



Arizona Riparian Council

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THE AGUA FRIA NATIONAL MONUMENT RIPARIAN ASSESSMENT PROJECT: CONTRIBUTING TO MANAGEMENT, ENHANCING SKILLS, AND MAKING NEW FRIENDS

by Tom Hildebrandt, President, Arizona Riparian Council

Federal land management agencies such as the Bureau of Land Management (BLM), Forest Service and the National Park Service (NPS) have the on-the-ground responsibility of managing much of Arizona's landscape. With the exception of the Park Service, these agencies work under a multiple-use mandate that requires them to include and balance a variety of uses of our public lands, everything from facilitating mining claims to bird watching. Although language exists in their enabling legislation requiring them to safeguard the fundamentals of the natural processes that these lands provide, many factors limit the ability of the agencies to fulfill this responsibility. Perhaps the most insidious are the compromises required when budgets are hollowed out, staffs reduced and programs limited to their most basic functions. Many responsible and conscientious federal employees labor within a system where the resources necessary for them to properly conduct their work are simply not provided. One of the typically underfunded areas in these agencies is the monitoring necessary to determine the status and trends of the landscapes under management. Monitoring is not sexy. You can't go out and take a picture of a newly created monitoring project and expect it to make the front page of the newspaper. Instead, it is a basic long-

term responsibility, much like mowing the lawn, which needs to be done regularly and with a certain level of skill and thoroughness to be a valuable piece of the management tool box.

The Agua Fria National Monument (Monument) was established in early 2000 by President Clinton's Antiquities Act Proclamation. At 71,000 acres, it is a large area of mesas and canyons at midelevations between Phoenix and Flagstaff, just east of I-17 (Fig. 1). It is managed by the BLM's Phoenix District Field Office. Protected in part for the rich prehistoric archaeological sites that occur here, the Monument also has rich biological resources in its grasslands, canyons and riparian areas. The BLM's Phoenix District office has a number of biologists and other resource specialists who are quite familiar with the Monument's landscapes and resources and are dedicated to their preservation. The newer Monument staff is likewise a dedicated group who wish the Monument to be all that it can possibly be. However, like many situations, after an initial flush of funds to establish the Monument and create programs and infrastruc-

ture, recent budgets are more limited, the staffing thin and the responsibilities broad.

Continued pg. 3 Agua Fria

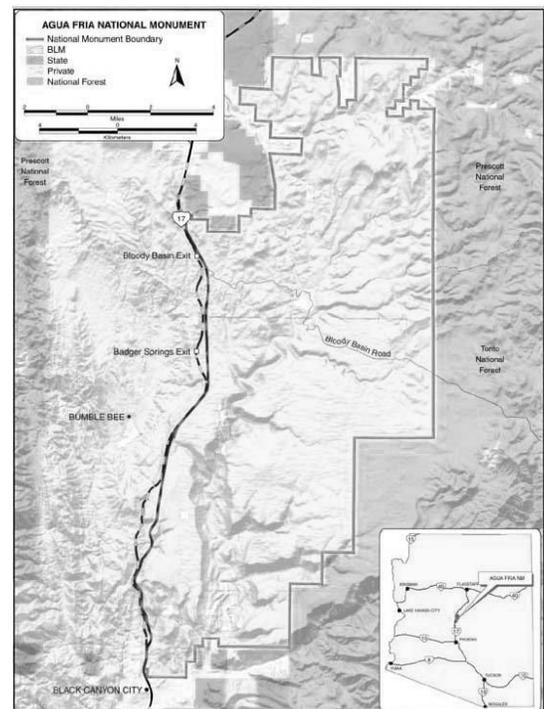


Figure 1. Map of Agua Fria National Monument. Adapted to black and white from <www.blm.gov/az/aguafria/aguafriamap.html>

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PRESIDENT'S MESSAGE

It's always a pleasure to address the membership. We're currently doing some great things on the Council and with your support, we can do even more. Below are some examples.

We had a terrific Spring Meeting again this year. Ninety-eight (98!) folks registered to attend. This is well above our average, although recently attendance has been building.

The theme of *Climate Change/Variability and Ecosystem Impacts in Southwestern Riparian Areas* proved to be very popular and timely. The Climate Assessment in the Southwest (CLIMAS) project, University of Arizona, brought together an extremely thought-provoking set of speakers from the field of climatology, including many who were studying the effects of climate change on riparian ecosystems. Combined with some familiar faces from our Council and associates in riparian science and management, the overall program was really thought provoking and informative. Thanks to all the speakers for their excellent contributions and efforts on our behalf!

The program was even more stimulating by including plenty of opportunity for panel discussion and questions and answers. These were always used to the maximum, in each case the time ran out before the questions did. The climatology planners remarked that this was a noticeably more involved and interactive group than their previous workshops with other resource managers. The Wednes-

day evening banquet, the technical papers session, and field trip were all well attended and informative. Thanks again to everyone who made this event an outstanding success!

Just a little bit of housekeeping left over from the meeting. We conducted our annual elections and I want to congratulate continuing Board Member At-Large Ron van Ommeren and new Board Members At-Large Nicole Brown and Charles Enos on their elections. We're sorry to see previous Board Members At-Large Diane Laush and Diana Stuart leave us as we welcome the new faces, although both indicated they would still be close to our group.

We also voted on changes to our bylaws, to bring them up to date with some of the current directions the Council is going. We broke the voting down into three categories: changes that were editorial in nature; changes that are substantive to the way the Council conducts its business; and changes to the formally recognized committee structure. All three proposed sets of changes passed with substantial margins in their favor.

I am pleased to say that three of our previous committee chairs have agreed to continue under the new committee structure, with Tim Flood and Bill Werner agreeing to serve as co-chairs of our new Conservation Committee, and Kris Randall agreeing to serve as chair of our revised Policy Committee. The appointment of all three to their new positions was ratified by

vote of the membership, so under the new bylaw provisions, all are eligible to vote as fully certified members of the Council's Executive Board. We do have one committee without a chair, our Activities Committee, so if anyone would like to participate in that capacity, please contact me.

In other news, please see the lead article on our big project! Our Agua Fria National Monument Riparian Assessment Project will be moving the Council into some new territory. It's going to be interesting to see if the membership and our associates will support us in this.

Diana Stuart has taken the lead in setting up periodic (perhaps quarterly) social meetings of the Council, where we can get together for an evening meal and beverages and have a guest speaker discuss riparian issues. Our first get together occurred in mid-June with Vice President Roger Joos delivering a talk on beavers in central Arizona that really brought out the attendees! Thanks Roger!

Your Board continues to explore ways to make the Council more relevant in the community and of greater benefit to its members and the riparian resources that are our subject of focus. We appreciate your ideas and participation. Help us keep up the good work!

*Tom Hildebrandt, President
Arizona Riparian Council*



Fall Meeting Announcement Put the Date on Your Calendar!

The Fall Meeting will be held October 27-28, 2007 at Horseshoe Ranch near the Agua Fria National Monument. We will start at 1 PM

Sat with learning about the protocols for rapid assessment of riparian areas for our project on the Monument. More details and a

map will be sent to the listserv and be posted on the website (azriparian.asu.edu)!

Hope to see you there!

Agua Fria Cont. from pg. 1

FRIENDS OF THE AGUA FRIA NATIONAL MONUMENT

One of the possible responses to agency limitations in fulfilling their missions is to use volunteers and community programs to pick up some of the slack. Founded in 2004, the Friends of the Agua Fria National Monument (Friends) have a mission to protect, preserve, and promote appreciation and enjoyment of the ecological, archaeological, scenic and scientific resources and values of the Monument, and to fulfill this mission through volunteer and professional projects and activities such as interpretation, education, fundraising, and advocacy in consultation and coordination with the BLM Field Office. The Friends have identified four areas of focus on which to concentrate their energies: Cultural Resources Preservation; Pronghorn Recovery; OHV Use and Management; and Water Resource Management. The Friends have conducted a number of volunteer projects on the Monument to remove old fences from pronghorn habitat, reduce saltcedar infestation in riparian areas, remove trash and participate in events and educational opportunities to help promote support for the monument and its management. In recent years the Friends have partnered with Audubon Arizona and the Prescott and Sonoran Audubon Society chapters to designate the Monument as an Important Bird Area (<http://www.audubon.org/bird/iba/>) and to conduct the background inventories of bird life to properly document the value of these lands to birds. This is an example of volunteer groups conducting "citizen science" to accomplish specific goals that would likely not be able to be accomplished using only the resources of the land management

agency and its other government partners. For the last several years members of the Audubon chapters have conducted monitoring in both upland and riparian sites across the Monument.

CITIZEN SCIENCE

Wikipedia defines "citizen science" as

a term used for a project or ongoing program of scientific work in which a network of volunteers, many of whom may have no specific scientific training, perform or manage research-related tasks such as observation, measurement or computation.

The *Wikipedia* article goes on to state that such citizen science projects often result in accomplishment of scientific objectives more feasibly than might otherwise be possible within agency frameworks, and that they lead to both an education of the public in scientific procedures and tend to engage public participation in science and management. Many examples of citizen science exist, but the annual Christmas Bird counts may be one of the most valuable and long-running ones.

I will add that such projects often provide opportunities to learn new skills and perspectives, and to make new friends with other folks with energy and commitment. Likewise, these projects often provide the organizations, which support and manage them, with a higher level of member participation and support for the mission of the organization. People belong to organizations to enhance personal growth, or a chance to contribute to worthwhile goals and socially fulfilling engagements. One of my objectives as current President of the Arizona Riparian Council is to give members a reason to become

more engaged with us on a frequent basis.

RIPARIAN ASSESSMENT

Tim Flood is our Conservation Committee Co-Chair and is likewise Vice President of the Friends of the Agua Fria National Monument. Tim is engaged and committed to his conservation work. Last winter he started a conversation with some of us about the Monument and the resources there. Several of us were aware of the Audubon chapter avian surveys and our conversation turned to the question of why not complement those surveys with habitat surveys of the riparian bird survey sites? A small group of us started meeting informally to discuss the idea and gather additional information. Another member of the Friends mentioned there was a riparian assessment protocol that he had heard about being used in Utah and provided a link to the web site where it was described.

THE RAPID STREAM-RIPARIAN ASSESSMENT PROTOCOL

This protocol, nicknamed the RSRA for Rapid Stream-Riparian Assessment protocol, was developed by members of the Wild Utah project and a cooperator from the University of New Mexico for use in small- and medium-sized streams in the arid Southwest. While there are other protocols for assessing riparian areas, for instance *RARS: Rapid Assessment of Riparian System* developed for Arizona Game and Fish Department by Arizona State University, none seem to be suitable for a citizen science approach in the same fashion as the RSRA. RSRA, like RARS, is designed to work in conjunction



with the BLM's Proper Functioning Condition Assessment protocol (PFC). In fact, it was developed partly in reaction to perceived inadequacies of the PFC system. These relate primarily to the lack of a quantitative foundation that is discernable in PFC ratings. RSRA is developed to address essentially the same parameters as PFC, but to provide a ranking scale quantification of a set of characteristics relating to these parameters. This is intended to be a more objective method to assess the functional condition of a riparian-stream reach and to allow the results to be "tiered up" directly into a PFC analysis. The RSRA does collect data on additional parameters that are not a part of PFC as well.

The RSRA protocol measures and ranks the conditions of the stream and associated floodplain and riparian zone as it exists at the time of measurement. It does not say anything about site potential, although the scale of ranking is ideally compared against a reference reach within a similar nearby system that has been identified as having relatively undisturbed and functional characteristics. This is difficult to do in most of Arizona, but remains an idealized objective. By considering current condition

only, the RSRA method can readily be used as a monitoring tool to determine the trend of the system as a result of management activities or natural processes.

The RSRA is designed specifically for small teams of technicians or citizen scientists to rapidly collect the necessary data to assess stream and riparian conditions within five ecological categories: non-chemical water quality, fluvial geomorphology, aquatic and fish habitat, vegetation composition and structure, and terrestrial wildlife habitat. Within each of these categories several variables are scored on a scale that ranges from "1," representing highly impacted and non-functional conditions, to "5," representing a healthy and completely functional system. The RSRA protocol requires no specialized equipment and is well-developed for use by small teams. The data sheets and instructions allow the team to function efficiently, collecting about half the information in the first pass along a study reach, and finishing the remaining data collection as they return to the starting point. An experienced team can complete an assessment of a 1 km stream reach in 3-4 hours. This rapid assess-

ment capability means that multiple reaches can be assessed relatively fast and the overall status of a watercourse established, illustrating both variability and common characteristics.

The tradeoff, of course, to such a rapid assessment protocol is that the assessments lack the depth and specificity to precisely identify and quantify conditions to the degree necessary to plan and conduct remedial management actions and the like. Rather, this protocol best serves as an indicator of status and trend at a moderately precise scale, with the acknowledged necessity of more precise assessments being required when conditions that seem to be in need of attention are identified.

Tim Flood and I attended a week-long training session in southern Utah in early June to be fully trained in the RSRA protocol and to be able to serve as trainers for the field teams we hope to put into the field here in central Arizona.

THE PROJECT

The Arizona Riparian Council has established a field activity for our membership and cooperators to conduct riparian assessments on the Monument. We are doing this partly to provide a service to the Monument in its resource management, and partly to offer an opportunity for higher levels of participation in the Arizona Riparian Council for you, the members. The project will be done in support of one of the four areas of focus for the Friends, the "Water Resources Management" focus area. We will partner with Monument staff, the Friends, Audubon Society chapters, and with the Master Watershed Stewardship group sponsored by the University of Arizona Cooperative Extension Service. Other cooperators are welcome.

We hope by involving all these cooperators we can all learn more about topics currently perhaps unfamiliar to us individually, learning about birds and habitats and watershed and stream processes. We hope this will be an activity that participants can find to be educational, fun and rewarding.

Likewise, we hope the information we generate will be genuinely useful in management for the Monument. We will share our raw data with the Wild Utah Project, which has volunteered to act as regional repository for data collected using the RSRA methodology. We will, of course, provide our own analysis and reports directly to the Monument. We hope that this is just the start of an ongoing pattern of activities for our membership, beginning with assessments of the Monument watercourses and perhaps expanding to other areas as our levels of interest and organizational momentum grow. For this to work, however, we hope many of you choose to participate.

Since the Monument is so near to the Phoenix metro area, we will plan to use this large reservoir of potential volunteers as our primary resource. We will have a few sets of the required equipment available to teams for checkout and use. We will coordinate the assigning of volunteers to teams and teams to stream reaches. We will encourage and facilitate carpooling for the field trips. Some assessments will probably be conducted as part of a larger social activity where several teams go to the field together and split off to conduct their individual assessments, returning to a common area for a later campout, etc. We are planning the first of this type of activity as the focus of this year's fall meeting in late October (27-28, mark your



calendars now), at which time the project will get its official kickoff.

For this project to succeed in all its potential, we will need additional participants and especially leaders to step up and choose to come out and play! Each field team will need a leader (or two) who can take responsibility for knowing the protocols sufficiently to lead a team, checking out the equipment, making sure the data sheets and notes are completed properly and turned in, etc. We would also like to identify a couple of folks who might like to work with us on the data archiving and analysis and similar administrative and leadership tasks. Ideally, the current team of project developers can step aside and return to their Board of Director duties and let a fresh group of leaders take over the project itself. Why don't you think about stepping into one of these roles? Contact me, tomarc@cox.net, for more information and your opportunity to get involved.





SPECIES PROFILE



RACCOONS

by Carol Birks, Arizona Department of Water Resources

Riparian areas are important to wildlife for many reasons. They provide the three critical resources needed for survival, food shelter and water for both permanent and temporary residents and are natural transportation corridors that wildlife uses for daily and seasonal movements. One mammal common to the state's riparian areas is the raccoon, *Procyon lotor*. If one is not fortunate enough to see the actual animal their tracks are frequently found in the moist ground near washes, creeks and rivers. Other signs of their presence include piles of discarded crayfish shells near streams and because they habitually use the same area for a latrine, small piles of "scat" may be visible.

PHYSICAL DESCRIPTION

Raccoons are well known for the black mask across their eyes and the bushy tail with four to ten black rings. Body coloration varies and is influenced by the surroundings but tends to range from grey to reddish brown. Raccoons have a stocky build and weigh between 4 to 23 lbs; averaging around 14 lbs. Males are usually heavier than females by 10 to 30%. The body length ranges from 24 to 37 inches with the tail comprising almost 50% of the length. Both their forepaws and hindpaws have five toes. The hind foot is plantigrade, meaning it walks on the sole of the foot like humans and the forepaws resemble slender human hands, giving the animal unusual dexterity.



Raccoon tracks. Photo by Mark Sanders, from <<http://www.ci.austin.tx.us/preserves/fototrax.htm>>.

HABITAT

Raccoons are extremely adaptable and found in many habitats but must have access to water. They prefer woody and brushy areas with large mature trees, but do well in agricultural and urban areas. They prefer to build dens in hollow trees, but will use burrows made by other animals, caves, mines, and uninhabited buildings. They may have several dens in their home range, which is about a square mile, however, males may expand their range during the breeding season.

DIET

Raccoons are omnivores and opportunists and their diet is dictated by protein and energy needs and food availability. In the spring high protein diets are needed to ensure the proper development of offspring and include crayfish, insects, birds, eggs and fish. After the young are weaned raccoons can take advantage of available fruits and vegetables, wild and cultivated. In the fall the animal's

fat deposits are increased in preparation for food shortages in the winter and the diet needs high energy foods such as nuts, grains and once again high protein foods.

REPRODUCTION AND LIFE CYCLE

Female raccoons will generally have only one litter each year but males may mate with several females to ensure greater genetic dispersal. Litter size is between three and seven but typically contains four young. The gestation period is 63 to 65 days or nine weeks. The helpless young are born blind and their eyes open at 18 to 24 days; they are weaned in 70 days. The female exclusively cares for the young and they remain with her through the first winter. When the young female offspring become sexually mature in eight to ten months they will frequently den nearby. Males are not sexually mature for two years.

The lifespan of wild raccoons is usually 5 to 7 years, however most don't live more than 2 years. In captivity they can live up to 20 years.



BEHAVIOR

Raccoons are nocturnal and have excellent hearing and night vision. They are solitary unless it is mating season but they may congregate around man-made food sources like trash dumps, picnic or agricultural areas. They do not hibernate but during extremely cold weather they sleep for long periods and live off their fat reserves.

Raccoons have a highly developed tactile sense. Their human-like forepaws are especially sensitive and enable the raccoon to pick up its food before eating it. This dexterity also enables raccoons to pry open the shells of crustaceans and the lids of cans. Because they are found near water this behavior of manipulating food before eating creates the appearance that they are washing their food.



Photo from Washington Department of Fish and Wildlife website
<<http://wdfw.wa.gov/wlm/living/raccoons.htm>>

They commonly shuffle as they walk however they are able to reach speeds of 15 miles per hour on the ground when necessary. Raccoons climb with great agility and are not bothered by a drop of 35 to 40 feet. As well as being excellent climbers, raccoons are strong swimmers, although they may be reluctant to do so. Without waterproof fur, swimming forces them to take on extra weight. Raccoons don't travel any farther than necessary and only far enough to meet the demands of their appetites.

IMPACTS WITH HUMANS

Because of habitat loss raccoons are being forced into more urban areas thereby increasing negative interactions with people. Even though raccoons, especially the young, are cute they are wild animals and should be left that way. They quickly become a nuisance to farmers and homeowners and can cause damage to a variety of crops, chicken coops, landscape plants and homes. They also carry diseases and parasites that can be transmitted to humans and domestic animals.

There are several ways to discourage raccoons from moving into urban areas. Keep garbage in the garage and use tight fitting lids on the cans. Also add a small amount of ammonia to the garbage can when new garbage is added. Feed household pets during the day and pick up their food at night. Keep barbecue grills clean and covered. Finally, eliminate potential den sites by putting screens on chimneys and access areas under porches and houses.

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Wisconsin Department of Natural Resources website
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accessed 4/24/2007



Legal From pg. 10

Salt Division, No. 04-17554, 2007 WL 686352 (9th Cir. Mar. 8, 2007), the Ninth Circuit addressed the issue of whether a pond is protected under the CWA because it is adjacent to navigable waters, i.e., a slough to the San Francisco Bay. The Ninth Circuit concluded that "the instant record does not support a finding that the Pond is a tributary of the Slough; there is no evidence that water from the Pond has ever flowed into the Slough or the Slough's wetland."

The jurisprudence following *Rapanos* is rapidly evolving. Other cases that may be instructive as of the time of this writing include: *Simsbury-Avon Preservation Soc'y, LLC v. Metacon Gun Club, Inc.*, No. 3:04cv803, 2007 WL 268341 (D. Conn. Jan. 31, 2007), *appeal pending* (2d Cir.); *United States v. Chevron Pipe Line Co.*, 437 F. Supp. 2d 605 (N.D. Tex. June 28, 2006); *United States v. Marion L. Kincaid Trust, et al.*, 463 F. Supp. 2d 680 (E.D. Mich. Nov. 3, 2006); *Sierra Club v. United States Corps of Engineers*, 464 F. Supp. 2d 1171 (M.D. Fla. Nov. 19, 2006); *Environmental Protection Information Center v. Pacific Lumber Co.*, 469 F. Supp. 2d 803 (N.D. Cal. Jan. 8, 2007); *United States v. George Rudy Cundiff*, No. 4:01CV-6-M, 2007 WL 957346 (W.D. Ky. March 29, 2007); and *United States v. Rowland Fabian*, No. 2:02-CV-495 (N.D. Ind. March 29, 2007).





NOTEWORTHY PUBLICATIONS

by Elizabeth Ridgely, One Green World, LLC

Shafroth, P. 2003. Natural flooding and dams. *Southwest Hydrology* 2(2):20-27.

The composition, structure and dynamics of riparian vegetation are determined by past and present hydrologic regimes and geomorphologic conditions. Evaluating current and natural dynamics of channel pattern, channel cross-section, and the size and distribution of bottomland landforms can help to identify which components of the system are in greatest need of restoration. A growing database clarifies alluvial groundwater dynamics and the responses of stream and floodplain biota to aspects of surface flow, e.g., timing, magnitude, frequency, duration, and rate of change.

In riparian areas, flooding is an important natural process, strongly influencing the physical environment by eroding and depositing sediments, destroying and creating fluvial landforms, moistening sediments, flushing concentrated salts in sediments, and transporting plant parts. These flood-driven processes determine the distribution, size, shape, and sediment characteristics of surfaces within a river bottomland in which vegetation grows. The life cycle of many riparian plants is closely related to these site conditions and, therefore, to flooding.

In the Southwest, riparian restoration often promotes the regeneration of native cottonwood and willow forests. The natural reproduction of these trees is dependent on flood-driven processes. To germinate, the seeds require bare, moist substrates during a limited period of time in spring and summer. Floods naturally create these substrates. As flows recede after a flood, soils must remain moist enough for drought-sensitive seedlings to survive. Seedlings are also vulnerable to removal by subse-

quent floods. Given these requirements, successful seedling establishment of cottonwood and willow trees may only occur once every 5 to 10 years. This is despite the fact that thousands of seedlings can be found almost yearly.

Today, most rivers in the Southwest have been dammed. While dams may be operated differently depending on the purpose, they affect surface flows downstream by changing the flooding regime. This usually involves reducing the magnitude and frequency of flood flows and changes in the timing and duration of flooding, all of which alter the physical conditions that influence riparian vegetation. These changes can adversely affect native species dependent on natural flooding regimes. Conversely, non-native species may be better suited to the new flow regimes. Low flows are important because they influence dry season alluvial water table depths, which can constrain the abundance and composition of riparian vegetation, particularly in arid regions. Downstream from dams, low flows are altered in different ways, depending on dam operation priorities. In some cases, where flows are diverted from a reservoir, low flows downstream may be reduced, leading to drier conditions than can be tolerated by many riparian plants. In other cases, where water is delivered for summer irrigation downstream, low flows may be increased, allowing for greater survival and growth of riparian plants than might have occurred with natural flows.

Given the importance of surface flow for riparian vegetation, a common restoration approach has been to manage streamflow downstream of dams. Changing dam operations may be feasible along rivers where patterns of downstream water delivery are flexible. This occurs when there is a possi-

bility of purchasing land and water rights, or when restoration downstream may be legally required and dam reoperation is found to be less expensive and more sustainable than active restoration. In the Southwest, this approach has often involved modifying the parts of the regulated hydrograph that are hindering cottonwood recruitment or survival.

Along rivers in Alberta, Canada, low flows have been increased to maintain the vigor of existing cottonwood forests, and the rate of flow recession following flood peaks has been controlled to promote seedling establishment. Along the Truckee River, NV, and the Bill Williams River, AZ, managed floods have been used in combination with controlled flow recessions to promote cottonwood recruitment. In these cases, the restoration objectives were achieved over many river miles, without costly, intensive, on-the-ground actions. However, it is important to recognize that naturalized flow regimes alone may not supply all of the conditions required for successful restoration, particularly if sediment and geomorphic dynamics are altered.

Another way to mitigate the downstream effects of dams is to remove the dam. Dam removal is increasing throughout North America, primarily because many dams have become unsafe over time or are no longer serving the purposes for which they were originally constructed (e.g., Fossil Creek). Environmental restoration is seldom the only reason for removing dams, but restoration benefits may occur. If there are no other dams upstream, dam removal may restore natural flow, sediment regimes, and the associated natural processes that favor native riparian vegetation. However, large volumes of sediment trapped in the reservoir during the life of the dam

may be transported and deposited downstream, creating unnatural conditions. It follows that after dam removal, the dam-altered system may not be immediately restored. The system will need to adjust to the influx of sediment, as well as to a return to natural flows. The timing and nature of these system responses will vary from river to river and are not yet well understood by scientists.

Opportunities to remove dams or to change dam operations are limited, and dam reoperations may not always provide all the required processes. In cases where only partial restoration of key processes is possible, more active restoration measures may be targeted to mimic

what is still missing. For example, restoring naturally high-magnitude floods and the associated physical disturbance that is essential to the reproduction of desirable, native pioneer trees and shrubs, may not be possible. In these cases, active measures can be used to mimic the physical disturbance, i.e., bulldozing existing, undesirable vegetation, followed by stream flows that moisten the surface. Where stream flows are too regulated to provide moistening, controlled irrigation may suffice. Even when several active restoration measures are required, they are more likely to succeed if they tend to mimic key functions of natural processes.

Restoring natural flow regimes and fluvial processes can have numerous benefits. Restoration efforts requiring many active measures and future maintenance are generally less sustainable, more expensive, and confined to small areas. In contrast, when natural processes are restored, restoration projects can be more sustainable, less expensive, and more extensive. Although factors unrelated to a river's hydrology or geomorphology may be the main source of degradation, the success of riparian restoration efforts will be enhanced when the important roles of natural processes are incorporated.



A BOOK REVIEW :

THE RIBBON OF GREEN BY R. H. WEBB, S. A. LEAKE AND R. M. TURNER

by Julia Fonseca

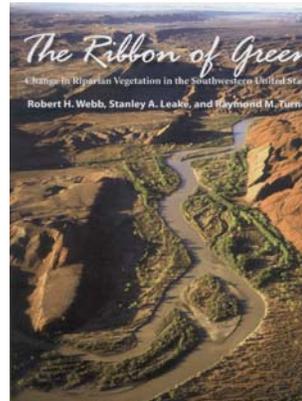
The *Ribbon of Green* is a regional synthesis of the changes in the structure and species composition of woody riparian vegetation along the major rivers of the U. S. Southwest. The authors use interpretations of photographs at gage sites in combination with actual gage records and long-term well hydrographs to interpret regional vegetation change along rivers. This combination of hydrologic and photographic data sources, coupled with insights into how geomorphology and vegetation interact, are real strengths of the work.

The book challenges the dominant paradigm of riparian loss. The authors found that woody riparian vegetation has increased along most stream reaches in the Southwest. Regionally speaking, this is the heyday of riparian forests, not its nadir. When viewed through the lens of repeat photography, we see that the sacaton grasslands of southeast Arizona have been replaced by cottonwood, willow and mesquite. Likewise the sand bars and short willows of the Colorado Plateau's canyons

have been replaced by thickets of Russian olive, tamarisk and mesquite. Only the Mojave and Santa Cruz rivers, deadened by groundwater pumping, show major losses of riparian forest.

The authors suggest that dam building, arroyo cutting and 20th century climatic variation brought about the expansion of riparian forests, particularly cottonwoods, in the region. If this is true, then I would add that in this time of drought and expanding demand for water, we stand as the inheritors and stewards of the largest inventory of cottonwood-willow forest that we and our descendants may ever know.

The authors' provocative conclusions are not limited to the status of cottonwood-willow forests. They also provide information and useful speculation about observed changes and direction of future changes in woody invasive species such as tamarisk and Russian



olive. The discussion of non-natives is especially timely, given recent funding of new initiatives within the Interior Department to reduce tamarisk. Some will take issue with the way the authors minimize grazing as a major ecological factor. The discussion of fire also is thought-provoking. I

expect *The Ribbon of Green* will stimulate additional research, analysis and discussion by others.

The stories of historic explorers and other characters are an unexpected delight. In particular, Webb's love of subject matter and intimate knowledge of the Colorado shines through. If you are interested in landscape, history, botany, river-running, or ecology of the Southwest, and especially if you liked Ray Turner's earlier book *The Changing Mile*, this book is for you.





LEGAL ISSUES OF CONCERN

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

LEGAL UPDATE: THE FEDERAL CLEAN WATER ACT AND *RAPANOS V. U.S.*

**Editor’s Note: Richard Campbell is an attorney with Region 9 of the U.S. Environmental Protection Agency’s Office of Regional Counsel. This paper does not represent the views of the EPA or the United States.*

In *Rapanos v. United States*, 126 S. Ct. 2208 (2006), the Supreme Court reversed two judgments by the Sixth Circuit Court of Appeals upholding federal authority (i.e., the Corps of Engineers) over wetlands under Section 404 of the Clean Water Act. There was, however, no majority opinion in *Rapanos*. Four Justices, in a plurality opinion authored by Justice Scalia, supported reversal and limiting federal authority over “navigable waters” to “those wetlands with a continuous surface connection to bodies that are “waters of the United States’ in their own right.” In other words, as stated by the plurality: “Wetlands with only an intermittent, physically remote hydrologic connection to ‘waters of the United States’ . . . lack the necessary connection to covered waters that we described as a ‘significant nexus.’”

Justice Kennedy concurred in the plurality’s judgment to reverse but not in Justice Scalia’s plurality opinion. Justice Kennedy expressly rejected the “limitations” imposed by the plurality on federal authority over wetlands under the CWA, i.e., the requirement of a “continuous surface connection” between the wetland and the conventional waterway that it abuts. Justice Kennedy instead proposed a “significant nexus” test, which he outlined: “[W]etlands possess the requisite nexus, and thus come within the statutory phrase

‘navigable waters,’ if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as ‘navigable.’ When, in contrast, wetlands’ effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term ‘navigable waters’”(Id. at 2248).

Rapanos has been addressed twice by the Ninth Circuit Court of Appeals, which has jurisdiction over Arizona. First, in *Northern California River Watch v. City of Healdsburg*, 457 F.3d 1023 (9th Cir. Aug. 10, 2006) (petition for rehearing pending) a citizen group sued the City of Healdsburg, located in northern California, alleging that a NPDES permit was required for the discharge of pollutants from a waste-treatment facility into a pond separated from navigable-in-fact river by a levee. The Ninth Circuit stated: “The Supreme Court . . . has now narrowed the scope of [*Riverside Bayview Homes*]. . . . In a 4-4-1 decision, the controlling opinion is that of Justice Kennedy who said that to qualify as a navigable water under the CWA the body of water itself need not be continuously flowing, but that there must be a “significant nexus” to a waterway that is in fact navigable. Adjacency of wetlands to navigable waters alone is not sufficient.”

The Ninth Circuit also found that:

- “[I]t is apparent that the mere adjacency of Basalt Pond and its wetlands to the Russian River is not sufficient for CWA protection. The critical

fact is that the Pond and navigable Russian River are separated only by a man-made levee so that water from the Pond seeps directly into the adjacent River. This is a significant nexus between the wetlands and the Russian River and justifies CWA protection under the ACOE regulations and current Supreme Court jurisprudence.”

- “Moreover, there is an actual surface connection between Basalt Pond and the Russian River when the River overflows the levee and the two bodies of water commingle.”
- “In addition to these physical connections between Basalt Pond and the Russian River, the district court found that there is also a significant ecological connection. The wetlands support substantial bird, mammal and fish populations, all as an integral part of and indistinguishable from the rest of the Russian River ecosystem.”
- “The district court also found that Basalt Pond significantly affects the chemical integrity of the Russian River by increasing its chloride levels.”

The Ninth Circuit concluded that the district court had made “substantial findings of fact to support the conclusion that the adjacent wetland of Basalt Pond has a significant nexus to the Russian River” and that “[t]he Pond’s effects on the Russian River are not speculative or insubstantial.”

More recently, in *San Francisco Baykeeper v. Cargill*

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

The purpose of the Council is to provide for the exchange of information on the status, protection, and management of riparian systems in Arizona. The term “riparian” is intended to include vegetation, habitats, or ecosystems that are associated with bodies of water (streams or lakes) or are dependent on the existence of perennial or ephemeral surface or subsurface water drainage. Any person or organization interested in the management, protection, or scientific study of riparian systems, or some related phase of riparian conservation is eligible for membership. Annual dues (January-December) are \$20. Additional contributions are gratefully accepted.

This newsletter is published three times a year to communicate current events, issues, problems, and progress involving riparian systems, to inform members about Council business, and to provide a forum for you to express your views or news about riparian topics. The next issue will be mailed in September, the deadline for submittal of articles is August 15, 2007. Please call or write with suggestions, publications for review, announcements, articles, and/or illustrations.

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CALENDAR

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

Arizona Hydrological Society 2007 Annual Symposium, Sustainable Water, Unlimited Growth, Quality of Life: Can We Have It All? August 29-September 1, 2007 at the Westin La Paloma Resort & Spa, 3800 E Sunrise Dr, Tucson. <http://www.swhydro.arizona.edu/symposium> for more information.

Arizona Riparian Council Fall Campout and Get Together. Put this date on your calendar! October 27-28, 2007. Horseshoe Ranch, near Agua Fria National Monument. More details to come.



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