head toward the skull. Longhorn Grill, 28851 S. Nogales Highway, Amado, AZ, 520.398.3955

Announcing: The SIA Photo Contest!

We invite you to submit your landscape photographs of the Sky Islands into our 2007 calendar photo contest. We are looking for photos of Sky Island landscapes representing the concept of Sky Islands, their beauty, uniqueness, natural resources, etc. No photographs of people or species, please. Landscapes, open spaces, mountain ranges, seasonality only. We will be selecting 12 photos to be printed in our 2007 calendar. Contest winners and **Legacy Club** members will receive a free copy of the calendar.

Submissions must be received by September 29, 2006. We will announce the winners at our Annual Volunteer Appreciation Party. Please send submissions to: Sky Island Alliance, Attn: Nicole, PO Box 41165, Tucson, AZ 85717 or email digital files to nicole@skyislandalliance.org. If the file size is bigger than 3 MB, please contact us before electronically sending your photograph. **Please include name of photographer, contact information, and location of photograph. You may be asked to verify that you are the photographer of submitted photos.** Unfortunately, we cannot return submitted photos.

Please contact Nicole at 520.624.7080 x209 or nicole@skyislandalliance.org with any questions.

Tumacacori T-Shirts!!

"The vanishing wilderness is yet a part of our western heritage. We westerners have known the wilds during our lifetimes and we must see to it that our grandchildren are not denied the same rich experience during theirs." - Senator Frank Church



Get your "Friends of the Tumacacori Highlands" t-shirts now!

- 100% organic cotton; **not** pre-shrunk.
- Pen-and-ink Jaguar logo on the front!
- Wilderness quotation (see above) on the back!
- Men's on a light-tan shirt, women's on a green-tea shirt.
- See pictures on our website at: www.TumacacoriWild.org

How many? What sizes?

Men's cut		Women's cut	
Quantity	Size	Quantity	Size
_____	XL	_____	XL
_____	L	_____	L
_____	M	_____	M
_____	S		

Where would you like your shirt(s) shipped?

Name: _____

Address: _____

City, State, ZIP: _____

Phone number (just in case): _____

Send this form with payment to:
(\$18.00 + \$3.00 shipping and
handling per shirt)

Sky Island Alliance
P.O. Box 41165
Tucson, AZ 85717



Forever Wild 2006 Walkin Jim Concert

Thursday, April 6 at PCC West's Proscenium Theatre

A FREE concert & multi-media presentation to bring attention to the attack on our Endangered Species Act, our wildlife and waterways. Info: wdr@theriver.com

Field Schedule: Spring into Summer! 2006

07-09 April. Joint Sky Island Alliance and New Mexico Wilderness Alliance. We will meet the great NMWA folks somewhere along the Arizona/New Mexico Border for a service project to benefit wildlife and wildlands!

21-23 April. Huachuca Mountains Riparian Monitoring. Join us in the beautiful Huachuca Mountains! Home of the Mountain Tree Frog! Ramsey Canyon Leopard Frog! Trogons! Turkeys! Bears and Lions! 2.0 hours from Tucson.

5-7 May. Los Picos Exploratory Trip. Join us in this little-known area just south of the border. 4.0 hrs from Tucson.

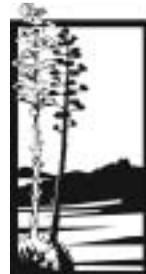
9-11 June. Peloncillo Mountains Riparian Restoration Project. Come out and get your hands dirty and play a direct role in improving the ecological health of your public lands! 1.5 hours from Tucson.

23-25 June. Santa Rita Mountains Road Closure. Come out and get your hands dirty and play a direct role in improving the ecological health of your public lands! 1.5 hours from Tucson.

For more information contact Trevor at trevor@skyislandalliance.org or at 520.624.7080 x204

Wishlist:

Mapping GPS units, Camping gear, Binoculars, Field equipment... Contact Trevor!



SKY ISLAND ALLIANCE
Protecting our Mountain Islands and Desert Seas

Join us!

Join or renew here OR through our website: www.skyislandalliance.org

If you received this newsletter and it's time to renew your membership, please send in your check! If you are reading a friend's newsletter, consider joining us. We rely on members for our basic operations. Contributions are tax-deductible; we are a 501(c)(3) organization.

Basic membership is only \$35, but if you add a little to that, here's a sampling of what your dollars can do:

- \$50 will help us survey 30 miles of roads.
- \$75 will sponsor volunteer training workshops
- \$100 will close one mile of road.

Fill this out, or donate online. It's quick, easy and safe!

Name: _____

Address: _____

City, State & Zip: _____

Phone & Email: _____

\$35 \$50 \$75 \$100 Other \$_____ (any amount helps and is appreciated!)

My check is enclosed

Please bill \$_____ to my: MasterCard Visa American Express

Card No.: _____ Exp. Date: _____

Security Code: _____ (usually the last 3-4 digits on the back of the card by the signature panel)

Card billing zip code if different: _____

Sky Island Alliance PO Box 41165, Tucson, AZ 85717

Sixth Conference on Research and Resource Management in the Southwestern Deserts Borders, Boundaries and Time Scales

May 2-5, 2006 at the Sheraton Hotel & Suites,
5151 E. Grant Rd. in Tucson, Arizona

Invited Speakers, Session Topics, Field Trips, and Social Events will all focus on: Socio-cultural and ecological frameworks from both U.S. and Mexico perspectives • Integration of socio-cultural and ecological concepts across borders • Using socio-cultural, economic and ecological models to help find solutions • Inventory and monitoring of socio-economic and ecological systems • The role of politics in managing resources across borders • Collaboration between Mexico and the U.S.

For more information or to register, follow the link from www.skyislandalliance.org

What is the Legacy Club?

The Legacy Club is comprised of our monthly and quarterly donors. This program is an easy way to donate to SIA and helps us tremendously. By donating just \$10 a month, you can turn your yearly \$35 membership contribution into \$120. Or, by donating \$50 every quarter, your yearly contribution would total \$200! There are many different donation options through this program. If you are interested, please call Acasia at 520.624.7080 x207 or click on the *Donate Now* button at www.skyislandalliance.org.

