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The Cocopah Tribe, the Colorado River, and Conservation: How Collaboration is Restoring a Cultural and Riparian Ecosystem

by Garrit Voggesser, Ph.D., National Wildlife Federation, Tribal Lands Conservation Program

Editor's Note: This is the first of a two -part article on the Cocopah Tribe's efforts along the Lower Colorado River. The Cocopah Indian Tribe Reservation is located 13 mi south of Yuma and 15 mi north of San Luis, Mexico in Yuma County along the river.

For thousands of years, the lower Colorado River of Arizona and Mexico has served diverse human and ecological communities. The Cocopah Tribe has always been a "River People," depending on the Colorado for physical and spiritual nourishment. In the last 150 years, the Colorado River region has changed dramatically. The river became the lifeblood of the West, supplying the water and power for a vast system of agriculture, businesses, and cities. Development, and the dam and canal systems critical to it, has reshaped the ecological, economic, and societal contours of the region. Through these complex changes, the Cocopah have maintained an essential link between past and present. The Cocopah's continuity of cultural and environmental connections to the Colorado River stands out in a landscape wholly transformed, politically, economically, and environmentally.

The lower Colorado River is ecologically vital and contributes significantly to the safe passage of migratory and wetland birds. The 23-river mile section that forms the natural border between the U.S. and Mexico, commonly known as the Limitrophe, sustains significant stands of native cottonwood (*Populus* spp.), willow (*Salix* spp.), and mesquite (*Prosopis* spp.). The river, its plants, and animals also represent a critical link between the Cocopah and their traditional homeland. The continuity between past and present reveals how history continues to influence the importance of the Colorado River and the Cocopah's role in shaping what the river symbolizes, how it is utilized, and how it is envisioned and managed in the future.

The Cocopah's ancestors migrated to the heart of the Colorado River Delta region between the Colorado and Hardy Rivers about 1,000 B.C. (Alavarez de Williams 1974, Kniffen 1931, Dutton 1983). The geography and hydrology of the Delta shaped every aspect of Cocopah life. The Colorado was the physical, intellectual, and cultural lifeline of the tribe (Kelly 1977). During a 1540 encounter, the "river people put stakes in [Spanish explorer Hernando de] Alarcón's path between the water and the land," indicating the importance of the river to the Cocopah and literally staking their claim to the region. The Cocopah had strong cultural connections to the Colorado. As one Cocopah explained, "I am here and own this land with my heart." The Cocopah creation story describes twin gods born from the powerful waters who created

(Cont. pg. 3 . . . . . Cocopah)

Inside This Issue

PRESIDENT'S MESSAGE

As I write this, the excellent series on Arizona's *Ruined Rivers* has recently run in the *Arizona Republic*. A mixture of hope and dismay, the series of articles outlines many of the forces and effects that those of us who've lived a life of appreciation for riparian systems know only too well. What is perhaps most heartening is evidence in subsequent letters to the editor, editorials in the paper and other reactions that people are getting the message. It is clear from the articles that only a mobilization of public opinion and courageous acts of foresight from our leaders will ultimately result in the positive outcomes we all desire. The challenge is great. Demand for water is rapidly outstripping supply. The voiceless and powerless, those animals and plants in the Arizona environment that don't vote or write to the editors or hire a lobbyist at the legislature, must depend on others to represent them.

The Arizona Riparian Council was founded 20 years ago by people who cared that riparian systems and the functions they contribute in so many ways to our well-being survive and thrive. We have always tried to communicate the importance of riparian systems and bring the best science available to each other and the public. While we and others perhaps let down our guard during some of the intervening years, the relentless march of short-sighted economies of the now have kept on whittling away at our systems. It is time for ARC and like-minded others to renew our efforts to develop and promote sound policies of land and waters management that have the long-term health of our ecologies as their ultimate goal. Our science is sound, if incomplete. It is time for the best and brightest of us to offer a synthesis and vision that is rigorous and achievable. Find your niche and join in!

Tom Hildebrandt, President

(Cocopah . . cont. from pg. 1)

"the earth, and its creatures, things, and customs" (Alavarez de Williams 1974, 1983; Trimble 1993).

The Colorado defined the natural, social, and cultural landscape of the region. For hundreds of miles, the river wove its way through cragged canyons, "long valleys…lined with cottonwoods, willows and mesquite," and the Native communities dependent on its resources. "If there is any one feature of the natural landscape that has retained its importance in the successive cultural landscapes, and has given them a degree of unity," anthropologist Fred Kniffen wrote, "it is the Colorado River." In a 1922 trip to the Delta, Aldo Leopold marveled at the "deep emerald hue" of the river and the undulating "snowstorm" of egrets, cormorants, avocets, and other birds. The river was the source of life "in a climatic desert" as well as a powerful and "destructive force" when flooding (Kniffen 1931, Leopold 1949, Lingenfelter 1978, Postel 1996).

The Colorado River Delta was characterized by the extremes of a vibrant river ecosystem and the harsh, dry Sonoran Desert. During flood season, the Cocopah lived on the high ground of the Delta, practicing a form of agriculture dependent on the river's floodwaters. As floodwaters receded, the Cocopah followed after with digging sticks, planting seeds, and moving their camps in tune with the ebb of the river. Spring flooding fertilized the land with rich silt and provided natural irrigation for the maize, beans, squash, and pumpkins that were the foundation of the Cocopah vegetable diet. The Cocopah collected wild wheat, rice, and other riparian plants in rich delta lands at the mouth of the river and gathered wild honey (*Prosopis glandulosa*) and screwbean mesquite (*P. pubescens*) along the river banks. The value of mesquite cannot be overemphasized. It provided the chief source of wild food and material for cooking implements, painting pottery and basketry, traditional ceremonies, and medicine (Palmer 1878; Kniffen 1931; Castetter and Bell 1951; Ives 1969; Alavarez de Williams 1974, 1983; Kelly 1977; Luecke et al. 1999).

Wildlife also played a significant role in Cocopah subsistence and the tribal economy and culture. The Delta harbored an abundance of large mammals, including Sonoran pronghorn (*Antilocapra americana sonoriensis*), deer, coyote (*Canis latrans*), and jaguar (*Panthera onca*). Tribal hunters took rabbits, quail, ducks, geese, and other small animals and birds. In the Colorado and Hardy Rivers, the Cocopah caught humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), bonytail chub (*Gila elegans*), and mullet. The Cocopah also went on frequent expeditions to the Gulf of California to spear sea bass, gather shellfish, and catch other saltwater species (Kniffen 1931, Castetter and Bell 1951, Alavarez de Williams 1974, Kelly 1977, Mueller and Marsh 2002, Luecke et al. 1999).

In the mid-1800s, the lower Colorado became an important region for non-Indians, as settlers, railroads, gold seekers, and the Mexican and U.S. militaries fought for control of the West. The Treaty of Guadalupe-Hidalgo ending the Mexican-American War in 1848 and the Gadsden Purchase five years later changed the physical and social map of Southwest. The California Gold Rush put Cocopah territory at the crosshairs of migration. A decade later, the discovery of silver and gold set off the Colo-

rado River Rush. The influx of thousands of settlers, miners, and other entrepreneurs incited conflict between newcomers and Native Americans (Lingenfelter 1978, Mueller and Marsh 2002).

The river became a magnet for trade in the second half of the 19th century. The 1852 launch of the first Colorado steamboat began an era of river exploitation. Steamboats traveled through the Delta, carrying ore from Yuma to the Gulf and returning with food and material goods. The Cocopah supplied the boats with wood for fuel and many became skilled river pilots and navigators. It was widely recognized that the Cocopah, "better than any non-Indian, knew the intricate and changeable waterways of the delta." The arrival of the Southern Pacific Railroad in 1877 destroyed river freighting enterprises and the bottom fell out of the Cocopah cash economy. Those changes, coupled with a cycle of floods and droughts at the turn of the century, began to more dramatically alter the Cocopah's subsistence lifestyle and their relationship with the Colorado River environment (Kniffen 1931, Alavarez de Williams 1974, Lingenfelter 1978, de Williams 1983, Luecke et al. 1999, Mueller and Marsh 2002).

The bustling social and economic climate of the region in the early 1900s created the ideal setting for re-envisioning the importance and role of the Colorado River landscape. The Delta region and Imperial Valley of California had great promise as an "agricultural empire." The California Development Company began plans for diverting the Colorado and by June 1901 water reached the Imperial Valley. Some Cocopah found new means of support, helping dig the ditches and level the land that would be farmed by non-Indians. In less than a year, the valley had 400 miles of canals and more than 100,000 acres ready for cultivation. Still, settlers had not yet tamed the mighty Colorado. In 1905, a massive flood destroyed the Imperial Valley canal headgates, inundating hundreds of thousands of acres. The flood changed more than geography. With their agricultural lands and many traditional gathering areas under water or washed away, many Cocopah lost "their ancient economic pattern" (Sykes 1937, Castetter and Bell 1951, Alavarez de Williams 1974, Hundley 1975, Cohen and Henges-Jeck 2001, de Buys 1999). Settlers began clamoring for a more dependable and efficient means of irrigation. They turned to the newly created U.S. Reclamation Service to develop the Yuma Project that envisioned a massive system of canals and Laguna Dam to make the Arizona and California deserts blossom (Sykes 1937, Lingenfelter 1978, Reisner 1986, Pisani 2002).

Since the 19th century, great change has come to the lower Colorado that the Cocopah call home. The Cocopah received a reservation much smaller than their traditional territory and non-Indians increasingly moved in. Up to the early 20th century, the Cocopah traveled freely across the international border. The Cocopah saw the division of lands as an artificial separation from their people and homeland. In the 1930s, the U.S. Immigration Service closed the border to this movement, dividing the Cocopah into Mexican and American communities (Alavarez de Williams 1974, 1983; Kelly 1977; Kappler 1929).

The damming of the Colorado and the water policy that came to regulate it not only changed the course and nature of the river but the character and shape of human communities. The Colorado's riparian systems changed very little between the 1600s and the completion of Hoover Dam in the 1930s. With the "Law of the River," the system of policies, court decisions, and multi-state agreements dictating the allocation and use of the Colorado, the river was divvied up to serve the agricultural, power, and urban needs of seven western states and Mexico. Now, the Colorado from Hoover to the Delta is blockaded by over 30 dams, irrigates over 3 million acres, and serves the water needs of 30 million people. Damming halted periodic flooding and shrunk Colorado River wetlands by more than 1.7 millions acres, threatening wildlife and plant populations. When Lake Powell, the last major reservoir on the river, reached full capacity in 1980, water diversion "had depleted virtually the entire flow of the river in an average year, leaving little or nothing" for the environment. Morelos Dam, the last dam on the river 23 miles north of the southern U.S. border, halts nearly all river flow, leaving nearly 60 miles of dry riverbed downstream (Briggs and Cornelius 1998, Postel et al. 1998, Cohen and Henges-Jeck 2001).

Yet changes in climate patterns and precipitation in the 1990s restored large portions of the lower Colorado ecosystem. Now, the region from Morelos Dam to the Gulf of California is recognized as having the most valuable riparian habitat on the lower Colorado, perhaps the entire river. However, this "remarkable ecological comeback" is threatened by water right squabbles, escalating human demand for water, and climate change. The Colorado River Compact does not recognize environmental protection as a "beneficial use," leaving the flora, fauna, and fish – and the people who depend upon and value them – the last in line for water (*Arizona v. California* 1963, Fradkin 1981, Glennon and Culp 2002, Briggs and Cornelius 1998, Postel et al. 1998, Mueller and Marsh 2002, BioWest 2005).

In 1981, Phillip Fradkin described the Colorado "as a river no more." Similarly, many have suggested that the Cocopah are on the brink of disappearance. In 1970, *Look* magazine sub-titled an article on the tribe "Arizona's Ruined Cocopah: Product of the White Man's Triumph." Twenty-six years later, Sandra Postel, an authority on water issues, argued, "It might be tempting to dismiss the Cocopah's plight as a price of progress," but "the Cocopah culture is at risk of extinction." And, Anita Alvarez de Williams, an expert on the tribe, concluded, "By the end of the twentieth century the Cocopah may no longer be a river people at all." These judgments about the Colorado River and the River People are far from inevitable (Cohen and Henges-Jeck, Mangel 1970, Fradkin 1981, Alavarez de Williams 1983, Cohen et al. 2001, Glennon and Culp 2002, Postel et al. 1998).

With burgeoning populations throughout Arizona and the West, the Colorado River came to signify much more than an Indian resource. Meanwhile, the river on Cocopah lands has nearly run dry, invasive plants took root, and a critical ecosystem became endangered. Today, the Cocopah are cooperating with diverse partners from both sides of the border to protect the biological and cultural resources of the region. With collaboration, the Cocopah hope to restore a cultural ecosystem and, once again, make the river flow.

Please make sure to read the next issue of the newsletter to see what the Cocopah have been doing to restore the river, build partnerships for conservation, and conduct outreach on the cultural and environmental importance of the Limitrophe.

The National Wildlife Federation's Tribal Lands Conservation Program aims to ensure the well-being of wildlife populations and habitat on and near tribal lands by working in partnership with tribal governments, environmental staff, and members, while respecting tribal culture and sovereignty. For more information, please contact Garrit Voggesser at (303) 441-5161 or voggesser@nwf.org.

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RESOLUTION COPPER COMPANY (RCC) LAND EXCHANGE AND THE FATE OF THE SAN PEDRO RIVER – S. 2466, THE SOUTHEAST ARIZONA LAND EXCHANGE AND CONSERVATION ACT OF 2006

(*Editor's Note:* This article is adapted by Julia Fonseca with permission of the author from the *Vermilion Flycatcher* Vol. 50, No. 9, 2006.)

Resolution Copper Company (Rio Tinto of the United Kingdom owns 55% and Broken Hill Properties [BHP] of Australia owns 45%) has acquired the old Magma Mine outside Superior and wishes to expand its holdings. Resolution Copper Company's (RCC) research indicates that it may be the largest and highest-grade copper ore deposit known, to date, in the world. RCC wants to acquire the nearby Oak Flat Campground, located in the Tonto National Forest, to mine in the area. President Eisenhower removed Oak Flat from mineral exploration and extraction in 1955 (Public Land Order 1229). Oak Flat and the nearby Apache Leap are significant cultural sites for the Apache people.

Within the San Pedro watershed, the Pinal County Board of Supervisors approved a massive (up to 35,000 residences) mixed-use community on BHP's lands (over 23,000 acres) around the community of San Manuel, along the west side of the lower San Pedro River. Meanwhile, RCC proposes to preserve a 3,000-acre mesquite bosque (the 7B), just downstream of BHP's lands, through its exchange.

BHP's proposed development will dewater and devalue not only the 7B bosque, but also dewater and devalue mitigation lands of the Salt River Project (SRP) and the Bureau of Reclamation (BOR), as well as lands owned and managed for conservation by the Nature Conservancy (TNC). We can't understand how RCC proposes mitigating lands that will be devalued by their partner, BHP.

Southwestern willow flycatchers densely occupy the lower San Pedro River between Three Links and the Gila River confluence. In 2005, the most-recent year for which complete survey data has been summarized, the reach thus described contained 164 southwestern willow flycatcher territories consisting of 308 adult birds – over 99% of this species' territories on the San Pedro River within the U.S. Approximately 60 river miles of the lower San Pedro River between a point approximately 3.5 river miles south of Hot Springs Canyon to the Gila River confluence have been designated critical habitat for southwestern willow flycatchers.

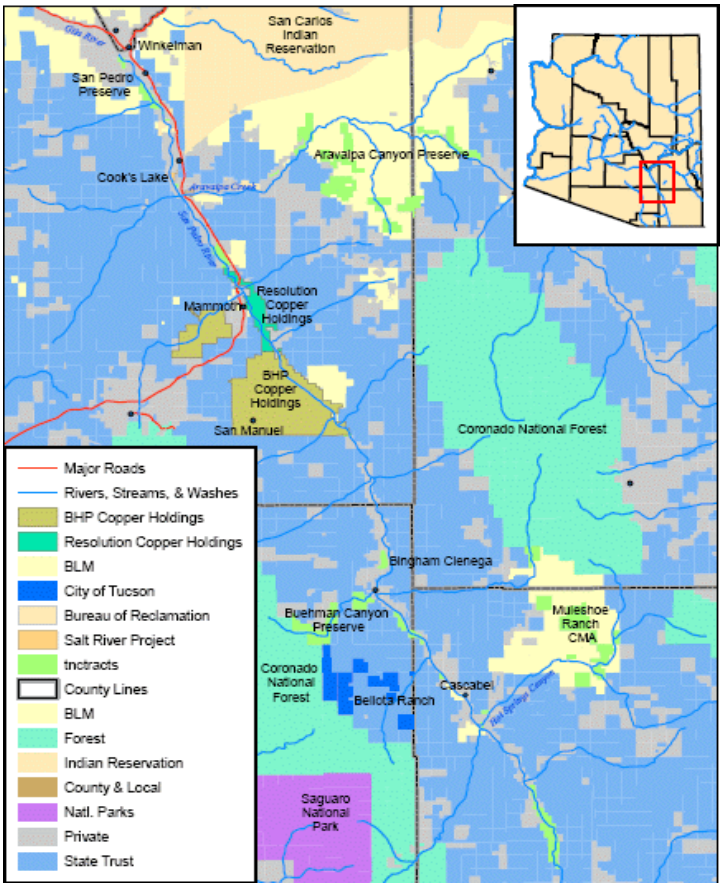
Investigations conducted in the 1940s and 1970s documented between 95 and 111 bird species solely within the mesquite bosque currently owned by RCC (Arnold 1940, Gavin and Sowls 1975). In 2005, there were 107 individual southwestern willow flycatchers documented at San Manuel Crossing (which includes BHP lands) with over 50 pairs and nests (English et al. 2006).

Aravaipa Creek, a major tributary to the lower San Pedro River, contains an intact native fish assemblage including the threatened spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*). The presence of a robust population of these fishes in a tributary stream and the largely unregulated hydrology of both waters led to an approximately 13-mile reach of the lower San Pedro River being proposed for spikedace critical habitat. The desert box turtle and the lowland leopard frog are also of concern.

While environmental groups like Tucson Audubon remain opposed to the exchange, we are hopeful that, if it moves forward, its conservation will be functional and meaningful. At a minimum, that means that BHP cannot dewater RCC's lands. Specific language that designates the 7B parcel AND the mosaic of other mitigation lands, With the addition of BHP's river lands and some portion of their 20,000-acre feet of water rights, as a Wildlife Refuge or a Riparian National Conservation Area (RNCA), is essential in order to adequately manage the area for conservation and avoid incompatible uses.

Without the inclusion of BHP's river lands, there is no point in acquiring the 7B, and the other entities will find it difficult, if not impossible, to meet their mitigation requirements along the lower San Pedro. Without inclusion of one of these two designations that mandate special management, the persistence of long-term conservation values of ALL the parcels in question is doubtful.

In April 2005, The Tucson Audubon Society Board of Directors discussed the Resolution Copper Land Exchange and decided that it was unable to support the exchange, as proposed, at that time. Nevertheless, the bill has advanced to a Senate subcommittee. Please contact your senators and tell them you'd would like to see a National Wildlife Refuge and/or a Riparian National Conservation Area (RNCA) on the lower San Pedro, as a part of the Resolution Copper Company land exchange.



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ARIZONA RIPARIAN COUNCIL FALL MEETING AT THE NATURE CONSERVANCY'S SAN PEDRO PRESERVE, OCTOBER 7 & 8, 2006 – SATURDAY & SUNDAY

Please join us at the Arizona Riparian Council's Fall meeting. At this year's very informal meeting we will camp at The Nature Conservancy's (TNC) 6,600-acre Preserve located along the beautiful San Pedro River. On Saturday afternoon, we will hear Dave Harris and Ken Wiley, both from TNC, talk about the proposed land exchange between Resolution Copper Company and the Tonto National Forest, which includes the possible creation of a new 3,000 acre mesquite bosque refuge – known as the 7B Ranch, and the proposed 35,000+ housing development near Mammoth. Diane Laush, Bureau of Reclamation, will give an overview of their Conservation Easement on Three Links Farm (located on the San Pedro River near Benson). The status of the southwestern willow flycather on the lower San Pedro River will be presented by the Arizona Game and Fish Department. Ruth Valencia, Senior Environmental Scientist from the Salt River Project, will talk about the Roosevelt Habitat Conservation Plan mitigation properties.

After the speakers, we will walk to ponds where Reclamation is rearing Gila topminnow, razorback suckers, and desert pupfish. Flood flows in late July and early August have made some changes in the riparian vegetation along the San Pedro and Aravaipa Creek. We can hike to Aravaipa Creek and see the effects of the flood flows that came through late July. We can also hike along the San Pedro and do some birding or explore the river. Dinner will be a cookout of San Pedro hamburgers, from cattle raised within the San Pedro area. Please indicate on the registration form (http://azriparian.asu.edu/2006/fallmtg2006regform.pdf) if you want a veggie burger.

On Sunday, Rob Burton, San Pedro Preserve Manager, will lead a hike to explore the 3,000-acre 7B property – located south of the Preserve. This area is one of the largest mesquite bosque habitats in the world.

A $10/adult and $5/child fee (children under 10 are free) should be sent to Cindy Zisner to reserve a spot for you and your family – kids are definitely invited. Please make your check payable to the Arizona Riparian Council.

*TNC asks that you leave your dogs and other pets at home. If you really **must** bring them, please call Rob Burton at 520-357-6076 so he can tell you what you need to do to ensure the safety of your pets.*

TIME TO MEET

Please meet at 1:00 pm at the TNC San Pedro Preserve, located northwest of the town of Dudleyville. See the map at (http://azriparian.asu.edu/2006/maptopreserve.pdf) giving directions from both Phoenix and Tucson to the Preserve.

WHAT TO BRING

Camping gear (tent, sleeping bag), folding chair, river shoes (if you wade into the river), water to drink. There is water available for washing. Bring food for breakfast and lunch for Sunday. We anticipate the day-time and nighttime temperatures at this time to still be warm. Bring plenty of water to drink.

ARC WILL PROVIDE

Hamburgers, veggie burgers, chips, salsa, veggie platter, cookies, dessert, and drinks for dinner Saturday night. Port-a-potties will be available near the camp site – an old pecan grove. The Preserve has picnic tables that are under a cover along with a barbeque grill.

The San Pedro River's cottonwood-shaded corridor supports about 350 bird species and provides critical stopover habitat for up to 4 million migrating birds each year. The San Pedro flows north from the Mexican state of Sonora into Arizona to join the Gila River, one of only two major rivers that flows north out of Mexico into the United States. It also is one of the last few large undammed large rivers in the Southwest. The lower San Pedro River (from I-10 north to the Gila River confluence) contains some of the best riparian habitat remaining in the Sonoran Desert ecoregion. It is a haven for wildlife species especially migratory birds including the federally listed endangered southwestern willow flycatcher. Several tributaries to the San Pedro still provide high quality habitat for native fish.

NOTEWORTHY PUBLICATIONS

Elizabeth Ridgely, Tristar Engineering and Management, Inc.

Landis, T. D., D. R. Dreesen, J. R. Pinto, and R. K. Dumroese. 2006. Propagating native Salicaceae for riparian restoration on the Hopi Reservation in Arizona. *Native Plants Journal* 7(1):52-60.

The USDA Forest Service, USDA Natural Resources Conservation Service (NRCS), and the Hopi Tribe Office of Range Management work together on native plant restoration projects. The aggressive exotic plants, Russian olive (*Elaeagnus angustifolia* L. [Elaeagnaceae]) and saltcedar (*Tamarix ramosissima* Ledeb. [Tamaicaceae]), have invaded many wetland and riparian areas on the Hopi Reservation in northeastern Arizona. The Tribe has been mechanically removing these invasives and propagating native species to plant in their place. The scattered locations of streams, wetlands, and seeps were considered during plant material collections to ensure that both genetic and sexual diversity were adequately represented. Another challenge was the determination of target plant stock types that are appropriate on the diverse hydrologic conditions.

Comprising about 2% of the reservation, these riparian and wetland communities are ecologically and culturally valuable for livestock grazing, wildlife habitat, traditional gathering, and ceremonial use. Although the initial eradications were successful, the saltcedar was resprouting. Found at remote sites were small stands of lanceleaf cottonwood (*Populus* × *acuminata* Rydb.) and quaking aspen (*P. tremuloides* Michx.). Many of the wetland and riparian areas are geographically isolated. Several of the existing plant stands were only one sex, and sometimes were only a single individual. Removal of the saltcedar and Russian olive had been completed on some sites, which were fenced to keep cattle out. The challenge was to produce enough plant materials, of the proper stock type, and have them ready when the sites were ready to be planted.

Most Salicaceae are vegetatively propagated with woody cuttings, and nonrooted cuttings are also widely used as live stakes or pole cuttings in riparian restoration projects. Because all members of the Salicaceae are dioecious, there were concerns about using vegetative propagation. Using only cuttings could compromise the objective of restoring the riparian and wetland areas with plants of the greatest possible genetic diversity. The goal was to produce plant communities that were self-sustaining. Therefore, all of the plant material was produced from seeds.

There was no supply of local seeds, and the flowering periods for the target species was not known at such high elevations, ranging from 1,433 to 2,073 m (4,700 to 6,800 ft). It became the strategy to identify male and female plants on the Hopi project areas during the winter dormant period, collect mature cuttings with floral buds, and root them at the NRCS Plant Materials Center (PMC) in Los Lunas, NM.

Old male catkins were used to determine the sex of dioecious species during winter dormancy, to ensure that branch collections included both sexes. It followed that branch ends containing floral buds were collected, and the woody cuttings were taken to the Los Lunas PMC. They were rooted in containers in a greenhouse with moderate success. Coyote willow (*Salix exigua* Nutt.) and lanceleaf cottonwood had good rooting success (80% to 90%), whereas the rooting of Goodding's willow (*S. gooddingii* Ball) and arroyo willow (*S. lasiolepis* Benth.) were moderately successful (75%). Fremont cottonwood (*Populus fremontii* S. Wats) had much poorer rooting, about 65% after 3 months. This was probably because the developing flower capsules on these sexually mature cuttings created a drain on carbohydrate reserves. Coyote willow took until the second year to get an appreciable number of seeds. The female arroyo willow produced some viable seeds the second year, which was unusual because there were no male cuttings. The seeds could have been a result of hybridizing with other willows at Los Lunas PMC that flower at the same time. Goodding's willow produced no seeds with only male clones. Fremont cotton-

wood cuttings produced male and female flowers, but no seeds formed even after attempts to hand pollinate.

It was suspected that the arroyo willow and lanceleaf cottonwood stands were all the same sex and perhaps even a single clone. When the samples were processed at USDA Forest Service National Forest Genetics Laboratory (NFGEL), the results confirmed the hypothesis that the extreme isolation of some of the project sites had resulted in clones that are genetically and sexually identical. The strategy became to locate male plants of arroyo willow and female plants of lanceleaf cottonwood and establish them in seed production plantings to foster cross-pollination and produce seeds of greater diversity.

Aspen is unique in that stem cuttings root poorly, so, nurseries have better luck forcing sprouts from root sections. In addition, aspen catkins from the project area yielded no viable seeds. However, some viable seeds were collected from healthier aspen stands on the surrounding Navajo Reservation, and these catkins did produce some viable seeds.

A new vegetative propagation method for quaking aspen is referred to in this article as "stacked propagation." This technique takes advantage of the rapid and extensive root growth of aspen seedlings and the fact that severed roots will form new shoots. Aspen seedlings are put in the top block of a stack of planting blocks. The lower blocks are filled with a growing medium only. The roots of the aspen seedling grow down through the cavities in the lower blocks and occupy all the cells. A knife is run between the blocks, and the roots are severed. The pruned root systems form new shoots.

The two primary locations for target stock types for riparian restoration are hydrologic zones and the effect of erosion during flood events. The use of hydrologic zones helps to account for the presence of subsurface water. On Hopi lands, all plants of the willow family are found within reach of groundwater. Large trees, such as Fremont cottonwood, lanceleaf cottonwood, and Goodding's willow are located in the far overbank and transitional zones, where their deep root systems can access water as it drops in the dry season. Quaking aspen were found in the far overbank and transitional zones where their root systems have access to the water table. The smaller shrub willows occur in the bank and overbank zones because of their extensive fibrous root systems and their flexible stems that move with the force of the high water flows. Arroyo willow was rare, but coyote willow was the most dominant plant in the flood zone.

For high water erosion sites, long pole cuttings or deep containers like PVC "tall pots" are the best option. Due to their aggressive growth habits, arroyo willow and coyote willows may be especially effective in the wetland areas with low erosive potential.

Collecting mature cuttings for seed production back at the nursery was more effective for willow than for cottonwood or aspen. Mature cottonwood cuttings did not root as well, and it is uncertain how long they will take to produce catkins and seeds. The simplest and most cost-effective method was to collect seeds from several trees over the range of project sites. With willows, careful identification was necessary to identify and exclude exotic species. Seeds of all species in the willow family can be cleaned easily but should be sown immediately. With all species, seed propagation was the easiest and best way to maintain genetic and sexual diversity. Stacked propagation is a good way to bulkup limited plant material, and it should work for all species in the willow family. It still suffers the major drawback of all vegetative propagation of Salicaceae, that is limited sexual and genetic diversity.

LEGAL ISSUES OF CONCERN

*Richard Tiburcio Campbell, U.S. Environmental Protection Agency**

A "WILD AND SCENIC" FOSSIL CREEK?

**Editor's Note: The viewpoints expressed in this article do not represent the viewpoints of the EPA.*

On July 28, 2006, Senator John McCain and Representative Rick Renzi introduced the *Fossil Creek Wild and Scenic River Act of 2006* to designate segments of Fossil Creek, a tributary to the Verde River, as wild and scenic rivers pursuant to the Wild and Scenic Rivers Act (WSRA), 16 U.S.C. §§ 1271-1287.[1] Senators Jon Kyl, R-Ariz., and Congressmen Raul Grijalva, D-Ariz., J. D. Hayworth, R-Ariz., Jim Kolbe, R-Ariz., and Ed Pastor, D-Ariz., signed on to the bill as co-sponsors.[2]

Specifically, the bill would add the following reaches of Fossil Creek to the National Wild and Scenic River System ("WSRS"):

- Upper Fossil Creek, from the source at Fossil Springs below Sand Rock and Calf Pen Canyons to where the water leaves the Fossil Spring Wilderness Area, as a wild river.
- Middle Fossil Creek, from the border of the Fossil Spring Wilderness Area to the Mazatzal Wilderness Boundary, as a scenic river.
- A "segment" of Fossil Creek located 6.6 miles from the Mazatzal Wilderness Boundary down to the confluence with the Verde River, as a wild river.[3]

The bill also would allow for federal and Arizona agencies to conduct stream restoration and barrier maintenance activities in accordance with the Environmental Assessment/Finding of No Significant Impact ("EA/FONSI")[4] for the U.S. Forest Service ("USFS") 2004 Fossil Creek Native Fish Restoration Project ("Restoration Project").[5] The purpose of the Restoration Project is to enhance and protect the native fish community[6] and their habitat within 9.5 miles of Fossil Creek below Fossil Springs diversion dam by constructing a fish barrier within the Mazatzal Wilderness; salvaging (capture and temporary holding) a portion of native fishes for restocking; eradicating non-native fishes[7]; protecting habitat to maintain options for future repatriation of fish species extirpated from the Verde basin; and integrating public information and education into the project components.

The bill also would appropriate funding for a USFS river ranger to oversee Fossil Creek, as well as for preparation of a management plan for the river segments designated as wild or scenic rivers.[8]

PROTECTIONS AFFORDED BY THE WILD AND SCENIC RIVERS ACT

The WSRA created a national system of free-flowing rivers to be permanently administered as wild, scenic, or recreational rivers by state agencies.[9] The WSRA reflected the recognition by Congress that

> the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fill other vital national conservation purposes.[10]

Thus, a river is eligible for protection under the WSRA if it is free-flowing and possesses at least one of the outstanding remarkable values ("ORVs") set forth in the statute.[11]

The WSRA provides permanent legislative protection from any

> new hydropower projects, federal water projects, and other federally assisted water-resource projects–defined as

> grants licenses, permits or funding–that would alter the rivers free-flowing characteristics, or have a direct effect on the river's outstanding resources.[12]

Under the WSRA, the USFS will be obligated to prepare a comprehensive management plan ("CMP") for Fossil Creek within three fiscal years of its designation under WSRA.[13] The CMP must

> protect and enhance the values which caused it [the River] to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archeologic and scientific features.[14]

The WSRA grants agencies discretion in determining what degree of physical disruption of the river's ORV's is permissible by providing that the CMPs "may establish varying degrees of intensity for its protection and development, based on the special attributes of the area."[15]

The WSRA requires that the CMP delineate river boundaries that "include an average of not more than 320 acres of land per mile measured from the ordinary high water mark on both sides of the river."[16] Recent case law makes it clear that boundaries set within the WSRA's acreage requirement, regardless where such boundaries fall within the statutory range, must be drawn so as to protect and enhance the ORVs causing that area to be included within the WSRS. *Friends of Yosemite Valley v. Scarlett*, 2006 U.S. Dist. LEXIS 49228 (E.D. Cal. July 19, 2006).[17]

It is noteworthy that should the *Fossil Creek Wild and Scenic River Act of 2006* not win passage, it is very likely that Fossil Creek will nevertheless be classified as a "potentially eligible river" under the WSRA. Under the WSRA, the USFS has a mandatory duty to consider potentially eligible rivers in planning for the use and development of land resources.[18]

A significant indirect effect of the WSRA is that projects that constitute a major federal activity in the vicinity must, pursuant to the National Environmental Policy Act, adequately consider and/or disclose environmental consequences of the project on designated and eligible wild and scenic rivers.[19]

More Wild and Scenic Rivers to Come?

In 1993, in response to a request by the Arizona Congressional delegation, the Forest Service conducted three studies of Arizona's free-flowing rivers, identifying those streams and river segments that satisfied the statutory requirements for inclusion in the WSRS. The Service published its findings in a 300-page report (the "1993 Report"), which identified 57 rivers and streams that qualified as potential additions to the WSRS and which provided all of the necessary information to determine which Arizona streams or river segments met the WSRA's criteria for designation. The rivers included in the 1993 Report have been listed on the Nationwide Rivers Inventory, "a register of river segments that potentially qualify as national wild, scenic or recreational river areas" maintained by the NPS on its website.[20] The rivers listed include stretches of Cherry Creek, the Colorado River, the Gila River, and Pinto Creek.[21]

A major hurdle for federal and state agencies to overcome when considering WSRA designation for wild and scenic rivers in Arizona is the need to secure water rights to protect instream flows in the river. As discussed in prior issues of the *Newsletter*, the ability of Arizona Department of Water Resources ("ADWR") to recognize and grant permits for instream flow rights was vigorously litigated by Phelps Dodge after the USFS applied to the ADWR for a permit to appropriate the waters of Cherry Creek, a tributary of the Salt River located in the Tonto National Forest, for instream flows for fish, wildlife and recreation purposes.[22] Arizona's lower courts consistently held that Arizona law allowed ADWR to issue permits to appropriate water for instream flows. On March 16, 2006, the Arizona Supreme Court may have finally settled the matter by denying Phelps Dodge's petition for review of this matter after losing in the Arizona Court of Appeals.[23] With this legal situation clearing, WSRA designations may be an easier sell to federal and

state agencies, and Arizona's Congressional delegation.

ENDNOTES

1. 109th Congress 2d Session H.R. 5957
2. The Act may be read in full at <http://thomas.loc.gov/cgi-bin/query/z?c109:-H.R.+5957:>
3. H.R. 5957 § 3.
4. The EA/FONSI may be viewed at Northern Arizona University's Fossil Creek Watershed website at: <http://www.verde.nau.edu/fossilcreekproject/pdf/Fossil%20Creek%20Native%20Fish%20Restoration%20Decision%20Notice.doc>
5. H.R. 5957 § 5.
6. The existing native fish species to be enhanced and protected, thus helping to avoid the need to list them as threatened or endangered under the Endangered Species Act (ESA), are headwater chub (*Gila nigra*), roundtail chub (*Gila robusta*), speckled dace (*Rhinichthys osculus*), longfin dace (*Agosia chrysogaster*), Sonora sucker (*Catostomus insignis*), and desert sucker (*Pantosteus clarki*). The razorback sucker (*Xyrauchen texanus*) was stocked into Fossil Creek above Irving Dam in 1988, and may also be encountered during restoration actions. See U.S. Forest Service, Coconino and Tonto National Forests, EA/FONSI (June 8, 2004).
7. The non-native fish known to occur in Fossil Creek include invasive green sunfish (*Lepomis cyanellus*), yellow bullhead (*Ameiurus natalis*), flathead catfish (*Pylodictis olivaris*), and smallmouth bass (*Micropterus dolomieui*). Ibid.
8. H.R. 5957 § 7.
9. See 16 U.S.C. §§ 1271-1287.
10. WSRA § 1(b).
11. 16 U.S.C. §§ 1271,1273(b).
12. Id.
13. 16 U.S.C. § 1274(d).
14. 16 U.S.C. § 1281.
15. 16 U.S.C. § 1281; see also *Sierra Club v. Babbitt*, 69 F. Supp. 2d 1202 (E.D. Cal. 1999).
16. 16 U.S.C. § 1274(b).
17. See also *Sokol v. Kennedy*, 210 F.3d 876, 878 (8th Cir. 2000) (remanding for redetermination of boundaries consistent with the WSRA).
18. 16 U.S.C. § 1276(d)(1); see also *Ctr. for Biological Diversity v. Veneman*, 335 F.3d 849, 857 (9th Cir. 2003) (holding the Forest Service failed to act pursuant to this mandatory duty under the WSRA to consider potentially eligible rivers in planning for the use and development of land resources); substituted opinion at *Ctr. for Biological Diversity v. Veneman*, 394 F.3d 1108, 2003 U.S. App. LEXIS 27927 (9th Cir. Ariz. 2005).
19. See, e.g., *Cascadia Wildlands Project v. Conroy*, 2006 U.S. Dist. LEXIS 16845 (D. Ore. 2006).
20. <http://www.nps.gov/ncrc/programs/rtca/nri/states/az.html>.
21. Ibid.
22. 2003 Vol. 16, No. 1 (Feb. 2003), 2003 Vol. 16, No. 2 (June 2003), 2004 Vol. 17, No. 3 (Sept. 2004), 2005 Vol. 18, No. 3 (Sept. 2005).
23. *Phelps Dodge Corp. v. ADWR*, 2005 Ariz. App. LEXIS 108 (Ariz. Ct. App., Sept. 1, 2005), review denied by Arizona Supreme Court in 2006 Ariz. LEXIS 33 (Ariz. Mar. 14, 2006).

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

The purpose of the Council is to provide for the exchange of information on the status, protection, and management of riparian systems in Arizona. The term "riparian" is intended to include vegetation, habitats, or ecosystems that are associated with bodies of water (streams or lakes) or are dependent on the existence of perennial 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 (January-December) are $20. Additional contributions are gratefully accepted.

This newsletter is published three times a year to communicate current events, issues, problems, and progress involving riparian systems, to inform members about Council business, and to provide a forum for you to express your views or news about riparian topics. The next issue will be mailed in January, the deadline for submittal of articles is December 15, 2006. Please call or write with suggestions, publications for review, announcements, articles, and/or illustrations.

Cindy D. Zisner
Arizona Riparian Council
Global Institute of Sustainability
Arizona State University
PO Box 873211
Tempe AZ 85287-3211
(480) 965-2490; FAX (480) 965-8087
Cindy.Zisner@asu.edu

web site: http://azriparian.asu.edu

The Arizona Riparian Council

Officers

Tom Hildebrandt, President (480) 345-6194
(Please leave message)
tomarc@cox.net
Roger Joos, Vice President . (602) 790-9027
Roger.E.Joos@aphis.usda.gov
Cindy Zisner, Secretary . . . (480) 965-2490
Cindy.Zisner@asu.edu
Cory Helton, Treasurer . . . . (928) 214-0887
cory@jefuller.com

At-Large Board Members

Diane Laush . . . . . (623) 773-6255
dlaush@lc.usbr.gov
Diana Stuart . . . . . (480) 491-1323
Diana.Stuart@asu.edu
Ron van Ommeren . . . . . (520) 884-5549
RVanommere@aol.com

Committee Chairs

Classification/Inventory . . . . . Vacant

Education
Cindy Zisner . . . . . (480) 965-2490

Land Use
Tim Flood . . . . . tjflood@att.net

Policy . . . . . Vacant

Protection/Enhancement
Kris Randall . . . . . (602) 242-0210 X250
Kris_Randall@fws.gov
Bill Werner . . . . . (602) 417-2400 X7264
bwerner@adwr.state.az.us

Water Resources
Julia Fonseca . . . . . (520) 740-6350
Julia.Fonseca@ rfcd.pima.gov

CALENDAR

Arizona Riparian Council Board Meetings. The Board of Directors holds monthly meetings the third Wednesday of each month and all members are encouraged to participate. Please contact Cindy Zisner at (480) 965-2490 or Cindy.Zisner@asu.edu for time and location.

RMR/ARC Field Trip. September 29, 2006. To Prescott Creeks Preservation Association projects in Prescott, AZ. See http://azriparian.asu.edu and click on link under Upcoming Events. Also take note of other trips listed there.

Verde River Days. September 30, 2006. Dead Horse Ranch State Park, Cottonwood, AZ. Join us for free entry, exhibits, fun activities, canoeing, interpretive walks, sandcastle building, climbing wall, fishing (license required) and more! 9am - 4pm. 928.634.5283 for more information.

Arizona Riparian Council Fall Meeting, October 7-8, 2006, at San Pedro Preserve. See inside of newsletter for details or go to http://azriparian.asu.edu and click on the link under Upcoming Events.

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Arizona Riparian Council
Global Institute of Sustainability
Arizona State University
PO Box 873211
Tempe, AZ 85287-3211

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