The Arizona Riparian Council Newsletter

Volume 6, Number 2 *Summer 1993*

Big Trees in Riparian Areas: The Natural Place to Discover New Champions for Arizona

Robert Zahner, Tucson

Arizona riparian walkers, whether natural resource professionals or Sunday bird-watchers, have the opportunity to discover, perhaps just around the next bend in the wash, a new national champion "Big Tree." Most of the largest specimens of southwestern trees occur in canyons and washes, even of species we normally associate with uplands. Arizona has over 125 species of native trees and many of them reach their greatest sizes along watercourses.

There are scientific and cultural values to seeking out the largest specimens of trees. Many scientists and the general public wonder how large trees can grow and where the largest are located. Only a few very large southwestern trees have survived the 200 years of man-caused habitat degradation, an abuse we all recognize especially in riparian areas. I believe it is a reasonable and credible goal to locate and document these relicts that have lived long enough to grow to their potential.

Table 1 lists the largest known individuals of 30 common species of trees native to Arizona's riparian areas. These specimens are samples from the *National Register of Big Trees*, maintained by *American Forests* magazine, call "Champion Trees," or those individuals reported to have attained the greatest growth of which their species are capable. You will note that about half of these national champions are located in Arizona, while New Mexico and California host most of the others.

There are five charismatic species of trees that we always associate with the sound of running water in Arizona's mountain canyons: Fremont cottonwood, Arizona sycamore, velvet ash, Arizona walnut, and netleaf hackberry. Sadly, none of these species has a national champion in Arizona; the champions are all in adjacent states. It should be gratifying to Arizonans if we could discover new champions of some of these old riparian mainstays. However, these current champions in New Mexico and California are very impressive specimens for their species.

Let's appraise these champions: The Fremont cottonwood is a gigantean 12' in diameter; the Arizona sycamore is huge, at 7.5' in diameter and 114' tall; the Arizona walnut is 6' in diameter and 85' tall; the velvet ash and netleaf hackberry are each over 4.5' in diameter. Is there a still larger specimen of any of these species somewhere alongside an Arizona watercourse, as yet unreported? It will take a prodigious search on the part of Big Tree hunters to dethrone any current champions.

In total, Arizona has 24 species champions on the National Register of Big Trees; only 16 of these are listed in the sample of riparian species in Table 1. We, of course, have the champion Arizona cypress, a huge tree 6' in diameter and over 95' tall, growing along Bear Creek in the

See Big Trees, page 13

Inside This Issue

President's Message

Marty Jakle

A better name for this column would be "Past-President's Message" as Dr. Julie Stromberg is the newly elected president of the ARC. I wanted to write a final column to report on the progress of the Governor's Riparian Area Advisory Committee (RAAC). Also I wanted to thank everyone for their help and support during my term as president.

The RAAC is a 26-member group with members representing the full spectrum of land use philosophy. It was formed in 1992 by Senate Bill 1030, the riparian studies bill. This bill fell far short of the bill that ARC and other environmental groups supported, SB 2404 - the Riparian Protection Act. But, in the spirit of doing the best we can with what we have, we are hopeful that this bill will be a step forward for riparian protection and are working with the Governor's committee toward that end. We will maintain efforts to have the state pass strong riparian protection/ instream flow legislation.

To date, the RAAC has met four times. The first two meetings were mainly organizational. During the third meeting each representative stated his/her desire for the future state of riparian areas and his/her view of the current state. The differences between current conditions and what is desired will give the group an idea of the gap between the two and provide a map of how to reach the objective of improved riparian conditions.

At the fourth meeting, results from the previous meeting were discussed and the Committee members divided themselves into two groups: regulatory and nonregulatory subcommittees. The job of the subcommittees is to look at existing strategies through the nation and proposed strategies for Arizona. They will be aided by state and federal agency staff who will provide information on present programs and provide advice.

Besides information on existing regulatory and nonregulatory programs, studies are being conducted by he Arizona Game and fish Department (classification and inventory), Arizona Department of Environmental quality (effects of land uses on riparian areas) and Arizona Department of Water Resources (effects of groundwater pumping on riparian areas) These studies will be submitted to RAAC for evaluation by late fall 1993.

All this information will be used to develop an interim report, to be completed by July 1994. A final report will be submitted to the Governor and Legislature by December 1994. This study is generating a large amount of very useful data on riparian areas and impacts to those habitats. Converting this information into sound riparian protection will depend on

- the RAAC developing sound recommendations for riparian protection and
- the Governor and Legislature implementing these recommendations.

Many thanks to Marty for his hard work as Council President and for his years as Vice-President, and Committee Chair!

Membership Brochures

New ARC membership brochures are now available from Cindy Zisner at the Center for Environmental Studies at ASU. (See page 15.) If you know of places where these brochures can be offered, either in on-going display racks or special meetings, please help us distribute them in order to increase awareness of the Council.

CAP Surplus Offers Environmental Possibilities

Andy Laurenzi, Water Issues Chair

One of the hottest items in Arizona water news is what some perceive to be an impending crisis with the Central Arizona Project (CAP). For a variety of reasons, the demand for CAP water among various users, especially Arizona's farmers is woefully short of the roughly 1.5 million acre-feet that is currently available for delivery through the CAP canal. This lack of demand (i.e., underutilization) has raised some serious concerns about Arizona's ability to pay back the debt owed the federal government (estimated at $3.6 billion, yes that's right billion), not to mention the routine operations and maintenance costs which are estimated to be $30-$50 million/year. In addition, re-allocation of water not contracted for will come under review by the Secretary of Interior.

In response to the issue the Governor has convened two task forces. Last year's Governor's CAP Task Force was unable to reach a consensus on a solution to the problem and this year's efforts seems similarly mired in debate. Increasingly, it appears that the State may need federal assistance to restructure the project. Based upon legislation last year concerning the Central Valley Project in California and the Central Utah Project, and the advice of House Natural Resource Committee Chairman Rep. George Miller, the potential involvement of the federal government in solving the CAP problem could lead to significant changes in the CAP, particularly as it relates to environmental protection.

Recognizing the significant opportunity the CAP crisis offers Arizona's environmental community, the Arizona Riparian Council has attended several meetings with other conservation organizations in the State to become more familiar with the Project and to explore options for enhancement and restoration of Arizona waters for the benefit of fish and wildlife resources. Eight main issue areas have been identified: water conservation; enhancement and restoration; aquatic, riparian and wetland habitats; the adequacy of project mitigation measures; the establishment of an environmental trust fund; power and water subsidies; deauthorization of unbuilt Project features such as Orme Dam, Charleston Dam, and Buttes Dam; prompt repayment of Project debt starting on January 1, 1994, and interstate water marketing.

Recently, the Chairman of the Governor's Task Force invited the environmental community to sit on the Task Force. The environmental community has expressed a strong interest in participating but has identified two areas of concern: the narrow mission of the Task Force and the number of seats being offered. Pending resolution of these issues, several members of the environmental community may begin efforts to participate with other water interest groups in the State to craft a solution. Any members of the Arizona Riparian Council who are interested in the CAP issue and would like to learn more on how they might assist the Council in evaluating opportunities are urged to contact Julie Stromberg at 965-2975.

Instream Flow Update

Andy Laurenzi

Protection of Arizona stream flows through the attainment of instream flow water rights continues at a slow but steady pace. The Instream Flow Program within the Arizona Department of Water Resources has received increased attention within the past year as the demands of the Gila adjudication have diminished. The program appears to have good support within the Department from the Director on down and the slow pace of issuance of permits can now be attributed largely to the lack of attention by applicants.

In an effort to assist agencies and encourage agency action, the Riparian Council has attended two coordination meetings involving federal agency personnel responsible for instream flow water rights protection. As an outgrowth of those meetings, letters of support and/or inquiry were sent to the Bureau of Land Management (BLM) and Forest Service (USFS) District offices to encourage the past efforts of these agencies and to solicit continued support for placing a high priority on instream flow needs. Responses from these letters indicate that attention to instream flow issues vary among agency offices. Lack of personnel appears to be a major factor which contributes to agency inaction. To help remedy this situation, both BLM and USFS have submitted Heritage Fund grant applications to A Game and Fish Dept. to help support temporary personnel to organize and develop hydrological and biological information necessary for instream flow permit justifications. The Council was pleased to provide a letter of support for one such application submitted by the Tonto National Forest, and we are encouraged that the Arizona State Office of the BLM submitted a similar request to the AGFD Heritage Fund.

On page 4 is a summary of instream flow protection efforts. This newsletter will provide such an update on a regular basis to better inform our members on the progress of instream flow water rights protection efforts.

Arizona Wild and Scenic Rivers Legislation Progress

Gail Peters, American Rivers

In March 1991, the Arizona Rivers Coalition presented a proposal to our Congressional delegation for federal protection of 40 rivers in Arizona. The proposal was submitted after individuals, now members of the Coalition, were told by most or the Arizona delegation that although no rivers could be included for designation in the Arizona Desert Wilderness Act of 1990, rivers legislation would be addressed if we came back with a proposal.

Looking at the entire state, Arizona Rivers Coalition found over 90 rivers that would be considered eligible for wild and scenic designation. To be designated a river must first be found eligible and then go through a suitability determination. Criteria for eligibility is simply that a stream be free-flowing and have at least one "outstanding remarkable value." Free-flowing is defined in the Act as "existing or flowing in natural condition." The definition applies only to the section of river to be designated - allowing for designation below impoundments when the values warrant. The outstanding remarkable values listed in the Act are "scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values."

For a variety of reasons, river assessments have not yet been completed by the Forest Service (USFS) or Bureau of Land Management (BLM) in Arizona. Congress needs this evaluation to proceed with legislation. Senator DeConcini was able to steer funding to both land management agencies this fiscal year so they can concentrate on the resource analysis needed.

Last January, the Arizona Congressional delegation held seven public meetings throughout Arizona in order to educate the public about the Wild and Scenic Rivers Act and express their intent to proceed with legislation in this Congress. The level of interest in this legislation may have surprised some people. A lot of support was shown at most of the meetings. There were a lot of questions and confusion as to what restrictions designation would put on private property, hunting and fishing, water rights and ranching on public lands. In fact, there is no jurisdiction over private property; hunting and fishing will continue; senior water rights cannot be affected, but all streams designated will receive a federal reserved water right effective on passage. Cattle grazing will continue to "the extent currently practiced," but, land managers must be sure that grazing is done without impacting the values for which the stream is designated.

Resource assessments are being carried out by the USFS and BLM. Your input to them on the proposed segments is critical at this time. Contact the recreation manager at any USFS or BLM regional office. Review any critical resources on the river with them and how mining, off-road vehicle use, more cattle, diversions, or other uses could damage the special values.

Your representatives are working towards consensus on as many streams as possible. They are contacting commodity groups, businesses and others asking for input. If you know these people, suggest that they contact American Rivers to review the proposal or concerns they may have. American Rivers is also available to present a slide show explaining the act and/or showing the rivers in the proposal. Contact Gail Peters at (602) 264-1823.

ARIZONA INSTREAM FLOW PROTECTION BOX SCORE

Instream flow certificates	2
Instream flow permits:	9
Instream flow applications:	57

Agency	Applicatons Pending	Certificates	Permits
BLM	23	1	3
USFS	16	0	1
Nature Conservancy	2	1	5
USFWS	1	0	0
State Land Dept.	2	0	0
Boyce Thompson Arboretum	1	0	0
Pima County	1	0	0
Navajo County	1	0	0
Sierra Club	1	0	0
Individuals	7	0	0
Totals	57	2	9

Little Guys Make Big Waves in Water Circles

Todd Sargent
University of Arizona

Cryptosporidium, the gut-wrenching microorganism that evaded Milwaukee's water treatment facilities in April causing hundreds of cases of a flu-like intestinal illness, may offer yet another reason to protect watersheds and riparian areas upstream of drinking water supplies.

The infectious oocysts are found in surface waters in every region of the U.S., including Arizona, with the highest levels associated with waters receiving wastewater and/or agricultural-ranching wastes. Recent outbreaks involving thousands of people in England, Oregon, Georgia, and now Milwaukee, have alerted water officials to take precautionary measures wherever possible in water treatment operations and watershed management strategies.

Cryptosporidium is an extraordinarily hardy microorganism. Even smaller than giardia, it is one of the most resistant parasites ever encountered, even to commonly used hospital and laboratory disinfectants. It is common in mammals. Large farm animals, such as cattle, are of particular concern because of their contact with surface water supplies. Cryptosporidiosis is typically transmitted by the fecal-oral route and can be widely disseminated by consumption of untreated or undertreated water. The oocysts can survive for weeks, especially at low temperatures. There is currently no effective antibiotic treatment for the disease, but it generally subsides on its own within 7-11 days. However, it may persist for weeks or months in those with those with impaired immune systems.

Cryptosporidium was not recognized as a human pathogen until the early 1980s and there are currently no standards for it. New Surface Water Treatment Plan Rules proposed by the Environmental Protection Agency, however, will specifically look for the oocysts in waters serving medium and large size water utilities. Optimal filtration is normally adequate to protect drinking water quality. Problems can arise, however, when using unfiltered source water or when treatment deficiencies are caused by overloading or inadequate maintenance. This may be especially troublesome in rural areas.

Adequate watershed protection, including limitations on grazing in streams and efficient sewage treatment up-stream from drinking water sources will undoubtedly be the least costly preventive approach. Perhaps it is time for Congress to mandate a new approach toward water quality, by requiring coordination of the Safe Drinking Water Act, with the Clean Water Act, public lands grazing policies,

Friends of the Santa Cruz River volunteers regularly monitor water quality and aquatic insects along the Upper Santa Cruz River in cooperation with the Arizona Department of Environmental Quality and the Santa Cruz County Health Department.
Photo: Sherry Sass

The Floods of '93 - an Ecological Perspective

Julie Stromberg,
Arizona State University

The storms of January 1993 produced 50-yr to 100-yr return interval floods in many of our desert rivers (e.g., Rillito River, Gila River, Verde River) and 25-yr return interval floods in many others (e.g., Tonto Creek, Tanque Verde Creek, Salt River, Agua Fria). We all know that these floods caused damage to farm fields and homes located in floodplains. Of equal interest, however, is the question of how the floods impacted native riparian and aquatic organisms.

The answer varies in part with natural variation in stream type and valley geomorphology. For example, it is clear that floods produce different effects on riparian ecosystems in canyons than in wide, unconstrained floodplains where flood energies can readily dissipate. Human activities in the watershed also influence characteristics of floods as well as ecosystem responses to floods. In general, however, we can conclude that floods are natural disturbance events to which many riparian and aquatic species are adapted, and in some cases, dependent upon. Such conclusions are based in part on ongoing studies of the effects of floods on ecosystem nutrient dynamics (see Fisher article, this issue) and plant population dynamics (Stromberg et al. 1993).

Densely vegetated flood plains often are resistant to floods as floods pass over the floodplain without causing substantial plant mortality or bank erosion. The combination of deep, wide-spreading tree roots and fine, dense grass roots binds the soil-plant continuum together and provides resistance to flood scour. Some riparian areas have low vegetation cover either because of heavy cattle grazing, floodplain clearing for agriculture, or pumping or diversion of surface or subsurface stream water. Such systems are more susceptible to erosion and plant death from large floods, and floods may produce "negative effects" in these devegetated riparian areas.

Floods serve many positive functions in "intact" riparian systems. Many riparian plant species including cottonwoods (*Populus* spp.) and willows (*Salix* spp.) are pioneer species that require flood disturbance to allow for periodic seedling establishment. Others, such as mesquite (*Prosopis* spp.), also do not germinate well in dense herbaceous vegetation. Floods stimulate germination of these species by providing competition-free sediment bars and by saturating normally dry floodplain soil surfaces; and enhance seedling survivorship by providing high water tables that recede at a rate slower than the rate of seedling root elongation. Some of these same species do not tolerate high soil salinities and also depend on floods to flush salts from floodplain soils. This function is of heightened importance along rivers in which salty irrigation return flows are a primary riparian water source.

Floods cause some degree of plant and animal mortality, but many species are resilient to flood disturbance in the sense that populations can rapidly recover after flood mortality. Burro brush (*Hymenoclea* spp.) and arrowweed (*Tessaria sericea*), for example, are clonal shrubs that rapidly recolonize after flood mortality via stem and root sprouts. Many streamside grasses, including the native knot grass (*Paspalum distichum*) and the exotic Bermuda grass (*Cynodon dactylon*), also recolonize rapidly .

Species differ in their ability to withstand the physical impacts of high velocity, debris-laden flood water or the physiological effects of prolonged soil saturation. saltcedar (*Tamarix pentandra*), for example, is relatively intolerant of the physical effects of floods and typically suffers greater stem breakage and mortality than do the more pliable stems of cottonwood and willow that often bend under the weight of flood waters. Give saltcedar a dammed river or a reservoir with salty soils from water evaporation, however, and it will thrive at the expense of the native trees.

Flood-plant interactions are two-way phenomena. Floods influence riparian vegetation, and vegetation influences flood flows. Densely vegetated riparian areas reduce the velocity of flood waters, increase lateral spread of the water, and dampen downstream peaks. Dense plant cover in the watershed also makes streams less "flashy" by increasing water percolation into soils and providing slower, sustained releases into the river bed. Flow peaks have been dampened along the San Pedro River, for example, in response to increased riparian vegetation development in recent decades.

By slowing water velocity and decreasing the "competence" of the river to transport sediment, densely vegetated stands also increase amounts of sediment and nutrients deposited in the floodplain. An issue of concern, however, is whether this amount of sediment is uncharacteristically high because of watershed activities that destabilize soils. The lack of answers to such questions calls out for research watersheds in which riparian issues can be studied independent of the effects of human activities.

Thoughts on Traditional Approaches to Flood Control

Do flood control structures work? "Flood control" is an oxymoron. We never completely control natural processes, we only achieve a partial control that gives us a false sense of security. Because flood-control structures "tame" small floods, we believe that they protect us from all flood waters. The result is extensive home building and development in floodplains. In truth, however, severe flooding remains a reality on most dammed and regulated rivers. Witness the recent release of record flows into the "normally dry!" Gila River, and of the human suffering caused by this failure of our flood control system.

Flood control structures also harm riparian plants and animals that live along riverbanks. Native riparian plants and animals depend on flood flows to be sustained. Floods allow for the establishment of new generations of cottonwood and willow forests along our streams, and do the same for many native desert fishes. Floods help native species compete against non-native species such as saltcedar that are now common along many desert rivers. Floods also flush toxins from soils, and deposit nutrients for plant growth.

The alternative: work with the environment. Should we build more and bigger flood control structures? To do so is to ignore lessons from the past., lessons we learned, for example The logical alternative to flood control is to leave the floodplains to plants that are adapted to flooding: cottonwood and willow trees, burro brush and arrowweed shrubs, and screwbean and velvet mesquite trees. This solution benefits our dwindling riparian forests, and also benefits people. We will no longer will lose our homes to floods, and will have recreational opportunities for hiking, bird-watching, and finding refuge from summer heat.

To realize this alternative we must provide year-round water for riparian plants. Most dams serve several purposes including flood control and water delivery. We recognize the need for impoundments to supply year-round water to municipalities and farms. However, a portion of the water that would be released for farming or urban use can be released to insure the survivorship of floodplain vegetation. The benefits of this re-allocation are many.

The river is a product of its watershed. The way we manage our forests and deserts also affects the amount and timing of water flow in rivers. We can minimize flood impacts and increase flow during drought periods by increasing native plant cover on upland areas. This means not overgrazing uplands (which in some cases means no grazing); reducing paved surface area; and managing forests and shrublands for high plant cover. This will enable the soils to absorb and store more water, and slowly release it to the river during dry periods when water is at more of a premium.

Conclusion. Floods are not necessarily undesirable. Native riparian species need floods to perpetuate themselves. If we manage our floodplains for riparian forests, the riparian forests will in turn lessen the impacts of floods by slowing flood waters, increasing percolation into the groundwater, and filtering sediment from floodwaters. We have much to gain by taking an ecological perspective of floodplain management and by working with the environment and not against it. To do this, we should: remove homes and buildings from floodplains and replace them with flood-adapted native plants. Maintain instream flows in our rivers to sustain floodplain vegetation year round. Manage our upland vegetation so that flash-flood watersheds become slow-release watersheds. There will be some tradeoffs under this scenario, but it may be the wisest overall course of action.

The Wisest Overall Course of Action?

The Pima County Board of Supervisors voted 3-2 recently ·in a tight budget year) to spend $585,000 for a house and 9.5 acres that owners say the County failed to protect from flood damage. This home is located at the confluence of Tanque Verde Creek and Pantano Wash, at Craycroft Road in Tucson. Last January several acres of land were eroded from this property which is situated in a highly erosion-prone part of the river. During the flow event itself (not a flood!) the County spent many thousands of dollars attempting to shore up the banks, driving the river's energy to the opposite bank, where much land was also lost. The owner claims that bridge construction exacerbated the damage to his property. According to the *Arizona Daily Star*, the County will repair the house and sell it, then include the property in a park.

What would it have cost if the County had instead long ago denied permission to build in this flood/erosion-prone spot and preserved this entire area with its once beautiful mesquite bosque and cottonwood forest as a park?

7th Annual Meeting Rio Rico Resort 16-17 April 1993

This year's annual meeting was, as usual both informative and fun. The morning session focused on border rivers, with the following talks:

The Upper San Pedro River by Greg Yuncevich (BLM) who discussed National Conservation Area and border implications.

The Lower Rio Grande River was discussed by Larry Ditto of the U.S. Fish and Wildlife Service in Texas. Very difficult issues were described from water quality to flood control.

The Lower Colorado River was the topic of Edward Glenn (University of Arizona, Environmental Research Laboratory). The desalting plant and the Santa Clara Cienega were main issues.

The Upper Santa Cruz was discussed by Julie Stromberg (ASU, Center for Environmental Studies), with mention of water quality issues, vegetation, etc.

At lunch, Kris Randall (Arizona Department of Environmental Quality) talked about the Governor's Riparian Area Advisory Committee and related activities of state agencies. Jeffrey Cooper of the Nature Conservancy enlightened us with some beautiful slides of southeastern Arizona riparian areas and the various plants and animals that inhabit them.

The technical session spanned a wide range of riparian research and management issues. The topics ranged from planning and zoning decision making in Madera Canyon to grazing impacts in the Arizona strip, effects of discharge rates on beach campsites in the Grand Canyon, legal issues concerning groundwater management, and international water management considerations in the San Pedro Basin.

Research talks covered the spectrum from water quality in the Santa Cruz River to use of water by woody vegetation, and regional variations in cottonwood recruitment patterns. In addition, there were excellent posters on evaluating degraded riparian ecosystems, vegetation management and inventory of the lower Colorado River, Arizona State Parks' streams and wetlands program, the Arizona Riparian Council and Arizona Game and Fish Department's statewide riparian inventory and mapping effort.

At the brief business meeting Julie Stromberg was elected President upon nomination from the Nominating Committee and no nominations from the floor. Kris Randall was elected as Vice President, after an election between herself and Roy Jemison who was nominated from the floor.

Diane Laush reported that the organization is financially solvent and she will provide a Treasurer's Report for the fall issue of the newsletter.

On Saturday, about 40 members took a fascinating field trip to five spots in and near the Santa Cruz River. They visited the Guevavi Ranch, Meadow Hills Cienega, Rancho Santa Cruz, and hiked 3 miles of the Anza Trail.

A total of 72 people attended this year's meeting, somewhat less than last year. The meeting kept on schedule and ran smoothly. A survey form was distributed which will help us plan next year's meeting. We have only received a few back and, in general, the comments have been very favorable. Remember, these are your meetings. If you want to have certain topics covered, please suggest them on your survey form and/or submit an abstract when next year's call for papers comes out. Copies of this year's abstracts are available for $2.50 to cover copying and postage and may be obtained from the Council address on page 15.

Many thanks to all who worked hard to make this a successful endeavor - Marty Jakle, Diane Laush, Sandy Montoya, Julie Stromberg, Marie Sullivan, Bill Swenson, and Cindy Zisner.

NEWS BRIEFS

Functional Assessment of the Verde River Riparian Corridor
Marie Sullivan
U.S. Fish and Wildlife Service

The "Functions and Values of the Verde River Riparian Ecosystem and an Assessment of Adverse Impacts to these Resources - A Supporting Document for the Initiation of the Verde River Advanced Identification" has been completed by the U.S. Fish and Wildlife Service (USFWS) and is available through the Environmental Protection Agency (EPA) Region IX. Those who would like to receive a copy may contact Mary Butterwick at 415/744-1985. If you are affiliated with an agency, please verify that your agency has not already requested a copy as only a limited number of documents were printed. Additional copies will also be available in local libraries and city offices of Clarkdale, Cottonwood, and Camp Verde. Copies are not available through USFWS.

This assessment will be utilized by EPA and the Corps of Engineers to implement an Advanced Identification (ADID) of potentially suitable or unsuitable disposal areas for future dredged or fill material along the Verde River. They will develop the specific criteria for site identification in a subsequent document.

This functional assessment includes an overview of the Verde Basin, and evaluations of 10 functions and land use activities for 13 reaches and subreaches identified between Sullivan Lake and Horseshoe Reservoir, and the first mile of the 6 perennial tributaries of the Verde River. The assessment indicates that the Verde River above Horseshoe Reservoir provides all the assessed functions although the extent to which the functions are provided is influenced by geomorphological, hydrological, and vegetative characteristics. The report provides evidence that preservation of these func-tions is critical to protecting the Verde River riparian ecosystem.

EPA will schedule a series of public workshops in the Verde Valley early this summer regarding the. Public notices of upcoming meetings will be sent out when specific dates and locations have been determined.

Fossil Creek Childs-Irving Hydropower Relicensing Update
Marie Sullivan,
U.S. Fish and Wildlife Service

The Arizona Public Service Company (APS) filed an application with the Federal Energy Regulatory Commission (FERC) on December 18, 1992, for relicensing of the Childs-Irving Hydroelectric Project located on Fossil Creek. This relicensing was the subject of last year's ARC fall meeting at Fossil Creek. Many of the concerns expressed by ARC members regarding this project were incorporated into comments submitted to APS by the interagency team before the application was sent to FERC. The interagency team, comprised of the USFWS, U.S. Forest Service (USFS), and Arizona Game and Fish Department (AGFD), has been working with APS during the pre-application process in reviewing the environ-mental studies conducted by a consultant contracted by APS.

FERC has requested APS to submit additional information. The 60-day public comment period for this proposed relicensing will start when FERC files a public notice of accepted application. This is anticipated to occur within the next several months. The National Environmental Policy Act (NEPA) process for this project will begin when FERC files a public notice that the application is ready for environmental analysis. Additional public comments can not be submitted during the NEPA process unless FERC determines that an Environmental Impact Statement is required. Those who submitted written comments after the application was accepted will be kept informed of the NEPA process by FERC.

To review the application contact Marie Sullivan, USFWS (602/379-4720), Eric Swanson, AGFD (602/789-3607), or Ken Anderson, USFS (602/567-4501) by June 1, 1993.

Tavasci Marsh

The Environmental Impact Statement is now available from Arizona Game and Fish Department, 2221 W. Greenway, Phoenix AZ 85023. Comments are due by June 1.

Arizona Hydrological Society Annual Scholarship Announcement.

Three $500 scholarships to full-time students in hydrology, hydrogeology or any water-related discipline at any AZ university or college. Information Dr. Aregai Tecle, NAU, 602 523-3031.

Southwestern Riparian Expertise and Information Directory

Roy Jemison of the Forest Service in Flagstaff and Barbara Tellman at the Water Center in Tucson are contemplating a Riparian Expertise Directory for the Southwest which would include government agencies, colleges and universities and other sources of expertise. If you are interested in helping design this product or have ideas about who and/or what should be included, call Roy at (602) 556-2176 or Barbara at (602) 792-9591.

Forest Service Told to Keep its Promise

Jeff Burgess

A biological opinion recently issued by the U.S. Fish & Wildlife Service (USFWS) may finally force the Apache-Sitgreaves National Forest to keep its promise to improve the condition of the trout streams it manages in Arizona's White Mountains.

The legally binding opinion requires the forest to implement an intensive livestock management plan for the 18,901 acre West Fork grazing allotment before this summer's grazing season. If the plan, which will improve habitat for the threatened Apache trout *(Oncorhynchus apache)* isn't in place by then, the forest will not be allowed to permit cattle on the allotment.

"I want to make it clear that we're not wild-eyed environmentalists," Sam Spiller, Supervisor of USFWS's Phoenix office, said. Spiller explained the measures mandated in the biological opinion simply ask the Apache-Sitgreaves National Forest to live up to the commitments it made in its 1989 forest management plan amendment. The amendment was a response to appeals filed by the Arizona Game & Fish Department and environmental groups against the forest's original 1987 management plan. The original plan had failed to seriously address riparian habitat recovery, despite the forest's admission that 72% of its streams were in poor condition primarily due to overgrazing.

In the amendment, the Apache-Sitgreaves promised to improve riparian habitat to at least 60% of its potential capability. In order to achieve this, the forest committed to implementing better livestock management by 1992 on 42 grazing allotments they identified as having riparian areas providing habitat for threatened or endangered species. The 42 allotments the forest identified encompass 31 Apache trout streams.

The Apache-Sitgreaves also promised that from these 42 allotments, forest staff would identify 10 as being high priority and implement better grazing management on them by 1990. The forest designated the West Fork allotment as the most important of these.

The ambitious timetables in the amendment generated an appeal by the Mountain States Legal Foundation on behalf of the Arizona Cattle Growers' Association.

"We felt it was impossible for them to get that many new plans completed that quickly in a fair manner," local cattlegrowers spokesman Charles Coleman said.

Apache-Sitgreaves supervisor John Bedell has never issued a formal decision to revise the amendment. But the revision timetable the forest is actually implementing resembles the one the cattle growers asked for in their appeal.

The revision of the West Fork allotment's grazing plan is an example. The Apache-Sitgreaves began drafting a new plan for the West Fork allotment in 1989. Alpine District Ranger Dean Berkey presented a draft in 1991 but he was forced by environmentalists to withdraw it because he had failed to request an opinion from the USFWS on how the plan would affect the allotment's Apache trout population. It wasn't until August of last year that Berkey finally got around to complying with the Endangered Species Act by requesting USFWS's opinion.

When USFWS responded this past December, they found Berkey's proposal did not put the Apache trout in danger of extinction. But they said the "incidental take" level of the fish would exceed legal limits if the plan wasn't implemented before this summer's grazing season.

The legally allowable level of incidental take was defined in the USFWS opinion to be 40%, or in other words, the achievement of the 60% percent of potential fish habitat the forest had promised in its 1989 amendment. Current potential habitat levels are below 60% on all three of the West Fork's Apache trout streams.

The opinion requires the forest to conduct monitoring to track the plan's progress toward the goal of 60% potential habitat.

The forest must also monitor to compare the rate of habitat recovery on the stream portions which will have managed grazing, against the portions which will be excluded from grazing.

USFWS told the forest that if the areas with managed grazing don't recover as quickly as the ungrazed areas, the plan must be revised.

Apache-Sitgreaves officials realize their response to the conditions in the West Fork's biological opinion will likely set a precedent for the forest's remaining allotment management plan revisions. They say no decisions have been made yet but they acknowledge something will have to be done before this summer.

"We have to see how many of the conditions we can realistically meet," the Alpine Ranger District's Gary Davis said.

Talk like that gets Arizona Game & Fish Department's regional supervisor, Norris Dodd, excited. His agency

recently announced plans to make the entire water-shed of the West Fork of the Black River a blue ribbon,to kill, trout fishing region. He said a continuing lack of adequate grazing management on the West Fork allotment will hinder the success of that plan.

"There are no excuses left. It's like the Nike ad: "Just do it!" he said.

Dodd explained he has made it clear to Forest Supervisor Bedell that the state is ready to quickly provide all the money,manpower and equipment the forest may need to help implement the plan. He pointed out USFWS acknowledged this in their opinion because they told the forest it cannot use lack of funding as an excuse for failure to comply with the conditions.

Dodd added that because his agency is willing to spend state wildlife funds on the range improvements necessary to implement the plan, the grazing permittee will not have to spend any of his own money.

But St. Johns, Arizona, rancher Rob Roy Patterson, who holds the permit, says the new grazing plan is so complicated he will have to hire more hands to handle his cattle.

"The operation's just marginal now," he said. Patterson claimed it's "fiction" that the streams on the allotment are valuable trout habitat. "There's never been any fish in those creeks," he said. "Those streams have always been intermittent."

Dodd says years of published research on the allotment's streams verify they are perennial habitat for Apache trout. But he concedes that because of overgrazing, the stretches that are easily accessible to cattle currently support few fish.

According to Dave Cohen, president of the Arizona Flycasters, sport fishing in Arizona contributes $400 million annually to the state's economy. He challenged the state's livestock industry to show comparable numbers.

"We applaud Fish & Wildlife's opinion," he said. "The White Mountains have the nation's fifth largest coldwater fishery on Forest Service land and it deserves better management."

The biological opinion also drew praise from the National Wildlife Federation. They attacked the status quo on the Apache- Sitgreaves last spring when they filed an appeal asking the forest to keep cattle off three other high priority allotments until new management plans were implemented. The Forest Service denied the appeal on the grounds that annual authorizations to graze are not appealable decisions.

"We're keeping an eye on the situation. We want to make sure the forest obeys the law and meets USFWS's conditions," the Federation's Beth Wendel said.

Arizona State Parks News

The Arizona Rivers Assessment

The survey has been completed and a report is in its final draft stage. The publication is targeted for release by early summer.

A user-friendly computer program that will enable the River Assessment data base to be readily accessed by any interested party will be provided as another final product. The program will be distributed on a single disk free of charge. The program's development is under contract with the National Parks System; its targeted date of completion is early summer.

Santa Cruz River Corridor Project

This corridor project is underway, under staff guidance from Kate Bradley (624-9463). Steering Committee meetings were held in March and April. Participants included local citizens, city and county staff, and representatives from State Representative Lou Ann Preble and Congressman Ed Pastor's offices. Issues discussed were water quality, North American Free Trade Agreement issues, private property rights and public access. Individuals and agencies will continue to identify needs as the process proceeds. The next meeting will be June 9 at the Tubac Art Center.

Statewide Comprehensive Outdoor Recreation Plan (SCORP)

The SCORP planning process is well underway, with subcommittees meeting regularly to develop proposals.

Information about any of these projects can be obtained from the Resource Stewardship Office of State Parks at (602) 542-4174.

PROJECT PROFILES

Julie Stromberg, Section Editor

Sycamore Creek Ecosystem Project: Disturbance and Nutrient cycling in the Stream-Riparian Ecosystem

Stuart Fisher, Arizona State University

Sycamore Creek in Maricopa County is the site of an intensive ecosystem study supported by the National Science Foundation since 1977. The project is led by Drs. Stuart Fisher and Nancy Grimm of Arizona State University's Zoology Department and has over the years incorporated the efforts of some 50 student, postdoctoral, and senior researchers. The overall objective of this project is to determine the influence of disturbance on ecosytem functioning. Early studies focused on the aquatic sector and documented responses of the aquatic biota (algae, invertebrates, and fish) to disturbance by flash floods. This early work provided a conceptual basis for studies of succession in flowing waters, an area that had been slighted by ecologists previously.

Recent work has expanded to form the stream channel outward to include the riparian corridor and upland areas in a study which now focuses on nutrient (particularly nitrogen) retention as a function of disturbance regime. Hydrologic connections between the stream channel, the underlying hyporheic zone, lateral sand bars, and the more distal zone of riparian trees are being resolved by establishing flow paths and nutrient and organize matter processing along these hydrologic trajectories. In addition to flash floods, disturbance by drought, grazing, and algal pathogens are now incorporated in a larger view of an ecosystem influenced by multiple agents of disturbance.

The current goal of this research is to investigate

1. the capacity of individual riparian subsystems to retain nutrients,
2. the effect of different types of disturbance on this capacity,
3. recovery of nutrient retention capability following disturbance, and
4. the resulting efficiency of the entire ecosystem as a filter of materials derived from upland areas.

Since the nutrient filtration capacity of the ecosystem is likely to be sensitive to regimes of flood and drought, results of this study should be useful in predicting the effect of climate change on this important ecological function of the riparian ecosystem.

National Champion Emory Oak located in Oak Tree Canyon on the Empire Ranch. Photo: Bob Zahner

Bill Williams River Corridor Planning

An interagency group is exploring future management strategies for managing the Bill Williams River and Alamo Lake to optimize the benefits for fisheries, wildlife and riparian values, while providing recreational opportunities.

The group is comprised of the Arizona Game and Fish Department, U.S. Bureau of Land Management, the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation and Arizona State Parks. The group operates under a standard decision making framework, wherein each agency can understand the ramifications of their management objectives upon the objectives of other agencies, and conflicts can be resolved or minimized.

Ultimately the recommendations (expected later this year) will be submitted to the Corps of Engineers for consideration in revising its management operations plan for Alamo Lake.

In order to properly understand the physical limitations of both watershed and reservoir control facilities, hydrologic models are being developed with the assistance of three universities, including the University of Arizona. Once completed these computerized models will predict hydrologic flows for both surface and subterranean water. When used in conjunction with the Corps model now in use, the group will be able to recommend a release strategy which will maximize multiple-resource benefits.

For information, contact Eric Swanson, Project Coordinator, at (602) 789-3607.

Big Trees - from page 1

Santa Catalina Mountains. We also have the champion velvet mesquite, another enormous specimen over 5' in diameter, growing along the Santa Cruz River a few miles north of the Mexican border. Other notable riparian champions in Arizona include an Arizona madrone in Reiley Canyon of the Winchester Mountains, a desert-willow along Russell Gulch near Globe, and an Arizona pine along the stream in upper Bear Canyon of the Santa Catalina Mountains.

Arizona oaks dominate the list of National Champions for our state. Although we tend to associate oaks with uplands, the really large specimens occur along water courses. The largest of these champion oaks is an Emory oak 5' in diameter, with a crown spread over 80', growing in Oak Tree Canyon on the Empire Ranch. (See photo p. 12.)

For many decades Arizona boasted National champions for desert ironwood and blue paloverde, until slightly larger specimens of these species were found recently just across the Colorado River in California. At this writing we are on the trail of, hopefully, a still larger specimen here in Arizona.

Some of our riparian trees do not yet have any national champions, including three species of *Salix* common along many of Arizona's watercourses, with really big specimens out there waiting to be discovered. These willow species are readily identified by simple leaf characteristics.

Champion trees are determined by a formula that gives size in girth of bole more weight than total height, and height more weight than spread of crown. The following information is needed: Name of species or variety; circumference of the bole in inches, at 4.5' above ground for a single-stemmed tree, or at the narrowest point below forks; height of tree in feet; diameter of crown, average of widest and narrowest spread; location; date measured and by whom; name and address of owner; clear photographs; tree's condition; name and address of nominator.

The National Register has recently established a state chapter in Arizona to encourage interest in big trees. The Arizona Register evaluates and verifies candidates for the National Register, documents state champions, unusual exotic trees, and historically important trees. If you believe you have discovered a champion tree, or other noteworthy tree, you can obtain forms for recording information, help in measurements, and instructions for nominating trees, by writing The Arizona Register of Big Trees, ASU Arboretum, Facilities Management, ASU, Tempe, AZ 85287-3305.

TABLE 1. National Champion specimens of riparian trees and other native trees of Arizona that reach largest sizes along water courses.

Species	Size	State
Acacia greggii (catclaw acacia)	79/50	NM
Alnus oblongifolia (Arizona alder)	201/130	NM
Arbutus arizonica (Arizona madrone)	143/53	AZ
Celtis reticulata (netleaf hackberry)	180/69	NM
Cercidium floridum (blue paloverde)	88/55	CA
Cercocarpus ledifolius (curlleaf mtn. mahogany)	160/28	NV
Chilopsis linearis (desert-willow)	145/57	AZ
Condalia globosa (bitter condalia)	43/19	AZ
Cupressus arizonica (Arizona cypress)	227/75	AZ
Fraxinus velutina (velvet ash)	168/81	CA
Juglans major (Arizona walnut)	225/85	NM
Lysiloma microphylla (littleleaf lysiloma)	58/27	AZ
Olneya tesota (desert ironwood)	198/33	CA
Parkinsonia aculeata (Mexican paloverde)	103/31	AZ
Pinus ponderosa var. arizonica (Arizona pine)	146/118	AZ
Platanus wrightii (Arizona sycamore)	283/114	NM
Populus fremontii (Fremont cottonwood)	454/87	NM
Prosopis pubescens (screwbean mesquite)	39/30	TX
Prosopis velutina (velvet mesquite)	196/46	AZ
Quercus arizonica (Arizona white oak)	148/39	AZ
Quercus chrysolepis (canyon live oak)	404/72	CA
Quercus emoryi (Emory oak)	190/53	AZ
Quercus grisea (gray oak)	73/65	AZ
Quercus hypoleucoides (silverleaf oak)	97/73	AZ
Quercus oblongifolia (Mexican blue oak)	128/38	AZ
Quercus turbinella (turbinella oak)	132/30	AZ
Robinia neomexicana (New Mexican locust)	64/77	AZ
Salix scouleriana (Scouler willow)	233/53	OR
Sambucus mexicana (Mexican elder)	108/31	NM
Sapindus drummondii (western soapberry)	105/54	TX

Tree size = circumference in inches/height in feet.

NOTEWORTHY PUBLICATIONS

Pat Ellsworth, Section Editor

Bormann, F.H. and S.R. Kellert (eds.) 1991. Ecology, Economics, Ethics: The Broken Circle. Yale Univ. Press 224 pp.

Here is a collection of 12 essays based on a lecture series at the Yale School of Forestry and Environmental Studies. The essays are built around the idea that ecology, economics, and ethics comprise a three-legged stool upon which conservation must rest.

Buck, S.J. 1991. Understanding Environmental Administration and Law. Island Press. 224 pp.

This guide makes the law more accessible for managers, citizens, special interest groups and others who need a thorough, but rapid understanding of environmental law.

Dixon, J.A. and P.B. Sherman. 1990. Economics of Protected Areas: A New Look at Benefits and Costs. Island Press. 234 pp

This publication represents a groundbreaking effort to help governments examine costs and benefits of protected areas. A method is provided for assigning monetary value to nature and the economic techniques involved are explained.

Ford, T.E. (ed.) 1993. Aquatic Microbiology: An Ecological Approach. Blackwell Scientific Publications. 544 pp.

Authored by an international team, this book includes chapters dealing with the microbiology of rivers, streams,wetlands, and swamps, estuaries and salt marshes, and groundwater. The ecosystem approach enables the general ecologist to understand current research.

Getches, D.H., L.J. MacDonnell, and T.A. Rice. 1991. Controlling Water Use: The Unfinished Business of Water Quality Protection. Natural Resources Law Center. 146 pp.

The authors give examples of water quality problems related to water use in the Western states. They also look at water laws for ways of addressing such problems.

Hairston, A.J. (ed.) 1992. Wetlands: An Approach to Improving Decision Making in Wetland Restoration and Creation. Island Press. 151 pp.

This book represents five years of research comparing populations of natural and created wetlands to determine whether restored wetlands can successfully replace those lost to development. Is should be useful to resource managers attempting to mitigate wetland losses.

Hammer, D.A. 1992. Creating Freshwater Wetlands. Lewis Publishers. 306 pp.

This book provides a step by step outline for restoring or creating a freshwater wetland. It considers site selection, planning, construction, selection and planting of vegetation, attracting wildlife, and more.

Harris, T. 1991. Death in the Marsh. Island Press. 270 pp.

The author explains how federal irrigation projects have altered selenium's circulation in the environment, resulting in its accumulation in marshes with some tragic effects.

Kazis, R. and R.L. Grossman. 1991. Fear at Work: Job Blackmail, Labor and the Environment. New Society Publishers, 336 pp.

Exposing "job blackmail" as a corporate manipulative tactic, the authors argue that we must protect both jobs and the environment. The book provides an inclusive and hopeful vision for the future.

Nielsen, D.M. (ed.) 1991. Practical Handbook of Groundwater Monitoring. Lewis Publishers. 717 pp.

The emphasis here is on practical application of current technology,with minimal discussion of theory. Consideration is given to federal regulations, investigative methods, and analysis of complex sets of water quality data.

Palmer, T. 1991. The Snake River: Window to the West. Island Press. 322 pp.

Palmer considers instream flows, groundwater management, water conservation, pollution of streams from agriculture and logging, small hydroelectric development, and reclamation of riparian habitat. He shows us that it is not too late to turn things around, both on the Snake and throughout the West.

Payne, N.F. 1992. Techniques for Wildlife Habitat Management of Wetlands. McGraw-Hill. 566 pp.

The only volume of its kind, this is a guide for wildlife professionals which describes techniques of direct habitat management for a variety of game and nongame species.

World Wildlife Fund. 1992./ Statewide Wetlands Strategies: A Guide to Protecting and Managing the Resource. Island Press. 267 pp.

The strategies given here are based on the recommendations of the National Wetlands Policy Forum, a group representing industry, government, farming, ranching, and environmental concerns.

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 are 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. 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 ARC members about Council business, and to provide a forum for you to express your views or news about riparian topics. The Fall Issue will be mailed in September, with the deadline for submittals August 1, 1993. Please call or write with suggestions, publications for review, announcements, articles, and/or illustrations. Information on computer disk (any type) is preferred.

Barbara Tellman, Editor
Water Resources Center
University of Arizona
350N. Campbell Avenue
Tucson AZ 85721
(602) 792-9591
FAX 792-8518

The Arizona Riparian Council

Officers:

President: Julie Stromberg	(602) 965-2975
Vice-president: Kris Randall	(602) 207-4510
Secretary: Cindy Zisner	(602) 965-2490
Treasurer: Diane Laush	(602) 870-6763

At Large Board Members

Russ Haughey	(602) 981-9400
Duncan Patten	(602) 965-2975
Marie Sullivan	(602) 379-4720

Committee Chairs:

Classification and Inventory:	
Education: Tanna Thornburg	(602) 542-1996
Land Use: Mark Heitlinger	(602) 622-3861
Protection/Enhancement::	
Water Resources: Andy Laurenzi	(602) 622-3861
Newsletter: Barbara Tellman	(602) 792-9591

To join the Arizona Riparian Council, contact

Cindy Zisner at
Arizona State University
Center For
Environmental Studies
Tempe AZ 85287-3211

(602) 965-2490

Annual dues are $10.

Calendar

May 30 - June 3. Edmonton, AB. Annual Meeting of the Society of Wetland Scientists. Contact Lyndon Lee (206) 283-0673.

June 5 - Tucson,AZ. Perspectives on Managing Rangeland Resources. Sponsored by Tucson Audubon and the U. of A. School of Renewable Natural Resources. $15. 1-800-955-8632 or 624-8632 ex. 252 in Tucson.

June 15-19 Madison, WI. International Wetland Symposium "Improving Wetland Public Outreach, Training, Education, Interpretation" Association of State Wetland Managers. $135 nonmembers. (518) 872-2171

July 12-15. Flagstaff, AZ. Conference on Sustainable Ecological Systems. Forest Service and NAU. $135 before June 7. Call (602) 523-7502 for information.

July 29-31. Phoenix, AZ. Symposium on Vegetation Management of Hot Desert Rangeland Ecosystems. Univ. of Arizona. Call George Ruyle. (602) 621-3802

Aug. 3-5 St. Louis, MO, Wetlands Engineering Workshop, U.S. Army Engineer Waterways Experiment Station. Planning and design approaches for wetlands establishment/ restoration, including vegetative techniques. Cheryl M Lloyd (601) 634-3711.

Aug. 9-Sept.2 Tucson, AZ. Innovations in Groundwater Management and Symposium on Effluent Use Management. American Water Resources Association. (602) 792-9591.

Sept 17-19. Sonoita, AZ. Rangeland Ecology Institute. Sponsored by BLM, Uof A and Tucson Audubon. $110. 1-800-8632, or 624-8632 ex. 252 in Tucson.

Sept. 23-24 Casa Grande AZ. Emerging Critical Issues in Water Resources of Arizona and the Southwest. Arizona Hydrological Society. Abstract submittals by May 28, 1993. Dr. Aregai Tecle, NAU, (602) 523-3031.

BT5 1005
Center for Environmental Studies
Arizona Riparian Council
Arizona State University
Box 873211
Tempe, Arizona 85287-3211

Nonprofit
Organization
U.S. Postage Paid
Arizona State
University