

Restoration & Management Notes

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'Ahakhav Tribal Preserve Restoration

Bottomland Forest Restoration in South Carolina

Restoration of Appalachian Wildflowers and Salamanders

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The 'Ahakhav Tribal Preserve

Colorado River Indian Tribes Initiate a Major Riparian Restoration Program

by Fred Phillips

The 'Ahakhav Tribal preserve is located on the lower Colorado River south of Parker, Arizona on the Colorado River Indian Reservation. Prior to European settlement in the late 1800s and early 1900s, the Lower Colorado River Valley was an ever-changing, dynamic riparian ecosystem. The river supported vast expanses of gallery forests of cottonwood and willow, mesquite bosques, alkali flats and wetlands. River flows ranged from modest winter flows of 1,000 cubic feet per second (28.3 cubic meters per second) to 250,000 cfs (7,078 cms) between May and July. The untamed river eroded and deposited sediment, created and displaced riparian forests and wetlands, and constantly changed its course in a never-ending cycle of disruption and mending. It provided habitat for an abundance of birds, mammals, amphibians, reptiles and fish. The 'Ahakhav (pronounced aha! kav) area of the lower Colorado was also the primary homeland of the 'Mojave and Chemehuevi Indian tribes. For the tribes the river was the center of their existence, providing them with everything they needed for their livelihood. The native plants, including the mesquite, cottonwood and willow provided the tribes with fuel and food and with materials they used to make shelter, baskets and tools, medicine, clothing and even dyes and paints. Valued from birth until death, wood from the mesquite was used for cremation ceremonies. It is important that these resources be preserved for present and future generations.

Since settlement, dams, agriculture, and the introduction of exotic plant species have forever altered the lower Colorado ecosystems and the traditional ways of life that depended on the river. Dams now restrict the life-giving floods that deposited the soil necessary for the creation of the forests and wetlands. Levees now control the river and cut off historic wetlands and sloughs from the seasonal floods necessary for their survival. Agriculture and exotic plant species have replaced the mesquite bosques and gallery forests. Backwaters, beaches and forests that were cherished by the tribes for hunting, recreation and homesites have both diminished and deteriorated. The southwest willow flycatcher, razorback sucker and yuma clapper rail are endangered due to loss of habitat. In less than one hundred years the historic Colorado has been transformed from a wild, meandering river to something resembling the West's largest drainage ditch.

Despite this, the Mojave and Chemehuevi tribes still occupy the valley on the Colorado River Indian Reservation. Due to government relocation in the 1940s, a small group of the Hopi and Navajo Indians today also live on the 225,000-acre (90,000-ha) reservation. For most of the tribal members living on the reservation, cultural links to the past are strong, and many of the people share a sense of biological and cultural impoverishment resulting from the alterations of the river during the past century. For many years lit-

tle was done about this, however. Then, in 1994, a Mojave Indian named Dennis Patch had the vision that it might be possible to restore part of the reservation for the benefit of both the tribe and the biological resources of the area. Intimately familiar with the reservation from childhood, and well versed with the stories of his elders, Patch had a master's degree in education, and also a prominent position in the tribe as a council member for the Colorado River Indian Tribes (CRIT). He began talking with others about a plan that would, as he saw it, help preserve the tribes' cultural resources while bringing back some of the historic biological diversity of the area.

Patch's vision inspired Peter Nimkoff, then CRIT Attorney General, to contact Benjamin Frederique Samuel, then a doctoral candidate at Purdue University. Nimkoff and Samuel had worked together on an Alaskan Indian reservation developing natural resource and recreation programs. In 1994, I was a junior in Purdue University's Landscape Architecture program. One day, after I had given a presentation on Native American cultures in a cross-cultural communications class I had with

Samuel, he mentioned that "he may have a job for me out west." He gave me Nimkoff's phone number and I called Nimkoff and asked him about the possibility of working on the reservation for the summer. Peter discussed the matter with Dennis Patch, and then called back to suggest that I could come out to the reservation and "see what happens." With no solid job offer, no guaranteed pay, no place to stay and nothing to lose, I packed my bags and moved to the reservation as soon as the semester ended in May. Once I got to the reservation (it was 128° F [53° C] that day!) Peter showed me around and was generous enough to offer me his spare bedroom for the summer (in exchange for cleaning and cooking dinner two nights a week).

Next, Peter introduced me to Dennis. We sat down, and Dennis filled me in on his idea for a Tribal Preserve. Most of our discussion occurred in a pickup truck as Dennis drove me around to visit several sites on the reservation. We started at Big River, one of the largest housing developments on the reservation. Dennis described the cottonwood forest that used to stand where there are now houses and palm trees. We then continued on to a series of

other areas where there "used to be" wetlands, forests, thick brush and wilderness, but where now we saw cotton fields, levees, thickets of salt cedar and dying wetlands. The tour ended at the 'Ahakhav and Deer Island Backwaters (now collectively called the 'Ahakhav Tribal Preserve), which Dennis had mentally tagged as the area for the preserve. The area consisted of two original meanders of the river that had been cut off by levees when the river was channelized so that it could transport water to cities and agricultural districts "more efficiently". The area consisted of 85 acres (34 hectares) of open aquatic habitat, 250 acres (100 hectares) of shallow wetland in cattails and 700-plus acres (280 hectares) of riparian "forest" made up at the time almost exclusively of salt cedar. Summarizing all this, Dennis told me that his plan was to restore the backwaters and forests in order to create a nature park where tribal members could go to relax, picnic, fish, hike, and so on without being overrun by motorboats, motor homes, or tourists. With all of this in mind I cleaned out the storage room in Dennis's office, put together a makeshift drafting table and got to work.

The first step was to obtain information on the existing habitats, land uses, zoning, access, flood-plains and plans that the tribe had for the area. I explored what permits we needed to do the work and what we had to do to get the permits. I also spent a great deal of time talking with Dennis and a handful of other tribal members about what the area used to look like and how the tribe used it. The Aha Macave elders, Mamie Harper, in particular, gave me a wealth of information on the area and its importance to the tribes. I visited the tribe's museum to study the traditional architecture and crafts of the tribes, dug through the tribal planning office for maps of the area, and searched the Colorado River Agency Bureau of Indian Affairs office for historic photos and information. I came up with a lot of verbal information, some USGS 24,000-scale topo maps, and dredging plans the local Natural Resource Conservation Service, then the Soil Conservation Service, had done in the 1980s. Not much to plan for restoration of 1,042 acres (417 hectares) of land, but one thing I did have was a lot of ideas of what the people at CRIT wanted. With this in

Leveraging a vision
and a summer job into
a 1042-acre
restoration project on
tribal lands.



Dredge spoils removed from backwater of Colorado River create windrows on-site at 'Ahakhav Tribal Preserve. Graded to match contours of the site, spoils provide good medium for planting of native species, following pin-point prescription based on high-resolution mapping of hydrology of planting sites. Photos by Fred Phillips

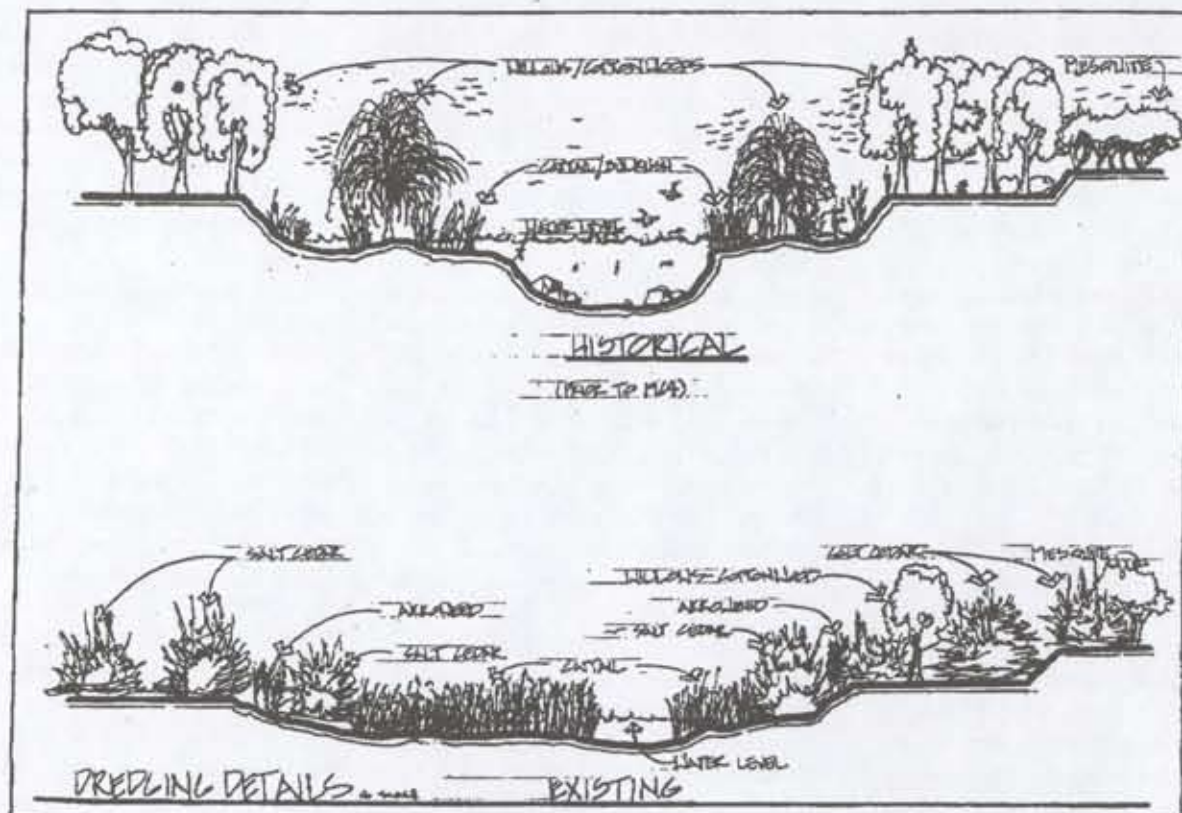


Figure 1. Historical and existing backwater cross-sections.

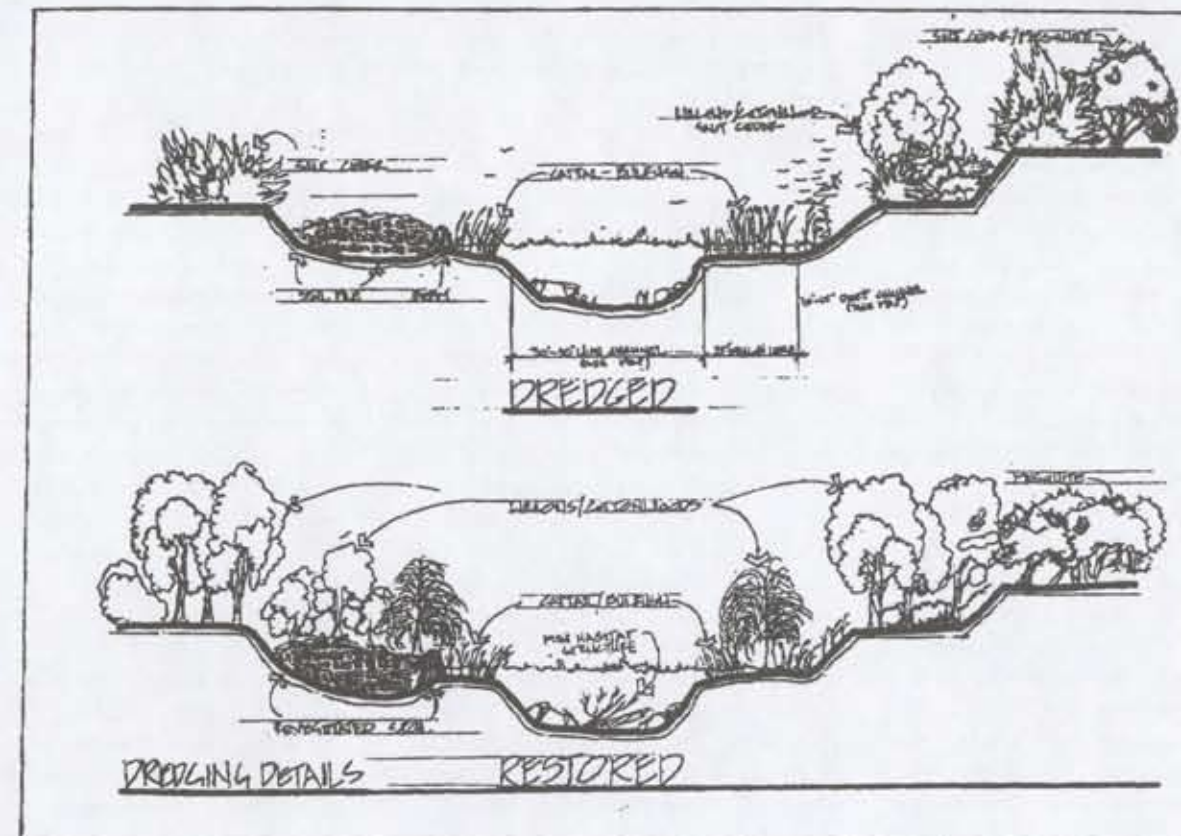


Figure 2. Dredged and restored backwater cross-section.

hand, I then produced a base plan of the area, designating areas that I thought could be revegetated with native species. We designated areas that are both in the 100-year floodplain and within 1-15 feet (3.3-49 m) of the water table as candidates for revegetation. Luckily, I had also found some aerial photos showing where the old meanders were, and these provided a basis for our plans for dredging to reopen the river channel.

The next step was to determine a site location for the Nature Park. I asked several tribal members where they would site the park. At first the results were disappointing. One member said that "all he needed for a park was his truck under a mesquite tree," showing as much interest in a park in the thicket as my peers in Indiana. A bit discouraged, I spent a great deal of time that summer hiking, camping, and canoeing the area. After much exploration I found a 10-acre (4-ha) upland site out of the floodplain. The site was accessible by road, yet far enough from the backwater not to impact the riparian habitat,

and it still had a few mature mesquites. It also provided a good view of two Mojave Sacred Mountains, which seemed appropriate. In the course of daily brainstorming, Dennis and I agreed on the locations of the different aspects of the project: revegetation areas, wetland restoration areas, and the park. I then put my artistic hand to work and in one month created a 30"x80" (75 cm x 200 cm) color plan and a ten-page booklet describing our ideas for the preserve (Figures 1 and 2). We then approached the Tribal Council with the plan. The council liked the ideas but wanted more details. With the idea up in the air, and out of time for the summer, I went back to school in September to finish my senior year.

Year Two

Back in Indiana, it had been over six months since I had heard from Dennis when he then called to ask whether I could come out for spring break in March, to write a grant for planting trees in the park

area. I went, I wrote, and flew back to Purdue. Two months later we received word from the Bureau of Indian Affairs Woodlands Program that we had been awarded \$10,000 to plant trees in two acres of the park. At this point Dennis let me know that he had enough money to hire two interns and me for the summer to develop a more-detailed plan. Shortly afterward, Adam Perrilo, a sophomore in Landscape Architecture, came to my desk in the senior design studio, introduced himself and told me that he and his girlfriend, Sonia Mullinex, a wildlife biology student, wanted jobs on the reservation. A month later they were living in a small house on the reservation, sleeping on an air mattress with lawn chairs as furniture, and helping me with the draft final plan. We collected 100-year floodplain maps from the Bureau of Reclamation, land-survey information from the Tribal Water Resources Department, and examples of environmental assessments and wetland restoration plans from the Arizona Game and Fish Department.

In the course of our research that summer we ran into three people who eventually played key roles in the formulation of the restoration and ecosystem-monitoring plan. Bertin Anderson of the Revegetation and Wildlife Management Center came first (see accompanying story). With more than 25 years experience with wildlife monitoring and native plant restoration on the Lower Colorado River, Bert supplied us with information and ideas on how we could accomplish the revegetation aspects of the plan. Dave Wegner and John Nagy (also a graduate of Purdue), of the United States Bureau of Reclamation's Glen Canyon Environmental Studies Office were the second and third. Dave, a fisheries biologist, had been in charge of that office for 13 years. His vast experience with the monitoring of ecosystems in the Grand Canyon guided development of the pre- and post-restoration ecological monitoring portion of our plan. John was one of the surveyors working on the canyon study. On a bar napkin one night in Flag-

staff, John summarized how he thought we could survey all the existing wetland and aquatic habitat, formulate a dredge design, and survey to monitor siltation and deposition of material in the backwater following the restoration. This after-hours inspiration soon became an integrated part of the plan.

After five or six 70-hour weeks and four "all-nighters," we had compiled all of our ideas and information and completed the 'Ahakhav Tribal Preserve Plan. The 'Ahakhav Preserve Plan' goals included: combining local, Tribal, State and Federal resources to restore and monitor viable wetland, riparian and aquatic communities; create a nature park with low-impact-recreation opportunities; establish a native-plant nursery; and implement an environmental education program for tribal members and visitors. The key to our success in producing this plan was being open to everyone's ideas and comments. We didn't reinvent any wheels. We just asked the right questions, collected all the

information and ideas that we could, and then sifted through all of it to come up with a plan that we thought was feasible.

Upon presenting the new plan to the council and receiving approval in the form of a tribal resolution we submitted the plan to all the relevant agencies for review. We then incorporated their comments into the final plan before seeking the necessary permits and additional funding. At the end of the summer Sonia and Adam headed back to school, and I went to work for Dennis again, getting the permits and funding for the project. Obtaining permits included getting Weldon Johnson, a Pima Maricopa Indian and tribal archaeologist, to perform an archaeological review of the site. No problems there, and after the State Historic Preservation office (SHPO) concurred we easily obtained SHPO approval. The next step was completing our Section 7 Critical Habitat Consultations for the razorback sucker, yuma clapper rail, and southwestern willow flycatcher. They all received a "may-affect-but-not-likely-to"

status, and Section 7 was complete (after months of waiting and a few site visits by people from the United States Fish and Wildlife Service). Next in line was NEPA consultation. After reviewing three environmental impact statements that had been done on the area, we submitted our report, which was modeled on one of them. The Bureau of Indian Affairs granted us a categorical exclusion, which meant that we did not have to file an Environmental Impact Statement. We received this because of the extensive detail in our plan, and because three environmental impact studies had been done on the area already. Our last and biggest hurdle was obtaining a wetland restoration permit from the Army Corps of Engineers. We forwarded all of our consultations, environmental clearances, plans, designs and a water-use budget to the Corps and, after one year and a long paper trail, we had all the permits to carry forward the final plan.

With the permits and a solid plan in place, our next priority was to locate funding. The summer of 1996 came around, and Adam and Sonia reappeared in the storage room office for another summer of work. While we finalized the plan and were

obtaining permits we were also putting together grant applications to the Arizona Department of Water Resources, Arizona Game and Fish, Bureau of Indian Affairs, Central Utah Completion Act Project and the U.S. Fish and Wildlife Service.

Call it luck, but just seven months after we received our final permits we had received over \$2 million in grants and in-kind services. In the summer of 1997 the tribes' in-kind contributions exceeded \$400,000. In-kind services included work donated by seven tribal departments: legal, administration, landfill, fish and game, farms, education, and the museum. Thereafter, a steady stream of grants "spike-flowed" (the term used to describe the 1996 man-made flood in the Grand Canyon [see R&MN 15(2):119-125]), and within two and a half years we have received more than \$3.6 million for preserve operations. Additional funding agencies include the National Fish and Wildlife Foundation, Ducks Unlimited, the Lower Colorado River Multispecies Conservation Program and the Arizona Department of Transportation. The largest contribution (\$1,128,000) came from the Arizona Water Protection Fund. Altogether, the

grants are funding restoration of native vegetation on 200 acres (80 hectares), restoration and protection of wetlands and aquatic habitat on 300 acres (120 hectares), and extensive "before" and "after" bird censusing, hydrographic surveys and ecological monitoring. Other grants fund habitat protection, environmental education programs, creation of a three-mile (4.8 km) boardwalk and hiking trail, a native plant nursery and two newly renovated office trailers at the preserve park.

With all of this soft money coming in, it was evident that we needed a stronger foundation budget from the tribes. In 1997 we finally became an official tribal department and began receiving operating funds, a travel budget, and three additional salaries to run the department, so that when grants run out we will still have funds to maintain the project. We also bring in revenue from our newly formed canoeing expeditions, gift shop and native plant nursery. With demand for these services rising, it is our hope that these operations will eventually help the preserve run on its own.

Riparian Restoration

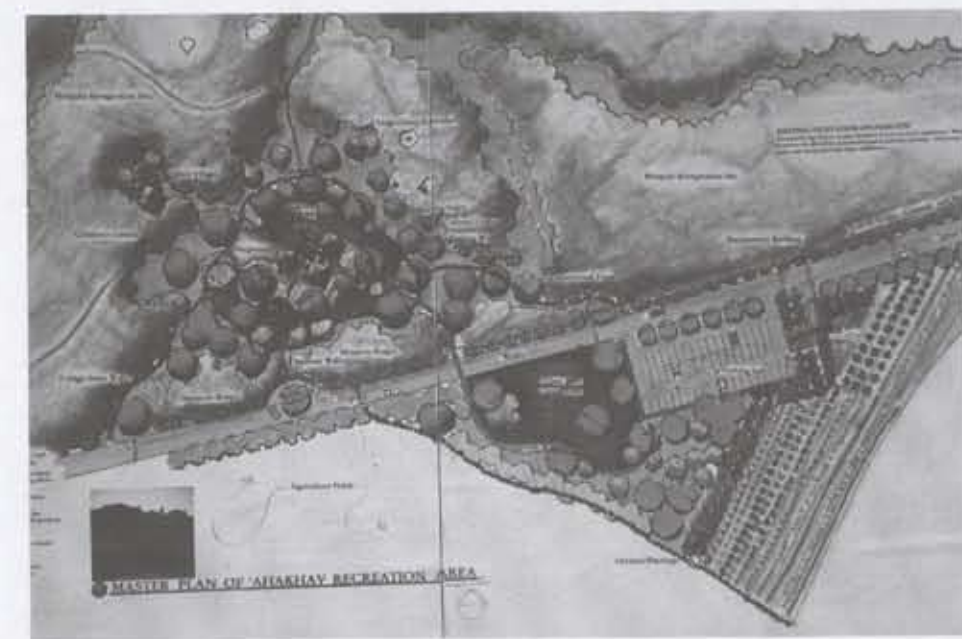
Life is funny. In February of 1996 we hauled a D-9 bulldozer to the site to destroy exotic salt cedar stands and thus begin restoration of a native riparian forest. In 1997, a fire destroyed the bulldozer. Yet, since 1996 we have cleared and replanted 124 acres (50 hectares) of riparian habitat. Bertin W. Anderson's Revegetation and Wildlife Management Center, together with the preserve staff, does all of the revegetation work. The Preserve supplies all of the native plant propagules, constructs the irrigation systems and performs the weeding and follow-up maintenance on the site. Our preserve foreman, Jim "Thunder Warrior" Dooley, a Manataka/Ouchita Indian, and Huluna Reyes, a Chemehuevi Indian, manages our field staff and oversees the Preserve's portion of the revegetation work. Our other field workers include four summer youth workers and 20 men and women from the reservation. We experienced great short-term success with our initial revegetation efforts. Some of the cottonwoods (*Populus fremontii*) we planted in 1996 have reached heights exceeding 30 feet (9 m), while some planted

honey mesquite and screwbean mesquites (*Prosopis glandulosa*) have exceeded 15 feet (4.5 m).

How do you get cottonwoods, willow and mesquite to grow an inch per day?

We are following Bert Anderson's Nine-Step Revegetation Plan:

1. **Preliminary Soil Analysis:** We collect two soil samples at one sample point per acre (0.4 hectare). The first sample is taken near the surface and the other is taken just above the water table, typically 6-8 feet (1.8-2.4 m) below the surface. For each sample we determine the soil type, pH, electroconductivity, and surface-to-water-table depth. Whenever possible, a water sample is taken and its pH and electroconductivity determined. This analysis reveals the range of variation for each variable tested on a site, and allows us to estimate the likelihood that a planting on the site will be successful.
2. **Propagules:** We collect cuttings of local stock, treat them with Rootone, and plant them in one-gallon pots. Potting material consists of equal portions of sandy soil from the revegetation area, and vermiculite and peat moss to encourage the growth of micorrhizal fungi. Cuttings are watered daily and kept in our native plant nursery for 8-12 weeks before planting.
3. **Site Preparation:** We clear the revegetation area of all salt cedar, arrowweed and exotic plant species and level the site with a D-9 bulldozer (or the equivalent). Our clearing is selective, sparing any valuable native trees already on the site. On sites that will not be revegetated, we leave the existing plants, typically salt cedar, mesquite, and other species. Although salt cedar is lower in habitat value to wildlife than native vegetation, Bert believes that it provides more habitat than a site devoid of all vegetation.
4. **Intensive Soil Sampling:** We take soil samples from ten percent of all planting holes on 20-foot (6-m) centers augured on a grid, and use the resulting data to map the distribution of nutrients, salts, soil types, pH values, and depth-to-water-table throughout the site. We have found that it is best to develop our



Carefully planned park area to provide an entry point has proved crucial to development of the Preserve. Features include a four-acre day-use area with a visitor center, picnic tables and barbeque pits, canoe rentals and interpretive trails with shade trees and wildflowers.

planting plans after we have this information because it allows us to place species in areas where they will grow at or near their maximum rate. This helps the native species outcompete the exotics and also reduces soil erosion.

5. **Tillage:** We auger holes at least 18 inches (45 cm) in diameter and 8-feet (2.4-m) deep (or to the water table) in areas prior to planting cuttings or propagules. This vertical tillage allows roots to penetrate to the water table rapidly.
6. **Irrigation System:** The irrigation system consists of commercially available 0.5-inch, black polyethylene drip tubing branching from a 2-inch diameter, black polyethylene main line. Each lateral drip tube has a filter and a ball shut-off valve every 15-20 feet (4.5-6.0 m) and 2-gallon, pressure-compensating emitters. We pump from the backwater or from a 6-inch line leading off the Mohave Road water main.
7. **Planting:** We plant larger trees, such as cottonwood, on 20-foot (6-m) centers. Smaller trees, such as willow and mesquite, are planted on 15-foot (4.5-m) centers, and patches of shrubs such as sandbar willow (*Salix exigua*) and wolf-

berry (*Lycium* spp.), are planted on 10-foot (3-m) centers. Slow-release fertilizer pellets are added to planting holes as needed to minimize nutrient availability to weeds. Trees planted on 20-foot centers develop 100-percent ground cover in three to four years. We find that planting at higher densities results in intraspecific competition and is wasteful. Rooted cuttings are approximately 15- to 20-inches (38- to 51-cm) tall at the time of planting, and a crew of five can plant at the rate of approximately 300 trees per day. Two-foot Tree Pees, a tree shelter, protect outplanted stock from browsing, slow growth of other competing species, and increase water-use efficiency.

8. **Irrigation and Weeding:** Approximately 8 gallons (30 liters) of water per day per tree are delivered through 2-gallon-per-hour, pressure-compensating emitters for five to seven days a week for 18 weeks. Cottonwood and willow are not planted where the permanently available water source (water table, perched water table, or wet soil) is greater than 8-feet deep. Weeding is done as needed during the irrigation period.



'Ahakhav backwater and revegetation site three months after planting. Note grid of transplants in upper left of cleared area. Isolated from the river, and no longer scoured by floods, backwaters such as this one act like desilting ponds, gradually filling with sediment that must be removed to allow for restoration of the backwater ecosystem.



Site of 'Ahakhav Park before planting, in August 1996



A year later

9. **Monitoring and Reports:** We conduct monitoring surveys when trees are planted and continue until the irrigation is halted. We monitor trees that are planted in the holes augured for soil analysis (10 percent of planting holes). We monitor 30 plants of each species planted. We measure each tree from the base of the trunk to the top of the tallest up-stretched leaf throughout the first

season. Ground cover (crown diameter) and foliage volume is calculated from this measurement, and these growth factors are checked to see if they correlate with the variables measured during the intensive soil sampling. We plan to monitor less frequently during the next five years, and to submit reports at the end of the first, third, and fifth year of the project. Average

growth during the first season is expected to be 0.5 inch (1.25 cm) per day. We have conducted pre-revegetation bird censuses on all of the revegetation sites and are currently conducting post-revegetation bird censuses. The results will provide an indicator of the effects of revegetation on the riparian habitat. We have also conducted quarterly photomonitoring on all of the revegetation sites at two points per 50-acre (20-ha) site.

Our first 20-acre (8-ha) site planted in 1996 has thus far been successful. The overall two-year mortality rate is 22 percent of all trees planted. We stopped irrigating after the first year and the trees are now growing on their own. The 75 acres (30 hectares) of vegetation we planted in 1997 is also doing well with an overall mortality rate of only 8 percent.

Nursery, Wetlands, Recreation

In 1996 we established the 'Ahakhav Native Plant Nursery with a \$10,000 grant. In our first year we propagated over 20,000 native trees and shrubs. In the summer of 1997, Tannia Garcia, a Navajo woman from the Southwest Indian Polytechnic Institute in Albuquerque, New Mexico, took the nursery manager position at the preserve. She not only developed a nursery-management plan, but trained our current nursery manager Anne Torres, a Mojave Indian who has been working in our native plant nursery for more than a year. Christina Rinderle, by coincidence another Purdue graduate, is our current nursery director. The nursery supplies all the plants for our revegetation projects as well as other restoration projects on the Lower Colorado River. Within just two years, the nursery has become a source of income, bringing in enough money from the sale of plants to cover salaries for nursery staff, and fund the recent expansion of the nursery (from 1 to 2 acres) with some funds left over for other parts of the project.

Since the development of the initial preserve plan, Dave Wegner left the Bureau of Reclamation and established Ecosystems Management International, Inc. (EMI). Since March of 1997, EMI in con-

junction with Larry Stevens, an ecologist, and Frank Protiva, a licensed surveyor and civil engineer, has collected information on backwater topography, substrate material, fisheries, water quality, invertebrates and sensitive habitat areas. We have used this information to create a restoration/dredging plan that protects sensitive habitats and maximizes restoration in deteriorating areas. EMI also takes advantage of monitoring sessions to train interested tribal members in sampling and surveying techniques. It's not hard to find students interested in natural resources to do the fish shocking or spend a day in the boat monitoring water quality and invertebrates.

Restoration of shallow, emergent wetlands and fisheries is an important part of the overall restoration plan for the preserve. Most of this work will be carried out in backwaters in areas where the river historically supported extensive emergent wetlands, alkalai flats and aquatic habitat. In the decades since the river was channelized and the backwaters cut off, these areas have sedimented and succeeded into solid stands of cattails, which eventually will become salt cedar thickets, leaving virtually no productive fisheries and a less productive marsh. At this point rerouting the river to reestablish full flow through the backwaters is impossible because of the dams and levees that restrict annual flooding and the original river channel flows. It is, however, possible to reestablish and manage water flows and optimum hydrological conditions in the backwaters. This would create improved fisheries habitat, and through a series of water-control structures would allow us to flood low areas adjacent to the backwaters, expanding the shallow, emergent marsh habitat. Dredging and wetland restoration is now underway on 100 acres (40 hectares) in the 'Ahakhav backwater at the preserve. During the summer of 1996, we removed more than 228,000 yd³ (173,000 m³) of material from the sedimented, anaerobic backwaters of the preserve. At the confluence and mouth of the backwaters we will construct water-control structures that will allow us to seasonally flood an additional 25 acres (10 hectares) of shallow, emergent marsh and low-lying revegetation areas adjacent to the 'Ahakhav backwater. These structures



Not all about biology and numbers, the 'Ahakhav project is aimed at enhancing human use of the natural landscape, and is attracting growing numbers of visitors. Here Navajo Nataani McCabe works with participants in the 'Ahakhav day camp.

will also restore regular water levels and flow, thus improving water quality, fisheries habitat, and protecting the backwater from the heavy jet-ski and motor boat traffic that uses the backwater year-round.

Twelve months of fighting thick cattails, anaerobic muck, and extreme temperatures should yield restored emergent marsh, improved fisheries and a better appreciation of how to manage water flow and levels. Mapping and monitoring once restoration construction has been completed should quantify successes and shortcomings. It should also produce information that will be valuable in planning future wetland restoration projects in the Southwest.

People Power

We're not all about biology and numbers, though. 'Ahakhav has gradually generated great interest in wilderness recreation on the Colorado River Indian Reservation. We managed to borrow enough tents and sleeping bags, and gather enough food and volunteers for our first camping trip to the Grand Canyon in October, 1996. A year later, after submitting grant applications, receiving more tribal funds and increasing volunteer participation, our outdoor rec-

reation/education program has really taken off. Patagonia, CRIT, One Sport, Kelty, Demeri Boats, Canviness Paddles, Partners Steel, Outdoor Research, Wilderness Systems, and even the U.S. Army have generously donated outdoor gear. Our hand-me-downs have been replaced with a full array of rafts/canoes, boats, kayaks, tents, sleeping bags, stoves, backpacks, binoculars and other gear necessary for the program.

In two years we've hosted more than 2,000 youths and adults in our programs. Participants include tribal members, youth groups, disabled children, local schools, colleges and universities, foreign-exchange students, Rotary groups, and a Mexican conservation group with which we canoed the Colorado River Delta in Mexico last spring. Activities include canoe and camping trips, interpretive hikes, a summer day-camp, cookouts, trail days, tree planting and canoeing and rafting trips, campouts, and environmental education activities. Our preserve staff also serve as river guides and chaperones during the trips. Last winter we hired John Squire, landscape architect and certified river guide, to train us in river guiding, and have since set up our canoeing adventures program. Adults from the tribal community

also donate time to help out with all of our trips. Foreign-exchange students, tribal elders, local professionals and an army of kids routinely gather for our weekend canoe trips.

Programs like these are as vital to the Preserve as water is to life—without it we would die. Projects that allow direct participation by the community in planning and carrying out the restoration have given the preserve a life of its own. People are always amazed at the progress of the project when they visit, especially when they see that a tree they planted at six inches has grown to a height of 25 feet in two years. Everyone's ideas, energy, and support for the project have helped us succeed.

Ahakhav park has also been a great staging ground for all of our activities and events. The park facilities include a four-acre (1.6-ha), grassy day-use area with picnic tables, barbecue pits, interpretive trails and shade trees and wildflowers. Opening day on October 19, 1996 brought 500 people together for the park's dedication. We celebrated with traditional dancing and singing and words of wisdom and encouragement from tribal councilmen and elders. Then the kids and canoes hit the water before feasting on two hundred pounds of "pitted" beef. We now have an annual fall gathering to celebrate the opening of the preserve. Last spring we also had our first youth cultural festival, organized by Stuart Harper, a Mojave Indian and probation officer, and Ruthanne Henry, a Canadian landscape architect.

Our current office staff of four and field staff of 21 is now located at our new Preserve office and visitor center at the park site—Sonia and Adam are gone, they graduated and married each other in the summer of 1997. The additional space is a

welcome change. Future plans for the preserve facilities include sites for primitive camping, an amphitheater, and three additional miles of interpretive trails.

Beneath traditional mesquite bosques and cottonwood forests, the Preserve is serving as a cultural classroom. Our natural science educator, Terry Shaffer, a wildlife biologist by training, has hosted over 5,000 youth and adults in our environmental education programs. Not only do school groups visit the preserve on a weekly basis, but Terry also visits all of the local schools weekly to help with lectures and environmental activities. The whole preserve staff joins in when we host large groups for tours of the project.

Conclusion

Our success at the Preserve has not been without sacrifice. We experienced great challenge in changing the landscape of 1,042-acres of tribal land. I can remember when people and agencies would often say things like "It will never happen," "That land is pristine, why would you change it?" and "Good luck, you are going to need it." Political opinions also presented opposition, some voting sessions for monies vital for the Preserve infrastructure (salaries, a skeleton operating budget necessary to continue, resolutions for permits) were won by narrow margins at times. We worked long hours to meet grant application and permit deadlines. Our field staff has worked three summers on revegetation projects and park construction in temperatures exceeding 125° F. There is truth to the old phrase "the squeaky wheel gets the grease." Persistence, optimism, and more than three years of commitment by count-

less individuals has paved the path to where we stand today.

We have worked hard here, and we have been very lucky. Dennis Patch's vision for the Preserve has presented us with a bigger picture than just the 'Ahakhav Tribal Preserve. In my opinion all of the talking and planning that has gone full circle time and time again between agencies and tribes will not make a difference. Working together, getting our hands in the dirt and restoring the roots of our communities, cultures and ecosystems will be the only way to bring about real change. Systematic destruction can only be countered with systematic restoration. No dam or levee can contain the spirit a community can have. So far, hundreds of people and millions of dollars have come together in behalf of just 400 acres, and I often wonder what it might take to restore the whole lower Colorado River region. Grant funding remains unpredictable, fleeting. Budget cuts keep coming. I don't know what the future holds. But we will keep doing our small part for the Lower Colorado.

The other night I walked through the 'Ahakhav. The smell had changed; it's cooler than it used to be here. Our two-year-old cottonwoods towered 35 feet above me. It is amazing what can be done when a community comes together and takes action as a whole. Let the historic cultural visions continue to guide us.

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