

The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

VOLUME 24 NUMBER 1

WINTER 2000

THE LADY BIRD JOHNSON WILDFLOWER CENTER BY WILDFLOWER CENTER STAFF AND VOLUNTEERS

The Lady Bird Johnson Wildflower Center (formerly the National Wildflower Research Center), was founded in 1982 to educate people about the environmental necessity, economic value, and natural beauty of native plants. The Center is a non-profit educational organization headquartered in Austin, Texas, with links to native plant societies and environmental organizations across the country and around the world. Former First Lady Claudia Alta Taylor "Lady Bird" Johnson, and actress Helen Hayes, co-founded the Center to promote North America's native flora and to better learn how to grow wildflowers.

On a bright December day in 1982, Lady Bird Johnson's seventieth birthday, the fledging institution dedicated its first site on Blackland Prairie soil in east Austin. Over its 18-year history, the Center's mission and outreach has expanded greatly to meet public demands. Today the Center operates in two arenas—by demonstration, at the its headquarters site in Austin, Texas; and by outreach, through its national program.

The Center's first staff leader was Dr. Katherine Kennedy, who is now a botanist for the US Fish and Wildlife Service in Austin, Texas. Dr. David K. Northington became the Center's first full-time director, joining the staff in 1984. During the early to mid-1990s, Dr. Northington oversaw the building of a new, more accessible headquarters site, located in prairie/savanna habitat at the eastern-most extension of the Texas Hill Country. The Center's new facilities opened in 1995. In October 1997, the Center's board of directors voted to rename their institution the Lady Bird Johnson Wildflower Center, and the following month hired Dr. Robert Breunig, a former ANPS vice-president and director of the Phoenix Desert Botanical Garden from 1985 to 1994 to become the new Wildflower Center director and advance its national program.

Regional Demonstration Site

The headquarters combines native plants with local culture, interpreting the Central Texas Hill Country and its ecosystems. Walking through the Center, visitors encounter native plants in gardens and natural areas, an unparalleled rainwater collection and storage system, engaging educational facilities, environmentally-conscious construction which incorporates local and recycled building materials, and Hill Country arts and crafts—all reflecting a regional "sense of place" and demonstrating alternatives for living more gently on the land.

Continued on page 8

MORE INSIDE

Outstanding botanist	2-3
Measuring trees	4-5
Ginny's Notebook	6-7
Plant List	10-16
Reviews	17
Conservation	17-18
ANPS News	19



OUTSTANDING ARIZONA BOTANISTS V: WILLIAM H. EMORY

BARBARA TELLMAN

William H. Emory was one of the first American scientists to reach Arizona when it

still belonged to Mexico and thus was the first to discover many species of plants and animals hitherto unknown to science. He was born in Maryland in 1811, of a long line of aristocrats. By the time William was thirteen his father had decided that William should go to West Point and he persuaded his close friend, James Calhoun, to ensure the appointment. The Emorys were a typical plantation family and Emory was proud of being a "true southern gentleman."

Emory graduated from West Point in 1831, well-schooled in all military aspects, but also devoted to scientific endeavors. In 1838 Col. John Abert (a distinguished soldier-scientist) appointed him to the elite Corps of Topographical Engineers. Its members served as explorers, surveyors and cartographers. Emory married a descendant of Benjamin Franklin that same year which brought him into a family with powerful connections and which played a major role in maximizing his opportunities.

For a few years he worked on harbor projects and from 1844 to 1846 surveyed the Canadian boundary. He also produced a superb map of Texas, using a number of existing maps, though he did not actually travel to Texas. However, Emory and Abert believed that it was important for cartographers to visit the areas they were mapping, so in 1846 Emory joined Kearny's forces which were sent to help take possession of Upper California. Emory was expected to fulfill all military duties as well as work on the survey and conduct scientific studies. The army consisted of 1,458 men, 459 horses, 3,658

mules and 14,904 cattle and oxen, plus some heavy artillery, not usually the best company for a serious scientist. They crossed the desert as quickly as possible, leaving little time for leisurely collecting. Emory made daily entries in his journal which was published as *Notes of a Military Reconnaissance*. He frequently commented on the vegetation of the area, especially plants unfamiliar to him. While he generally described species objectively, he couldn't resist referring to creosote as "our disagreeable friend."

When Kearny sent the wagons back from New Mexico to make progress easier, collecting became even more difficult. Many specimens went to Washington with the wagons, but from then on, it was much more difficult to carry large numbers of



Quercus emoryi from Report on the Boundary Survey.

specimens. Emory did, however, manage to continue collecting, although he was baffled about collecting cacti and had to be satisfied with drawing them and collecting their seeds. Drawings and specimens were sent to George Engelmann and John Torrey who described and classified them. Emory reported on plants, animals, fossils, geology, archaeology and ethnology. These were days before established trails, so travel was difficult and dangerous.

Emory's arrival in California came shortly before the Treaty of Guadalupe Hidalgo turned large parts of the Southwest into U.S. territories. A boundary survey was essential since treaty lines had been drawn on the basis of political decisions and inaccurate maps. Who could be better to work on this project than Emory?

The boundary survey was fraught with dissension and problems, too numerous to discuss here, but Emory again had an opportunity to conduct important scientific work. The survey report was in two volumes, the second of which contained a large botanical section with beautiful engravings of many of the new species collected by Emory, Parry and others. John Torrey classified 2,648 species in his botanical section. Engelmann contributed a 75 page section on cactus and Parry a section discussing the different plant regions. When Asa Gray reviewed this work, he remarked that it was "the most important publication of any kind that has ever appeared."

Soon after publication, Emory was sent to Fort Riley,

Kansas and later he (now a General) became involved in the Civil War. Although he had grown up as a true southern gentleman and was a close friend of Jefferson Davis, he played an important military role on the Union side. After the war, he was deeply involved in reconstruction and later retired with the rank of Brigadier General. He had little time in these later years for scientific endeavors.

For more information:

L. David Norris, James Miligan and Odie Falk. William H. Emory, Soldier-Scientist. University of Arizona Press. 1998.

W.H. Emory. Notes of a Military Reconnaissance from Fort Leavenworth in Missouri to San Diego in California including Parts of the Arkansas, Del Norte [Rio Grande], and Gila Rivers. Exec. Doc. 41, 30th Congress - 1st Session. (Also available as an abridged reprint by the University of New Mexico Press). 1848.

W.H. Emory. Report on the United States and Mexican Boundary Survey made under the Direction of the Secretary of the Interior. 34th Congress - 1st Session. Exec. Doc. 135. 1857.

B. Cunningham. W.H. "Bold" Emory's notes of a military reconnaissance: a survey of Arizona's Gila River, 1846. Tucson Corral of the Westerners.. Smoke Signal #66. 1996.

Barbara is editor of the Plant Press and a researcher and writer at the University of Arizona's Water Resources Research Center.

THANKS MARTY EBERHARDT

Marty Eberhardt will leave as Director of the Tucson Botanical Gardens in May. She is moving to San Diego where her husband is now the curator of fishes and a professor at Scripps Institute of Oceanography. Marty has done an wonderful job in her eleven years at TBG. Under her leadership the gardens have become nationally recognized and now include a children's garden, a sensory garden for the disabled, a butterfly garden, a barrio garden, and a xeriscape garden. TBG now also has a flourishing education program, a horticultural therapy program and a series of public events, such as the Chili Fiesta. Marty has also been a valued ANPS member and served on the state board for several years. The TBG Board is looking nationally for a replacement. For information call TBG at 520 326-9255.

TIPS FOR MEASURING ARIZONA'S TREES

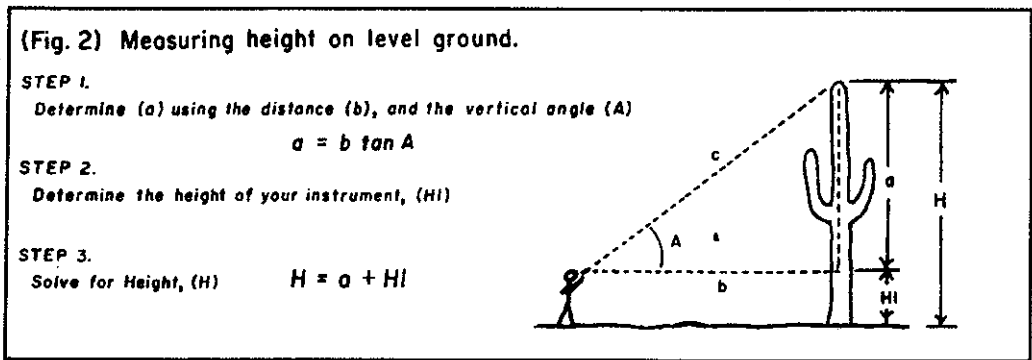
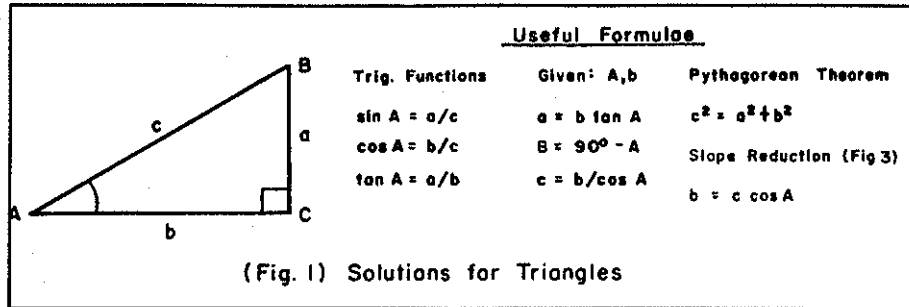
JEFF KREAMER

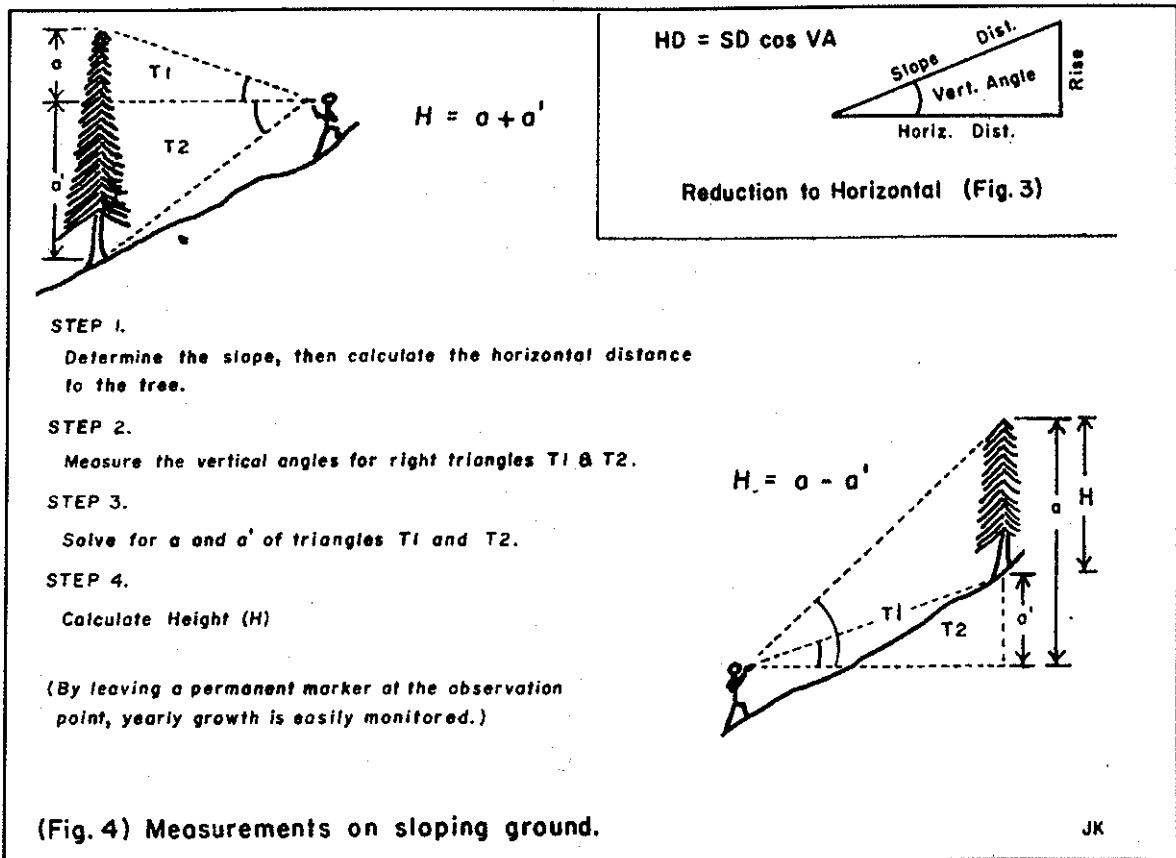
Have you ever come upon an old saguaro or a towering pine and wondered just how tall it is? There are many unique devices to help determine the size of trees. Telescoping measuring rods are effective for the direct measurement of trees up to approximately fifteen feet high, but are cumbersome to carry. For taller objects, specialized instruments are used to obtain the measurements necessary to compute the heights of trees. Measuring devices, such as the Relaskop or Hypsometer, can measure tree heights and diameter quickly and easily. These instruments are designed for professionals, and are quite costly.

Most tree measuring instruments operate on similar principles. They contain a clinometer for measuring vertical angles, an automatic range finder for determining distance, and a computation scale. They operate using the geometric solutions of right triangles. Internally programmed trigonometric functions enable the user to calculate tree heights directly from the device, otherwise, you must also use a hand held calculator. If you understand the theory of operation, then you can use any tools that measure distance and vertical angles to obtain the height of a tree. A tape measure and simple clinometer can provide the data. Many of the better

compasses used by backpackers and orienteering enthusiasts contain simple clinometers. The popular "Silva Ranger" has a built-in clinometer for about \$45.00.

The accuracy of your height calculations depends upon the quality of your measurements. Tape measures are much more accurate than range finders. The ideal distance from the point of sighting to the tree to be measured is slightly more than the tree is tall which would result in a vertical angle of 35° to 40°, (Fig. 2). Since distance can be measured accurately with a tape, it is the vertical angles that must be determined carefully. For most surveys, a reasonable precision can be achieved if vertical angles are measured accurately to the nearest whole degree of arc. When using inexpensive devices, the quality of angle measurements can be strengthened to this precision by using the average of several readings. Once the horizontal distance and the vertical angle are measured, a calculator with trig functions can then be used to determine the height. Most calculators allow people with almost no understanding of trigo-





nometry to perform the calculations as long as they know how to use the formulas. If you prefer to carry as little as possible, record your data and do the calculations at home.

Fig. 1 provides the basic formulas needed for tree height measurements. These formulas are for the solution of right triangles. More complex formulas can be used for the solution of oblique triangles, but they are seldom needed for this purpose. Fig. 2 illustrates the ease with which tree heights can be measured on level ground. Knowing the horizontal distance from the tree, the vertical angle to the top, and the height of the instrument, one can determine the height of the tree from two simple calculations.

Observations on sloping ground require the solution of additional triangles. The slope distance measured from the tree must first be reduced to

the horizontal distance using the slope formulas (Fig. 3). Vertical angles are then measured, and the rise (or fall) is calculated for each right triangle. The tree height can then be calculated using the formulas shown in Fig. 4.

With the proper tools, and a working knowledge of triangle mathematics, many types of measurements can be made in almost any field condition. Since most surveying and mapping techniques are based upon vertical and horizontal triangulation, an understanding of these principles will greatly enhance the mapping skills of scientists and orienteering enthusiasts. If extremely detailed measurements are needed for growth studies, then standard surveying instruments should be used. The mathematics is the same, but the measuring precision is greatly improved.

For information about Jeff, see page 19.

PAGES FROM GINNY'S NOTEBOOK
SAXIFRAGACEAE - SAXIFRAGE FAMILY
VIRGINIA SAYLOR

SAXIFRAGACEAE - SAXIFRAGE FAM.

21

JANAS 26(1)

Pg. No.	Genus Common Name	Form	Flower		Pet. No styles Stms	Leaf cm	G WF	K CF	TX RK
			Color	Outline mm					
	<i>Astilbe</i> False Goatsbeard	PHrb	yel- wh	R-P 5	4-5 2 8-10		736 E202	— —	— —
	<i>Bensoniella</i>	PHrb	wh	threalike ephem. 5	5 2 5	B 4.70	— —	JM 1002	— —
	<i>Bolandra</i>	PHrb	grn pur tip	P 4.7	5 1 5	B-C 1-5 wd	JM 1003	731	—
	<i>Boykinia</i>	PHrb	wh	P 2-7	5 1 5	B-C 12- 20 wd	736 268	— 732	— 238
	<i>Chrysosplenum</i> Golden Saxifrage	PHrb	yel± grn	A.50 15 1/2	0 2 4-8	C-O/A 5-2	744 E210	— 738	— 237
	<i>Darmera</i> Indian Rhubarb Umbrella Plant	PHrb	wh to pk	R 5-7	5 2 10	B 10 dm	JM 1003	733	—
	<i>Elmera</i>	PHrb	wh	R 4	5	B-C 5	— FG 86	— —	— —
	<i>Heuchera</i> Alumroot	PHrb	wh pk grn yel-grn	R 2-7	0-5 2 5	B± 2- 9-18	741 269	363 740	719 235
	<i>Jepsonia</i>	PHrb	wh pk yel-grn	CY 3-6	5 1 10	B 2-6	— 262	— 733	— —
	<i>Leptarrhena</i> Leather-leaf S.	PHrb	wh	P 6-9	5	B-C 3-5	— —	— —	RM 208
	<i>Lepuropetalon</i>	AHrb	wh	So MI 5	5	scalc A 2-6 mm	— —	— —	718
	<i>Lithophragma</i> Woodland Star	PHrb	wh pk	R 3-13	5 3 10	B-C 	— 262	365 736	— RF 312
	<i>Mitella</i> Bishop's Cap Miterwort	PHrb	yel-grn wh	R/S 3	5 2 5-10	B± 1.5-8 wd	744 270	— 740	719 237
	<i>Parnassia</i> Grass of Parnassus	PHrb	wh pl yel	So 8-20	5 4 5	B 3-18	UT 560 266	366 731	719 234

SAXIFRAGACEAE - SAXIFRAGE-FAM. 21
JANAS 26 (1)

Pq No.	Genus Common Name	Form	Flower outline color	mm	Pet.No. styles stms	Leaf cm-blade	G WF	K CF	TX RK
	<i>Penthorum</i> Ditch- Stonewort	PHrb	yel- grn	cy 5	0 5 10	A 5-10 la	736 E202	—	718
	<i>Saxifraga</i> <i>Saxifrage</i>	PHrb	wh pk ± yel	cy-p 2-6	5 2 10	B(C) 1- 20	737 JM 1009	362 733	718 238
	<i>Saxifragopsis</i>	PHrb	wh	p 2-3	5 1 10	B 1.5-4	JM 1010	734	—
	<i>Suksdorfia</i>	PHrb	wh	cy 2-4	5 1 5	B-C 1-4 wd	JM 1010	732	—
	<i>Sullivantia</i>	PHrb	wh	p 5	5 2 5	B 2-5d.	736	—	237
	<i>Tellima</i> Fringe Cups	PHrb	wh red	S-R 5	5 1 10	B-C 5-40	JM 1011	739	237
	<i>Tiarrella</i> Coolwort Sugar Scorp	PHrb	wh	R 3-4	5 2 10	B-C 3-9 9-12	JM 1011	739	—
	<i>Tolmiea</i> Pg-a-Back Plan	PHrb	brn-pur thread	R 8-12	4 1 3	B-C 8-40	JM 1011	739	—

40 genera - 600 spp. chiefly n temperate, arctic, alpine regions
Fruit - 2 follicles or 2-4 valved capsule.

Notes To Ginny's Notebook

- The last three columns refer to pages in which the species is described in standard books.
 CF: P.A. Munz. 1959. California Flora. Univ. of California Press. 1681 pp.
 FG: T.F. Niehaus and C.L. Ripper. Field Guide to Pacific States Wildflowers. Houghton-Mifflin. 432 pp.
 G: M.L. Fernal, ed. 1988. Gray's Manual of Botany 8th ed. Dioscorides Press. 1632 pp.
 JM: E. Hickman. 1987. Jepson Manual of the Higher Plants of California. Univ. of California Press. 1400 pp.
 K: Thomas Kearny and Robert Peebles. 1951. Arizona Flora. Univ. of California Press. 1032 pp.
 RK: John Coulter and Aven Nelson. 1902. New Manual of Botany of the Central Rocky Mountains. American Book Company. 1902. 646 pp.
 TX: Donovan Correll and Marshall Johnson. 1970. Manual of Vascular Plants of Texas. Texas Research Foundation. 1881 pp.
 UT: S.L. Welsh. 1987. Utah Flora. Brigham Young University. 894 pp.
 WF: Harold Rickett et al. 1970. Wild flowers of the United States, Vol. 4 the Southwest New York Botanic Garden.

Abbreviations: AHrb - Annual Herb; PHrb - Perennial Herb; R - Raceme; P - Panicle; A - Axillary; So - Solitary

Virginia is a long-time ANPS member with an enthusiasm for botany and, now retired, she continues her studies through careful observation recorded in her notebooks.

Ladybird continued from page 1



A limestone arch frames one of the garden's wildflower beds. Photo: Wildflower Center.

Landscape Design and Horticulture

Surrounding the Center's courtyard and building facilities are three acres of formally landscaped native plant gardens. Based on a conceptual design by landscape architect Dr. Darrell Morrison, of the University of Georgia, the gardens include 23 distinct theme beds. Especially popular with local residents, the theme beds display regional native plants to help residents select species and varieties adapted to the soil, light and water conditions of their yard and garden sites. Plants native to a 100-mile radius from Austin are grown from seed for use in display gardens and for purchase by the public during twice-yearly sales.

Environmentally Sensitive Construction

The Wildflower Center's headquarters stand as an award-winning model of environmentally sensitive construction and landscape design. Woodland areas and large trees were protected during construction and rocks, plants and soil, removed during building excavation, were later reintegrated into the landscape design. Sedimentation/filtration ponds were engineered to collect runoff from paved areas, preventing pollutants in rainwater runoff from seeping into the porous limestone of the Edwards Aquifer (an invaluable water source for Austin and San Antonio that underlies the headquarters site).

Rainwater Harvesting System

Water conservation has always been a practice of the Center, with rainwater collection a feature at both the original and the newer headquarters. The current site showcases one of North America's largest rainwater harvesting systems that collects rain from every major building on the site. In all, 17,000 square feet of rooftop are utilized, yielding about 10,200 gallons of irrigation water per inch of rain. Rainwater is carried along a stone aqueduct and through metal troughs to rustic stone cisterns near the courtyard and buildings, and also through underground pipes to inconspicuous metal storage tanks. The system can store up to 68,500 gallons of rainwater.

Regional Integrity in Architectural Design

The Center's unique architecture, along with native plants, have made the headquarters site a national model for demonstrating a regional "sense of place." The buildings surround an open stone courtyard and a replicated aquifer spring. They blend Texas Hill Country building materials and architectural styles from various settlers—limestone and brick masonry (inspired by German immigrants), sandstone (inspired by Spanish mission architecture) and corrugated tin siding and metal roofs (inspired by ranchers). Recycled pine floor boards add warmth to interior spaces, which feature the decor of Hill Country antiques, American quilts and textiles, and Texas stoneware pottery. The buildings include a visitor gallery and auditorium, children's education center, gift store, administration, research and library facilities, and a café.

Habitat Preservation and Land Restoration

The headquarters site, when first opened in 1995, consisted of 43 acres, 5 acres of which were developed for public use and native plant exhibits. The remaining 38 acres, managed for habitat restoration and enhancement, include nature trails that wind through a prairie/savanna wooded area and meadow. In 1999, to help preserve its open setting and conserve surrounding native habitat, the Center acquired 136 acres of adjacent, prairie/savanna land. A \$4 million "Love the Land" campaign has been launched to pay for the acquisition (which had been slated to be developed as a dense tract of single family homes). The acquired land is being managed as a Prairie Savanna Preserve and is a model for ecological restoration under the Center's new Landscape Restoration Program, which is one component of the Center's national program.

National Program

In tandem with its regional headquarters, the Center has a national program which includes an information clearing house, Internet website, quarterly magazine (*Native Plants*), various partnerships, affiliates and conferences, the Brown Center for Education and the Landscape Restoration Program.

Information Clearing House

The Center's clearinghouse has long-offered regional native plant information to individuals, educators, businesses and various institutions. This includes native plant bibliographies, seed source lists and recommended species lists for nine regions across North America, along with fact sheets on special topics such as propagating individual species, converting a lawn to buffalo grass, recreating a prairie, etc. Also available for rent or purchase are wildflower slide programs for six regions.

Internet Website www.wildflower.org

Features include a North American Native Plant Event Calendar, an education page for the Center's workshops and classes, Kids Page, an active links page, a membership page, and an on-line catalog.

Native Plants Magazine

In 1999, the Center launched a new national magazine, *Native Plants*, which covers subjects ranging from endangered species to landscape design to nature activities for children.

Partnerships, Affiliates and Conferences

The Center has entered into several collaborative partnerships with the National Wildlife Federation, the Nature Conservancy of Texas, the Plant Conservation Alliance and other groups that promote native plant conservation and education. The partnership with the National Wildlife Federation features sharing of web and database resources and joint curriculum development. Additionally, the Center's first affiliate garden, at Westchester Community College in Valhalla, New York, was dedicated last October. Both local and national conferences are held at the Center, utilizing state-of-the art classroom facilities and an uncommonly beautiful auditorium, constructed from colorful sandstone in an architectural style influenced by Spanish mission architecture.

Brown Center for Education

In 1998 a gift from the Brown Foundation of Houston endowed a new educational program at the Wildflower Center, the Brown Center for Environmental Education. The Brown Center was formed to develop model innovative programs in environmental education that connect people, and especially children, to the natural world through plants. An environmental science curriculum has been written for grades K-6, with other grade levels to follow. Youth classes, day camps, and general classes taught through the Brown Center will utilize the newly acquired, 136-acre Prairie/Savanna Preserve for botanical and ecological study.

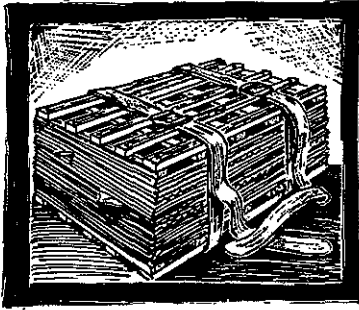
Landscape Restoration Program

With the Prairie/Savanna Preserve as a centerpiece, the Center launched a Landscape Restoration Program in 1999. This program serves as a regional center for coordination, education, and research, and as a national model for a community-based landscape restoration demonstration project. It provides expertise, consultation and coordination for municipal and non-governmental organizations and for private landowners. Training in restoration ecology and land management is available to North American land managers and consultants. The Program will contribute to public school curricula in collaboration with the Brown Center and will conduct research on questions of local restoration relevance as well as broader restoration concerns.

To learn more, write to 4801 La Crosse Avenue, Austin, Texas 78739 or visit the website. Dues start at \$25 and include a subscription to *Native Plants*.



Entryway to the main buildings.
Photo: Wildflower Center.



FLORAS OF ARIZONA NATIONAL PARKS AND MONUMENTS IV: PETRIFIED FOREST NATIONAL PARK STEVE MCLAUGHLIN

This is the fourth checklist in our series of floristic species lists for various

national parks, monuments, and historic sites in Arizona. These lists were obtained from the World Wide Web at <http://ice.ucdavis.edu/nps>, an online database created and maintained by the Information Center for the Environment (ICE) at the University of California at Davis. This is a very useful web site, providing lists of plants and animals from parks from throughout the United States. Names appearing on these lists, however, have not been verified by ICE and may have some nomenclatural problems. Each list will be edited by ANPS member Steve McLaughlin for synonymy (the same plant species occurring under two or more Latin names), exotic species will be identified by an asterisk (*), and updated nomenclature will be provided along with Latin binomials that may be more familiar to ANPS members.

Petrified Forest National Park is at the south end of the Colorado Plateau along the Navajo-Apache county line. The park occupies 93,533 acres (379 km²), ranging in elevation from approximately 5,500 ft. (1678 m) to 6,240 ft. (1902 m). Annual precipitation is low, just 8.7 in. (222 mm) annually,

with 57% occurring from July through October. The entire region is mapped as "Plains and Great Basin Grassland" on Dave Brown's and Charles Lowe's "Biotic Communities of the Southwest" map.

The flora is not large for such an extensive area, just 349 native species and subspecific taxa. Exotic species account for 12 % of the total flora. The ICE checklist includes 49 families, 181 genera, and 320 species and subspecific taxa, but includes no Euphorbiaceae and few Fabaceae, which I assume were inadvertently omitted. To provide a more complete accounting of the flora, the following checklist combines the plants included on the ICE list with species listed in the "Seed plant checklist of Petrified Forest National Park" printed in 1976 by the Petrified Forest Museum association. There is considerable overlap between these two lists, although taxa occur on each list that are not included in the other. The following combined checklist comprises 51 families, 209 genera, and 398 species and subspecific taxa, including 49 exotic species.

Steve is a professor at the University of Arizona's Office of Arid Lands Studies with special interest in economic botany and taxonomy.

THE PETRIFIED FOREST

The Petrified Forest was set aside as a National Park in 1906, and expanded in 1962, to protect a highly unusual collection of 225 million year old fossils. The Park also includes portions of the Painted Desert to the north. There are no camping facilities in the Park, but there are places to stay in the nearby communities of Holbrook and St. Johns. For more information about the Park, read *Petrified Forest National Park: a Wilderness Bound in Time* by George Lubick (Univ. of Arizona Press 1996). You can contact the Park directly at 520 524-3138 or through the web site www.nps.gov.pefo.

PLANTS OF PETRIFIED FOREST NATIONAL PARK

* indicates exotic species, + indicates species added from Petrified Forest Museum Association (1976) list.

GYMNOSPERMS

Cupressaceae

Juniperus monosperma One seed juniper

Ephedraceae

Ephedra nevadensis Nevada jointfir

Ephedra torreyana Torrey's jointfir

Ephedra viridis var. *viridis* Mormon tea

+*Ephedra viridis* var. *viscida*

Pinaceae

Pinus edulis Two needle pinyon

ANGIOSPERMS - Dicots

Amaranthaceae

Amaranthus blitoides (*A. graecizans*) Prostrate pigweed

**Amaranthus hybridus* Slim amaranth

**Amaranthus retroflexus* Redroot amaranth

Anacardiaceae

Rhus trilobata Skunkbush sumac

Apiaceae

Cymopterus bulbosus Bulbous spring parsley

Cymopterus fendleri Fendler's spring parsley

+*Cymopterus newberryi*

+*Cymopterus purpurascens*

Cymopterus purpureus Purple spring parsley

Apocynaceae

Amsonia peeblesii Peeble's bluestar

Asclepiadaceae

Asclepias involucrata Dwarf milkweed

Asclepias subverticillata Whorled milkweed

Asteraceae

Achillea millefolium var. *lanulosa* Western yarrow

Ambrosia acanthicarpa Flatspine burr ragweed

+*Ambrosia artemisiifolia*

Artemisia filifolia Sand sagebrush

Artemisia frigida Fringed sagewort

Artemisia tridentata Big sagebrush

Bidens bigelovii Bigelow's beggarticks

Brickellia californica California brickellbush

Brickellia eupatorioides (*B. chlorolepis*) False boneset

Brickellia oblongifolia

var. *linifolia*

Narrowleaf brickellbush

Chaenactis macrantha Bighead dustymaiden

Chaenactis stevioides Steve's dustymaiden

Chaetopappa ericoides (*Leuceline ericoides*) Rose heath

Chrysothamnus greenii Greene's rabbitbrush

Chrysothamnus nauseosus Rubber rabbitbrush

Chrysothamnus parryi

ssp. *nevadensis*

Nevada rabbitbrush

Chrysothamnus pulchellus Southwestern rabbitbrush

+*Chrysothamnus viscidiflorus* var. *stenophyllus*

Cirsium ochrocentrum Yellowspine thistle

Conyza canadensis Canadian horseweed

Erigeron concinnus Navajo fleabane

Erigeron consimilis (*E. compactus*

var. *consimilis*)

Foothill fleabane

Erigeron divergens Spreading fleabane

+*Erigeron flagellaris* (*E. nudiflorus*)

Gaillardia pinnatifida Red dome blanketflower

+*Grindelia nuda* var. *aphanactis* (*G. aphanactis*)

Grindelia squarrosa Curlycup gumweed

Gutierrezia microcephala

(*G. lucida*)

Threadleaf snakeweed

Gutierrezia sarothrae Broom snakeweed

Helianthus annuus Common sunflower

Helianthus ciliaris Texas blueweed

Helianthus petiolaris Prairie sunflower

+*Heliomeris longifolia* var. *annua* (*Viguiera annua*)

+*Heliomeris ciliata* (*Viguiera ciliata*)

Heliomeris multiflora

(*Viguiera multiflora*)

Showy goldeneye

Heterotheca subaxillaris (*H. psammophila*) Camphorweed

+*Heterotheca villosa* var. *foliosa*

Heterotheca villosa var. *villosa* Hairy goldenaster

Hymenopappus filifolius

var. *pauciflorus*

Fineleaf hymenopappus

+*Hymenopappus flavescens*

var. *canotomentosus* (*H. robustus*)

+*Hymenothrix loomisii*

Hymenothrix wrightii Wright's thimblehead

+*Hymenoxys richardsonii* var. *floribunda*

Isocoma drummondii

(*Haplopappus drummondii*)

Drummond's jimmyweed

<i>Iva acerosa</i>	Copperweed	<i>var. cupulata (L. texana)</i>	Flatspine stickseed
* <i>Lactuca serriola</i>	Prickly lettuce	+ <i>Lappula occidentalis var. occidentalis (L. redowskii)</i>	
<i>Lygodesmia grandiflora</i>	Largeflower skeleton plant	+ <i>Lithospermum incisum</i>	
<i>Machaeranthera canescens</i>		Brassicaceae	
<i>var. glabra (M. linearis)</i>	Cutleaf goldenweed	<i>Arabis lignifera</i>	Desert rockcress
<i>Machaeranthera gracilis</i>	Slender goldenweed	<i>Arabis perennans</i>	Perennial rockcress
+ <i>Machaeranthera grindelioides (Haplopappus nuttallii)</i>		+ <i>Arabis pulchra</i>	
<i>Machaeranthera pinnatifida</i>	Lacy tansyaster	<i>Descurainia incana</i>	
+ <i>Machaeranthera tanacetifolia</i>		(<i>D. richardsonii</i>)	Mountain tansymustard
(<i>Aster tanacetifolius</i>)		<i>Descurainia obtusa</i>	Blunt tansymustard
<i>Malacothrix fendleri</i>	Fendler's desert dandelion	<i>Descurainia pinnata</i>	Western tansymustard
+ <i>Malacothrix sonchoides</i>		<i>Dimorphocarpa wislizenii</i>	Tourist plant
<i>Pectis angustifolia</i>	Narrowleaf pectis	<i>Erysimum capitatum</i>	Sanddune wallflower
<i>Petrorhiza pumila</i>	Grassy rock goldenrod	<i>Lesquerella fendleri</i>	Fendler's bladderpod
<i>Psilostrophe tagetina</i>	Woolly paperflower	<i>Lesquerella intermedia</i>	Mid bladderpod
<i>Ratibida tagetes</i>	Green prairie coneflower	<i>Physaria newberryi</i>	Newberry's twinpod
<i>Sanvitalia abertii</i>	Abert's creeping zinnia	<i>Rorripa sinuata</i>	Spreading yellowcress
<i>Senecio flaccidus</i>		<i>Rorripa sphaerocarpa</i>	Roudfruit yellowcress
(<i>S. douglasii var. longilobus</i>)	Threadleaf groundsel	* <i>Sisymbrium altissimum</i>	Tall tumbledustard
<i>Senecio multica pitatum</i>	Ragwort groundsel	<i>Stanleya pinnata</i>	Desert prince's plume
+ <i>Solidago parryi (Haplopappus parryi)</i>		<i>Streptanthella longirostris</i>	Longbeak streptanthella
* <i>Sonchus asper</i>	Spiny sowthistle		
<i>Stephanomeria exigua</i>	Small wire lettuce	Cactaceae	
<i>Stephanomeria pauciflora</i>	Brownplume wire lettuce	<i>Echinocereus coccineus var. coccineus (E. triglochidiatus</i>	Scarlet hedgehog cactus
<i>Tetradymia canescens</i>	Spineless horsebush	<i>var. melanacanthus)</i>	
<i>Tetraeneuris acaulis var. arizonicus</i>		<i>Echinocereus fendleri</i>	
(<i>Hymenoxys a. var. a.</i>)	Arizona hymenoxys	<i>var. fendleri</i>	Fendler's hedgehog cactus
<i>Tetraeneuris ivesiana</i>		<i>Escobaria vivipera var. arizonica</i>	
(<i>Hymenoxys ivesiana</i>)	I've's' fournerved daisy	(<i>Coryphantha v. var. a.</i>)	Arizona spinystar
<i>Thelesperma megapotamicum</i>	Hopi tea greenthread	<i>Opuntia erinacea var. erinacea</i>	Grizzlybear pricklypear
<i>Townsendia annua</i>	Annual townsend daisy	<i>Opuntia erinacea var. hystricina</i>	Grizzlybear pricklypear
<i>Townsendia incana</i>	Hoary townsendia	<i>Opuntia erinacea var. utahensis</i>	
<i>Townsendia strigosa</i>	Hairy townsendia	(<i>O. rhodantha</i>)	Utah grizzlybear pricklypear
+* <i>Tragopogon pratensis</i>		<i>Opuntia fragilis var. brachyarthra</i>	Brittle pricklypear
+ <i>Verbesina encelioides</i>		<i>Opuntia fragilis var. fragilis</i>	Pygmy pricklypear
<i>Wyethia scabra var. canescens</i>	Badlands mules ears	<i>Opuntia macrorhiza</i>	Twistspine pricklypear
<i>Xanthium strumarium</i>	Rough cocklebur	<i>Opuntia polyacantha var. rufispina</i>	Hairspine pricklypear
<i>Zinnia grandiflora</i>	Rocky Mountain zinnia	<i>Opuntia polyacantha</i>	
		<i>var. trichophora</i>	Hairspine pricklypear
Berberidaceae		<i>Opuntia whipplei</i>	Whipple cholla
<i>Mahonia haematocarpa</i>		<i>Pediocactus peeblesianus</i>	
(<i>Berberis haematocarpa</i>)	Red barberry	<i>var. peeblesiana</i>	Navajo pincushion cactus
Boraginaceae		<i>Sclerocactus papyracanthus</i>	
<i>Cryptantha crassise-pala</i>	Thicksepal catseye	(<i>Pediocactus papyracanthus</i>)	Paperspine fishhook cactus
<i>Cryptantha flava</i>	Brenda's yellow catseye	<i>Sclerocactus whipplei</i>	Whipple's fishhook cactus
<i>Cryptantha fulvocanescens var. echinoides</i>	Tawny catseye		
<i>Heliotropium convolvulaceum</i>	Phlox heliotrope		
<i>Lappula occidentalis</i>			

Capparidaceae

- Cleome serrulata* Rocky Mountain beeplant
Wislizenia refracta ssp. *refracta* Spectacle fruit

Caryophyllaceae

- Arenaria eastwoodiae*
 var. *adenophora* Eastwood's sandwort

Chenopodiaceae

- Allenrolfea occidentalis* Iodinebush
Atriplex argentea Silverscale saltbush
Atriplex canescens Fourwing saltbush
Atriplex confertifolia (*A. jonesii*) Shadscale saltbush
Atriplex powellii Powell's saltbush
 **Atriplex rosea* Tumbling saltweed
Atriplex saccaria Sack saltbush
 +*Chenopodium berlandieri*
Chenopodium desiccatum Aridland goosefoot
Chenopodium fremontii
 var. *fremontii* Fremont's goosefoot
Chenopodium leptophyllum Narrowleaf goosefoot
 +*Chenopodium neomexicanum* (*C. arizonicum*)
Chenopodium salinum
 (*C. glaucum* var. *salinum*) Rocky Mountain goosefoot
 **Corispermum nitidum* Common bugseed
Cycloloma atriplicifolium Winged pigweed
Kochia americana Greenmolly
 **Kochia scoparia* Common kochia
Krascheninnikovia lanata (*Eurotia lanata*) Winterfat
Monolepis nuttallianus Nuttall's povertyweed
 **Salsola tragus* (*S. iberica*) Prickly Russian thistle
Sarcobatus vermiculatus Greasewood
Suaeda moquinii (*S. torreyana*) Mojave seablite
Zuckia brandegei var. *arizonica*
 (*Grayia brandegei*) Brandegee's siltbush

Convolvulaceae

- **Convolvulus arvensis* Field bindweed
Evolvulus nuttallianus
 (*E. pilosus*) Shaggy dwarf morningglory

Euphorbiaceae

- Chamaesyce albomarginata* (*Euphorbia albomarginata*)
Chamaesyce fendleri (*Euphorbia fendleri*)
Chamaesyce parryi (*Euphorbia parryi*)
 +*Croton texensis*

Fabaceae

- +**Alhagi camelorum* Camelthorn
 +*Astragalus brandegei*
 +*Astragalus ceramicus* var. *ceramicus*
 +*Astragalus convallarius* (*A. junciformis*)
 +*Astragalus kentrophyta*
 +*Astragalus lentiginosus*
 +*Astragalus praelongus*
 +*Astragalus mollissimus* var. *thompsonae* (*A. thompsonae*)
 +*Caesalpinia jamesii* (*Hoffmannsseggia jamesii*)
 +*Dalea candida* (*Petalostemon candidum*)
 +*Dalea flavescens* (*Petalostemon flavescens*)
 +*Dalea lanata* var. *terminalis* (*D. terminalis*)
 +*Glycyrrhiza lepidota*
 +*Lupinus brevicaulis*
Lupinus pusillus ssp. *intermontanus* Intermountain lupine
 **Medicago sativa* Alfalfa
 **Melilotus officinalis* Yellow sweetclover
Parryella filifolia Common dunebroom
Peteria scoparia Rush peteria
 +*Psoralidium lanceolatum* (*Psoralea lanceolata*)
Sophora stenophylla Fringeleaf necklace pod

Gentianaceae

- +*Frasera albomarginata* (*Swertia albomarginata*)
Frasera paniculata (*Swertia utahensis*) Tufted elkweed
 +*Frasera speciosa* (*Swertia radiata*)

Geraniaceae

- **Erodium cicutarium* Redstem stork's bill

Hydrophyllaceae

- Nama hispidum* var. *spathulatum* Bristly nama
Phacelia cephalotes Virgin scorpionweed
Phacelia corrugata Cleftleaf wild heliotrope
Phacelia crenulata Cleftleaf wild heliotrope
Phacelia integrifolia
 var. *integrifolia* Gypsum scorpionweed
Phacelia ivesiana Ives' phacelia
 +*Phacelia neomexicana*

Lamiaceae

- **Marrubium vulgare* Horehound
 +*Mentha arvensis*
Poliomintha incana Hoary rosemary mint
Salvia pachyphylla Blue sage
Salvia reflexa Lanceleaf sage
Stachys rothrockii Rothrock's hedge nettle

Linaceae		Plantaginaceae	
<i>Linum aristatum</i>	Bristle flax	* <i>Plantago lanceolata</i>	Narrowleaf plantain
<i>Linum puberulum</i>	Plains flax	* <i>Plantago major</i>	Common plantain
		<i>Plantago patagonica</i>	Woolly plantain
Loasaceae		Polemoniaceae	
<i>Mentzelia albicaulis</i>	Whitestem blazingstar	<i>Gilia ophthalmoides</i>	Eyed gilia
<i>Mentzelia multiflora</i>	Manyflowered mentzelia	<i>Gilia rigidula</i> ssp. <i>acerosa</i>	Bluebowls
<i>Mentzelia pumila</i>	Dwarf mentzelia	+ <i>Gilia scopulorum</i>	
		<i>Gilia sinuata</i>	Rosy gilia
Malvaceae		<i>Gilia subnuda</i>	Coral gilia
<i>Malvella leprosa</i> (<i>Sida hederacea</i>)	Alkali mallow	<i>Gilia triodon</i>	Coyote gilia
<i>Sphaeralcea ambigua</i>	Desert globemallow	+ <i>Ipomopsis gunnisonii</i> (<i>Gilia gunnisonii</i>)	
<i>Sphaeralcea incana</i> ssp. <i>cuneata</i>	Soft globemallow	<i>Ipomopsis longiflora</i>	Flaxflowered gilia
<i>Sphaeralcea incana</i> ssp. <i>incana</i>	Gray globemallow	<i>Ipomopsis multiflora</i>	Manyflowered gilia
<i>Sphaeralcea parvifolia</i>	Smallflower globemallow	<i>Ipomopsis polycladon</i>	Manybranched gilia
<i>Sphaeralcea subhastata</i>	Globemallow	+ <i>Ipomopsis pumila</i> (<i>Gilia pumila</i>)	
		Polygonaceae	
Nyctaginaceae		<i>Eriogonum alatum</i>	Winged buckwheat
<i>Abronia elliptica</i>	Fragrant white sand verbena	<i>Eriogonum cernuum</i> var. <i>cernuum</i>	Nodding buckwheat
+ <i>Abronia fragrans</i>		<i>Eriogonum corymbosum</i>	
+ <i>Boerhaavia torreyana</i>		var. <i>aureum</i> (<i>E. c.</i> var. <i>glutinatum</i>)	Crispleaf buckwheat
<i>Mirabilis linearis</i>	Narrowleaf four o'clock	<i>Eriogonum divaricatum</i>	Divergent buckwheat
<i>Mirabilis multiflora</i>	Colorado four o'clock	<i>Eriogonum ericifolium</i>	
		var. <i>pulchrum</i>	Yavapai County buckwheat
Oleaceae		<i>Eriogonum hookeri</i>	Hooker's buckwheat
<i>Forestiera pubescens</i>	Stretchberry	<i>Eriogonum jamesii</i> var. <i>jamesii</i>	James' buckwheat
<i>Menodora scabra</i>	Rough menodora	<i>Eriogonum lachnogynum</i>	Woollycup buckwheat
		<i>Eriogonum leptoclado</i>	
Onagraceae		var. <i>ramosissimum</i>	Sand buckwheat
+ <i>Calylophus lavandulifolius</i> (<i>Oenothera lavandulaefolia</i>)		<i>Eriogonum leptophyllum</i>	Slenderleaf buckwheat
<i>Camissonia scapoidea</i>	Barestem evening primrose	+ <i>Eriogonum microthecum</i> var. <i>simpsonii</i> (<i>E. simpsonii</i>)	
<i>Gaura coccinea</i>	Scarlet beeblossom	<i>Eriogonum microthecum</i>	
+ <i>Gaura parviflora</i>		var. <i>foliosum</i>	Simpson's buckwheat
<i>Oenothera albicaulis</i>	Whitestem evening primrose	+ <i>Eriogonum subreniforme</i>	
+ <i>Oenothera caespitosa</i>		<i>Eriogonum wrightii</i> var. <i>wrightii</i>	Wright's bastardsage
<i>Oenothera flava</i>	Yellow evening primrose	* <i>Polygonum arenastrum</i> (<i>P. aviculare</i>)	Prostrate knotweed
<i>Oenothera pallida</i> ssp. <i>pallida</i>	Pale evening primrose	* <i>Polygonum lapathifolium</i>	
<i>Oenothera pallida</i> ssp. <i>runcinata</i>	Pale evening primrose	(<i>P. incanum</i>)	Curlytop knotweed
		<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed
Orobanchaceae		<i>Polygonum ramosissimum</i>	Bushy knotweed
<i>Orobanche cooperi</i>	Desert broomrape	+ <i>Rumex hymenosepalus</i>	
<i>Orobanche fasciculata</i>	Clustered broomrape	<i>Rumex salicifolius</i>	
+ <i>Orobanche ludoviciana</i> ssp. <i>multiflora</i> (<i>O. multiflora</i>)		var. <i>mexicanus</i> (<i>R. mexicanus</i>)	Mexican dock
		+ <i>Stenogonum salsuginosum</i> (<i>Eriogonum salsuginosum</i>)	
Papaveraceae			
<i>Argemone pleiacantha</i>	Southwestern prickly poppy		

Primulaceae			
+* <i>Anagallis arvensis</i>			
Ranunculaceae			
* <i>Ceratocephala testiculata</i> (<i>Ranunculus testiculatus</i>)	Curveseed butterwort		
<i>Clematis ligusticifolia</i>	Western white clematis		
<i>Delphinium scaposum</i>	Tall mountain larkspur		
<i>Ranunculus cymbalaria</i> var. <i>saximontanus</i>	Rocky Mountain buttercup		
Rosaceae			
<i>Purshia stansburiana</i> (<i>Cowania mexicana</i> var. <i>s.</i>)	Stansbury cliffrose		
Rubiaceae			
<i>Houstonia rubra</i> (<i>Hedyotis rubra</i>)	Red bluet		
Salicaceae			
<i>Populus x accuminata</i>	Lanceleaf cottonwood		
+ <i>Populus fremontii</i>	Fremont cottonwood		
<i>Salix exigua</i>	Sandbar willow		
Santalaceae			
<i>Comandra umbellata</i> ssp. <i>pallida</i> (<i>C. pallida</i>)	Pale bastard toadflax		
Scrophulariaceae			
<i>Castilleja angustifolia</i> (<i>C. chromosa</i>)	Northwestern Indian paintbrush		
<i>Castilleja integra</i>	Wholeleaf Indian paintbrush		
+ <i>Castilleja linariifolia</i>			
<i>Cordylanthus wrightii</i> var. <i>wrightii</i> (<i>C. w.</i> var. <i>pauciflorus</i>)	Wright's bird's beak		
* <i>Verbascum thapsus</i>	Common mullein		
Solanaceae			
<i>Chamaesaracha coronopus</i>	Greenleaf five eyes		
<i>Datura wrightii</i> (<i>D. meteloides</i>)	Sacred datura		
<i>Lycium pallidum</i>	Pale wolfberry		
<i>Nicotiana attenuata</i>	Coyote tobacco		
+ <i>Physalis hederifolia</i> var. <i>fendleri</i> (<i>P. fendleri</i>)			
<i>Quincula lobata</i> (<i>Physalis lobata</i>)	Chinese lantern		
<i>Solanum americanum</i> (<i>S. nodiflorum</i>)	American black nightshade		
<i>Solanum elaeagnifolium</i>	Silverleaf nightshade		
<i>Solanum jamesii</i>	Wild potato		
<i>Solanum rostratum</i>	Buffalobur nightshade		
Tamaricaceae			
* <i>Tamarix chinensis</i> (<i>T. pentandra</i>)		Fivestamen tamarisk	
* <i>Tamarix ramosissima</i>		Saltcedar	
Verbenaceae			
<i>Phyla cuneifolia</i>		Fogfruit	
<i>Verbena bracteata</i>		Bigbract verbena	
Viscaceae			
<i>Phoradendron juniperinum</i>		Juniper mistletoe	
Zygophyllaceae			
* <i>Tribulus terrestris</i>		Puncture vine	
Monocots			
Agavaceae			
<i>Yucca angustissima</i>		Narrowleaf yucca	
<i>Yucca baccata</i>		Banana yucca	
Cyperaceae			
<i>Cyperus esculentus</i>		Chufa flatsedge	
+ <i>Cyperus niger</i>			
+ <i>Cyperus squarrosus</i> (<i>C. aristatus</i>)			
<i>Eleocharis palustris</i>		Common spikerush	
+ <i>Eleocharis parishii</i>			
<i>Scirpus acutus</i>		Hardstem bulrush	
<i>Scirpus maritimus</i>		Saltmarsh bulrush	
Juncaceae			
<i>Juncus bufonius</i>		Toad rush	
Liliaceae			
<i>Allium macropetalum</i>		Largeflower wild onion	
<i>Androstephium breviflorum</i>		Pink funnel lily	
<i>Calochortus aureus</i>		Golden mariposa lily	
Poaceae			
* <i>Agropyron cristatum</i>		Crested wheatgrass	
+* <i>Agrostis gigantea</i> (<i>A. alba</i>)			
* <i>Agrostis stolonifera</i>		Creeping bentgrass	
+ <i>Andropogon hallii</i>			
<i>Aristida adscensionis</i>		Sixweeks threeawn	
<i>Aristida purpurea</i> var. <i>fendleriana</i> (<i>A. fendleriana</i>)		Fendler's threeawn	
<i>Aristida purpurea</i> var. <i>longiseta</i>		Purple threeawn	
+ <i>Bothriochloa saccharoides</i> (<i>Andropogon saccharoides</i>)			
<i>Buteloua aristidoides</i>		Needle grama	

<i>Bouteloua barbata</i>	Sixweeks grama	<i>Muhlenbergia porteri</i>	Bush muhly
<i>Bouteloua curtipendula</i>	Sideoats grama	<i>Muhlenbergia pungens</i>	Sandhill muhly
<i>Bouteloua eriopoda</i>	Black grama	<i>Muhlenbergia torreyi</i>	Ring muhly
<i>Bouteloua gracilis</i>	Blue grama	<i>Munroa squarrosa</i>	False buffalograss
<i>Bouteloua hirsuta</i>	Hairy grama	<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Bouteloua rothrockii</i>	Rothrock's grama	<i>Oryzopsis micrantha</i>	Littleseed ricegrass
<i>Bouteloua simplex</i>	Matted grama	<i>Panicum capillare</i>	Witchgrass
* <i>Bromus diandrus</i> (<i>B. rigidus</i>)	Ripgut brome	<i>Panicum hirticaule</i>	Mexican panicgrass
* <i>Bromus hordaceus</i> (<i>B. mollis</i>)	Soft brome	<i>Panicum obtusum</i>	Vine mesquite
+* <i>Bromus inermis</i>		<i>Pascopyrum smithii</i>	
* <i>Bromus rubens</i>	Red brome	(<i>Agropyron smithii</i>)	Western wheatgrass
* <i>Bromus tectorum</i>	Cheatgrass	+ <i>Phragmites australis</i> (<i>P. communis</i>)	
+ <i>Cenchrus carolinianus</i> (<i>C. pauciflorus</i>)		<i>Poa arida</i>	Plains bluegrass
<i>Chloris virgata</i>	Feather fingergrass	<i>Poa fendleriana</i>	Muttongrass
* <i>Cynodon dactylon</i>	Bermuda grass	* <i>Poa pratensis</i>	Kentucky bluegrass
<i>Distichlis spicata</i>	Inland saltgrass	* <i>Polypogon monspeliensis</i>	Annual rabbitsfoot grass
+* <i>Echinochloa crus-galli</i> var. <i>macera</i> (<i>E. crus-galli</i> var. <i>zelayensis</i>)		* <i>Polypogon viridis</i>	
<i>Elymus elymoides</i> (<i>Sitanion</i>		(<i>Agrostis semiverticillata</i>)	Beardless rabbitsfoot grass
<i>hystrix</i> var. <i>brevifolium</i>)	Bottlebrush squirreltail	+ <i>Pseudoroegneria spicata</i>	
<i>Elymus x pseudorepens</i>		ssp. <i>inermis</i> (<i>Agropyron inermis</i>)	
(<i>Agropyron pseudorepens</i>)	False quackgrass	* <i>Puccinellia distans</i>	Weeping alkaligrass
* <i>Elytrigia elongata</i> (<i>Elymus elongatus</i>)	Tall wheatgrass	+* <i>Puccinellia fasciculata</i>	
<i>Erneapogon desvauxii</i>	Nineawn pappusgrass	<i>Puccinellia nuttalliana</i>	Nuttall's alkaligrass
* <i>Eragrostis barrelieri</i>	Mediterranean lovegrass	<i>Schedonnardus paniculatus</i>	Tumblegrass
<i>Eragrostis mexicana</i>	Mexican lovegrass	<i>Schizachyrium scoparium</i>	
<i>Eragrostis mexicana</i>		ssp. <i>neomexicanum</i>	New Mexico little bluestem
var. <i>virescens</i> (<i>E. orcuttiana</i>)	Mexican lovegrass	<i>Scleropogon brevifolius</i> (<i>S. longisetus</i>)	Burrograss
<i>Eragrostis pectinacea</i>		* <i>Setaria glauca</i>	Bristlegrass
(<i>E. diffusa</i> , <i>E. arida</i>)	Tufted lovegrass	* <i>Setaria viridis</i>	Greene bristlegrass
<i>Eragrostis spectabilis</i>	Purple lovegrass	+* <i>Sorghum halepense</i>	Johnson grass
<i>Erioneuron pulchellum</i>	Low woollygrass	+ <i>Sporobolus airoides</i>	
* <i>Festuca pratensis</i>	Meadow fescue	<i>Sporobolus contractus</i>	Spike dropseed
<i>Hilaria jamesii</i>	Galleta	<i>Sporobolus cryptandrus</i>	Sand dropseed
<i>Hordeum jubatum</i>	Foxtail barley	<i>Sporobolus flexuosus</i>	Mesa dropseed
* <i>Hordeum murinum</i> ssp.		<i>Sporobolus giganteus</i>	Giant dropseed
<i>leporinum</i> (<i>H. leporinum</i>)	Leporum barley	<i>Sporobolus interruptus</i>	Black dropseed
<i>Hordeum pusillum</i>	Little barley	<i>Sporobolus pyramidatus</i>	
<i>Leptochloa fascicularis</i>		(<i>S. pulvinatus</i>)	Whorled dropseed
(<i>Diplachne fascicularis</i>)	Bearded sprangletop	<i>Stipa arida</i>	Arid needlegrass
* <i>Lolium perenne</i>	Perennial ryegrass	<i>Stipa comata</i> var. <i>comata</i>	Needle and thread
<i>Muhlenbergia depauperata</i>	Sixweeks muhly	<i>Stipa neomexicana</i>	New Mexico needlegrass
<i>Muhlenbergia longiligula</i>	Longtongue muhly	<i>Stipa speciosa</i>	Desert needlegrass
		<i>Vulpia octoflora</i> var. <i>hirtella</i>	Sixweeks fescue

PUBLICATION REVIEWS

BARBARA TELLMAN

SOME RECENT PUBLICATIONS

BY RICHARD FELGER

The Palms (Arecaceae) of Sonora, Mexico
Richard S. Felger and Elaine Joyal.
Rancho Santa Ana Botanic Garden,
Claremont CA. 18(1) 1-18. 1999.

This interesting article deals with the botany, history and ethnobotany of the palms of Sonora. The authors describe six native species, *Brahea aculeata*, *B. elegans*, *B. dulcis*, *B. nitida*, *Sabal uresana*, and *Washingtonia robusta*, in three genera, with clearly written keys to identification. Maps show the distribution of each species and photos show examples of each species. The article also briefly discusses twelve non-native palm species.

The authors argue convincingly for additional measures to conserve local populations of these native palms and recommend that some species be added to the Mexican endangered species listing.

The Flora of Canon de Nacapule: A Desert-Bounded Tropical Canyon near Guaymas, Sonora, Mexico. Richard Felger. Proceedings of the San Diego Society of Natural History. #35. June 1999. Available from the Drylands Institute, 2509 N. Campbell Ave., Tucson 85719 for \$12..

This flora includes 285 species of vascular plants in 215 genera and 65 families, of which the most diverse are the Asteraceae, Fabaceae, Poaceae, and Euphorbiaceae. There are several regional endemics and isolated populations of tropical genera. Seventeen non-native species are listed. Nacapule Canyon contains some of the best stands of native palms in Sonora.

In 1997 the Santa Ana Botanic Garden published another interesting article on Sonoran botany, The Euphorbia of Sonora, Mexico by Victor Steinman and Richard S. Felger. 16(1): 1-71.



CONSERVATION ANNOUNCEMENT

JEFF KREAMER, CONSERVATION CHAIR

In the last issue of the Plant Press, Julia Fonseca outlined the conservation policies of our Society. An effort is underway to establish chapter level conservation committees under those guidelines. Each chapter is encouraged to create a committee, or designate an individual to monitor local conservation issues. On January 22, the Tucson chapter held a conservation meeting in order to establish a working committee to meet the conservation needs of the chapter and begin to develop a conservation strategy.

ANPS is an organization of hundreds of native plant enthusiasts. Some belong to enjoy the social aspects of our society. Others belong because they are botanists, nursery workers, or have other plant-related occupations or hobbies. The

common thread between us is the love of nature and the plant and animal communities that thrive here in Arizona. Among the many nature oriented groups, ANPS is one of the few whose mission statement includes the preservation of habitat, or the creation of habitat through the use of native landscaping. The urban landscape committee's successful program to promote native plant use and appreciation is a prime example of educational conservation. We must also endeavor to preserve our natural environment through education toward a wise eco-philosophy. This can only happen through the dedicated efforts of our members. Please consider supporting these efforts any way you can, including your continued membership in ANPS.

Call me for more information or to volunteer at 520 318-0914.

SONORAN DESERT CONSERVATION PLAN UPDATE

JULIA FONSECA

The Sonoran Desert Conservation Plan (SDCP) is a county-wide planning tool that Pima County initiated to address the Endangered Species Act. When completed, the SDCP will (1) define urban form; (2) provide the basis for natural resource protection and an environmental element of the Comprehensive Plan; (3) lead to the recovery of the endangered cactus ferruginous pygmy-owl and other listed species; (4) stabilize the ecosystem and plant communities which support indigenous plants and animals and thereby prevent the need for future listings under the Endangered Species Act (ESA); and (5) lead to issuance of a Section 10 (a)(1)(B) permit under the ESA for a regional multi-species conservation plan.

Technical Advisory Teams in the areas of science, law and economics, historic preservation and ranch/range issues, provide expert information to the Steering Committee. The Steering Committee will narrow the options created by this information into recommendations that will ultimately go to the elected officials of various governments for final deliberations.

The Science Technical Advisory Team (STAT), chaired by Dr. Bill Shaw of University of Arizona, was seated in May 1999, with ANPS president Mima Falk as a member. I and other County staff assist the STAT. Dr. Shaw and county staff prepared a technical report (which was reviewed by the committee) entitled Determining Species of Concern, in order to facilitate discussion about which species might be considered for protection under the Sonoran Desert Conservation Plan. Initially the report was based on a series of in-depth interviews conducted with members of the local

science community who have expertise in the areas of birds, fish, invertebrates, mammals, plants and plant communities, reptiles and amphibians. The report describes the status, location, distribution and habitat needs of species recognized by the federal government as imperiled or extirpated, and a much larger number of species that are in decline, and potentially on the way toward listing if conservation measures are not put in place.

In Pima County 24 animals and plants are federally recognized as listed, proposed, candidates, or petitioned for threatened or endangered status. Including these species, the scientists identified 107 species as vulnerable in Pima County. The species were assigned a status ranging from species at risk in Pima County and for whom habitat in Pima County is critical for their overall existence (Status 1) to species not believed to be at risk overall, but which should be considered for conservation in Pima County because of their low numbers or ecological or social importance (Status 4). In addition to the identification of species, the report describes habitats of concern, and target habitats for conservation. It also lists more than fifty non-native species to highlight the need for their management.

Editor's Note: Scientists participating in this process are highly enthusiastic about the care Pima County is taking to identify conservation needs.

Julia is chief hydrologist for the Pima County Flood Control District where she manages open space riparian areas and heads the Sonoran Desert Conservation effort.. She is a former ANPS board member and state conservation chair.

THE PLANT PRESS

The Plant Press is one of the benefits of membership in ANPS. Members are encouraged to submit suggestions, articles, book reviews and ideas for articles to the editor, Barbara Tellman who can be reached by Email at bjt@ag-arizona.edu; phone 520 792-4515; or mail to 127 E. Mabel St., Tucson AZ

ANPS NEWS

MEET THE NEW BOARD MEMBERS

David Bertelsen - Dave is a self-taught botanist, with botany as his avocation. He has been documenting the plants of Finger Rock Canyon in the Catalina Mountains for the past sixteen years. He also worked on many other floras, including those of Colossal Cave and the Tucson Mountains. He is active in many environmental groups, is a member of the Bureau of Land Management's Resource Advisory Committee for Arizona and works on the Arizona Game and Fish Department's plant diversity review.

Mary Jean Hage - Mary Jean is another botanical amateur who has become involved in numerous educational activities. She is a docent at the Arizona Sonora Desert Museum and also worked in the public schools since 1976. She helped organize the 1998 and 1999 ANPS Chiricahua Workshops.

Mary Irish - Mary is a freelance garden writer with gardening books in press on agaves and yuccas and on gardening with desert plants. She was formerly Director of Public Horticulture at the Desert Botanic Garden in Phoenix. She has agreed to write landscaping articles for future Plant Presses.

Jeff Kreamer - Jeff is a professional land surveyor and cartographer who specializes in wilderness mapping and complex boundary surveys. He has worked all over the western hemisphere, including the Arctic. Jeff is on the boards of the Ironwood Alliance and Tucson Audubon Society and will serve as the conservation chair for ANPS.

ANPS T-SHIRT NOW AVAILABLE

Hibiscus colteri and *Ipomoea cristulata* on a white background, as pictured by Margaret Pope, are featured on this beautiful new T-shirt. It is available in all adult sizes from small to extra large for \$16. To order, contact Marge Norem at ANPS, P.O. Box 68324, Tucson AZ 85737. The shirts make great birthday gifts, Valentine's Day presents, thank you gift, and are a fine way to do something nice for yourself while benefitting a worthy cause, native plants.

Plant Press, Winter 2000

THANKS TO THE 1999 CHIRICAHUA WORKSHOP COMMITTEE

The ANPS Board would like to thank last year's Chiricahua Workshop Committee for another successful weekend. Participants hiked on trails loaded with late summer wildflowers, mushrooms, birds, and butterflies, and were treated with great hospitality by the Southwestern Research Station staff. In addition to the hikes, participants heard excellent lectures by Wade Sherbrooke, Kenn Kaufman, and Edward Smith. Other workshop leaders included Steve McLaughlin, Meg Quinn, and Lynn Kaufman.

The dedicated organizing committee consisted of Mary Jean Hage, Mae Criley, Lynne Taylor, Meg Quinn and Lynn Kaufman.

We are looking for new committee members for the millennium workshop. Benefits include reduced workshop fees and the satisfaction of making an important contribution to ANPS. If you are interested, please call Lynn Kaufman at 520 326-9688, ext. 17 or Email to lynnhk@ix.netcom.com



In thanks for many things, the ANPS Board gave Horace Miller a gift of an original colored drawing by Margaret Pope, the new T-shirt illustration. Photo: A. Segade

NEW MEMBERS WELCOME

People interested in native plants are encouraged to become members. People may join chapters in Flagstaff, Phoenix, Prescott, Tucson, and Yuma or may be members only of the statewide organization. For more information, write to ANPS at the address below, visit the Web site <http://www.azstarnet.com/~anps/> or contact one of the people below.

State President	Mima Falk	520 387-6281
Central Highlands (Prescott) President	Jeff Hogue	520 443-1425
Flagstaff President	Ana-Novak Goodman	520 525-3659
Phoenix President	Kathy Rice	602 808-9304
Tucson President	Marcia Tiede	520 791-7963
Yuma President	Pat Callahan	520 627-2773

MEMBERSHIP FORM:

Name _____
Address _____
City _____ State _____ Zip _____
Phone Number _____
Chapter preferred: State Flagstaff Phoenix Prescott Tucson Yuma
Enclosed: \$10 Student \$ 20 Individual or Family
 \$30 Organization \$ 50 Commercial/Sponsor \$100 Patron

Mail to: Arizona Native Plant Society
P.O. Box 41206, Sun Station
Tucson AZ 85717

Printed on recycled paper

ARIZONA NATIVE PLANT SOCIETY
P.O. BOX 41206
TUCSON AZ 85717

Address Service Requested

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

VIRTES, GEORGE & GAIL
85759 E. ROSE CREST DR.
TUCSON, AZ 85739