

Patagonia

April 26th - 28th, 2013



Madrean Archipelago Biodiversity Assessment



patagonia



Photographs on cover by Jessica Moreno (left), Nick Deyo (middle), and Jim Rorabaugh (right); Document written and designed by Nick Deyo

Bioblitz Overview

The weekend of April 26th through 28th marked an exciting event for the community of Patagonia, Arizona. Biologists from all over the state gathered to document and celebrate the tremendous biodiversity of the Patagonia Mountains, one of the southernmost Sky Island ranges in the United States, and an area threatened by four proposed mining operations. A *bioblitz* is a relatively recent term describing a short but intense period of biological surveying, meant to identify as many species as possible for a designated area, while also involving the public and raising awareness about the importance of conservation.

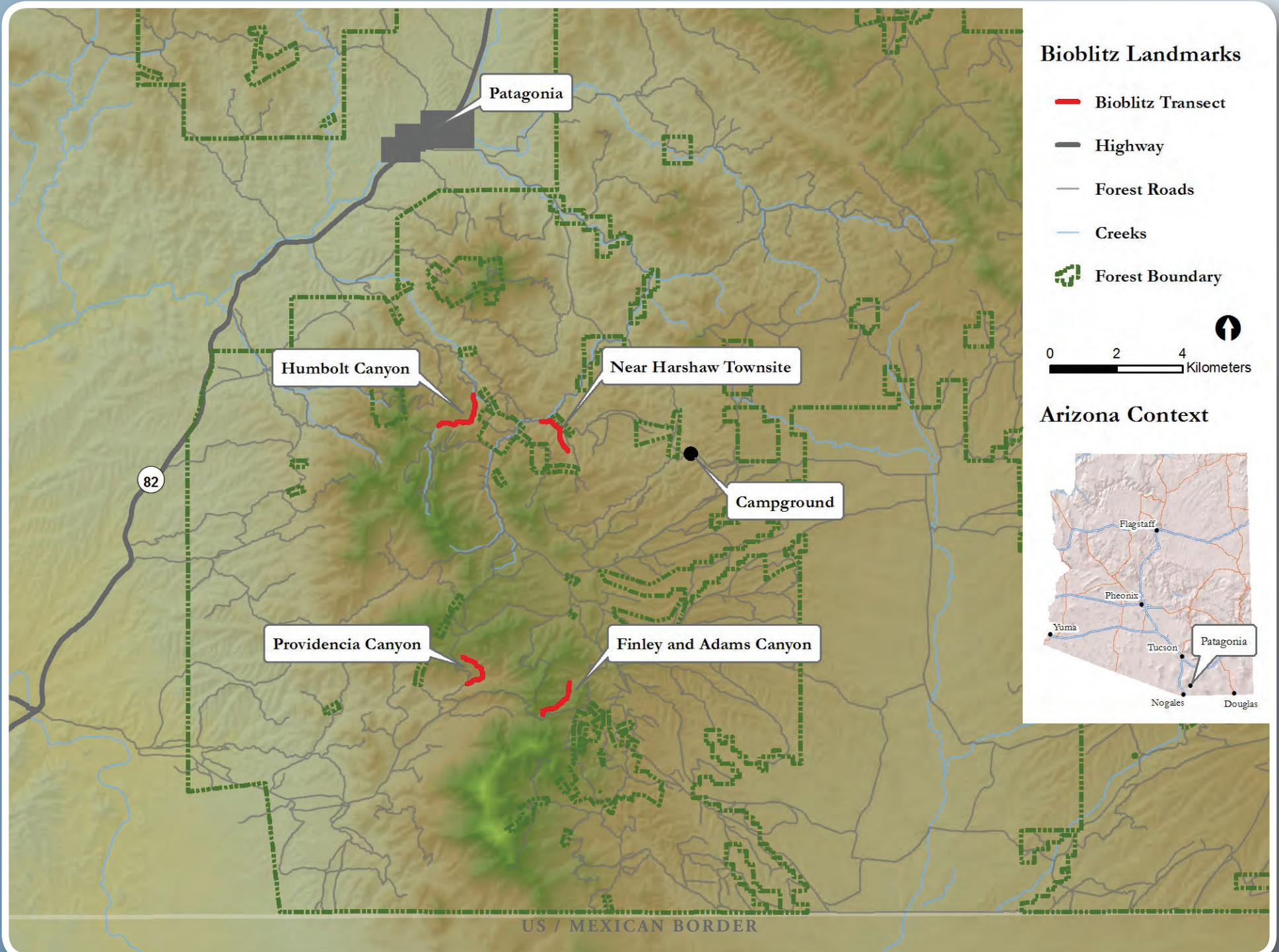
This bioblitz was an effort of Sky Island Alliance's Madrean Archipelago Biodiversity Assessment (MABA) project and the Patagonia Area Resource Alliance (PARA). MABA is an ongoing effort to document and conserve the biodiversity of the Sky Island Region--this event marked MABA's seventh biodiversity expedition and its first event outside of Mexico. PARA is a grassroots organization of volunteer community members committed to preserving and protecting the Patagonia area.

30 expert botanists, entomologists, herpetologists, ornithologists, and mammalogists, representing organizations such as The University of Arizona, Arizona State University, The Borderlands Habitat Restoration Initiative, The Nature Conservancy, Southeast Arizona Butterfly Association, Ravens-Way Wild Journeys, the Hummingbird Monitoring Network, and the Arizona-Sonora Desert Museum, as well as a cadre of trained volunteers from Tucson and Patagonia, attended the event. This bioblitz focused primarily on four main areas located near proposed mining activities--these transects are depicted on the map on the following page. Other events included a Sky Island Biodiversity talk given by Dr. Tom Van Devender, a lecture describing proposed mining activities in the area by SIA's Jenny Neeley, and an informational booth located in Patagonia's community park. Over 900 species records were recorded over the course of the weekend, resulting in the documentation of 418 different species of plants and animals. These records are available to the public through MABA's online database at www.madrean.org.



Photographs on this page by Glen E. Goodwin





Participants

Expert biologists and support volunteers donated over 700 hours of their time towards this project, an invaluable contribution that can't be underestimated. The Sky Island Region is one of the most biologically diverse places in the world, and it can take a lifetime to learn to identify the many species that inhabit it. Gathering a group of biologists, each passionate about his or her area of expertise, creates a synergy that is contagious. Newcomers to an event like this would be carried away by the frenzy of activity surrounding them. One moment you would be gathered around a rare plant, learning the minute characteristics used to identify it. The next moment, a group of herpetologists may find a mountain patch-nosed snake (*Salvadora grahamiae*) and let you hold the sleek chocolate brown and orange striped creature in your hands. If you get up early enough to go out with the ornithologists, you might have the rare opportunity to see a nesting pair of Goshawks, as the birders on this trip were able to do. Our volunteer scientists provided a powerful team of experts. A group of entomologists came from Arizona State University; among them were experts on micro-moths, weevils, and other insect groups. Southeast Arizona Butterfly Association volunteers recorded more than 30 species of butterflies over the weekend. The University of Arizona provided expert entomologists and botanists, while organizations like The Nature Conservancy, the Borderlan Habitat Restoration Initiative, and Arizona-Sonora Desert Museum provided expert naturalists.

Photographs on this page: Sky Island Alliance staff Sergio Avila and Jessica Moreno talking to Patagonia residents about the bioblitz (Glen E. Goodwin); Michael Bogan identifying aquatic insects at Ferrell Spring (Charles Hedgcock); Identifying a mountain patch-nosed snake (Nick Deyo); Jim Rorabaugh, Dale Turner, and Nick Deyo navigating to Ferrell Spring (Charles Hedgcock); Bioblitz participants enjoying a camp fire at Coral Canyon Campground (Sergio Avila)



The Patagonias

In 2007, Conservation International named the Madrean Pine-oak Woodlands, including the Sky Islands, as a global biodiversity hotspot. The Patagonia Mountains, in Santa Cruz County, Arizona, are located in this high biodiversity region. The Patagonias are renowned--locally and internationally--by scientists, birdwatchers, campers, hunters, hikers, and outdoor recreationists, and are the starting point for the continuous 800 mile Arizona National Scenic Trail, connecting Mexico to Utah. This mountain range, which straddles the US-Mexico border, was designated critical habitat for Mexican Spotted Owl (*Strix occidentalis*) in 2004 by the U.S. Fish and Wildlife Service and proposed critical habitat for jaguar (*Panthera onca*) in 2012. The range is likely a gateway for these tropical cats which travel north from their breeding grounds in Sonora, Mexico. Additionally, three plant species with restricted distributions and Special Concern protection status occur in the Patagonia Mountains: Bartram's stonecrop (*Graptopetalum bartramii*), Huachuca milkvetch (*Astragalus hypoxylus*), and Arizona blue star (*Amsonia grandiflora*). A rare moth, the Patagonia eyed silkmoth (*Automeris patagoniensis*), was described from the Harshaw townsite in the Patagonias, and only occurs there and in the Sierras la Madera and La Púrica in northern Sonora.

Habitat Types

The Patagonia Mountains rise 1,000 meters (3,281 feet) from the Santa Cruz River Valley in the west to an elevation of 2,201 meters (7,221 feet) at the summit of Mount Washington, the range's highest peak. Lower elevations of the Patagonias are dominated by semi-desert grasslands, similar to nearby Sky Islands such as the Santa Ritas, Huachucas, and Whetstones. Common desert grassland species include spidergrass (*Aristida ternipes*), cane beardgrass (*Bothriochloa barbinodis*), sideoats grama (*Bouteloua curtipendula*), century plant (*Agave palmeri*), velvet mesquite (*Prosopis velutina*), border pinyon (*Pinus discolor*) and alligator juniper (*Junipers deppeana*). Above 1,300 meters (4,265 feet), the habitat quickly transitions into oak woodland dominated by Arizona white oak (*Quercus arizonica*), Emory oak (*Quercus emeryi*), skunkbush (*Rhus aromatica*), and mountain yucca (*Yucca madrensis*). Above 1,600 meters (5,249 feet) pine trees become more common, and the habitat becomes pine-oak forest. Common pines include Apache pine (*Pinus engelmannii*), Arizona pine (*Pinus arizonica*), and Chihuahua pine (*Pinus chihuahuana*). Riparian areas, especially the perennial Harshaw Creek, provide critical habitat for more water-loving species. Common riparian species include Arizona sycamore (*Platanus wrightii*), Fremont cottonwood (*Populus fremontii*), velvet ash (*Fraxinus velutina*), and Goodding willow (*Salix gooddingii*).

Pine-oak Forest



Oak Woodland



Riparian Areas

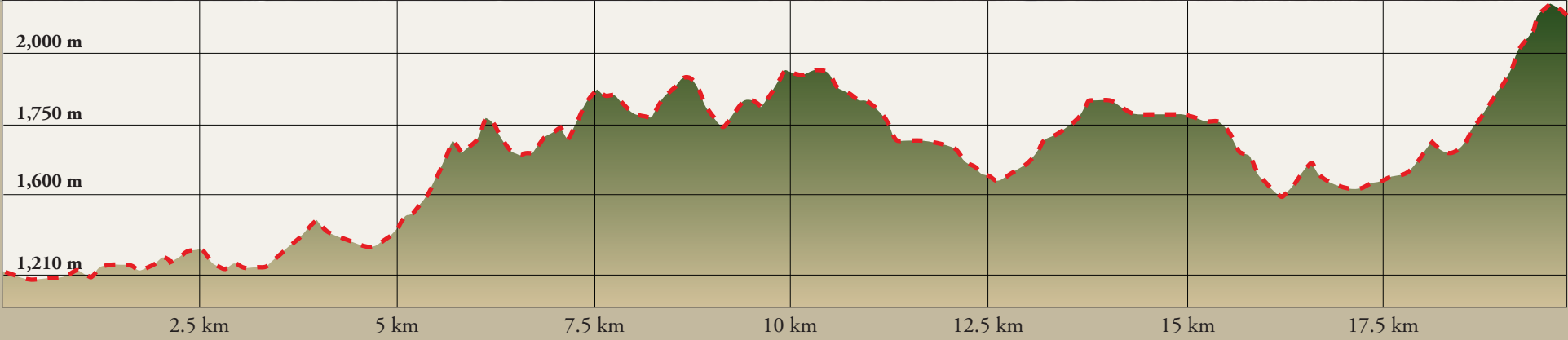
Desert Grassland



Photographs on the opposite page by: top (Jennifer Gremer), middle (Sergio Avila), and bottom (Glen E. Goodwin)



2,201 m



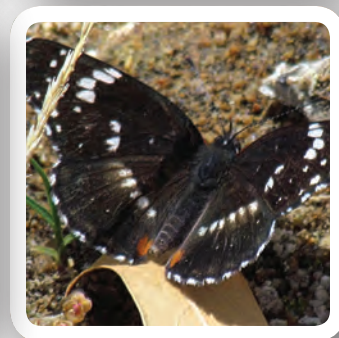
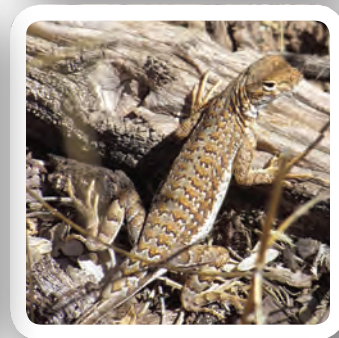
Fauna

The Patagonia Bioblitz only lasted a weekend; however, due to the incredible support we received from volunteer scientists, 405 animal records were collected, totaling 207 different species. Ornithologists were able to identify 80 species of birds, including exciting finds such as Elegant Trogons (*Trogon elegans*), a Peregrine Falcon (*Falco peregrinus*), and a pair of nesting Northern Goshawks (*Accipiter gentilis*). 65 species of insects were recorded, including 33 species of butterflies. Dr. Sangmi Lee, a researcher from Arizona State University, discovered an undescribed species of micro-moth. The weather was too cool for finding many reptiles and amphibians; only ten species were found. Notable reptiles were a beautiful peach and brown-colored mountain patch-nosed snake (*Salvadora grahamiae*), a Yaqui black-headed snake (*Tantilla yaquia*), and a black-tailed rattlesnake (*Crotalus molossus*). Wildlife trackers and mammalogists found what seemed to be an ocelot (*Leopardus pardalis*) track – the first record of its type documented in this mountain range. Wildlife cameras were placed prior to the Bioblitz and recorded 14 species of mammals, including mountain lion (*Puma concolor*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), ringtail (*Bassariscus astutus*), and white-nosed coati (*Nasua narica*). These cameras will continue to monitor wildlife movements in the Patagonias. It would not be surprising to discover an ocelot or a jaguar moving through the area; both species have recently been recorded in the nearby Santa Rita and Huachuca Mountains as well as in other ranges south of the international border.

Photographs on this page: Top - Tom Van Devender taking a closer look at the “patch” on the mountain patch-nosed snake - *Salvadora grahamiae* (Nick Deyo); Bottom - Flame skimmer dragonfly - *Libellula saturata* (Steve Minter)

Photographs on opposite page (from top to bottom and left to right): black-tailed rattlesnake - *Crotalus molossus* (Charles Hedgcock), Wild Turkey - *Meleagris gallopavo* (Jim Rorabaugh), mountain lion track - *Puma concolor* (Sergio Avila), bloody net-winged beetle - *Lycus sanguineus* (Jim Rorabaugh), sheep skipper - *Atrytonopsis edwardsii* (Doug Danforth), pipevine swallowtail larvae - *Battus philenor* (Doug Danforth), canyon tree frog - *Hyla arenicolor* (Jim Rorabaugh), elegant earless lizard - *Holbrookia elegans* (Jim Rorabaugh), Arizona strippedtail scorpion - *Vaejovis spinigerus* (Jim Rorabaugh), Arizona gray squirrel - *Sciurus arizonensis* (George Ferguson), antlion larvae - Myrmeleontidae (Justin Schmidt), bordered patch butterfly - *Chlosyne lacinia* (Jim Rorabaugh), Arizona sister - *Adelpha eulalia* (Paul Levine)





Flora

The Patagonia Mountains are home to a rich diversity of plants. A quick examination of herbarium records shows over 460 plant species for the mountain range (Southwest Environmental Information Network 2013). Over the course of a weekend, our volunteers were able to collect 497 plant observations for 211 different species. High biodiversity is a characteristic of all Sky Island ranges, due to elevational gradients, which create a series of different habitat types in close proximity, and the unique biogeography of the region. Six different biological provinces overlap in the Sky Islands, including the Rocky Mountains, the Sierra Madre, the Sonoran Desert, the Chihuahuan Desert, the Great Plains, and the Neotropics—each area contributes its own unique variety of plants and animals.

Bioblitz discoveries of special note included two Endangered Species Act species of Special Concern, Huachuca Mountain milkvetch (*Astragalus hypoxylus*) and Arizona bluestar or large-flowered bluestar (*Amsonia grandiflora*). This trip also provided an opportunity to search for the willowleaf oak (*Quercus viminea*), a species that is well known in the Sierra Madre of Mexico, but had only been rumored to exist in the United States. A single specimen was collected in the Patagonias in 1923, with subsequent attempts at finding the tree proving unsuccessful. Remarkably, on this trip the willowleaf oak was discovered in two separate localities and later verified by oak expert Richard Spellenberg at New Mexico State University. An article describing this discovery was published in the journal *Phytoneuron*.

Plant species information provided by:

Arizona Game and Fish Department. 2003 and 1999. *Amsonia grandiflora* and *Astragalus hypoxylus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ.



Above: Tom Van Devender pressing a willowleaf oak specimen (Sergio Avila)

Photos on opposite page: willowleaf oak - *Quercus viminea* (Mark Dimmitt), Arizona bluestar – *Amsonia grandiflora* (Doug Danforth), and Huachuca milk-vetch - *Astragalus hypoxylus* (Tom Van Devender)

Willowleaf Oak *Quercus viminea*

This evergreen tree reaches a height of 10 meters. Its narrow pointed leaves are similar in appearance to narrow-leaved willows, hence its name. Like other Sky Island oaks, it loses its leaves each year in the arid fore-summer just before the rains start, becoming “drought-deciduous.” Oaks are the most diverse genus of trees, with 17 species in the Sky Island Region. *Quercus viminea* is well known from Sky Islands in Mexico and further south in the Sierra Madre Occidental. This bioblitz verifies this Madrean oak’s rare presence in the United States.



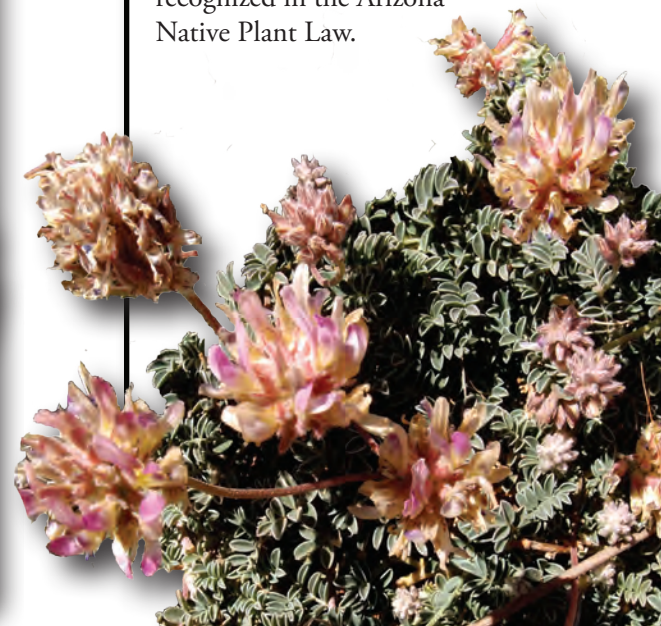
Arizona Bluestar *Amsonia grandiflora*

Arizona bluestar is a showy perennial herb in the Apocynaceae, or dogbane family. It is characterized by milky sap, numerous erect stems with long thin leaves, and can reach a height of 40-90 cm. Multiple blue-white flowers bloom on individual plants in May and April—a spectacular sight. *Amsonia grandiflora* has a very narrow distribution in northern Sonora and Arizona, with only five known populations. It is an Endangered Species Act species of Special Concern and a Forest Service Sensitive Species. The species was originally found in Flux Canyon in 1930 by Robert H. Peebles, one of the authors of *Arizona Flora*.



Huachuca Milk-vetch *Astragalus hypoxylus*

This plant forms dense mats, or rosettes, that are typically less than 10 cm in diameter. Alternate compound leaves are gray-green in color, with individual leaflets appearing folded along their midline. Flowers are compact and globe shaped, appearing somewhat like a clover flower. *Astragalus hypoxylus* is only known from the Patagonia and Huachuca mountains in southeastern Arizona and the Yécora area in the Sierra Madre Occidental in eastern Sonora. It appears to be susceptible to drought and overgrazing. *Astragalus hypoxylus* is an Endangered Species Act species of Special Concern, a Forest Service Sensitive Species, a Bureau of Land Management Sensitive Species, and is recognized in the Arizona Native Plant Law.



Protecting Patagonia

During one brief weekend in April, we were able to identify over 400 species of plants and animals in the diverse habitats of the Patagonia Mountains. Further inventories during the summer rainy season would yield a great many additional taxa. Patagonia residents have access to the one of the country's most biodiverse regions, while visitors come from all over the country to enjoy the natural beauty of the Patagonias and have the chance to observe some of the range's unique species. Currently, four mining operations are under consideration by the Forest Service. These operations threaten to harm important habitat, forever changing this treasured landscape. We hope that better understanding the biodiversity of this irreplaceable Sky Island will help decision makers and community members realize the ecological and economic importance of preserving the Patagonias for future generations. Thankfully, organizations like Sky Island Alliance and the Patagonia Area Resource Alliance are working hard to keep this incredible range wild and intact.

Photographs from left to right: Humbolt Canyon pine-oak forest (Jennifer Gremer), rock face in Humbolt Canyon (Jennifer Gremer), oak woodland in Finley Adams Canyon (Charles Hedgcock), Harshaw Creek (Steve Minter), and San Rafael grassland (Charles Hedgcock)





Contributors



Many thanks are deserved by the organizations and individuals who made this event possible. Sky Island Alliance is fortunate to have the support of talented biologists, dedicated conservationists, and enthusiastic volunteers, who, together, make events like the Patagonia Bioblitz so productive and enjoyable.

Sky Island Alliance is a grassroots 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.



The **Patagonia Area Resource Alliance** is a grassroots organization of volunteer community members committed to preserving and protecting the Patagonia, Arizona area.

Patagonia, Inc. is an outdoor clothing and gear company dedicated to environmental conservation. This project was made possible by a generous grant from Patagonia, Inc.

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Our Dedicated Volunteers: Richard A. Bailowitz, Michael Bogan, Jefferson Carter, Joe Cicero, Jim Chumbley, Doug Danforth, Ana L. Reina-Guerro, Kevin Demater, Mark Dimmitt, Tim Erickson, George Ferguson, Kim Franklin, Nico Franz, Gooch Goodwin, Jenny Gremer, Chip Hedgcock, Fred Heath, Cliff Hirsch, Sky Jacobs, Andrew Jansen, Sangmi Lee, Steve Minter, Kathy Pasierb, Vince Pinto, Lee Rogers, Jim Rorabaugh, Wendy Russell, Justin Schmidt, Michael Stabilz, Dale Turner, Abbie Zeitzer, and Guanyang Zhang.

