



The Arizona  
Native Plant  
Society

# The Plant Press

## THE ARIZONA NATIVE PLANT SOCIETY

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Special thanks from the editors to all who contributed time and efforts to this issue.



## A Jewel Called Ruby

by Jeannette Hanby and David Bygott. Photos courtesy the authors.

"Hey look!" someone called as I bent over the pit to peer into the darkness. I stood up and scanned around but my companion wasn't warning me about the gravelly edge of the old mine shaft or a rattlesnake. He was pointing to a clump of bright flowers growing nearby. The scarlet tubular flowers belonged to a firecracker bush, *Bouvardia ternifolia* (appropriately in the Rubiaceae family). This plant is just one of Ruby's treasures.

Ruby, Arizona, is definitely a gem even though it was named after the postmaster's wife and not a rich red jewel. We love the place for its biological delights, the landscape, the peace, the town full of its ghosts, the collapsing mines with their batty visitors.

Ruby "ghost town" was an active mine for 63 years, producing a little gold and silver and a lot of zinc and lead. The tailing piles from the mine filled a valley where two canyons met, creating two lakes separated by fine white sand. This oddity in the desert creates very special conditions for plants and animals. When Ruby's Eagle Pitcher Mine shut down in 1941, most people moved out and wildlife moved back in. Visitors like ourselves are now allowed to share the treasures of Ruby because some farsighted folks decided to buy the place and preserve it. They have fenced out the cattle and have promoted Ruby as a small paradise for those wanting to rest, explore, learn and have a unique experience in this part of the Sonoran Desert.

Today Ruby is a precious place, full of beauty and surprises all year round. The scenery is grand with Montana Peak perched over rugged hills, canyons and hidden valleys. The derelict houses and mine buildings are historic ruins well worth exploring. But for us, it is nature that attracts

*continued next page*

**above** Firecracker bush (*Bouvardia ternifolia*) blooms in August around abandoned mines.

# President's Note

by Barbara G. Phillips [bgphillips@fs.fed.us](mailto:bgphillips@fs.fed.us)

Coconino, Kaibab and Prescott National Forests, Flagstaff

What fun to be a member of the Arizona Native Plant Society when one can share spectacular floral displays with kindred spirits! Spring is now fully upon us after a very long hard winter. I joined Yuma Chapter members spotting tiny annuals in the Castle Dome Mountains in March, and we discovered abundant rare Bigelow onions at our Tent Rocks Plant Atlas Project of Arizona (PAPAZ) site in April. The Endangered Arizona cliffrose is greener and enveloped with more pale yellow flowers than I have ever seen in over 30 years of monitoring. The rare Pediocacti are in abundant flower also so maybe this will be the year for the long-anticipated germination event to reinvigorate the declining populations!

AZNPS is also undergoing change and renewal as State Board members retire and new people take up their tasks:

Arlene Stigen is resigning as State Treasurer after valiantly working to create order. Many thanks to you, Arlene, for all your contributions while on the Board.

Doug Green has been very active in AZNPS in many capacities for as long as I can remember. He was our State Membership and Chapter Development Chair and lately has been the President of the Phoenix Chapter. Doug has been a volunteer extraordinaire throughout the Phoenix area, speaking to homeowner groups about native landscaping, representing AZNPS at Invasive Weed Council meetings and numerous other functions, and selling our AZNPS merchandise and tabling. We cannot thank you enough, Doug.

We hope you enjoy this issue of *The Plant Press*. All over the state in the midst or outskirts of cities (Willow Bend and the Highlands Center) to further afield, our authors love of their favorite locality comes through loud and clear. We urge you to not only enjoy reading about these interesting sites but also to follow directions and visit these "hidden treasures of Arizona native plants."



above Rainbow cactus (*Echinocereus rigidissimus*) produces its spectacular flowers in May.

## A Jewel Called Ruby *continued*

our attention. At Ruby you can watch a dazzling array of birds, from brilliant vermilion flycatchers to great blue herons. You can glimpse or track deer, raccoon, bobcat, fox, coyote, javelina; maybe even a coati or puma. Mine shafts provide a year-round home for some bats and a seasonal home for thousands of Mexican free-tailed bats. They come to have their young here, and every summer night they fly out in dense flickering ribbons across the evening sky.

With so many birds, bats and mammals, you can imagine the wealth of insects and the vegetation upon which this abundance of life depends. Because of the lakes and arroyos there are willows and some cottonwoods and other riparian plants. One of the Ruby lakes drains south into California Gulch where there are swamps and pools for a good part of the year. Without cattle, resident humans, and only rare bush fires, Ruby has lovely stands of native grasses.

Ruby's hills are clothed with oaks and mesquites, with manzanita and juniper as you move up the canyons. Drier slopes are crusted with thick prickly stands of velvetpod mimosa, shindagger and prickly pear. Among the rocks you may spot the beautiful rainbow cactus (*Echinocereus rigidissima*), as well as the rare golden-chested beehive cactus (*Coryphantha recurvata*).

One of my Ruby favorites is the rock trumpet (*Macrosiphonia brachysiphon*). Its flowers are long tubes of white among small dark green leaves. Because it's a perennial, you can find it all summer long among the rocks on Ruby's hillsides. Its wonderful fragrance can be inhaled in the freshness of early mornings before that hot summer sun rises glowing over the brow of Montana Peak's eastern ridge.

Another beautiful summer flower is the briefly blooming Yellowshow (*Amoreuxia* species) with its asymmetrical orange flowers and lovely palmate leaves.





**above, left to right** Two perennials — rock trumpet (*Macrosiphonia brachysiphon*) and yellowshow (*Amoreuxia* spp.).

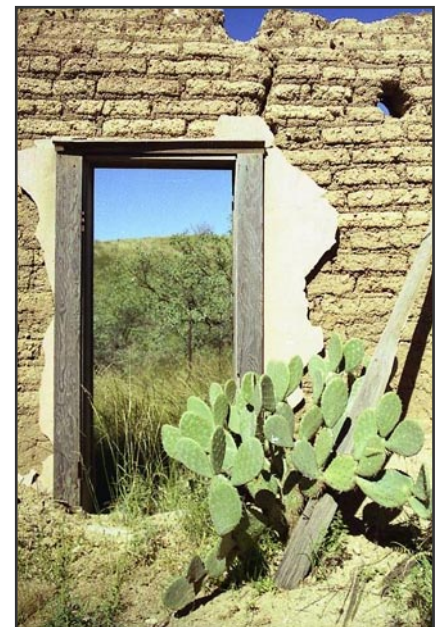
This unusual perennial grows from a large tuberous root that desert inhabitants used to dig up and eat.

One of Ruby's strangest habitats is the tailings area that lies between the two small lakes with their fish, birds and water vegetation, and the swampy valley to the south. Little can survive in these shifting sands, but every morning the fine sand yields a record of whatever has walked across it in the night. In summer, huge cicada-killer wasps nest in colonies all round the edges of the sands. Not aggressive to people, they are deadly to cicadas, which they paralyze then air-lift back to their burrows to serve as a living larder for the wasp grubs. Ruby is an entomologist's delight, especially from July through September — it has an impressive variety of butterflies, moths, dragonflies and other insects.

Come to Ruby with the Arizona Native Plant Society. Bats, Bugs and Botany — trips are offered from time to time. Check the *Happenings*, the Society's newsletter.

For an illustrated and enticing history of Ruby in its heyday, we recommend *Ruby, Arizona: Mining, Mayhem and Murder* by Bob Ring, Al Ring and Tallia Cahoon. Ruby is privately owned but is open to the public Thursday through Sunday. We would like to thank all the owners of Ruby Mines for saving Ruby and allowing visitors to share it. Entry fee is \$12, or \$18 if you want to fish. There are campsites with an outhouse but no other facilities — bring everything you will need, especially drinking water. You can call before your visit to get up-to-date information about the roads, campsites, etc.; the number is 520.744.4471.

From central Tucson it is about 75 miles to Ruby. The fast route is via I-19, Amado and Arivaca. The slower, but prettier route (sometimes a bit wash-boardy), is via AZ-86, Three Points, AZ-286 and Arivaca. Either way you get to Arivaca. Once at Arivaca, turn south on South Fifth Ave., which becomes Ruby Rd. This winding scenic road starts paved but becomes unpaved about halfway through the 12 miles from Arivaca to Ruby. Our car has low clearance and no 4WD but always gets through. During the last few miles there are signs warning you about primitive roads, wildfires and illegal border activity; you may meet cows and streams wandering across the road, and the Border Patrol is ever-present. All these serve to deter the faint-hearted. Keep going. The entry to Ruby is clearly sign-posted. Upon arrival, be sure to check in with the caretaker who lives on site and knows Ruby and surrounding area thoroughly. He can share his knowledge of medicinal plants as well as much else and help you enjoy your time in this wonderful "jewel" of an area.



**below** Some of Ruby's habitats: rocky cliffs, oak woods and grassland slope down to riparian vegetation around a permanent lake. A prickly pear reclaims the ruins of an adobe house.



# Granite Mountain: An Island in a Sea of Developing Lands

by Sue Smith, Prescott Chapter member

Granite Mountain is an easily identifiable landmark located on the outskirts of Prescott. Surrounded by the 9,799-acre Granite Mountain Wilderness (designated in 1984), it is an island in a sea of developing lands. It offers the experience of hiking among huge granite boulders, outstanding views of the surrounding area, and a mosaic of chaparral, oak and pine woodlands. There are a great variety of plant habitats due to the unique blend of location, elevation (over 7,600 ft.) and terrain. Prescott National Forest Service manages both the Wilderness and the adjacent Granite Basin Recreation Area.

On southern slopes, chaparral, a community of plants including shrub live oak (*Quercus turbinella*), mountain mahogany (*Cercocarpus montanus*), pointleaf and yellowleaf manzanita (*Arctostaphylos pungens*, *A. pringlei*), Wright's silktassel (*Garrya wrightii*) and lemonade berry (*Rhus trilobata*) dominate with scattered stands of singleleaf pinyon (*Pinus monophylla*) and alligator juniper (*Juniperus deppeana*). On northern slopes you'll find pinyon-juniper woodlands and some ponderosa pine (*P. ponderosa*) and Emory oak (*Q. emoryi*). On the higher elevations ponderosa pine is common. Mule deer and javelina inhabit the area, along with pronghorn, mountain lion, bobcat, badger, fox, skunk, coyote, rabbit, and woodrats. It is also home to collared lizards, horned toads and blacktail rattlesnakes. Common birds are ravens, red-tailed hawks, scrub jays, western kingbirds, ash-throated flycatchers, and phainopeplas.

Only two maintained trails enter the Granite Mountain Wilderness; several trails skirt its boundaries and are part of the Granite Basin Recreation Area. Trail #261 takes you to the top of the mountain. It starts at the Metate trailhead near Granite Lake and descends into a thin belt of ponderosa pine along a seasonal stream. The trail continues alongside a dry wash surrounded by oak and pine woodlands, which become more and more open, eventually revealing the steep southern cliffs of the main peak. The cliffs and the area beneath are home to an endangered population of peregrine falcons, and are closed during the breeding season (February to July).

The trail climbs the southern slope and flattens at the top of a ridge. It then curves around a lesser summit, over a level area and finally up to the base of the peak, where the trail ends. A little climbing is required to make it to the very top, an area with flat rocks and a 360-degree view. The walk to this summit is four miles and gains 2,000 feet.



above *Purshia stansburiana*.

A different experience can be found hiking Trail #308, the Tin Trough Trail, which begins at the Williamson Valley Road trailhead. Trail #308 starts in open grasslands with beautiful views of Granite Mountain and its surrounding wilderness. The landscape soon changes to a mix of chaparral, including rabbit thorn (*Lycium pallidum*), Fremont mahonia (*Mahonia fremontii*), scrub oak, mountain mahogany, lemonade berry, silktassel, manzanita, and pinyon-juniper woodland. After two miles, the trail crosses Mint Wash — often a running stream in winter and after summer storms — and at about 2.5 miles it enters the Granite Mountain Wilderness. The trail continues for three more miles through a granite boulder-strewn landscape of pinyon-juniper woodlands and chaparral.

A particularly delightful time to hike Trail #308 is late April to early June. Along the trail are patches of miniature woollystar (*Eriastrum diffusum*). A rocky slope near the beginning of the trail is home to the blooms of mariposa lily (*Calochortus ambiguus*) and Woodhouse's phlox (*Phlox woodhousei*). A little further down the trail a large stand of Mexican cliffrose (*Purshia stansburiana*) may be in full bloom filling the air with their wonderful scent. Shortly after the trail crosses Mint Wash a large stand of apache plume (*Fallugia paradoxa*) may be sporting their pink feathery plumes. Scattered along the trail are Fremont mahonia with their clove-scented yellow blooms.

Summer is a great time to explore the areas along Mint Wash. Sightings of birds in the summer months include black-headed grosbeaks, Bullock's orioles, and summer and western tanagers. These birds are found in the presence of magnificent specimens of velvet ash (*Fraxinus velutina*), Fremont cottonwood (*Populus fremontii*), and Arizona walnut (*Juglans major*).

Avoid Trail #308 if it has recently rained — the soil is clay and will quickly attach itself to your boots! Other than this warning, these trails have a lot to offer almost anytime of the year.



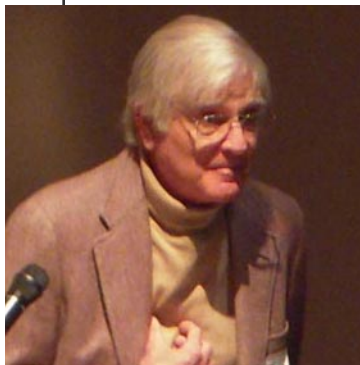
**Here are excerpts I read from two of Ray's many admirers:**

Ben Wilder, graduate student at University of California, Riverside, student of Exequiel Ezcurra and collaborator with me on the flora of Gulf of California islands, wrote:

*Dr. Raymond Turner, long-time Sonoran Desert ecologist and previous head of the Desert Lab at Tumamoc Hill, has been a guide and inspiration, and was my usher into my position at the Desert Lab and the ecological world. As my interest gravitated toward this field, I realized the significant contributions of Ray's work, and have been fortunate to learn a great deal from his knowledge and demeanor. One of the things that has always amazed me about Ray is that he treats every single person, no matter the circumstances, with the same amount of respect, attention, and kindness. His work is careful, reasoned, and well documented allowing for the next generation of desert ecologists to continue the long-term investigations he either began or continued from the generation before him. Life, family and friends always come before science or work for Ray and Jeanne and this manner is fully engrained in their family. I have never met a family as selfless and helpful as the Turners. In the tradition of the Desert Lab, Ray's work carefully peels back the mysteries of the desert ecosystem through meticulous long-term investigations. When I think about striking a balance between work and life, there is no better model to follow than Ray's. One image I always have of Ray in my mind is him in the field, behind his camera matching a historic photograph, lining up the shot, taking a Polaroid to make sure it is on line, assessing the changes in the scene, and whistling all the time, fully engrossed in the moment.*

**From Bob Webb, USGS in Tucson:**

*I could talk all day about Ray, my friendship with him, my collaboration with him, and my respect for his work. One of my greatest accomplishments was helping to revise *The Changing Mile*, a classic book that really launched my career. This year is the 50th anniversary of the Desert Laboratory Collection of Repeat Photography, which Rod Hastings and Ray founded with initial matches in the Pinacates in June 1960. It is a major accomplishment that alone could define a career, but Ray clearly has done far more than that. He also has helped push me towards long-term quantification of desert plant demographics, at first in Grand Canyon, second in the Mojave Desert, and now at the Desert Lab long-term plots. Finally, the Agave with the name of *Agave turneri* is now in press at Brittonia, honoring his 45 years of plant biogeography work in Baja California.*



## Honoring Ray & Jeanne Turner

### at the Seventh Arizona Botany Meeting, February 20, 2010

*by Richard Felger*

It was 1949. A tall handsome field ecologist rode his horse down the mountain into the little town of Richfield, Utah. He was noticed by a beautiful young nurse, Jeanne Brunner, who had recently moved to Richmond to take care of her father and find employment at the local hospital. They married the next year and 61 years later the partnership continues to glow. Jeanne worked to help put Ray through graduate school. Over the years Jeanne accompanied and helped Ray in the field and twice to east Africa, co-authoring in 1998, *Kenya's Changing Landscape*. They have three children, Terri, Martin, and Justin, and four grandchildren.

Ray's work is a life of esteemed collaborations. For me, on trips to conferences in Mexico, as one of my professors at the University of Arizona when I was a sapling, in the herbarium, as a guest in their home— always time to help, always a smile. I admire Jeanne's dedication to home and place, to the neighbors and neighborhood. Ray and Jeanne — ever a team.

As the wheel of time turns we come to treasure our friends and mentors and those who have made a difference in everything that we value. It was with great honor that together with fellow committee members Andrew Salywon, Wendy Hodgson, Barbara Phillips, Tom Van Devender and the entire Arizona botanist community, we presented the Lifetime Achievement Award to Raymond Marriner Turner and Jeanne Brunner Turner. Sixty-one years is a good start.

“Retired” since 1989, Ray subsequently co-authored or co-edited four major books: *Sonoran Desert Plants: An Ecological Atlas*; *Kenya's Changing Landscape*; *The Changing Mile Revisited*; and *Repeat Photography: Methods & Applications in the Natural Sciences*. You can feast on Ray's publications at: [www.paztcn.wr.usgs.gov/ray\\_cv.html](http://www.paztcn.wr.usgs.gov/ray_cv.html).

For every botanist, for every family member, every human — there are no better role models than Raymond Marriner Turner and Jeanne Brunner Turner.





# Hart Prairie Preserve

by Neil Chapman<sup>1</sup> and Keri Stiverson<sup>2</sup>

Located at the base of the sacred San Francisco Peaks near Flagstaff, the Nature Conservancy's (TNC) Hart Prairie Preserve combines an oasis of beauty and grandeur with heartfelt land stewardship and restoration ecology.

Home to a globally unique community of Bebb willows (*Salix bebbiana*) and the nearly 300 species of native flowers and grasses, visitors can watch the aspens gracefully sway in the wind, climb Fern Mountain, study native plants, watch monsoon storms or sing along with migratory birds. Volunteers guide nature walks, don chaps and wield a chainsaw, split wood, haul slash, remove invasive weeds or participate in the native seed collecting program with Preserve Manager, Neil Chapman, who delights in bestowing the tenets of effective and successful conservation.

There is also a rich human history, as the 125-year-old homestead at Hart Prairie was the first stop on the Flagstaff to Grand Canyon stagecoach route. Native Americans have used this area for thousands of years. The early populations of people, referred to as "Archaic Indians," were the earliest Native Americans known to have been in this area, from about 7000 B.C. to 300 B.C.

Over the last 100 years, a number of human impacts have altered the course of this landscape from its original trajectory. The ponderosa pine forests that today surround the meadowlands were once far more open, with grassland and an understory of shrubs filling the open prairie between scattered large pines. Low-intensity grass fires would sweep through the area randomly on a two to fifteen year cycle, killing young pine saplings but leaving the thick-barked older trees intact. Livestock grazing and active fire suppression have resulted in a far greater density of young pines, reducing the overall health of the ecosystem for several reasons. More nutrients are locked in the biomass of the trees, fallen limbs, and needle litter, and are not recycled back into soil nutrients as they naturally would be by fire. There is greater competition for groundwater, and more tree evapotranspiration, reducing soil moisture from its previous levels. The existing trees are thus weaker, and dense forests are more prone to catastrophic fires that kill everything in their paths, making regeneration much more difficult.

In addition, early settlers channelized the original meandering streambeds through the prairie in order to bring water to their cultivated fields. This further reduced natural percolation and



above *Salix bebbiana*

soil retention of water needed by wetland plants such as the Bebb willows. High numbers of Rocky Mountain elk, which were introduced to the Peaks early this century, have had a serious impact on the ability of both the willow community and surrounding aspen forests to regenerate. Young saplings of both species are relished by elk. Consequently, most of the stands of trees are aging, without young replacements. At Hart Prairie Preserve, aspen and willow saplings exist only within elk exclosures.

The Nature Conservancy is actively experimenting with restoring natural processes to the Preserve, and is cooperatively working with the U.S. Forest Service (USFS), Northern Arizona University, and the Ecological Restoration Institute to effect positive changes to the landscape. Fire has been reintroduced to the prairie successfully, and some of the encroaching ponderosas have been removed. Stock tanks have been removed, and the original meandering stream channels have been restored to help distribute runoff from precipitation throughout the site, and to recharge the groundwater. Monitoring of rare and significant plant species and of the hydrologic effects of restoration is ongoing, with special attention being given to how the ecosystem responds to management activities.

The Bebb willow-dominated Hart Prairie riparian community is unique in that it is the largest and most extensive yet driest known population of this species. The Hart Prairie population of Bebb willow is in a decadent or declining condition, with

<sup>1</sup>Hart Prairie Preserve Manager; <sup>2</sup>Museum of Northern Arizona.

from left *Penstemon virgatus*, *Helianthella quinquenervis*, *Frasera speciosa*



little natural recruitment. This decline is not only of concern because of the unique nature of the community, but also because it supports a wide variety of species. A diverse population of more than 121 bird

species, including at least 23 neo-tropical migrants, makes their home in the Bebb willow and aspen trees in the Hart Prairie area. Additionally, TNC has identified 31 mammal, 4 reptiles and amphibians, and 37 butterfly species.

Primary threats to the Bebb Willow riparian community are:

- 1) **Altered Hydrology:** Diversion of water from springs and seeps; surface modifications (ditches and roads) that interrupt overland flow; channel entrenchment; and conversion of short grass prairie to pine stands within the Hart Prairie watershed;
- 2) **Fire Suppression:** Fire creates sites and conditions favorable for Bebb willow recruitment and slows successional processes detrimental to willows; and
- 3) **Excess Herbivory:** Bebb willow is a nutritious and palatable plant with extreme levels of herbivory by non-native Rocky Mountain elk.

Due to these threats, this community lacks necessary natural regeneration and consists primarily of older age classes of willows. In order for Bebb willow regeneration to be successful, it requires bare, moist soil and protection from disturbance until it reaches a viable height to withstand browsing. The restoration of natural ecological processes and minimization of human-caused disturbances ensures that new plants and a healthy riparian community can become established over time.

Working in the lush meadows and drainages at the base of the San Francisco Peaks on the Hart Prairie Preserve is a rare treasure. The beauty of the area and the significance of its ecology make the work of the Budding Botanists (BBs) who have adopted Hart Prairie as their collection site vital to the future health of this landscape. In 2009, a partnership began between TNC and the Arizona Native Plant Society's Plant Atlas Project of Arizona (PAPAZ) to aide in the documentation of the Preserve's flora. Information garnered by the BBs will assist TNC in the development of land management practices and restoration strategies used on the Preserve. This data will also be used by TNC as they work with the USFS to develop land management policies for the USFS lands surrounding Hart Prairie Preserve.

During the 2009 field season small groups of BBs ventured north to the Preserve to begin collecting voucher specimens that

will later be housed in several herbaria throughout the state. It was a very dry year and less than half of the nearly 300 species known to exist at the Preserve were collected. Of those collected, the vast majority were from the Bebb willow drainages where a trickle of water managed to persist. Hunkering out of the wind behind the willows or under the heat of the sun in the open meadows, BBs worked tirelessly on this important project, accumulating over 150 volunteer hours. The vibrant deep blue flowers of the Gentian (*Gentiana rusbyi*) nestled among the grasses of the open meadow offered a welcome dash of color during one of our less spectacular growing seasons. Although it was dry, the Hart Prairie BBs collected three species not previously documented on preserve property.

To better aide in directing management efforts, the collection area of this site has been expanded and now reaches from Forest Road 151 on the west to the Wilderness area boundary (Arizona Trail) on the east. While we still have much to collect on Preserve property, the 2010 season will find us trekking to Fern Mountain as well as Bismark Lake. The abundant winter moisture whets our appetite and gives us hope for a wetter 2010 collecting season. We have many years of work ahead of us, but without the commitment of the BBs this work would take much longer or perhaps not be done at all. Thanks to all the wonderful BBs who have worked on this and other PAPAZ projects. We could not accomplish such meaningful work without your dedication and passion.



Guided nature walks at the Hart Prairie Preserve are led every Sunday from June through mid-October. These ninety-minute walks offer a wonderful opportunity to learn more about birds, wildflowers, forest ecology, and TNC's work across the region. To join the walks, meet at 10am at the Fort Valley Plaza Shopping Center, 1000 N. Humphreys Street at the southwest corner by the guardrail. The following items are essential to the walks — sturdy shoes, sun protection, rain gear or jacket, and water. Reservations are not required. For more information, contact The Nature Conservancy at 928.774.8892 x5 or email hartprairie@tnc.org. Due to the ecologically sensitive area, please, no pets.





## Willow Bend Environmental Education Center: Learning from Native Landscapes *Text and photos by Zack Zdinak<sup>1</sup>*

Imagine sitting by the cool, babbling waters in Oak Creek with the leafy fluttering of deciduous trees around you. Now take yourself along a trail on the Peaks, winding between boulders, massive logs and hidden wildflowers in a shady mixed conifer forest. Next, wade through a wide forest meadow where grass heads tickle your legs and the blue of blooming lupines rival the sky. Now realize you are wandering between these and other native habitats — and you're still in central Flagstaff!

You are in the Backyard Wildlife Demonstration Gardens that surround the Willow Bend Environmental Education Center in Sawmill Multicultural Art & Nature County Park, one of my favorite places in my hometown.

This urban Coconino County park was created within the city of Flagstaff in 2000 on the south side of the expansive “brownfield” where the first — and last — sawmill operated from 1908 to 1993. Downhill from the park, the Rio de Flag carries snow melt and storm water through the channel of Sinclair Wash. On the Rio's curve you can see the namesake of the Environmental Education Center, a lone willow tree. To the north, the rocky face of Mount Elden and the broad forests of the San Francisco Peaks provide the backdrop.

What makes this park unique is the vision the Coconino County Parks and Recreation Department planners and Willow Bend educators had in establishing five habitat demonstration gardens. The Center's staff and visiting organizations have been utilizing these replicated habitat plots for convenient public, school and private classes while conserving on travel time and expenses. Under an earlier community adoption program, local organizations and companies with outdoor interests and sustainability ethics became volunteer groundskeepers of each of the five gardens. Along with their members, employees

and/or friends, I enjoyed participating in the sponsored planting parties and regular maintenance of the plots. I personally adopted the Wetland and Pond for two years because I like to garden, and I like to play in the mud. The County also registered these gardens as a National Wildlife Federation Backyard Wildlife Habitat™ site.

In earlier years the grounds were set up for drip and nighttime spray irrigation using the City's reclaimed water. The initial seeding and transplants benefited from this supplemental watering, and when I tended the garden at sunrise, I found the still damp soil easy to work. Recycling household greywater lessens our dependence on pumping deep wellwater for non-domestic use. Since the process of recycling water does not remove many contaminants — the wet garden often smelled of perfumed laundry detergents — I began wondering what effects the human hormones and drugs would have on plants and birds over time. In a 2008 presentation for Northern Arizona Audubon Society, the Arizona Game and Fish Department acknowledged over 20 chemicals are not removed during the process, though they also endorse the use of reclaimed water for wildlife water. I hope the ongoing research into the effects of reclaimed water on vegetation and wildlife produces answers sooner than later.

The gardens continue to evolve with the growth of plants as well as new conservation and landscaping ideas. Last year Willow Bend installed a huge rain barrel, adding 1,500 gallons to the existing 410-gallon harvesting system. Rainwater, not reclaimed water, will be used for the new food garden on native edible and heritage crops.

Individual plant identification tags have occasionally been used, though they focused on only a handful of species. This year, the Parks Department plans to install secure species signs. Whether you come with books and keys to test your identification skills

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<sup>1</sup> Naturalist, Life Drawing and Education, Flagstaff, Arizona



or simply to revel in the colors, take a stroll through at your own speed. Plan to visit several times a season to catch the changing growth, flowering, seeding, and color.

### **A Walk Through the Five Gardens**

With many plants indigenous to habitats around northern Arizona, these gardens provide a convenient place for adults and children to learn about our region's biodiversity. Initially, native seed mixes were sown. Some perennial plants have persisted for many years. With years of additional native plants purchased and donated by local nurseries and green-thumbed home gardeners, the assemblages are impressive. Visit the gardens through the season to witness the changes in growth, blooming and fruiting. You may come during exceptionally wet or dry times to find different species thriving. Look for evidence of the several species of woody shrubs and trees that persistently root sprout. This natural growth in this limited space requires active pruning to accommodate the wide variety of species established for public viewing in these demonstration gardens. Consider situations where root sprouting could be a detriment or a benefit for home gardeners.

#### *The Pond and Wetland Garden*

The low depression in front of the Willow Bend Center parking lot receives water from snowmelt and summer rains like many ephemeral wetlands in northern Arizona. A variety of sedges and rushes grows best in the lowest, wettest portion. Check to see if northern water plantain or cardinal flower are persisting along the muddy edges. Up the gradual slopes of this basin, look for wild delphinium, cut-leaf coneflower, wild bergamot, Missouri goldenrod, harebells and big bluestem. Woody plants around this wetland include red-ozier dogwood, water birch, narrow-leaf cottonwood and trembling aspen. The backdrop to the wetland is a low ridge of coyote or sandbar willow.

As you walk the path toward the Willow Bend Center building, take time to sit on the bench between the coyote willows and a thinleaf alder, to enjoy the sound and sight of the stony water feature babbling into the tranquil pond. Both yellow and red monkeyflower have graced the waterfall. Dragonflies of several species are often patrolling the pool between the cattails. Look for canyon grape, Virginia creeper, virgin's bower and an Arizona walnut in the surrounding foliage.

The subtle movement and sound of the pond also attract local birdlife to drink and bathe. One May, a male blue grosbeak began territorial singing around this tiny oasis. Unfortunately, no female took up his offer and he left by the middle of June. The winter of 2005-06, a ruddy ground dove frequented the willow thicket from December to March. Though this primarily Mexican species does move into Arizona deserts in the winter, this occurrence was unusually far north.

#### *The Forest Garden*

The forest plot wraps around the west and north sides of the Willow Bend Center building and expands behind the pond. Visitors can view the plot from the sidewalk to the front door, or along the path from the east corner of the parking lot to the

building. Ponderosa pine, Bigtooth maple and New Mexico locust are the tree species here. Large boulders and a massive log add structure to separate this plot from the Pond and Wetland Garden and transports garden strollers into a sense of the littered forest floor. The shade on the north side of the building creates a cooler, shaded forest environment, retaining more soil moisture than sunnier areas. Look for creeping barberry, golden pea, Arizona sweet pea, Arizona valerian (hardy plants left of the front door), western red columbine, silvery lupine, purple geranium and pearlseed. Depending on the Park's maintenance and pruning schedule, you may see subtle or overwhelming root sprouting of the locust and Wood's rose, a serious growth habit of these plants to consider for home gardens!

#### *The Lizard Garden*

Planned to mimic exposed sunny habitats like Mount Elden and rocky ridges in lower pinyon-juniper forests, this garden began living up to its wildlife name by the second year when local tree lizards gave their approval. When you visit, keep an eye out for short-horned lizards on the rocks, too; they are common in our local forests and are bound to show up in the gardens sooner or later.

Circling pathways and a large mounded bed give viewers ample opportunity to find the typical wildflowers. Between the pinyon pine and alligator juniper, look for the plains prickly pear and claret cup cactus, Sunset Crater penstemon, Colorado four o'clock, Parry's agave, banana and narrow-leaf yuccas. Additional shrubby plants create a border between the path and downhill slope. Rabbitbrush, squawbush, cliffrose and fernbush are locally common. Beargrass occurs in Oak Creek Canyon and other mid-elevation area to our south. Big sagebrush range over much of the intermountain west south to the Grand Canyon's Coconino plateau and northeast Arizona.

Big sagebrush was included in native seeds used for restoration after the widening of Rt. 180 north of Flagstaff and the Sunset Crater National Monument turnoff over 10 years ago. Over the years, I've noted its roadside establishment and gradual spread. Time will tell if they will continue to spread out of the local highway right-of-ways. This scenario has me keeping vigil of my home garden (yes, I have a big sagebrush, too, and other non-local native species) as well as my neighborhood for seedlings of non-local plants I may be introducing!

#### *The Hummingbird Garden*

The furthest garden centers around a stone water basin, ringed with golden columbine. A nearby bench accommodates those who want to stay to watch the animated interaction of hummingbirds as they feed and socialize. Broad-tailed hummingbirds (the green ones) return to our area in late March or early April, nesting through the summer and heading south in late September. Rufous hummingbirds (the orange ones) migrate north mostly through California, nesting in the Pacific Northwest states and provinces. Migrating south early, this species comes back to Arizona by mid-July, adding noisy and comical interactions with the green guys.

*continued next page*

# Willow Bend Environmental Education Center *continued*

Red flowers attract the hummers, so this plot is planted with firecracker and scarlet bugler penstemon. Since these bird brains are smart, they do test flowers of all colors. In my home gardens, hummingbirds show a preference for golden over red columbine (hmmm, they *do* have much larger nectar-producing spurs). New Mexico vervain, and even the diminutive mat penstemon are also visited for sweets.

## *The Wildflower Garden*

A wide open, sunny meadow fills the space on the side of the Willow Bend Center. Depending on the season, I have seen a variety of sun-loving plants growing, blooming and fruiting. Look for Rocky Mountain iris, yarrow, paintbrush, skyrocket, poison milkweed, decumbent goldenrod, sunflowers and purple aster. Grasses like Arizona fescue, blue grama and others fill in between the flowering forbs.

Lesser goldfinches, dark-eyed juncos and other birds frequent this field for seed and insects on the ground or for seed in the feeder the Willow Bend staff offers. But to be truly an authentic meadow, this garden needs native rodents to aerate the soil and keep the plants on their toes. Northern pocket gophers have crossed the pavement to the parking lot island strip along Sawmill Road where tasty tulip bulbs have been planted (how did they know?). But to date I have not seen their burrows or hills in this or any of the gardens.

## **Nature Trail to Reclaimed Wetland**

Across the sidewalk opposite Willow Bend's front door, a stone lined path descends the hill slope to the Rio de Flag's channel (actually this is Sinclair Wash; the Rio's name came with upstream diversions decades ago). Since the ephemeral channel usually runs dry, there is no bridge. Crossing the streambed, the path connects to the Flagstaff Urban Trail System, or FUTS as it's known for short (some say the literal "futs", some say "foots"). Be aware: this wider path is multi-use and may have bicycle and jogging traffic; it is best to step off the path for them.

Turning to the left or downstream, the Sinclair Wash Trail winds through a shaded ravine under Gambel oak and ponderosa pine. Beneath the trees and on rocky slopes, look for Arizona honeysuckle, wild candytuft, golden and red columbines, Arizona valerian, creeping barberry, leatherflower and golden pea. After a couple of curves, the forest opens to a meadow, the actual confluence of the Rio de Flag and Sinclair Wash. On that short walk, the surface geology has changed from basalt to Kaibab limestone. The pathway curves around a low ridge. Arizona grape, virgin's bower, taperleaf, squawbush, and snowberry grow on the sunny portions of the limestone slope. Several signs along this portion of trail interpret the history of flooding, stream relocation and the natural history of the Rio de Flag drainage.

*continued next page*

## **Below is a list of scientific names of plants and animals mentioned in the article:**

alligator juniper, <i>Juniperus deppeana</i>	decumbent goldenrod, <i>Solidago decumbens</i>	poison milkweed, <i>Asclepias subverticillata</i>	Virginia creeper, <i>Parthenocissus quinquefolia</i>
Arizona fescue, <i>Festuca arizonica</i>	fernbush, <i>Chamaebatiaria millefolium</i>	ponderosa pine, <i>Pinus ponderosa</i>	water birch, <i>Betula occidentalis</i>
Arizona honeysuckle, <i>Lonicera arizonica</i>	firecracker, <i>Penstemon barbatus</i>	purple aster, <i>Machaeranthera canescens</i>	western red columbine, <i>Aquilegia desertorum</i>
Arizona sweet pea, <i>Lathyrus arizonicus</i>	Gambel oak, <i>Quercus gambelii</i>	purple geranium, <i>Geranium caespitosum</i>	wild bergemont, <i>Monarda fistulosa</i>
Arizona valerian, <i>Valeriana arizonica</i>	golden columbine, <i>Aquilegia chrysantha</i>	rabbitbrush, <i>Ericameria nauseosa</i>	wild candytuft, <i>Thlaspi montanum</i> or <i>Noccaea montana</i>
Arizona walnut, <i>Juglans deppeana</i>	golden pea, <i>Thermopsis montana</i>	red monkeyflower, <i>Mimulus cardinalis</i>	wild delphinium, <i>Delphinium</i> spp.
banana yucca, <i>Yucca baccata</i>	harebells, <i>Campanula parryi</i>	red-ozier's dogwood, <i>Cornus sericea</i>	yellow monkeyflower, <i>Mimulus guttatus</i>
beargrass, <i>Nolina bigelovi</i>	leatherflower, <i>Clematis hirsutissima</i>	Rocky Mountain iris, <i>Iris missouriensis</i>	bald eagle, <i>Haliaeetus leucocephalus</i>
big sagebrush, <i>Artemisia tridentata</i>	Missouri goldenrod, <i>Solidago missouriensis</i>	rushes, <i>Juncus</i> spp.	blue grosbeak, <i>Passerina caerulea</i>
big-bluestem, <i>Andropogon gerardii</i>	narrow-leaf cottonwood, <i>Populus angustifolia</i>	scarlet bugler, <i>Penstemon eatonii</i>	broad-tail hummingbirds, <i>Selasphorus platycercus</i>
bigtooth maple, <i>Acer grandidentatum</i>	narrow-leaf yucca, <i>Yucca angustissima</i>	sedges, <i>Carex</i> spp.	dark-eyed junco, <i>Junco hyemalis</i>
blue grama, <i>Bouteloua gracilis</i>	New Mexico locust, <i>Robinia neomexicana</i>	silvery lupine, <i>Lupinus argenteus</i>	lesser goldfinch, <i>Carduelis psaltria</i>
canyon grape, <i>Vitis arizonica</i>	New Mexico vervain, <i>Verbena maddougallii</i>	skyrocket, <i>Ipomopsis aggregata</i>	ruddy ground dove, <i>Columbina talpacoti</i>
cardinal flower, <i>Lobelia cardinalis</i>	northern water plantain, <i>Alisma triviale</i>	snowberry, <i>Symphoricarpos albus</i>	rufous hummingbird, <i>Selasphorus rufus</i>
cattail, <i>Typha latifolia</i>	paintbrush, <i>Castilleja</i> spp.	squawbush, <i>Rhus trilobata</i>	northern pocket gopher, <i>Thomomys talpoides</i>
claret cup cactus, <i>Echinocereus coccineus</i>	Parry's agave, <i>Agave parryi</i>	sunflowers, <i>Helianthus</i> spp.	short-horned lizard, <i>Phrynosoma douglassii</i>
cliffrose, <i>Purshia stansburiana</i>	pearlseed, <i>Macromeria viridiflora</i>	Sunset Crater penstemon, <i>Penstemon clutei</i>	tree lizard, <i>Urosaurus ornatus</i>
Colorado four o'clock, <i>Mirabilis multiflora</i>	pineleaf penstemon, <i>Penstemon linariodes</i>	taperleaf, <i>Pericome caudata</i>	
coyote or sandbar willow, <i>Salix exigua</i>	pinyon pine, <i>Pinus edulis</i>	thinleaf alder, <i>Alnus tenuifolia</i>	
creeping barberry, <i>Mahonia repens</i>	plains prickly pear, <i>Opuntia polyacantha</i>	trembling aspen, <i>Populus tremuloides</i>	
cut-leaf coneflower, <i>Rudbeckia laciniata</i>		virgin's bower, <i>Clematis ligusticifolia</i>	



## EDUCATION AND OUTREACH COMMITTEE REPORT

# First Meeting of SEINet participants at Arizona Sonoran Desert Museum a great success!

by Wendy Hodgson, Education and Outreach Committee Chair

“The Southwest Biodiversity Consortium (SBC) is an organization of individuals and institutions devoted to specimen-based knowledge sharing and development of digital resources that facilitate the preservation of biodiversity. The area of interest is the southwestern US and northwestern Mexico. The Consortium unites data providers, agency scientists, the scientific community, and interested public, encouraging a democratic dialogue in an open forum environment for the rapid exchange of ideas. The primary goals of the SBC are to advance the value of natural history collections and the role they play in society for understanding life and global change.”<sup>1</sup>

Many of you are already familiar, and use the plant database SEINet [swbiodiversity.org/seinet/index.php](http://swbiodiversity.org/seinet/index.php), which is under the umbrella of the SBC and serves as the single access point for botanical specimens held in 21 herbaria from 5 western states (Utah, Colorado, New Mexico, Arizona, California), and the Mexican state of Sonora. The majority of the data providers of the SBC are herbaria, but it also includes fauna collection and observational data. We are excited that MABA, or Madrean Archipelago Biodiversity Assessment Project, is in collaboration with SEINet now, under the management of AZNPS Board member, Tom VanDevender (see [www.madrean.org/maba/symbfauna/](http://www.madrean.org/maba/symbfauna/)).

The first meeting involving all collections currently participating in SEINet and interested parties took place on February 19th at the Arizona Sonoran Desert Museum in Tucson, the day before the Arizona Botany Meeting. Thirty one participants attended. Corinna Gries, Tom Nash and Ed Gilbert led the exciting discussions during the meeting, a testament to the success and support SEINet has already garnered. Committees were formed, including an Outreach Committee to give the program greater exposure to families, children, land managers and others, an Organizational Committee responsible for policies, responsibilities and finance, and a Rare Species Committee.

SEINet is already a wonderful database, but all those present at the meeting are very excited at the prospect of making it even better, further connecting and educating people with plants. Did you know that from the end of February through the end of March of this year there were 9848 visits to SEINet, and most were new (66%)? And that they came from 129 countries, as far away as India (thank you to Ed Gilbert for this information)? The program is always being updated, tweaked or provided with new additions and fun surprises, so check it out and keep using it!

<sup>1</sup> Excerpted from the Southwest Biodiversity Consortium website: <http://swbiodiversity.org/>

## Willow Bend Environmental Education Center *continued*

In addition to natural runoff from the Sinclair Wash and Rio de Flag, this perennial cattail marsh receives supplemental water from the Rio de Flag Water Reclamation Plant up the hill to the east. The FUTS trail merges with a maintenance road as it follows the outflow from the marsh under the I-40 bridges. South of I-40 a wider, deeper basin creates an open pond with limited cattails on the shoreline. Wintering waterfowl and bald eagle take advantage of the ice-free water in the pond and upstream marsh. Songbirds and shorebirds frequent the environs during migration, and a handful of riparian species nest here during the summer. (Caution: the polluted water can smell pretty bad at times.) The pond is a little more than half mile from Willow Bend and Sawmill Park.

### Visit Sawmill Park for Education and Ideas

Are you a backyard gardener? Looking for ideas on what native plants work well in a garden? Parents, are you looking for easily accessed, recreational and educational outdoor experiences with your kids? These free, growing gardens are here to provide

information and examples on how the community, and you, too, can reclaim degraded sites and incorporate native plants into your home or business landscapes. They are also a great place to just come smell the flowers!



### For more information, visit these websites:

[www.coconino.az.gov/parks](http://www.coconino.az.gov/parks) — Sawmill Multicultural Art & Nature County Park, Coconino County Parks and Recreation Department. The Park has a bike rack and public restrooms at the parking lot.

[www.willowbendcenter.org](http://www.willowbendcenter.org) — Willow Bend Environmental Education Center. For hours and events, call 928.779.1745.

[www.flagstaff.az.gov/index.aspx?nid=1379](http://www.flagstaff.az.gov/index.aspx?nid=1379) — Flagstaff Urban Trail System, or the City of Flagstaff Visitor Center at [www.flagstaffarizona.org/playing\\_parks.html](http://www.flagstaffarizona.org/playing_parks.html)



**above** The east side of the Tumacacoris courtesy Mike Quigley.

## A Wilderness of Plants *by Mike Quigley<sup>1</sup> and Drew Milsom<sup>2</sup>*

Charismatic megafauna seem to get all of the attention sometimes: a remote camera captures a photograph of an ocelot or a jaguar in Sonora or Arizona, or a wolverine in California, and it's front-page news and on NPR (National Public Radio). People love the large furry exotic animals. Land conservation efforts often rally around a charismatic animal as symbolic of the need to preserve. But there are other things living on the land that are also fascinating, rare or threatened, and in need of preservation. As members of the Arizona Native Plant Society, you know this well.

Sky Island Alliance is a regional conservation organization working to preserve the native biodiversity of the Sky Island region: roughly, southeastern Arizona, southwestern New Mexico, northern Sonora and northern Chihuahua. The Sky Island Region is a permanent home for many species and a temporary home for other migrating species. Situated between the Sierra Madre to the south and the Rocky Mountains to the north, the several dozen mountain islands that are the Sky Islands, with the desert and grassland valley “seas” between them, are globally important. Temperate species reach the southernmost extent of their range here, while tropical species reach the northernmost extent of theirs.

The rapid altitude gradients of mountains such as the Chiricahuas, Pinaleños, Sierra Azul, Sierra del Tigre, and others

compress multiple lifezones in a small area—resulting in a wide variety of habitat types and overlapping species ranges. The region is special; Conservation International has named the Sky Island region a World Biodiversity Hotspot. The region is sensitive: in the U.S., rapid population growth and the accompanying pressures of increased urbanization and motorized recreation threaten to fragment and destroy important wildlands habitats. In Mexico, a land tenure system of mostly private ranchlands presents challenges to landscape-level conservation efforts. Nevertheless, this region deserves preservation—we are working towards that one step at a time.

In Santa Cruz County, Sky Island Alliance has been leading the campaign to gain Wilderness designation for the Tumacacori Highlands. Roughly 83,000 acres of the Coronado National Forest's Nogales District, the Tumacacori Highlands encompass the Tumacacori, Atascosa, and Pajarita mountain ranges, as well as Bear Valley and the Bartolo complex. This is wide-open country—and it is rugged country. One can hike there all day and not see another person. One can find year-round water in small pools and tinajas. One can explore side canyons that open into boulder-filled bowls. One can climb peaks that offer expansive views of southern Arizona and northern Mexico.

We have led several hikes in the Tumacacori Highlands for the Sierra Club and the University of Arizona Ramblers hiking club. Every time, we find some new little treasure. Every time, someone sees it for the first time and is amazed by the beauty

<sup>1</sup> Wilderness Campaign Coordinator, Sky Island Alliance;

<sup>2</sup> Senior Lecturer, Department of Physics, University of Arizona.





from left Closeup of columbine flower courtesy Jessica Lambertson. Columbines in Bartolo Canyon courtesy Drew Milsom.

and wildness. And every time, we are reminded how fortunate we are to have places like this, and how fragile they are.

In Bartolo Canyon we came across a scour pool of water in the heat of the day; the fact that it is north-facing kept it in shade with moss clinging to the spillway rocks. Columbines, with their cilantro-like leaves and brilliant yellow blooms, covered the damp earth and reached for the sky.

In Alamo Canyon we have found running water and Fremont cottonwoods (“alamo” being Spanish for “cottonwood”). In Ramanote Canyon we have walked beside velvet ash and netleaf hackberry looking for Chiricahua leopard frogs and attracting chiggers. In Peñasco Canyon we have found fallen leaves reminiscent of eastern autumn hiking. In Bear Valley we have rested under Emory oaks. On Atascosa Peak we have looked over manzanita and into Mexico.

And there are plants that live in the Tumacacori Highlands that are rare as well as noteworthy. For example, there are *Agave parviflora* (Santa Cruz striped agave)—the smallest species of agave in Arizona; *Coryphantha recurvata* (Santa Cruz beehive cactus); *Graptopetalum bartramii* (Bartram stonecrop), a nice little stonecrop. There are *Macroptilium supinum* (supine bean), a small member of the pea family with pinkish purple flowers found in southern Arizona and into Sonora; and *Choisya mollis* (Santa Cruz starleaf), a green flowering shrub endemic to the Tumacacori Highlands.

There are also *Abutilon parishii* (Pima Indian mallow), *Metastelma mexicanum* (Wiggin’s milkweed vine), *Pectis imberbis* (Beardless chinch weed)—all Species of Concern. There are *Carex spissa* var. *ultra* (Arizona giant sedge), *Laenniccia eriophylla* (Woolly fleabane), *Penstemon discolor* (Catalina beardtongue), *Muhlenbergia dubioides* (Box canyon muhly), and

*M. xerophila* (Weeping muhly)—all species considered sensitive by the U.S. Forest Service, the last two known only in southeastern Arizona.

If we are to preserve the native biodiversity of the Sky Island region, we must protect intact habitat like the Tumacacori Highlands. The area is predominantly roadless, yet is within an hour’s drive of more than one million people—and counting. Wilderness designation by the U.S. Congress is both appropriate and needed for the Tumacacori Highlands. Wilderness designation directly restricts motorized and mechanized uses on public lands—an excellent tool for preserving roadless areas of the National Forests—and directs the land management agency to manage the land primarily for its natural characteristics. When we talk about pretty canyons, rock pools and columbines, oak grasslands, spectacular views; when we talk about jaguars and leopard frogs and beehive cacti; we are talking about natural characteristics, about habitat, about native biodiversity. It’s all connected; it is all important.

Oh, one more thing: on the east side of the Tumacacori Highlands is the Wild Chile Botanical Reserve, created in 1999 to preserve an area where one of the world’s northernmost population of native chiles—the chiltepin (*Capsicum annum* var. *aviculare*)—thrives on the rocky slopes and canyons between desert and mountains. Wiry and fiery, the chiltepin is the ancestor of modern chiles and has a rich heritage with Aztec, Spanish, Mexican, and now American people. It is nice to see conservation efforts focused on plants, and the importance of plants to human civilization and culture. It is nice to celebrate and protect what’s important and special about the Sky Island region we call home. And yes, like jaguars, chiltepins have been featured on NPR.



## SPOTLIGHT ON A NATIVE PLANT

# Flagstaff Cinquefoil

by Judy Springer, Ecological Restoration Institute,  
Northern Arizona University

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Flagstaff cinquefoil (*Potentilla sanguinea*, formerly *P. thurberi* var. *sanguinea*), is a showy species endemic to the area east and south of Flagstaff and currently known from only a handful of locations. It has been elevated to species status by Barbara Ertter at UC-Berkeley, and the species description will be published in a forthcoming edition of *Flora of North America*. Natureserve ranks the taxon (under its previous status as a subspecies) as T1 and N1, critically imperiled, because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the jurisdiction in which it is found.

The type specimen was collected by D.T. MacDougal in July 1898 “about Walnut Canyon” at 7,000 ft. It was first described by Per Axel Rydberg in 1908 as a perennial, with a thick woody tap-root, a very short caudex and 50-60 cm tall stems. Interestingly, Rydberg’s description describes rose-purple petals, which may be simply an artifact of the drying process, for this former variety of *P. thurberi* is distinguished from the other varieties in possessing petals that are red-orange around the edges and maroon toward the center. Another defining characteristic is that the lower pair of leaflets is often offset by a millimeter or two from the others. Leaflets are green and only sparsely hairy on both sides, with the teeth often confined to the upper half of the leaflet (*P. thurberi* is always toothed toward the base), but some are toothed from the apex to the base. It flowers mainly from July to September.

The current and past known range of *P. sanguinea* is defined by a rough rectangle within Coconino County, from southern Flagstaff east to Walnut Canyon, south to the Bar M drainage, and west to Oak Creek Canyon. The natural habitat of this species is currently unknown due to a paucity of known populations. Existing documented populations are subject to roadbuilding and road salting activities, expansion of social trails, automobile traffic and overcollecting.

Another interesting side note: apparently seeds of this species have been collected from the wild and then cultivated and sold in the horticultural trade, for it has been observed growing in various gardens around Flagstaff. Amateur and professional botanists alike can greatly assist conservation efforts of this species by searching for it within and around the known range and determining GPS locations so that this information can be reported to the Coconino National Forest and the Arizona Game and Fish Department.



## Wildflower Posters in the classrooms!

AZNPS would like to get our wildflower posters into the classroom! We need you to adopt a school nearest you, or one that your child attends. Your assignment, should you choose to accept it, is to (1) **send us the school name and address along with the teacher’s name** so that we can mail the posters (we have two — *Northern Arizona Wildflowers* and *Sonoran Desert Wildflowers*) with an introductory letter to your favorite school, and 2) **follow up with the teacher(s)** to make sure they got their posters, 3) **work with a chosen teacher who wants to do a class project** about our native plants, letting us know what you are doing.

If you can’t do the last item, then perhaps someone else can step in? **The important first step is to get our posters distributed!** Send information to: Nancy Zierenberg by email — [nzberg4@cox.net](mailto:nzberg4@cox.net) — or by snail mail — AZNPS, POB 41206, Tucson AZ 85717.

And thank you for helping!



# The Highlands Center for Natural History

by Fiona Reid<sup>1</sup>

Through my office window I see ponderosa pines (*Pinus ponderosa*), alligator junipers (*Juniperus deppeana*), oaks (*Quercus* spp.), Arizona grape (*Vitis arizonica*), blue skies, and wispy white clouds as almost the icing on the cake. There isn't a workday goes by that I don't marvel at my good fortune to work in place like this doing the work that I do.

The Highlands Center for Natural History is a non-profit environmental educational organization teaching children and adults about the natural world so they become wise caretakers of the land — this land I see outside my window, and land wherever they happen to live. Our facility is LEED Certified Gold and is located in Prescott on an 80-acre piece of the Prescott National Forest within the Lynx Lake Recreational Area. As Education Director I do have to tap away on computer keys, gaze endlessly at a screen, attend meetings, and be professionally serious some of the time! But the work, and the world, comes alive for me when I can spend it outside, in the woods, with kids. Luckily, that happens often, and groups of us are often found early in the morning disappearing down any one of a number of trails on our site, never to be seen again until late in the afternoon.

Our trails traverse a microcosm of the greater Central Arizona Highlands region and here we are blessed with plants from a variety of ecosystems and perfect for introducing people to the complexity and diversity of plants in the Highlands. It's true, we don't have the Sonoran Desert flora, such as ocotillo (*Fouquieria splendens*), saguaro (*Carnegiea gigantea*), creosote bush (*Larrea tridentata*) and so on, all of which are within an hour's drive of Prescott (towards Bagdad), but we do still have some old, majestic ponderosa pines scattered throughout the site, in spite of the Ips bark beetle kill of 2002-2003. Unfortunately those trees that succumbed to the beetle now lie on the forest floor, having fallen or been chopped down for the safety of hikers on the trail, but they still provide wonderful habitat for a myriad of small critters most people barely take the time to discover. Let's face it, nature models the natural forces and cycles of life, and with the death of those that have lived a good long life there is now opportunity for the younger pines and other species, such as wildflowers and grasses, to germinate and fill the gaps previously occupied by the elder pines.

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<sup>1</sup> Education Director, The Highlands Center for Natural History, Prescott, Arizona



above Sunflowers and pines.

Look up while hiking any of our trails, and if you spot a large untidy nest of sticks high in the branches of a pine, you will have found the nest of the Abert squirrel, an animal dependent upon the ponderosas for its whole way of life. Look down and you will see one of the reasons why. The “crumbs” are left by the squirrel — chewed up pine cones and, where you see the green tips of the pines littering the forest floor, little “squirrel snacks,” — those very small fresh, white twigs, the inner bark upon which our Abert has been dining! At the base of the giant tree trunks there are often many scuffle marks showing that Abert has been busy searching for another favorite food, the “false truffle,” a hypogeous mycorrhizal fungus, whose spores pass through the digestive tract of a mammal and form additional mycorrhizae with their host plants, the ponderosa pines.

Another important species in the forest and woodland (and some great specimens occur on and near our trail system) is the alligator juniper. The cones, or “berries,” taste very sweet when perfectly ripe, and if the frequent big piles of seed-filled scat are anything to go by, then we know that coyote has a very sweet

*continued next page*

## The Highlands Center for Natural History *continued*

tooth! But time should be taken by anyone wandering our trails to sit beneath one of these very old trees. They provide wonderful shade throughout the year, and the feel of the solid, reptilian looking bark as one leans against it gives a sense of permanence and of solidity and of belonging. Not a bad way to think or feel in this age of fidgety folks who find it difficult to set roots in one definite place.

Pinyon pines (*Pinus edulis*) are plentiful although perhaps a little frail, less lush-looking than the same species found on other sites, due to the presence of pinyon needle scale. These little sucking insects are doing well here, unfortunately, and my personal concern is for the scrub jays that love the pine nuts and are thus largely responsible for further recruitment of pinyon pine trees. Less healthy trees means less cones produced; less cones equals less nuts; less nuts may equal less scrub jay nut dispersal; less nut dispersal equals less germination of seeds, equaling less pinyon pines in our forest. And, perhaps, such is the way and mystery of nature.

So into the chaparral and the glory (as I write) of the full flowering of the manzanita (*Arctostaphylos* sp.). How sweet the honey perfume; how natural that fellow animals such as early hummingbirds and tiny bees also find the perfume enticing, and nectar so sweet. Although it just occurred to me that the hummingbird may also be munching on the insects feeding on the flower. Buckbrush (*Ceanothus* sp.) is also found along the trail giving us, at this time of flowering, glimpses of butterflies alighting on its tiny white flowers. A single patch of Apache plume (*Fallugia paradoxa*), a rose by any other name, on Trail 442 near the feeder wash to Lynx Creek surprises the observer with its pale, fluffy-looking seedheads later in the year. I think (since it loves full sun) that the patch has grown considerably since the cutting of a huge old beetle-killed ponderosa pine. In late summer, the conspicuous rich pink and purple flowers of a patch of New Mexican locust (*Robinia neomexicana*) grace an outdoor bench amphitheater. Cool and shady under the pines, and close to a natural underground water supply, this little patch is directly in the run zone of a number of games played by summer camp children. It doesn't take them long to learn about this plant — you could call it perfect experiential education. The thorns on the plant protect it well from children!

Interspersed along the trail can be found banana yuccas (*Yucca baccata*), beargrass (*Nolina microcarpa*), claret cup cacti (*Echinocereus coccineus*), as well as Engelmann's prickly pear (*Opuntia engelmannii*). Of course we have an abundance of the scrub (*Quercus turbinella*), Emory (*Q. emoryi*), and gray oaks (*Q. grisea*), with the occasional Gambel oak (*Q. gambelii*) down at the creek. Mountain mahogany (*Cercocarpus montanus*) needs to be sought out, hiding itself tightly within other chaparral species. The creek provides us the shade of Arizona alders (*Alnus oblongifolia*), both alive and dead, the former for



**above** Through day camps, family programs, school programs, field studies, lectures, workshops, and other activities, the Highlands Center reaches over 10,000 children and adults each year.

the shade it affords the creek and the latter, fallen, giving children many hours of pleasure while building bridges over the creek. Velvet ash (*Fraxinus velutina*), wax currant (*Ribes cereum*), Arizona black walnut (*Juglans major*), Arizona grape, and Arizona rose (*Rosa woodsii*) are among the other species of plants to be found along or near the creek. On the way down to the creek, along Trails 305 and 442, the visitor passes through a couple of clearings we grandly call our grasslands. Invasive species of grasses and other forbs and wildflowers make the most of these sunny, disturbed patches and eventually, when time and money allow, we hope to restore these to more native, meadow species. In the meantime we must simply enjoy and understand the benefits of the many bees and butterflies that the invasives — the horehound (*Marrubium vulgare*), poison hemlock (*Conium maculatum*), toadflax (*Linaria dalmatica*), and white sweet clover (*Melilotus alba*) — bring to the site. A perfect world, let alone a perfect natural world, does not exist. We can boast some of the more common but nonetheless beautiful native grasses, such as blue grama (*Bouteloua gracilis*) and sideoats grama (*B. curtipendula*), and deergrass (*Muhlenbergia rigens*), and as long as we have those I am content.

This is just a sampling of some of the flora one might expect to see while wandering our trails. Slow down and enjoy what is here. Stop and investigate. The world is worth it.







**above** Wendy Hodgson teaches Hualapai youth how to collect and press plants for the Hualapai herbarium.

## ETHNOBOTANY: PEOPLE USING NATIVE PLANTS

# Hualapai Ethnobotany

by Jessa Fisher, Flagstaff Chapter member [nightbloomingcactus@yahoo.com](mailto:nightbloomingcactus@yahoo.com)

Have you ever been to the Hualapai Reservation? If you have, it was most likely because you were taking Diamond Creek Road down to or up from the Colorado River on a river trip. If so, you might remember what a beautiful road this is geologically, and what an interesting amount of diversity there is in the plants of this area.

The Hualapai, who live centered around the town of Peach Springs on their reservation, are a wonderful and generous tribe of people. The translation of Hualapai is “People of the Tall Pine,” and the spread of plants in their traditional area ranges from ponderosa in high elevations to sagebrush in mid elevations to ocotillo and other Sonoran desert plants at the lower elevations by the river. Phyllis Hogan, co-founder and director of the Arizona Ethnobotanical Research Association (AERA), has been working with tribal elders such as Lucille Watahamogie and Malinda Powsky since the 1980s on reviving the Hualapai ethnobotany. Recently, Carrie Cannon has been working with those same elders and a whole new generation of youth to practice some of the traditional ways of harvesting and preparing plants. The Hualapai Ethnobotany Project has been

sponsoring yearly agave pit roasts (*viyal* in Hualapai), which was a main staple food and has a sweet, fermented taste. Skunkbush sumac (*gith'e*) berries are fun to harvest and make a sour drink like lemonade. The Project has been holding traditional feasts, featuring foods like mesquite flour (*na:l*) and prickly pear jam (*alav*).

Wendy Hodgson from the Desert Botanical Garden has also been working, along with the AERA, the Ethnobotany Project, and the Hualapai Tribe to update their herbarium. There are some fabulous cacti growing along Diamond Creek road, including prickly pears, chollas, hedgehogs, fishhooks, and barrel cacti. Of special interest is *Cylindropuntia abysii*, a species of cholla which seems to be a hybrid between two more common species, and only is found in this area. Next time you are driving down to the Colorado River from Peach Springs, enjoy the wonderland of cacti dotting the hillside, and imagine what it was like centuries ago to survive on only the plants you could find by foot. We are lucky, through the Hualapai, to have access to this fabulous botanical goldmine.

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### Would you like to take a more active role in protecting Arizona's native plants?

There are open Board positions — please contact any of the above board members for more information on how you can get involved. You can also contact your local chapter (see back cover) for local volunteer opportunities.

## Workplace Giving to Support Arizona Native Plant Society

If you work for a government entity, you can make contributions through your workplace to support Arizona Native Plant Society as part of the Combined Federal Campaign (AZNPS #38438), and the State Employees Charitable Campaign. We are also a member group of the ever-growing Environmental Fund for Arizona ([www.efaz.org](http://www.efaz.org)) which supports many of our state's conservation and environmental organizations (29 member groups). Employees of the federal government, Arizona state government, some counties, city programs, and other workplaces can contribute through their workplace giving programs. If you don't have a workplace giving program, see the EFAZ website to find out how we can help get one started. The EFAZ website lists businesses with campaigns supporting EFAZ organizations, but that list needs to be expanded in communities throughout the state. Feel free to contact Laine Seaton, EFAZ Executive Director ([laine@efaz.org](mailto:laine@efaz.org)) with ideas or suggestions!



**above** Arizona bluestar (*Amsonia grandiflora*) is a deciduous perennial found in southern Arizona along canyons at elevations of 3,900 to 4,500 feet. Flowering in the spring and summer, it dies back to a woody stem in the winter months. *Photo courtesy Jeannette Hanby and David Bygott* (see "A Jewel Called Ruby" on page 1).



# New Women's Violet tee shirts in the datura design!



These 100% cotton (not pre-shrunk) tees are more fitted for women, have a scoop neck and shorter sleeves than the standard datura tees. They are a lovely violet color, between a light lavender and the deep purple.

Price is \$16 each for members, \$18 for non-members, plus postage. \$3 for the first shirt and add \$1 per shirt sent to the same address.

## We are officially part of Basha's "Shop & Give" program!

When you shop at any Basha's, AJ's or Food City, a percentage of your purchase will come back to support your favorite Native Plant Society!

**It's simple:** At the cash register, tell them to attribute your purchase to **AZNPS #25053**. This is a super easy and effective way to help AZNPS bring in extra cash for our important efforts!

Thank you... and thank you Basha's!

## Clearance Sale on our landscaping booklets!

Originally created by the AZNPS Urban Education Committee, these booklets flew off the shelves due to the excitement over new xeric plant offerings (though some were not native to this country... the text in the booklets notes that), and due to the very low price we set to appeal to newcomers in our region. The booklets have done a great service to AZNPS over the years, keeping us flush with money to fund our educational projects through the years. We are grateful to the professional growers, landscapers and other committee members who developed these useful tools.

There is good growing information in these booklets and we are urging you to utilize that for formulating your own landscape plans and adding to them. We also urge that you consider growing our Arizona Natives instead of some of the suggestions in these booklets to use non-natives. Our plan is to keep plugging on production of several good native plant lists that we will eventually put onto our website to help people with landscape planning. If you have good photos of natives in habit that you would like to share for our educational purposes, please email those in reasonable quality to: [nzberg4@cox.net](mailto:nzberg4@cox.net)

All booklets are now available for retail sale at \$2 each. Wholesalers can order quantities of 50 or more at \$1 each, in any combination. We pay the postage! The following booklets are still in print: *Sonoran Desert Trees*, *Desert Shrubs*, *Desert Grasses*, *Butterfly Gardening*, and *Bird Gardening*.



## Upcoming Issue:

### Riparian & Wetland Ecology

Contact *The Plant Press* Technical Editor, Barbara Phillips, at [bgphillips@fs.fed.us](mailto:bgphillips@fs.fed.us) for more information on contributing articles, illustrations, photos, or book reviews on this topic... as well as themes you'd like to see us cover in future issues.



**The Arizona  
Native Plant  
Society**

*The Plant Press* is a benefit of membership in the Arizona Native Plant Society.

Suggestions are welcome for book reviews, and articles on plant use, conservation, habitats, and invasive species.

# New Members Welcome!

People interested in native plants are encouraged to become members. People may join chapters in either Phoenix, Flagstaff, Prescott, Tucson, Yuma, or may choose not to be active at a chapter level and simply support the statewide organization. For more information, please write to AZNPS at the address below, visit the AZNPS website at [www.aznativeplantsociety.org](http://www.aznativeplantsociety.org), or contact one of the people below.

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