The Arizona Riparian Council Newsletter

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Cienega de Santa Clara: A Threatened Remnant Wetland in the Colorado Delta

Edward P. Glenn, Environmental Research Laboratory, Tucson; Richard S. Felger, Drylands Institute, Tucson; and Alberto Búrquez, Centro de Ecología, Universidad Nacional Autónoma de México, Hermosillo

The Colorado Delta is that vast region of salt and mud flats where the Colorado River empties into the sea. Although the Colorado is still capable of flooding the entire delta, as it did most recently in 1983, in most years scarcely any river water at all reaches the sea. The water is mainly diverted for agriculture but also for golf courses, swimming pools, and drinking water, on the river's last run across the desert from Lake Mead to the Gulf of California.

The most familiar view of the delta is the western bank, where Highway 5 from Mexicali to San Felipe passes first through the irrigated fields of the Mexicali Valley then onto the barren salt flats which extend to the horizon east and south. Few people know that a wild wetland area still exists on the other side of the delta, away from the highway and invisible to the casual traveler. This is the Cienega de Santa Clara. Its history and fate are of interest to anyone concerned about desert wetlands.

The wetland is southeast of the city of San Luis and northwest of the fishing village of El Golfo, along the eastern shore of the Colorado floodplain. Climb to the top of the low mud cliffs that form the eastern border of the marsh and you are in the Gran Desierto, the driest desert in North America and a stark contrast to the lushness of the marsh below.

Cienega de Santa Clara is a remnant of a much larger wetland ecosystem which once existed throughout the Colorado Delta. Written observations of the delta began with Spanish colonial exploration in 1540. The physical habitat of the delta and its history to date are described in the classic work of Geoffery Sykes, *The Colorado Delta* (1937). Great gallery forests of willow and cottonwood once stretched along the myriad channels of the delta. The vast marshes and sandbars between the channels were filled with 200 - 400 other plant species. The course of the Colorado through the delta changed continuously as silt built up in the channels. Spring snowmelt in the Rockies brought the river out of its banks, so that most of the delta area was irrigated by the river and vegetated except in drought years.

- **See Wetland page 6**

In This Issue

PRESIDENT'S COLUMN

Update on the status of the West Fork Grazing Allotment

Marty Jakle

As many members will remember, we held our fourth annual meeting at the Sunrise Ski Resort in the White Mountains on September 22 and 23, 1989. One day was devoted to field trips visiting various riparian projects in the northern part of the state. One of the sites we visited was the West Fork Grazing Allotment located on the Apache-Sitgreaves National Forest's Alpine District. Forest Service and Arizona Game and Fish personnel talked to our group about the problems associated with this allotment and what was planned to correct them.

The stream we visited was Wildcat Creek and I remember looking at the area and thinking, "this place is a wreck". The channel was downcut, stream banks were raw and devoid of vegetation, the stream was wide and shallow, meadows dry with a mown look. Riparian recruitment was nonexistent, and other signs of a riparian system in poor condition were observed. I overheard someone mention that Centerfire Creek, a stream I knew contained the federally listed Apache trout, was also within the allotment.

I later learned that 3 streams located within this allotment- - Wildcat, Centerfire, and Boggy Creek--were 3 of 15 streams on the Forest which are considered necessary for the recovery of the Apache trout. I was shocked to learn that a stream containing eight federally listed species, especially one located on public land, could be in such bad condition.

Why were the riparian areas in this allotment in such bad shape? The people I've talked to blame it on overgrazing. While livestock deserve the major share of the blame, Elk may also deserve part of it. Although it was obvious to anyone standing beside this stream that it was in extremely bad shape, I had the feeling that help was on the way and the land managers were taking aggressive and immediate action. The revised allotment plan was scheduled for completion in 1990.

Although I had intended to follow up on the progress of riparian restoration associated with the new allotment management plan, I simply have not done so until recently. I had heard that things were going very slowly on this project. In May 1991, an Environmental Assessment (EA) was prepared for the revision of the allotment management plan which analyzed alternatives. An alternative which permitted 1,860 AUMs was selected. The actual number of AUMs allowed to graze would be 1,550 for the first several years, after which the grazing lease would be re-evaluated. Based on this EA, a Decision Notice with a finding of "no significant impact" (FONSI) was issued. This Decision Notice was withdrawn effective July 19, 1991, because it did not include a Biological Evaluation (BE) analyzing possible impacts to Federal, State, and Forest Service listed threatened and endangered species.

A BE was prepared by the Forest Service dated September 1, 1991. This document was revised and sent from the Forest Service's Alpine District office to their Regional office on July 28, 1992. It is expected that it will be finalized and submitted to the Fish and Wildlife Service (FWS) within two weeks.

Upon the receipt of the BE, the Fish and Wildlife Service will have 90 days to issue its biological opinion on whether the action (the preferred alterative) is likely to jeopardize the continued existence of federally listed species. If the FWS believes that the plan, as proposed, does not adequately protect listed species, they may mandate changed (reasonable and prudent alternatives or measures) which would ensure the continued existence of the species or compensate for incidental take. Changes could include, among other things, the reduction or elimination of livestock grazing in sensitive stream reaches or other actions.

So--how are the riparian areas in this allotment doing today, three years after the ARC visited it?

- See West Fork, page 4

Hitt Wash Restoration

Jay Eby, Forester, Prescott National Forest

Riparian health and function are simply a barometer of the condition and uses of the watershed. With this in mind we began work on Hitt Wash, one of a number of tributaries to the upper Verde River on the Chino Valley Ranger District, Prescott National Forest.

In 1977 an exclosure was fenced in Hyde Creek, one arm of Hitt Wash. This demonstrated some of the potential for vegetative recovery but the storms of the winters of 1978 and 1979 flushed out the recovered riparian vegetation.

In 1988 we adjusted the grazing program for the two grazing allotments at the head of the streams. Included in these new programs was fuelwood harvest, coupled with seeding and slash covering of the bare soils. Other actions included burning and seeding of some of the chaparral slopes, and in 1990, implementation of our off road vehicle use program and closure of some offending roads. All of these will be coordinated with better livestock management.

In 1990 we placed a structure at Round Valley to reconstitute some of the lost geologic structure at this point and regain the alluvial deposit lost at this midsystem point in the watershed.

Combined, these actions have had a major effect on the duration of water flow after storm events. The vegetative response to the extinction of moisture in our warm climate is continuing to surprise us. We are hanging our hat on the peg of increasing riparian vegetative structure (importantly grasses and forbs) to provide the impetus for recovery.

We plan to redesign our road crossings to enhance flow charcteristics rather than to concentrate flows, adjust the grazing on the two remaining allotments lower in the watershed, and continue to expand the area of chaparral rejuvenation and fuelwood harvest.

We expect the water flow regime to improve to a level that would increase the subsurface flow at the walnut grove to the point that the trees would broaden the stand and be replaced close to the wash with more phreatophytic species. The major storm events

Sycamore Creek Management, Tonto National Forest

Lew Myers, Tonto National Forest

The Tonto National Forest is working on improved livestock and recreation management for the Sycamore Creek drainage along Highway 87, north of Phoenix. Of particular concern are the impacts of intensive recreational use, including off-road vehicles, and livestock management on riparian areas of Sycamore Creek.

Improved grazing management was implemented this year on the upper Sycamore Creek area, called the Diamond Unit. This five-pasture management system will provide for winter use only on important riparian areas. During winter, cattle disperse well into upland areas, and have relatively little impact on riparian plants. This management strategy has worked well on other riparian areas on the Tonto Forest, resulting in their recovery.

Planning is underway for management of the remainder of Sycamore Creek, called the DOS-S unit. The Forest has hosted open-house meetings, and interested persons are aiding in the development of management alternatives. A list of alternatives should be developed by late August, 1992, and improved livestock management implementation begun by 1993. Full implementation will take several years.

The close proximity of Sycamore Creek to Phoenix and the relatively flat terrain, result in intensive off-road vehicle use. The Forest is currently intensifying efforts to reduce resource damage from indiscriminate vehicle use in the upper Sycamore Creek area, near Sunflower. Still to be resolved is a management program for dealing with these uses on lower Sycamore Creek. Ultimately, the Forest Service must embark on a program of education and enforcement which is beyond its present workforce capabilities.

The Ironwood Task Force: A Vehicle For Preserving Xeroriparian Habitats

Humberto Suzán, ASU, Center for Environmental Studies

Ironwood (*Olneya tesota*) is a legume tree endemic to the Sonoran Desert, that ranges from southern Arizona and southeastern California through Baja California and Sonora, Mexico. Ironwood trees can live up to 800 years, and play important ecological, cultural and economical roles in xeroriparian and desert communities.

In places near the Sea of Cortez coast, ironwood replaces mesquite and palo verde as the largest and most ecologically important tree along watercourses. It also is an important element of the upland vegetation along desert plains and bajadas. Along desert washes, ironwood plays a major role in nitrogen and water dynamics, and provides critical microhabitat for many plants and animals. It serves as a nurse plant for many cacti, vines, shrubs, and desert wildflowers, including several species classified as endangered or threatened (e.g. two species of night blooming cereus and tumamoc globeberry). Ironwood also supplies vital nutrient to bees, reptiles, amphibians, birds and mammals that eat its nectar, flowers or foliage, and provides crucial shade to desert animals and important roosting branches for migrating birds.

Ironwood has economic significance for indigenous and mestizo peoples south of the border. However, ironwood is becoming decreasingly available for hand and machine-carved figurines. This has specific impacts to the Seri Indians in Sonora where carvings provide approximately $50,000 in annual income for the tribe, one of North America's last group of hunter-gatherers. However, the carving industry is not the major threat to ironwood. Rather, the conversion of hundreds of thousands of acres of cactus-ironwood forests to pasture lands, and the cutting of ironwood and mesquite for charcoal, have resulted in large-scale deterioration of ironwood communities. The forces behind these threats have roots on both sides of the border. For example, the U.S. is the major consumer of mesquite charcoal and ironwood carvings. Therefore, solutions will require international cooperation.

To address this crisis, a task force was created under the auspices of Conservation International. Members of the task force, which include Mexican and U.S. scientists, public agency officials, indigenous peoples and businesses, met in Puerto Peñasco, Sonora, México, in fall 1991 to propose ways of protecting the ironwood tree and associated xeroriparian communities. This first task force meeting was an important step in building the contacts for collaboration that will be essential for developing and implementing effective conservation strategies.

New Trail Access Guide

The Arizona State Parks Board announces its new guidebook, *Public Trail Access - - A Guide to the Protection of Arizona's Trails* . This handbook addresses trail access issues, land preservation methods, forming an advocacy group, funding, and related topics. Write: Trails Coordinator, Arizona State Parks, 800 W. Washington #415, Phoenix AZ 85007.

West Fork from page 2

Some progress toward riparian restoration has been made. Two check dams have been placed in Wildcat Creek and approximately 1/2 mile of it has been fenced with livestock exclosure. One-half mile of livestock and/or elk exclosures has been built on Boggy Creek. No revised grazing management plan has been implemented. I understand that the overall condition of the habitat is much today as it was three years ago, although the areas within the exclosures are showing marked improvement.

It is time, past time, that the agencies involved with the stewardship of these degraded riparian areas start the healing process in earnest by taking aggressive action to expedite riparian restoration. These riparian areas and the biota they contain are too important not to give them the high protection priority they deserve. I will keep the membership apprised of the status of this project.

NEW PROJECTS

Riparian Site Stewardship Program Development
Sherry Sass
Friends of the Santa Cruz, Tubac

Friends of the Santa Cruz River (FOSCR), the Arizona State Parks Board (SPB), and the Arizona Department of Environmental Quality (DEQ) are working together to develop a "site stewardship" program for the river. The SPB, the lead agency in this endeavor, is counting on us to provide a useful model from which it can extend the program to cover other key natural resources in the state.

The idea is to select certain sites along the Santa Cruz, and intensively monitor conditions in those places in a regular fashion, over tim, i.e. water quality, riparian vegetation density and diversity, and water flowe. The DEQ has done some of this testing, but manpower constraints prevent that agency from having much in the way of timeseries data. However, FOSCR has a wonderful manpower resource: our members!

Properly trained, volunteers will be able to gather vital information on the river's state of health.

By keeping track of such things as concentrations of coliform bacteria, nitrogen, and trace metals in the water, as well as integrated measures of water quality such as aquatic invertebrate and algal diversity, and integrated measures of water quantity such as riparian (riverside) vegetative density and growth, we'll have a much better idea about how the river is faring than we do now. This type of information is critical if we are to protect and improve the river's ability to support life.

Other benefits: not only will participating volunteers become intimately knowledgeable about the sites we sample, but we'll also provide a regular presence to discourage littering, destructive driving by all-terrain vehicles, etc. It is hoped that high school students will eventually be part of this program, as it presents a rare and wonderful opportunity for hands-on environmental training.

We are now at the stage of pricing equipment we will need, figuring out what will be funded by the agencies, and seeking support to fill in the gaps. We especially need a dissecting microscope and a dissolved oxygen (DO) meter. Sampling procedures and sites also are being worked out.

Any help, financial or otherwise, would be much appreciated (call 398-9093 (Sherry) or 398-9055 (Karen) for more information).

Request for proposals
Cienega Creek Management Plan

The Pima County Flood Control District requests proposals for resource inventory and management planning for the District's Cienega Creek natural Preserve and Empirita Ranch acquisitions. The selected consultant team will identify plant communities, sensitive wildlife species, and existing public uses, and recommend recreational use levels, access locations, and management actions for a 5000 acre riparian habitat preserve. Interested consultants should request a detailed scope of work as soon as possible from Mr. Mike Studer, Pima County Dept. of Transportation and Flood control District, Contract Administration, 201 N. Stone Ave., 3rd floor, Tucson AZ 85701-1207, (602) 740-6409.

Arizonans Support River Protection

The Morrison Institute surveyed a sample of 800 adult Arizona residents in the spring of 1992. The general conclusion reached was that "Arizonans express strong concern about the deterioration of the environment and a deep commitment to environmental preservation. Questions dealt with air quality, water quality and supply and solid waste. On riparian area preservation in particular, 80% agreed with the statement, "Arizona's remaining free-flowing rivers and stream-side wildlife habitats should be designated as 'wild and scenic' so that people can continue to enjoy them in their natural state."

Similarly, 74% favor preserving the remaining free-flowing rivers and stream-side habitats, even if it means restricting the use of privately owned lands that may abut these areas.

Arizonans and the Environment: Attitudes Toward the Key Environmental Issues Facing the State, Morrison Institute for Public Policy, ASU., May 1992,

Arizona Environmental and Resource Conservation Directory

The updated directory is now available for $12.50 by mail from the Commission on the AZ Environment, 1645 W. Jefferson #416, Phoenix AZ 85007.

Tucson Basin Environmental Education Resource Guide

This guide to environmental information sources is available from the Arizona Association for Learning in and about the Enviorment, 1645 W. Jefferson #416, Phoenix AZ 85007.

Wetlands - from page 1

The wetlands fueled the teeming life of the delta and northern part of the Gulf of California. A vivid image of the delta in its pristine condition is Aldo Leopold's narrative of a canoe trip taken with his brother in 1922, in an essay titled "The Green Lagoons." He described climbing to the top of giant mesquite trees to get his bearings in the seemingly endless bosques.

Following diversion of Colorado River water for irrigation and the construction of upriver dams which trapped silt, most of the wetland habitats disappeared. Most of the delta is now above the flood zone and most of the wetland habitat has turned into barren, saline mudflats. The great cottonwood and willow gallery forests have vanished. Today only a small fraction of the original delta wetland vegetation and associated wildlife remains.

At 20,000 hectares (50,000 acres), Cienega de Santa Clara is today the largest wetland habitat left in the delta. It contains at least two species once common throughout the region, the Desert Pupfish (*Cyprinodon macularius*) and the Yuma Clapper Rail (*Rallus longirostris yumanensis*), which have been listed as endangered pursuant to the Endangered Species Act. Rare plants are also known to occur there, Cienega de Santa Clara may be the most important remaining habitat for waterfowl in the delta.

The near demise, then resurrection, and now imminent alteration of the Cienega de Santa Clara wetland are side effects of Bureau of Reclamation programs to provide more water for agriculture over half a century.

Prior to construction of the large dams on the Colorado, the Cienega de Santa Clara was a lushly vegetated overflow arm of the Colorado. Geoffery Sykes captured the scene in photographs and accurately predicted that Hoover Dam would drastically alter the Cienega, since there would be no river overflow in the years it took to fill the dam. As the river was tamed and diverted, the wetland shrank to a tiny fraction of its former size.

Since 1977, however, the marsh has been revived by enormous quantities of mildly saline groundwater originating in the Wellton-Mohawk Irrigation District in the United States. Because this water is too salty to grow crops and represents a danger to farmers' fields on both sides of the border, it is pumped into a concrete canal where it flows 80 kilometers (50 miles) from Arizona to Mexico for disposal in Cienega de Santa Clara.

This was intended to be a temporary disposal method, pending completion of the Bureau of Reclamation's Yuma Desalting Plant, which will desalt the water to make it fit for agriculture. However, construction delays postponed the plant and the water has flowed into the wetland for the past 15 years.

Satellite photographs show the dramatic increase in the size of the wetland which occurred after water began flowing down the canal. Recent overflights revealed that the central portion is a vast cattail swamp with myriad open channels of water amidst the emergent vegetative cover. The northern margin of the wetland is a diverse halophyte shrub and arborescent ecosystem, whereas the southern (seaward) end terminates in vast salt flats with numerous brackish pozos vegetated with halophytes. The wetland has no outlet to the sea; it is a huge evaporation basin in the desert.

Wildlife thrives in the expanded habitat. Yuma Clapper Rails have increased in number, and the wetland may now support the largest population of these birds in the delta, which in turn contains 1/4 to 1/2 of the total population found in Mexico and the U.S. William Eddleman, one of the few scientists who have written about the area, noted that the marsh supports an "extremely diverse avifauna in addition to clapper rails." His species list included soras, rails, bitterns, coots, moorhens, dowitchers, stilts, teal, shovelers, ibis, heron, egret, terns and plovers, all recorded in a two-day visit to the area.

The Yuma Desalting Plant began operation at one-third capacity in May 1992. At full capacity, it will produce some 600 million cubic meters per year of fresh water, which will be delivered to Mexico to meet treaty obligations.

However, the desalting process is not completely efficient. Two-thirds of the water entering the Yuma Desalting Plant will be desalted and the remaining third, containing the concentrated salts removed in the process, will flow back into the canal for disposal in the Cienega de Santa Clara. As a

result, the net flow of water into the wetland will be reduced from the present 900 million cubic meters per year to just 300 million cubic meters, and the salinity of the water entering the wetland will nearly triple, from 3,200 ppm to 8,500 ppm.

No one is willing to predict what will happen to the marsh and its biological communities once the desalting plant is operational. It will not operate every year - in some years there will be enough water in the Colorado to meet treaty obligations, and desalting of Wellton-Mohawk water will not be necessary. In years of plant operation there will undoubtedly be a reduction in the area of the wetland but what effects that increased salinity will have on the biological components of the wetland, especially the cattails and the plant, fish and bird species that depend on the cattails for cover, are undetermined.

Wetland areas are especially valuable wildlife habitats in Mexico, where 40% of the land is classified as arid. Cattail marshes such as Cienega de Santa Clara are among the most productive ecosystems known to man, in some cases even more productive than cultivated land. This wetland provides a striking comparison in terms of primary productivity between one of the most to one of the least productive ecosystems on Earth. We need to reconcile our need for ever more water on both sides of the border to the need for critical wildlife habitats such as Cienega de Santa Clara. We hope to conduct a survey and inventory of species of the wetland before the Desalting Plant is fully operational, to develop a better understanding of the marsh before it is altered once again.

Reprinted from *CEDO News*, Centro Intercultural de Estudias de Desiertos y Océanos

CONSERVATION NEWS

State Land Trades

The November ballot will include a constitutional amendment to allow the State Land Department to trade land, now prohibited as a result of a 1988 court ruling. Over 615,000 acres of state land have been identified for transfer to other ownership.

Now, these lands can only be sold at public auction to the highest bidder. This greatly hampers effective use of certain lands, including those with riparian values which should preserved, not sold to the highest bidder. For example, many state land parcels are within wilderness areas, wildlife refuges and other protected lands. These should be traded and not sold. There will still be opportunities for public input on specific trades. A yes vote will enable trades of state lands.

Tavasci Marsh

ARC recently sent comments to Arizona Game and Fish regarding the draft plant for Tavasci Marsh. While generally praising the plan, ARC urged mini- mal intervention in marsh design, in contrast to excavation of areas to provide more open water. Comments were also madeabout trails and other matters.

Yuma clapper rail

Mine Proposed at Pinto Creek

Efforts have begun to open up new areas to mining in the Pinto Creek area near Globe. Concerns have been raised about the impacts on this riparian area as well as nearby drainages. The mining firm has rights to mine here based on the 1872 Mining Act, but water quality permits are required as well as Section 404 permit. For more information, contact Judith Johnston at 425-4779.

The "Takings" Bill

The 1992 Legislature passed (and Governor Symington signed) what Sen. Bartlett described as the "worst piece of environmental legislation ever passed in Arizona." This vaguely written bill is a lawyer's dream, since the bill is cloaked in obscurity and ambiguity. What it seems to require is that the state conduct studies for all new regulations, permit and licensing conditions to see whether anyone's private property rights might be violated even temporarily by the action. If so, recompense may be necessary. The law goes far beyond what the U.S. Supreme Court has ever required. The cost of implementing this law is totally unknown. Fears are that at best it will inhibit any new governmental regulation on any matters - environmental, worker safety, day care licensing, accessibility for the disabled, etc. - because of the costs and liability involved. It will make new riparian protection measures extremely difficult if not impossible.

The "Take Back Your Rights Committee" is attempting to place this on the ballot through a referendum. The deadline for collecting signatures is Sept. 25. If you want to help, donate money, or just sign a petition, call 253-8633 in Phoenix or 620-6401 in Tucson.

RIPARIAN PROGRAMS IN ARIZONA

Julie Stromberg
Section editor

This section features dscriptions of riparian programs at Arizona universities and colleges and governmental agencies.

ASU Department of Planning Riparian Activities
Frederick Steiner,
ASU Department of Planning

Since the 1970s, ASU has offered a Master of Environmental Planning (MEP) degree. As the only accredited planning degree in the state, a core of "traditional" urban and regional planning courses are taught. However, because the word "environment" is in the title of the degree, many faculty and students with environmental interests are attracted to the program . As a result, water quality, greenway development, the use of metropolitan canals, river corridor planning, and riparian and wetland protection have become major teaching and research focus areas.

Riparian-related activity has occurred in three general, frequently overlapping, areas: teaching programs, site specific research, and policy analysis research.

Teaching Programs

Riparian issues have received much attention in studios, the environmental impact assessment course, and theses as well as ancillary consideration in other courses. The ASU Department of Planning is part of the College of Architecture and Environmental Design. Studios are the pedagogical cornerstone of architectural schools. Planning programs have adopted this system of small group, problem-focused learning. Teams of students analyze the landscape of a place and interpret it in prose, maps, and graphics, and through oral presentations.

Many of ASU's MEP students come from backgrounds in biology and other environmental sciences. They work together and exchange skills with students with landscape architecture and architecture educations as well as those from the social sciences. Since 1991, students have been studying sites encompassing rivers, including the Verde Valley, the Salt River in Phoenix, and the confluence of the Salt and Hassayampa rivers at the Town of Buckeye.

Many students elect to take an environmental impact class. A required component of this class is a mock draft environmental impact statement (EIS). Since 1989, draft EISs have been prepared for projects on the Hassayampa, Verde, and Salt rivers as well as on Roosevelt Lake and Lake Pleasant.

Because of interest generated in the studios and through preparing EISs on water-related topics, several students have written or are writing theses on riparian topics. Abstracts of two of those theses are on page 9. Another recent graduate and Dames and Moore employee Donna Gelfand wrote her MEPthesis on "Citizen Participation in Environmental Decision Making: A Study of Two Arizona Cities."

Several planning courses have direct relevance to riparian issues. An environmental planning course is taught by wetlands expert Jackie Rich, a Phoenix consultant. Planning law, taught by Professor Richard Lai, addresses important property rights and takings issues. Professor Ruth Yabes' citizen participation course is essential for anyone who must deal with the public. Other related courses include land economics, environmental planning economics, and landscape ecological planning.

Site-Specific Research

Faculty members of the ASU College of Architecture and Environmental Design have been long-term advocates for the regional Rio Salado project. Professor Ted Cook led a team of faculty and students on the initial plan of the Tempe Rio Salado. He was also involved with other planning and architecture faculty and students on the urban design study of the Phoenix metropolitan canals. The canals study was funded by the National Endowment for the Arts and several local municipalities.

Site-specific research on the Verde River corridor from Tapco to Beasley Flat has been supported by the Verde Resource Conservation District, Arizona State Parks, and the Arizona Department of Environmental Quality. Two studies were conducted in support of the Verde River Corridor Project. One study involved the identification of potential reclamation sites. The other, led by Professor Cook and MEP graduate student Bill Whitmore, was an analysis of scenic resources. A paper based on the visual resource assessment is forthcoming in *Landscape Journal.*

Policy Analysis Research

The department collaborated with J. Rich and Associates on an analysis for ADEQ of Arizona wetlands and riparian programs . The first component of the project was a nationwide inventory of state wetlands and riparian programs U.S. Environmental Protection Agency (EPA) officials have called it the most comprehensive census available on the

topic. The inventory report is being used by state officials across the nation, environmental groups, and economic development interests.

The second phase resulted in an in-depth analysis of Arizona's wetlands and riparian programs. Based on data from ADEQ, EPA, the U.S. Army Corps of Engineers, and others, co- authors Jackie Rich and Virginia Coltman provide a detailed critique of current efforts in Arizona.

The final phase produced a recommended memorandum of understanding (MOU) for ADEQ to explore with federal officials. This MOU is based on similar agreements in other states and the current Arizona system. A draft guidebook for Arizona programs was also produced. It was originally hoped that a final guidebook could have been drafted, but without comprehensive state riparian legislation and firm policies and rules in place, this is not possible.

The department has also received funding for a river corridor planning and study from the Arizona Water Research Center. The project involves an assessment of Arizona river corridors, specifically the Agua Fria and Verde, with proposals for alternative planning approaches.

Many of the site specific and policy analysis research reports are available from the ASU College of Architecture and Environmental Design's Herberger Center for the cost of photocopying and mailing. For information, contact Pamela Shippey (965-6693).

THESES AND DISSERTATIONS

Protecting floodplain functions, values and benefits in Yavapai County.
Jana Fry, ASU Department of Planning, MEP Thesis .

The thesis sets forth the proposition that natural functions, values, and benefits that flood plains provide should be protected in Yavapai County. Riparian areas are a component of flood plains that are conducive to providing natural functions, values, and benefits. Riparian areas are resources that have been largely degraded, altered, or lost in Arizona. Potential benefits that flood plains and riparian area provide include flood control, erosion control, improved water quality and quantity, enhanced wildlife habitat, economic advantages, potential recreation opportunties, and added aesthetic value. An exploration of definitions for wetlands, riparian areas, and flood plains was completed through a literature search.

Legal aspects of regulating flood plains were examined. Biophysical and socio-economic inventories were conducted for the study area, which consisted of the Agua Fria River watershed. Ten specific transects along the river were field checked to expand on and substantiate inventory data. A suitability analysis based on a capability system for farmlands developed by the Soil Conservation Service was adapted to evaluate flood plains and riparian areas. Points were assigned to each transect in order to determine the appropriate buffer zones that would be required to protect natural functions, values, and benefits. Results of the suitability analysis indicate that flood plains with riparian areas are better able to provide natural functions, values, and benefits. Recommendations to implement buffer zones includes the suggestion that the county adopt a growth management plan with flood plain protection as one of its components.

A positive model for river corridor planning in the southwest: theVerde River corridor project
Elaine M. Averitt, ASU Department of Planning, MEP Thesis

Averitt's research was designed as a case study of the Verde River Corridor Project (VRCP) to test its usefulness as a positive model for citizen-based river corridor planning and conservation in the Southwest. Analysis of the case study was divided into two parts. The first part of the findings investigated the VRCP's progress in implementing recommended actions. The second part of the findings evaluated specific recommendations developed by VRCP subcommittee members for land and water conservation, in order to judge their effectiveness at fulfilling desired objectives. This evaluation used criteria developed by the Environmental Protection Agency (EPA) for establishing and implementing effective riparian protection policies. Half of the designated top ten priority action items have been implemented since the VRCP Final Report and Plan of Action was published in June 1991. Recommendations for land and water conservation incorporated EPA's criteria for effectiveness to a high degree. Strengths and weaknesses of individual recommen-dations were identified. The VRCP was judged to be a successful model for development of community consensus and for developing river conservation strategies.

CONFERENCES AND MEETINGS

Verde River Watershed Conference

Pat Ellsworth, Prescott College

The Verde River Watershed Conference (held April 20-22,1992,in Prescott) was an outgrowth of the Verde River Corridor Project (VRCP). The conference was sponsored by Cocopai Resource Conservation & Development Area, Inc., a coalition of Verde corridor residents, many of whom had worked on the VRCP and had seen the need to go further, i.e. to invite the participation of all interested parties throughout the entire watershed.

On the first day of the gathering we heard 16 presentations by representatives of private groups, municipalities, and governmental agencies. Carlton Camp (Yavapai County Board of Supervisors) and Tanna Thornburg (Arizona State Parks) set the tone for the conference. Camp listed the familiar issues surrounding water use, and reminded us that the traditional method of resolving conflict has been the court system Many people believe there is a better way, and that "win - win" solutions can be found. Such was the purpose of this conference.

Thornburg reviewed the VRCP as a model for citizen planning. She emphasized the need for a common vision, a commitment to cooperation, and a willingness to look at creative solutions. She reminded us that a crucial component in communication is LISTENING to each other.

The second day was the essence of the conference. Participants were divided into 11 groups of 4-8 persons with a facilitator to keep us on track. The groups were diverse in point of view. Our task was not to discuss issues but to experience the group process by which consensus is reached. Two items were on the agenda. 1) decide whether all stakeholders in the Verde River watershed should work together, and 2) develop a mechanism whereby that can happen. All groups reached consensus on the first item rather quickly; the second item required several hours of work. At day's end, 11 small group papers were presented to the large group by designated spokespersons.

A writing group composed of volunteers from the small groups worked for several hours in the evening to hammer out a single written product that reflected common threads as well as areas of disagreement. This was presented to the conference on the third day.

A "bridging committee" was formed by open invitation to participants. This committee was charged with the task of meeting in the near future to iron out ground rules for a permanent body, which will then assume the long-term job of planning for the management of the Verde River watershed. The bridging committee will identify all affected parties and solicit their participation in the process, which must remain completely open.

This was a most surprising and encouraging experience, certainly not just another conference." A high degree of commitment to the group process was evident among participants. There was a willingness to build consensus in spite of the fact that this is a long and difficult task. Ultimately, this approach is the only one that will be generally satisfying and ensure the reaching of our common goal: maintaining the Verde as a live river.

Society of Wetland Scientists Annual Meeting

Julie Stromberg, ASU, and Marie Sullivan, U.S. Fish and Wildlife Service

The 13th annual meeting of the Society of Wetland Scientists was held in New Orleans LA, May 31 to June 6, 1992. Sessions dealing with wetland policy, wetland restoration, and ecology of southeastern marshes and bottomland forests dominated the meeting. Six percent of the 200 talks and posters dealt with western riparian systems and another 4% with western wetlands, bringing the western total to 10%.

Presentations most relevant to Arizona included two by Marie Sullivan (USFWS) on wetland functions of western riparian systems and on uptake of heavy metals from effluent by riparian trees; one by Julie Stromberg and others (ASU) on relationships between groundwater depth, plant water potential, and structure of *Prosopis velutina* stands across riparian-upland water gradients; and one by Duncan Patten (ASU) on the decision making process for setting interim flows in the Grand Canyon.

Other talks dealing with riparian areas in arid settings included one by M. Scott and C. Segelquist (USFWS) that quantified growth and survivorship of *Populus deltoides monolifera* (Plains cottonwood) seedlings in relation to rate of water table drawdown. Scott discussed the implications of this study for assessing the effects of river regulation and changes in water table drawdown rate on recruitment success of riparian trees.

Also presented were two talks dealing with mitigation and restoration of riparian forests in southern or central California. S. Talley and J. Zentner (Zentner & Zentner Inc.) discussed ways in which urban channels could be designed to allow for flood water conveyance while also allowing for establishment of riparian woodlands to satisfy mitigation requirements. Charles Klimas and D. Evans (US Army Engineers) described a project along Santa Margarita Creek that is legally mandated to restore willow habitat (*Salix gooddingii* and others) for the federally endangered Least Bell's Vireo (*Vireo bellii arizone).* Restoration involves planting of young willows to provide foraging habitat and maintenance of mature willows to provide nesting habitat.

Published proceedings should be available by October for about $15. Contact Dr. Mary Landin at (601) 634-2942 or the US Army Corps of Engineers, Waterways Experiment Station, 3909 Halls Ferry Road, Vicksburg MS 39180-6199.

Verde River Days

Verde River Days will be celebrated September 26 and 27 at Dead Horse Ranch State Park in Cottonwood. *Verde River Days* is a community sponsored event that focuses the public's attention in a fun way on and its resources. The event is an enjoyable way to spend the day for you and your family. There are lots of hands-on activities (kid's games, canoeing, fishing, etc.) planned as well as entertainment, food educational sessions and a wide range of informational booths. The Riparian Council's educational display will be set up at one of these booths. Go to the Verde Valley, have a good time, and support one community's efforts to protect its riparian resources.

Arizona Hydrological Society (Northern AZ Chapter) Constructed Wetlands Meeting

This early August meeting featured field trips to constructed wetlands in the Pinetop/Show Low area. These two communities have pioneered the use of constructed wetland habitats for treated effluent in Arizona. Information about water quality was provided attendees as well as information about the value of the areas for wildlife such as cormorants, ducks, herons and osprey. Other field trips were to Pinetop's innovative new composting plant, (wherein all Pinetop's garbage and sewage are made into a commercial compost) and to the Stone Container Corp.'s tree planting site, where NAU is conducting research on developing tree farms using wastewater from the Stone Container pulp mill .

Verde River Corridor Study Update

The Verde River Corridor Project continues to move forward. The Bridging Committee (described on the previous page) held its third meeting on August 28 in Camp Verde. The purpose was to discuss and recommend a management organization structure for local citizens and involved agencies to plan and manage the VerdeWatershed in a coordinated way. Public participation enhancement was also discussed.

Riparian Management: Common Threads and Shared Benefits

This Western regional conference to be held in Albuquerque Feb 4-6, 1993, will feature talks,panels and concurrent sessions on all aspects of river management strategies, with a focus on rivers managed by multiple agencies and landowners. Many river systems will be looked at as examples of good (and bad) management efforts. Posters on more technical matters, such as restoration or wildlife management techniques are invited. The deadline for submitting abstracts for posters is Oct. 31, 1992. Sponsors include most major Federal land agencies, American Rivers, the Arizona Riparian Councils and many others. For more information, contact Barbara Tellman at (602) 792-9591, Water Resources Center, University of Arizona, 350 N. Campbell, Tucson AZ 85721.

RIPARIAN ECOSYSTEM PROFILES

Sacaton Grasslands

Julie Stromberg, Center for Environmental Studies, ASU

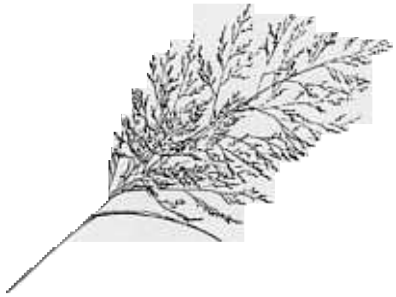
Among wooded riparian communities of the Southwest, Fremont cottonwood-Goodding willow forests are widely believed to be the most endangered. Among herbaceous riparian types, sacaton grasslands are in strong competition for this dubious honor. It is estimated that sacaton grasslands now occupy only 5% of their former range. They are dominated by one or two species of intergrading perennial bunchgrasses. Alkali sacaton *(Sporobolus airoides)* occurs throughout the west and is smaller than its more geographically restricted cousin, big sacaton *(Sporobolus wrightii)*, which occurs from west Texas to California and central Mexico. Both species are most abundant in the grassland savannah zone of the state's southeastern corner, between 600 and 1900 meters in elevation.

Sacatons are like the facultative riparian tree mesquite in the sense that their density, size, associated species, and ecological roles change dramatically depending on whether they are in an upland or riparian setting. Although sacatons can grow in the uplands, riparian sites are their primary habitat. Alkali sacaton prefers areas with very alkaline or saline soils, such as playas. Big sacaton prefers the less alkaline soils of riverine floodplains. Along southern Arizona floodplains, big sacaton often forms dense, nearly monotypic stands of large (to 2 meters tall) vigorous plants. Stands may occur in the open but also occur in the understory of mesquite or cottonwood.

When early explorers described the riparian bottomlands of southern Arizona as being "covered with the most luxuriant grass we had anywhere seen...our mules fed upon it as they traveled, for it was from three to four feet high in many places", they may have been referring to sacaton. It also may have been the culprit that contributed to the "difficulty of getting through the high grass, which covered the heavily timbered bottom" and to the "undergrowth of rank grass, weeds, and jungle, rising above our heads even when on horseback". In uplands,sacaton has smaller size and density, and is but one of many grasses and forbs that constitute the diverse grassland community.

Whereas upland sacatons depend on precipitation, riparian sacaton stands owe their lushness to subsurface water tables that feed capillary water into the fine-textured alluvium of floodplain soils. Sacaton occurs where groundwater is up to 8 m below the surface, but most luxuriant growth occurs where the water table is at depths of 2 to 5 m. This subsurface water is also seasonally supplemented by periodic floodflows and rainfall. However, extensive studies have not been conducted on hydrological relationships of the species.

Primary causes of destruction of sacaton habitat are similar to generic causes of riparian destruction in southern Arizona: clearing of floodplains for agriculture and urbanization, historical downcutting and associated dropping of water tables and reduction in lateral spread of water into the floodplain, channelization and diversion of stream water, and overgrazing. Overburning and the combination of fire and grazing also have been implicated as causes. Sacatons become seasonally



flammable and undoubtedly historically burned: "In March 1858, the entire body of these [San Pedro bottom] lands were covered with a dense growth of sacaton grass averaging 4 feet in height and dry as tinder".

Fire today is often used as a grazing management tool for sacaton stands, since burning makes the palatable new spring growth more accessible to cattle. Some researchers feel that fire benefits sacaton communities, as long as a mosaic of different-aged stands is maintained. However, when burned too frequently, particularly when cattle are present, sacaton grasslands can be eroded and destroyed. When sacaton grasslands go, they take with them species such as Botteri's sparrow, an "old-growth" sacaton specialist, and also decrease the functional ability of the floodplain to trap sediments, spread floodwaters laterally, and recharge the shallow water table.

Sacaton grasslands historically were most abundant in the Sulphur Springs, Santa Cruz, San Simon, and San Pedro river basins. Some of the best remaining examples can be found along the Babocomari River (private property), the San Pedro River (BLM's Riparian Conservation Area), and along Cienega Creek (BLM land).

Quotes are from: Goode. P. Davis, Jr. 1986. *Man and Wildlife in Arizona- the American Exploration Period 1824-1865.* Arizona Game and Fish Dept.

NOTEWORTHY PUBLICATIONS

Pat Ellsworth, Section Editor

Please send reviews and suggestions for this section to Pat at 202 S. Virginia St. Prescott AZ 86303.

Books

Dzunik, A. 1990. *Water resources planning*. Rowman and Littlefield. 318 pp.

This book offers a comprehensive survey of all aspects of water resources planning.

Eden, S. and Wallace, M. G. *Water supply and demand in Arizona.*. University of Arizona. 45 pp.

This book analyzes water supplies throughout Arizona as well as all types of water demand. The authors recognize free flowing streams as a water use. Free from the Water Resources Center, 350 N. Campbell, Tucson AZ 85721.

Goldfarb, W. 1988. *Water law*. 2nd ed. Lewis Publishers. 290 pp.

This revised edition is the only book on water law written for non-lawyers as well as attorneys. It explains all legal terms and covers all aspects of water law, including water pollution.

High Country News. 1987. *Western water made simple*. Island Press. 237 pp.

This book focuses on three rivers: The Colorado, the Columbia, and the Missouri. It presents a lively account of the pressing issues affecting Western water. Winner of the George Polk award for Environmental Planning.

Klett, C. T. O. (ed. 1992. *Proceedings of the 36th annual New Mexico water conference: science and agencies working for the future. Report No. 265.*

Includes 16 papers. $5.25 from Water Resources Research Institute, Box 30001- Dept. 3167, Las Cruces NM 88003 (505-646-1813).

National Research Council. 1992. *Water transfers in the West*. Washington, DC: National Academy Press.

This report by the Committee on Western Water Management examines the impact of past and potential water transfers on "third-parties" such as the environment and rural communities. The Central Arizona Project is a focus of one of the book's case studies.

Rinne, J. N. and W. L. Minckley. 1991. *Native fishes of arid lands: a dwindling resource of the desert Southwest.* General Technical Report RM-206. Ft. Collins Colorado: USDA Forest Service.

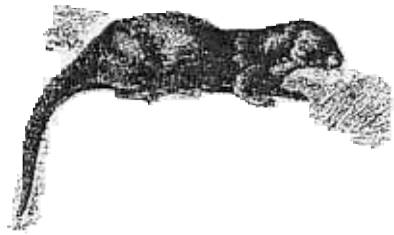
The intent of this well-illustrated publication is to increase public awareness of the plight of southwestern fishes. The introduction concisely summarizes the historical causes of stream and riparian habitat degradation.

Reisner, M. and S. F. Bates. *Overtapped oasis: reform or revolution for Western water?* Island Press. 200 pp.

This is a comprehensive critique of the cardinal dogma of the American West: that the region is always running out of water and must therefore build more and more dams. The authors analyze the West's water allocation system and offer dozens of revolutionary proposals for increased efficiency and policy reform.

Tellman, B. *Effluent dominated riparian areas: issues and opportunities.* University of Arizona. 45 pp.

This book discusses the laws and regulations governing effluent dominated riparian areas in the state, details the many disincentives to keeping flows in streams and discusses options. Free from the Water Resources Center, 350 N. Campbell, Tucson AZ 85721.



van de Leeden, F., F .L. Troise, and D. K. Todd. 1990. *The water encyclopedia*. 2nd ed. Lewis Publishers. 808 pp.

Articles

Croonquist, M. J. and R. P. Brooks. 1991. Use of avian and mammalian guilds as indicators of cumulative impacts in riparian wetland areas. *Environmental Management* 15(5):701-714).

Although conducted within the eastern USA, the techniques of this study are applicable to Western riparian systems. The study found that the response of certain avian guilds (i.e., groups of species that exploit the same class of resources in a similar way) was an accurate indicator of habitat disturbance.

Howe, W. B. and F. L. Knopf. 1991. On the imminent decline of Rio Grande cottonwoods in central New Mexico. *Southwestern Naturalist* 36(2):218-224.

This study documents the poor recruitment by cottonwood and the invasion of exotic species within the Rio Grande floodplain, and contends that a change in river management practices is needed to reverse these trends.

Lamb, B. L. and E. Lord. 1992. Legal mechanisms for protecting riparian resource values. *Water Resources Research* 28(4):965-977.)

This review on law and policies regarding water allocation, endangered species protection, grazing management, and other aspects of riparian protection concludes that there is a lack of direct attention paid to riparian ecosystem issues at every level of government.

The Arizona Riparian Council (ARC) was formed in 1986 as a result of increasing concern over the alarming rate of loss of the State's riparian ecosystems. It is estimated that less than 10% of the State's original riparian acreage remains in a natural form. These habitats are considered Arizona's most rare natural communities.

The purpose of ARC is to provide for the exchange of information on the status, protection, and management of riparian systems in Arizona. The term "riparian" includes vegetation, habitats, or ecosystems that area associated with bodies of water or are dependent on the existence of perennial intermittent or ephemeral surface or subsurface water drainage. Any person or organization interested in the management, protection, or scientific study of riparian systems, or some related phase of riparian conservation is eligible for membership. Annual dues are $10.00; additional contributions are gratefully accepted.

This newsletter is published three times a year to communicate current events, issues, problems, and progress involving Arizona's riparian systems, to inform you the members of ARC about Council business, and to provide a forum for you to express your views or news about riparian topics. The Winter issue will be mailed in January, with the deadline for submittal, December 1, 1992. Please call or write me with suggestions and offers of articles and/or illustrations. This publication will be as interesting and useful as the members make it.

Barbara Tellman, Editor
Water Resources Research Center
University of Arizona
350 N. Campbell Avenue
Tucson AZ 85721
phone 792-9591 FAX 792-8518

The Arizona Riparian Council

Officers:

President: Marty Jakle	(602) 870-6764
Vice President: Julie Stromberg	(602) 965-2975
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Protection/Enhancement: Kris Randall	(602) 207-4510
Water Resources: Andy Laurenzi	(602) 622-3861
Newsletter: Barbara Tellman, editor	(602) 792-9591

MEMBERSHIP FORM

Membership in the Arizona Riparian Council is available to anyone interested in riparian ecosystems. $10 annual dues include a subscription to the quarterly newsletter and the opportnity to attend two statewide meetings.

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Affiliation (if applicable) _____

Mail to:
Arizona Riparian Council
Center for Environmental Studies
Arizona State University
Tempe AZ 85287-3211

1992 Arizona Riparian Council Fall Meeting

The 1992 fall meeting will be held at the Irving power plant along Fossil Creek in the Tonto National Forest, the weekend of October 17 and 18. Plan on arriving Saturday morning, for a weekend of camping, listening, discussing, planning, and hiking. The meeting will be hosted by Arizona Public Service Co.

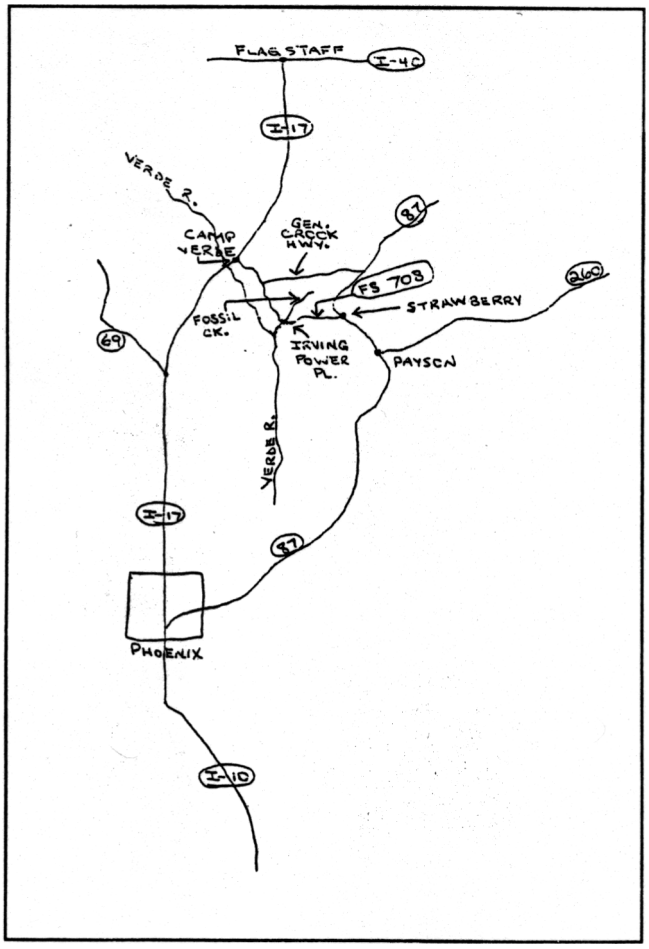
The Saturday program will begin at 1 pm. On the slate will be presentations by APS personnel on issues surrounding the FERC relicensing of the Childs-Irving power plants, the oldest hydroelectric plants in the state. APS will describe plans for altering river flows along Fossil Creek, based on studies done by the consulting company CH2M Hill and on consultations with federal and state agencies. Additionally, representatives from the U. S. Forest Service will discuss other local riparian management issues.

The Saturday night barbecue dinner will be graciously supplied by APS. Dinner will be followed by an ARC meeting, which will focus on plans for the spring 1993 annual meeting.

Sunday's activities will include a leaderless hike to Fossil Creek Springs and back (about a 4 to 5 mile easy hike, one way) during which we can observe the riparian area with an enlightened eye after hearing the prior day's presentations.

Plan on setting your tents in the grassy area around the Irving Power Plant. Rest rooms will be available. Sunday meals are not provided.

We need a head count to plan for the Saturday night barbecue, so please return the form below. —



Arizona Riparian Council
1992 Fall Meeting

Name _____

Address _____

City _____ State ___ Zip _____

Phone _____

Number of family members attending

Please return this form to:

Cindy Zisner,
Center for Environmental Studies,
Arizona State University,
Tempe AZ 85287-3211.

Calendar

Sept. 10-11 *Arizona Water 2000*, Commission on the Arizona Environment, Arizona Hydrological Society, *et.al*, Sedona, Call CAE at (602) 542-2101.

Sept. 13-17 *INTECOL International Wetlands Conference* in Columbus OH. Write William Mitsch, School of Natural Resources, 2021 Coffey Road, Ohio State University, Columbus OH 43210 for information.

Sept. 26 - 27 *Verde River Days* at Dead Horse State Park in Cottonwood. See page 11.

Oct. 2-3 *Western Regional Instream Flow Conference II* in Jackson Hole, WY. Contact Suzanne Van Gytenbeek, Trout Unlimited (307) 733-0484.

Oct 17-18 *Arizona Riparian Council Fall Meeting*. See page 15.

Oct 22-24 - *Symposium on Rangeland Watershed Management* in Safford AZ. Contact Bill Brandau, Society for Range Management at (602) 428-4040.

Oct. 23-25 *Land Use Changes in the Western Sonoran Desert Border Area*, in Ajo. Contact the Sonoran Institute at (602) 290-0828. .

Feb 4-6, 1993 *Riparian Management Conference* in Albuquerque. See page 11

March 8-12, 1993 *Rare Plants of the U.S.-Mexico Border* Contact the Nature Conservancy at (602) 322-3861.

Oct 19-21, 1993 *Wildland Shrub and Arid Land Restoration Symposium*, Las Vegas. Papers and posters invited (abstracts by 12/15/92.) Contact Keith McNeil, Division of Continuing Education, University of Nevada, Las Vegas, 4505 Maryland Parkway, Las Vegas NV 89154-1019.

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