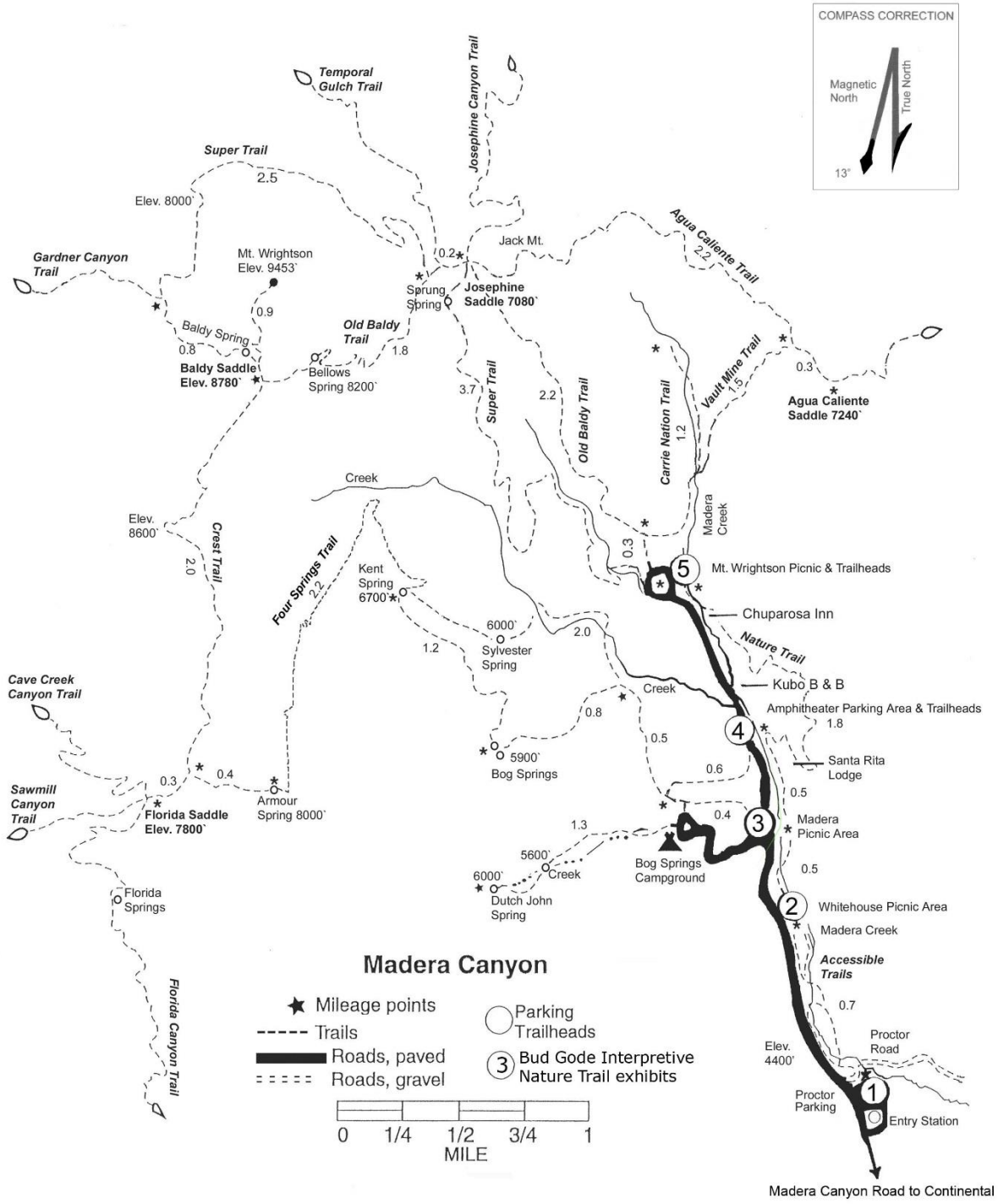
Teacher/Naturalist Interpretive Guide
Proctor Loop Nature Trail
Madera Canyon

Douglas W. Moore, Education Director
Friends of Madera Canyon
2017

Table of Contents:

Cover photo: Sweet Four O'clock (*Mirabilis longiflora*)

Madera Canyon Trail Map
(with numbered Recreation/Parking Areas & trail mileage)



Introduction:

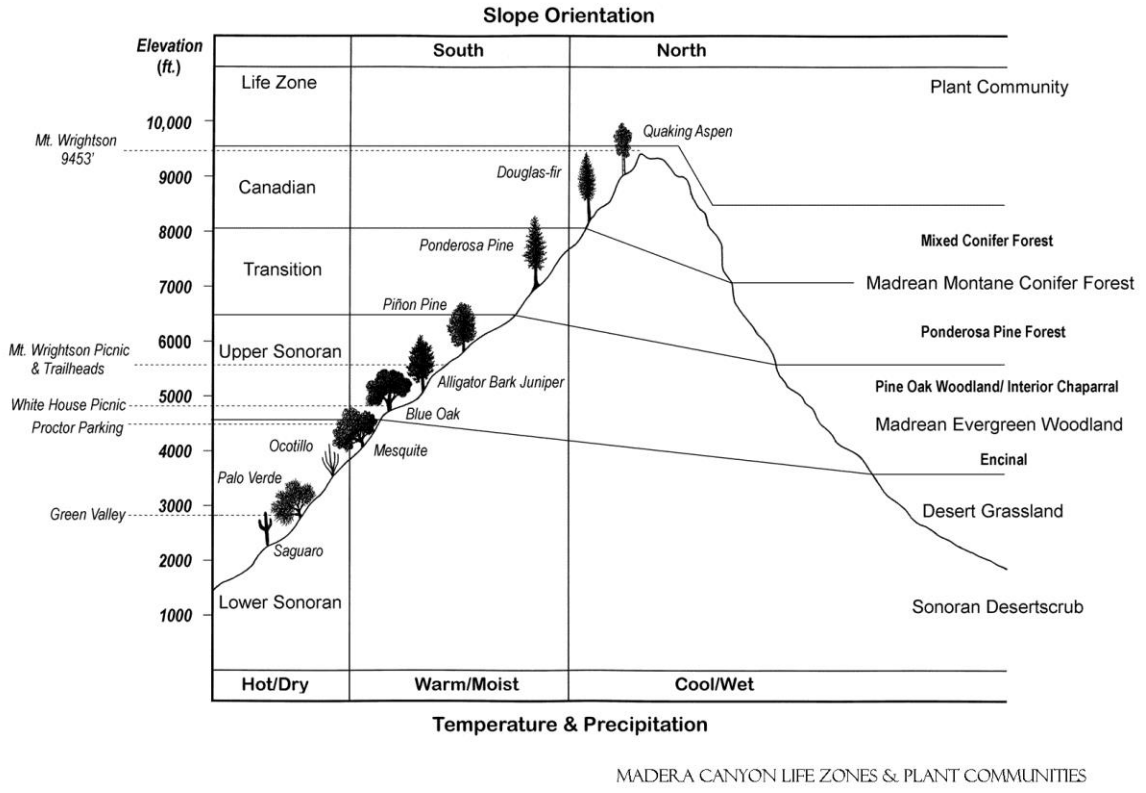
Welcome to Madera Canyon and the Santa Rita Mountains Sky Island in the Coronado National Forest. The **Proctor Recreation/Parking Area** (#1 on the Madera Canyon Trail Map) is the gateway to Madera Canyon. The **Proctor Loop Nature Trail** starting here is an easy 3/4 mile paved trail with slight elevation gain. It is an excellent nature field trip area through a variety of habitats with a rich diversity of plants and animals suitable for school children (generally 4th grade and up) and adults. There are also several locations of significant cultural history on the loop.

In addition to the **Proctor Loop Nature Trail Trail-head**,
the Proctor Recreation/Parking Area contains:
Proctor Education Ramada- roomy, shaded gathering point for groups doing a nature walk or educational activities; ADA accessible
Bud Gode Interpretive Nature Trail (BGINT) Ramada- with informative panels introducing canyon natural history, climate, geology/canyon formation, cultural history, plants, animals, fire ecology and more
Geologic Timeline- signs along the main sidewalk
Native Pollinator Landscape Garden- native Santa Rita Mountains pollinator-attracting plants in a water-harvesting interpretive area near the picnic ramadas
Picnic Area- two tables with ramada coverings; ADA accessible
Restrooms- near the trail-head; ADA accessible

Before hiking the nature loop trail, a visit to the BGINT Ramada is recommended for an intro to Madera Canyon and southeast Arizona's Sky Island Mountain Ranges. A brief overview of the Sky Islands and the canyon's life zones and floral communities for pre-walk preparation is provided below:

Sky Islands: The term given to the separate forested mountain ranges, like the Santa Rita Mountains, rising thousands of feet above the surrounding "seas" of desert scrub and desert grassland. There are about 40 such ranges in this region that lie between the Rocky Mountains to the north and the Sierra Madre to the south in Mexico (the plant and animal relationships of these ranges to the Sierra Madre has spawned the term **Madrean Archipelago**). Other major Sky Island ranges in our area include: the Rincon, Santa Catalina, Baboquivari, Huachuca, Pinaleno, Dragoon, Patagonia and Chiricahua mountains.

Madera Canyon/Santa Rita Mountain Life Zones:



MADERA CANYON LIFE ZONES & PLANT COMMUNITIES

Proctor Parking Area (~ 4,400' elevation) is located in the transition between the Lower Sonoran & Upper Sonoran life zones; **Proctor Nature Loop Trail** extends up into the Upper Sonoran zone. A life zone (also called a vegetation belt) contains specific communities of plants and associated animals, defined by elevation and the typical species of plants found within.

Please note: The edges of a life zone are not distinct, but overlap and blend in transition with the life zones above and below. This area is called an ***ecotone****.* (*Life zone elevations are approximate and vary with conditions such as sun exposure, slope orientation and proximity to riparian areas*.)

Lower Sonoran Zone- (0 to 4,500') warmest & driest zone; cactus, paloverdes, Velvet Mesquite, Ocotillo, Creosote Bush, bursages, Gila Woodpecker, Cactus Wren, Desert Spiny Lizard, Diamondback Rattlesnake and Antelope Jackrabbit. Transitioning to bunch grasses, scattered mesquite and small shrubs, like Hopbush, Fairy Duster, Velvet Pod Mimosa and Ocotillo, with Ladder-backed Woodpecker, Say's Phoebe, Desert Grassland Whiptail Lizard, Mojave Rattlesnake and Banner-tailed Kangaroo Rat higher on the **bajada** (alluvial fan of rock, sand and dirt eroded from the canyon and deposited over the foothill slope) nearer the canyon mouth.

Upper Sonoran Zone- (4,500 to 6,500') warm and dry; juniper, evergreen oaks, Apache and Chihuahua pines,Wait-a-Minute Bush, Smooth Bouvardia, Madrean Yucca, Palmer's Agave, Mexican Jay, Bewick's Wren, Clark's Spiny Lizard, Black-tailed Rattlesnake, Coues' White-tailed Deer

Transition Zone- (6,500 to 8,000') milder summer & cold winter; (many plants common to Rocky Mountains) Gambel's Oak, Arizona Madrone, Big-tooth Maple, Southwest Ponderosa Pine, Pointleaf Manzanita, Yellow-eyed Junco, Arizona Woodpecker, Mountain Spiny Lizard, Sonoran Mountain Kingsnake, Arizona Gray Squirrel

Canadian Zone- (8,000 to 9,500') highest, coolest and most moist life zone in the Santa Ritas; Douglas Fir, White Fir, Southwestern White Pine, Quaking Aspen, Kinnikinnik, Olive Warbler, Stellar's Jay, Twin-spot Rattlesnake, Short-horned Lizard, Black Bear, Porcupine

(*Additional* ***Hudsonian Zone*** *occurs above 9,500' in higher elevations, like Pinaleno Mountains with Mt. Graham*)

Proctor Loop Nature Trail Plant Communities:

Many plant communities are present within life zones of the Santa Rita Mountains; five of these communities interface along the Proctor Loop Nature Trail (and can be seen in the picture above):

At Proctor the higher elevation portion of the Lower Sonoran life zone is dominated by extensive (**1**) **Desert Grassland**. Found from ~ 3,000 to 5,000' this plant community is characterized by grasses, shrubs, agaves, yuccas and small mesquite trees; sometimes termed "semi-desert grassland".

Further up the Proctor Trail, an indication of the transition from Lower Sonoran to Upper Sonoran zone is the immergence of the (**2**) **Encinal** (**oak woodland)** community. This plant community is distinguished by Mexican Blue and Arizona oaks, Alligator Juniper, Desert Spoon (Sotol), Madrean Yucca and bunch grasses from ~ 4,000 to 6,000'.

The dry canyon-side slope on the opposite side of the trail from Madera Creek is primarily (**3**) **Interior Chaparral**, a plant community which thrives in the sun-exposed, poor, rocky soil amongst granite boulders. At lower elevations along the Proctor Loop Trail, this plant community is characterized by Wait-a-Minute Mimosa, Beargrass, Desert Spoon, Palmer's

Agave, Southwest Coral Bean, Ocotillo, and several species of short grasses under scattered Alligator Juniper and evergreen oaks.

(*Higher in the canyon, these dry, exposed rocky slopes of* ***Interior Chaparral*** *also include shrubs, such as Pointleaf Manzanita, Fendler's Ceanothus, Wright's Silktassel and Birchleaf Cercocarpus (Mountain Mahogany), with scattered Chiricahua, Apache and Mexican Pinyon pines and short Emory, Silver-leaf and Arizona oaks. Some of these primarily higher elevation plants enter the Proctor Loop Nature Trail area above the loop intersection*).

As the Proctor Trail reaches and then parallels Madera Creek, desert grassland and oak woodland give way to two associated plant communities that are more water dependent. Along the creek banks (and in groves around springs and marshy areas up-canyon) is (**4**) **Interior Deciduous Riparian Woodland** with large riparian trees growing mainly from ~ 2,700 to 6,000' elevation. The principal riparian tree species here are Freemont Cottonwood, Arizona Sycamore, Velvet Ash, Gooding's Willow, and Netleaf Hackberry. Cottonwood, sycamore and willow require having their roots in water and grow right in the water course, while the ash and hackberry never grow very far from it. In Madera Canyon this plant community creates a **Riparian Corridor** that follows Madera Creek and its tributaries up through the canyon and transects the terrestrial life zones.

Flanking the riparian woodland along both sides of lower Madera Creek is a woodland composed primarily of Velvet Mesquite called a (**5**) **Mesquite Bosque**. A mesquite bosque typically grows along the banks of the larger washes and water courses in our area; access to extra water allows Velvet Mesquite to sometimes grow quite large. (A water course that does not have enough water flow to support a riparian woodland may none-the-less often support a healthy mesquite bosque.) Due to cold temperatures increasing with elevation, the mesquite bosque starts to thin out above the Proctor Loop and Velvet Mesquite trees disappear from the canyon landscape completely approximately at the elevation of the Santa Rita Lodge.

Cooling shade and moisture underneath the riparian trees and large mesquites allows for a diverse understory of shrubs, like Soapberry, Desert Hackberry, Graythorn, Desert Honey Suckle and several wolfberry species, vines such as Moonseed Vine, Texas Snout Bean and various morning glories, along with many other perennial/annual plants and wildflowers. The

shrubs can reach prodigious size and foliage can be very dense, particularly after abundant spring or summer rains. A variety of riparian/aquatic wildflowers, rushes, sedges and grasses grow in and along the creek itself.

Along the Proctor Loop Nature Trail, many prominent plant species are identified by metal signs located at trailside.

Proctor Loop Nature Trail Guide:

Be prepared for this activity! **Every *participant should have adequate water, sturdy walking/hiking shoes, appropriate clothing for weather/season, sunscreen and sunhat; optional- walking stick. Cell phones for emergency are recommended,* but cell service is patchy and inconsistent in the canyon!**

*Remind students/participants to "**turn on their powers of observation**" and utilize their senses while walking on the trail; **vision** is important, but **hearing** and even **smell** can be used to locate and identify animals and plants! Walking slowly and looking closely can reveal an amazing variety of small plants, insects and other arthropods. **Moving quietly and speaking softly can help from frightening off people-shy canyon animals.***

*Advise group to stay together, stay alert/watchful and stay on the trail to keep from getting separated and lost. Staying on established trails minimizes erosion and habitat damage from trampling and potentially harmful encounters with Poison Ivy, thorny plants or dangerous animals, like rattlesnakes, that may rest under trailside vegetation. **Also remind everyone that they are "in somebody's home"; all plants and animals- even ants and bugs- should be treated with care and respect and are not to be deliberately disturbed, stepped on or injured for any reason! Watch them, don't squash them!***

1) ***Proctor Parking Area/ Nature Loop Trail Head to Mesquite Bosque/Riparian Corridor***

From the trail head at the parking lot, the paved path leads through Desert Grassland habitat (*which also surrounds the parking area*). *Introduced African* ***Lehman's Lovegrass*** *covers 70-90% of the habitat; remaining native grasses here are* ***Gramma grasses, Arizona Cottontop, Bush Muhly, Pappasgrass*** *and others. The many small* ***Velvet Mesquite*** *trees are survivors growing back from their roots after all being burned to the ground in a 2008 wildfire. Several other species of shrub are conspicuous along the trail.*

Velvet Mesquite (*Prosopis velutina*)- Native tree, 10-30' tall, found primarily along washes in Lower Sonoran Zone and scattered across desert grasslands up into the Upper Sonoran Zone; grows larger and in dense stands along riparian areas (**mesquite bosque**). Winter deciduous; mesquites usually leaf out in March/April after the last frost. Petal-less flowers hang in creamy-yellow spikes and are an important nectar and pollen source for insects. Nutritious seed pods, high in protein and sugars, are an important food for many animals and are ground into flour for human consumption. Seeds germinate extremely well after traveling through a cow's digestive

system; current distribution primarily the result of cattle grazing. Thick sap traditionally used medicinally and for chewing gum. (Pea family)

Fendler's Globemallow (*Sphaeralcea fendleri*)- Small shrub with crinkled, fuzzy gray-green leaves and large orange flowers that blooms in spring and during monsoon; common around the trail head. Globemallow is called "mal de ojos" (sore eyes) because easily detached dense leaf and stem hairs are extremely irritating if they lodge in the eyes. Interestingly, a tea brewed from the dried leaves is a reputed remedy for the inflammation and other eye irritants. (Hibiscus family)

Fairy Duster (*Calliandra eriophylla*)- small open shrub with light-gray stems and no thorns. Compound leaves are widely spaced and the petal-less flowers form showy spherical puffs of long pink, rose or red stamens in the early spring; common shrub growing around parking area and along first section of the trail. (Pea family)

Velvetpod Mimosa (*Mimosa dysocarpa*)- small dense shrub with scattered straight prickles (not paired) and compound leaves that superficially resemble young mesquite or acacia. Pink petal-less staminate flowers form cylindrical spikes which fade to white with age. Velvetpod Mimosa blooms in late spring and during summer monsoon; common shrub growing around Proctor Ramada and parking area. (Pea family)

Ocotillo (*Fouquieria splendens*)- A tall shrub growing with many whip-like stems that is often mistaken for a cactus. The stems are woody, not succulent (water storing), and have thorns, not spines. Leafless and dormant in winter, ocotillo will also drop their leaves when it is too hot and dry. Plants can leaf back out within 48 hours of sufficient precipitation. Ocotillos are reliable spring bloomers even in drier years and hummingbirds follow the bloom north as a significant, reliable nectar source on their migration. Many ocotillos along the trail here were burned and killed in the 2008 wildfire. (Ocotillo family)

*The **Landscape Interpretive Sign** and panoramic view along trail here is a good place to discuss and point out landmarks: Elephant Head, Baboquivari Peak, Kitt Peak, etc. Turning around to east also provides great view of Mt. Wrightson and the Santa Rita Crest.*

Kidneywood (*Eysenhardtia polystacha*)- Also known as "Palo Dulce," kidneywood is an medium sized, open upright-growing shrub with light yellow-green compound leaves with up to 20 pairs of leaflets. Tiny white flowers cluster in fragrant spikes at the tips of branches in spring and summer; very attractive to insects. Kidneywood is usually one of the later plants to wake up and leaf-out in the spring; a subtropical plant reaching the northern limits of its range in our area. (Pea family)

Other plants: Many annual and perennial plants grow along the path here in season under the mesquite trees and grasses. Spring wildflowers bloom with the adequate rains: Arizona Gold Poppy, Desert Anemone, Desert Hyacinth, Blue Phacelia, Silverleaf Nightshade. Morning Glory vines, Wishbone Vine, Indian Mallow, Orange Flame Flower, Sonoran Globe-amaranth and others flourish during the summer "monsoon".

Mammals: Many species of mammals inhabit the grasslands here, but usually are not regularly seen or are primarily nocturnal- Javelina, Mule Deer, Coyote, Bobcat, Kit Fox, Badger, Banner-tail Kangaroo Rat, Arizona Cotton Rat and a variety of pocket mice and mice.

Birds: *Year-round*- Common Raven, Red-tailed Hawk, Great Horned Owl, Barn Owl, Say's Phoebe, Black-throated Sparrow; *summer*- Turkey Vulture, Northern Mockingbird, Western Kingbird, Botteri's and Cassin's sparrows; *winter*- Northern Harrier, Loggerhead Shrike, Chipping Sparrow, Brewer's Sparrow, Vesper Sparrow (*sparrows often foraging together in mixed flocks*)

Reptiles: On warm days, spring-fall- Elegant Earless Lizards in/around Proctor Parking Area and on trailside rocks, Desert Grassland Whiptail lizards on sidewalks/trail, Clark's Spiny & Ornate Tree lizards sunning on sides of "Ed Shed" near Proctor Ramada. Regal Horned Lizard is present, but increasingly rare. Snakes rarely seen during the day in this area, but include Gophersnake, Western Patch-nosed Snake, Western Lyresnake, Mojave Rattlesnake and Tiger Rattlesnake. Ornate Box Turtle is also very rare.

Insects: Look for evidence of Twig-pruning Longhorn Beetle (girdled dead twigs) and Praying Mantis egg cases on mesquites; Pipevine Swallowtail and a few other butterfly species fly on warm days year-round. Spring-fall, particularly after summer rainy season, great variety of butterflies, beetles, grasshoppers, flies, wasps and bees flying about or in vegetation/flowers.

Ants are often seen on path in warm weather. **Watch for Red Harvester Ant colonies here- observe carefully, as these generally peaceful ants pack a very painful sting!** Listen for cicadas calling from vegetation in warm weather and closely observe vegetation to spot. Some grasshoppers also make considerable noise when flying. Many species of butterfly and moth caterpillars feed on a specific plant species or plant family; identifying the plant a caterpillar is eating can often help identify what it is (and vice versa)! *Walk slowly and look closely, so not to miss interesting species!*

2) *Riparian Corridor to Proctor Road Crossing* (*via paved spur trail to creek overlook*)

*At the intersection of the grassland with the edge of the creek drainage, the trail makes a hard right (east) and descends into the **mesquite bosque** flanking the riparian corridor. The change in vegetation is abrupt from primarily grasses and shrubs to large trees and thick undergrowth. There is a Santa Rita Prickly Pear growing on the creek side of the trail at the turn.*

Santa Rita Prickly Pear (*Opuntia santa-rita*)- a medium to large prickly pear cactus with roundish pads often lavender to red-purple in color, particularly when under stress. Few long spines present, but many clusters of

short, dense glochid spines. Brilliant yellow flowers in spring, followed by tasty fruit (**tunas**). Closely related and hybridizes with Pancake Prickly Pear.

***Riparian**, as defined previously, refers to a body of water, such as Madera Creek, and the associated vegetation growing along its banks. Point out here that the extra water allows large trees to grow (students can see the big trees growing along the creek drainage down the bajada to the west). The trees produce shade keeping things cooler and moister underneath. These "milder" conditions allow a greater number and variety of plants to grow underneath. More plants provide cover and food for more animals- diversity of plants and animals is greatest here!*

Point out to students/participants how the trees and vegetation get much thicker as the trail turns and descends toward the creek- first a thick mesquite bosque, then other tree species mix in. Density of shrubs also increases dramatically providing a natural "trellis" for climbing vines.

*This densely-wooded section of trail is excellent birding and a prime nesting area. Particularly in early spring before the trees leaf out, bird nests are easily spotted along the trail here. Look for ball-shaped **Verdin nests** in the outer branches of trees. **Hummingbirds, Northern Cardinal, Canyon Towhee, Bell's and Hutton's vireos** and other birds also nest here.*

Many types of spiders live here; watch for spider webs on vegetation and on the ground. Great variety and numbers of insects, particularly butterflies and grasshoppers, can be observed in season as well!

Turpentine Bush (*Ericamaria laricifolia*)- Shrubby plant with bright green foliage and gray branches resembling a small fir or juniper is actually a "daisy". Foliage smells like turpentine (or pine) when crushed and contains rubber. Yellow flowers, produced in the fall, are somewhat smelly and very attractive to insects. Not related to Guayule, a non-native plant in same family, grown for its rubber content as one of the first commercial ventures down the road in the village of Continental, AZ. (Sunflower family)

Graythorn (*Ziziphus obtusifolia*)- This medium shrub has velvety gray branches, small oval leaves and small blackish fruits eaten by birds. Long sharp thorns grow at right angles to the stem and eventually become branches; produces very small cream-colored flowers in summer. Grazed by

rabbits, deer and a very handsome, striped, moth caterpillar early in the summer rainy season. (Buckthorn family)

Desert Hackberry (*Celtis pallida*)- A dense spiny evergreen shrub, the branches of desert hackberry grow in a distinctive zig-zag pattern. The leaves are larger than gray thorn and dark green with a toothed edge. Leaf texture is rough like fine sandpaper. Juicy orange berries are an important food source for birds in summer. Food plant for larva of the Leila Hackberry and American Snout butterflies. (Elm family)

Wolfberry (*Lycium sp.*)- There are a three wolfberry species here that look very much alike. The wolfberry bushes along the trail have smooth, gray, striped stems and short, green leaves clustered in bunches. New branches begin as long, thin thorns and are often bumpy. Tiny white to violet flowers are among the first to bloom in spring and attract many pollinators; small red-orange berries eaten by birds. (Nightshade family)

Please point out that many berries and fruits, even those eaten by other animals, may not be edible or might be poisonous to humans*. People should not pick and eat things from nature that have not been positively identified by an expert.*

The many big rocks, old rock walls and downed trees along this section provide lots of protected living space for critters. Talk about what could live and/or hunt here and why. Explain that in the process of decomposition, old logs give off a small amount of heat and stay just a bit warmer than the surrounding ground. Rocks can absorb heat from the sun during the day, heating up, and then radiate that stored heat back into the environment at night. This makes rotting logs and rocks potentially attractive places for animals to live in cooler weather.

A number of important tree, shrub and other plant species grow mixed in among the mesquites along this section of the trail. Several usually evergreen vines grow along this trail section on other plants as well.

Netleaf Hackberry (*Celtis reticulata*)- Important deciduous riparian tree along water courses. This tree has smooth gray bark with raised bumps resembling warts, thin leaves with a strong "veiny" pattern underneath, and dry orange berries eaten by birds. Larval food plant of both the Celtis Hackberry, Clyton Hackberry and American Snout butterflies. (Elm family)

Western Soapberry (*Sapindus saponaria*)- A deciduous riparian tree usually seen in groves of saplings with straight light-gray trunks and compound leaves divided into a dozen or more long, lance-shaped leaflets. Tiny ivory-colored flowers bloom in large open clusters. Poisonous, translucent yellow berries produce a harsh foamy soap; trunks used to be cut for broom and shovel handles. Larval food plant for the Alcestis Hairstreak Butterfly and (with oaks) the magnificent Western Imperial Moth. (Soapberry Family)

Desert Honeysuckle (*Anisicanthus thurberi*)- Common upright shrub, usually with a few upright stems to 4 feet high, this important "hummingbird plant" grows in stands along the trail. Sparse foliage, with lance to oblong shaped leaves, is topped by showy, tubular orange flowers with flared petals. Blooming most abundantly in spring, but also in summer and fall, the nectar-rich flowers attract hummingbird pollinators. Black female Carpenter Bees often act as "nectar thieves" chewing into the base of the blossoms to drink the sugary liquid without pollinating the flowers.

Common Trail-side Vines:
Snailseed Vine (*Cocculus diversifolia*)- a prolific vine with single dark green oval leaves, leaf width is variable. Nearly evergreen except in the coldest winters, it grows primarily on the south side of the trail, often covering other plants. Flowers are tiny and hard to see. (Moonseed family) **Texas Snoutbean** (*Rhynchosia senna*)- draped over plants on the north side of the trail, this climbing bean has compound leaves of three small, elliptical light-green leaflets each. A native legume, it produces clusters of small yellow pea flowers in summer. (Pea family) **Mexican Passion Flower (***Passiflora mexicana*)- look closely for the two-lobed leaves (look like a green "pair of pants") and spiraling climbing tendrils; unusual petal-less flowers smell like moth balls. (Passion Flower family) **Morning Glory** (*Ipomoea spp.*)- during summer monsoon rains at least six species grow prolifically in the foliage; their dried stems and seed-pods can be seen tangled around plants the rest of the year. Most species have showy, colorful funnel-shaped flowers. (Morning Glory family)

*Turn right on to the paved spur to creek overlook w/ bench. The huge tree here is an **Arizona Sycamore**. Tall **Fremont Cottonwood** can be seen up and down the creek from this spot. Check out the vegetation around the bench area, taking care not to get into **Poison Ivy**!*

Littleleaf Mulberry (*Morus microphylla*)- Dense small tree (partially burned) growing on the north side of trail near spur turnoff and others holding up grape vines on the creek overlook, under the huge sycamore. Deciduous in winter, this tree has large dark green leaves with a sandpapery texture on the upper surface. Small blackberry-like fruit popular with birds, wildlife and people. (Mulberry family)

Poison Ivy (*Toxicodendron radicans*)- Extensive patch of this toxic plant grows along the ground to the west of the big sycamore on the side-trail to the creek. Grows as simple to sparsely branched stems; leaves are alternate and compound with three leaflets- "leaves in three, let it be!" Poison ivy sometimes climbs like a vine; leaves turn brilliant red in fall and drop with winter cold. Oil on stems and leaves very irritating to skin of most people. Smoke extremely harmful if burned and inhaled. (Sumac family)

Canyon Grape (*Vitus arizonica*)- This common woody vine is a true wild grape with large maple-like leaves, shredding bark, coiling climbing tendrils and juicy blue-black edible fruit in the summer. Wild grapes are eaten by many small animals, dozens of bird species; bark is often stripped for nesting material. Humans use fruit for juice, wine, jellies and preserves. A number of colorful moth caterpillars eat Canyon Grape, including the incredible Typhon and Achemon sphinx moths. (Grape family)

Arizona Sycamore (*Plantanus wrightii*)- With cottonwoods, Arizona sycamores are the largest trees growing in the canyon (40 to 80'). Always found next to water, these trees grow massive trunks, often divided at the ground into two or three stems, and a mass of roots running along the ground. Deciduous in winter, sycamores leaf out with huge five-lobed maple-shaped leaves late in the spring. Looking ghostly white from a distance, the peeling bark is actually mottled and resembles a soldier's camouflage uniform. Cavities are favored nesting sites for Elegant Trogon, Acorn Woodpecker, Sulphur-bellied Flycatcher and small owls. Rows of holes, called sap-wells, are drilled by sapsucker woodpeckers who return later to drink sweet sap and eat attracted insects. (Planetree family)

Fremont Cottonwood (*Populus fremontii*)- Along with sycamores, these are the largest trees in the canyon (to 60' or more). Cottonwoods have thick, deeply corrugated gray bark and broad "triangular" bright green leaves. Deciduous in winter, they are among the first trees to leaf out in spring. Cottonwoods only grow in riparian areas where their roots have access to

water. Named for John Fremont, explorer and first AZ territorial governor. In late summer, look for the scat (called frass) of Great Poplar Sphinx Moth caterpillars on the ground under the foliage; frass looks like small "rootbeer-barrel candies". Then try to spot the big green larvae camouflaged in the foliage above. (Willow family)

From the creek overlook, take the dirt "social trail" down along the creek to Proctor Rd.; use caution walking here- watch out for the uneven ground, roots and rocks! (*People in wheelchairs or with walking difficulties can return via the spur back to the Proctor Nature Loop Trail and proceed to Proctor Rd.*)

As students/participants walk down to the dirt road, point out the exposed roots, smooth rocks and the water-cut embankment as indications of ***erosion****- this physical action is slowly cutting the canyon deeper.*

On the west side of where Madera Creek crosses the road is a ***Velvet Ash*** *growing under the sycamore canopy. On the east side of the creek crossing are several sprawling* ***Goodding's Willow****. The "willow-like" shrub growing next to the willows at roadside is* ***Seep Willow****, actually closely-related to Desert Broom in the Sunflower family.*

Velvet Ash (*Fraxinus velutina*)- In Madera Canyon, this deciduous ash is a common small to medium-sized tree growing along the creek in the riparian corridor. Several grow where Proctor Rd. crosses Madera Creek; a beautiful grove grows around the first creek bridge. Bark is light gray and furrowed, but much smoother than the oaks. Light green compound leaves have 3 to 7 leaflets, which turn brilliant yellow in the fall. Birds eat the seeds. (Olive family)

Goodding's Willow (*Salix gooddingii*)- A medium-sized tree with broad, rounded crown growing to 45' and 30" in diameter, but usually much smaller in Madera Canyon. It also grows along Madera Creek in the riparian corridor. Thick gray bark is rough and deeply furrowed with narrow ridges; twigs are yellowish. Shiny bright green leaves up to 5" long are narrow, finely toothed and curved. Tiny flowers grouped together in distinctive catkins bloom primarily in March. (Willow family)

Seep Willow (*Baccharis salicifolia*)- An upright, woody shrub 6 to 12' tall with "willow-like growth", common along water courses in Arizona. Shiny, narrow dark-green leaves are up to 6"long, lanced-shaped and roughly

toothed; leaves are sticky with a very distinctive odor. Showy clusters of creamy-white rayless compound flowers bloom at ends of branches on separate male and female plants. Flowers very attractive to insects; can bloom between March- December. (Sunflower family)

Other plants: Annual and perennial plants grow along the path here in season under the trees and shrubs. Spring wildflowers bloom with the adequate rains: Desert Hyacinth, Blue Phacelia, Silver Puff, Desert Chicory, London Rocket and Tansy Mustard. Morning Glory vines, several Golden Eye daisies, Rouge Plant, Sparse-flowered Goldenrod, Beggarticks, Hairy Fournwart, Wright's Cudweed and others flourish during the summer "monsoon". Prickly Poppy and Camphorweed bloom along Proctor Rd. from spring through summer.

Birds: *year-round*- Northern Cardinal, Canyon Towhee, Verdin, House Finch, Lesser Goldfinch, Hutton's Vireo, Bewick's Wren, Black-tailed Gnatcatcher, Ladder-backed Woodpecker, Western Screech-owl; *summer*- Bell's Vireo, Blue Grosbeak, Varied Bunting, Summer Tanager, Cordilleran Flycatcher, Lucy's Warbler, Phainopepla, Black-capped Gnatcatcher; *winter*- Ruby-crowned Kinglet, Green-tailed Towhee, White-crowned Sparrow

Reptiles & Amphibians: Canyon Treefrog bask on creek-side granite boulders when stream is flowing in warm weather; tiny juvenile Red-spotted Toad common along creek in August/September (adults out at night during summer rains). Ornate Tree Lizard and Clark's Spiny Lizard display on rocks and tree trunks spring-fall; Sonoran Spotted Whiptail Lizard are common on/along the trail spring-fall. Sonoran Whipsnake, Green Ratsnake, Black-tailed Rattlesnake, Ring-necked Snake and other small snakes occur here, but are rarely seen.

Arthropods and Insects: The sheet-like webs of Funnel-weaving spiders are very common along trail; look for the spiders hiding in tunnel at back end of web. Orb-weaver and other web-spinning spider webs found draped in vegetation. A variety of jumping spiders and Green Lynx Spiders hunt the trailside vegetation; also look for Green Lynx on prickly pear pads and flowers. Look for Praying Mantis egg cases on tree branches. Pipevine Swallowtail and several other butterfly species fly on warm days year-round. Huge Two-tailed Swallowtail butterflies sail down the riparian corridor from spring-fall. Also spring through fall, particularly during/after summer rains,

a great variety of butterflies, beetles, grasshoppers, flies, wasps and bees fly about or land on vegetation/flowers. Butterflies often gather in large "puddle party" gatherings on moist ground where the creek crosses Proctor Road. Many species of caterpillars munch trailside vegetation and tree leaves in August/Sept. Listen for cicadas in hot weather- different species produce different sounds. Take care around common Red Harvester Ant colonies along the trail!

3) ***Proctor Road Crossing to Loop Intersection***

Turn left (*north*) on *Proctor Rd. and walk the dirt road back to the paved nature trail, looking at roadsides for interesting plants and insects. Turn right* (*east*) *and proceed up the paved trail into the canyon.*

Point out the grove of young sycamore trees on the southeast side of road/trail intersection; see if students can use observation skills to determine what kind of trees these are. Tall, spindly shrubs around the sycamores are ***Desert Broom****. Dense woodland of mesquite and hackberry on the north side of the trail here can be very good birding! Large* ***evergreen oaks*** *grow along the trail here, the lower edge of the* ***Encinal*** *woodland; look for* ***acorns*** *and* ***galls*** *underneath the spreading branches.*

Desert Broom (*Baccharis sarothroides*)- A very hardy native shrub that prefers disturbed ground, as along the trail here above Proctor Rd. As an adaptation to desert heat and aridity, desert broom has nearly dispensed with water-losing leaves entirely, photosynthesizing primarily with its green stems instead. Desert Broom grows as separate male and female plants, each producing only male (tan) or female (white) flowers in the fall that are extremely attractive to pollinating insects. (Sunflower family)

Mexican Blue Oak (*Quercus oblongifolia*)- Growing at the lowest elevations of some seven species of oaks in Madera Canyon, Mexican Blue Oak is a large spreading evergreen tree with deeply furrowed light gray bark. The leaves are blue-green, unlobed and oval to oblong in shape with fairly parallel sides. Acorns form singly, not in pairs; often plentiful under the trees in Fall, an important food source for many birds and mammals. Native Americans soaked acorns to remove bitterness and ground them into flour or brewed a coffee-like beverage. (Oak family)

Galls- Tan, round balls found on the ground under oaks are "green apple" oak galls (often seen on the tree in fall). Galls are caused by many kinds of insects; oak galls caused by tiny wasps. Insects deposit eggs under the surface of a twig, leaf, root or bud. Introduced chemicals from the egg-laying or chemicals/stimulation from the larva cause abnormal tissue growth, providing a growing food source for the larva inside the gall. Holes in the gall are made by insect hatching out or predatory insects burrowing in. Other common galls seen in Madera Canyon are the conspicuous bulges at the base of hackberry leaves, white fuzzy galls on desert hackberry twigs, and hot-pink fuzzy galls on oak leaves.

Underneath the oaks near the White House turnoff the soft ground often looks dug up. There is a colony of ***gophers*** *living here; coatis have been observed trying to dig them up (other predators, like skunk, gray fox and bears, may also dig here). Note: No chipmunks in the Santa Ritas as reported in many previous natural histories.* ***Rock Squirrel*** *and* ***Arizona Gray Squirrel*** *are present, but striped Harris Antelope Squirrel, often mistaken for chipmunk, does not range up into Madera Canyon. Large solitary Freemont Cottonwood off near the creek to the right often has perching birds.*

*The paved spur trail to the left leads up to the **White House ruin**, the remains of a two-roomed, white-washed adobe building. Observe, but* **please do not touch** *fragile adobe. Originally built by a sheepman around 1880, it was used as a vacation retreat by Tucson merchant Theodore Wellish in the 1880's, then occupied by the Alcario Morales family from 1911 to 1941.* (For further details refer to "History of Madera Canyon" published by the Friends of Madera Canyon, pages 18-19.) *Take care with Red Carpenter Ants near the ruin.*

Western Virgin's Bower (*Clematis ligusticifolia*)- Climbing woody vine grows on vegetation along the trail below and above White House turnoff and on the trail corner opposite the Matate Station. Tendril-like leaf-stems with five, toothed leaflets aid in climbing. Showy white flowers in summer followed by fluffy "plumed" fruits. (Buttercup family)

Above the White House spur, point out large dead oak tree that has collapsed above the sharp right bend in the trail. Ask for a theory as to why it might have fallen. The tree actually collapsed under the weight of a wet snowfall; lots of evidence of insect damage- may have weakened tree and contributed to the collapse. Dense stand of young Net-leaf Hackberry is growing in the sunny opening created by the falling oak. Several interesting plants growing under the trees along the trail here.

Alligator Juniper (*Juniperus deppeanna*)- Large, slow-growing coniferous tree that can grow over 50' tall and live to be very old, 600-800 years. Bark resembles the scales of an alligator; leaves are modified into tiny overlapping "scales." Juniper "berries" are actually modified fleshy cones relished by many animals, particularly bears, for their high carbohydrate content. They taste sugary sweet when fully ripe. (Cypress family)

Cane Cholla (*Cylindropuntia spinosior*)- Highest elevation-growing cholla cactus found in the Sky Islands. Cane Cholla grows upright with a straight stem and branches covered in prominent oval tubercles and short spines (plants grow more elongated and spindly in shady conditions). Large showy flowers usually rose to red-purple in later April-May. (Cactus family)

Sotol (*Dasylirion wheeleri*)- Also known as desert spoon, Sotol grows in high desert grasslands and oak woodland from ~ 3,000 to 6,000'. Plants grow from a short trunk topped with a spiraling crown of erect blue-green leaves, producing a rosette somewhat like a giant bunch grass or yucca.

Narrow leaves are lined with sharp yellow teeth and a dry, blunt tip. Tiny cream-colored flowers are born in clusters on tall flower stalk in late spring to summer. (Nolina family)

*On the right-hand side of the trail are **bat houses and a Madera Canyon bat interpretive sign**. Seventeen species of bats have been identified in the canyon and Santa Rita Mountains; these are pictured on the interpretive sign. Take a few minutes here to learn about canyon bats. Several species of dangly-legged **Paper Wasp** (Polistes spp.) sometimes nest in the bat houses. Also look for woven grass nests (or nest remnants) of **Hooded Oriole** hanging in the house entrances.*

*On the opposite side of the trail from the bat houses, is a young **Emory Oak**, identified by its bright green holly-shaped leaves. This evergreen oak is more commonly found higher in the canyon. Past the Bat Houses the trail enters a grove of large oak trees with Net-leaf Hackberry and Alligator Juniper. Look for bunches of **mistletoe** hanging from the oak branches and observe the variety of understory plants in the grove.*

Emory Oak (*Quercus emoryi*)- Found primarily in the pine-oak woodlands and interior chaparral of the higher **Upper Sonoran Zone** in the canyon, a few specimens grow at lower elevations along the riparian corridor. Emory Oak is a medium-sized evergreen tree growing to about 35 feet, with rough, dark blackish-gray bark. The unlobed leaves are bright shiny green on both sides and lanceolate to elliptic in shape. Leaves are often "holly-like" with small, spine-tipped teeth spaced along the edge. Acorns are an important food source for many birds and mammals. Native Americans soaked acorns to remove bitterness and ground them into flour or brewed a coffee-like beverage. (Oak family)

Mistletoe- Hanging yellow-green stems with round succulent leaves growing in several species of trees along the Proctor Nature Loop. Sticky seeds of these parasitic plants are dispersed by birds that feed on the juicy berries and adhere to branches and twigs. Upon germination, roots invade and tap into vascular tissues of the host. **Oak Mistletoe (***Phoradendron coryae*) parasitizes oaks. **Big-leaf Mistletoe** (*P. serotinum subsp. macrophyllum*) found in deciduous cottonwood, willow, sycamore, hackberry, ash and walnut. **Juniper Mistletoe** (*P. juniperinum*) grows on junipers. (Mistletoe family)

Madrean Yucca (*Yucca madrensis*)- Formerly called Schott's Yucca, this mountain yucca grows in oak and pine forest from ~ 4,000- 7,000'. Often over 6' tall on a dark brown trunk obscured by a "skirt" of dried leaves, Madrean Yucca has smooth, rigid blue-green leaves with a sharp, brown terminal spine and no teeth. Showy flower stalk with many ivory bell-shaped flowers is produced in late spring. Though flowers are very attractive to **Giant Leaf-footed Agave Bug** and a variety of nectar-feeding insects, yuccas are pollinated solely by species of nocturnal **Yucca Moth**. Flowers, fruit and seeds eaten by native people; leaf fibers woven into rope, cloth, mats, baskets and sandals; roots pounded in water for soap. (Agave family)

*In the oak grove, the trail turns left at large boulders just above the stream. The cup-shaped depression in the **granite** boulder below the trail is a **bedrock mortero**- a grinding hole used by Native Americans in the past. No habitation/village archeological sites have been found in the canyon, but there are many "use sites" for food processing, tool making, etc. This mortero may date back to the **Hohokam** culture and may have been subsequently used by **Tohono O'odom** and **Apache**.* (For details refer to "*The Nature of Madera Canyon"* published by the Friends of Madera Canyon, pages 99-106.)

*The huge trailside boulder just past the mortero, is **rhyolite** and originally part of the ancient lava rock that makes up **Mount Wrightson and the Santa Rita Crest** in the distance above. Many such boulders, usually purple, yellow or gray in color, tumbled down the canyon and lodged along the creek bed sometime in the distant past.* (For details on Madera Canyon geology, refer to "The Rocks and Landscapes around Madera Canyon" pamphlet published by the Friends of Madera Canyon.)

*Just beyond the rhyolite boulder the trail passes a stand of Soapberry on the right, then overlooks an excellent example of exposed **granite bedrock** in the streambed below the guardrail- the "treefrog rocks". Erosion has smoothed and carved the **granite**- brilliant white rock with small dark flecks- in the stream bed. Flowing water with suspended particles has eroded the rocks into polished, undulating shapes.*

*In warm weather when water is flowing, look carefully along stream for "granite colored" bumps of **Canyon Treefrog** sunning on rocks. The only frogs commonly seen in the canyon, they shelter under rocks and roots*

during cold or dry seasons. These treefrogs change their skin color and texture to remain camouflaged on rocks.

*On the far hillside above the stream, hardy **Interior Chaparral** grows on the hot, exposed slope amongst the granite boulders and scattered small trees.*

Southwestern Coral Bean (*Erythrina flabelliformis*)- Coral Bean is another sub-tropical plant that reaches its northern limits in our area. The green-beige sparsely branching stems stick up prominently among the boulders across the creek above the "treefrog rocks." Bare stems produce spikes of brilliant red tubular flowers in late spring that are an important nectar source for hummingbirds. After flowering, large cottonwood-like leaves emerge along with long, maroon-colored pods bearing poisonous orange beans. (Pea family)

*Past the "treefrog rocks", the trail ascends gradually away from the creek into grassland with scattered trees. There is a showy purple rhyolite boulder to the right. Look for **Carpenter Bee** nesting holes in the wooden benches; the large, noisy black female bumblebees may be hovering around the benches in spring and summer. Golden-yellow males are not often seen. Females can sting, but are docile and more interested in each other than people. The statuesque oak across from benches is an **Arizona Oak**. Yucca, cane cholla and barrel cactus grow in the grassy habitat trailside, along with dense stands of Desert Honeysuckle. Look for hummingbirds and insects when the honeysuckle is blooming.*

Arizona Oak (*Quercus arizonica*)- The other large oak tree species found on the Proctor Nature Loop is distinguished from Mexican Blue Oak primarily by bark texture and acorns. Trees have light gray, vertically furrowed bark. The unlobed blue-green leaves are variable in size and shape, often wider towards the middle or end than at the base; acorns form in pairs or threes. One of several oaks used as larval food plant of Arizona Sister Butterfly and many moth species. (Oak family)

Fishhook Barrel Cactus (*Ferocactus wislizenii*)- Large cactus growing on both sides of the sidewalk near the loop intersection. Barrel-shaped stems with many vertical ridges bear long fishhook-shaped central spines. Faster growth on the more shaded/cooler north side causes the plant to lean to the south; hence nickname "compass barrel." Flowers bloom yellow to red in late spring/early summer; persistent, sour yellow fruit remain on the stem,

looking like “mini-pineapples”. Ground squirrels, packrats and mice gnaw open fruit to gather copious, protein-rich seeds and discard the tart remainder. (Cactus family)

Other plants: Annual and perennial plants grow along the path here in season under the trees and shrubs. Spring wildflowers bloom with the adequate rains: Desert Hyacinth, Dakota Verbena, Bajada Lupine, Green’s Lotus and Desert Straw. Morning Glory vines, several Golden Eye daisies, White-mouthed Dayflower, Sparse-flowered Goldenrod, Tepary Bean and Hooker’s Evening Primrose flourish during the summer “monsoon”. Arizona Blue Eyes and Dakota Verbena bloom spring through early fall.

Mammals: Coue’s White-tailed Deer, Eastern Cottontail and Rock Squirrel are common. Javelina are regular visitors during fall acorn and juniper berry season. Bobcat, Gray Fox, Coati, Striped Skunk, Botta’s Pocket Gopher, White-throated Woodrat and a variety of mice and bats present, but not regularly seen or are nocturnal.

Birds: *year-round*- Mexican Jay, Bridled Titmouse, Lesser Goldfinch, Acorn Woodpecker, Northern Flicker, Cooper’s Hawk, Western Screech-owl; *spring*- Townsend’s Warbler, Wilson’s Warbler, Orange-crowned Warbler, Hammond’s Flycatchers; *summer*- White-winged Dove, Broad-billed Hummingbird, Hooded Oriole, Gray Hawk, Cordilleran Flycatcher, Yellow-billed Cuckoo (rare); *winter*- Hermit Thrush, Dark-eyed Junco, Red-naped Sapsucker, Yellow-rumped Warbler

Amphibians & reptiles: Canyon Treefrog on creek boulders when water present in warm weather; juvenile Red-spotted Toad along creek banks during summer rains. Clark’s Spiny Lizard on rocks and tree trunks; Sonoran Spotted and Desert Grassland Whiptail lizards in this mixed grassland/woodland habitat in warm weather. Mountain Skink (with shiny blue tails) under rocks and leaf-litter, but rarely seen. Black-necked Gartersnake, Sonoran Whipsnake, Gophersnake, Knoblock’s (Arizona) Mountain Kingsnake, Black-tailed Rattlesnake and other small snakes present, but not commonly seen.

Arthropods & insects: Spring-fall, particularly during/after summer rains, a great variety of butterflies, beetles, grasshoppers, flies, wasps and bees fly about or perch in vegetation/flowers. Observe closely for showy click, jewel and longhorn beetles on tree bark and flying. Arizona Sister butterfly is

common; their larvae feed on oaks. Red-spotted Admiral butterfly mimics Pipevine Swallowtail, but lacks the hind-wing “tails”. Golden Eye daisies and Desert Broom attract many butterflies, bees and flies when blooming. In late summer/early fall look for interesting caterpillars on golden eye, goldenrod, soapberry, grape, oaks and other plants.

4) ***Loop Intersection to Upper Bridge***

At the trail loop intersection, take the right-hand fork. The trail quickly emerges from the woodland and enters the lower end of a large meadow. During summer rains, ***Arizona Sunflowerweed*** *grows and blooms yellow in a thick unbroken stand under the mesquites; observe the honey-combed leaves eaten by voracious* ***leaf beetles****. Otherwise, it is thick grass beneath the trees with scattered cholla, prickly pear and barrel cactus under the open tree canopy. A massive Mexican Blue Oak on the right-hand side of trail has horizontal striations in its bark on the lower trunk caused by fence wire from many years past. Watch for* ***Coue’s White-tailed Deer*** *in the meadow or in surrounding woods; listen for* ***Mexican Jay*** *or* ***Acorn Woodpecker*** *calling from woods nearby. Insects are often crawling on grass stems along the trail or walking on the pavement.*

Pancake Prickly Pear (*Opuntia chlorotica*)- A related species to Santa Rita Prickly Pear in the canyon, this cactus grows upright with round yellowish-green to bluish-green pads. Cactus has yellow central spines in patches of dense, shorter glochid spines giving the pads a polka-dot appearance. Flower is yellow with reddish tint. This species often hybridizes with Santa Rita Prickly Pear. Look for **Cactus Weevil**, black beetles with long snouts, on the pads and Green Lynx Spider in the flowers. Javelina chew on the pads and can take down the plants. (Cactus family)

Trail turns east through thicket of oak, sycamore & hackberry. Tumbled rock piles are from old walls/human action. Notice paths made by animals down to the steam on right, as well as Arizona Grape growing over mesquites. Acorn Woodpecker acorn storage holes dot old gray sycamore trunks. Several huge wolfberry bushes grow up into trees on right side of trail at the bend before the ***lower,*** *or first****, bridge*** *across Madera Creek.*

Stop on the bridge and look up and down the stream channel. Explain that Madera Creek is an intermittent stream that flows seasonally, but not all year. No fish live here, but there are Canyon Treefrogs, Red-spotted Toads and many types of aquatic insects. If the water is running, look for flecks of ***biotite****, a mica-mineral, eroded out of granite that shine like fool's gold underwater in the sunshine. Thick stand of young Velvet Ash trees grow above and below the bridge with some hackberry and sycamore. Excellent wildlife viewing/resting bench on far side of bridge; listen/watch for birds and wildlife coming to water.*

Black Witch (Ascalapha odorata)- the largest owlet moth in the U.S., occasionally hides under the bridge from the summer rains into fall. With a wingspan of nearly 6", these huge moths fly great distances at night, straying north from Mexico/Central America; during daylight they hide away in dense shade. Disturbed by vibrations from bridge crossers, the moths fly out and flutter erratically around. With their large size and dark brown wings crossed by a series of alternating light and dark undulating lines and bands, they are easily mistaken for bats!

Just past the bench, a great ***woodpecker hole*** *is in the trunk of the broken mesquite nestled next to the juniper. Though it appears brand new, mesquite wood is very tough and the hole is actually over 20 years old. It has been used by* ***Bewick's Wren*** *and several other cavity nesting bird species over the years. Severe damage to junipers and mesquites evident along this section of trail caused by overzealous trimming for utility easement in 2016.*

From the bridge, the trail climbs away from the stream into a hillside of ***Interior Chaparral*** *vegetation and scattered small junipers and oaks. Dense grass and shrubby vegetation is strewn with weathered granite boulders. After the onset of summer rains this trail section can bloom densely with summer flowers.* ***Lichens*** *grow on trailside boulders and a wooden bench with scenic views rests under a big solitary Alligator Juniper up to the right. Look for Carpenter Bee nest holes in the wood of the bench and watch the antics of the bees flying about in season. Scan riparian trees for birds and enjoy the beautiful view!*

Lichen- Colorful living "crusts" growing on the large boulders around the bench under the alligator juniper. There are many lichen species in a variety of colors growing on rocks and dead tree branches along this section of trail. Lichens are made up of a fungus and an alga that live together in a mutually beneficial relationship (**symbiosis**). The fungus anchors the lichen, absorbs water, and protects the alga inside from intense sunlight and environmental hazards; it may also digest some nutrients from the substrate to share. The alga has chlorophyll and uses photosynthesis to create carbohydrates which are shared with the fungi. Lichens are not considered parasites.

This section of the trail provides good views of Mt. Wrightson and Mt. Hopkins, peaks named for William Wrightson, superintendent of the Santa Rita Mining Company, and his mining engineer, Gilbert Hopkins, both killed by Apaches on Feb. 17, 1865. (For further Madera Canyon mining history refer to "History of Madera Canyon", pages 9-12.)

Above the solitary juniper, ***Beargrass****, sotol and Madrean Yucca can all be seen growing closely together on the hillside among the oaks and junipers of Interior Chaparral plant community. Yucca and agave (Agave family) and sotol and beargrass (Nolina family) are closely related and all in the order* ***Liliales****, which also contains lilies, amaryllis, iris and onions.*

Beargrass (*Nolina microcarpa*)- Not actually a grass at all, beargrass is a relative of agaves, yuccas, and sotols with thin grass-like leaves. Leaf bases clasp the stem in densely overlapping spirals producing rosettes that grow in fountain-like clumps on hillsides. Leaf margins are finely toothed and very sharp; Tohono O'odham traditionally weave strips of the leaf edge into their storage baskets as protection against gnawing rodents. Sotol-like flower stalk with tiny greenish-white flowers bloom in May and June (Nolina family)

Watch for large colony of Red Harvester Ant right next to left edge of trail in the dip just past the plant interpretive signs. The ants have cleared vegetation around their nest and distinct harvesting trails radiate out into the surrounding grass. The trail approaches Madera Creek again here. Point out to students/participants the huge, leaning Fremont Cottonwood on the left near the stream; gray bark looks like large polygonal plates. One of the largest trees in the canyon, leaning was caused by the tree reaching for light, growing out from underneath other trees. Screech Owls are sometimes seen in tree holes along this stream section. Acorn Woodpeckers regularly roost on utility poles to right of trail.

Grove of thin straight trees growing amidst the mesquite along the trail is Western Soapberry. Many soapberry seedlings germinated in the wet winter of 2004-2005; their small straight trunks can be seen pushing up through the grass under their parents. At the top of the soapberry grove the paved trail turns sharply right towards the creek; the un-paved trail continuing up the hill is the ***Nature Trail*** *to* ***White House Picnic and Parking Area.***

Descending the trail towards the creek, find an old, downed oak trunk lying to the left before the second bridge with remnants of granary holes made by Acorn Woodpeckers. If the tree was still upright, the woodpeckers would fill the holes with acorns for later use. Watch for lizards basking in the sunlight here. Interesting plants grow along the trail on bridge approach.

Wooly Mullein (*Verbascum thapsus*)- Rosettes of long ultra-fuzzy blue-green leaves grow close to the ground near bridge. A biannual, seeds germinate in spring and grow into a large rosette the first year; the rosette then produces a tall flower stalk with "popcorn-like" yellow blooms the second summer. Feel the leaves softness if close to trail (there is poison ivy here too!). Native Americans reported to stuff leaves in their moccasins as cold insulation. Leaves also used as toilet paper. (Figwort family)

Other plants: Annual and perennial plants grow along the path here in season under the trees and shrubs. Spring wildflowers bloom with the adequate rains: Bajada Lupine, Green's Lotus, New Mexico Thistle. Arizona Sunflowerweed, San Pedro Daisy, Sweet Four O'clock, Red Spiderling, Isolated Blazing Star, Fingerleaf Gourd flourish during the summer "monsoon". Sacred Datura, Ribbon Four O'clock, Parry's Penstemon bloom spring through late summer. Non-native, invasive Vinca blooms in the dappled shade along the creek here; it is a remnant landscape plant that escaped cultivation from canyon cabins.

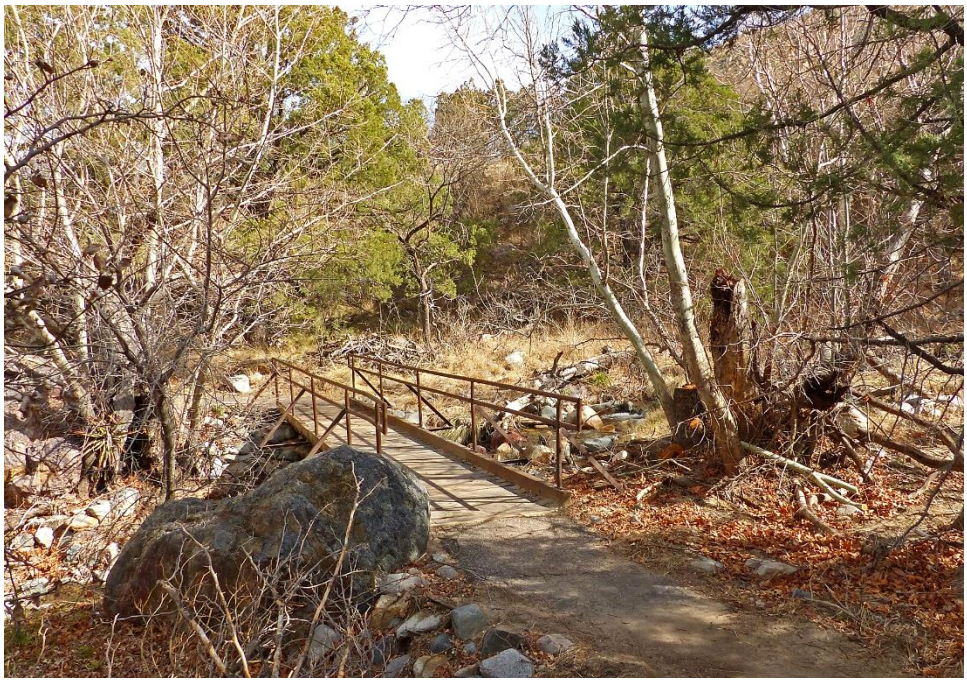
Mammals: Coue's White-tailed Deer, Eastern Cottontail, Rock Squirrel and Arizona Gray Squirrel are common. Javelina and Black Bear visit during fall acorn and juniper berry season. Bobcat, Gray Fox, Coati, Striped Skunk, Ringtail, Botta's and Southern pocket gophers and a variety of mice and bats present, but not regularly seen or are nocturnal.

Birds: *year-round*- Mexican Jay, Acorn Woodpecker, Common Raven, Cooper's Hawk, Bewick's Wren, Bridled Titmouse, White-breasted Nuthatch, Montezuma's Quail; *summer*- Summer Tanager, Cassin's Kingbird, Ash-throated Flycatcher, Brown-crested Flycatcher, Northern Beardless Tyrranulet; *winter*- American Robin, Hermit Thrush, Ruby-crowned Kinglet, Dark-eyed Junco, White-crowned Sparrow, Chipping Sparrow, Brown Creeper

Amphibians & reptiles: Juvenile Red-spotted Toad along creek banks during summer rains. Clark's Spiny Lizard on rocks and tree trunks; Sonoran Spotted and Desert Grassland Whiptail lizards in this mixed grassland/woodland habitat in warm weather. Sonoran Whipsnake, Gophersnake, Knobloch's (Arizona) Mountain Kingsnake, Black-tailed Rattlesnake and other small snakes present, but not commonly seen.

Arthropods & insects: Spring-fall, particularly during/after summer rains, a variety of Spur-throated Grasshopper species, butterflies, bees, wasps and flies fly about or perch in vegetation/flowers. Carpenter Bees often buzzing around wooden trail benches. Pipevine Swallowtail butterflies visit thistles and daisies spring-summer. Arizona Sunflowerweed and other yellow daisies attract many butterflies, bees and flies when blooming; look for small, colorful Jewel Beetles (family **Buprestidae**) in the flowers. In late summer/early fall watch for caterpillars on the foliage of all the yellow daisy species, soapberry, grape, oaks and other plants.

5) ***Upper Bridge to Loop Intersection***



The ***second, or upper, bridge*** *on the Proctor Nature Loop is in one of the most beautiful and lush areas of lower Madera Canyon. Oak and juniper grow almost right down to the creek; there are numerous specimens of sycamore, cottonwood and ash. The creek often runs here, or at least holds some water in small pools, when lower portions are dry. Look for Canyon Treefrog on the bridge railings and streamside rocks.* ***Long-jawed Orb-weaver*** *spiders can often be seen sitting in circular webs spun along or over creek pools. Excellent bird watching area! Black Witch owlet moths sometimes rest under the bridge during summer rains into fall*

On the north end of the bridge is a huge purple rhyolite boulder over-grown with an ancient looking sycamore. From here along the trail, past the resting bench to the next large trailside sycamore, is a good area to watch for Knobloch's (*Arizona*) *Mountain Kingsnake and Black-tailed Rattlesnake in warm weather. Use caution- Poison Ivy grows around the sycamores and densely along the trail on the stream side. Across the creek, opposite the bench, are several* ***Wright's Silktassel****, an Interior Chaparral shrub. Just downstream under several Velvet Ash is a thick stand of* ***False Indigo****, one of the few scattered examples of this shrub in the canyon; look for camouflaged male and female* ***Walkingstick*** *insects in the upper foliage during the late summer to fall in alternate years- males are brown, females green.*

Wright's Silktassel (*Garrya wrightii*)- An evergreen shrub up to 8' tall that grows primarily on dry rocky slopes in Interior Chaparral. 2" long leathery gray-green leaves are generally oval with a pointed tip. Inconspicuous greenish-white flowers bloom in silky clusters May to August, producing small, dry dark blue fruit eaten by wildlife. (Dogwood family)

False Indigo (*Amorpha fruticosa*)- A delicate looking deciduous shrub that grows in dense stands from 4 to 10 feet tall, usually where there is some moisture, like a stream bank. Long, compound lime-green leaves are "locust-like" with 11 to 15+ leaflets. Tiny dark violet-purple flowers with dark orange stamens have only one petal and bloom in long dense spike-like clusters at the ends of branches from May to June. (Pea family)

On the right side of the trail a partially buried granite bedrock boulder has a large fracture running through it- digging here is from Rock Squirrels sheltering back under the rock. In late summer and fall watch for big piles of ***Black Bear*** *scat full of juniper berry seeds along this section of trail. Other smaller omnivores, like Gray Fox and skunks, will leave smaller scat piles full of juniper seeds on the trail as well.*

Trail turns to the right and gradually climbs away from the creek. ***Smooth Bouvardia****, an important "hummingbird shrub" grows on the left side. Several species of* ***Cloak*** (Notholaena sp.)***, Lip*** (Myriopteris sp.) *and* ***Cliffbrake*** (Pellaea sp.) ***ferns****, as well as* ***Spike Moss*** (Selaginella sp.)*, grow around trail-side boulders on the right. Often dried-out and brown during dry seasons, these plants can rehydrate and green up rapidly following precipitation.*

Smooth Bouvardia (*Bouvardia ternifolia*)- A very common small shrubs in the mid-canyon, Smooth Bouvardia grows to about 3 feet tall, usually in partial shade. Lance-shaped, 1-3" long, bright green leaves are arranged in whorls along the stems. 1 ¼" long, bright orange-red tubular flowers with tiny flaring petals bloom in dense, erect clusters at the ends of stems May-September. Often found in dense stands, Smooth Bouvardia flowers prolifically and is one of the most important nectar sources for canyon hummingbirds through the summer. Foliage eaten by Falcon Sphinx Moth caterpillars.

The trail runs under a canopy of juniper, mesquite and oaks. Tall cane cholla grow in partial shade back in the mesquites; elongated stems often eventually fall over and branches grow into new stems. Then the woodland

*begins to open up with grass and stands of **Wait-a-minute Mimosa** growing between the scattered trees as the trail approaches the upper end of the "Loop Junction Meadow" described previously in Trail Section 3.*

Wait-a-minute Mimosa (*Mimosa aculeaticarpa var. biunicifera*)- Another common medium-sized shrub along the trail with curved thorns, primarily in pairs, that jut out on either side of the branches. Clusters of tiny petal-less flowers open into small puffballs of creamy-white stamens in late spring/monsoon and are very attractive to insects. Clothes and skin readily catch on thorns and cause hikers to "wait-a-minute" to get unstuck! Thickets on hillsides can make for very difficult, scratchy off-trail hiking. Often mistaken for **Catclaw Acacia**, from lower elevations and not found here, which also has curved thorns, but not in opposite pairs. (Pea family)

Rocks and downed log along trail are excellent critter homes. Woods along the trail here offer good birding- watch for mixed flocks, and deer often graze in the meadow in early morning or rest under surrounding trees.

*After crossing the upper end of the meadow, the trail re-enters the trees, descending slightly and roughly paralleling the meadow along the base of a rocky, wooded hillside. A line of rocks behind the "Clowery Bench" is the remains of an aqueduct built in the late 1800s to channel water to habitation and placer gold mining lower in the canyon. Turpentine Bush, Wolfberry and other small shrubs grow amongst the rocks. Look for the robust green rosettes of **Palmer's Agave** scattered on the hillside.*

Palmer's Agave (*Agave palmeri*)- Sometimes called century plants because they take so many years to bloom, agaves grow in a rosette of thick, succulent leaves armed with teeth along the edges and tipped with a stout terminal spine. Adult plants flower once after some 10-30 years, the bloom stalk growing 8 to 12" a day and reaching up to 15' tall. The adult plant dies after blooming, but often produces a number of offsets (clones genetically identical to the parent) from underground stems. Opening in summer, cylindrical yellow flowers with pinkish red petal tips produce copious nectar, an important food source for nectar feeding bats, but also attracting birds, insects and climbing mammals, like Ringtail, to pollinate the flowers. (Agave family)

This hillside area has rather lush, dense vegetation under dappled shade from the tree canopy. There can be copious wildflowers in the spring and summer monsoon. It is one of the more productive birding areas on the loop-

stop to look and listen! Clark's Spiny Lizard is often observed on tree trunks and rocks in warm weather, as are Sonoran Spotted Whiptail lizards along the trail. Sonoran Whipsnake hunt the trailside vegetation and are occasionally seen climbing trees. Large wolfberry on the right side of trail has older gray stems with new growth that is nearly white; look for ***Tobacco*** *and* ***Tomato "Hornworm" Sphinx moth caterpillars*** *on this plant in late summer. Several Fishhook Barrel Cactus grow in the woods on the meadow-side of the trail.*

Approaching the loop intersection, the hillside abruptly ends at a small side-drainage. There is an extensive, dense stand of Desert Honeysuckle along this drainage; stop at the wooden bench to watch for hummingbirds coming to flowers. Mixed flocks of birds often forage in the mesquites on the hillside behind. Large grape vines drape over a trailside mesquite here (*used to form a "hideout" shelter that kids could crawl into- unfortunately, the weight of the vines eventually collapsed the tree*), *look for caterpillars and other insects on grape foliage. Large, multi-stemmed woody shrub on right side is* ***Birch-leaf Cercocarpus****.*

Birch-leaf Cercocarpus (*Cercocarpus betuloides*)**-** Formerly known as birch-leaf mountain mahogany, this tall multi-stemmed shrub with small crinkly leaves growing opposite the "grape hideout" is the only specimen of its kind in this lower section of the canyon. It is very common on dry exposed slopes higher in the canyon in Interior Chaparral. Growing from about 8 to 20' tall with smooth gray bark, *Cercocarpus* wood is known for hardness and density. Inconspicuous, whitish petal-less flowers produced from May to November. The leaves provide good browse for deer. (Rose family)

At this point the trails meet again at the Loop Intersection. Proceed from the trail junction back down to the Proctor Loop trailhead at the parking area. Continue to observe closely for plants and animals not seen through this section on the walk up.

Other plants: Annual and perennial plants grow along the path here in season under the trees and shrubs. Spring wildflowers bloom with adequate rains: Blue Phacelia, Horehound (alien), Henbit, Silver Puff, Common Monkeyflower, Common Bedstraw. Arizona Sunflowerweed, Sweet Four O'clock, Mountain Wood Sorrel, Apache Plant, various Morning Glory vines and a variety of wild beans flourish during the summer "monsoon".

Dakota Verbena, Ribbon Four O'clock, Arizona Blue Eyes bloom spring through late summer.

Mammals: Coue's White-tailed Deer, Rock Squirrel and Arizona Gray Squirrel are common. Black Bear visit during fall acorn and juniper berry season. Mountain Lion, Bobcat, Gray Fox, Coati, Striped Skunk, Ringtail, Raccoon, Botta's and Southern pocket gophers and a variety of mice and bats present, but not regularly seen or are nocturnal.

Birds: *year-round*- Mexican Jay, Arizona Woodpecker, Cooper's Hawk, Wild Turkey, Bridled Titmouse, Painted Redstart, Lesser Goldfinch, Western Screech Owl; *spring*- Western Tanager, Townsend's Warbler, Wilson's Warbler, Pacific Slope Flycatcher; *summer*- Hepatic Tanager, Dusky-capped Flycatcher, Cordilleran Flycatcher, Elf Owl, Broad-billed Hummingbird, Black-chinned Hummingbird; *winter*- American Robin, Hermit Thrush, Dark-eyed Junco, Brown Creeper, Yellow-rumped Warbler

Amphibians & reptiles: Canyon Treefrog around upper bridge at stream. Clark's Spiny Lizard and Ornate Tree Lizard on rocks and tree trunks; Mountain Skink and Madrean Alligator Lizard in leaf litter among rocks, but rarely seen. Sonoran Whipsnake, Knobloch's (Arizona) Mountain Kingsnake, Black-tailed Rattlesnake and other small snakes present but not commonly seen.

Arthropods & insects: Spring-fall, particularly during/after summer rains, a variety of Spur-throated Grasshopper species, butterflies, bees, wasps and flies fly about or perch in vegetation/flowers. Carpenter Bees often buzzing around wooden trail benches. Pipevine and Two-tailed Swallowtail butterflies visit thistles and daisies spring-summer. Arizona Sunflowerweed and other yellow "daisy" composites attract many butterflies, bees and flies when blooming; look for small, colorful Jewel Beetles on the open flowers. Leaf and Tortoise beetles eat the leaves into a lattice work of holes. In late summer/early fall watch for caterpillars on the foliage of all the yellow daisy species, soapberry, grape, oaks and other plants.

6) ***Proctor Road Crossing to Morales Graves Trail Spur***

If you took the "sycamore trail spur detour" to the creek on the way up the trail, you may have missed this section. After crossing the dirt road, the trail enters a dense mesquite bosque; several large deciduous Netleaf Hackberry trees lining the left side of the trail here are excellent examples of the species- notice the gray "warty" bark and rough "sandpapery" leaves. A short blackened stump in the foliage marked with a plant sign immediately on the right side is the remains of a huge ***Blueberry Elder*** *tree that was burned to the ground in a 2008 wildfire; a sapling has been planted in its place.*

Blueberry Elder (*Sambucus glauca*)- Also called elderberry, this largest native elder species has compound leaves with toothed, lance-shaped leaflets. In spring fragrant, flat-topped clusters of delicate white flowers are borne on the end of branches and attract insects. Clusters of dark berries are relished by many species of birds; humans use them for food and medicine. Likely that the original tree here was an offspring of elders planted in the orchard of the Morales family. (Honeysuckle family)

The dense woodland and understory provides excellent habitat and cover for animals. Look for birds and bird nests in the trees; several old Verdin nests hang very near the trail in the branches. Watch for the characteristic dark

*colored arrow-shaped leaves of **Watson's Pipevine** sprawling close to the ground on the right side. Look closely, as the plants can be well-hidden under foliage or eaten almost to the ground by **Pipevine Swallowtail caterpillars**.*

Watson's Pipevine (*Aristolochia watsoni*)- A trailing/climbing vine growing to 3' from a small tuber, this plant is the only local representative of a tropical family with more than 400 species. Long, arrow-shaped leaves can be more than 1" long and are dark-green to maroon-brown with a wavy edge. Pipevine gets its common name from the strange tubular flowers said to resemble an old-fashioned, curved Dutchman's pipe. Pipevine contains a variety of powerful toxins and is the only larval food plant of the **Pipevine Swallowtail** butterfly. The caterpillars become poisonous after eating the leaves, storing the plant toxins in their tissues, but remaining immune themselves. With black or red bodies sprouting red tubercles, the larvae have conspicuous **warning coloration** that alerts potential predators to beware! The adult butterfly is also poisonous.

*Piles of rock along the right side of trail are remnants of old walls associated with the White House. There is a large packrat nest (actually **White-throated Woodrat**) in one of the wall remnants about 25 feet past the blueberry elder sign. Look for sticks piled on and amongst the rocks. These nests are often used for decades, each new generation adding to the pile of accumulating debris.*

*If time permits, allow the students to visit the **Morales Graves** (Refer to White House outline in Section 3 for details). Keep group together, under control and respectful of area while off-trail at grave site. Do not disturb site or remove offerings.*

From the Morales grave site spur, return to paved trail and walk back to the trail head at Proctor Parking Area to finish hike.

For a list of plants, mammals, birds, amphibians/retiles, and arthropods/ insects on this final trail section, please refer to Section 2 above.

Additional resources:

Conway, Richard, "The Rocks and Landscapes of Madera Canyon"; pamphlet published by Friends of Madera Canyon

Gibbeson, Louise & Gantt, Phil, editors, "History of Madera Canyon"; booklet published by Friends of Madera Canyon, 2012

Lewis, Joan W. G., "Madera Canyon Wildflowers in the Santa Rita Mountains of Southeastern Arizona"; Friends of Madera Canyon, 2008

Moore, Douglas W., "The Nature of Madera Canyon"; Friends of Madera Canyon, 1999

SEINet Arizona-New Mexico Chapter, botanical data portal, swbiodiversity.org/seinet

friendsofmaderacanyon.org