

The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

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ANPS: A Voice for the Wilderness

By Karen Enyedy Breunig

It was ANPS member Mary Butterwick who, through frequent presentations at Phoenix chapter meetings in the mid-1980s, awakened me to the fact that millions of acres of public land in Arizona were then under review for wilderness values. Much of this land met the government's criteria for wilderness as areas which are roadless, 5,000 acres or larger in size, and pristine. Potentially, such areas could, by congressional designation, be added to the National Wilderness Preservation System and thus receive the highest level of protection offered under federal law.

Mary encouraged ANPS members to involve themselves with our public lands, to make independent analyses as to which lands might qualify for wilderness status, and to apprise federal land managing agencies (the BLM, NFS, NPS and USFWS) of special plant values on Arizona's public lands.

By 1984, federal agencies had nearly completed their review of roadless public lands in the northern half of our state and had made their recommendations regarding which of these lands should be designated wilderness. Meanwhile, an ad-hoc organization called the Arizona Wilderness Coalition (AWC) had begun work on an independent review of wilderness values in these same federal lands. AWC published its recommendations, which were more generous than those of the agencies, in a document called the Arizona Wilderness Coalition Proposal. Public support for the 1984 AWC proposal resulted in a 44 percent

increase in the amount of eligible lands finally designated in the 1984 Arizona Wilderness Bill.

Now, in 1989, wilderness legislation for the southern and western regions of Arizona is being readied for a vote in Congress. Once again the AWC conducted an independent review and published its recommendations in a formal proposal. The AWC proposal for these new areas recommends protection for 2.2 million acres of BLM land and 1.6 million acres of USFWS wildlife refuge lands. Partly in response to support received for this proposal, some fairly generous legislation for new Arizona wilderness has been introduced into the U.S. House of Representatives in House Bill 2570 for 1.45 million acres of BLM land and in H.B. 2571 for 1.3 million acres of USFWS wildlife refuge lands. However, Senators McCain and DeConcini have drafted a Senate version of a new wilderness bill (S.B. 1080) that recommends only about 880,000 acres of BLM land and 12,000 acres of USFWS land for wilderness status. In its present version, the Senate bill will not adequately protect some of our state's rarest and most endangered plants and biomes. Even the House bill falls short of adequate protection for some areas.

ANPS has tried to rectify inadequacies in these bills, but help from individual members is now needed. In mid-September it appeared that Arizona's U.S. House representatives were about to "mark up" H.B. 2570/71 for a final revision before sending it to committee. Sponsored by ANPS, I visited Arizona's congressional delegation in

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Notes from the President

By Karen Reichhardt

Arizona native plant enthusiasts have been busy this fall attending meetings and workshops, working at plant sales, planting wildflower seeds, hiking and meeting in Washington, D.C. The rewards of our volunteer efforts are becoming evident as increasing numbers of Arizona citizens show an interest in native plants. When the newspaper article in the *Arizona Republic* featuring desert shrubs came out this July, three days later Horace Miller received more than 900 pieces of mail requesting copies of the shrub brochure sold by the Tucson Urban Landscaping Committee. Tempe Mayor Harry Mitchell emphasized during the 1988 ANPS annual meeting that our influence is far greater than our membership. We now have more than 700 members and the number continues to increase as more people are becoming excited about native plants.

The annual meeting held on October 7, 1989, in Tucson was well attended by more than 80 members, including a couple from Needles, California, and member Nell Backus, from Woods Hole, Mass. The topic of vegetation change forced us to visualize the Sonoran Desert vegetation as a non-static continuum. Plant communities are vulnerable to change caused by long term climatic shifts over thousands of years time and also vulnerable to change caused by human impacts within a short time-frame.

Speakers at the meeting came from the Arizona botanical community to share this knowledge. In their careers as researchers and professionals they've gone to areas where the native vegetation still remains. They picked through packrat middens, sorted through archives of photos and documents, and made transacts over cactus and shrub thickets. Thanks to all of the speakers who contributed to the day. Thanks also to Barbara Tellman, Marie Lynn Hunken, and May Criley and the Tucson Chapter for hosting this event.

State officers appointed for the next two year term are Karen Reichhardt, President; Mark Dimmitt, Vice President; Carol Shumaker, Recording Secretary; Karen Breunig, Corresponding Secretary; and Horace Miller, Treasurer. Committees which report to the state chapter have been active, also. Anyone who is a member of ANPS is welcome to belong to a committee. The Conservation Committee, chaired by Dan James, meets to

discuss and act upon issues dealing with plant protection. On behalf of the Conservation Committee, Karen Breunig recently went to Washington, D.C., to educate legislators on the botanical virtues of Arizona Wilderness Study Areas. The Education and Publicity committees also need dedicated workers.

The Tucson Urban Landscaping Committee is a real success story. The sale of tree and shrub brochures has been so popular that we now have \$16,000 in the bank. Office space at Tucson Botanical Gardens has been rented. The committee is still looking for office furniture donations and a typewriter for the new office. People with items they wish to donate should contact Carol Shumaker. Items on their wish list include:

- File
- Bookshelves
- Chairs
- Computer Desk
- Printer Stand
- Lights

The Phoenix Chapter has been busy planting wildflower seed at the Desert Botanical Garden, donated by Rita Anthony of Wild Seed in Tempe. The wildflower beds of varying species are located across from the DBG gift shop and promise to be a gorgeous display this spring.

NEW EDITOR SOUGHT

The current editor plans on retiring soon. Qualifications include an enthusiasm for Arizona's native plants, newsletter experience, and a willingness to work with native plant activists state-wide. If interested in learning more about this position, contact President Karen Reichhardt.

Wilderness, continued

from page one:

Washington, D.C., on September 18 and 19 to appeal for the protection of such ecologically important areas as Upper Burro Creek, Cactus Plain and Ragged Top.

If I left D.C. with one conviction, it was that ANPS can be a forceful voice for the protection of plant and wilderness values. Specific information on plants provided to me by ANPS members made my arguments for wilderness protection more interesting and more convincing. My presentation on Ragged Top (an area not in either version of the bill) illustrates how effective we can be. Recently, member John Wiens encountered *Pisonia capitata* (April 1989), not previously known to exist further north than Soyopa, Sonora, some 460 km away; and *Abutilon parishii* (August 1989) on Ragged Top. Such new information is always exciting, and it caught the attention of the leaders with whom I met. When teamed with a reminder that the federally listed endangered *Tumamoc macedouglii* also grows on Ragged Top, and that Ragged Top Pleistocene relic plants are studied by the International Biosphere Project, this new information from ANPS moved Ragged Top back onto the Washington discussion table for reconsideration as wilderness.

At this writing, unexpected delays have found U.S. House representatives still waiting to get together for the final "mark up" of H.B. 2570/71 before it goes to committee for reconciliation with S. 1080. This circumstance gives ANPS members an unexpected window of opportunity to further influence the bill's final format. Your knowledge about plants and the ecology of areas under consideration can still make a difference. Most helpful will be information concerning:

1. the location of threatened or endangered plants
2. observance of unusual mixes of plants
3. furthest known range of a plant (in direction or altitude)
4. location of especially dense, large, tall or old plants

Also helpful are general comments about any of the areas you may have visited. Argue for their overall ecological values and ask that they receive protection as wilderness. Your comments can be made by phone or through the mail. For greater effectiveness, write a letter and follow it with a phone discussion or a visit to local or D.C.

congressional offices. Be persistent but respectful and you will get through.

Address your comments to Mark Trautwein in Congressman Udall's office, to the congressman in whose district the area you are concerned with lies, and to our two senators. Let our delegates know that you are a member of the Arizona Native Plant Society and refer as well to your business, professional and academic credentials.

A list of the areas in the AWC proposal, with notations showing which bill(s) presently include them appears below, as does the addresses for Arizona's congressional delegates.

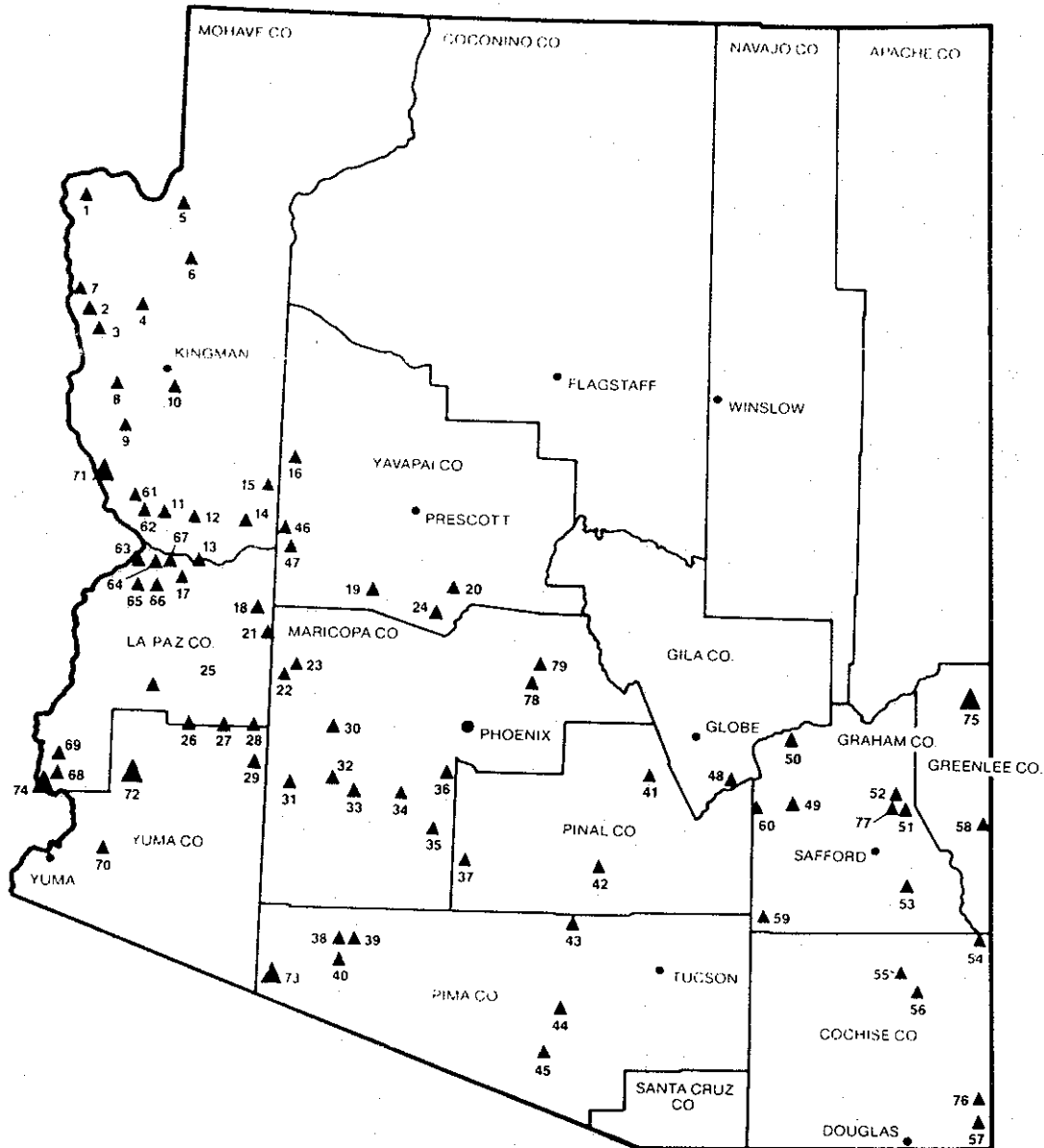
But first, here is a synopsis of areas that are presently in trouble but still have a chance to make it into the final bill if more of us voice support for them and/or if conflicts with other interest groups can be resolved:

Black Mountains North and Burns Springs (Santa Fe Railroad subsurface mineral holdings conflict and opposition from Bullhead City management), Grapevine Wash, Black Mesa, Upper Burro Creek (Cypress Copper Company conflict), Hassayampa River Canyon, Hummingbird Springs, Little Horn Mountains and Little Horn Mountains West, Face Mountain, Butterfield Stage Memorial and South Maricopa Mountains (no conflicts but the senators say they are waiting to hear more voices of support!), Ragged Top, Black Mountains/Ives Peak, Tres Alamos, Gila Box, Crossman Peak, Cactus Plain and the Kofa National Wildlife Refuge.

Comments on the above areas carry the potential to make the greatest difference. These areas are hanging by a thread — support them!

On the bright side, here are some areas which presently appear only in the House version of the bill, yet through continued pressure and support, have gained a likelihood for inclusion in the final reconciliation: Saddle Mountain, White Canyon, Peloncillo Mountains, Baker Canyon/Guadalupe/Bunk Robinson, Galiuro Addition, Aravaipa Canyon Addition and the Cabeza Prieta National Wildlife Refuge. However, further support for these areas, particularly for Saddle Mountain, may still be needed.

Illustrations on pages 8, 11, 12 and 13 were drawn by Phoenix artist Bonnie Jakubos.



- | | | |
|--------------------------------|--|--|
| 1. Mt. Wilson | 29. East Clanton Hills | 57. Baker Canyon/Guadalupe Canyon/Bunk R. |
| 2. Black Mountains North | 30. Saddle Mountain | 58. Hoveirocker/Hell's Hole |
| 3. Burns Springs | 31. Face Mountain | 59. Galiuro Addition |
| 4. Mount Tipton | 32. Signal Mountain | 60. Aravaipa Canyon Addition |
| 5. Grapevine Wash | 33. Woolsey Peak | 61. Crossman Peak |
| 6. Grand Wash Cliffs | 34. N. Maricopa Mountains/Butterfield Stage Mem. | 62. Mohave Wash |
| 7. Mount Davis | 35. S. Maricopa Mountains | 63. Gibraltar Mountain |
| 8. Mount Nutt | 36. Sierra Estrella | 64. Planet Peak |
| 9. Warm Springs | 37. Table Top Mountain | 65. Cactus Plain |
| 10. Wabayuma Peak | 38. Batamote Mountains | 66. East Cactus Plain |
| 11. Aubrey Peak | 39. Sikort Chuapo Mountains | 67. Swansea |
| 12. Black Mesa | 40. Pozo Redondo | 68. S. Trigo Mountains |
| 13. Rawhide Mountains | 41. White Canyon | 69. Trigo Mountains |
| 14. Arrastra Mountains | 42. Picacho Mountains | 70. Muggins Mountain |
| 15. Lower Burro Creek | 43. Ragged Top | 71. Havasu National Wildlife Refuge (Needles)
Needles East Addition
Chemehuevi/Needles |
| 16. Upper Burro Creek | 44. Coyote Mountains | 72. Kofa National Wildlife Refuge
Kofa Unit 3 South
Kofa Unit 4 North
Kofa Unit 4 South |
| 17. Buckskin Mountains | 45. Baboquivari Peak | 73. Cabeza Prieta National Wildlife Refuge |
| 18. Harcuvar Mountains | 46. Black Mountains/Ives Peak | 74. Imperial National Wildlife Refuge |
| 19. Hassayampa River Canyon | 47. Tres Alamos | 75. Blue Range Primitive Area/San Francis |
| 20. South Bradshaws East | 48. Needles Eye | 76. Whitmire Canyon |
| 21. Harquahala Mountains | 49. Black Rock | 77. Gila Box National Park Service Study Area |
| 22. Big Horn Mountains | 50. Fishhooks/Day Mine | 78. Verde Wild and Scenic River Addition |
| 23. Hummingbird Springs | 51. Gila Box | 79. East Verde Wild and Scenic River Study |
| 24. Hell's Canyon | 52. Turtle Mountain | |
| 25. New Water Mountains | 53. Javelina Peak | |
| 26. Little Horn Mountains West | 54. Peloncillo Mountains | |
| 27. Little Horn Mountains | 55. Dos Cabeza Mountains | |
| 28. Eagletail Mountains | 56. Bowie Mountain/North End | |

Wilderness Notes

By Gary Maskarinec

The summer rains have come and gone — not as heavily as we had hoped. Saltbushes are now setting their seed. There's been a flowering of paperflower and zinnia, but nothing so abundant as last year. Today a cool wind has been blowing steadily from the west. It's a relief to see a hint of the jet stream swinging across Phoenix so strong and so early. Soon we'll be watching for the sprouting of Spring ephemerals. As we watch the progress of these plants from germination to blossom, it will be of great interest to see if we're in for more of the dryness and awful heat of the past few years.

These coming months also will tell the status of Arizona's BLM administered wilderness study areas. A congressional bill will likely be finalized by the end of September, and the Senate bill should follow by a couple of months. Thanks partly to considerable efforts of a number of ANPS members, several of our desert mountains which last January seemed unlikely to receive protection as wilderness are now likely candidates. At this point, there are several territories which have become focuses of controversy. Reasons for opposition to naming these areas wilderness are various, ranging from mining interests to individual inclination against further government regulation of public land.

Currently, the areas of the most evident indecision are: Crossman Peak, a fabulous mix of Sonoran and Mohavean flora immediately east of Lake Havasu City; White Canyon, south of Superior, an area many ANPS members have visited on field trips; Cactus Plain, north of Parker, an area that I've seen depicted on calendar shots for the profuse Spring flowering there; Ragged Top, a mountain visible from I-10 between Tucson and Eloy; the Hassayampa River Canyon, truly an exceptional riparian zone; Gila Box, a dramatic spot east of Florence, and the Kofa Wildlife Refuge, just east of the Colorado.

Each of these areas harbors a great diversity of native plants. The scenic beauty of the geography of each is intriguing in itself — the fabulous flora supported in all of these areas will provide endless enjoyment for recreationists in years to come, at the same time providing the core of the biotic communities there.

As the population of Arizona has grown, off-road vehicle use in the desert has extended across virtually every plain between these moun-

tains and canyons. Often, bajadas are scarred right up to the rock faces. The spacing of individual plants in typical Lower Colorado Desert populations allows for vehicle access without obstacle. Much of our western desert is already severely disturbed. While the destruction of the flora is immediately evident, it is the degradation of the entire biological community and of the topography itself that are profoundly alarming. No data regarding off road damage has been compiled. My own observations, based on 40,000 miles of travel in Arizona's western deserts in 1981 - 1989, is of a hundred fold increase in acreage that's been hurt during that period. In some ranges, the vastness of those damaged areas is astounding. I get this vision of western Arizona resembling eastern California after another 10 years, and what a dismal scene that is.

But surely that won't happen. Many of our desert lands will be protected in the name of wilderness. Consider those areas that I listed, and, if you will, take time to both call and write local congressional offices. Speak with the staff member who is involved with the wilderness issue. I am convinced that any individual's action at this point could be a deciding influence. Even if you already have contacted a politician about this issue, please give it one more shot. Our ANPS members are an active lot in terms of improving the quality of life in Arizona. At the moment, an urge in the direction of protecting the quality of our desert — wherein lie some of the finest wildlands of the west — will help shore up the wildness that we all find enjoyable and useful. Beyond this opportunity to protect our flora, it's worth noting that as our society continues to learn about and to cultivate Arizona's native plants, we act as promoters of wildness, an endless job that follows this current protection issue.

A final thought — if you find free time for a wilderness visit, and haven't seen the areas that I mentioned, take a road to one of these spots. You will certainly be rewarded for your time. Adios.

Are you looking for Christmas cards? The *Lysiloma thornberi* notecards are available in the original green-on-white card with green envelope, \$5.00 for a package of twenty. To order by mail, write to ANPS, Box 41206, Tucson 85717. Your purchase yields a contribution to the Lucretia Breazeale Hamilton Scholarship Fund for a student of botanical illustration at the University of Arizona.

Threatened Hohokam Agaves Need Your Help

By Gary Nabhan

For several years now, ethnobotanists such as Suzanne Fish, Charles Miksicek, Bob Gasser and Vorsila Bohrer have been investigating the possibility that one or more species of century plants (agaves) may have been cultivated on a large scale by the prehistoric Hohokam and Salado peoples of southern Arizona. Stunning discoveries made by the late Rick DeLamater and his colleagues at the Desert Botanical Garden in spring 1988 confirm that *Agave murpheyi* as well as an undescribed (new) species were cultivated on terraces and rock alignment/rock pile fields in Tonto Basin and in the New River drainage. Today, these agaves are threatened in their original "cultural habitat", and need your help through letters to government agencies.

Although one or two clones of *Agave murpheyi* are common in ornamental cultivation, most of the remnant clones of prehistoric farmers of this and the other (new) species have yet to be conserved, or made available to agave enthusiasts. At the same time, many of their original sites — where they remain in cultural context with water-control features, agave knives, turtleback scraping planes, spindle whorls and other prehistoric technologies — are currently threatened. The imminent expansion of Lake Roosevelt will wipe out some of these materials, and the sale of state lands to real estate developers in New River will deplete others. New River is being allowed the highest densities of residential development of any place in Maricopa outside a major municipality. Already, other clones have been lost in Sonora, on the Tohono O'odham Reservation and in Paradise Valley.

What is at stake is one of the *in situ* survivals of a prehistoric native crop — without intervening crop improvement or adulteration by historic breeders. It is a remarkable opportunity for botanists and archaeologists to collaborate on a study of prehistoric agriculture, if it is saved in place. Four actions have been initiated, but need your support. First, the U.S. Fish and Wildlife Service (USFWS) has been petitioned to list *Agave murpheyi* as threatened, and must publish its determination by this winter. Please write Sue Rutman, USFWS Ecological Services, 3616 W. Thomas, Suite 6, Phoenix, AZ 85019, in support of officially listing this species as both a federal and state protected plant.

Second, the State Historic Preservation Office (SHPO) of Arizona has been petitioned to protect these plants as cultural artifacts in the context of prehistoric terraces, under antiquities and historic preservation acts. Write Bob Gasser, State Historic Preservation Office, 800 W. Washington, Suite 415, Phoenix, AZ 85007, in support of further archaeological protection.

Third, an interagency task force on Hohokam agave resources has been established, and others are invited to participate. The U.S. Forest Service, Arizona Game and Fish, Arizona SHPO, USFWS, Bureau of Reclamation, Pueblo Grande Museum, University of Arizona, Desert Botanical Garden, and Native Seeds/SEARCH have expressed an interest in research collaboration. Write or call Gary Nabhan to participate.

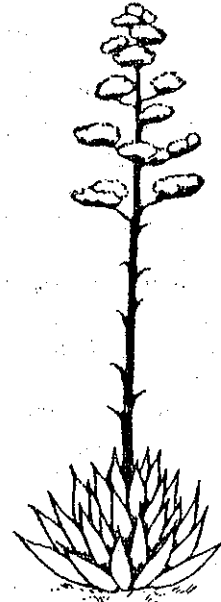
Fourth, a permanent Agave conservation endowment has been set up in memory of Rick DeLamater, who spearheaded this research for several years. Donations are being taken in Rick's name by the Center for Plant Conservation, 125 The Arbor Way, Jamaica Plain, MA 02130. To read more of Rick's efforts with agave conservation, see:

DeLamater, R. & W. Hodgson. 1987. *Agave arizonica*: an endangered species, a hybrid, or does it matter. Pp. 305-310 in T. Elias, Conservation and Management of Rare and Endangered Plants. California Native Plant Society, Davis.

MacMahon, L.R. 1989. Pulling out all the stops for plants. *Garden* 32: 2-4. May-June.

Nabhan, Gary. 1989. Rescuing Arizona's endangered plants. *Garden*. March-April.

Swain, Roger. 1987. Agaves in the Southwest. *Horticulture*. November.



'Succulent Hill,' Baja California

By Gene Joseph

Reprinted with permission from Cactus & Succulent Journal (U.S.) Vol. 57, 1985

Four miles south of San Ignacio, B.C.S., lies an amazing place for plant lovers, especially those of us with a succulent bent. It is a site on the west side of Hwy 1, known by those of us who have been there as 'Succulent Hill.' There are no less than twenty-six species of succulent plants occurring here! All twenty-six species can be seen within a mile's walk from the road.

The slope with the greatest number of plants is the northwest exposure. The soil here is of volcanic origin with red lava rocks filling the spaces between the plants. 'Succulent Hill' is only about twenty miles west of the extinct volcanoes, Los Tres Virgenes, and thus about thirty miles from the Sea of Cortez. This area lies within the Viscaïno subdivision of the Sonoran Desert.

One of the more interesting species of plants that is found here in abundance is *Ferocactus rectispinus*. This is normally a medium sized barrel with the average height being no more than about two feet. Most of these plants occur on somewhat level terrain where there are a few three to four foot tall plants and one incredible specimen that was over nine feet tall! I saw the plant in healthy condition in the fall 1980 and a year later it was visited by Kent Newland (Boyce Thompson Arboretum) when he reported that it did not look good. In the fall of 1982 I was saddened to find a nine foot long carcass. Occurring side by side with *F. rectispinus* is *F. peninsulae*. These plants interbred freely here so you see the entire range from arrow straight, terete central spines (up to eight inches long) to much shorter hooked, flattened central spines. In the first week of November 1980, *F. rectispinus* fruit was fully ripe whereas *F. peninsulae* fruit was still green, indicating that *F. rectispinus* flowers first and that this may be the factor in preventing complete hybridization of the two species.

Another plant of particular interest found here is *Cochemiea setispina*. This is a beautiful clumping white spined cochemiea (named after the Cochemi Indians) with a scarlet red tubular flower. Although there are only a few plants to be found here, they get fairly large, with one plant forming a dense clump about five feet in diameter at the base of a *Bursera microphylla*. The other

plants of this species that I have seen occur over a hundred miles to the north of here in the Mission San Borja area and are usually no more than a couple of feet in diameter. This is possibly a range extension for this species.

Three succulent species of the Euphorbia family grow here. *Pedilanthus macrocarpus* is unique in its growth form in the Sonoran Desert. With its finger-thick stems up to three feet tall and its basal branching growth habit, it has earned the common name of 'Candelilla' (Little Candle). This is the same name applied to a related species from the Chihuahuan Desert, *Euphorbia antispyllitica*, which is similar in habit but smaller in stature. *P. macrocarpus* has a most distinctive flower (actually a combination of modified bracts and male and female flowers). It looks like nothing other than a brilliant red 'ladies slipper' one to two inches long. The other two euphorbias are very



Castilleja chromosa

similar in appearance to each other. *Euphorbia misera* and *Jatropha cuneata* are low growing shrubby succulents that are virtually indistinguishable when leafless. I had to resort to a small pinprick to tell the two apart. *E. misera* bleeds the typical white milky sap whereas *J. cuneata* either does not bleed (if the plant is too dry) or it bleeds a light amber colored sap.

'Succulent Hill' is a fantastic place. It is the kind of natural garden that we try to capture and imitate, though never really quite succeeding. It is also the kind of place that reinforces the need for conservation of land and preservation of habitat.

The following is a list of species, by family, compiled during the fall, 1982 trip to 'Succulent Hill.'

Agavaceae

Agave cerulata v. *subcerulata*

Burseraceae

Bursera hindsiana

B. microphylla

Cactaceae

Cochemiea setispina

Echinocereus brandegeei

Ferocactus peninsulæ

F. rectispinus

Lophocereus schottii

Mammillaria brandegeei v. *gabbii*

Mam. sp.

Myrtillocactus cochal

Pachycereus pringlei

Opuntia cf. *ciribe*

O. cholla

O. invicta

O. molesta

O. cf. *phaeacantha*

Stenocereus gummosus

S. thurberi

Crassulaceae

Dudleya cf. *attenuata*

Cucurbitaceae

Ivervillea sonora v. *peninsularis*

Euphorbiaceae

Euphorbia misera

Jatropha cuneata

Pedilanthus macrocarpus

Fouquieriaceae

Fouquieria diguetii

Moraceae

Ficus petiolaris v. *palmeri*

Acknowledgements due: Matt Johnson for compiling this plant list.

In Memoriam: Hortense Spoehr Miller

By Tim Clark

Members of the Society and their friends attended the planting of a tree in memory of Hortense Spoehr Miller at the Boyce Thompson Southwestern Arboretum at noon, Saturday, November 11, 1989. The planting took place in conjunction with the Arboretum's annual fall landscaping festival.

Hortense, who passed away in Tucson in January of this year, was a founding member of the Arizona Native Plant Society. While active with the state organization and the Tucson Chapter for more than a decade, her most important contribution to the society was during the late 1970s and early 1980s. She worked tirelessly during these years to stabilize and create a Tucson chapter which is, today, one of the most vibrant local chapters of the country's native plant societies. Her intelligence, wit and love of life impressed deeply her many friends.

For many years, Hortense actively pursued her interest in the history of botanical exploration. Her most ambitious project in that field was an extensive investigation of the acquisition, dispersal and present whereabouts of the large private herbarium of the early English botanist, Aylmer Bourke Lambert (1761-1842).

After Lambert's death, his herbarium of some 50,000 specimens was sold at auction in 317 lots and became widely dispersed with their present locations often unknown. They ended up in at least 18 institutions in Europe and the U.S. The specimens, many of which were types, were acquired by Lambert and his agents from at least 130 collections, including such notables as Aime Bonpland, Robert Brown, David Douglas, Lewis & Clark and Thomas Nuttall.

The results of her several years of detective work in this country and Europe are contained in her paper, "The Herbarium of Aylmer Bourke Lambert", *TAXON* 19(4), p. 489-553, August 1970, which is available in the herbarium of the University of Arizona.

Field Notes on a Springtime Trip to the Arizona-Sonora Desert Museum

By Patrick H. Boles

April 1, 1988. My family and I drove down from Prescott yesterday in order to get an early start today. We left Tucson around 7:30 a.m. for the Desert Museum. Mesquite (*Prosopis juliflora*) and catclaw acacia (*Acacia greggii*) bushes were all leafed out along the Gates Pass Road. We were impressed by the dense stands of saguaros (*Cereus giganteus*) on the south facing slope. My eight year old son Matt remarked that there must be at least 100! He started counting them and said he counted 32.

We arrived at the Arizona-Sonora Desert Museum just before it opened at 8:30 a.m. The first stop was to look through the building which houses insects, reptiles, and small mammals such as kangaroo rats. A few summers ago, I noticed large black bugs (with red on the ends of the antennae and legs) on some agaves in central Yavapai County. I recognized them in one of the exhibits as "giant plantbugs" (*Acanthocephala grandulosaa*). The museum is an excellent place to "discover" species that you have seen out in the wilds but have been unable to identify. One exhibit I noticed said that the white "fluff" on the pads of some prickly pears contain cochineal scales (*Dactylopius confusus*). These scales are commonly observed on prickly pear plants in the desert.

The kids enjoyed seeing the snakes, although my three year old daughter Katie, upon seeing the different rattlesnakes, would remark, "sick." We then made our way through the mineral exhibit and to the artificial cave, which is a favorite of the kids. They especially enjoy the narrow side passages.

Walking toward the entrance to the cave, I noticed new pads and flower buds on prickly pear plants (*Opuntia* spp.); some flowers are starting to open. Ocotillos (*Fouquieria splendens*) are in flower. Also flowering in this area of the museum were: fairy duster (*Calliandra eriophylla*; some plants already had seed pods), jojoba (*Simmondsia chinensis*; green flowers), sacred datura (*Datura meteloides*), Verbena gooddingii, canyon ragweed (*Ambrosia ambrosioides*; with both flowers and fruit on some of the plants) and Apache plume (*Fallugia paradoxa*). Mesquite, catclaw, and desert willow (*Chilopsis linearis*) were leafing out. The catclaw had flower buds.

On to the various animal exhibits; they were all pretty active this early in the morning (9 a.m.) while it was still fairly cool. The early morning is the best time to see and photograph the mammals. Sonoran desert wildlife observed included gray fox, American black bears, mountain lions, coatimundis, prairie dogs, a common (gilded) flicker, javelina, bobcat, and desert big-horn.

In the shade of one of the ramadas a volunteer museum worker had half a dozen or so mammal skulls on a table and explained to my son the differences between the skulls of carnivores, herbivores, and omnivores. We noticed other educational displays staffed by volunteers elsewhere on our walk around this living museum.

I photographed a brown bear lying on a ledge and took several pictures of the wolves pacing back and forth in their enclosure, and a picture of a Coues' white-tailed deer. Berberis was in fruit. Plants flowering in this area of the museum included: cliffrose (*Cowania mexicana*), creosote bush (*Larrea tridentata*), and green brittlebush (*Encelia frutescens*).

I took two pictures of javelina drinking at a mudhole with a barrel cactus in the foreground; this was a very natural looking scene. I took several pictures of the bighorn sheep (a ewe and her lamb; the female lamb was born 2/18/88). Nearby I photographed a hedgehog cactus (*Echinocereous fendleri* var. *boyce-thompsoni*) that was flowering.

Some of the mesquite and catclaw acacia bushes were in flower. I took a picture of a road-runner on its nest of sticks in a small catclaw acacia tree a few feet from the ground. This catclaw plant was in flower.

Approaching the exhibits housing the beavers and otters, desert sage (*Salvia dorrii*) and beavertail prickly pear (*Opuntia basilaris*) were flowering next to the trail. Between the ponds where the beaver and otters are kept, there is an underwater viewing area. The kids got to see the way ducks move their feet to swim. The otters were inactive this early, but later on a return visit around 2 p.m., they put on quite a show.

On to the aviary. Birds observed and photographed included: the common gallinule, Gambel quail, killdeer, Bendire's thrasher, mockingbird, summer tanager, scaled quail, yellow grosbeak, long tailed magpie, pyrrhuloxia, cardi-

nal, masked bobwhite (the one I photographed had a nest under a concave artificial rock next to a stream with a clump of grass by the entrance), Scott's oriole, white wing dove, green winged teal, and cinnamon teal. While walking around the enclosure, I noticed a scaled quail chasing some Gambel quail out of a small territory it had established. Excellent close-ups of various birds within the aviary can be obtained with nothing more powerful than an 80-200 mm zoom lens.

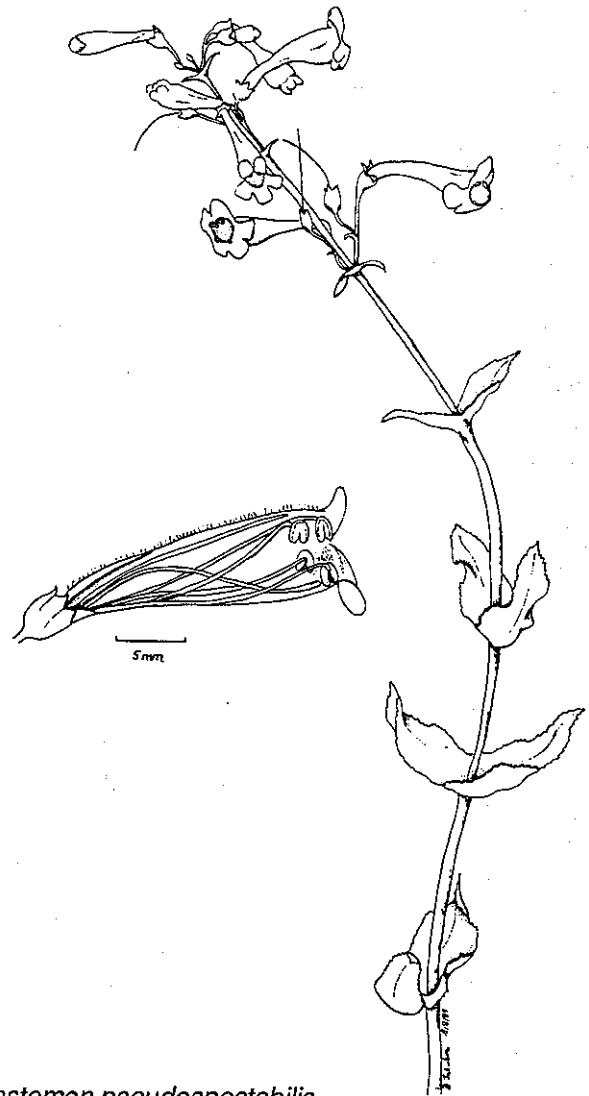
While sitting on a bench in a shady area of the aviary changing film with my backpack/camera bag leaning against a nearby tree I learned a lesson — leaving a fancy bag under a tree is not a wise thing to do in an aviary! When I picked up the bag, I noticed that a bird had made a "deposit" on top of it. Mexican elder (*Sambucus mexicana*) was in flower in the aviary.

Each time we walked around on the circular path, we noticed different birds. On one of the loops through the aviary, my wife, Ann, saw a bullsnake beside the path (after which she was ready to leave). Matt and Katie got a good look at it and were pretty interested in it. It had its head a few inches down a small hole and didn't notice us so close; however, when it finally pulled its head from the hole, it took off fast.

Just outside of the aviary there are a series of exhibits on the various life zones found in Arizona. I stopped to take a picture of the "Chaparral" lifezone and overheard a boy about 12-years-old tell his mother "there's nothing along here to see except plants... we might as well go back to the entrance." Sugar sumac (*Rhus ovata*) was mostly in fruit; a few flowers were still present. Parry penstemon, *Verbena tenuisecta*, Indigo bush (*Dalea pulchra*), white flowered globemallow (*Sphaeralcea ambigua*), Goodding verbena, firewheel, and flattop buckwheat were all in flower.

Just down from the lifezone exhibits, I photographed a sugar sumac in flower that was being visited by honey-bees, plus goldpoppies (*Eschsholtzia mexicana*; bees were also on them), blanket flower (*Gaillardia pulchella*), and Gooddings verbena (*Verbena gooddingii*). I noticed that the mesquite was just starting to leaf out in the particular spot. *Berberis haematocarpa* was in flower. Some seeds were present on hopbush (*Dodonaea viscosa*); this particular plant was tree-like and some seeds were present.

I had made arrangements for Meg Quinn, an employee of the Desert Museum as well as a member of the Arizona Native Plant Society, to give us a guided tour of the greenhouse facilities. They grow plants in the greenhouses for fundraising sales and new habitats, as well as for replacements for existing landscaping and habitats. At that time they were growing a lot of hummingbird plants for the new hummingbird exhibit which was under construction. Plants being grown for the hummingbirds included skyrocket (*Gilia* spp.). Meg told us that the museum at that time had seven
continued next page



Penstemon pseudospectabilis

ASDM Field Notes, continued

landscape technicians who water and tend plants. In the greenhouses there was drip irrigation going to each of the potted plants. Plants being grown included a species of ocotillo from Mexico which has a trunk.

After the greenhouse tour, we went back out onto the museum's grounds and had some snacks in the shade of a ramada. At 12:45 the air was a little cool in the shade.

I walked through the cactus garden, taking more pictures. The ocotillo flowers were pale orange; the plants were mostly leafless. Flowering were: *Opuntia violacea* (long spined prickly pear; honeybees on the flowers), *O. v. var. macrocentra*, *O. rosarica* (yellow flowers), *Mammillaria can-*

dlensis (yellow flowers), *M. marksiana*, *M. standleyi*, strawberry hedgehog (*Echinocereus engelmannii*), golden hedgehog (*E. engelmannii* var. *nicholii*), and Boyce-Thompson hedgehog (*E. fendleri* var. *boyce-thompsonii*).

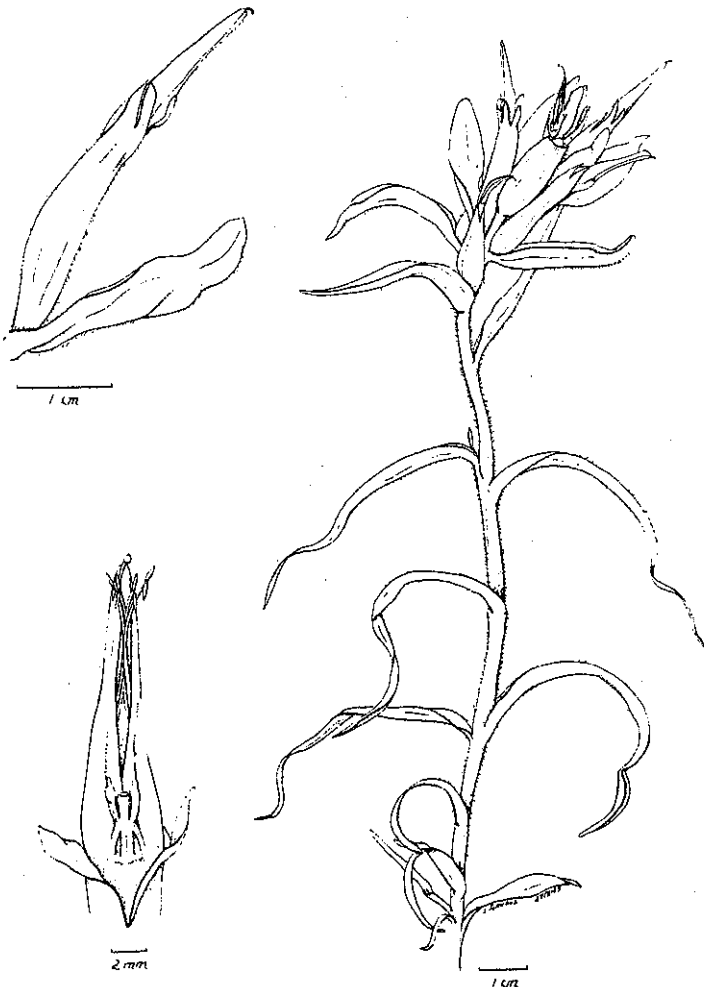
In the early afternoon we made another trip around the exhibits. In the cool of the morning everything had been pretty active, but now, about 1:30 p.m., most of the mammals were just lying in the shade.

I noticed a few flowers open on Engelmann prickly pear plants. I photographed the prairie dogs (several young ones were present), mountain lion, coati, and a bobcat. Due to the manner in which the various enclosures are designed to look natural rather than artificial ("habitats" vs. the cages used by some zoos), I obtained photographs here without any hint of man.

The Joshua trees were in flower, however their flowers were past their prime with the petals falling on the ground. As a matter of fact, I hadn't thought to look up at the Joshua trees until I noticed the petals on the path beneath them.

I noticed a red claret cup hedgehog (*Echinocereus triglochidiatus*) cactus in flower on edge of the bobcat enclosure. Desert tobacco (*Nicotiana trigonophylla*) was in flower. Just as we were leaving the museum, a curved billed thrasher perched on an ocotillo.

Out in the parking area, a cactus wren landed on the driver's window of our car which I had left rolled half-way down. The bird looked inside and then hopped on the headrest to have a look around before flying off when I started walking to the car (after the experience with the camera bag, I was a little afraid it might have an "accident" inside the car).



Castilleja integra

Mt. Lemmon Ski Expansion

By Doug Koppinger

The Tucson Chapter of the Arizona Native Plant Society co-sponsored a public forum in September on a proposal to enlarge the Mt. Lemmon ski area. The operator of the skiing permit area located on National Forest land is proposing an expansion that will include clearings for new ski runs and lifts along with parking lots, alpine slides, support facilities, etc.

The forum was well attended and a great deal of concerns were expressed by the crowd with generally unsatisfactory responses from the Forest Service. The Forest Service has said they will make a decision by the end of October. Letters are desperately needed to the Forest Service at this time to off-set a vigorous letter writing campaign by some skiing groups who have portrayed this as an all or nothing issue. They keep arguing that if no expansion is allowed there will be no skiing on Mt. Lemmon. The only reason there will be no skiing on Mt. Lemmon is because there is no snow on Mt. Lemmon and when there is, it usually only lasts about as long as the road to the top is impassable.

Send your comments to: Steve Plevel, District Ranger, Santa Catalina RD, 5700 N. Sabino Canyon Rd., Tucson 85715, with a copy to the Forest Supervisor, James Abbott, Coronado National Forest, 300 W. Congress, Tucson 85701.

Points to stress about the proposal:

The environmental assessment that was prepared was not nearly thorough enough to adequately address this issue. An environmental impact statement is needed to provide the kind of analysis that is needed. Some components of the proposed expansion such as an observation deck and improved administrative facilities would have little impact on the environment. However, the new ski run and lift proposed for the east side of existing facilities would have numerous serious impacts by:

- destroying a substantial area of old growth with some of the oldest trees in southern Arizona (500 years old and older).

- removing one-fifth of an entire unique plant association of maple, aspen and New Mexico locust, and the future of the area will be jeopardized by opening up the canopy and exposing the site.

- eliminating the entire Mt. Lemmon population of orange-crowned warbler.

- eliminating the Aspen Draw Trail, the only trail left in the area since the Sabino Dawn Trail was destroyed a few years ago for another ski run which is now the site of the proposed summer-use alpine lift.

- destroying known rare Mexican spotted owl habitat.

The Forest Service has a policy practiced through the west whereby it works to accommodate the economic viability of a private investor who utilized public lands. Clearly, the long-term public interest dictates that it should place greater emphasis on protecting natural resources.



Pedicularis grayii

Lemon Lily

By Sue Rutman

Lilium parryi (Lemon lily) is an attractive, intriguing, and commercially valuable member of Arizona's flora. Lemon lily is a showy herbaceous perennial that can reach a height of 40 inches. The leaves are lance-shaped and arranged in whorls or alternately along the stem. The flowers look just like an Easter lily flower, except that *Lilium parryi* flowers are lemon yellow and have red spots in the throat.

Lemon lilies are found near perennial water in shaded, mountain canyons that have deep, organic, wet soils. The overstory is dominated by conifers, sometimes mixed with oaks and riparian deciduous trees. Before 1989, botanists knew of only four sites in the Huachuca Mountains where this species still occurred. Other historic sites in the Santa Rita Mountains were believed to have been extirpated by flooding and placer mining. During the summer of 1989, surveys for this species intensified and three more populations were discovered. Two of the new locations were in the Huachuca Mountains and one population, discovered by Arizona Native Plant Society members, was located in the Santa Rita Mountains.

In addition to its southeastern Arizona locations, lemon lily occurs in the mountains of southern California, but is not known from Mexico. The wide range disjunction (separation) of lemon lily raises some interesting questions. How did lemon lily get from its place of origin to Arizona and California? Did the species first establish itself in California and then Arizona? Did the species move north from Mexico during the last glacial age? These questions and others are as yet unanswered and may never be answered.

A variety of threats face this species. Because the plants are so attractive, commercial collectors take the plants and seed for artificial propagation. Collection not only reduces the already small population sizes, but disturbs the fragile habitat. Trampling by visitors interested in seeing this species in the wild could also be a problem. In the past, catastrophic flash flooding has nearly eliminated two populations. Some biologists believe that wildfires contributed to the severity of the flooding. Perhaps some controlled burns will be necessary to reduce the potential effects of fires. Diversion of water for human uses away from the habitat and placer mining may cause the loss of populations.

The Coronado National Forest, the Nature Conservancy, and the Fish and Wildlife Service are working cooperatively to develop a management plan for this species. Maintaining Arizona's lemon lilies for future generations to enjoy is a goal we can all support.



Lilium parryi

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Trees For Tucson - Global ReLeaf

By Greg McPherson

Plans are underway to plant a half million trees in Tucson. This massive reforestation project is co-sponsored by Tucson Clean and Beautiful and the Desert Survivors, a non-profit corporation that employs the disabled. Congressman Morris Udall and Tucson Mayor Tom Volgy are honorary Co-Chairs of the program.

Trees for Tucson is in the vanguard of the American Forestry Association's Global ReLeaf program, which advocates planting 100 million trees in the United States to offset carbon-dioxide emissions and "greenhouse warming" by an estimated 18 million tons annually. The goal of Trees for Tucson is to improve environmental quality, conserve natural resources, bolster civic-pride, and beautify metropolitan Tucson through planting of one tree per person, or about 500,000 trees by 1996.

Preliminary research findings indicate that Tucson's vegetation cover has dropped from 37 percent in 1953 to 28 percent in 1983. This trend is consistent with results of a survey that reported an average of one tree planted for every four removed in American cities. If one half million trees are planted, tree numbers and canopy cover will increase by about 30 percent (1.75 million trees, 30 percent tree cover). Assuming that desert adapted trees are planted, annual water costs (in 1988 dollars) will be about \$2 per tree and energy savings will amount to \$24 per tree once the trees near maturity. In addition, each tree will reduce carbon-dioxide emissions by approximately 365 lbs. per year, intercept about 2 lbs. of airborne dust annually, reduce stormwater runoff by 0.4 cubic feet, increase property values, enhance wildlife habitat, and make Tucson a more attractive and livable city.

The program was kicked-off this October 21-28. Mayor Volgy and Governor Rose Mofford have issued proclamations encouraging all citizens to plant and nurture water-thrifty trees during this week. Tree plantings took place daily throughout that week at businesses, schools, parks, and other public places. Homeowners are encouraged to plant desert trees in their yards and neighborhoods. Desert trees are available from participating nurseries throughout Tucson. People unable to plant trees themselves may purchase tree gift certificates for trees that volunteers will plant. Trees for Tucson's goal is for Tucson to plant 25,000 trees in 1989.

A large Arbor Day planting scheduled for spring 1990 will focus on educating children about the ecological and economic value of the world's forests and our urban trees. Another planting is being planned for the 20th anniversary of Earth Day on April 22, 1990.

Committees are meeting to coordinate tree selection and location, maintenance, funding, volunteers, education, and program promotion. Any persons interested in assisting with this project can contact Ms. Joan Lionetti at Tucson Clean and Beautiful, 791-3109.

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<input type="checkbox"/> Patron	100.00
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The Arizona Native Plant Society
P.O. Box 41206
Tucson, AZ 85717

OFFICERS

Karen Reichhardt, President 481-9561
434 E. Beatryce, Tempe 85281
Mark Dimmitt, Vice President 883-1380
Arizona-Sonora Desert Museum
Tucson 85745
Carol Shumaker, Recording Sec. 325-6992
3458 E. 1st St., Tucson 85716
Karen Breunig, Corresponding Sec. 274-9737
1540 W. Flower Circle S., Phoenix 85015

EX-OFFICIO

LeRoy Brady 255-7357
1428 N. Del Mar, Mesa 85203
Dr. Howard Scott Gentry (hon.) 946-2183
2336 N. 57th Pl., Scottsdale 85257
Dr. William G. McGinnies (hon.) 297-1506
2001 W. Rudasill Rd., Tucson 85704
Stephanie A. Meyer
Alamos, Sonora, Mexico

CHAPTER PRESIDENTS

PHOENIX: Kent Newland 585-3630
8376 Cave Creek Stage, Cave Creek 85331
SOUTH CENTRAL: Velma Adams 426-9172
450 Sun West Drive #30, Casa Grande 85222
TUCSON: Barbara Tellman 792-4515
127 E. Mabel St., Tucson 85705

OTHER BOARD MEMBERS

Dr. Robert Breunig 274-9737
1540 W. Flower Circle S., Phoenix 85015
Martha Burgess 622-1370
2602 W. Calle Paraiso, Tucson 85745
Glen Crough 846-6136
4828 W. Coolidge, Phoenix 85031
Kevin Dahl 881-0807
1609 E. Spring, Tucson 85719
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2122 N. Marion, Tucson 85712
Dr. Richard Felger 624-7888
2003 E. 4th St., Tucson 85719

Rodney Engard 326-9255
3932 E. 1st St., Tucson 85711
Dan James 899-2564
Conservation Committee Chair
14854 W. Belmont, Casa Grande 85222
Matt Johnson 886-6130
9159-H E. Broadway, Tucson 85710
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Michael Kuzmik 968-0969
1544 W. 6th St., Tempe 85281
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Sue Rutman 261-4720
U.S. Fish & Wildlife Service
3616 W. Thomas Rd. #6, Phoenix 85019
Nancy Stallcup 378-1169
RR 1 Box 31C, Hereford 85615
Meg Quinn 883-1380
4500 W. Speedway, Tucson 85745

NEWSLETTER CONTRIBUTIONS

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Kevin Dahl, editor
1609 E. Spring
Tucson, AZ 85719
881-0807

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January 15, 1990

Please direct all other inquiries regarding the Arizona Native Plant Society to the Secretary at our official address:

P.O. Box 41206 Sun Station
Tucson, AZ 85717

The Arizona Native Plant Society
P.O. Box 41206
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