SAN PEDRO RIVER
An Anthology of Articles
Volume 1

Compiled by Dutch Nagle & Chris Long
FORWARD:

These articles were written for publication by the Sierra Vista Herald newspaper. They are intended to inform the public about the San Pedro Riparian National Conservation Area. The Friends of the San Pedro River hope that they are informative and improve understanding of the river, its ecology, and history.

All the articles were written by BLM staffers or members of the Friends of the San Pedro River and reviewed by a panel comprised of Friends and BLM personnel.

With thanks to all the writers and reviewers over the years.

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Why Volunteer?  By Dutch Nagle

There are many reasons to volunteer, but the main one is to derive a feeling of self-worth, to know that you have made a difference. In the modern world, it is difficult to believe that we are making any contribution to future generations. Many jobs, although they give us income and perform meaningful work, do not give us a feeling of accomplishment. Volunteering, on the other hand, gives us the chance to make a contribution to our world. People that I have known have always been eager to talk about what they do (or did) as a volunteer, but most don't talk much about their jobs. Let me mention that I’m speaking mostly about volunteers who enjoy working on projects that benefit the environment, but I think all volunteers share the same feelings. In talking to volunteers I know, here are some of the benefits they listed for me:

LEARN! They all learned much more about their local environment and therefore felt better prepared to teach others.

TEACH! Almost everyone enjoyed educating others, especially children, in the importance of balancing the needs of people with the resources available. While teaching, you continue to learn (people ask the darnedest questions.)

CONTRIBUTE TO SCIENCE! Many of my volunteer associates enjoyed being involved in scientific studies that would not have been done if it had not been for volunteers. Most non-profit organizations, as well as governmental agencies, do not have sufficient funds to carry out most of the projects they need to tackle.

GET PHYSICAL! Getting out and about, enjoying the sun and fresh air, and doing something physical is good for your health. It keeps you going. It gives you a reason to get up in the morning. It keeps your mind alert. It feels good. It keeps you from getting bored (bored people become boring people, so this makes you more pleasant to be around). It keeps you young.

MAKE NEW FRIENDS! No matter what program/project you get involved with, you will be surprised at how friendly, interesting, knowledgeable, caring, and energetic your fellow volunteers are.

GIVE BACK TO YOUR COMMUNITY! It is a way to give back to the community in a non-financial way. As pointed out earlier, many
organizations cannot afford to pay to have things done and rely heavily on volunteers.

CONSERVE HISTORY! It allows us to conserve history by both educating others, and maintaining the integrity of historic and environmentally important properties.

Being able to use my personal skills and interests to help the environment gives a large boost to my feelings of self-worth. And it is nice to know that our local residents, as well as visitors, have had a safe, fun, and educational experience because of me. I find myself a busier and happier retiree than I ever thought I would be.

Would you like to feel more worthy? Would you like to feel healthier, more knowledgeable, and younger? Would you like to be more interesting to be around? Would you like to feel a sense of accomplishment? Would you like to meet people with similar interests? Would you like to work for free? If so, please check out volunteer opportunities. I think you will be happy you took that first step, I know I am.

About the Author: Dutch Nagle is a past President of the Friends of the San Pedro and a docent.

Docent Training Class on Field Trip
Photo by Chris Long
On first seeing the San Pedro River, many people can’t help but laugh. From most perspectives, it hardly qualifies as a creek. But, its character and location in relationship to the surrounding environment make it important well beyond its size. In 1988, Congress designated a roughly 40-mile stretch of the upper San Pedro River as the San Pedro Riparian National Conservation Area (SPRNCA), created to protect what is arguably the rarest ecosystem in North America, desert riparian woodland. In 1990, The Nature Conservancy designated the San Pedro River basin as one of the “Last Great Places” in the Western Hemisphere – an area so unique it warranted international recognition. In 2003, Congress requested, through the 2004 Defense Authorization Act, that our local communities eliminate the area’s water pumping deficit by 2011, language aimed, in large part, at preventing the rapidly growing population along the upper San Pedro River basin from destroying the SPRNCA. So what is it about the San Pedro River that has generated so much national and international attention? Simply stated, the San Pedro River is home to one of the highest vertebrate animal diversity in the U.S. and is the “last of its kind.”

In the early 1800s, approximately one percent of what is today the state of Arizona consisted of riparian habitat – lands associated with water features, like rivers, springs, and lakes. Much of this habitat in the desert areas of Arizona consisted of desert riparian woodland, an ecosystem central to the existence of myriad animals and the Native Americans that made Arizona’s deserts their home. Two hundred years later, 90% - 95% of that former riparian habitat has been destroyed or seriously degraded. Picture the dry riverbeds of the Salt and Santa Cruz rivers to get a picture of “destroyed or seriously degraded.” Today, all of Arizona’s desert rivers have been dammed -- all but one, and that one is our own San Pedro River. The San Pedro River is the last free-flowing river in the southwest U.S. Its cottonwood-willow woodland is one of the most productive wildlife habitats in the US.

The San Pedro River is the only largely intact desert riparian woodland in an almost 750-mile wide region from the Rio Grande River in central New Mexico to the Colorado River on the Arizona/California border – land characterized by generally dry mountain ranges alternating with even drier desert lowlands. The San Pedro River’s
location in the middle of this area, coupled with its north/south orientation connecting northern Sonora, Mexico, to central Arizona, begins to give you an idea of why it is such a critical wildlife habitat. It also explains why it is a magnet for millions of migrating birds, facilitating their journey from the Sonoran Desert to the Rocky Mountains.

The San Pedro River provides migrating birds with the water, food, and shelter they need in order to make this journey through an otherwise hostile environment. An estimated average of 12 million birds migrate through the San Pedro River basin annually. More than 60% of all species of birds in North America have been sighted here, and the San Pedro River is also home to over 100 species of birds that breed along the river. For all these reasons, the San Pedro River basin is one of the most popular destinations in North America for birders.

Just as the San Pedro River serves as a critical migratory corridor and breeding habitat for North America’s birds, it also serves as a corridor for the movement of plants and animals between Sonora and Arizona. It is home to a great diversity of mammal species and among the highest number of reptile species in the U.S. It is one of the top areas in the U.S for butterflies and dragonflies. And for those interested in archeology, it is one of the richest archeological locations in North America, with a history of human occupation stretching back roughly 13,000 years.

In short, the San Pedro River is the sole survivor of a network of rivers that once flowed through the desert southwest. Its singular nature, location, composition, and orientation make it a vitally important element in the lives of many millions of birds and animals and a link to the history of mankind in this region. It would be a sad tribute to local residents and an even sadder legacy to future generations if we cannot do a better job than Phoenix and Tucson in protecting our desert river.
Aerial View of the San Pedro River
Photo courtesy of BLM

About the Author: Ted Mouras is a retired Army officer, a past President of the Friends of the San Pedro and a docent.
Bisbee’s Wastewater Treatment  

By Ted White

Most readers know that Bisbee has been plagued for years with a decaying sewer system and outmoded wastewater treatment plants. I use the plural here because Bisbee is the only city in the United States with a population of 6,500 that has three separate wastewater treatment plants (WWTP). Currently, none of the outflow from these three WWTPs benefits the San Pedro River.

Also, most readers are aware that Bisbee just got their new WWTP and sewer system approved and started construction in December 2004.

So, just what does all this have to do with helping the San Pedro River? With the use of just one pumping station, we will be able to direct all outflows from Bisbee to the San Jose Lagoons, which will be expanded, and this is where the new WWTP will be built. The other two WWTPs will be closed. The original plan called for the treated and purified effluent to flow downhill (no pumping needed) through a new pipeline directly to the Turquoise Valley Country Club (TVCC) golf course.

The golf course, which currently pumps some 600,000 to 800,000 gallons of water daily, wouldn’t have to pump from the aquifer any more. Bisbee will produce between 600,000 and 1,200,000 gallons of treated water per day. Surplus water that the golf course couldn't use would be discharged into Green Bush Draw. The daily golf course draw on the aquifer would be eliminated and much of what Bisbee pumps out of the aquifer would be returned.

I consider this good news for the San Pedro River. Bisbee has always held the River in great regard, and now we are able to help it survive.

It ought to be good news also for the Arizona Water Company. Oddly enough they have complained that treated water might ‘contaminate’ their wells, which are the sole source of water for Bisbee and are located just west of Naco, Arizona. However, as their water table is falling and they have had to drill a second well, I don’t see that they’ve got much room to complain. Rather, they ought to be throwing a party. In addition, our contracted engineers point out that the water
will be treated to such a high standard that Arizona Water Company’s fears are unfounded.

However, there is one new change to the overall plan. In November 2004, the golf course wrote a letter to the Mayor and Council of Bisbee stating that they had changed their mind and would not accept treated wastewater. Apparently they fear that it will somehow damage their turf, despite their awareness that hundreds of golf courses across the country use wastewater treated to a B+ standard (Bisbee's wastewater will be treated to this standard).

Bisbee's engineers have therefore modified the plan and are simply going to discharge the treated wastewater directly into Green Bush Draw rather than sending it to the golf course. The distance from the beginning of Green Bush Draw to its discharge point at the San Pedro River is about 12 miles. However, as Green Bush Draw does not travel in a straight line, and is in fact quite sinuous, its actual length is greater. The discharge rate into the draw will be between 500,000 to 800,000 gallons per day, but engineers doubt any surface flow will actually reach the river. Rather, most of it will either evaporate or percolate downward into the aquifer.

So, as the golf course pumps water out of the aquifer, Bisbee's treatment plant will return water to the aquifer. The return won't equal what's pumped out, but then it's not a perfect world, either.

Further, language in the deed that conveyed ownership of the golf course from the City of Bisbee to TVCC clearly states that in the event treated wastewater is made available to TVCC that they must accept it, and the new owners agreed to that. So, should it care to, Bisbee could take TVCC to court. Whether it will or not is anyone's guess. Perhaps the Upper San Pedro Partnership will look into this.

But it's still a win for the river, because, as it stands now, one third of Bisbee's wastewater is being discharged from the Mule Gulch Treatment Plant directly into the Sulphur Springs Valley, and the rest goes to two settlement ponds, one near the Warren district, the other near the San Jose district. None of it, as far as I can tell, is currently being returned to the river.

In addition to Bisbee's plan, there is an International Boundary Water Commission plan to build a joint wastewater treatment plant to service the two Nacos. Treated wastewater from this facility would also
be discharged into Green Bush Draw, adding another 800,000 gallons per day to the flow.

Imagine, in few years we might have another riparian area to explore!

(I hope someday Arizona will see the folly of its water policy and construct some large desalinization plants along the Sea of Cortez, stop pumping groundwater, and just leave the Colorado, the Gila, the Salt, and the San Pedro Rivers alone). But, then, I’ve always been a dreamer.)

**About the Author:** Ted White has lived in Bisbee since 1976 and holds a Master of Fine Arts in Creative Writing. He is a member of the Friends of the San Pedro River.

**NOTE:** Bisbee has a new water treatment plant that discharges its clean water into Greenbrush Draw and is also used to water the Turquoise Valley Country Club.
The Clovis Hunters started it. They were on their way south killing mammoth and bison as they went. Other hunters followed, some stayed, some moved on. In the 16th century, Westerners began to pass through the valley in search of cities of gold or converts to the Christian faith. They were followed by beaver trappers, military expeditions, ranchers, miners, and others. Some stayed, others moved on. Today it is migrants from the south seeking a better life or migrants from the north seeking a warmer clime. Some stay, some move on.

So it is with the avifauna as well. Every year in the spring millions of birds arrive in the valley from the south and every year in the fall more millions arrive from the north. In a way, their migration is a mirror of the human migration. They leave their winter homes in the tropics, as they have for millennia, seeking the “greener pastures” of northern climes to raise their young on the abundance of North America. In the fall, they return to the tropics because, in winter, that abundance of food disappears.

First to arrive in the spring is the lovely Vermilion Flycatcher. In late February, bright dots of the reddest of reds adorn the mesquites, willows and cottonwoods of the San Pedro reclaiming territories abandoned in September or staking out new territories to attract their salmon-bellied mates who return over the next few weeks. What could be a better harbinger of spring?

March brings a steady stream of migrants north. Swallows pass through often in large flocks, some come from as far as Argentina and others will go as far as the Arctic shore. Many will stop here for the summer, nesting on cliffs, buildings, bridges, river banks and in tree cavities. Turkey Vultures spread out over the west through March. Their thermoregulation is less efficient than other birds so they winter to the south not from dwindling food resources as most birds but to escape the cold.

By April, migration is in full swing. This is the time when the San Pedro is most important to migrating birds. The reason is obvious when you look at the April landscape. Cottonwoods and willows green-up in March when all the other habitats are at their poorest. Even the evergreen oaks drop their leaves in the spring and the grasses and desert scrublands are at their lowest ebb. Only the riparian strand is
fresh and green, and abloom with insects. It is a narrow strip of green and plenty in a sea of brown and poverty. Before the modern settling of the West there were healthy riparian strands throughout but population pressure has reduced most of the riparian systems here to mere shadows of their former selves. Locally we have the Santa Cruz as an example of what happens to a riparian system when it is diminished. True, there are still some areas where riparian vegetation has persisted and others where it has returned but throughout most of its length the Santa Cruz is a ghost of what it was. This is true of the Pecos, the Rio Grande, the Colorado and a myriad of smaller streams that once were available to migrants.

April is the month of warblers when more than a dozen species can regularly be found along the river and thirty-seven species have been documented. Hundreds of these tiny beauties, dressed chiefly in yellows and greens, might be seen in a short walk under the cottonwoods and willows. Most will move on to spread out all over the West from the pinyon and juniper of the Great Basin to the conifer forests of the Sierra Nevada and Cascades, to the Taiga of Alaska. Many will stay to nest along the San Pedro. Four species of warblers probably comprise three-quarters of the birds of the Riparian Area - Yellow Warbler, Wilson’s Warbler, Common Yellowthroat, and Lucy’s Warbler. Get more than a few yards away from the riparian habitat and there are almost no warblers.

Spring migration continues unabated through May and into June with the last northward-bound stragglers passing the earliest fall migrants, for at the end of June it all begins again in reverse. The first returning Rufous Hummingbirds may be present by the last week of June to greet the northward bound Yellow-billed Cuckoos who only begin arriving mid-month. The southward passage may last into November but peaks in late August and September with waves of adults preceding the birds-of-the-year. These birds may spend as much as half of their lives migrating.
Wilson’s Warbler
Photo by Dwight Long

About the Author: Jack Whetstone is a retired BLM San Pedro Riparian National Conservation Area Biologist.
Beaver Update

Beavers once thrived in the San Pedro watershed. Their numerous dams created deep pools, inhabited by native minnow, sucker, chub and even the Colorado River squawfish, known to reach lengths of almost six feet. The river teemed with waterfowl and wildlife. By the late 19th century the beavers had been wiped out, along with the dams, pools, and associated riffles. Portions of the river, which ran yearlong, dried up, marshes and meadows disappeared, and erosion cut into the riverbanks. The Bureau of Land Management (BLM) realized that this process of degradation could be reversed if beavers were reintroduced. Once beavers begin to repopulate and build their dams, water tables rise, riparian vegetation expands, and soil erosion ceases. Fish, waterfowl, songbirds, and mammals return to their former abundance. In short, the river is revitalized.

With this in mind the BLM and Arizona Game and Fish Department (AGFD) formulated a plan to re-establish beavers in suitable habitat within the San Pedro Riparian National Conservation Area (SPR NCA). The plan, approved in 1998, called for the release of 15 individuals. In March 1999, the capture program began. Mike Pruss, AGFD non-game biologist, and I made several trapping expeditions to beaver colonies in the Gila River, Salt River, Cluff Ponds, and Bonita Creek. Mike, coauthor of the plan, used his considerable skill as a biologist to set wire snares. Since beavers are primarily nocturnal, snares were set before dusk. The beaver swam or walked through the snare and became entrapped by a loop which tightened around the animal’s middle. A small bell attached to the device signaled its struggles. Once subdued by a restraint pole it was placed in a transport cage and taken to Tucson, where it was equipped with a radio transmitter, surgically implanted by veterinarian Carol Rowe. Each was then taken to the release location between Hereford road and Highway 90.
North American Beaver (*Castor canadensis*)

In 1999 four males, three females, and one juvenile were released. By October 1999 six had formed male/female pair bonds and the juvenile had established a solitary residence. One male disappeared from the area. Its remains were discovered near St. David but the cause of death could not be determined.

In the spring and early summer of 2000 three males and two females were equipped with transmitters and released in the San Pedro. The monsoon season began in mid-June that year. Flood events were frequent and intense, culminating in a large October flood. Two of them, released in 2000, perished within weeks of their release from unknown causes.

One male traveled downstream more than 100 miles to a spot near Dudleyville. A combination of reduced water and competition with an established beaver colony forced it into unsuitable habitat where it died in June 2001.

Two females were released in winter 2002 making a total of 15. One of these died in June, probably from drought stress.

A colony of beavers, typically, consists of a mated male and female plus kits (less than 12 months old) and yearlings (between 12 and 24 months old). Three colonies, two in the main channel of the river and one in Kingfisher Pond, were established in the autumn of 1999. As of May 2005, there were 12 to 14 colonies most located
between Charleston Road and Hereford Road. The BLM estimates that, conservatively, 70 to 80 beavers currently occupy the conservation area.

Three beaver carcasses have been found in the Kingfisher pond area over the past two years. At least two of these were mountain lion kills. This suggests that native predators are taking beavers and, possibly, helping to prevent overpopulation.

The number of dams has also increased, from three in 1999 to 19 in 2004. The dams range in height from one to four feet. Each is allowing water to filter into the alluvial soil where it is released during the dry season. This improves habitat downstream for vegetation growth and wildlife use.

The AGFD and BLM continue monitoring the beaver reestablishment project and also are monitoring the vegetation near colonies (beavers generally cut smaller trees close to the edge of the stream and many of these trees are re-sprouting from the stumps.). The BLM and USGS are monitoring stream flow and groundwater levels, while The Nature Conservancy and volunteers survey the river annually to document surface water. The BLM and volunteers monitor bird species near Kingfisher Pond. Contract biologists from Engineering and Environmental Consultants are performing surveys for southwestern willow flycatcher and Huachuca water umbel. When all these data are compiled and analyzed we will gain better insight into the relationships between beavers and the riparian ecosystem.

**About the Author:** Mark Fredlake was a Wildlife Biologist with BLM and co-led the Beaver Reintroduction Project in the SPRNCA
When people ask me about the cultural resources of the San Pedro Riparian National Conservation Area (SPRNCA), I often reply, “We have sites from the Clovis people to the Old West Clanton gang, and everything in between.” The BLM manages sites from all phases of history with ties to Padre Kino, the Apache, Tombstone, the Hearst Family, and the Goldwaters, to name a few.

Some of these historical sites are especially suited for visitors with interpretive trails and signs: the Murray Springs Clovis Site, the Presidio Santa Cruz de Terrenate, Millville and Petroglyph Trail, and Fairbank Historic Townsite. Visitors can also see preservation work being done at Fairbank and other sites. Partnerships with the National Park Service, the Forest Service, the Federal Highway Administration, and non-profits such as the Friends of the San Pedro River, the Center for Desert Archaeology, the Arizona Site Stewards and the Arizona Archaeological Society greatly assist the BLM in managing these rare and outstanding historic sites.

The Murray Springs Clovis Site is possibly the richest and most important site of the Clovis period ever excavated in North America. It is a late Ice Age (around 13,000 years ago) hunting encampment with two separate kill/butchering locations: one of now-extinct bison, the other of Big Eloise, an adult female mammoth. Large chert spear points found throughout and butchering marks found on the bones tell us humans were there. The campsite of these big-game hunters lies nearby. The interpretive signs at the site assist visitors in understanding the late ice age, its people, animals, and the science of archaeology.

The Lehner Clovis Site is still undeveloped, but it was designated a National Historic Landmark in 1967, a very high honor for a well-deserving site. Another exceptionally significant Clovis site, remains of nine mammoths and Clovis campfires were excavated there. Ed and Lynn Lehner opened their home and educated so many here from the 1950s to the 1970s and then donated the site to the BLM in 1989. Plans to build an interpretive trail to this site are under way.

The Presidio Santa Cruz de Terrenate (1776-1780) was the first interpretive project on the San Pedro undertaken by BLM in 1992. The signs there tell of the remote fortress designed to secure the Spanish frontier. Several engagements with Apache Indians convinced the
Spanish to retreat back into present-day Mexico in 1780. Visitors to the site can get a real feel for the isolation the soldiers, their families and the local Native Americans living at the Presidio may have felt. The fear is gone now and it’s open for public enjoyment.

The Fairbank Historic Townsite is a work in progress! New turn lanes, entrance, parking lots on both sides of the highway, and handicap-accessible trails and portable toilets have been installed. A Federal Highway Administration Enhancement Grant has helped fund the project. Does this sound like archaeology? Maybe not, but archaeology is a constant consideration at Fairbank. Not only do we have the 1879-1930 town but underneath there is a very large Hohokam village (circa 300 B.C.-A.D. 1450). Desert Archaeology excavated the site before the Arizona Department of Transportation built the turn lanes, and all ground-disturbing work is monitored by an archaeologist, or qualified volunteer assistant. The historic setting is always a consideration when deciding what to change, to build, or to take away. Every decision involves the archaeology and the history. The site is eligible for the National Register of Historic Places after all, and its outstanding qualities must be protected and preserved. Signs here tell of the railroad and frontier days. The school house has been restored and adaptively reused as a visitor contact station, museum and gift shop.

The newest site to have interpretive exhibits is the Millville and Petroglyph Discovery Trail. The trail has been built and the exhibits are installed. Four signs on the upper trail give the visitor insight into the Old West days of Charleston and Millville and the workings of the Gird and Corbin Mills. You can learn about colorful characters like Justice Jim Burnett. The lower trail takes the visitor to two Hohokam petroglyph (rock art) sites with signs explaining the people who made them, what they might mean, and how archaeologists study them.

**About the Author:** Jane Pike-Childress is an Archaeologist with BLM
Petroglyph rock at Millville
Photo courtesy of BLM
Recreation in the SPRNCA  

By Ted Mouras

In the more than 22 years since the establishment of the San Pedro Riparian National Conservation Area (SPRNCA), the Bureau of Land Management (BLM) has developed a wide range of recreational opportunities in the SPRNCA for local residents and visitors alike. These include something for just about everyone.

For those interested in enjoying a beautiful outdoor setting, a little exercise, and some fresh air, a number of sites along the 40-mile-long SPRNCA offer short walks along established trails. Perhaps the most popular of these trails starts at the San Pedro House (SPH), just off of Highway 90 about six miles east of Sierra Vista. This is a roughly 1.5 mile walk on a relatively level loop trail that runs from the SPH Visitor Center and Bookstore to the river, along the river in the cool shade of cottonwoods and willows, over to the Kingfisher Pond, and back across the open fields to the SPH. While you may just want to stroll along the trail taking in the sights and sounds on your own, self-guided trail brochures are available at the SPH highlighting natural history topics at marked locations along the trail. Also, every Saturday morning, trained docents from the Friends of the San Pedro River (FSPR) lead a walk on the loop trail starting from the San Pedro House parking lot. When you finish with your walk, you may want to visit the SPH Visitor Center and Bookstore, managed by FSPR volunteers and offering a wide variety of topical books and merchandise for sale, as well as information on the SPRNCA.

Other popular walking trails are located at the St. David Cienega, Presidio Santa Cruz de Terrenate, Fairbank, Millville and Charleston, Escapule Wash, Murray Springs, Hereford Bridge, and just south of the Highway 92 Bridge over the San Pedro River. Several of these trails are located at historic sites and include signs providing visitors with self-guided tours of the site. Many of these sites offer excellent examples of Native American “rock art.” Each year, the FSPR offers docent-guided hikes at many of these sites. Hikes are longer and more strenuous than the walks and those participating need to be in good shape. Fairbank, the site of a well-preserved “ghost town,” also has its own visitor center/museum/bookstore.

All of these sites offer opportunities to see some of the more than 350 species of birds that visit, breed, or reside in the NCA. For the more serious birder, the FSPR, Southern Arizona Bird Observatory
(SABO), and Huachuca Audubon Society co-sponsor docent-guided bird walks from the San Pedro House, Casa de San Pedro, and the Sierra Vista Environmental Operations Park throughout the year. SABO and BLM also conduct bird banding at various sites within the SPRNCA.

For those interested in equestrian activities, equestrian gates leading to trails have been installed at Fairbank, Little Boquillas Ranch, Escapule Road, San Pedro House, Presidio Santa Cruz de Terranate, Waters Road in Palominas, and St. David Cienaga/Land Corral. Opportunities also exist for biking, hiking, and primitive camping in the SPRNCA (camp fires are currently prohibited except at an official camp site where there is a fire-ring). Fishing is allowed for those holding an Arizona fishing license and hunting is also allowed in designated areas, at designated times (contact the BLM at 439-6400 for hunting regulations.) Picnic sites are located at the San Pedro House and Fairbank.

About the Author: Ted Mouras is a past president of the Friends of the San Pedro and an active docent.

The restored Schoolhouse at Fairbank, which is now a combination museum, visitor center, and bookstore

Photo by Dwight Long
The view from the back of a horse is unsurpassed. The leisurely pace of the horse is perfect for viewing wildlife, birding and socializing. Nothing can beat the feeling that comes from this experience. But as the population of the west grows, so does the limiting of open spaces to ride. Fortunately, for those in this area, the San Pedro Riparian National Conservation Area (SPRNCA) provides numerous trails for a trail rider to enjoy.

Although there are dangers associated with riding near or in the river itself, the Bureau of Land Management (BLM) has constructed an exceptional system of trails, which skirt the dangers while still providing excellent views of the river and the surrounding area. Staying on the trails will give a rider the safest ride and will protect the fragile environment as well. Many of the trails are very easy rides for both horse and rider. These trails are accessible from the equestrian gates installed for the sole purpose of encouraging horseback riding in the SPRNCA. The hope is that trail riders will be able to experience the magical and unique habitat that the San Pedro River creates.

I have ridden much of the river between the Mexican border and Benson, but there are two trails I ride repeatedly. Both take approximately two hours at the walk, but provide areas where a rider could trot, or even canter, their horse. No matter the speed, both give a rider a glance into the history of the river and beautiful vistas to enjoy.

The first trail is a historical journey, which leaves from the Terrenate parking area in the northern portion of the NCA. Following the signs from the parking area will bring the rider to the historic Presidio Santa Cruz de Terrenate. While a horse cannot be ridden through the ruins themselves, there are hitching posts available on the side next to the river. It is a great spot to dismount, view the ruins, and eat a snack while overlooking the river. By descending the hill to the north of the ruins, a trail will lead the rider beside the old railroad bed until it intersects with a dirt road. Turning west will lead the rider back to the old railroad bed. Following it south will lead back to the trail that returns to the parking lot. In two hours, a rider can experience the Spanish exploration of the area as well as enjoying panoramic views of the mountains.
The second ride leaves from the San Pedro House parking lot. Leaving from the gate at the far southwest corner of the parking lot the rider needs to ride until he picks up the Del Valle Ranch Road going south. Beautiful views of the river and mountains form the backdrop to this ride. Going east on the first dirt road after the first wash will move the rider toward the river. Turning south at the end of the wash will provide a great ride along the edge of the cottonwood canopy. Be sure to watch for holes in this area. I have seen deer, Javelina, Great Blue Herons, and Gray Hawks numerous times in this area. Whenever the rider is ready to return he just needs to turn west and travel until he picks up the ranch road again, and then follow it back to the San Pedro House, easily recognizable from the two huge cottonwoods that flank the house. Both sites offer plenty of parking for horse-trailers.

These two rides are my favorites, but there are many others. Equestrian access gates are available at Escapule Road and Waters Road. Most of the trailheads do not have a water source and there is not a reliable and accessible water supply in the river, so pack some water in the trailer. Finally be sure and muck up after the horses in the parking areas. It’s hard to believe, but there are a few SPRNCA visitors who don’t find horse droppings to be an enjoyable experience!

The San Pedro River and BLM have created a unique trail riding opportunity which combines an inspirational experience in the wild, along the last free-flowing river in the desert southwest, with a visit into the San Pedro’s long human history. So saddle up and see if a ride into the past is in your future. Come and ride along your river.

**About the Author:** Dede Havens is a retired teacher, a nurse, a docent and a volunteer with the FSPR.
Riders crossing the San Pedro River
Picture by Dede Havens
For many years, volunteer docents of the Friends of the San Pedro River (FSPR) have offered guided river walks to area schoolchildren. The FSPR is a group of volunteers supporting the Bureau of Land Management (BLM) in its stewardship of the San Pedro Riparian National Conservation Area (SPRNCA). The FSPR Education Program is just one of many activities in which these volunteers are involved. The Education Program is structured to provide students with a hands-on learning experience to help them gain an appreciation of the magic and singular nature of this desert riparian area, one of the last of its kind in the United States.

Visits to the river are usually preceded by a classroom slide show to acquaint students with the river and with some of the animals that inhabit the SPRNCA. Since many of the 80-plus mammals in the area are nocturnal, students may only see secondary evidence of their presence from the night before. When students arrive at the San Pedro House, they are given graphic cards of animal tracks, which they use to identify tracks they see as they walk the mile-long trail. Tracks of javelina, deer, coyote, and gopher are almost always seen. Mountain lion and badger tracks are fairly rare but have been observed from time to time. Stops along the trail are also made to discuss plants like the soaptree yucca and velvet mesquite. These discussions include descriptions of how Native Americans and early settlers used these plants for food, medicine, shelter, clothing, and tools.

Stopping at Green Kingfisher Pond, students are shown an abandoned lodge built by beavers re-introduced to the river in 1999. Continuing around the pond, students often see great blue heron, American coots, and Mexican mallards. During the spring migration, millions of birds move north through our area. At this time, colorful birds like the vermilion flycatcher, yellow warbler, and western tanager are often seen along the river. Continuing along the trail to the river, students are given strainers in which to collect small aquatic animals, such as mayfly nymph and water boatman, to view later with magnifying glasses. Older students can use their math skills to calculate the river flow and use test kits to find the pH and oxygen levels of the water, indicators of the health of the river. Water samples are also collected and examined with microscopes purchased with a generous
grant from the Cochise Community Foundation.

Field trips usually begin at 9 am at the San Pedro House and last 2 1/2 to 3 hours. Students are advised to bring hats, sun screen, and bug repellent. Since there are four kinds of rattlesnakes in the area, participants are advised to remain on the trails. Picnic tables are available for those wishing to bring lunches.

Although created primarily for elementary and middle school students, preschools and high schools also take advantage of the Education Program. Between 300 and 500 students per year participate in this program. Most of the participants are from Cochise County schools; however, one private school from as far away as Phoenix has enjoyed the river’s surprises.

In addition to the river walks, the education docents also conduct guided tours of the Murray Springs Clovis Archeological Site. It was at this site, about thirteen thousand years ago, that members of the Clovis culture hunted, killed, and butchered mammoth, bison, and other animals. This site was excavated in 1966 and is the only Clovis site in the area developed for public access.

The FSPR Education Program is not limited to schools. Education docents serve as walk leaders for other organizations, such as church groups and scouts.

About the Author: John Rose is a retired foreign service officer and serves on the Board of Directors for the Friends of the San Pedro River (FSPR). He manages the FSPR education program.
The St. David Cienega occupies a low depression of approximately 100 acres, one half mile west of the San Pedro River in the northern portion of the San Pedro Riparian National Conservation Area. *Cienega* (see EN eg ah) is the Spanish term for marsh or wetlands. A cienega can form where layers of rock or impervious clay hold water at the surface or through the continuous upwelling of numerous small springs and seeps. These conditions produce a rare plant community of sedges, grasses, reeds, and cattails because the soil is permanently saturated. This habitat supports a diversity of interesting plants, birds, insects, amphibians, reptiles, and mammals. The St. David Cienega is a small remnant of the extensive wetlands that once made up most riverine areas in the southwestern United States.

Before extensive human settlement in the area, the San Pedro River was a system of cienegas maintained primarily by thousands of beaver that lived along the river. Removal of the beaver in the mid to late 1800s, increased land use, and excessive removal of vegetation, caused the river to channelize and down cut in a relatively short period of time. Other floodplain wetlands were drained to create productive agricultural fields. Most of the remaining cienegas disappeared as the water table that once sustained them declined.

Of further interest to visitors is the Land Corral, located at the St. David Cienega – San Pedro Trail trailhead. The extensive wooden corral was used by local ranchers for holding cattle and loading them onto trucks for market. The corral was also featured in at least two of John Wayne’s most famous Hollywood Western films, *Red River* and *McLintock*. From this location, you can access the San Pedro Trail, a long distance trail that parallels the river through most of the San Pedro Riparian National Conservation Area. The San Pedro Trail is open to hiking, bird-watching, horseback riding, and mountain biking. Some areas, away from the trail, are also open to camping and hunting.

The St. David Cienega and Land Corral are unique and well worth visiting. The St. David Cienega has been federally designated as a Research Natural Area, and is protected within the Bureau of Land Management’s San Pedro Riparian National Conservation Area. Research Natural Areas are managed to keep human impacts to a minimum. Please do not camp within 200 feet of water or leave any
evidence of your visit; help protect this special example of our nation's natural and cultural heritage.

**About the Author:** Jim Mahoney is an Outdoor Recreation Planner with the BLM.

**Land Corral**  
Photo from BLM archives
San Pedro Riparian NCA  By Dutch Nagle

What is known today as the San Pedro Riparian National Conservation Area (SPRNCA) encompasses portions of two Spanish land grants dating back to 1827. These two grants were eventually purchased and consolidated into the Boquillas Land and Cattle Co., who sold their holdings to Tenneco. Tenneco planned to develop the land but instead was convinced to trade with the Bureau of Land Management (BLM) for equal acreage in the Phoenix area. This allowed the BLM to take possession of the property in 1986. Some additional land has been acquired since that time through donations and purchases.

This property, which now consists of approximately 60,000 acres, stretches from the border with Mexico to St. David (about 40 miles), and extends roughly 1 mile on either side of the San Pedro River. It contains the oldest evidence of the pre-historic Clovis Culture at two “mammoth kill sites,” ruins of old stamp mills and the townsites that supported them; ranch buildings which are still useable today; Indian rock-art sites; and the ruins of a Spanish presidio.

In 1987, a group of concerned citizens formed the Friends of the San Pedro River (FSPR). The sole purpose of this non-profit and non-political organization was, and still is, to support the BLM in its preservation and enhancement of this special area.

In 1988, the U.S. government recognized the value of this parcel and declared it a Riparian National Conservation Area. This was the first such area in the U.S. The SPRNCA was identified by The Nature Conservancy as the premier remaining riparian habitat in the Southwest and in 1996, the American Bird Conservancy designated it as the first Globally Important Bird Area (GIBA) in the United States. The San Pedro River is one of the last free-flowing rivers between Texas and California.

In 1989, cattle were removed from most of the SPRNCA (see before/after photos). Also in 1989, the BLM and FSPR volunteers restored an old ranch house, which was previously the home of ranch superintendents. It was turned into a bookstore/gift shop/info center and is known as the San Pedro House. All profits from the bookstore and other fund raising activities of the FSPR are used to help BLM make the SPRNCA a better place for public visitation.
Today, people can enjoy seeing protected pre-historic sites dating back more than 13,000 years; restored historic buildings; preserved foundations; rock art sites, and signage giving informative data. Maintained trails allow easy access for hiking, walking, horseback riding, and bicycling. Many trails are handicapped accessible. Benches are located along trails. Picnic tables are located near the San Pedro House (some covered), and a covered amphitheater is also located there. All these amenities are available for your use.

Trash pick-up and fence mending take a lot of time and energy, as does monitoring of wildlife and plant communities. (The SPRNCA is home to the endangered Water Umbel plant and is good territory for the endangered Southwestern Willow Flycatcher. It is also a necessary rest area for several million migrating birds each year.)

In addition to its many other activities, BLM has re-introduced beaver to the SPRNCA and is supporting a continuing effort to replace non-native plants with native vegetation.

As you can see, the BLM is kept very busy and could not support all these activities and still stay within their budget. This is where the Friends are able to step in and assist with volunteer activities and dollars. But, what better place could we donate our time and money than this treasured gem?

Come on down to the SPRNCA and see what we have done for you.

About the Author: Dutch Nagle is a docent and past President of the Friends of the San Pedro River.
The history of the Presidio of Santa Cruz de Terrenate is a chapter in the story of Spain's exploration and settlement of the Americas. The site itself is one of many historic and archaeological properties located on the public lands that belong to all Americans.

When the Spanish explorer Francisco Vasquez de Coronado passed through the San Pedro River valley in 1540, he entered a land already inhabited by people for at least 12,500 years. It is for one of the peoples of this area, the Sobaipuri Pima, that the Spanish eventually named the region the Pimeria Alta, or "Land of the Upper Pima."

By the middle of the eighteenth century, Spain had abandoned its dreams of obtaining gold and silver from the fabled "Seven Cities of Cibola." Denied the riches they sought, the Spanish increased their efforts to Christianize the native peoples and to defend their vast empire.

In order to do this, they had to provide military protection to the missions, settlers, and Christianized Native Americans who allied themselves with the Spanish. Protection was needed against the western Apaches. To provide security on the mission frontier, Spain established a defensive line of presidios. According to the Royal Regulations of 1772, presidios constructed to a standard plan were to be placed forty leagues (one league equals approximately 2.6 miles) apart and linked by regular patrols. "The Line," as it was called, would bar nomadic raiders from New Spain's northern frontier.

Putting these events within the context of American history, consider that on July 2, 1775, George Washington arrived in Cambridge, Massachusetts, to take command of the newly established Continental Army. The day before and nearly a continent away, Francisco Tovar completed the muster of his small band of presidial soldiers assigned to Santa Cruz. Fate was to take these two commanders, so close in time and duty, down vastly different paths. After years of seemingly hopeless struggle, Washington and his soldiers were to earn the love and acclaim of their countrymen by winning America's War of Independence. Within a year, Tovar and most of his men would lie dead and forgotten in a remote corner of today's Arizona.
The Presidio of Santa Cruz was established by an Irish expatriate, Hugh O' Conor, for the King of Spain, on a steep bluff overlooking the San Pedro River on December 10, 1775. By that time, the effects of the European population on the natives had already been felt. European disease, notably smallpox, had a devastating impact on the Aztec of the central valley of Mexico. Its spread far outpaced the actual arrival of the Spanish in Pimeria Alta. By then, disease and Spanish slave raiding had drastically reduced the Pima population, making them vulnerable to the Apache, who were themselves being pushed by the Comanche and other tribes westward and southward into Pima territory. Historic accounts reveal that by the time Santa Cruz was built, the Pima had relocated westward to the Santa Cruz River valley because they could no longer effectively fend off the Apache. Archaeologists have identified one earlier period of occupation at the site that ultimately became Santa Cruz—that of the Hohokam tribe, whose culture there dates to the thirteenth century.

The adobe Presidio consisted of a walled compound measuring about 121 varas by 103 varas (330 by 280 feet), which enclosed a large open plaza. The height of the walls, still under construction in early 1779, varied from 2.5 to 4.5 varas (7 to 12 feet.) By this date, approximately 3,592 pesos (about $60,000 today) had been spent on construction. Within the plaza were the commander's quarters, a church, storehouses, settlers' houses, and soldiers' quarters. Eventually over 300 people, including soldiers, their families, and settlers, came to live at Santa Cruz. Historic accounts indicate that the population was multicultural, consisting perhaps of 20 to 30 percent free African blacks and an equal percentage of native peoples.

Spain's resources in terms of men, money, and materials could not match the task at hand. For nearly five years, from 1776 to 1780, the Apache posed the same threat to the Spaniards as they had to the Pima. The raiders struck repeatedly at Santa Cruz, capturing horses and cattle and burning houses and crops. Many Spaniards and their Native American allies lost their lives. Two presidial commanders and more than 80 soldiers were killed.

Finally, in 1780, after the expenditure of thousands of pesos and scores of lives, the Presidio of Santa Cruz was abandoned.

Santa Cruz remained silent until archaeologists arrived in the middle of the twentieth century to begin excavation. There is
undisputed evidence of a prehistoric Hohokam occupation, evidenced by sherds found scattered on the surface and eroding out of the adobe walls for the later Spanish Presidio.

Today, the Spanish Presidio Santa Cruz de Terrenate is still the most intact example remaining of a once extensive network of similar presidios (fortresses) that marked the northern extension of New Spain into the New World. Only a stone foundation and a few remaining adobe wall remnants mark the location of an isolated and dangerous military station.

The Bureau of Land Management trusts in your desire to help preserve this unique site. Management of this fragile public legacy is the responsibility of the BLM and it is our desire to share information about these resources in the interests of protecting them through education. The privilege to view these sites and protect them for future generations of Americans involves the responsibility of every one of us.

**About the Author:** Jim Mahoney is an Outdoor Recreation Planner with BLM.

**Volunteers are using local adobe, capping and strengthening original Presidio de Terrenate walls**

Picture courtesy of BLM
A Tale of Two Docents

By Chris Long

_The Setting:_ Saturday morning, outside San Pedro House (the information station and bookstore operated by the Friends of the San Pedro River) in the San Pedro Riparian National Conservation Area (SPRNCA).

_The Players:_

**Docent #1** – Chris Long, a longtime resident of the local area, now leading interpretive walks along the San Pedro.

**Docent #2** – Heidi Schubert, a brand new resident of the area, assisting with the walk to answer questions and help the visitors get to know and understand the river.

**The Tour Group** – a variety of individuals, some from the local area, some folks visiting family and friends, some from Tucson or other parts of the country, even one from Germany. All are interested in natural history; some are dedicated birdwatchers; but most just want to learn about the San Pedro and its history.

_Act 1 – Prologue (One Year Earlier):_ Both Chris and Heidi notice a small announcement in the Sierra Vista Herald. The FSPR is going to hold training sessions for docents (four Thursday night classes and three Saturday morning walks). The sessions will cover everything about the San Pedro from archaeology to zoology. Chris signs up for the training. She feels that after 30 years of walking along the river both with her family and with FSPR walks and hikes, it is time to give something back to the community. She also wants to learn more details about the plants and animals she sees along the river. Heidi, as a new resident of the area, feels that being a docent will help her learn about the rich natural history in the area as well as contribute to the appreciation and preservation of the Conservation Area by sharing it with visitors. Since she has always loved nature and has a degree in zoology, this is a perfect opportunity to put these talents to use.

The training sessions are conducted by some of the area’s finest experts in their specialties. These are world famous names: Tom Wood on bird watching and Mark Pretti on bats are the very best the area has to offer. Bill Childress from the Bureau of Land Management, Bob Strain from the Upper San Pedro Partnership, Cado Daly on plants, and Sandy Kunzer on hydrology are the local gurus in their areas of expertise. In addition, we have John Porter with his snakes, Mark Fredlake to teach...
about mammals, and other FSPR docents willing to share their information with the newcomers. If one had to pay for this expertise at a conference, it would be worth thousands of dollars. Here it was free! (Actually $25, refundable after 50 hours of docenting). What a wonderful opportunity to receive training from these experts and at the same time prepare to spread the word about the attractions and diversity of our local area.

**Act 2 – The Interpretive Walk:** Good morning, I’m Chris Long. And I’m Heidi Schubert. We are here this morning to spend a few hours with you and introduce you to the San Pedro Riparian National Conservation Area. We will cover everything from the history to the hydrology and, at the same time, get a little exercise by walking about a mile and half through the desert grassland to the river itself. We will see six different life zones and the coming together of four different geographic areas. SPRNCA represents one of the most diverse areas in the world for wildlife. The human history covers over 13,000 years, everything from Clovis culture through the Spanish conquest, the cowboy west, to the present day. The bird list covers over 400 species with 50 percent of all the birds in the United States represented here. While we are walking, we will look for and point out the birds, mammals, insects, and plants that make this area their home. We will also talk about the river itself, where the water comes from, and what the future of the river might be.

Now that we have had our brief introduction, let’s get started. Don’t forget your hat and water (it gets hot in the sun, even in winter.)

**Epilogue:** Have we tweaked your interest? Come out to San Pedro House to meet one of our experienced docents and finish the tour.

**About the Author:** Chris Long is a past president and docent with the Friends of the San Pedro River.
Chris Long and Heidi Schubert Ready to Lead
Photo by Dwight Long
We who live in the San Pedro River Valley are so very fortunate. Not only are we able to enjoy the beauty of the last free-flowing river in the southwestern United States, but we also have evidence of ancient history in our own backyard. The San Pedro River Valley has been occupied by man for over 13 millennia and the oldest humans known to have walked this valley belonged to the Clovis culture.

Murray Springs is a significant Clovis archeology site and is named after the closest natural feature, Murray Springs, located ½ mile to the east. Excavations conducted by Dr. Vance Haynes and Dr. Peter Mehringer of the University of Arizona and funded by the National Geographic Society and the National Science Foundation, began in 1967. Besides finding the bones of several extinct animals including Mammoth, North American horse, camels, bison, lion and Dire wolf, evidence of Clovis culture was also found.

The Clovis culture is a prehistoric Native American civilization that first appears in archaeological records of North America at the end of the last Ice Age, around 13,000 years ago. This culture was named for artifacts first found near Clovis, New Mexico in 1932. The Clovis people, also known as Paleo-Indians are known for their use of a distinctively-shaped fluted rock spear point, called the Clovis point, which made them expert hunters of the large mammals of the late Ice Age. The points were skillfully fluted on both sides with concaved bases. Archaeologists believe the points were hafted to short shafts that were then mounted into sockets on heavier spear shafts. This provided for extremely accurate and “reloadable” spears. There are relatively few excavated Clovis sites within North America and we are very lucky to have a site so close.

The Murray Springs site is considered to be an important archeological find because the evidence of Clovis occupation was found “in place.” Bones, tools, and a hearth were discovered exactly as the Clovis people left them. The proximity of spear points and butchering tools with the animal bones proved that these people did hunt and kill the large mammals. A hundred yards away from the kill site the archaeologists found a hearth which indicated that the Clovis hunters camped near the kill site and probably stayed there until the meat was gone or too rotten to eat. This site was uncovered directly under a mantle of clay and organic material called the Black Mat. The mat,
which was deposited over a short period of time, is composed of material from a rapidly drying swampy area and made absolute dating of the artifacts possible.

Besides the 16 Clovis points found at Murray Springs, a very unusual bone tool was discovered amongst mammoth bones. It is believed to have been used as a wrench to straighten spear shafts and was made from a previously killed mammoth leg bone. As evidence shows, the Clovis people were expert big game hunters who were always on the move following their prey. Their dependence on the now extinct large animals so defined their culture, that it is theorized these people may have actually contributed to the extinction of these animals by over hunting. However, the period of drought which caused the swampy area to dry out so rapidly certainly had an impact on the area and its plants and animals. In any case, the dwindling of the game caused corresponding shifts in the life style and survival strategies of humans, and gave rise to the next cultural period called the Archaic Period.

The public is welcome to visit this site on their own. The Murray Springs Interpretive Trail is 1/3 mile-long and offers 10 exhibits on life in the late Ice Age.

About the Author: Alice Hawker is retired from the U.S. Army and a former member of the Board of Directors of the Friends of the San Pedro River
Artistic rendition of the mega-fauna that lived in the Murray Springs area about 13,000 years ago

Photo courtesy of BLM
The Antiquities Act  

By Lorraine Buck

One hundred years ago, President Theodore Roosevelt signed “An Act for the Preservation of American Antiquities,” otherwise known as the Antiquities Act of 1906. This was the first time the United States recognized, in law, that the material remains of our past were a valuable part of our heritage. The Antiquities Act set the stage for law and policies that became the foundation for the cultural resource management programs for federal land management agencies.

In addition to protecting archaeological and historic sites, the Antiquities Act provides the President with the means of setting important places aside for special preservation and interpretation. In 1906, President Roosevelt created the first national monument to protect Devil’s Tower in Wyoming; in that same year, he used the Antiquities Act to set aside historic and prehistoric sites in Arizona including Montezuma’s Castle, Tonto ruins, and Tumacacori. In 1908, President Roosevelt designated the Grand Canyon National Monument in what was at that time the Arizona Territory. This designation set a precedent in terms of the scale, 800,000 acres, that was conceivable for national monuments.

The Bureau of Land Management (BLM), an agency of the U.S. Department of the Interior, manages 261 million acres of public land, more than any other Federal agency. These lands represent about one-eighth of the United States, and are found primarily in the American West, and Alaska. Public lands managed by the BLM include grasslands, forests, high mountains, arctic tundra and deserts. They contain an abundance of resources such as timber, forage, wild horse and burro populations, fish and wildlife habitat, wilderness areas, paleontological sites, and cultural resources.

Cultural resources include archaeological sites, historic sites, and places of traditional importance to Native Americans and other ethnic groups. The BLM is responsible for the Federal government’s largest, most varied and most scientifically important body of cultural resources. These resources represent the tangible remains of 13,000 or more years of human adaptation to the land, spanning the entire spectrum of human experiences since people first set foot on the North American Continent.
The BLM manages more than 250 recorded prehistoric and historic sites within the San Pedro Riparian National Conservation Area (SPRNCA). Likely, there are many more that remain undiscovered. Of note is evidence of the Clovis Culture, named for a unique type of projectile called a Clovis Point. These were the first known occupants in the upper San Pedro River Valley, dating back about 13,000 years. Stone tools and weapons used by these people to kill large mammals, such as mammoths and bison, were found with the bones of their prey at the Lehner Mammoth Kill Site and the Murray Springs Clovis Site. Historic cultures are also of evidence in the SPRNCA: the Presidio Santa Cruz de Terrenate was established by Spanish troops in 1775-1776; it was never completed and abandoned in 1780, but what remains gives us insight into a time long past.

As fascinated and as thrilled as we are when coming across artifacts that tell the story of our recent and distant past, we must remember that these pieces of history are protected. Visitors to public lands can take personal responsibility for protecting and preserving heritage sites for future generations by following these basic rules: Leave artifacts and fossils where you find them. It is illegal to dig, remove or collect artifacts and vertebrate fossils without a permit; avoid moving or climbing on the walls of prehistoric or historic structures when touring sites; treat rock art, historic structures, and archaeological features with respect, touching or chalking can cause damage to rock art, gravestones, and fossils. Report looting and vandalism to your nearest BLM office, and report the location of archaeological sites so they can be documented. Lastly, keep the spirit of the Antiquities Act alive by educating others never to dig or collect artifacts so that they will last another hundred years.

About the Author: Lorraine Buck is the Public Affairs Specialist for BLM's Tucson Field Office.
Ramada at Murray Springs
Photo by Dwight Long
Many people wonder why we don't cut down the cottonwoods because they use so much water. Many also do not believe that they are native to the area. I would like to present the following case in favor of the trees.

The Fremont cottonwoods are native. Fossils of cottonwood trees, found in the San Pedro River area, have been dated from 10,000 years ago and cottonwood trees were described by the Coronado expedition, which went through this area in the 1540s.

Advantages to humans and animals. Cottonwoods provide a comfortable area in the desert for human activities: Picnicking, Camping, Hiking, Bicycling, Horseback riding, Hunting, Bird and Butterfly watching, and Educational field studies. Eco-tourism brings in millions of dollars a year to our economy.

The trees also provide an area for MILLIONS of birds annually by offering abundant food, protection, and nesting opportunities. Many hawks and owls that nest in the cottonwoods help to control the rodent population while other birds take care of insects. The "forest" also
offers a reasonable degree of safety for other animals passing through this corridor.

The cottonwoods provide food for beneficial bugs (i.e. Caterpillars eat the leaves, become moths and butterflies and go on to pollinate our native plants and food crops.) The leaves are also eaten by porcupine, deer, beaver, etc.

**Erosion control.** These trees hold the soil together thus preventing erosion. They also hold back flood debris, thereby slowing the velocity of the water and reducing its channeling effect, while at the same time building the soil around it. This slowing action also allows more water to penetrate the earth and recharge our aquifer. It is estimated that the river channeled down 35 feet between 1850 and 1950, probably because in the 1880s almost all the trees along the river had been cut to provide building material and fuel for Tombstone (residential building and heating, the operation of the mines, and powering 8 stamp mills along the river) and cattle grazing, which removed new growth and wore down the banks. This was compounded by an earthquake in the late 1800s and major flooding in the mid 1920s.

**Natural recharge.** The trees provide a food source and building material for beavers, which build dams on the river. These dams back up the water and allow it to seep back into the ground and recharge our aquifer rather than flow downstream only to eventually evaporate.

**Evaporation.** Trees evapotranspire only when in leaf and only in the daytime (at night and when leafless, the trees use practically no water.) This evapotranspiration takes in water and carbon dioxide (bad stuff) and releases water vapor and oxygen (good stuff) which all of us need to survive.

According to a scientific paper from 2000, on the water use of cottonwoods along the San Pedro River in southern Arizona: The large, mature trees with easy access to groundwater (depths less than 5 feet), during the peak of summer, could use anywhere from 200 - 500 liters of water per day (53 - 132 gallons). Another study done in 2003, which monitored a site with less access to groundwater (the stream goes dry seasonally at this site), found the water use to be about half that of the site with easy access to groundwater. (These rates are for large, well-watered trees during the peak of summer. Certainly their water use would be less during days that are cloudier, cooler, more humid etc.)
However, the cottonwood shades the land and nearby water, which cools the area, providing relief for many plants, insects and animals including fish, birds and humans, and last but not least, reduces evaporation within the shaded area.

To make this simple I will assume that the cottonwood tree is shading the river channel. Typical unsheltered open water evaporation rates are about 70% more than cottonwood water usage (90 - 224 gals. per day) or a net water saving of 37 - 92 gals. per day. This is the best case scenario because at least half of the shaded area is land which does not evaporate as rapidly as the water surface, however, even under these conditions, the water loss/gain is negligible.

**Conclusion:** In the final analysis, the water used by the cottonwoods is more than offset by:

- Aquifer recharge due to reduced floodwater velocity and the beaver dams.
- Reduced evaporation due to their shading effect.
- Additional benefits of aesthetics, air purification, rodent control, plant pollination, educational opportunities, recreational opportunities, eco-dollars, etc.
- Acting as a “corridor of life” for birds and other animals.

**About the Author:** Dutch Nagle is a past president and docent with the Friends of the San Pedro River.
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