

FOURTEENTH MEETING
OF THE
ARIZONA RIPARIAN COUNCIL

Eastern Arizona College
Thatcher, Arizona
May 12-13, 2000

Upper Gila River Watershed:
Conservation and Management



PROGRAM AND ABSTRACTS
2000

**Fourteenth Annual Meeting
Arizona Riparian Council
Eastern Arizona College
Thatcher, Arizona
May 12-13, 2000**

**UPPER GILA RIVER WATERSHED:
CONSERVATION AND MANAGEMENT**

FRIDAY, May 12

- 7:30-10:00 Registration
- 8:30-9:00 **Welcome** – Kris Randall, President
- 9:00-9:20 **Gila Box: Tough Decisions, Sound Riparian Management** - Diane Drobka,
Bureau of Land Management, Safford
- 9:20-9:40 **The Gila Watershed, Affectionately Known as the Gila Monster: Getting
Things Done Without Getting Bit** - Jerry Barney, Gila Monster Watershed
Council
- 9:40-10:10 BREAK
- 10:10-10:30 **Management of the San Pedro National Riparian Conservation Area** - Jesse
Juen, Bureau of Land Management, Tucson
- 10:30-10:50 **The Power of Partnership: Working to Conserve the San Pedro** - Holly
Richter, The Nature Conservancy
- 10:50-11:20 **Panel Discussion of Invited Speakers** – Marty Jakle, Moderator
- 11:20-11:30 Business Meeting
- 11:30-1:00 **Lunch Presentation on Fossil Creek** – Mindy Schlimgen-Wilson, American
Rivers
- 1:15-1:35 **Watershed Rehabilitation Activities in the Upper Gila River Watershed on
the Gila National Forest** - Pete Stewart, Gila National Forest

- 1:35-1:55 **Returning Fire to the Watersheds of the Upper Gila River: Have We Learned Anything?** -- Paul F. Boucher and Ronald D. Moody, Gila National Forest
- 1:55-2:15 **Comparative Fish Community Structure in the Southwest: A Tale of Two Rivers.** – John N. Rinne, U.S. Forest Service, Rocky Mountain Research Station
- 2:15-2:35 **Upper Gila River Fluvial Geomorphology** - Dan Levish, Rod Wittler, and Jeanne Klawor, Technical Service Center, Bureau of Reclamation
- 2:35-3:00 BREAK
- 3:00-3:20 **Physical Effects of Flooding on Native and Exotic Plant Seedlings: Implications for Restoring Riparian Forests by Manipulating Flow Regimes** – Crystal Levine and Julie C. Stromberg, Department of Plant Biology, Arizona State University
- 3:20-3:40 **Riparian Proper Functioning Condition Assessment Methodology: Common Language for Common Solutions in Watershed Management** - David R. Smith¹ and Tom Subirge², ¹Bureau of Land Management, Kingman and ²Apache-Sitgreaves National Forest
- 3:40-4:00 **Cienega Creek Stream Restoration Project** – Jeffrey R. Simms, Bureau of Land Management, Safford
- 4:00-4:20 **The Tonto Creek Riparian Unit Monitoring Study 1994-1998: Summary of Conclusions** – Larry Ford¹, Gary Ahlborn², and Raymond S. Dalen³, ¹Garcia and Associates, ²Ecosystem Sciences, and ³Consultant
- 4:20-4:40 **The Tonto Creek Riparian Unit Monitoring Study 1994-1998: An Evaluation of Riparian Habitat Values and Change** – Gary Ahlborn¹ and Larry Ford², ¹Ecosystem Sciences and ²Garcia and Associates
- 7:00 Dinner at Discovery Park

Map to Discovery Park:



POSTERS (View during breaks)

Vegetation Changes at Bingham Cienega, the San Pedro River Valley, Pima County, Arizona, since 1879 - Julia Fonseca, Pima County Flood Control District, Tucson

Habitat Preferences of Southwestern Willow Flycatchers in the Gila Valley, New Mexico: Analyses at Multiple Spatial Scales - Michael Means and Scott Stoleson, Rocky Mountain Research Station, Albuquerque

The Miracle of a Desert River/El Milagro de un Rio en el Desierto – The story of Conserving the San Pedro River Watershed and Riparian Corridor of Sonora and Arizona. Jack G. Peterson¹ and Beaumont C. McClure². ¹Bureau of Land Management, Boise, ID, and ²Bureau of Land Management, Phoenix

Riparian Proper Functioning Condition Assessment Methodology: Common Language for Common Solutions in Watershed Management - David R. Smith¹ and Tom Subirge², ¹Bureau of Land Management, Kingman, and ²Apache-Sitgreaves National Forest

SATURDAY, May 13

FIELD TRIPS

We plan two Saturday field trips to the Gila River and the Bonita Creek area east of Safford.

En route to each field trip you will see the Sanchez Road bridge which was controversial following flooding in 1993 because of concern for conflicts with habitat for razorback sucker and southwestern willow flycatcher. Plan to bring water, sun screen, a hat, etc.

1. Diane Laush, Wildlife Biologist, Bureau of Reclamation, will lead a birding trip along Bonita Creek. This trip will leave the Ramada Inn parking lot by carpool at 6:30 am sharp and plans to be back to Safford by noon.
2. Jeff Simms, Fisheries Biologist, Bureau of Land Management, will lead a trip about native fish in the Gila River and Bonita Creek. This trip will leave the Ramada Inn parking lot by carpool at 8:00 sharp and plans to be back to Safford around 3:00 pm. Bring a lunch for this trip.

ABSTRACTS

AHLBORN, G.¹, AND L. FORD². ¹Ecosystem Sciences, 17148 Park Ave, Sonoma CA 95476-8500 and ²Garcia and Associates, 13444 Beaumont Ave, Saratoga CA 95070-5050. *The Tonto Creek Riparian Unit Monitoring Study 1994-1998: an Evaluation of Riparian Habitat Values and Changes.*

The Tonto Creek Riparian Unit (TCRU) Monitoring Study evaluated the improvements in riparian habitat values along Tonto Creek, in a 9,483-acre zone within the Tonto National Forest in central Arizona. The Bureau of Reclamation (Bureau) renovated and elevated Roosevelt Dam, which will raise water levels at Roosevelt Lake and inundate important riparian habitat at the mouth of Tonto Creek. As mitigation, the Clean Water Action Section 404 Permit required the Bureau to improve riparian habitat conditions equivalent to 80 acres, the amount of riparian habitat to be inundated. The TCRU Habitat Suitability Index (HSI) model was used to track vegetation changes and to document compliance with the wetlands mitigation requirements.

The TCRU HSI model, based on the results of extensive field studies, aerial photo interpretation, and geographic information system analysis, was developed to assess the effectiveness of changes in grazing management in the TCRU. The model synthesized the findings of three core field studies: riparian vegetation community characterization; forage production and livestock grazing utilization; and submature woody riparian vegetation characterization. The composite model is simple and is based on characteristics of the vegetation that are important to wildlife habitat. The model addresses the quality of habitat and the extent of each vegetation type within the project area. It also incorporates the arrangement and patterns of the vegetation stands, and evaluates the sustainability of the system. This approach organizes habitat information and community function into useful categories that can be used as a basis for intelligent and adaptive resource management.

The results of the model indicate the mitigation requirements were attained, and the trend in increased habitat quantity and quality appears reasonable. However, the time frame of this monitoring study is short when compared to the longer time frame of the ecological processes that drive riparian/wetland community development. These ecological processes are dependent upon the ecological condition of the Tonto Creek watershed, which is poor. We expect that the poor watershed conditions will eventually, through repeated flooding and drought episodes, cause the reduction of much of the riparian habitat gains that have been made in the TCRU.

BOUCHER, P. F., AND R. D. MOODY. USDA Forest Service, Gila National Forest, 3005 Camino Del Bosque, Silver City NM, 88061. *Returning Fire to the Watersheds of the Upper Gila River: Have We Learned Anything?*

The historical record supported by tree ring analysis indicate that fire played a dominant role in southwestern vegetative types within Arizona and New Mexico prior to European settlement. Studies within some stands of ponderosa pine have provided a fire return interval of 2 to 7 years (Swetnam, T. W., and C. H. Baisan. 1996. Fire histories of montane forests in the Madrean borderlands. Pp. 15-36 in: P. F. Ffolliott, L. F. DeBano, M. B. Baker, G. J. Gottfried, G. Solis-Garza, C. B. Edminster, D. G. Neary, L. S. Allen, and R. H. Hamre, tech. coords. *Effects of Fire on the Madrean Province Ecosystem*. USDA For. Serv. Gen. Tech. Rep. RM-289. Rocky Mtn. For. and Range Exper. Sta. Ft. Collins, CO). The wildland fire threat has been dealt with effectively for the past 100 years. During that time forest fuels, that were once recycled by frequent surface fires have increased. It is widely believed that these unnatural fuel levels are responsible for an increase in size and intensity of fires throughout the Southwest. In an effort to reduce this threat, the Gila Forest has been managing the return of fire to the Upper Gila Basin since 1992. With this effort and the addition of several large wildfires in 1989 large amounts of material has been moving through the system with some very positive benefits to riparian habitats down river. Returning the natural functions to the watershed can have short term negative impacts to both water and air quality but to ignore the nature cycle of fire can only set the stage for greater problems in the future.

DROBKA, D. Bureau of Land Management, Safford Field Office, 711 14th Ave, Safford, AZ 85543. *Gila Box: Tough Decisions, Sound Riparian Management.*

When Congress designated the Gila Box Riparian National Conservation Area (RNCA) in 1990, it directed the Bureau of Land Management (BLM) to “conserve, protect, and enhance” the area’s riparian and related values. In the case of the 20,000-acre Gila Box RNCA, these values include 50 miles of perennial water in four rivers and streams, one of Arizona’s designated Unique Waters, six native fish species, riparian-obligate neotropical migratory birds, healthy aquatic macro-invertebrate habitat, numerous Threatened and Endangered species, and beaver colonies. This 23-mile stretch of the Gila River was selected as a Showcase Watershed under the Clean Water Action Plan, while Bonita Creek is a major source of municipal water for the Gila Valley. Within the RNCA, all of the Gila River and half of Bonita Creek’s 15 miles were rated as Suitable for Wild and Scenic Rivers designation, which is pending before Congress.

Some of the historical uses of the Gila Box included livestock grazing and recreation, as well as development of mining claims filed for placer gold. Through its management plan, the BLM adopted two especially controversial restrictions designed to protect riparian values. Grazing in riparian areas was curtailed with fences and waters developed to contain livestock to the uplands. Use of sand rails, all-terrain vehicles similar to dune buggies, was eliminated from the river corridor, stretches of riparian road along Bonita Creek were closed, and a network of designated roads was established. In addition to these management actions, validity exams were conducted on mining claims, resulting in the closure and reclamation of mining claims near the confluence of Bonita Creek and the Gila River. Impacts from overnight recreational use of riparian areas was addressed through the construction of two new campgrounds, located on uplands sites overlooking the river.

Most of the BLM’s accomplishments in the Gila Box are the result of partnerships with federal, state, and local governments; conservation groups; and private partners. The BLM’s stewardship of the Gila Box will certainly result in further enhancement of these valuable riparian resources. Work with the groups such as the Gila Box Advisory Committee, San Carlos/Safford/Duncan Watershed Council and Gila Monster, along with financial support from sources such as the Arizona Game and Fish Department Heritage Fund, Arizona State Parks Off-Highway Vehicle Recreation Fund, and Arizona Department of Water Resources Water Protection Fund will ensure the continuation of BLM’s goals to “conserve, protect, and enhance” this desert riparian ecosystem.

FORD, L.¹, G. AHLBORN ², AND R. DALENS³. ¹Garcia and Associates, 13444 Beaumont Ave, Saratoga CA 95070-5050, ²Ecosystem Sciences, 17148 Park Ave, Sonoma CA 95476-8500, and ³161 Long Hollow Circle, Durango, CO 81301. *The Tonto Creek Riparian Unit Monitoring Study 1994-1998: Summary of Conclusions.*

The Tonto Creek Riparian Unit (TCRU) is a 9, 483-acre grazing management corridor within the Tonto National Forest in central Arizona. It was established in part to mitigate for inundated riparian habitat associated with the renovation of Roosevelt Dam by the Bureau of Reclamation. The TCRU Monitoring Study evaluated improvements in riparian habitat for five years following fencing of the perimeter and the shift from year-long to winter cattle grazing. The study results indicated enough expansion and improvement of riparian habitat to exceed the required mitigation credits, which were computed in a Habitat Suitability Index Model (described in another paper). The study included assessments of trends in the mature and submature woody vegetation and the production and utilization of forage in the TCRU and the history of livestock grazing and rangeland condition within the Tonto Creek watershed.

Current channel and riparian conditions within the TCRU are a function of the degraded conditions of the larger watershed, a history of year-long grazing, and the effects of the modified grazing. Forest Service assessments of soils and rangeland conditions of the watershed remain mostly unsatisfactory and not improving. Despite these poor conditions, the current winter grazing program in the TCRU has favored recovery. Major flooding in 1993 and 1995 set up favorable conditions for establishment of seedlings. Cattle grazing from January to March preferred the temporarily available green annual herbaceous forage, and did not reduce the growth of desired forage species below Forest Service objectives. Annual herbaceous forage production fluctuated annually with precipitation. Its utilization reached the highest rate of 40% (57 pounds per acre) in 1996, a poor production year. Increasing tree density and height was due to juvenile trees maturing to the tree size as well as natural growth during a period without disturbance from major flooding, drop in the groundwater, or excessive grazing. Utilization in excess of the objectives occurred only in 1996, and was associated with trespass grazing of willows (*Salix gooddingii*). Trespass grazing was frequent in 1996, less in 1997, and diminished in 1998. Utilization of woody forage reflected the preference for juvenile seedlings in the recruitment zones, particularly by trespass cattle when the annual herbaceous forage was less available. Restriction of cattle grazing to the winter was effective in increasing the area and growth of cottonwood (*Populus fremontii*) and willow stands. The rates of persistence and growth of juvenile trees were similar to those observed in ungrazed riparian woodlands elsewhere in Arizona. Abundant seedlings of all the dominant woody species survived the post-flood environment despite natural mortality, and have developed toward the more complex community structure and habitat values of mature riparian woodland.

FONSECA, J. Pima County Flood Control District, 201 N. Stone Ave., 4th Floor, Tucson, AZ 85701. *Vegetation Changes at Bingham Cienega, the San Pedro River Valley, Pima County, Arizona, since 1879.*

Descriptions in the 1879 General Land Office survey for Township 11 South, Range 18 East, were reviewed and compared to current conditions in the San Pedro River Valley as part of a vegetation restoration plan. The survey indicates that mesquite was an important component of the floodplain plant community prior to channel-bed widening and incision. While mature specimens existed in sufficient quantities to use for construction, the present-day closed-canopy mesquite woodlands were not described in 1879. Sacaton grassland communities were historically present in the San Pedro floodplain, but are absent today. The areal extent of the wetland now known as Bingham Cienega was less than one-fourth the current size. The existing ash-dominated palustrine wetland was not present in 1879. Replacement of floodplain vegetation by Anglo agriculture was underway by 1879.

For the restoration planners, the 1879 records provide a wider vision of potential plant communities which could replace the existing agricultural fields. Sacaton grasslands and mesquite savannas are suggested as alternatives to closed-canopy mesquite woodlands prevalent in the untilled portions of the San Pedro River Valley today. Restoration planners must still consider whether vegetative communities suggested by land survey records are feasible given current site conditions, or desirable from a land management perspective. Disturbance processes such as fire, and beaver activity may be necessary to sustain certain vegetation structures.

LEVINE, C. M., AND J. C. STROMBERG. Plant Biology Department, Arizona State University, PO Box 871601, Tempe, AZ 85287-1601. *Physical Effects of Flooding on Native and Exotic Plant Seedlings: Implications for Restoring Riparian Forest by Manipulating Flow Regimes.*

Unregulated rivers of the southwestern United States typically carry high sediment loads. Young riparian seedlings often are killed by mid-season floods that deposit sediment, but as seedlings grow larger they develop more resistance to damage by flood flows. However, due to variations in stem growth rate and plant growth form, seedlings of different species do not respond to sedimentation uniformly. Specific environmental conditions required for optimal growth may not be met for each species present along a reach, conferring a size advantage to some. In addition, seedling size at the time of any given flood will vary simply because different species germinate at different times of the year and some will be older. On regulated rivers, natural sedimentation processes often are interrupted, possibly eliminating the competitive advantage associated with native plants and allowing colonization by exotics less tolerant of burial. Reinstating flood flows accompanied by sedimentation may aid in controlling undesirable or exotic vegetation.

In this suite of experiments, seeds of three native woody species, *Baccharis salicifolia*, *Populus fremontii*, *Salix gooddingii*, and an exotic, *Tamarix ramosissima*, were sown concurrently in greenhouse pots. Seedlings were experimentally buried by sediment at progressive age intervals up to 90 days. Sediment treatments varied in terms of depth deposited (1 or 2 cm) and method of application (undisturbed sifting or forceful burial). Ability of seedlings to survive sediment deposition increased in all four species as they grew older and taller: *P. fremontii*, however, had unusually high survivorship to sift treatments even when very young. *Populus fremontii* showed significantly higher survivorship to sifted sediment than *T. ramosissima* at 14 days and 25 days of age. Survivorship was greater in sift treatments than burial treatments.

The results of this study carry important management implications. One approach to restoring the native species involves restoring the physical conditions under which they are more competitive. By combining the results of our experiments with previous work addressing seed dispersal phenology, flood timing, flood magnitude and duration, inundation timing and duration, water table drawdown rates, and water quality conditions, we will suggest ways in which flows of water and sediment in degraded reaches could be managed to favor growth and survivorship of native species relative to *Tamarix ramosissima*.

LEVISH, D., R. WITTLER, AND J. KLAWOR. U.S. Bureau of Reclamation, Technical Service Center, PO Box 25007, Denver CO 80225. *Upper Gila River Fluvial Geomorphology*.

A fluvial geomorphology study is underway to assess the current condition of the Gila River in Arizona between the New Mexico State border and the San Carlos Apache Reservation. The study is a cooperative effort between the Bureau of Reclamation Phoenix Area Office, the Arizona Water Protection Fund, Graham County, the Gila Monster Watershed Council, and the San Carlos/Safford/Duncan Non-Point Source Advisory Group. The study includes a summary of relevant historical information, development of detailed topographic maps and orthographs, a compilation of historical changes in the Gila River, geomorphic mapping, analysis, and a causal analysis report. The study will combine fluvial geomorphology with hydraulic engineering to provide an understanding of the current condition of the river, changes in the river during the recent geologic past, as well as potential future changes. The goal is to provide the stakeholders and decision makers with a scientific basis for making future management choices.

MEANS, M. AND S. H. STOLESON. USDA Forest Service, Rocky Mountain Research Station, 2205 Columbia SE, Albuquerque, NM 87106. *Habitat Preferences of Southwestern Willow Flycatchers in the Gila Valley, New Mexico: Analyses at Multiple Spatial Scales.*

The recovery and management of endangered species requires a clear understanding of their habitat requirements, yet most studies have examined habitat only at a single, local scale. The largest population of the endangered Southwestern Willow Flycatcher occurs in the Gila River Valley of New Mexico. There, flycatchers occur only in a subset of habitat patches, in specific portions of occupied patches, and nest in specific microsites. We are assessing habitat preferences of flycatchers and associated riparian birds at multiple spatial scales: landscape, stand, and nest site. We are using a combination of aerial photo interpretation and GIS to characterize occupied and unoccupied patches. We are developing maps of stand types within occupied patches using GIS, GPS, and standard vegetation sampling. Individual nest sites and mist net locations were plotted on maps using GPS locations. Preliminary analyses demonstrate that densities of flycatcher nests varied considerably among stand types, but differed from the relative usage of those stands by the birds as indicated by mist net capture rates.

PETERSON, J. G.¹, AND B. C. McCLURE.² ¹Bureau of Land Management, 1387 South Vinnell Way, Boise, ID 83709 and ²Bureau of Land Management, Arizona State Office, 222 N. Central Avenue, Phoenix, AZ 85004. ***The Miracle of a Desert River/el Milagro De Un Rio En El Desierto – the Story of Conserving the San Pedro River Watershed and Riparian Corridor of Sonora and Arizona.***

The San Pedro River is one of the last free-flowing rivers shared by Mexico and the United States. *The Miracle of a Desert River/El Milagro de un Rio en el Desierto* is the story of the local, regional, and international efforts to conserve the San Pedro River watershed by an astonishing number of cooperating institutions. The cooperative scientific research focused on this vitally important desert river involves more than two dozen scientific institutions, several universities, the states of Sonora and Arizona, and the nations of Mexico, France, and the United States. It also is the story of the commitment by local communities, ejidos, and citizens in Sonora and Arizona to conserve the San Pedro River. *The Miracle of a Desert River/El Milagro de un Rio en el Desierto* is an interactive multimedia production on compact disk (CD) in Spanish and English. The production is a partnership between the US Department of the Interior, Bureau of Land Management and the Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora (IMADES). It is one of the first major multimedia productions about the natural resources of the Mexico-United States borderlands produced in Spanish and English by the Department of the Interior and Bureau of Land Management. It also is the first to be produced both in Mexico and the United States using professional and technical personnel from both nations. Jack G. Peterson produced, directed, researched and wrote the script for *The Miracle of a Desert River/El Milagro de un Rio en el Desierto* which includes video clips, color photography, archival photos, music, narration, 360 degree landscape panoramas, and live World Wide Web links. More than two-dozen institutions cooperated in its production. The production includes narratives in Spanish and English that are rich in the biology, ecology, geology, climate, and landscape and watershed dynamics of the San Pedro River watershed. It is a powerful educational and research tool for teachers, students, the public, and professionals.

RICHTER, H. E. The Nature Conservancy, Upper San Pedro Ecosystem Program, 4774 E. Green Oak Lane, Hereford, AZ 85615. *Conservation of the San Pedro River: The Power of Partnership.*

The Arizona Department of Water Resources recently created the Rural Watershed Initiative to focus attention on water management and planning challenges in rural watersheds across the State that are experiencing rapid growth. The Initiative encourages locally-driven partnerships to identify regional solutions to these challenges while maintaining economic potential, quality of life, and the preservation of natural resources.

In the Sierra Vista subwatershed, the Upper San Pedro Partnership has formed as part of this Initiative, with the intent of collaborating regarding the identification, prioritization, and implementation of comprehensive policies and projects to assist in meeting water needs. The Partnership will analyze and evaluate many potential water management options, assess their impacts on the groundwater system, and develop a long-term water management program for the area. Possible strategies being considered by the Partnership include: effluent recharge projects, open space protection, water conservation education programs, and storm water recharge projects. In addition, a study has been initiated to more precisely define the hydrological context necessary to maintain the ecological values associated with the Bureau of Land Management's San Pedro Riparian National Conservation Area, and the formulation of possible management options. Sixteen agencies and organizations currently participate in the effort, including local, state, and federal entities, and during their first year, over \$2,000,000 was raised for Partnership projects. During the past year, the Upper San Pedro Partnership has begun to demonstrate that by pooling technical expertise and financial resources together, agencies can accomplish much more through collaborative efforts than by working individually on large scale, complex watershed issues.

RINNE, J. N. U.S. Forest Service, Rocky Mountain Research Station, 2500 S. Pineknoll Drive, Flagstaff, AZ 86001. *Comparative Fish Community Structure in the Southwest: a Tale of Two Rivers.*

Native-nonnative fish community structure differs in the Verde and Gila Rivers, Arizona and New Mexico, respectively. In the Verde, native fishes have declined steadily in the absence of significant flood events and livestock grazing. The three smaller-sized fish species have become markedly reduced or absent in samples. Recruitment of the three large-size species is very reduced. By comparison, nonnative species have become the dominant (> 70%) component of the total fish community. By contrast, in the upper Gila River, New Mexico, native fishes currently predominate (> 85%) the fish community and two threatened species, spinedace (*Meda fulgida*) and loach minnow (*Rhinichthys cobitis*), are common, however, fish community structure varies markedly in time and space. Possible factors that likely combine to legislate fish community structure in these two southwestern desert rivers and that need further study are hydrograph (especially recency of flooding), geomorphology, instream habitat, introduced fishes and other anthropogenic influences.

SIMMS, J. R. US Bureau of Land Management, 12661 E. Broadway Blvd., Tucson AZ 85748.
Cienega Creek Stream Restoration Project.

A 1.4-mile reach of Cienega Creek, Pima County, Arizona, was disturbed by farming activities in the 1970's. Modifications include three dams, one levee and a road crossing/canal system that diverts water away from 3 miles of Cienega Creek into a small tributary. This disturbance of the creek has effected riparian development and habitat for a multitude of special status species including *Poeciliopsis occidentalis* (Gila topminnow), *Gila intermedia* (Gila Chub), *Empidonax traillii* (southwestern willow flycatcher), *Thamnophis eques* (Mexican garter snake) and *Rana chiricahuensis* (Chiricahua leopard frog). The hydrologic and ecologic processes of this stream segment were restored using principles of stable natural channel morphology with the idea that restoration would be self-sustaining under the current sediment load and hydrograph. Key aspects of the design were to maintain the proper pattern, dimension and profile of the segment being restored. Structures were removed, the diversion canal blocked, road crossing moved and reconstructed, and a new stream segment constructed. Revegetation and two grade control structures composed of boulders were used to stabilize areas at risk of erosion. Monitoring has begun and will be used to gage the level of physical and biological change resulting from stream restoration efforts.

SMITH, D. R.¹, AND T. SUBIRGE². ¹ USDI Bureau of Land Management, Kingman Field Office, Kingman, AZ and ² USDA Forest Service Apache-Sitgreaves National Forest, Springerville, AZ
Riparian Proper Functioning Condition Assessment Methodology: Common Language for Common Solutions in Watershed Management.

Concern for important water resources has spurred the recent growth of watershed associations in the West. This emphasizes the recognition that this resource must be managed not only on a stream or river channel basis but also by the entire watershed. These associations are commonly composed of interested government and non-government stakeholders. Accommodating the needs of these diverse groups with consistent information and technology may be one of the first challenges in implementing watershed restoration programs.

In 1996, Forest Service Director Jack Ward Thomas and Bureau of Land Management Director Mike Dombeck signed a letter committing the two agencies to "Accelerated Cooperative Riparian Restoration and Management." The major emphasis of this program is that riparian resources must also be managed on a watershed basis across many landownership boundaries. In order to incorporate private land, the Natural Resources Conservation Service later came on board as a principal partner to involve all landowners. This initiative led to the formation of the National Riparian Services Team (NRST), a group of specialists funded by the BLM and Forest Service.

In order to successfully implement this program across lands with multiple owners, a common terminology and riparian assessment methodology was needed. The riparian assessment method known as Proper Functioning Condition or PFC was selected. The PFC method was developed over several years, beginning in 1988, by a team of soil scientists, hydrologists, and biologists from the BLM, NRCS, and U.S. Fish and Wildlife Service. To develop PFC, specialists reviewed Ecological Site Inventory (ESI) methodology and identified those attributes and processes that can visually assess the condition of a riparian area. PFC assessment is the minimal methodology used by the BLM and Forest Service. It was not intended to replace more intensive methods, but rather to allow the rapid assessment of a riparian area to prioritize it for management purposes.

In order to promote Accelerated Cooperative Riparian Restoration and Management the NRST established the PFC training cadre program in 1996. Specialists from the BLM, Forest Service, NRCS, state agencies, and private citizens were trained to teach the PFC method. Each of the 11 western states and recently British Columbia has a team of instructors that teach this assessment technique. As of 1998, over 6,000 people have been taught PFC.

The Arizona Cadre, with members from the BLM, Forest Service, and Fish and Wildlife Service has taught six classes in Arizona. Additional classes will be taught as requested by groups. The cadre is particularly interested in working with watershed associations, exposing them to the common terminology of PFC and its method.

STEWART, P. T. USDA Gila National Forest, 3005 E. Camino del Bosque, Silver City, NM 88061. *Watershed Rehabilitation Activities in the Upper Gila River Watershed on the Gila National Forest.*

Watershed rehabilitation activities on the 1.5-million acre portion of the Gila National Forest consist primarily of riparian improvement prescribed fire and improved livestock management. Historically, wildfire, flooding, livestock grazing management practices and to a lesser extent mining and roads have had significant impacts on the condition of the Upper Gila River watershed. The watershed is characterized as steep, rugged, biologically diverse, flashy with naturally high rates of geologic erosion. Biological diversity is attributed to three eco-regions coming together in southwestern New Mexico. Permitted livestock grazing has been excluded in much of the half million acres of Congressionally designated wilderness and all of the Gila River mainstem and major tributaries. Riparian improvement efforts have been very successful in reestablishing obligate woody galleries. Upland watershed improvements, in terms of increasing vegetative groundcover, are more difficult. The major problem in the fluvial system is access by the active channel to the floodplain.

NOTES

NOTES