TWENTY-FIFTH MEETING OF THE ARIZONA RIPARIAN COUNCIL AND STREAM RESTORATION PROJECT WORKSHOP

EASTERN ARIZONA COLLEGE
THATCHER, ARIZONA
MARCH 29-31, 2012

PEOPLE AND THE UPPER GILA RIVER RIPARIAN ECOSYSTEM: PAST, PRESENT, AND FUTURE

GILA WATERSHED PARTNERSHIP OF ARIZONA

PROGRAM AND ABSTRACTS
2012

TWENTY-FIFTH ANNUAL MEETING
ARIZONA RIPARIAN COUNCIL
Cosponsored by the Gila Watershed Partnership

People and the Upper Gila River Ecosystem: Past, Present, and Future

Eastern Arizona College
Thatcher, Arizona
March 29-31, 2012

Thursday, March 29

11:30-1:00 *Registration*

1:00-5:00 *Stream Restoration Planning Workshop* – Allen Haden and Stephanie Yard, Natural Channel Design, Flagstaff, AZ

1:00-1:15	**Introductions**
1:15-2:30	**Background and Assessment Findings**
	Geomorphology
	Hydrology
	Hydraulics - HEC RAS
	Plant Community
	Willow Flycatcher Surveys
	Agricultural requirements
2:30-3:00	**Discussion of Objectives and Planing Strategy**
3:00-3:30	**Break**
3:30-4:30	**Presentation of Natural Channel Design's Plan and Discussion**
	Regrading and flood plain reconnection
	Vegetation removal
	Bank stabilization
	Revegetation
	Fencing
4:30-4:45	**Discussion of Compliance Activities/Permitting**
4:45-5:00	**Construction Schedule and Concerns**
5:00-	**Questions and Discussion**

Friday, March 30

7:15-8:30	*Registration*
8:00 - 8:15	*Welcome and Introductions* – Kris Randall, President, Arizona Riparian Council
8:15 - 8:30	*Overview of Gila Watershed Partnership* – Jan Holder, Executive Director, Gila Watershed Partnership
8:30 - 9:10	*Historical Channel Change on the Upper Gila River, Arizona and New Mexico in Response to Anthropogenic Modifications and Extreme Floods* – Jeanne Godaire, Geomorphologist, Sedimentation and River Hydraulics Division, US Bureau of Reclamation
9:10 - 9:50	*Landowner Tools, Conservation and the Endangered Species Act* – Jeff Humphrey, Public Affairs and Outreach, US Fish and Wildlife Service
9:50-10:10	*Break and Poster Viewing*
10:10 - 10:50	*An Overview of the Arizona Water Settlements Act and Activities Affecting the Gila River Basin* – Mary Reece, PE, General Engineer, US Bureau of Reclamation
10:50 - 11:30	*Protecting Arizona's Landscapes, Wildlife Habitat, and the Waters that Sustain Them* – Liz Petterson, Executive Director, Arizona Land and Water Trust
11:30 - 12:10	*Walking in their Boots: The Science of Working with Landowners to Implement Projects and Programs* – Jan Holder, Executive Director, Gila Watershed Partnership
12:10 - 1:15	*Lunch with Speaker* – Bill Brandau, Chairman, Gila Watershed Partnership
1:25 - 1:45	*Panel Discussion with Invited Speakers*
1:45 - 2:00	*Business Meeting*
2:05 - 2:20	*The Arizona Water Settlements Act (AWSA) and New Mexico*. Craig Roepke, Deputy Director, New Mexico Interstate Stream Commission
2:20 - 2:35	*Working Lands for Wildlife: Wildlife Habitat Financial Assistance Targeted for the Southwestern Willow Flycatcher.* Stu Tuttle, State Biologist, Natural Resources Conservation Service
2:35 - 3:00	*Break and Poster Viewing*

3:00 - 3:15 *Tamarisk Biological Control and Implications for Land Management.* Shannon Hatch and Stacey Beaugh, Tamarisk Coalition

3:15 - 3:30 *Riparian Management of the Gila River under the Roosevelt and Horseshoe-Bartlett Habitat Conservation Plans.* Marc Wicke and Ruth Valencia, Salt River Project

3:30 - 3:45 *Near-Stream Recharge in the Sierra Vista Subbasin - A Potential Interim Solution to Keep the San Pedro River Flowing?* Laurel J. Lacher, PhD, RG. Lacher Hydrological Consulting

3:45 - 4:00 *Paleoecological Examination of Southern Colorado Plateau Wetlands: the Relationship Between Biological, Climatic, and Euro-American Introduced Changes on the Northern Arizona Landscape*. Spencer Rubin, School of Earth Sciences and Environmental Sustainability, Northern Arizona University

4:00 - 4:15 *Assessing and Addressing Ecological Water Needs in Arizona*. Kelly M. Lacroix, Joanna B. Nadeau, Brittany Choate, and Sharon B. Megdal. Water Resources Research Center, University of Arizona

6:30 *Dinner at Discovery Park* (see below map and driving instructions)

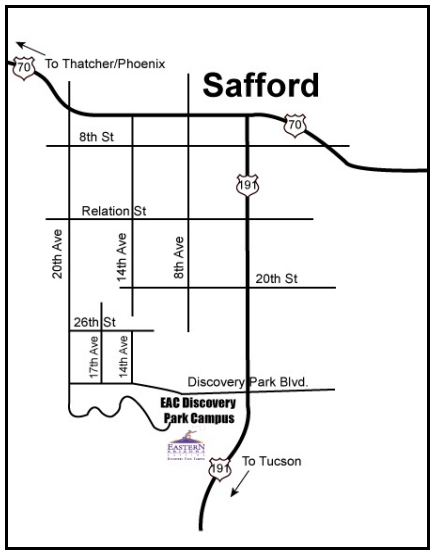
Driving Instructions

From Eastern Arizona College or Springhill Suites: Drive East on Highway 70 (also referred to as W. Thatcher Blvd.).

Turn RIGHT (South) on S. 20th Ave. for 2.7 miles.

Continue south past "Discovery Park Blvd." and you will see a sign for Discovery Park

Turn LEFT and continue to maintenance road. Drive down the hill, turn right and continue south.
You will see a large barn, and that's where we will have dinner .



Posters (view during breaks)

Monitoring Changes in the Gila Box Riparian National Conservation Area since the "Arizona Desert Wilderness Act of 1990." David Arthun, Bureau of Land Management; George N. Zaimes, Kavala Institute of Technology, Greece; and Jonathan Martin, Dudek Engineering and Environmental.

Critical Role of the Arizona Water Protection Fund in the Upper Gila Watershed. Susan Craig and Rodney Held, Arizona Water Protection Fund, Arizona Department of Water Resources.

Water Awareness Month. Susan Craig and Rodney Held, Arizona Water Protection Fund, Arizona Department of Water Resources.

Saturday, March 31, 2012
Field Trip

Meet at Eastern Arizona College at 8:00 a.m. for the field trip to a farm/ranch located a few miles north of Duncan on Highway 191. We will have some vans to limit the number of vehicles at the project site. The drive will be approximately 45 minutes. Driving instructions will be given to those who cannot carpool.

For those who want to participate in some actual restoration activities there will be some willow poles to plant, erosion fabric to install, and some invasive plants to remove. Be prepared to get dirty, so dress appropriately.

The Restoration of the Gila River at Apache Grove Project was developed in response to a previously funded Arizona Water Protection Fund project, the Upper Gila River Fluvial Geomorphology Study (#98-054WPF), and its recommendations (Jeanne Godaire's presentation of study during Friday's meeting). The Apache Grove project was funded in 2008 by the Arizona Water Protection Fund (#08-155WPF) and the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife in 2009.

The field trip on Saturday will be to a project that implemented recommendations from that report. The project involved 1.6-miles of the Gila River on 200-acres near Duncan. Objectives of the project included restoring natural floodplain function by removing an existing partially breached levee, reducing the risks of lateral erosion and land loss, managing salt cedar, improving riparian habitats and stream function. Proper stream geomorphology/channel characteristics will be restored by allowing the main channel to reattach to its former floodplain thereby restoring floodplain conditions within the project area. Mechanical excavation of 3,000 feet of earthen levee was involved to return the area to a natural grade so that natural flooding to the floodplain could be restored. A series of overbank hedgerows were planted in the landowner's agricultural fields and designed to allow for efficient harvesting of crops. Other treatment practices include implementation of bank stabilization measures, invasive vegetative species management, native species revegetation, monitoring, and fencing. The workshop and field trip are part of the public outreach plan for this project.

STREAM RESTORATION PLANNING WORKSHOP INSTRUCTORS

Stephanie Yard, P.E., is a licensed civil engineer and a principal in Natural Channel Design, Inc. She has nearly 25 years of professional experience in natural resource planning and conservation engineering. Stephanie has worked for a site development civil consulting firm, served 14 years as an Area Engineer with the USDA Natural Resources Conservation Service, and currently manages Natural Channel Design, Inc as the president where she provides leadership to the firm in project planning, design and implementation. She has extensive experience in hydrology, hydraulics, geomorphology, drainage, erosion control, irrigation, streambank stabilization, and riparian and wetland restoration and enhancement in the arid Southwest and has applied that expertise to design and permitting of projects for federal and state agencies, tribal entities, municipalities, and private landowners. She received a B.S. in Civil Engineering from Northern Arizona University and has completed Levels I-IV river short courses in the inventory, classification, assessment, and design of natural channels from David Rosgen at Wildland Hydrology. Ms. Yard is a licensed Civil Engineer in the States of Arizona (#26889), Alaska (#11189), Utah (#26889), New Mexico (#19006), and Nevada (#20690). Stephanie is a native of Flagstaff, Arizona, and is intimately familiar with the Arizona regional landscape.

Allen Haden is an aquatic ecologist and a principal in Natural Channel Design, Inc. Allen has broad experience in stream systems and aquatic habitats of the arid Southwest. He has been involved in research and management of human impacts on river ecosystems in the Southwest for over 18 years. He has a broad understanding of the field of aquatic ecology and its applications to management of ecosystems which house threatened and endangered species. He has expertise in sampling and statistical techniques for monitoring biological and physical aspects of riparian/aquatic/wetland habitats, as well as an understanding of life-history requirements and threats to Southwestern native species. His major interest is the interaction of habitat changes and nonnative species on native aquatic insects and fish. He has extensive experience with habitat enhancement projects. He has authored and coauthored several refereed manuscripts on effects of nonnative species and links between habitat quality and ecology of aquatic communities. He received a B.S. in Forestry and Wildlife from Virginia Polytechnic Institute and State University in Blacksburg, VA, and an M.S. in Biology from Northern Arizona University in Flagstaff. Allen has completed Levels I-IV river short courses in the inventory, classification, assessment, and design of natural channels from David Rosgen at Wildland Hydrology with special emphasis on sediment transport and channel stability.

BIOGRAPHIES AND ABSTRACTS OF INVITED SPEAKERS

Abstracts are listed alphabetically.

Jeanne Godaire, Geomorphologist, Sedimentation and River Hydraulics Division, US Bureau of Reclamation

Jeanne Godaire has worked as a geomorphologist for 13 years at the Bureau of Reclamation in Denver, Colorado. Her work experience has involved fluvial geomorphology studies related to channel erosion, bed aggradation or degradation and aquatic habitat. She has also conducted many paleoflood hydrology studies across the western U.S. for the Reclamation Dam Safety Program and Bureau of Indian Affairs. Prior to her career at Reclamation, Jeanne worked for the Arizona Geological Survey mapping the Quaternary geology in the state of Arizona and working on various projects in fluvial geomorphology, paleoflood hydrology and geoarcheology. She received a Master of Science in geosciences from the University of Arizona and a Bachelor of Science in geology from Bucknell University.

Godaire, J. E., and D. R. Levish. US Bureau of Reclamation, PO Box 25007, Denver, CO 80225.
Historical Channel Change on the Upper Gila River, Arizona and New Mexico in Response to Anthropogenic Modifications and Extreme Floods.

In recent decades, landowners along the Gila River have experienced a substantial amount of property erosion during large floods. Concern arose regarding whether the river was inherently unstable or if conditions in the upper watershed were causing the geomorphic change in Safford and Duncan valleys. Over the past century, the majority of alluvial reaches along the upper Gila River in Arizona and New Mexico have been leveed in an attempt to protect adjacent property from flood damage. In addition, the demand for irrigation has prompted the construction of diversion dams in these alluvial reaches to divert water for agriculture. Detailed geomorphic mapping and investigation of historical channel change along the upper Gila River reveals that many channel modifications are catalysts for major channel change and can result in catastrophic property loss rather than safeguarding valuable farmland.

Channel widths were measured every 0.6 miles for approximately 100 miles from Safford Valley, Arizona through Cliff-Gila Valley, New Mexico for eight decades to develop a quantitative analysis of channel change. An overall pattern of channel narrowing and widening coincides with periods of few large floods and periods of multiple large floods, respectively. Furthermore, reaches along the upper Gila River with greater channel modifications have experienced more variation in channel width than reaches with fewer modifications. Although the average width of the upper Gila River is very similar to the width of the 1935 channel, the lateral position of the channel is very different in many reaches. Many channel changes in recent decades are unprecedented in previous historical aerial photography and reveal that the upper Gila River is currently eroding stream banks that are were not previously part of the floodplain.

Fourteen specific reaches with substantial property loss are described ranging from 0.5 to 3.5 miles in length. Together, these reaches constitute approximately 40 miles of the entire study reach.

The majority of property loss has occurred in areas of young alluvium, which is part of the active channel migration zone. Within this zone, lateral migration is common and it is not unusual for significant areas to be eroded during large floods. Several areas with unusual channel geometries and eroded banks older than several hundred years provide clues that other factors are important in creating the current (year 2000) channel geometry. Factors that cause lateral instability include: (1) levee failure; (2) downstream propagation of erosion; (3) channel straightening; and (4) diversion dam orientation. Vegetation and alluvial fan development may also act as controls on channel position in some of these reaches. The factors mentioned above appear to cause minimal geomorphic change during low to moderate flows but are the catalysts of exceptional geomorphic change during the large floods of the 1970's-1990's.

Jan Holder, Executive Director, Gila Watershed Partnership

Jan Holder spent over 20 years in advertising and marketing, with America West Airlines, SkyMall, and Chase Bank of Arizona, among others. In 1992, Ms. Holder and her husband Will relocated to Greenlee County, where they managed the family's cattle ranch, and started an organic, predator-friendly beef company. The company's customers included natural foods stores in 11 Western states, and Alain Ducasse's restaurant in New York City, according to *People Magazine*, the most expensive restaurant in America. Ms. Holder worked part-time for the Southeast Arizona Land Trust in 2006, developing, writing, negotiating, and monitoring conservation easements.

In 2002, Ms. Holder joined the Gila Watershed Partnership as the Executive Director. She is responsible for leading a broadly represented and sustainable organization that is making a demonstrable social, economic, and environmental contribution to the Upper Gila Watershed of Arizona. Ms. Holder has planned and implemented over 40 successful projects and programs designed to restore, enhance, and protect the watershed, invigorate the local economy, and educate and inspire the community.

Holder, J. Executive Director of the Gila Watershed Partnership, 711 S 14th Ave, Safford, AZ 85546. *Walking in their Boots. The Science of Working with Landowners to Implement Projects and Programs.*

Government agencies and environmental organizations often have contempt for local landowners because they think landowners are uneducated, resist evidence, and are slow to adopt new ideas, and sound scientific practices. In contrast, landowners tend to reject the ideas or suggestions of government agencies and environmental organizations because they feel they have no respect for their countless years of experience, private property rights, and the basic necessity to make a living. These conflicting viewpoints are at the core of every unsuccessful on-the-ground project.

The divide that separates the agricultural, governmental and environmental sectors have long plagued land issues in rural areas. Vast amounts of money has have been spent in the past trying to improve relationships between these often contentious groups.

However, the best new idea or sound scientific practice is useless unless it is actually implemented. If your objective is to execute your new ideas, programs, or projects, it's difficult and cost-prohibitive to try and make them do it - if they do it at all. They have to want to do it, or you will fail.

Our work has taught us that to engage critical stakeholders, we must understand their needs, know their history and background, and understand their issues, priorities, and immediate and long-term concerns. Then we must ensure they get what they need out of the project or program. We have to put in the time, effort, and financial investment. It makes the difference between failure and success.

Jeff Humphrey, Public Outreach Specialist, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office

Jeff has served as the Public Outreach Specialist for the Arizona Ecological Services Field Office of the U.S. Fish and Wildlife Service since September 1994. He provides current information on the Service's Arizona endangered species management, wildlife contaminants, and habitat restoration programs to congressional and legislative members and staffs, news media, industry and environmental groups, and community leaders.

Jeff is an Arizona native, educated in aquatic biology at Northern Arizona University. He worked as a field herpetologist and contributed to preparation of Environmental Impact Statements as a biologist for the U.S. Bureau of Reclamation's Central Arizona Project (1982-1984). He served as an aquaculture extension agent with the Peace Corps in Zaire (Congo), Africa (1984-1987). From 1988-1994, he was editor of *Fisheries Review*, a publication and electronic database of bibliographic information on fisheries research and management.

Since 1988, Jeff has been tolerated by an exceptional wife (Linda). They have three school-age children.

Humphrey, J. U.S. Fish and Wildlife Service, Arizona Ecological Servics field Office, 2321 W. Royal Palm Rd, Ste 103, Phoenix, AZ 85021-4951.
Landowner Tools, Conservation and the Endangered Species Act.

The Endangered Species Act (ESA) was signed in 1973 to prevent the loss or harm of endangered and threatened species and to preserve the ecosystems upon which these species depend. The ESA is comprised of 18 sections. Section 7 applies only to federal actions, including funding, permitting, or carrying out of an action. Section 9 prohibits the "taking" of an endangered or threatened species. The ESA defines "take" to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. There are ESA authorized exceptions to take - 4(d) rules and experimental populations.

The U.S. Fish and Wildlife Service (FWS) recognizes that private landowners have a vital role in maintaining healthy fish, wildlife and plant populations and recovering ESA-listed species, To this end, FWS has developed conservation tools for private landowners such as Habitat Conservation Plans, Safe Harbor Agreements, Candidate Conservation Agreements with Assurances, and Conservation Banking. The Service also provides technical and financial assistance through its Partners for Fish and Wildlife program in which private landowners and tribes can receive funding for improving wildlife habitat.

On March 8 of this year, the Secretaries of Agriculture and Interior announced a new $33 million partnership called Working Lands for Wildlife. The Fish and Wildlife Service working with the Natural Resource Conservation Service's Wildlife Habitat Incentive Program looks to develop partnership with ranchers and farmers to use innovative approaches to restore and protect the habitats for wildlife, including seven at-risk species and other vulnerable game species. In return for voluntarily making habitat improvements on their lands, the federal government will provide landowners with regulatory certainty that they will not be asked to take additional conservation actions. For Arizona, the species is the Southwestern Willow Flycatcher (*Empidonax traillii extimus*).

Liz Petterson, Executive Director, Arizona Land and Water Trust

Liz Petterson is Executive Director of the Arizona Land and Water Trust. A native Tucsonan, Liz is a graduate of the University of Arizona in Ecology & Evolutionary Biology. After spending 12 years along the Maine coast helping landowners and communities secure watershed restoration grants, administering a variety of community-based watershed protection projects, and developing environmental education programs for the public, Liz returned to Tucson to help protect the open spaces, water and wildlife habitat of the Sonoran Desert. Liz works throughout the Gila River Watershed, also serving on county open space committees, facilitating land protection workshops for landowners, and seeking funding sources for land and water protection projects.

Petterson, L. Arizona Land and Water Trust, 3127 N. Cherry Ave, Tucson, AZ 85719.
Protecting Arizona's Landscapes, Wildlife Habitat, and the Waters that Sustain Them.

Since 1978, Arizona Land and Water Trust has been committed to protecting southern Arizona's vanishing western landscapes, its heritage of working farms and ranches, wildlife habitat and the water resources that sustain them. The Trust accomplishes its work through partnerships with willing landowners and local, state and federal agencies, along with other conservation partners. We are also addressing water conservation through our Desert Rivers Initiative, protecting streams and rivers in the Gila River Watershed by partnering with landowners to implement voluntary water use agreements that benefit both landowner agricultural operations and river systems.

Mary Reece, PE, General Engineer, Bureau of Reclamation

Ms. Reece has 13 years of experience working with stakeholders and managing planning studies involving water supply and quality issues in various watersheds including the Upper Gila River Basin. Since 2005, she has been Reclamation's study manager for the New Mexico Unit of the Central Arizona Project supporting the State of New Mexico and other stakeholders in making decisions required by the Arizona Water Settlements Act. She previously worked for Reclamation as a mechanical engineer on the Central Arizona Project from 1986 to 1997, and as an agreements specialist providing financial assistance for conservation, endangered species, fish and wildlife activities, and various technical agreements from 1997-1999. Mary graduated with Bachelor of Science in Mechanical Engineering and Master in Public Administration degrees from Arizona State University.

Reece, M. Phoenix Area Office, U.S. Bureau of Reclamation, 6150 W. Thunderbird, Rd, Phoenix, AZ 85306-4001.
An Overview of the Arizona Water Settlements Act and Activities Affecting the Gila River Basin

The Arizona Water Settlements Act (AWSA) is at the heart of a complex web of agreements attempting to incorporate the physical constraints of water as a scarce resource into the laws and policies of numerous federal, state, tribal, and local governmental agencies and water management entities. The AWSA provides adjustments to the Central Arizona Project, authorizes the Gila River Indian Community water rights settlement, and reauthorizes and amends the Southern Arizona Water Rights Settlement Act of 1982. Among other benefits, the AWSA reduces uncertainty for non-Indian municipal, industrial, and agricultural water users, assures tribes of long-term water supply, and provides assistance to build water infrastructure. Ms. Reece provides a brief background and overview of the AWSA components and parties to the settlement, and discusses Reclamation activities associated with implementation of several AWSA provisions in the Gila River Basin.

ABSTRACTS FOR TECHNICAL SESSION AND POSTERS

Abstracts are listed alphabetically by first author.

Arthun, D.[1], G. N. Zaimes[2*], and J. Martin[3]. [1]Rangeland Management Specialist, Bureau of Land Management, U.S. Department of the Interior, Safford Field Office, Safford, Arizona; [2]Lecturer, Laboratory of Management and Control of Mountainous Waters, Department of Forestry and Natural Environment Management, Kavala Institute of Technology, Drama Annex, 1st km Drama-Mikrohoriou, Drama, 66100, Greece; and [3]Hydrologist, Dudek Engineering and Environmental, Encinitas, California.

Monitoring Changes in the Gila Box Riparian National Conservation Area since the "Arizona Desert Wilderness Act of 1990." (Poster)

The Gila Box Riparian National Conservation Area (hereafter referred to as the "Gila Box") was established as a result of the "Arizona Desert Wilderness Act of 1990." The U.S. Department of the Interior, Bureau of Land Management Safford Field Office is tasked with management responsibilities. The objective is to conserve, protect, and enhance its riparian areas and associated resources and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, recreational, educational, scenic, and other resources and values of such areas. The Gila Box has four perennial waterways, the Gila and San Francisco Rivers and Bonita and Eagle Creeks, which are the lifeline of this remarkable place. It offers year-round recreation opportunities and is located 20 miles northeast of Safford, Arizona. The purpose of this study was to investigate temporal changes that occurred in the stream channel of the Gila River that flows through the Gila Box. This protected riparian area has received less scientific attention compared to other protected riparian areas of Arizona. To accomplish this purpose, eight channel cross-sections measured in 1994, 2001, and 2008 were compared; while aerial photographs from 1935 and 2007 were used to measure sinuosity. Results indicate changes have occurred in stream channel geometry. Sinuosity was slightly different between 1935 (1.48) and 2007 (1.41), while thalweg depths were significantly deeper in 1994 than in 2001 and 2008. Climate patterns and particularly precipitation that causes major floods appear to be the major influence on stream channel dimension. Still, management that can lead to increased vegetation in the riparian areas (e.g., exclosure of livestock, all terrain vehicles) can mitigate flood impacts. In this study the stream channel appears more resilient to the 2005 flood when vegetation was better established than in 1993 when past management impacts were still lingering.

Craig, S., and R. Held. Arizona Water Protection Fund, Arizona Department of Water Resources, 3550 N. Central Ave., Phoenix, 85012.
Water Awareness Month. (Poster)

The Arizona Department of Water Resources (ADWR) is promoting Water Awareness Month (WAM). The availability and quality of our water supply makes a big difference in our quality of life and our state's status as a world-class destination. This essential and precious resource was recognized by Arizona's Governor in 2008 with the proclamation that April is Water Awareness Month. ADWR and its WAM partners want to encourage all Arizonans to join in the celebration of Water Awareness Month by promote water-use efficiency. Water education is a cornerstone of any comprehensive water conservation program, and greater awareness of water issues can be gained through community education, action and celebration of water. Practicing a low water-use lifestyle is a way each individual and business in Arizona can help ensure a long-term, sufficient water supply. The Water Awareness Month web site (www.waterawarenessmonth.com) has tons of ideas and activities to help people learn about water conservation and become more aware of our state's most precious resource, water. At the heart of web site is a day-by-day calendar of activities, tips and resources. There are hundreds of events, resources and water-saving tips on the site!

Craig, S., and R. Held. Arizona Water Protection Fund, Arizona Department of Water Resources, 3550 N. Central Ave., Phoenix, 85012.
Critical Role of the Arizona Water Protection Fund in the Upper Gila Watershed. (Poster)

Arizona Water Protection Fund (AWPF) staff will provide a brief overview of the program, and general information on the projects and amount of funding that has been invested into the Upper Gila Watershed. The poster will also showcase the program's current funding situation and what citizens can do to save the Arizona Water Protection Fund.

Hatch, S., and S. Beaugh. Tamarisk Coalition, PO Box 1907, Grand Junction, CO 81502.
Tamarisk Biological Control and Implications for Land Management.

Since 2007, expansion of the tamarisk leaf beetle (*Diorhabda carinulata*) in the Colorado River Basin has been documented through landscape-scale mapping efforts coordinated by the Tamarisk Coalition, in collaboration with the Colorado Department of Agriculture's Palisade Insectary and numerous other partners. Over the years, monitoring capacity has continued to grow through expanded partner collaboration and training.

The Coalition widely disseminates monitoring results though web and print-based outlets and through outreach events. These data provide timely information on where beetles are currently defoliating tamarisk (*Tamarix* spp.), allowing managers to implement adaptive management principles.

While the tamarisk leaf beetle can be a useful tool in the control of tamarisk, there are growing concerns that large-scale defoliation of tamarisk stands may have adverse impacts on the riparian ecosystem. Loss of bank stability and increased sedimentation are of concern, as is short-term habitat degradation for a number of species that have come to utilize tamarisk in the absence of native vegetation.

The endangered Southwestern Willow Flycatcher (flycatcher; *Empidonax traillii extimus*) is of special concern for many conservation biologists and managers. In beetle-affected areas, poor reproductive success has been observed due to increased nest predation and exposure to the elements. Focus is currently on the Virgin River given the beetle's established presence in flycatcher nesting areas; however, based on current beetle distribution trends, other rivers with nesting flycatcher populations, including the Gila River, could likely be affected in coming years.

Lacher, L. J. Lacher Hydrological Consulting, 265 W. !8th St, Ste 1, Tucson, AZ 85701.
Near-Stream Recharge in the Sierra Vista Subbasin - A Potential Interim Solution to Keep the San Pedro River Flowing?

The hydrologic connection between groundwater-based development and baseflow in the Sierra Vista (SV) Subbasin of the Upper San Pedro River Basin has long been the subject of intense political and scientific scrutiny. Section 321 of the Defense Authorization Act (DFA) of 2004 required the Secretary of the Interior, in cooperation with various other agencies, to submit annual reports to Congress specifying the "water use management and conservation measures that have been implemented and are needed to restore and maintain the sustainable yield of the regional aquifer by and after September 30, 2011." Since 2007, the annual rate of aquifer depletion (overdraft) in the Sierra Vista subbasin has averaged about 5,000 acre-feet (AF) per year. Estimates for total aquifer storage depletion in the SV Subbasin since about 1940 range from 575,000 to over 800,000 AF. While the comparatively modest goal of eliminating annual groundwater overdraft remains elusive eight years after the 2004 DFA, the related issue of sustaining baseflows in the San Pedro River (SPR) in the face of historic and future aquifer storage depletion still looms. This study simulated three strategically located near-stream recharge projects designed to sustain baseflows even as projected basin-wide pumping increases over the next century. Simulation results indicate that combined application rates of 1,200 to 3,800 AF per year (AF/yr) over the period 2012 to 2100 at the three sites could sustain simulated baseflows in the SPR and in the lower Babocomari River (an important tributary to the SPR) at or above 2003 levels for the entire 88-year simulation period. This approach represents a potential interim solution for maintaining baseflows in the river while efforts to reduce aquifer depletion continue.

Lacroix, K. M., J. B. Nadeau, B. Choate, and S. B. Megdal. Water Resources Research Center, University of Arizona, 350 N. Campbell Ave., Tucson, AZ 85719.
Assessing and Addressing Ecological Water Needs in Arizona.

In 2011 the University of Arizona Water Resources Research Center (WRRC) published two documents that assess Arizona's environmental water needs: the Arizona Environmental Water Needs Assessment (AzEWNA) Report and the AzEWNA Methodology Guidebook. These technical reports are a first step in understanding and quantifying water needs for rivers in Arizona.

For the AzEWNA Report, the WRRC reviewed 93 studies to determine what we know about water needs in Arizona's rivers and where gaps in our information exist. The Report also contains maps and graphics to help readers visualize the extent of the study inventory. The Guidebook describes the methods employed to quantify Arizona's environmental flows and provides decision trees for those designing environmental flow studies.

The WRRC is now utilizing these AzEWNA products and other resources in our Connecting the Environment to Arizona Water Planning (EnWaP) outreach project. Using regionally focused data the EnWaP project is working to communicate the need for environmental water planning and identify voluntary, stakeholder driven options for addressing the environment in the context of limited water supplies and existing water rights.

Our presentation at the Arizona Riparian Council meeting will highlight our findings on the water needs of Arizona's environment in the Upper Gila River watershed. The presentation will summarize existing studies on environmental water needs, provide information on data gaps and explore how environmental water needs fit with human water needs in the region. We will also include an audience participation section to gain feedback on how we can help apply available information about desert rivers and riparian areas to water planning in southeastern Arizona.

Roepke, C. Deputy Director, New Mexico Interstate Stream Commission, 407 Galisteo Street Bataan Memorial Building, PO Box 25102, Santa Fe, NM 87504-5102
The Arizona Water Settlements Act (AWSA) and New Mexico

This presentation will describe the pertinent features of New Mexico's part of the AWSA with an emphasis on how the benefits provided through the AWSA can improve aquatic ecology and riparian habitat. The presentation will also highlight the New Mexico Interstate Stream Commission's (ISC) planning process, the current status of the NM ISC decision development and New Mexico's path forward along the Gila River. Deputy Director Roepke will answer questions and the presentation will contribute to a broadened understanding of the AWSA and the future of the riparian ecosystem.

Rubin, S. School of Earth Sciences and Environmental Sustainability, Northern Arizona University, PO Box 5694, Bldg 19, Rm 119, Flagstaff, AZ, 86011.

Paleoecological Examination of Southern Colorado Plateau Wetlands: the Relationship Between Biological, Climatic, and Euro-American Introduced Changes on the Northern Arizona Landscape

The field of paleoecology has often been used to reconstruct historic biological communities and landscape changes on large geologic time scales, but more rarely has it been utilized for assessing contemporary changes to landscapes that occur on time scales of only hundreds of years. This study uses paleoecological tools to reconstruct historic plant communities and landscape changes in northern Arizona from the time period before significant Euro-American settlement onwards to the present in response to the introduction of widespread livestock grazing and fire-exclusion during the late 19th century. The dynamic changes of land management regimes and policies regarding both livestock grazing and fire management, an effect of Euro-American settlement, are reflected by changes in the pollen, charcoal, and loss-on-ignition records preserved within different wetland basins. The rareness, yet importance, of wetlands to the semi-arid landscape of northern Arizona make these habitats sensitive to disturbances from historic and contemporary grazing events and changes in the regional fire regimes, and are also highly susceptible to regional climate change projections for the 21st century. Thus, this study aims to combine techniques of paleoecology, conservation, and environmental policy to address changes in land management policies and cultural habits on the northern Arizona landscape over the past 200-300 years, and create a new way to view baseline ecological information for wetland conservation. Sites were chosen across various public lands to reflect differences in land management policies and wetland conservation issues. These sites include: Walker Lake, Coconino National Forest; Bear Lake, Kaibab National Forest; and Greenlands Lake and Tiyo Lake, Grand Canyon National Park. Sediment cores were collected by using a gravity corer and were analyzed for: 1) loss-on-ignition 2) pollen, and 3) charcoal. Loss-on-ignition may explain differences in overall wetland productivity and precipitation. Charcoal particles should prove the record of localized fire history near each wetland site. Analysis of pollen assemblages will show changes in the forest plant community dynamics; a reflection of both the effects of the introduction of livestock grazing and fire-exclusion on plant community succession. The bottom date for each core was obtained by radio-carbon dating and the 1963 peak was identified by using Pu-239/240 dating. Sedimentation rates for each wetland basin were obtained by combining these two techniques. Cultural proxies of change, including historic photographs and oral records, will be included in the assessment of landscape change since the period of Euro-American settlement. Land management policies regarding livestock grazing in northern Arizona and national fire-exclusion policies will be reviewed in regards to these historical changes. The effectiveness of using paleoecology on short time scales to assess the effects of landscape disturbance and policy initiatives in northern Arizona from this study may be useful for addressing future changes to this landscape, and its riparian and wetlands, in the face of a growing human population and climate change projections.

Tuttle, S. USDA Natural Resources Conservation Service, , 230 N 1st Ave, Phoenix, AZ 85003. *Working Lands for Wildlife; Wildlife Habitat Financial Assistance Targeted for the Southwestern Willow Flycatcher.*

The Natural Resources Conservation Service (NRCS) and U.S. Fish & Wildlife Service (FWS) have outlined a partnership called "Working Lands for Wildlife." This partnership will provide landowners with technical and financial assistance to achieve specific conservation goals for at risk species through funding from the Wildlife Habitat Incentive Program (WHIP). The project is a voluntary, incentive-based effort that has three primary objectives: 1) restore populations of declining wildlife species; 2) provide farmers, ranchers, landowners and forest managers with regulatory certainty through existing or new mechanisms developed by NRCS and FWS; and 3) strengthen and sustain rural economies by restoring and protecting the productive capacity of working lands. The Southwestern Willow Flycatcher is one of seven species selected for fiscal year 2012. Applications for the program open immediately as WHIP applications are accepted year-round. The application window for ranking closes April 30th. Privately owned and tribal lands with potential habitat for the species are eligible to apply.

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Riparian Management of the Gila River under the Roosevelt and Horseshoe-Bartlett Habitat Conservation Plans

As part of mitigation obligations under the Roosevelt and Horseshoe-Bartlett Habitat Conservation Plans, the Salt River Project (SRP) acquired 1,259 acres of riparian habitat in the Gila River in central Graham County, approximately 18 miles northwest of Safford, AZ. These lands, referred to as the Fort Thomas Preserve, were acquired over a 5-year period to offset impacts to Southwestern Willow Flycatchers (*Empidonax traillii extimus*) and Western Yellow-billed Cuckoos (*Coccyzus americanus*) from dam operations at Roosevelt and Horseshoe Lakes. The Preserve is a mix of fee title lands and conservation easements, which are collectively managed by SRP to provide breeding habitat for flycatchers and cuckoos. The riparian habitat is dominated by a Fremont cottonwood - Goodding's willow - tamarisk (*Populus fremontii - Salix goodingii - Tamarix* spp.) riparian community with associated understory species of coyote willow (*Salix exigua*) and seep willow (*Baccharis salicifolia*). Monotypic stands of tamarisk are common, especially along the outer edges of the floodplain. SRP completed a baseline inventory of all Preserve lands and developed a management plan based on the results of that inventory. Monitoring of target species and habitat conditions are conducted at regular intervals. The most recent flycatcher protocol surveys indicate that approximately 160 flycatchers in 86 territories existed on the Preserve in 2009. Seventy-seven (77) nests were located, with all but one found in tamarisk trees. Cuckoo surveys conducted in 2009 resulted in 86 detections and estimates of 5 to 7 pairs of cuckoos using the Preserve. Although a number of habitat stressors and threats were identified, the biggest threat to date has been from human-induced wildfires. Last spring, more than 100 acres of riparian vegetation were burned in a wildfire that spread across portions of the Preserve, as well as adjacent private and federal lands. The fires burned a range of riparian vegetation types, from tamarisk monocultures to stands of Fremont cottonwoods, situated on floodplain terraces. Some of this vegetation was supported by irrigation runoff from adjacent agricultural fields. A wildfire that burned 17 acres of occupied flycatcher habitat in 2007 was replaced with a monoculture of tamarisk and kochia. SRP is in the process of establishing demonstration plots in the 2011 burned areas to test various seeding and planting options with the hope that the tamarisk/kochia monoculture can be avoided. The challenge is that no supplemental water is available at these sites.