

The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

VOLUME 20 NUMBER 1

WINTER, 1996

THE VEGETATION OF THE QUEMADO

by John F. Wiens
3972 W. Mandarin Circle
Tucson, Az. 85741

AUTHOR'S NOTE - This vegetation and flora is the second in a series of my ongoing project to study and catalogue the plants of the watershed of the Avra Valley region west of Tucson, and the lower Santa Cruz River region to the north. Pan Quemado is neither a grand, picturesque range nor is it extremely rich in plant species. When asked "Why study and publish on such an area?" I could come up with many reasons, these being the most basic. Our undeveloped areas are diminishing at a rapid rate and we are becoming more conscious of our impact on our environment. Can we honestly say whether a site has changed if we have no baseline to start from? We cannot justify writing off a wild area as expendable when we don't even know what it holds. The information gathered in this type of study is proving to be educational for me in many ways. I hope it has something to offer all of you.

PAN QUEMADO consists of a group of low hills bordering the Avra Valley, 48 km (30 mi.) WNW of Tucson in Pima County. Lying just east of the Waterman Mountains, these hills blend in and are rather nondescript at a distance; yet up close they are abrupt and beautiful in their own way.

GEOLOGY: I was unable to find out any history or tidbits of lore on this site, not even how it obtained the Spanish name for burnt bread. It is interesting that Pan Quemado received its own name at all, as the hills nearly connect with the Watermans. Perhaps the difference in geology helped earn its distinction. The Waterman Mountains are predominantly Mesozoic and Paleozoic limestone, with some granite on the northwestern flanks and mudstone at the southeastern edge. Pan Quemado, however, is composed of the Tertiary volcanic, andesite (Wilson and O'Hair, 1960), linking it geologically to the Silver Bell Mountain region, 8 km (5 mi.) to the northwest. The Silver Bell Mountains themselves are remnants of a caldera of the Laramide orogeny and predate Pan Quemado. However, andesite and basalt hills on the east and north bajadas of the Silver Bells are likely of the same origin as the study area (Heindle, 1959). An interesting geologic feature found on certain bajadas at Pan Quemado are chalcedony roses, a type of quartz that was precipitated in the andesite and later weathered out.

(PAN QUEMADO - CONTINUED ON PAGE 5)

INSIDE: Annual Merit Award Winner...Page 3 -- Conservation Update...Page 4 -- Grant Awards... 4 -- In Brief...Page 4 -- Notes from President...Page 2

NOTES FROM THE PRESIDENT

How to maintain hope and heart in the midst of dismaying times -- this is the task that faces us. I've had a really hard time coming up with something uplifting and inspiring to say to you, my fellow Arizona native plant advocates. I'm a student of the American Civil War and this year I've felt a little like General Rosecrans after the disaster of Chickamauga, of whom Lincoln said, "He's like a duck staggering around the barnyard after it's been hit on the head, he just doesn't know what to do." The world's been turned upside down and the fox is in the hen house.

"It's war!" cried the headline of one environmental newsletter which recently arrived at my home. The Endangered Species Act is coming under great pressure and talk of fundamentally altering bedrock environmental legislation such as the Clean Water Act is rife. Without explicitly intending to do so, we in our collective identity as the American electorate have chosen a Congress which has a deep antipathy to the idea of environmental stewardship as a proper function of society and government.

Intellectually, I realize that we must continue the struggle to protect the environmental gains of the past 25 years, but the attack is so overwhelming, so pervasive and so multifaceted that I have to admit to feeling like Lincoln's duck these past few months. But as General Grant came to Chattanooga and organized eventual victory, I know that we will rally, we will fight back, we will preserve our natural heritage for future generations, because I really believe that most Americans want it so and because the

alternative is just too grim. As a society, the challenge for us is how best to apply our limited resources and strengths so as to be an effective force in working towards the protection and restoration of our native plants and their irreplaceable habitats.

At the present, bills pertaining to the reauthorization of the Endangered Species Act are working their way through the U.S. House and Senate. Both bills aim at eliminating current provisions which mandate the "recovery" of sensitive species by either conserving existing populations in place -- known as *in situ* conservation -- or by reintroduction into the wild of species increased *ex situ* such as in zoos, botanical gardens, etc.

For the framers of this proposed legislation, mere maintenance of germplasm *ex situ* is deemed adequate protection for sensitive species. In evolutionary terms, a species divorced from its natural ecosystem context and no longer regenerating itself naturally is virtually extinct in the absence of a successful reintroduction program.

What we all need to do now is to stay abreast of this evolving situation; write expressing our views to our Congresspersons and Senators -- even if we have little hope that they will change their present stands; and work to elect representatives for whom environmental concerns are central and vital, and not just seen as a roadblock to short-term, unsustainable economic activity.

Bill Feldman

EDITOR'S COMMENTS

The Plant Press is pleased once again to be publishing a flora by John Wiens. Wiens, a botanist at the Arizona-Sonora Desert Museum, makes an enormous personal contribution as he hikes about the mountains near Tucson, studying and recording the plant life (his "Vascular Plants of the Silver Bell Mountains" appeared in *The Plant Press*, Vol 15, No. 2). This time he explores Pan Quemado, which borders the Avra Valley, and shares his discoveries with us.

Personal action such as Wiens' is a concept that, no doubt, inspires many of our members - a theme that weaves through this issue. I'm borrowing the term from Julia Fonseca, who

talks about its value in conservation...how individuals can make a difference a little at a time through their everyday actions (see "Conservation Update"). President Bill Feldman also touches on the importance of personal action in the face of a mounting political attack on environmental ethics.

Action doesn't always have to be the noisy "call to arms." It can also be the small changes we try to effect - in our backyards, our neighborhoods and towns.

Balbir

A LONG-STANDING MEMBER OF ANPS RECEIVES ANNUAL MERIT AWARD

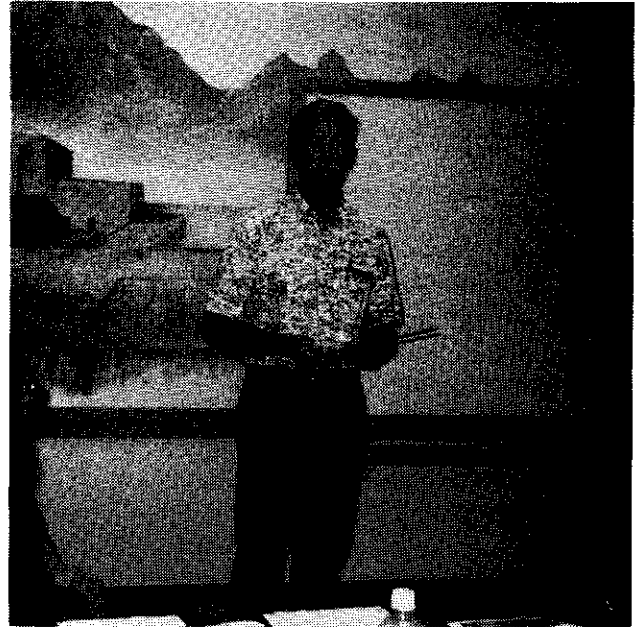
William A. Kinnison, professor of Biological Science at Central Arizona College, is this year's recipient of the Arizona Native Plant Society's Annual Merit Award. Kinnison received the award at the ANPS Board meeting held November 2, appropriately at the Central Arizona College (CAC) campus which served as the center for his many contributions. Many members of the South-central chapter attended to see one of its founders honored.

Kinnison received this award in both the landscaping and educational categories. In 1971, he was hired to landscape the grounds of the newly built CAC campus, located between Coolidge and Casa Grande. In his design, Kinnison pioneered the principles of "xeriscaping" through use of drought-tolerant trees and shrubs and by using designs which take advantage of natural runoff patterns. In addition, he developed three demonstration gardens to test the landscape potential of lesser known plants native to the Chihuahuan and Sonoran Deserts.

In 1980, Kinnison began to teach full-time at CAC. His courses included general biology as well as desert biology and flora and fauna. Over the years, he has also taught vegetable gardening and orchard techniques and has led many nature hikes for all ages. He is looked upon by hundreds of students as a tireless and patient teacher, one who appreciates the natural beauty of this state.

Kinnison also served on the Casa Grande City Planning and Zoning Commission from 1985 to 1991. He is a past president of ANPS.

In remarks made at the awards ceremony, Kinnison thanked Dr. Warren Jones, his graduate professor at the University of Arizona, for his "inspiration and direction" and also the South-Central Chapter.



Bill Kinnison addresses the ANPS Board of Directors and members of the South Central Chapter after receiving the 1995 Annual Merit Award.

NOW AVAILABLE

SONORAN DESERT PLANTS: AN ECOLOGICAL ATLAS

By Raymond M. Turner, Janice E. Bowers
and Tony L. Burgess

The University of Arizona Press

This 500-page atlas and encyclopedia emphasizes the taxonomy, ecology, and biogeography of 339 characteristic trees, shrubs, and cacti of the Sonoran Desert. With more than 400 maps, charts, and photos, this monumental work is intended primarily for scientists, but also is useful to a general audience as well. Each species has its own entry, which includes a map with an elevational profile and a narrative account. Also included is information on ethnobotanical, commercial, and horticultural uses of the plants.

Sonoran Desert Plants is available at some booksellers and can be ordered from the University of Arizona Press, 1230 North Park Avenue, Tucson, Arizona 85719, (520) 621-1441.

CONSERVATION UPDATE

A Conservation Tool Kit:
The Land and Water Conservation Fund

by Julia Fonseca, Conservation Editor

This issue, I begin a series on sources of conservation assistance. In Arizona, land acquisition is one of many strategies that one might use to prevent habitat destruction. One potential source of funding for such an effort is the Land and Water Conservation Fund (LWCF). The LWCF is funded by federal offshore oil and gas leases for private enterprise. Over the past 25 years, hundreds of millions of dollars have poured into the LCWF.

Some LCWF monies are reserved for national forests, refuges and parks, but cities, counties and local park districts are also eligible to obtain funds. The funds can be used for both acquisition of land and trail or park development projects.

For example, the Buenos Aires National Wildlife Refuge recently received LCWF monies to purchase Brown Canyon, a lush riparian area at the foot of the Baboquivari Mountains. A subsequent inventory of plants in this canyon revealed a new population of the rare Kearney's bluestar.

To find out more about the LWCF, write to the National Park Service, Division of Planning, 450 Golden Gate Avenue, Box 36063, San Francisco, CA 94102, or contact your local congressional office.

Personal action

The strongest conservation tool we have is personal initiative. For example, Marilyn Rosenblatt took on cleaning up a dump site in Tucson Mountain Park. She hauled off many pounds of trash and thousands of glass shards, bit by bit, to clean up the desert. At first, people thought she was crazy to attempt such a hopeless task. But then, neighbors began to pitch in. Now that the site is clean, Rosenblatt is working with the subdivision builder to replant the area with desert vegetation.

ANPS members Glenda and Robert Zahner have also become caretakers of the portion of Tucson Mountain Park that adjoins their lot. They lead plant identification and nature hikes for residents of their subdivision.

THREE GRANTS AWARDED BY PUBLICATION COMMITTEE

The Publication Committee of ANPS awarded three grants under the 1995 Publication Grants Program. The grant program is open to individuals, groups, or organizations (individual membership in ANPS is not required). Recipients and grant amounts were:

- 1) *Desert Plants*, to assist in defraying publication costs, \$1,000;
- 2) Native Seed/SEARCH, to assist in funding publication of *Traditional Foods*, \$800;
- 3) John Anderson, toward costs of publishing his paper, *Floristic Patterns of Late Tertiary Lacustrine Deposits in the Arizona-Sonoran Desert*, \$325.

IN BRIEF...

The 1995 ANPS Annual Meeting, held September 30 - October 1 in Safford, was a great success. Ninety or so members attended a variety of talks and field trips pertaining to the plant communities of the Upper Gila watershed. The Society would like to thank Julia Fonseca, Nancy and Larry Stallcup and other organizers for their efforts in making this weekend a very educational and enjoyable one.

An annual ANPS rite of a different sort has been the Chiricahua Workshop held during the Labor Day weekend. This has traditionally been a kind of retreat to learn some of our natural history and "hike around in the Chiricahuas and have a good time," as one former attendee put it. But attendance has been down the last couple of years, and at the November meeting of the Board of Directors there was discussion of how to stimulate more interest in this event.

Therefore, the Board would like input from *you*, our members, on any suggestions and ideas you may have to encourage greater involvement. Are costs of attending becoming prohibitive? Do we need an alternative site, date, etc.?

You can make your ideas known in a number of ways:

- through discussion at chapter meetings around the state,
- via letters to the editor,
- or by contacting a Board Member.

Proceedings of the Sky Island Conference, "Biodiversity and Management of the Madrean Archipelago," held September, 1994 in Tucson, are available from the Rocky Mountain Experimental Station, U.S. Forest Service, Fort Collins, CO, 80526. Ask for General Technical Report RM-GTR-264. This volume features papers by ANPS members Richard Felger, Matt Johnson, Steve McLaughlin, Janice Bowers and Mark Fishbein, among others.

ANNOUNCEMENT

Conference on the Effects of Fire on the Madrean Province Ecosystems

March 11-15, 1996, Tucson

For more information, contact:
Peter Ffolliott

School of Renewable Natural Resources
University of Arizona
Tucson, Arizona 85721
(520) 621-7276 - FAX (520) 621-8801

PAN QUEMADO - (CONTINUED FROM PAGE 1)

CLIMATE: Rainfall for Pan Quemado can be estimated by using rainfall records from the Silver Bell Mine (1953-1990), 11.3 km (7 mi.) to the northwest, and my former residence (1985-1992) 16.1 km (10 mi.) to the northeast, in the middle of Avra Valley. Silver Bell, sitting in the Silver Bell Mountains at 823 m (2700 ft.) elevation,

averaged 331 mm (12.9 in.) per year (Sellers and Hill, 1974; 1972-1990 data from ASARCO: Silver Bell Unit records), while the Avra Valley site, at 594 m (1950 ft.) averaged just 270 mm (10.5 in.) (Wiens, unpublished data). Based on its location, elevation and vegetation, Pan Quemado's precipitation probably averages not much more than 280 mm (11 in.) annually. Light frosts are probably common, but the healthy Saguaro population shows no signs of recent catastrophic freezes.

STUDY AREA: My study area includes the main ridge of hills and the half dozen isolated hills and associated bajadas to the west. I did not include the easternmost hills that abut the Avra Valley or the small hill to the northeast, next to the Gas Pumping Station (see map, page 15). The area of the study site is approximately 1450 ha (3580 a.), or 14.5 km² (5.6 mi²). Elevation ranges from 645 m (2120 ft.) on the eastern bajada of the main ridge, to 890 m (2925 ft.) at the summit of the main ridge.

The hills lie on a combination of BLM and state holdings, except for the privately held southwest corner. The Agua Dulce Ranch has a grazing lease to most of the study area and while cattle grazing is ubiquitous, it is rather light. No portions are fenced off from cattle, but cliffs and rough terrain keep some areas pristine. I have found one dammed wash created by ranchers but I have rarely seen water in it. Cattle must usually travel out of the hills to drink, probably contributing to the light grazing. Arizona Game and Fish has built a rain water catchment (guzzler) for wildlife and fenced it to exclude cattle. It has held water on the occasions that I have been there and is the nearest thing to permanent water in the hills. Other human-made constructs are a couple of dirt roads and a transmitter or relay tower on the southernmost peak of the main ridge.

To reach Pan Quemado take I-10 northwest from Tucson to Avra Valley Road. Drive west about 10 miles and cross Anway Road. At 5.8 miles past Anway Road (2.8 miles beyond Gas Pipeline Road), take a left turn on the dirt road marked with an "Agua Dulce Ranch" sign. Access from the east via Anway Road passes through private property and is discouraged. Hiking at the site can vary from easy strolls on the flats among the hills to

short, but steep forays to the peaks. The Silver Bell Peak 15 minute topographic map (Geological Survey, 1959) is useful for studying the topography but does not show the guzzler, tower or the smaller dirt roads; the map in this article does.

VEGETATION: The vegetation of Pan Quemado is the Saguaro-Palo Verde series of the Arizona Uplands subdivision of the Sonoran Desert (Brown, 1982). Foothill Palo Verde (*Cercidium microphyllum*), Triangleleaf Bursage (*Ambrosia deltoidea*), and Saguaro (*Carnegiea gigantea*) are the common species throughout the site. Profuse stands of Creosote Bush (*Larrea divaricata*) on silty flats bordering the hills are similar to ones you may find in the Lower Colorado River Valley subdivision of the Sonoran Desert (Brown, 1982). However, other elements of this biome are missing at Pan Quemado, so its classification remains Arizona Upland.

I was quite surprised as to the variety of micro- and macrohabitats provided by the monotypic substrate of andesite on such relatively low desert hills. The rock itself is somewhat coarse grained and fractures easily. It varies from being solid and blocky like rhyolite to being as crumbly as decomposed granite. Some of the hills have steep slopes of loose rock capped by sheer cliffs of bedrock. North-facing locations in these situations offer shady sites that stay moist for weeks after rain. Desert Globe Mallow (*Sphaeralcea ambigua*), Wild Buckwheat (*Eriogonum wrightii*), Desert Hackberry (*Celtis pallida*), and a variety of ferns thrive among the beds of Spike Moss (*Selaginella arizonica*) here. The lipferns (*Cheilanthes* spp.) and Wavy Cloakfern (*Notholaena sinuata*) are found only in this microhabitat. Southerly slopes are loosely held talus sprinkled with Saguaros and Teddybear Chollas (*Opuntia bigelovii*). Slender Grama (*Bouteloua repens*) is often abundant on these open, rocky slopes. Yellow Felt Plant (*Horsfordia newberryi*) is limited to these localities. Other hills have a gentler terrain, with a somewhat more uniform vegetation.

The bajadas and slopes are where I found amazing variability in the andesite soil. In places it is coarse and quick draining, while a few feet away it can be finely ground and limey with caliche, holding moisture and

offering a better substrate for ephemerals (annuals), particularly Woolly Daisy (*Eriophyllum lanosum*), Desert Star (*Monoptilon bellioides*), and Silverbells (*Streptanthus carinatus*). Cane Cholla (*Opuntia spinosior*), Desert-holly (*Acourtia nana*), White Bursage (*Ambrosia dumosa*), and Emory Globe Mallow (*Sphaeralcea emoryi*) are quite common at the bottom of Avra Valley, but are restricted in this study site to the deeper, silty soils to the south and northwest. The dammed wash is the only location for Prostrate Vervain (*Verbena bracteata*), Small Coast Germander (*Teucrium cubense*), and Sorrel Eriogonum (*Eriogonum polycladon*). Consistent with my findings on other desert hills in southern Arizona, chollas can often form dense populations. There are flat areas where Jumping Cholla (*Opuntia fulgida*) is locally dominant, while on some bajadas the density of Buckhorn Cholla (*Opuntia acanthocarpa* var. *major*) matches that of the bursage one to one.

The flora of 217 taxa may seem depauperate when compared to the 295 taxa of the nearby Silver Bell Mountains (Wiens, 1991), or around 600 taxa across the valley in the Tucson Mountains (Rondeau, 1991), but I have found it to be more diverse than other areas of similar size and topography in the region. In future articles I shall reveal how a multitude of factors - rainfall, substrate, topography, drainage, etc.- are involved in determining the richness of a given flora.

Pan Quemado's flora shows 27 taxa, mostly ephemerals and herbaceous perennials, not found next door in the Silver Bell Mountains. This, though, may relate to my lack of extensive field work on the lowest part of the bajadas of the Silver Bell Mountains which is analogous to this site. Pan Quemado's flora is strong in ephemerals (N = 93, 41.0%), especially those adapted to the winter/spring season (N = 78, 33.8%). I have come to expect this since around 50% of annual precipitation falls from October through March, and the low density of woody perennials means less competition for water and sunlight.

The extreme seasonal dryness can be seen when comparing the variety of herbaceous plants, perennials and ephemerals (N = 146, 67.3%) with the number of truly woody taxa

(N = 26, 12.0%). The herbaceous majority are truly masters of drought avoidance and dormancy - important strategies for coping with locally dry conditions.

Exotics (non-native plants) are remarkably few in variety (only 3.3% of the total flora) and six of the seven are winter/spring ephemerals. Lehman Lovegrass (*Eragrostis lehmanniana*), the only perennial exotic here, occurs in spots along the road going up to the tower. London Rocket (*Sisymbrium irio*), Cheeseweed (*Malva parviflora*), and Prickly Lettuce (*Lactuca seriola*) are widely scattered and never plentiful.

The low diversity of exotics is offset by the abundance of the other three annual species. Red Brome (*Bromus rubens*) festoons the shadier portions of the hills and bajadas while Mediterranean Grass (*Schismus barbatus*) carpets the open areas of the valley floor. Filaree (*Erodium cicutarium*) is abundant throughout the site. The percentage of exotics are higher in the Silver Bell Mountains, 6.9% (Wiens, 1991), at Picacho Peak, 8.1% (Wiens, et al., unpublished), and the Tucson Mountains, 13.9% (Rondeau, 1991), probably due to slightly higher rainfall, and the proximity of humans with their persistent disturbances. White Canyon, a somewhat disturbed, desert-lined riparian area showed 8.6% exotics in a provisional flora (Miller, et al., 1990).

I found no rare or endangered plant species at Pan Quemado. I will relate what I feel are a couple of anomalies, considering the relative aridity and small size of the range. Although uncommon, Pancake Prickly-pear (*Opuntia chlorotica*) can be found scattered on shady slopes and on the cliffs. In the desert, it would be much more likely to find this typically grassland species on higher peaks in massive ranges such as the Tucson Mountains (Rondeau, 1991), the Silver Bell Mountains (Wiens, 1991), the Picacho Mountains (Wiens, unpublished), and Ragged Top (Van Devender and Wiens, 1993).

Another species of interest here is Lac Bush (*Coursettia glandulosa*). This large shrub is common, again in larger desert ranges in rather large canyons and drainages that can concentrate moisture. It is locally abundant in one west-facing drainage of modest size on

the main ridge on Pan Quemado. One must travel almost 16 km (10 mi.) NW to Ragged Top (Van Devender and Wiens, 1993), or 67 km (42 mi.) ESE to the Tucson Mountains (Rondeau, 1991) to find other populations. To have this relatively mesic species at this xeric site is indeed odd. *Nissolia schotti*, a semitropical vine that prefers large canyons and shady slopes around Tucson, is represented at Pan Quemado by a few plants in one small north-facing canyon. Finally, a single specimen of a cholla was found on a slope thick with *Opuntia acanthocarpa* and *O. leptocaulis* (Desert Christmas Cholla). The plant, *Opuntia x tetracantha*, is a natural hybrid showing characteristics of both species.

I never consider a flora complete and comprehensive, and I'm sure there are species I have missed. The list may be weak in summer ephemerals, due to both the locally dry summers during my study and my lack of resolve to visit the site during that season. Any information on additional plants found here by readers would be appreciated. I will publish updates as called for. The only plant species vouchered from this site, *Coursettia glandulosa*, *Teucrium cubense* ssp. *deprosum*, and *Verbena bracteata*, were deposited at the Arizona-Sonora Desert Museum Herbarium.

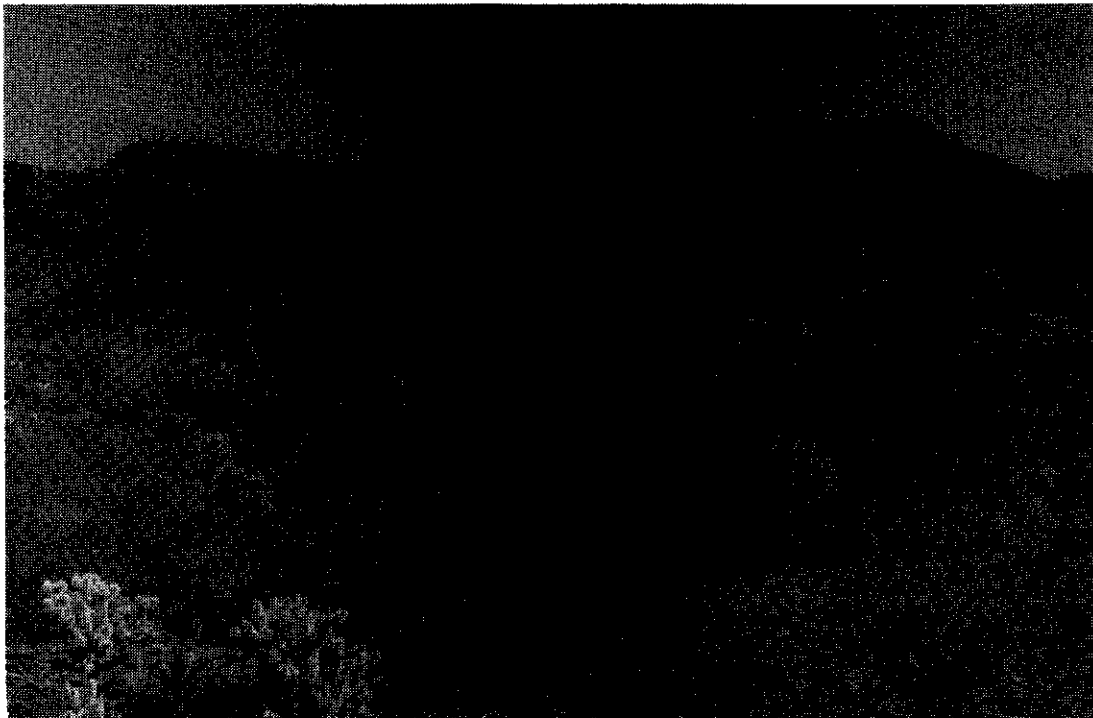
For ease of comparison, I have followed a similar format to the flora of the Silver Bell Mountains. Plant nomenclature follows Lehr (1978) and its supplements (Lehr and Pinkava, 1980, 1982) and Moran, 1994. Exceptions are footnoted. The sequence of taxa in the following list is alphabetical by family, genus, and epithet.

Acknowledgements: My appreciation to Phil Jenkins for help in plant identification and Joe Abendroth for site information and access. Thank you to Dr. Donald Pinkava for many helpful suggestions in editing the manuscript. Many thanks go to Tom Van Devender, whose help and encouragement know no bounds.

John Wiens is a botanist at the Arizona-Sonora Desert Museum since 1985. He is a member of ANPS and enjoys hiking and compiling lists of plants from the mountains around his home.

REFERENCES

- Brown, D. E. ed. 1982. Biotic Communities of the American Southwest - United States and Mexico, *Desert Plants* 4, nos. 1-4.
- Geological Survey, ed. 1959. Silver Bell Peak, Arizona, N3215 - W11115/1115, AMS 3748 IV - Series V798, USGS & USC&GS, Denver, Co., 80225.
- Heindle, L. A. ed. 1959. *Southern Arizona Guidebook II*, Arizona Geological Society.
- Lehr, H.J. 1978. *A Catalogue of the Flora of Arizona*, Desert Botanical Gardens, Phoenix, Ariz.
- and D. J. Pinkava 1980. A Catalogue of the Flora of Arizona Supplement I, *Journal of the Arizona-Nevada Academy of Science* 15:17-32.
- . 1982. A Catalogue of the Flora of Arizona Supplement II, *Journal of the Arizona-Nevada Academy of Science* 17:19-26.
- Miller, H. P., W. R. Feldman, and K. Newland. 1990. Provisional Plant List of White Canyon, *The Plant Press* 14:7-8.
- Moran, R. 1994. Crassulaceae. In: C. T. Mason, L. R. Landrum, D. J. Pinkava, J. R. Reeder, and R. K. Van Devender (eds.), A New Flora for Arizona in Preparation, *Journal of the Arizona-Nevada Academy of Science* 27(2).
- Rondeau, R. J. 1991. *Flora and Vegetation of the Tucson Mountains*, Pima County, Arizona, M. S. Thesis, University of Arizona, Tucson.
- Sellers, W. D., and R. H. Hill. 1974. *Arizona Climate 1931-1972*, University of Arizona Press, Tucson.
- Van Devender, T. R., and J. F. Wiens. 1993. Holocene Changes in the Flora of Ragged Top, South-Central Arizona, *Madroño* 40:246-264.
- Wiens, J. F. 1991. Provisional Flora of the Silver Bell Mountains, *The Plant Press* 15:1, 6-10.
- Wilson, E. D., and R. T. O'Haire. 1960. Geologic Map of Pima and Santa Cruz Counties, Arizona Bureau of Mines, University of Arizona, Tucson.



This slope area of the Pan Quemado is dominated by familiar desert plants - Saguaro, Cholla, & Palo Verde. Photo by John Wiens.

THE FLORA OF PAN QUEMADO

Compiled by John F. Wiens, 1989-1995

PLANT LIST KEY

Abundance

1 - 5 = rarely seen to quite common form

Tree = single or multiple trunked tree

WdSh = woody shrub

Sbsh = subshrub (suffrutescent or nonwoody shrub)

Succ = rosette or stem succulent

PHrb = perennial herb or grass

PVin = herbaceous or woody perennial vine

AHrb = Annual or ephemeral herb or grass

AVin = Annual or ephemeral vine

* = exotic species

ACANTHACEAE

- 3 *Carlownrightia arizonica*
- 1 *Ruellia nudiflora*
- 2 *Siphonoglossa longiflora*

ACANTHUS FAMILY

- SbSh
- Phrb Longneck Ruel
- SbSh

ADIANTACEAE

- 2 *Cheilanthes lindheimeri*
- 2 *Cheilanthes wootonii*
- 1 *Cheilanthes wrightii*
- 2 *Notholaena cochisensis*
- 1 *Notholaena sinuata*
- 3 *Notholaena standleyi*
- 2 *Pellaea truncata*

FERN FAMILY

- Phrb Lindheimer Lipfern
- Phrb Beaded Lipfern
- Phrb Wright Lipfern
- Phrb Helechillo
- Phrb Wavy Cloakfern
- Phrb Standleyi Cloakfern
- Phrb Cliff Brake

AMARANTHACEAE

- 3 *Amaranthus fimbriatus*
- 1 *Amaranthus palmeri*
- 3 *Tidestromia lanuginosa*

AMARANTH FAMILY

- Ahrb Fringed Amaranth
- Ahrb Careless Weed
- Ahrb Woolly Tidestromia

APOCYNACEAE

- 2 *Haplophyton crooksii*

DOGBANE FAMILY

- SbSh Cockroach Plant

ASCLEPIADACEAE

- 1 *Matelea producta*

MILKWEED FAMILY

- Pvin Milkweed Vine

BORAGINACEAE

- 4 *Amsinckia intermedia*
- 4 *Amsinckia tessellata*
- 3 *Cryptantha barbiger*
- 2 *Cryptantha maritima*
- 2 *Cryptantha micrantha*
- 3 *Cryptantha nevadensis*
- 4 *Cryptantha pterocarya*
- 2 *Harpegonella palmeri*
- 2 *Lappula redowskii*
- 2 *Pectocarya platycarpa*
- 5 *Pectocarya recurvata*
- 4 *Plagiobothrys arizonica*

BORAGE FAMILY

- Ahrb Coast Fiddleneck
- Ahrb Checkered Fiddleneck
- Ahrb Bearded Nievitas
- Ahrb White-haired Nievitas
- Ahrb Purpleroot Nievitas
- Ahrb Nevada Cryptantha
- Ahrb Wingnut Nievitas
- Ahrb Stickseed
- Ahrb Broad-nutted Combbur
- Ahrb Archnut Combbur
- Ahrb Blood Weed

2 <i>Plagiobothrys pringlei</i>	Ahrb	Popcorn Flower
CACTACEAE	CACTUS FAMILY	
4 <i>Carnegiea gigantea</i>	Succ	Saguaro
2 <i>Echinocereus engelmannii</i> var. <i>ascicularis</i>	Succ	Strawberry Hedgehog
2 <i>Echinocereus fendleri</i> var. <i>fasciculatus</i> 1	Succ	Robust Hedgehog
3 <i>Ferocactus cylindraceus</i> ²	Succ	Spiny Barrel
3 <i>Ferocactus wislizeni</i>	Succ	Fishhook Barrel
3 <i>Mammillaria grahamii</i> var. <i>microcarpa</i>	Succ	Fishhook Pincushion
3 <i>Opuntia acanthocarpa</i> var. <i>major</i>	Succ	Buckhorn Cholla
3 <i>Opuntia bigelovii</i>	Succ	Teddybear Cholla
1 <i>Opuntia chlorotica</i>	Succ	Pancake Prickly-pear
4 <i>Opuntia fulgida</i> var. <i>fulgida</i>	Succ	Jumping Cholla
2 <i>Opuntia leptocaulis</i>	Succ	Desert Christmas Cholla
1 <i>Opuntia</i> x <i>tetracantha</i>	Succ	hybrid cholla
3 <i>Opuntia phaeacantha</i> var. <i>discata</i>	Succ	Engelmann's Prickly-pear
2 <i>Opuntia phaeacantha</i> var. <i>major</i>	Succ	Sprawling Prickly-pear
1 <i>Opuntia spinosior</i>	Succ	Cane Cholla
CAMPANULACEAE	BELLFLOWER FAMILY	
3 <i>Nemacladus glanduliferus</i>	Ahrb	Thread Plant
CARYOPHYLLACEAE	PINK FAMILY	
4 <i>Silene antirrhina</i>	Ahrb	Sleepy Catchfly
CHENOPODIACEAE	GOOSEFOOT FAMILY	
1 <i>Atriplex canescens</i>	WdSh	Fourwing Saltbush
2 <i>Chenopodium neomexicanum</i>	Ahrb	Fishy Goosefoot
COMPOSITAE	SUNFLOWER FAMILY	
1 <i>Acourtia nana</i>	Phrb	Desert-holly
2 <i>Acourtia wrightii</i>	Phrb	Brownfoot
3 <i>Ambrosia ambrosioides</i>	WdSh	Canyon Ragweed
2 <i>Ambrosia confertiflora</i>	Phrb	Slimleaf Bursage
5 <i>Ambrosia deltoidea</i>	WdSh	Triangleleaf Bursage
1 <i>Ambrosia dumosa</i>	WdSh	White Bursage
1 <i>Baccharis sarothroides</i>	WdSh	Desert-broom
1 <i>Baileya multiradiata</i>	Phrb	Desert-marigold
1 <i>Bebbia juncea</i>	SbSh	Sweetbush
3 <i>Brickellia coulteri</i>	SbSh	Brickellbush
2 <i>Calycoseris wrightii</i>	Ahrb	Tackstem
2 <i>Chaenactis</i> sp.	Ahrb	Pincushion Flower
1 <i>Conyza coulter</i>	AHrb	
3 <i>Encelia farinosa</i>	WdSh	Brittle Bush
2 <i>Erigeron divergens</i>	Phrb	Spreading Fleabane
2 <i>Eriophyllum lanosum</i>	Ahrb	Woolly Daisy
3 <i>Filago californica</i>	Ahrb	California Filago
1 <i>Gaillardia arizonica</i>	Ahrb	Arizona Blanketflower
2 <i>Gutierrezia microcephala</i>	SbSh	Three Leaf Snakeweed
1 <i>Gymnosperma glutinosa</i>	SbSh	Tatalencho

1 <i>Heterotheca psamophila</i>	Ahrb	Camphor Weed
2 <i>Isocoma tenuisecta</i>	SbSh	Burro Weed
*2 <i>Lactuca serriola</i>	Ahrb	Prickly Lettuce
1 <i>Machaeranthera pinnatifida</i>	SbSh	Spiny Haplopappus
3 <i>Microseris linearifolia</i>	Ahrb	Silver Puffs
2 <i>Monoptilon bellioides</i>	Ahrb	Desert Star
1 <i>Pectis papposa</i>	Ahrb	Chinchweed
2 <i>Perityle emoryi</i>	Ahrb	Rock Daisy
3 <i>Porophyllum gracile</i>	Phrb	Odora
2 <i>Psilostrophe cooperi</i>	SbSh	Paper Flower
2 <i>Rafinesquia neomexicana</i>	Ahrb	Desert-chickory
2 <i>Senecio lemmonii</i>	Phrb	Groundsel
3 <i>Stephanomeria pauciflora</i>	SbSh	Desert Straw
3 <i>Stylocline micropoides</i>	Ahrb	Desert Nest Straw
3 <i>Trixis californica</i>	SbSh	Pichaga
3 <i>Zinnia acerosa</i>	SbSh	Desert Zinnia

CONVOLVULACEAE

2 *Evolvulus alsinoides*

CRASSULACEAE

4 *Crassula connata*

CRUCIFERAE

1 *Arabis perennans*
 4 *Caulanthus lasiophyllus*
 3 *Descurainia pinnata*
 3 *Draba cuneifolia*
 4 *Lepidium lasiocarpum*
 2 *Lesquerella gordonii*
 *2 *Sisymbrium irio*
 1 *Streptanthus carinatus*
 3 *Thysanocapus curvipes*

EPHEDRACEAE

2 *Ephedra nevadensis*
 1 *Ephedra trifurca*

EUPHORBIACEAE

2 *Chamaesyce arizonica*³
 3 *Chamaesyce capitellata*³
 1 *Chamaesyce florida*³
 3 *Chamaesyce melanadenia*³
 2 *Chamaesyce polycarpa*³
 3 *Ditaxis lanceolata*⁴
 1 *Ditaxis neomexicana*⁴
 2 *Jatropha cardiophylla*

FOUQUIERIACEAE

3 *Fouquieria splendens*

GERANIACEAE

*5 *Erodium cicutarium*
 3 *Erodium texanum*

GRAMINEAE

3 *Aristida adscensionis*

MORNING GLORY FAMILY

Phrb

Arizona Blue Eyes

STONECROP FAMILY

Ahrb

Pigmy Weed

MUSTARD FAMILY

Phrb

Rock Cress

AHrb

Ahrb

Ahrb

Ahrb

Ahrb

Ahrb

Ahrb

Ahrb

Tansy Mustard
 Whitlow Grass
 Peppergrass
 Yellow Bladderpod
 London Rocket
 Silverbells
 Lacepod Mustard

JOINTFIR FAMILY

WdSh

Mormon Tea

WdSh

Longleaf Jointfir

SPURGE FAMILY

Ahrb

Phrb

Ahrb

Phrb

Phrb

SbSh

PHrb

SbSh

spurge
 spurge
 spurge
 spurge
 Smallseed Sand Mat
 Lanceleaf Ditaxis

Limber Bush

OCOTILLO FAMILY

WdSh

Ocotillo

GERANIUM FAMILY

Ahrb

Filaree

Ahrb

Largeflower Stork's Bill

GRASS FAMILY

Ahrb

Sixweeks Threeawn

1 <i>Aristida parishii</i>	Phrb	Threeawn
3 <i>Aristida purpurea</i> var. <i>nealleyi</i> ⁵	Phrb	Reverchon Threeawn
2 <i>Aristida ternipes</i>	Phrb	Spider Grass
2 <i>Brachiaria arizonica</i> ⁶	Ahrb	Arizona Panicgrass
2 <i>Bouteloua curtipendula</i>	Phrb	Sideoats Grama
3 <i>Bouteloua repens</i>	Phrb	Slender Grama
*4 <i>Bromus rubens</i>	Ahrb	Foxtail Chess, Red Brome
2 <i>Chloris virgata</i>	Ahrb	Feathery Fingergrass
2 <i>Digitaria californica</i>	Phrb	Arizona Cottontop
1 <i>Enneapogon desvauxii</i>	Phrb	Spike Pappusgrass
*1 <i>Eragrostis lehmanniana</i>	Phrb	Lehman Lovegrass
3 <i>Erioneuron pulchellum</i>	Phrb	Fluff Grass
3 <i>Heteropogon contortus</i>	Phrb	Tanglehead
1 <i>Hilaria belangeri</i>	Phrb	Curly Mesquite
2 <i>Leptochloa mucronata</i> ⁷	Ahrb	Red Sprangletop
2 <i>Muhlenbergia microsperma</i>	Ahrb	Littleseed Muhly
3 <i>Muhlenbergia porteri</i>	Phrb	Bush Muhly
1 <i>Pappophorum mucronulatum</i> ⁸	Phrb	Pappusgrass
1 <i>Poa bigelovii</i>	Ahrb	Bigelow's Bluegrass
*5 <i>Schismus barbatus</i>	Ahrb	Mediterranean Grass
2 <i>Setaria leucopila</i>	Phrb	Bristlegrass
2 <i>Tridens muticus</i>	Phrb	Slim Tridens
4 <i>Vulpia octoflora</i>	Ahrb	Sixweeks Fescue

HYDROPHYLLACEAE

3 <i>Eucrypta chrysanthemifolia</i>	Ahrb	Torrey Eucrypta
1 <i>Eucrypta micrantha</i>	Ahrb	Smallflower Eucrypta
1 <i>Phacelia crenulata</i>	Ahrb	Caterpillar Weed
3 <i>Phacelia distans</i>	Ahrb	Wild Heliotrope
2 <i>Pholistoma auritum</i>	Ahrb	Lilja

WATERLEAF FAMILY

KRAMERIACEAE

1 <i>Krameria erecta</i> ⁹	WdSh	Range Ratany
2 <i>Krameria grayi</i>	WdSh	White Ratany

RATANY FAMILY

LABIATAE

2 <i>Hyptis emoryi</i>	WdSh	Desert Lavender
2 <i>Salvia columbariae</i>	Ahrb	Chia
1 <i>Teucrium cubense</i> ssp. <i>depressum</i>	Ahrb	Small Coast Germander

MINT FAMILY

LEGUMINOSAE

3 <i>Acacia constricta</i>	WdSh	Whitethorn Acacia
2 <i>Acacia greggii</i>	WdSh	Catclaw Acacia
3 <i>Astragalus didymocarpus</i>	Ahrb	locoweed
3 <i>Astragalus nuttallianus</i>	Ahrb	locoweed
2 <i>Calliandra eriophylla</i>	SbSh	Fairy Duster
5 <i>Cercidium microphyllum</i>	Tree	Foothill PaloVerde
1 <i>Coursettia glandulosa</i>	WdSh	Lac Bush
4 <i>Lotus humistratus</i>	Ahrb	Hill Locust
4 <i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	Ahrb	Deer Vetch
3 <i>Lotus strigosus</i> var. <i>tomentellus</i>	Ahrb	Hairy Deer Vetch
5 <i>Lupinus sparsiflorus</i>	Ahrb	Arizona Lupine
1 <i>Marina parryi</i>	Phrb	Parry Dalea

PEA FAMILY

1 <i>Nissolia schottii</i>	PVin	
2 <i>Prosopis velutina</i>	Tree	Velvet Mesquite
2 <i>Senna covesii</i>	SbSh	Desert Senna
1 <i>Vicia ludoviciana</i>	Ahrb	vetch
LILIACEAE	LILY FAMILY	
2 <i>Calochortus kennedyi</i>	Phrb	Desert Mariposa Lily
3 <i>Dichelostemma pulchellum</i>	Phrb	Bluedick
MALPIGHIACEAE	MALPIGHIA FAMILY	
2 <i>Janusia gracilis</i>	Pvin	Desert Vine
MALVACEAE	MALLOW FAMILY	
3 <i>Abutilon incanum</i>	SbSh	Indian Mallow
1 <i>Abutilon malacum</i>	SbSh	Indian Mallow
3 <i>Herissantia crispa</i>	Phrb	Pelotazo
3 <i>Hibiscus coulteri</i>	SbSh	Coulter Hibiscus
2 <i>Horsfordia newberryi</i>	WdSh	Yellow Felt Plant
*1 <i>Malva parviflora</i>	Ahrb	Cheeseweed
3 <i>Sphaeralcea ambigua</i>	SbSh	Desert Globe Mallow
1 <i>Sphaeralcea coulteri</i>	Ahrb	Coulter Globe Mallow
1 <i>Sphaeralcea emoryi</i>	SbSh	Emory Globe Mallow
NYCTAGINACEAE	FOUR O'CLOCK FAMILY	
2 <i>Allionia incarnata</i>	Phrb	Trailing Four O'clock
2 <i>Boerhaavia erecta</i> var. <i>intermedia</i>	Ahrb	Fivewing Ring Stem
2 <i>Commicarpus scandens</i>	SbSh	Bush Spiderling
2 <i>Mirabilis bigelovii</i>	Phrb	Wishbone Bush
OLEACEAE	OLIVE FAMILY	
2 <i>Menodora scabra</i>	SbSh	Twinberry
ONAGRACEAE	EVENING PRIMROSE FAMILY	
2 <i>Camissonia californica</i>	Ahrb	Mustard Evening Primrose
3 <i>Oenothera primiveris</i>	Ahrb	Yellow Desert Primrose
OROBANCHACEAE	BROOM RAPE FAMILY	
1 <i>Orobanche cooperi</i>	Phrb	Broom Rape
PAPAVERACEAE	POPPY FAMILY	
1 <i>Argemone gracilentia</i>	Phrb	Crested Prickly Poppy
3 <i>Eschscholzia mexicana</i> ¹⁰	Ahrb	Mexican Gold Poppy
PLANTAGINACEAE	PLANTAIN FAMILY	
5 <i>Plantago fastigiata</i> ¹¹	Ahrb	Indian Wheat
4 <i>Plantago patagonica</i>	Ahrb	Pursh Plantain
POLEMONIACEAE	PHLOX FAMILY	
3 <i>Eriastrum diffusum</i>	Ahrb	Miniature Wool Star
3 <i>Gilia flavocincta</i> ssp. <i>australis</i>	Ahrb	gilia
2 <i>Gilia stellata</i>	Ahrb	gilia
4 <i>Linanthus bigelovii</i>	AHrb	
POLYGALACEAE	MILKWORT FAMILY	
1 <i>Polygala macradenia</i>	SbSh	milkwort

POLYGONACEAE

- 4 *Chorizanthe brevicornu*
- 3 *Chorizanthe rigida*
- 2 *Eriogonum abertianum*
- 3 *Eriogonum deflexum*
- 3 *Eriogonum inflatum*
- 3 *Eriogonum wrightii*
- 1 *Eriogonum polycladon*

PRIMULACEAE

- 4 *Androsace occidentalis*

RANUNCULACEAE

- 2 *Anemone tuberosa*
- 3 *Delphinium scaposum*
- 2 *Myosurus cupulatus*

RHAMNACEAE

- 1 *Ziziphus obtusifolia*

RUBIACEAE

- 1 *Galium proliferum*
- 2 *Galium stellatum*

SCROPHULARIACEAE

- 1 *Linaria texana*
- 1 *Orthocarpus purpurascens*
- 2 *Penstemon parryi*

SELAGINELLACEAE

- 3 *Selaginella arizonica*

SOLANACEAE

- 1 *Datura discolor*
- 2 *Lycium andersonii*
- 4 *Lycium berlandieri*
- 2 *Nicotiana trigonophylla*
- 1 *Physalis lobata*

STERCULIACEA

- 2 *Ayenia compacta*

ULMACEAE

- 3 *Celtis pallida*

UMBELLIFERAE

- 4 *Bowlesia incana*
- 2 *Daucus pusillus*

URTICACEAE

- 4 *Parietaria hespera*
var. *hespera*

VERBENACEAE

- 3 *Aloysia wrightii*

BUCKWHEAT FAMILY

- Ahrb
- Ahrb
- Ahrb
- Ahrb
- Phrb
- SbSh
- Phrb

- Brittle Spineflower
- Rigid Spineflower
- Wild Buckwheat
- Skeleton Weed
- Desert Trumpet
- Wild Buckwheat
- Sorrel Eriogonum

PRIMROSE FAMILY

- Ahrb

- Rock Jasmine

CROWFOOT FAMILY

- Phrb
- Phrb
- Ahrb

- Wind Flower
- Barestem Larkspur
- Mousetail

BUCKTHORN FAMILY

- WdSh

- Graythorn

MADDER FAMILY

- WdSh
- Ahrb

- Desert Bedstraw
- Great Basin Bedstraw

FIGWORT FAMILY

- Ahrb
- Ahrb
- Phrb

- Texas Toad Flax
- Owl Clover
- Parry Beardtongue

SELAGINELLA FAMILY

- Phrb

- Spike Moss

NIGHTSHADE FAMILY

- Ahrb
- WdSh
- WdSh
- Phrb
- Phrb

- Desert Thornapple
- Anderson Thornbush
- wolfberry
- Desert Tobacco
- Purple Ground Cherry

CACAO FAMILY

- SbSh

- Desert Ayenia

ELM FAMILY

- WdSh

- Desert Hackberry

PARSLEY FAMILY

- Ahrb
- Ahrb

- Hairy Bowlesia
- Wild Carrot

NETTLE FAMILY

- Ahrb

- Pellitory

VERVAIN FAMILY

- WdSh

- Oreganiillo

1 *Verbena bracteata*

Phrb

Prostrate Vervain

VISCACEAE

MISTLETOE FAMILY

1 *Phoradendron californicum*

SbSh

Desert Mistletoe

ZYGOPHYLLACEAE

CALTROP FAMILY

5 *Larrea divaricata*
ssp. tridentata

WdSh

Creosote Bush

Footnotes:

¹*Echinocereus fasciculatus* (Engelm.) L. Benson

²*Ferocactus acanthodes* (Lemaire) B. & R.

³*Euphorbia* L. spp.

⁴*Argythamnia* P. Browne spp.

⁵*Aristida purpurea* var. *glauca* (Nees) Walp.

⁶*Panicum arizonicum* Scribn. & Merr.

⁷*Leptochloa filiformis* (Lam.) Beauv. var. *pulchella* (Scribn.) Beetle

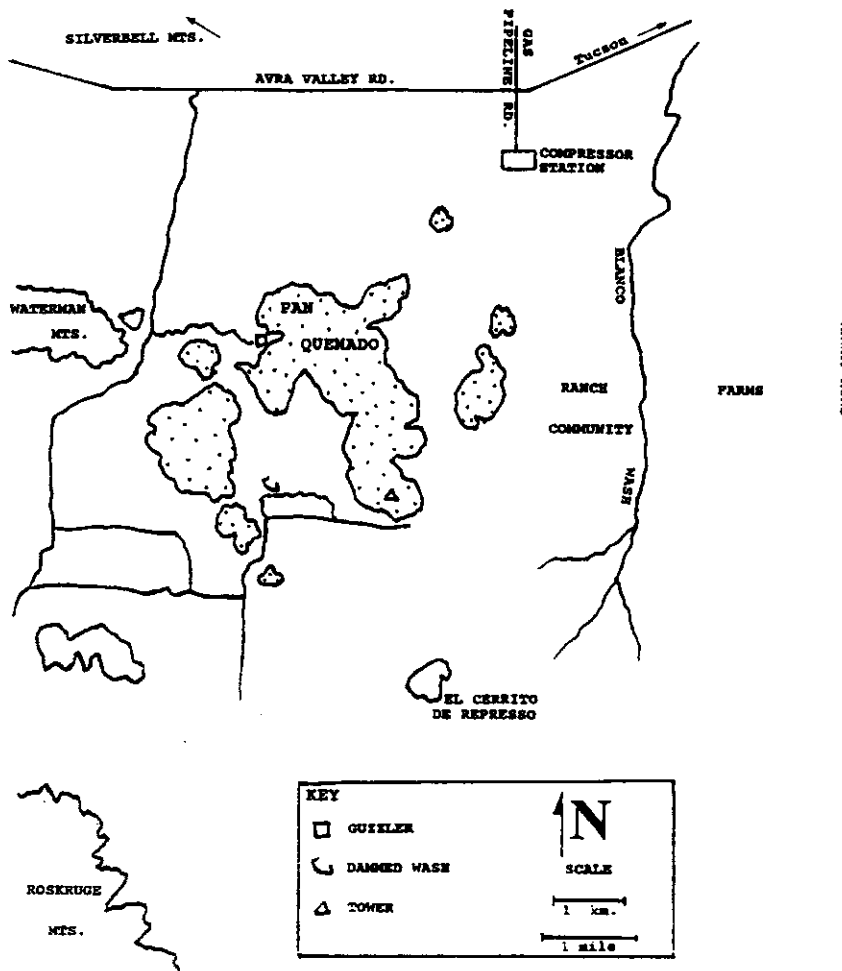
⁸*Pappophorum vaginatum* Buckl.

⁹*Krameria parvifolia* Benth.

¹⁰*Eschscholtzia californica* Cham. ssp. *mexicana* (Greene) C. Clark

¹¹*Plantago insularis* Eastw.

MAP SHOWING PAN QUEMADO AND KEY FEATURES



ARIZONA NATIVE PLANT SOCIETY BOARD OF DIRECTORS

OFFICERS

President, William R. Feldman, Ph.D.
Boyce Thompson Southwest Arboretum
37615 E. Hwy. 60, Superior 85273-5100 689-2723

Vice-President, Nancy Stallcup
6469 Calle de la Ceraza, Hereford 85615 378-1169

Treasurer, Horace Miller
6010 N. Canyon Dr., Tucson 85704 297-4633

Recording Secretary, Sue Rutman
P.O. Box 26, Ajo 85321 387-6281

Corresponding Secretary, Vacant

Newsletter Editor, Balbir Backhaus
3716 Rocky Slope Drive, Phoenix 85044 706-6449

EX-OFFICIO

Jim McGinnis
Arizona Native Plant Law Manager
1688 W. Adams, Phoenix 85007 542-3292

Irving Vincent
Statutory Agent
P.O. Box 651, Florence 85232

CHAPTER PRESIDENTS

Flagstaff: H. David Hammond
4025 Lake Mary Rd., Apt 33, Flagstaff 86001 282-4484

Phoenix: Kent Newland
27218 N. 46th St., Cave Creek 85331 585-3630

Prescott: Inactive

South Central: Jean England
9985 W. Woodruff Road, Casa Grande 85222 836-8792

Tucson: Marcia Tiede
1025 E. Hampton St., Tucson 85719 791-7963

Yuma: Pat Callahan
Rt. 1, Box 28M, Somerton 85350 627-2773

OTHER BOARD MEMBERS

Pamela Davis
11440 E. Prospect Lane, Tucson 85749 749-2581

Jane Evans
2945 N. Fontana, Tucson 85705 628-8773

Mima Falk
528 E. 8th St., Tucson 85705 624-1599

Julia Fonseca
315 E. Elm, Tucson 85705 792-2690

Wayne Hite
1211 University Heights Dr. N., Flagstaff 774-3215

Dan James
14854 W. Belmont, Casa Grande 85222 421-1652

Jack Kaiser
P.O. Box 1602, Nogales 85628 287-3374

Steven McLaughlin, Ph.D.
3949 E. Paseo Dorado, Tucson 85711 325-3839

Meg Quinn
524 E. 4th St., Tucson 85703 624-7331

Peter Warren
922 E. Mesquite Dr., Tucson 85719 622-3861

Scott Wilkins
1031 W. Cornell Dr., Tempe 85283 820-2730

Catherine Wertz
P.O. Box 27, Bisbee 86603 432-4345

Newsletter Typesetting & Design

Dean Brennan
429 W. McNair St., Chandler 85224 926-6598

The Arizona Native Plant Society
P.O. Box 41206
Tucson, AZ 85717
Address Correction Requested

Non-Profit Org.
U.S. Postage
PAID
Tucson, Ariz.
Permit #1505

If you move, please send us a change of address.

Printed on Recycled Paper