TWENTY-SEVENTH MEETING OF THE ARIZONA RIPARIAN COUNCIL

RIVERPARK INN
TUCSON, ARIZONA
OCTOBER 2-3, 2014

RIPARIAN PROTECTION AT THE LOCAL LEVEL

Cosponsored by:

ARIZONA ASSOCIATION OF ENVIRONMENTAL PROFESSIONALS
AZAEP

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WATER RESOURCES RESEARCH CENTER

THE UNIVERSITY OF ARIZONA
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PROGRAM AND ABSTRACTS
2014

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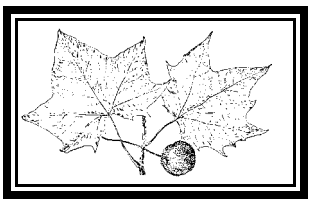

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TABLE OF CONTENTS

TWENTY-SEVENTH ANNUAL MEETING
ARIZONA RIPARIAN COUNCIL

Co-sponsored by:
Arizona Association of Environmental Professionals and the Water Resources Research Center, University of Arizona

RIPARIAN PROTECTION AT THE LOCAL LEVEL

Riverpark Inn
350 S. Freeway
Tucson, Arizona
October 2-3, 2014

Thursday, October 2, 2014

8:00 a.m.-9:00 a.m.	***Registration***
9:00-9:30 a.m.	***Welcome and Goals and Objectives of Meeting*** Kris Randall, President, Arizona Riparian Council; Mike Dawson, President, Arizona Association of Environmental Professionals, Kelly Mott Lacroix, University of Arizona, Water Resources Research Center
9:30-11:30 a.m.	***Panel 1. At the Table: Stakeholder Engagement in Riparian Protection and Restoration Efforts*** - Cyndi Ruehl, Moderator Panelists (listed alphabetically): Michael Byrd, Prescott Creeks Cate Bradley, National Park Service Carolyn Campbell, Coalition for Sonoran Desert Protection Sarah Porter, Executive Director Audubon Arizona Nancy Young Wright, Tucson Audubon
11:30 a. m.-12:30 p.m.	***Lunch***
12:30-2:30 p.m.	***Panel 2. In the Toolbox: Local Implementation of Regulations, Policies, and Laws for Riparian Protection and Restoration*** - Julia Fonseca, Moderator

Panelists (listed alphabetically):
Sallie Diebolt, Army Corps of Engineers
Jonathan Horst, Tucson Audubon
Jackie Keller, City of Surprise
Marisa Rice, Pima County Flood Control District
Doug Williams, Maricopa County Flood Control District
Wendy Wonderley, City of Phoenix

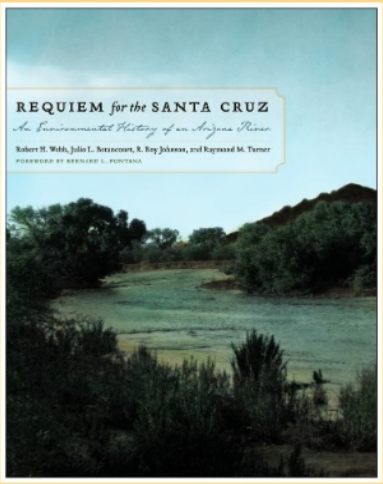
2:30-2:45 p.m. ***Break***

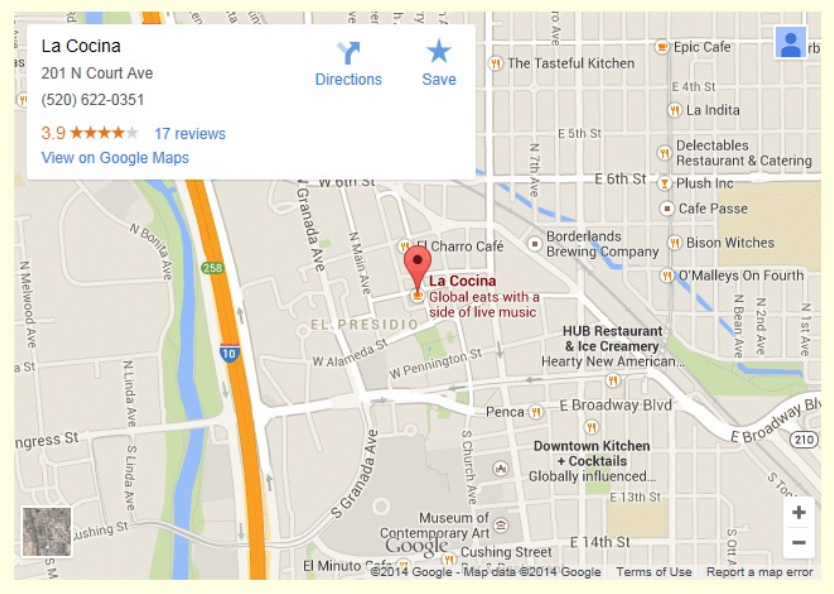
2:45-4:45 p.m. ***Panel 3. On the Ground: Collaboration for Riparian Protection and Restoration*** - Moderator, Kelly Mott Lacroix
Panelists (listed alphabetically):
Peter Else, Lower San Pedro Watershed Group
Jan Holder, Executive Director Sky Island Alliance
David McKee, City of Flagstaff
Liz Petterson, Executive Director Arizona Land and Water Trust
Peter Skidmore, Walton Family Foundation

4:45-5:00 p.m. ***Wrapup and What's Next***

6:00 p.m. ***Dinner (optional) at La Cocina.*** La Cocina is located in the heart of the historic Presidio district of downtown Tucson and tucked inside the walls of Old Town Artisans.

R. Roy Johnson will be our guest speaker. He will present T*he Ribbon of Brown: Riparian Vegetation or Riparian Ecosystems* and talk about his latest book co-authored with Robert Webb, Julio Betancourt, and Raymond Turner titled *Requiem for the Santa Cruz: An Environmental History of an Arizona River*.





Driving directions to La Cocina (2.3 mi) 201 N. Court Ave. from Riverpark Inn

From Riverpark Inn, drive south on South Freeway. Turn left onto W Starr Blvd. Take 1st left onto S Freeway. Turn right onto Granada Ave. Turn right onto W Alameda St. Turn left onto N. Main Ave and go around the block and take W. Washington to the restaurant.

SunLink Streetcar directions

RiverPark Inn/Cushing Street stop eastbound to Broadway /Church Ave. stop., get off walk north on Church Avenue 3 blocks, turn left (west) on Washington Street to Court Avenue, look for La Cocina/Old Town Artisans on the left. For the return trip retrace the steps except get back on SunLink at the Congress /Church Avenue stop and go westbound.

Friday, October 3, 2014

8:00-8:20 a.m.	***Overview of Thursday's Sessions. ARC Business Meeting and Elections Results*** - Kris Randall
8:20 - 9:30 a.m.	***Poster Session***. Brief presentations by poster author(s) and time to read posters.
9:30 a.m.-12:30 p.m.	Field trips - two options
Option 1	Effluent-Dependent Santa Cruz River and Simpson Farm In-Lieu Fee Project
Option 2	Paseo de las Inglesias and West branch of the Santa Cruz River

Field Trips

Option 1. Effluent Dependent Santa Cruz River and Simpson Farm In-Lieu Fee Project

This field trip will visit a part of the Santa Cruz River that flows year round due to treated effluent. The effluent is now much clearer and nearly odorless thanks to a recent $242 million overhaul at the Tres Rios Water Reclamation Facility at Ina Road. Treated wastewater is discharged to the Santa Cruz River bed, where it recharges the aquifer and maintains lush riparian vegetation and diverse bird life. Come see the flowing Santa Cruz River yourself. Learn how recent upgrades in water quality, flood flows, and other factors are affecting plants and animals along the river. Your field guides at the first stop will be Julia Fonseca, Pima County Office of Sustainability and Conservation, and Daniel Bunting, Harris Environmental Group (HEG). HEG is monitoring vegetation for Pima County and the Sonoran Institute as part of the Living River Project.

The second part of the field trip will feature the Simpson Farm In-Lieu Fee Project. The Simpson Farm restoration project area is located along the Santa Cruz River near Trico Road, on City of Tucson land, where effluent flow was perennial until the recent upgrades. Your field trip guide will be Jonathan Horst, ecologist with Tucson Audubon Society, who will show you what was achieved at the site under the historic mitigation rule and entertain a discussion of floodplain restoration constrained by severe societal and environmental factors.

Option 2. Restoring and Preserving Riparian Habitat in the Heart of Tucson: Paseo de las Iglesias Phase 1 & West Branch Preserve

Paseo de las Iglesias Phase 1

Paseo de las Iglesias Phase 1 is a $14 million flood control, ecosystem restoration, and river park project funded by bonds approved by voters in 2004. The project is located along the Santa Cruz River and historic floodplain between Ajo Way and Silverlake Road, within two miles of downtown Tucson.

The project provides erosion and flood control using soil cement and gabions to protect existing residences, structures, and former landfill sites. The key ecosystem restoration elements include water harvesting basins, planting and seeding with a diverse native plant pallet, enhancement to an existing ephemeral toad-breeding pond, other wildlife habitat amenities, lizard salvage and re-introduction, preserve-in-place areas for habitat preservation, and interpretive signage. The project supports the goals of the Sonoran Desert Conservation Plan for riparian habitat protection and preservation.

In addition to habitat and public safety amenities, this project will benefit the community and provide for alternative modes of transportation by closing a gap in the Santa Cruz River and Juan Bautista de Anza National Trail systems, and by constructing key trail linkage where the Julian Wash meets the Santa Cruz River along the "The Loop" shared-use metropolitan path system.

This project is currently under construction with completion anticipated for spring 2015. Come and see what work has been completed onsite for this unique section of river park.

West Branch Preserve and Bosque Basins Project

Upstream of its confluence with the Santa Cruz River at A-Mountain, the West Branch Santa Cruz River floodplain ecosystem preserves a rare connection to historical conditions. Half of its current flora of nearly 200 species was also present a century ago. The area provides habitat for local and migratory birds, and locally rare species including the giant spotted whiptail lizard and narrow-mouthed toad.

Until the early 21st century, this post-agricultural area was at risk of further urban development due to its mostly private ownership, wide open space, and proximity to the urban core. In response to a grassroots effort organized by neighbors, biologists, and open space advocates, the available land was acquired by Pima County Regional Flood Control District. The District established the West Branch Santa Cruz River Preserve in 2003 as partial mitigation for a USACE permitted disturbance farther downstream in the watershed.

Local stewardship and knowledge have been crucial to understanding the ecosystem's history, and will continue to play key roles in preserving its unique qualities. The District continues to acquire vacant riparian land in the area and manages the area to best protect and sustainably enhance riparian resources. Active management actions include the delineation of pedestrian and equestrian paths for neighborhood use, invasive species control, erosion repairs, and temporary irrigation in response to drought and the expiration of a historic agricultural irrigation agreement. Where the riparian functions are most at risk due to stream bank failure,

the District is phasing the installation of the Bosque Basins Project on the floodplain parallel to eroding river banks. The Bosque Basins Project provides enhancements to riparian resources by addressing erosion risks, installing water harvesting basins and ephemeral toad breeding ponds, and planting a diverse mix of indigenous plant species.

This field trip will be led by Jennifer Becker, CFM for West Branch Preserve and Bosque Basins Project and Deirdre Brosnihan, P.E., CFM for Paseo de las Iglesias Phase 1.

Exhibitors and Posters

Exhibitors

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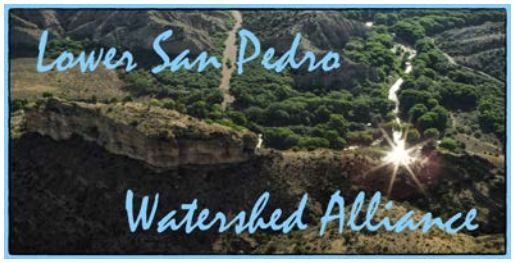

Posters (listed alphabetically; *indicates student poster)

Block, Michael. *Drilling Municipal Wells and Minimizing Impacts to Riparian Areas - A Case Study.*

Breedlove, Samuel J. *Utilizing the Arizona Department of Environmental Quality's Water Quality Improvement Grants to Protect and Enhance Riparian Areas as a Way to Reduce Nonpoint Source Pollution in Impaired Waterways.*

Connor, Kate, S. Bolduc, H. Lasham, and D. Brosnihan. *A New Approach to Designing River Parks: Integrating restoration design at Santa Cruz River Park from Ajo Way to Silverlake Road.*

Hullinger, Ashley, and Mead Mier. *Tracking Drought Impacts along the Lower Cienega Creek, Pima County.*

Meader, Norman. *Riparian Mesquite: How Much Water Does It Use?*

Morris, Gail, and Citizen Scientists. *Preserving Threatened Monarch Migration Flyways in the Sonoran Desert.*

Mott Lacroix, Kelly, Brittany Xiu, Darin Kopp and Sharon B. Megdal. *Considering Water for the Environment in Arizona through Understanding Science, Policy and Water-User Perspectives.*

Palta, Monica, and Nancy Grimm. *Nutrient Removal by "Accidental" Urban Wetlands in Phoenix, Arizona.*

Rose, Courtney, and Julia Fonseca. ***Protecting Riparian Areas with Cultural Resources Conservation Strategies.***

Sitzmann, Paul. ***Agua Fria National Monument Riparian Conservation, Restoration and Youth Engagement.***

Stempniewicz, Victoria, Krista Sparks, Sharon Masek Lopez, Abraham E. Springer, and Lawrence E. Stevens.** ***Development of Monitoring Studies for Springs and Ephemeral Channels within Four Forest Restoration Initiative (4FRI) Treatment Areas.

Tackett, Ian. ***Restoring the Salt/Gila Rivers: The Tres Rios Environmental Restoration, Phase 3A and 3B.***

Verburg, Edwin, Catlow Shipek, Claire Zucker, and others. ***Restoration of Riparian Habitat Using Reclaimed Water in the Tucson Area.***

Wilson, Natalie R. , Laura M. Norman, Miguel Villarreal, Leila Gass, Ron Tiller, and Andrew Salywon.** ***Temporal Study of Cienegas at Cienega Creek Using Multispectral Satellite Imagery.

Zugmeyer, Claire, and Akitsu Kimoto. ***Tracking Wetland Conditions of an Effluent-Dependent River: the Lower Santa Cruz Living River Project.***

Thursday, October 2, Speaker Bios and Abstracts

Kris Randall, President, Arizona Riparian Council
Coordinator, Partners of Wildlife Program, U.S. Fish and Wildlife Service

Kris Randall is a riparian ecologist and is the State Coordinator for the Partners of Wildlife Program, U.S. Fish and Wildlife Service. The Partners program provides financial and technical assistance to private landowners, non-governmental organizations, and locally led watershed groups to implement wildlife habitat improvement projects. Partners has identified wetlands and riparian areas as priority ecosystems for focusing project funding. Kris received a Bachelor of Science in Zoology and a Master of Natural Science in Ecology from Arizona State University. She has been a member of the Arizona Riparian Council since 1987, chairs the Activity Committee, and is the current President of the Council.

Michael R. Dawson, President, Arizona Association of the Environmental Professionals
Senior Environmental Planner, EcoPlan Associates, Inc., Tucson

Mr. Dawson has a degree from the University of Arizona in Natural Resources and Recreation Management. His has extensive experience in the environmental, community involvement, and transportation fields. His background encompasses 30 years in the federal, state, county, and private consulting sectors, preparing or directing land use plans, corridor studies, feasibility studies, and project National Environmental Policy Act documentation. Mr. Dawson has participated in, or directed the preparation of, hundreds of environmental documents and studies. He is experienced in working with multiple jurisdictions and interest groups to help solve complicated local and regional issues in projects. His thorough knowledge of the environmental field, permitting issues, and regulatory requirements assists in the planning and engineering elements of a project.

His career has included working for the Bureau of Land Management, Arizona Department of Transportation, Maricopa County Department of Transportation, and several consulting firms. He has been with EcoPlan since 2006 and manages the Tucson office. He has served as an at-large AZAEP Board member from 2005 to 2010, as Vice President 2012 to 2014, and became President July 2014.

Kelly Mott Lacroix, Research Analyst, Water Resources Research Center, University of Arizona

Kelly Mott Lacroix is a Research Analyst for the WRRC's Water Research and Planning Innovations for Dryland Systems (RAPIDS) program. She has an M.S. in Environmental and Healthy Cities Planning from the University of Arizona and is a Ph.D. candidate in Arid Lands Resource Sciences. Her dissertation research examines ecohydrological and social aspects of water for riparian and aquatic ecosystems in Arizona. Prior to returning to graduate school at the University of Arizona, she worked for five years as a key member of the Arizona Department of Water Resources' (ADWR) Arizona Water Atlas project. She has also worked with rural water providers in Arizona as the manager of ADWR's Community Water System Program and with diverse interests from across the state as a constituent services liaison for the Arizona State Senate.

Planning Committee

(Listed alphabetically)

Mike Dawson, Arizona Association of Environmental Professionals and EcoPlan Associates, Inc.
Julia Fonseca, Office of Sustainability and Conservation, Pima County
Kelly Mott Lacroix, Water Resources Research Center, University of Arizona
Kris Randall, Arizona Riparian Council and Partners of Wildlife, U.S. Fish and Wildlife Service
Cyndi Ruehl, Pinal Partnership Open Space and Trails Group and Faculty Associate, Arizona State University
Kelly Wolff-Krauter, Arizona Game and Fish Department

Panel 1. At the Table: Stakeholder Engagement in Riparian Protection and Restoration Efforts

Cyndi Ruehl, Moderator
Chair, Pinal Partnership Open Space and Trails Group
Faculty Associate, Arizona State University

Cyndi has chaired the Pinal Partnership Open Space and Trails Group for the past seven years; a diverse community-based grassroots collaboration whose mission is to advance the establishment of public county conservation areas, regional parks, a connected trail system and riparian protection within Pinal County whose borders encompass some of the last large pieces of contiguous Sonoran Desert. The open space group takes a collaborative approach involving stakeholders, citizens, policy makers, developers, elected officials and government entities. As an arid lands restoration ecologist, Cyndi prefers to work toward smart development and land conservation in order to prevent areas, which without ecological planning, require restoration. She also serves as the first Chair of the newly formed Pinal County Open Space and Trails Advisory Commission. Cyndi is Faculty Associate at Arizona State University where she teaches Desert Ecology in the graduate and undergraduates programs in Landscape Architecture. As a long-time student of ethnobotany, in her spare time she teaches classes about the medicinal and edible uses of our wondrous desert plants.

Panelists listed alphabetically

Michael Byrd, Executive Director
Prescott Creeks Preservation Association

As Executive Director for Prescott Creeks, my duties vary on a day-to-day basis from advancing the organization's mission by working with community stakeholders, building strong programs, and presenting to school classes and civic organizations, to transplanting *Scripus acutus* in local wetlands, catching lizards, photographing wildflowers, and digging up previously planted cottonwoods to assess root development. The variety of experiences and the diversity of people I encounter are treats for me. The learning curve stays steep and I like that – usually. Because of my work at Prescott Creeks, I often find myself looking for the rivers and streams in other communities that I visit.

Riparian Riches: A Story of Observation, Restoration, and Celebration

Prescott Creeks is a locally based not-for-profit organization with a small, but dedicated staff and Board of Directors. The Prescott Creeks mission is to achieve healthy watersheds and clean waters in central Arizona. Working in a watershed that straddles "rural" and "urban," the issues include water availability, surface water quality, loss of habitat, open space protection, land use policy, recreational demand, and more. Executive Director, Michael Byrd, will share the origins of the Watson Woods Riparian Preserve Restoration Project on Granite Creek in Prescott, Arizona, as well as explore upstream considerations that have influenced project direction. The organization has drawn on partnerships and collaboration at the local, region and national levels to advance its mission and affect positive environmental and community change.

Cate Bradley, Ph.D., MLA, Landscape Architect
National Park Service

Cate has been working in the field of public participation for over 20 years helping communities focus on their important natural resource issues, understand the range of concerns and issues, develop desired outcomes that focus work to achieve progress towards their goals. She loves living in and enjoying the Sonoran Desert, being active outdoors, and traveling to magnificent places on this planet.

Stakeholder Engagement Environments: Effective System Fundamentals Review

Stakeholder Engagement Environments: Effective System Fundamentals Review will explore – through slides, verbal explanation and audience input – components of "me and we" dynamics that can obstruct the best intentions for riparian protection and natural resource management. Cate will categorize essential building blocks for collaboration - situation analysis, decision-making process options, stakeholder analysis, and other exercises that clarify individual and group needs, expectations, focus, goals and roles. Then she will hone in on individual skills that support and strengthen collaborations – or cause them to go off track.

Rather than using a specific case study, Cate will review systems and methods for efficient and effective meeting processes. She will discuss various ways personal perceptions affect our visions and can lead to conflict within a group. There are physiological reasons how and why this happens and this presentation will briefly describe them in plain language. The point is to locate how individual reactions and responses fit into or effect group dynamics.

Riparian protection is a very complicated endeavor, we all know this. Still, these important resource areas can be protected if all who care about them have the opportunity to explain and represent why they care, how they want to be involved and are willing to listen to others – because they have been heard as well. The good news is there are ways to make stakeholder engagement productive. It takes time, it takes skill, commitment, courage and creativity – for

starters. We can always sharpen our skills. This panel segment will provide the theoretical grinding wheel.

Carolyn Campbell, Executive Director
Coalition for Sonoran Desert Protection

Carolyn helped found the Coalition for Sonoran Desert Protection in 1997, and was hired as Executive Director in February, 1998. Carolyn was a member of citizen stakeholder committees for Pima County's Sonoran Desert Conservation Plan, and both the City of Tucson's and Town of Marana's Habitat Conservation Plans. She serves as Vice-Chair of Pima County's Bond Advisory Committee and has been involved in transportation planning as a member of the 2006 Regional Transportation Authority's Citizen Advisory Committee and currently serves on Pima Association of Governments' Regional Task Force for Long Range Transportation Plan. Previous to her work with the Coalition, Carolyn served as Chief Administrative Aide to Tucson City Councilmember Molly McKasson (1994-1998) and U.S Congressman Morris K. Udall (1981-1988).

Forging Relationships and Finding Stakeholder Agreement without Sacrificing your Principles

The population of metropolitan Tucson has rapidly grown for decades, with suburban growth outpacing Tucson's growth since the 1990s. Because residential development is the top industry in this region, there have been tensions and battles between neighborhoods that would be affected by proposed growth, and the homebuilders that want to produce the subdivisions. Adding to this tension, national and regional conservation groups have a strong presence in eastern Pima County. These groups are working to protect desert habitat and in particular, the scarce water resources. This has lead to the over-simplification of these tensions as growth versus the environment. When the tiny cactus ferruginous pygmy-owl was declared endangered by the US Fish and Wildlife Service in 1997, it caused an enormous firestorm in Pima County. The owl's prime nesting habitat occurred in the fastest-growing part of the region, the Tortolita Mountain alluvial fan. This issue quickly became a focal point of the growth battles. This was, after all, listing of an endangered species that was directly in the path of the bulldozers. As a result of the Endangered Species Act listing, local groups that had experience with endangered species processes created the Coalition for Sonoran Desert Protection of 41 member groups. The Coalition's goal was to have conservationists leading the creation and construction of what would become a regional multi-species habitat conservation plan.

With the conservation community unified and speaking with one voice, work began on obtaining agreement from a wide range of stakeholders. This bucked the trend of other multi-species habitat conservation plans across the country, where plan development was driven almost exclusively by economic interests and their political allies. In these cases, regulatory compliance was typically achieved while endangered, threatened, and sensitive species continued to decline on a downward spiral. In Pima County, however, the stakeholders were remarkably diverse, and included homebuilders, developers, realtors, ranchers, neighborhood groups, and full representation of the conservation community, together with the Multi-Species Conservation Plan permit applicant, Pima County. Bringing all these stakeholders to agree on lasting principles and sound conservation policies became the Coalition's trademark, which continues to this day.

Sarah Porter, State Director and Manager, Audubon Western Rivers Action Network Project, National Audubon Society

Sarah Porter is Audubon's Arizona state director and manager of Audubon's Western Rivers Project. Before joining Audubon as a staff member in 2006, Sarah spent fourteen years as an attorney in private practice, specializing in complex commercial litigation. After three years on Audubon Arizona's board, where she chaired the Education Committee and served as vice chair, Sarah became Audubon Arizona's deputy director and was tasked with development of the Nina Mason Pulliam Río Salado Audubon Center, an environmental education center located in a 600-acre habitat restoration near downtown Phoenix.

Sarah serves on the Phoenix Parks and Recreation Board, the University of Arizona's Water Resources Research Center's External Advisory Committee and the boards of Camp Colley Foundation and Phoenix Collegiate Academy. A native of Phoenix, Sarah grew up exploring Arizona's extraordinary natural spaces and remains an avid hiker, birder and camper.

Jump in Before It's Too Late: Empowering People to Advocate for Water for Natural Areas

Launched in 2013, Audubon's Western Rivers Action Network is a multistate grassroots coalition of over 28,000 individuals and more than 150 conservation organizations advocating for water for important natural areas in the Intermountain West, with an initial focus on the Colorado Basin.

Audubon is building and activating the Western Rivers Action Network through workshops, policy briefings and webinars. Regular communications throughout the network enable members to alert others of potential action items, greatly increasing public awareness of issues that might otherwise remain local. Through Audubon's national policy office in

Washington, D.C., network members are also informed of opportunities to influence federal legislation directly or indirectly related to riparian conservation in the west (e.g., the Farm Bill).

To date, network members have taken over 50,000 individual actions to advocate for restoration and protection of the Colorado River and its tributaries. In Spring 2014, network members turned out for Western Rivers Day at the Arizona, Colorado and New Mexico legislatures, reaching dozens of elected officials. Hundreds of network members have participated in our day-long leadership workshops in cities and towns throughout the Colorado Basin, including in Tucson, Phoenix, Prescott and Flagstaff.

Nancy Young Wright, Board Member
Tucson Audubon Society

Nancy is a fourth-generation Southwestern resident with extensive experience in public service and community advocacy focusing on conservation, youth and education issues. Nancy represented Tucson's northwest side in the Arizona State Legislature for two terms, where she served on the Water and Energy, Education, and Health Committees. She started a Water Caucus to promote bi-partisan awareness and cooperation. She was a member of the Pima County Sonoran Desert Conservation Plan Steering Committee, the Buffers citizen conservation group, and board member of Amphitheater Public Schools from 1997-2006. She serves on the board of the Tucson Audubon Society, the Southern Arizona Historical Society, the Humane Society of the United States' Arizona Council, and the Advisory Board for the Owl and Panther Expressive Arts for Refugees program. She has a BA in Journalism from New Mexico State University and a MFA in Creative Writing from the University of Arizona.

Effective Citizen Activism on the Local and State Legislative Levels for Riparian Issues

Honey Bee Canyon is a Class One Riparian area in northwestern Pima County located within Rancho Vistoso, a planned area development of 5,000 acres. This presentation will talk about citizen efforts that spanned nearly a decade to protect the stream, which is an important wildlife corridor. It will include comments on the value of working with the state legislature and other elected officials to promote awareness of riparian issues and conservation values.

Panel 2. In the Toolbox: Local Implementation of Regulations, Policies, and Laws for Riparian Protection and Restoration

Julia Fonseca, Moderator

Environmental Planning Manager, Office of Sustainability and Conservation, Pima County

Ms. Fonseca has worked on land and water issues in southern Arizona since 1986. She is environmental planning manager for the Office of Sustainability and Conservation at Pima County. She works with other individuals, agencies and groups toward protecting an inter-jurisdictional landscape spanning three million acres. In a prior 22-year career with Pima County Regional Flood Control District, Julia worked on surface water rights, land development policy, groundwater recharge, and riparian habitat protection and restoration. She also helped develop the biological reserve design, and natural resource inventories for the Sonoran Desert Conservation Plan. Julia received a M.S. in geology at University of Arizona and a long-time member of the Arizona Riparian Council.

(Panelists listed alphabetically)

Sallie Diebolt, Chief, Arizona Branch
Regulatory Division, Los Angeles District, US Army Corps of Engineers

Sallie Diebolt is the Chief of the Arizona Regulatory Branch. The US Army Corps of Engineers Los Angeles District covers southern California and the entire state of Arizona. The mission of the Corps' Regulatory program is to protect waterways, wetlands and other aquatic resources while balancing economic and private property needs. The Arizona Branch is responsible for enforcing Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act within the state. Sallie's background is in biology and she started as a Regulatory project manager in 1997. Since 2009, she has served as the Branch chief, with eight project managers handling all projects within the State of Arizona.

Jackie Keller, RLA, Long Range Planner
City of Surprise, Arizona

Jackie Keller graduated from Purdue University with a Bachelor of Science in Landscape Architecture and has been practicing as a Community Planner/Registered Landscape Architect in Arizona for over 25 years. Through her experience, she has provided municipal and county open space and natural resource planning for over 4 million acres in Arizona.

Key elements of her planning process for municipality and county projects have included an extensive inventory and analysis of the natural and built environments and their interface as it relates to potential impacts to natural and urban populations.

These analyses provided the basis for the development of plan recommendations and implementation programs to allow for new development that respects lands with the highest wildland values. Her key implementation tools have included the development of General Plan and Comprehensive Plan amendments, ordinance development, specific plans, and design and development guidelines that serve to integrate Arizona's rich natural resources into the urban fabric for the health and quality of our communities.

Regulatory Tools and Policies for Conserving Wildlife Linkages

Investing in wildlife is not only advantageous to helping maintain the gene pool of wild populations, but also provides direct "quality of life" and economic benefits to local communities by providing open space and wildlife-related activities (such as education, viewing, and recreation opportunities) that attract residents and visitors to an area.

The inevitable result of urban development is loss and fragmentation of habitat resulting in the decreased colonization, population size, and genetic diversity of wildland populations. With careful planning and design, wildlife linkages can help reduce the negative effects of habitat fragmentation by allowing dispersal of wildlife between larger habitat areas. For this reason, it was important for the City of Surprise to use a proactive approach to identify, conserve, and restore wildland and wildlife habitats by providing appropriate and reasonable regulatory controls for the development of areas with rich wildland resources.

Utilizing planning, zoning, and design tools that assist in guiding the regulatory development of a community can provide a means for transversing physical barriers and maintaining local and regional connectivity for wildlife and humans.

Learn how the City of Surprise used the State legislated General Plan planning process, in concert with key agency stakeholders, to initiate wildlife friendly development standards that increase a community's quality of life and natural resources. These adopted standards and policies help accommodate normal patterns of wildlife movement between isolated habitat

remnants and larger wildland areas by allowing for population persistence in an increasingly developed landscape.

The City of Surprise will discuss the planning process, stakeholder and public involvement, and design and development policies they have adopted to help guide future development as it pertains to wildlife linkages within the City's planning area.

Jonathan Horst, Restoration Ecologist
Tucson Audubon Society

Jonathan has led Tucson Audubon's restoration program for two years including the ongoing transition of their In-Lieu Fee program into compliance with the current Compensatory Mitigation ruling. He joined Tucson Audubon after studying population ecology at the University of Arizona. He's been a Tucson resident for 10 years and has done field research on Burrowing Owls, Band-tailed Pigeons, and winter-annual plants, and has done niche modeling for invasive plants. He's currently involved with species-specific restoration projects on Tumamoc globeberries, Azure Bluebirds, and Lucy's Warblers.

A Decade of ILF-based Restoration in the Tucson Region

In 2004 Tucson Audubon entered into an agreement with the US Army Corps to provide in-lieu fee (ILF) based compensatory mitigation for Pima County. Audubon provides compensatory mitigation for impacts to Waters of the US for development projects permitted by the Corps while the permittees pay a fee to Audubon, based on the project scale and type of Waters impacted, in lieu of mitigating their own impacts thereby transferring responsibility for the regulated mitigation. Through this program Audubon has restored 229 acres in Pima and Pinal counties, piecemeal, in response to the annual mitigation demand. Work has been done at three sites, primarily on retired agricultural lands adjacent to the Santa Cruz River owned by Tucson Water. Various restoration techniques and approaches have been utilized achieving varying degrees of success. Monitoring efforts focused on rates of successful establishment of plantings, to guide ongoing approaches, and on bird diversity and density as indicators of ecosystem health. While Audubon maintained a high level of monitoring and program accountability, such was not the case for all ILF programs leading to a rewriting of the compensatory mitigation regulations in 2008. The ILF-based mitigation approach was nearly revoked in favor of only utilizing a mitigation bank-based approach, which guarantees mitigation is implemented before any mitigation credit is sold. Instead, the ILF program was reformed to include heightened reporting requirements, performance standards, incremental credit generation, and increased oversight on site restoration plans. The ILF approach allows conservation and government agencies the opportunity to continue providing mitigation. Tucson Audubon is pursuing an ILF

program in compliance with the current regulations while continuing the ongoing responsibilities to sites that were begun under the previous program, in order to provide the region with meaningful mitigation for permitted disturbances to Waters of the US.

Marisa Rice, CFM, Senior Hydrologist
Pima County Regional Flood Control District

Marisa Rice is a hydrologist with Pima County Regional Flood Control District. During her career with the District, Marisa has implemented the riparian protection regulations, managed ecosystem restoration projects, addressed land stewardship issues on District lands, and maintained the District's ALERT storm monitoring system. Currently she is focused on land management issues and implementing and managing ecosystem restoration projects. Ms. Rice received a B.S. in Soil, Water and Environmental Sciences from the University of Arizona and is an active member of the Arizona Native Plant Society and Sky Island Alliance.

Protecting Riparian Areas in Pima County Arizona

In the early nineties, Pima County Board of Supervisors directed staff to develop riparian protection regulations following public outcry over the disturbance of natural washes in Pima County's growing suburban areas. In 1994, the Board adopted the first riparian protections under the Floodplain and Erosion Hazard Management Ordinance. In addition to the Ordinance, Riparian Classification Maps delineating the location of regulated riparian habitat were adopted. In the late nineties, the Board again directed staff to develop mitigation guidelines to assist property owners with implementing mitigation on their property. These guidelines were adopted in 2001. Since 2001, Periodic review of the effectiveness of the Ordinance and Guidelines has led to multiple revisions, resulting in the current regulations. The goal of riparian protection regulations is to encourage property owners to avoid and minimize impacts to regulated riparian habitat. When avoidance is not possible, 1/3 acre disturbance is allowed before mitigation is required. A number of flexible mitigation options are available to replace disturbed habitat.

Doug Williams, Planning Manager
Flood Control District of Maricopa County

Doug Williams is the Planning Manager for the Flood Control District of Maricopa County where he has been employed for the past nineteen years. He is involved in the development and implementation of Watercourse Master Plans. His responsibilities include administering the riparian restoration and tall pot nursery programs for the Flood Control District.

Prior to his present position, Doug spent eight years working as a long-range planner for Maricopa County. His planning experience also includes employment with the City of Phoenix and The Town of Apache Junction. A significant portion of his career has been spent trying to balance environmental concerns with developmental pressures.

Wendy Wonderley, Environmental Programs Coordinator
Office of Environmental Programs, City of Phoenix

Wendy Wonderley is an Environmental Programs Coordinator for the City of Phoenix focusing on environmental compliance issues for City projects including compliance with the Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, and the National Environmental Policy Act. She has had the pleasure of working on all of the City's major riverbed projects including Tres Rios, Rio Salado, and Rio Salado Oeste.

Tres Rios and Rio Salado Safe Harbor Agreements: Proactive Compliance with the Endangered Species Act

If you build it, they will come. Riparian and wetland habitat and endangered species, that is. But now you need to do something that may impact some of the habitat. Must you go through a full-blown Endangered Species Act (ESA) Section 7 compliance effort every time? Isn't there a better way? The U.S. Fish and Wildlife Service (Service), which administers the ESA, developed a proactive solution: the Safe Harbor Agreement (SHA). This agreement spells out the ground rules for ESA compliance for a project area for the next 50 years, a true benefit for both the environment and the project operator. The City of Phoenix (City), in conjunction with the U.S. Army Corps of Engineers and the Flood Control District of Maricopa County, have embarked on two massive habitat restoration projects, the Tres Rios Ecosystem Restoration Project (Tres Rios) and the Rio Salado Habitat Restoration Area (Rio Salado). Each project has its unique

aspects, but both projects have created hundreds of acres of habitat attractive to endangered species and so the City has obtained a SHA for each. Safe Harbor Agreements benefit endangered species while providing landowners assurances from additional restrictions. After the SHA is executed, the Service issues an "enhancement of survival" permit to authorize any necessary future incidental impact to endangered species. The SHA lists the actions allowed, including routine maintenance activities, and also establishes a pre-project baseline for each covered species. The City monitors the habitat and endangered species status and submits an annual report to the Service.

Panel 3. On the Ground: Collaboration for Riparian Protection and Restoration

Kelly Mott Lacroix, Research Analyst, Water Resources Research Center, University of Arizona

Kelly Mott Lacroix is a Research Analyst for the WRRC's Water Research and Planning Innovations for Dryland Systems (RAPIDS) program. She has a MS in Environmental and Healthy Cities Planning from the University of Arizona and is a PhD candidate in Arid Lands Resource Sciences. Her dissertation research examines ecohydrological and social aspects of water for riparian and aquatic ecosystems in Arizona. Prior to returning to graduate school at the University of Arizona, she worked for five years as a key member of the Arizona Department of Water Resources' (ADWR) Arizona Water Atlas project. She has also worked with rural water providers in Arizona as the manager of ADWR's Community Water System Program and with diverse interests from across the state as a constituent services liaison for the Arizona State Senate.

Panelists listed alphabetically

Peter Else, Chair
Lower San Pedro Watershed Alliance

After completing a Bachelor of Science degree at the University of California-Berkeley, Peter Else spent 34 years engaged in commercial and research agriculture, with an emphasis on the conservation of natural resources. His research experience focused on conducting field-based trials, and he was eventually responsible for managing the facilities and 57,000 acres of lands associated with the University of Arizona's Tucson Area Agricultural Centers. While working at the university, Mr. Else completed a Master's degree in education. He retired from the university in 2005, and has subsequently dedicated most of his time to voluntary conservation activities, including three years as a supervisor in the Winkelman Natural Resource Conservation District, as coordinator of Friends of the Aravaipa Region, and as a founding member of the Lower San Pedro Watershed Alliance.

Political Obstacles to a Collaborative Approach for Riparian Ecosystem Protection in the Lower San Pedro Watershed

The framework for a collaborative and landowner-based approach for protecting the lower portion of the last remaining major and intact desert river ecosystem in southern Arizona was conceived at the end of 2012. The bylaws of the Lower San Pedro Watershed Alliance (LSPWA) were subsequently structured to include direction from conservation-minded property owners, agencies, and locally invested NGOs, but formal participation thus far has been limited mainly to the first group. The LSPWA is adjusting its efforts in response to a political landscape that currently inhibits effective collaboration and watershed-wide conservation planning among major stakeholders, oversight agencies, land trusts, academic institutions, and other organizations. A brief description of the LSPWA and its current programs will be presented, followed by a description of the challenges faced and the need for neutrally facilitated and science-based conservation planning at a landscape scale.

Jan Holder, Executive Director
Sky Island Alliance

Jan Holder is the Executive Director of Sky Island Alliance, a bi-national grassroots organization dedicated to the protection and restoration of native species and habitats in the Sky Island region of the southwestern United States and northwestern Mexico.

Previously, Jan was the Executive Director for the Gila Watershed Partnership in Eastern Arizona. She worked for a land trust, co-managed a cattle ranch and founded an organic, predator-friendly beef company that distributed to 11 western states and the most expensive restaurant in the country. Prior to that, Jan spent 10 years in the marketing industry.

Jan served on the Defenders of Wildlife's Wolf Compensation Board, the Bureau of Land Management Resource Advisory Council, chaired the University of Arizona Udall Center's Sustainable Ranching Committee, was awarded the Public Lands Foundation's Landscape Stewardship Award in 2008, Interior's Partners in Conservation Award in 2012, and serves on the core team for The Cross Watershed Network, an organization dedicated to enhance watershed practitioner collaboration throughout the West.

Working with Landowners to Protect Riparian Areas

I have implemented a fair amount riparian restoration on a mix federal, state, and private lands, and the projects have been quite successful. Most of the time, the state and federal agencies and organizations who are supplying the funding have the same interests that I do – healthy riparian habitats, threatened and endangered species, improved water quality. But

often the private landowners I work with don't care as much as I do about those issues. They care about more about making enough money raising healthy cattle to feed their family, and saving time and money doing it, or raising a plentiful crop of cotton.

However, I have learned that I have to understand the landowner's issues, needs, priorities, and concerns to implement the project successfully. I have to learn their language and understand how to communicate to them how this project will help address their values, issues, needs, priorities, and concerns…..and not mine.

I've heard people say that we should just show landowners the science that says what they should be doing. And why what they are currently doing is bad for the environment. That they should do things our way. The right way. And why what we want them to do is right. But we need to give up on being right. Give up on forcing someone else to be like us. It usually doesn't work. We need to acknowledge that our values, issues, needs, priorities, and concerns may be different. We must speak to them in their language about how this will benefit their issues, needs, priorities and concerns. Not ours.

Working this way is usually much more effective, saves time, money, is much more effective, and builds positive relationships between all of us.

David McKee, Watershed Specialist
City of Flagstaff

David McKee spends his work days at the City of Flagstaff as the Watershed Specialist within the Stormwater Section of the Utilities Department. As with any small town he wears many hats that range from project management to environmental regulatory enforcement and education. One of his favorite hats is being the director for the city-sponsored Flagstaff Area Stream Team (F.A.S.T).

The Flagstaff Area Stream Team (Fast) as a Collaborative Tool for Affecting Change

The mission of the Flagstaff Area Stream Team (F.A.S.T.) is to identify opportunities for restoration maintenance and preservation of streams, wash corridors, and open channels within the city limits and take an active role in achieving these goals. Collaborators on each project can represent a wide range of and very different stakeholders. Often they may not have thought of themselves as a stakeholder. Taking the time to scope the project is essential to the step of figuring out the who your partners may be (you might already have quite a few).

A lesson I have learned is to keep an open place within your project that is mindful to new collaborators. Even if they seem like they may not be a key of your current project get them involved and interested.

Within the Federal, State and Local regulations there are many different tools the city uses to promote voluntary means of protection. Find out what they are and talk with other cities and counties to see what works for them and how they apply these regulations to benefit/protect the watershed.

Tudor A. Montague, Sr. Planner and Policy Analyst
Department of Environmental Quality, Gila River Indian Community

Mr. Montague has been working in the environmental field for over 11 years, all of which have been spent working for tribal communities in Arizona. He is currently employed with the Gila River Indian Community's Department of Environmental Quality as the Sr. Environmental Planner & Policy Analyst. During his time working for tribal communities he has been involved with the National Environmental Policy Act review and implementation, rangeland/wildlife management, and administration of a U.S. Environmental Protection Agency's Brownfields Program assessment and cleanup grant. He received his Bachelor's degree in Environmental Studies with an emphasis in policy and planning from the University of Kansas in Lawrence, Kansas. He is also an enrolled member of the Fort Yuma Quechan Tribe in Winterhaven, CA.

Preservation and Restoration of the Pee Posh Wetlands

Protection and restoration of the Pee Posh Wetland on the Gila River Indian Community (GRIC) Tribal communities have an intimate connection with the natural environment that surrounds them. Today many of these areas have been severely degraded and are in danger of being lost if they are not protected. The Pee Posh wetlands located on the GRIC is an area that is being restored and protected so that future generations of Akimel O'odham (Pima) and Pee Posh (Maricopa) will have a chance to remain connected to these precious areas that do still remain. Efforts to provide various levels of protection and restoration of this site would not be possible without extensive coordination and cooperation between a variety of local departments, community groups and Federal and State agencies. A brief overview of the history of the site and the current restoration work that is being done will be covered in addition to how collaboration between the various groups has made the effort a success.

Liz Petterson, Executive Director
Arizona Land and Water Trust

Liz Petterson joined the Arizona Land and Water Trust (the Trust) in 2007 and has held the position of Executive Director since 2011. A native Tucsonan and University of Arizona graduate, she has been involved with natural resource public outreach/education efforts for over 20 years. Liz's extensive experience working with both rural landowners and the wide variety of land and water conservation tools available makes her particularly well-suited to furthering the Trust's mission: 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 has protected over 44,500 acres in southern Arizona since 1978.

Land and Water Conservation Toolbox

Since 1978, Arizona Land and Water Trust (the 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 has protected over 44,500 acres through more than 50 transactions by partnering with willing landowners and conservation buyers. We accomplish our program goals by completing transactions that link and protect working landscapes, scenic viewsheds, riparian areas, water for people and the environment, and a local food supply. Along with landowners, the Trust works with local, state, and federal agencies to protect land throughout the Gila River Watershed. In addition to our land protection work, in light of drought and observed changes in climate, we developed our Desert Rivers Program in 2007. Expanding our protection work to secure water for the environment and to sustain rural economies that will in turn preserve Arizona's unique environmental and cultural heritage, the Desert Rivers Program seeks to protect and restore desert rivers throughout the Gila River Watershed. We are currently implementing water lease agreements with landowners, our first established in the fall of 2012 and renewed for a subsequent year in 2013. The Trust continues to be particularly well suited to advance the transactional water agreement model in Arizona based on our long history of land protection successes, landowner partnerships, and the water trust model.

Peter Skidmore, P.G., Program Officer
The Walton Family Foundation

Peter Skidmore has spent 20+ years dedicated to conservation and restoration of river systems and has authored numerous publications on river restoration planning and guidance. Previously, he was a Freshwater Program Director at The Nature Conservancy and most recently Principal of Skidmore Restoration Consulting, LLC. Peter has a BA in Geology from Macalester College and a Masters in Earth Sciences from Montana State University.

Watershed Planning and Collaboration and the Walton Family Foundation Colorado River Initiative

The Walton Family Foundation (WFF) Freshwater Initiative's primary objective is to ensure healthy and resilient communities of both wildlife and humans in targeted rivers systems, including the Colorado River basin. The initiative accomplishes its goals through economic incentives and other conservation tools, and through fostering collaboration among varied interests within priority tributaries. In the Colorado River, WFF strategies include improving river flow to benefit instream and riparian values, and riparian restoration to improve the quality of riparian habitat.

WFF invests in riparian restoration in five priority geographies: the Escalante, Dolores, Verde, and Upper Gila Rivers, and the Colorado River Delta region. In each priority geography, the Foundation supports the development of basin-wide restoration plans by multi-stakeholder watershed partnerships, focused particularly on the removal of invasive plants and restoration of native riparian vegetation. The Foundation then provides partial support for the implementation of those plans, helps raise matching funds to complete the work, and supports monitoring programs to track restoration progress.

WFF recognizes that enduring restoration success will depend not only on thoughtful planning and implementation of restoration and protection, but also on broad support for restoration work from a diverse community of interests. We support collaboration at two different scales: within priority geographies and basin-wide. Within priority tributaries, the Foundation has facilitated the establishment of watershed partnerships, provided financial support for watershed-scale riparian restoration planning, and has funded studies and analyses to support planning, implementation, and monitoring. At the Colorado River basin scale, the Foundation supports collaboration and sharing among watershed partnerships primarily through grants to the Tamarisk Coalition to develop and administer a Cross Watershed Network with annual gatherings to share lessons learned, an information clearinghouse, and professional network for riparian conservation.

Poster Abstracts

Listed alphabetically by first author; view during breaks and session on Friday; *student posters

Block, Michael. ***Drilling Municipal Wells and Minimizing Impacts to Riparian Areas - A Case Study.***

Metro Water a medium-sized public water utility serves 50,000 people in Tucson, Arizona. Two of its eastside wells are 49 years old. Metro Water initiated a replacement search location for one of the wells where the well lot has insufficient space to drill. The service area is 97% built out. This posed a serious challenge to find a vacant area for a replacement well site. Aerial photographs revealed the southern portion of a public elementary school was unused and had one acre of previously disturbed native vegetation and riparian habitat.

The replacement well project involved working with Pima County's riparian habitat ordinance and minimizing the disturbance by using a drilling method with a small footprint (100' × 100') and renting a portion of adjacent school property for materials storage instead of employing conventional drilling methods that would disturb the entire one acre site.

Due diligence investigations were completed to ascertain whether the site was indeed suitable for a municipal supply well. Professional consulting firms completed archaeological, native plant, biological, hydrogeological, and environmental assessments, plus mitigation plans. Metro Water hired a drilling company with a dual rotary rig to test the aquifer's productivity and water quality to a depth of 1,000 feet. These investigations produced positive results and the well is now functional and designed to minimize impacting nearby shallow groundwater.

Metropolitan Domestic Water Improvement District, PO Box 36870, Tucson, Arizona 85740

Breedlove, **Samuel J.** ***Utilizing the Arizona Department of Environmental Quality's Water Quality Improvement Grants to Protect and Enhance Riparian Areas as a Way to Reduce Nonpoint Source Pollution in Impaired Waterways.***

The Arizona Department of Environmental Quality offers Water Quality Improvement Grants to reduce nonpoint source pollution in the impaired waterways of Arizona. These grants can be used to protect, enhance, or establish riparian areas as a way to reduce nonpoint source pollution. This poster session will be used to inform guests of the opportunities for funding through this grant program, the restrictions involved and clearly define the eligibility requirements for the grant program. The Arizona Department of Environmental Quality's Water Quality Improvement Grants are provided by funding from the Environmental Protection Agency.

Arizona Department of Environmental Quality, 1110 W. Washington St. Phoenix, Arizona 85007

Connor, Kate [1], S. Bolduc [2], H. Lasham[3], and D. Brosnihan[2]. ***A New Approach to Designing River Parks: Integrating Restoration Design at Santa Cruz River Park from Ajo Way to Silverlake Road.***

The Pima County 2004 Bond Election authorized the construction for flood control improvements and linear river park system improvements along the Santa Cruz River from Ajo Way to Silverlake Road. Explicitly mentioned in the 2004 Bond Election verbiage was ecosystem restoration and riparian habitat enhancement. With direction from the Bond, the Paseo de las Iglesias Phase 1 project, strove to balance the 3 goals of providing erosion protection, river park and ecosystem restoration.

[1]RECON Environmental Inc. 2033 East Grant Road Tucson, AZ 85719: [2]Pima County Regional Flood Control 97 E Congress St Tucson, AZ 85701: and [3]Psomas 333 E Wetmore Rd, Tucson, Arizona 85705

Hullinger, Ashley, and Mead Mier. ***Tracking Drought Impacts along the Lower Cienega Creek, Pima County.***

Considering the low vegetative productivity in arid landscapes, streams and rivers are unique productive systems in Arizona that are especially sensitive to disturbances such as drought. Pima Association of Governments (PAG) has consistently monitored the shallow groundwater-dependent riparian area of Cienega Creek Preserve on a monthly and quarterly basis since 1989, allowing them use this rich dataset to track and evaluate the seasonal, annual and cumulative impacts of drought. This Preserve, located outside of Tucson, Arizona, is the site of a rare, low-elevation perennial stream that is of regional importance for its environmental and recreational value, designated as an "Outstanding Water" by the State of Arizona. The Cienega Creek Preserve contains critical habitat for many wildlife and plant species, to which the impacts of drought pose a serious threat. In 2014, PAG's analysis determined several record-breaking water level trends that indicate a heightened level of risk to the ecosystem due to drought, especially during the driest times of the year. Recent results include the lowest flow length in our historical record at 0.86 mile in June 2014 (9% of the full 9.5 miles of flow extent observed in June of the mid-1980s). Other findings include the lowest levels of average annual streamflow on historical record and a 5-foot drop in average well levels with some wells dropping as much as 12 feet in one year. In light of these circumstances, PAG recommends increased coordination with landuse planners, managers, water providers and well owners to encourage conservation strategies near vulnerable riparian area.

Pima Association of Governments (PAG), 1 E. Broadway, Tucson, Arizona 85705

Meader, Norman. ***Riparian Mesquite: How Much Water Does It Use?***

Mesquite water use became a political issue in 2014 in Arizona with passage of Senate Bill 1478, which prohibits the use of Water Protection Fund money to restore riparian mesquite while allowing its use to remove mesquite in all environments. Some in the agricultural community have claimed that mesquite uses more water than any other plant or crop in Arizona, including alfalfa. This was a major justification for the new law. To address these claims, mesquite and crop water use in Arizona was reviewed. The primary data come from the work of Russell Scott on mesquite in the San Pedro Riparian National Conservation Area and from the work of L.J. Erie and coworkers on Arizona crops. These data show that annual mesquite woodland evapotranspiration (ET) is ~28-29", while annual alfalfa ET is ~74". When precipitation is removed from these figures, irrigated alfalfa is found to use 3 to 4 times as much groundwater per year as a mature mesquite bosque. In comparison with other crops, riparian mesquite ET is about the same as that of grains such as wheat, barley, or sorghum. Only vegetable crop ET is less. Mesquite uses less groundwater than most crops for four reasons: (1) it is dormant for 6 months of the year, (2) it redistributes and stores water in deeper soil layers during winter and summer rains for later use, (3) its canopy rarely expands to cover 100% of the ground area, and (4) it is naturally adapted to an arid environment.

Cascabel Conservation Association, 6146 N. Cascabel Road, Benson, Arizona 85602, and Lower San Pedro Watershed Alliance, P.O. Box 578, Mammoth, Arizona 85618

Morris, Gail, and Citizen Scientists. ***Preserving Threatened Monarch Migration Flyways in the Sonoran Desert.***

While monarchs instinctively fly south during their fall migration and do so over the entire state, the largest density is found in riparian and river corridors in the West. During spring and fall, these locations are home to more available nectar and *Asclepias* spp. (milkweed) creating ideal microclimates for successful breeding. In the fall, they provide flora corridors fueling the migration to Mexico or California while also stabilizing temperatures necessary for reproductive diapause. Through tagging and monitoring of monarchs in their breeding and migratory flyways we have learned that rivers are a critical gateway in the monarchs' migration.

Southwest Monarch Study, Chandler, Arizona 85226 ; swmonarchs@yahoo.com

Mott Lacroix, Kelly[1], Brittany Xiu[1], Darin Kopp[2] and Sharon B. Megdal[1]. ***Considering Water for the Environment in Arizona through Understanding Science, Policy and Water-User Perspectives.***

In an effort to more deeply understand water governance in relationship to Arizona's riparian and aquatic ecosystems, the Water Resources Research Center has been working to examine how, if, and where we should be considering water for ecosystems in statewide water

management and planning decisions through the Connecting the Environment to Arizona Water Planning (EnWaP) project. The emphasis of this project is on exploring voluntary, stakeholder-driven options within the context of limited water supplies and existing water rights. The first project phase provides information on the water needs of riparian and aquatic ecosystems to stakeholders across Arizona through presentations, bulletins, and the development of a spatial/tabular database of riparian and aquatic species flow needs and flow responses. The second project phase consists of engagement to create a stakeholder driven "Roadmap" for considering the environment in Arizona water planning and management. The Roadmap includes: (1) concerns and ideas from a diverse array of Arizonans on water for natural resources; (2) lessons learned from previous efforts to consider water for natural resources in management ranging from an entire river to an individual ranch; and (3) recommendations and tools for how Arizonans might consider water for natural resources in their management and planning. This poster provides a summary of the EnWaP findings including knowledge gaps in flow needs and responses, perspectives on how we should provide water to those ecosystems, and recommendations and actions for how Arizona could move forward in our consideration of water for riparian and aquatic ecosystems in our management and planning.

[1]University of Arizona Water Resources Research Center, 350 N. Campbell Ave., Tucson, Arizona 85721; and [2]School of Natural Resources and the Environment, Biological Sciences East, Room 325, 1311 E. 4th St., Tucson, Arizona 85721

Palta, Monica, and Nancy Grimm. ***Nutrient Removal by "Accidental" Urban Wetlands in Phoenix, Arizona.***

Wetlands are typically constructed or restored to mitigate nutrient contamination of wastewater. In the Salt River in Phoenix, Arizona, a number of "accidental" wetlands have been created through a continuous supply of waste and stormwater that exits industrial and residential areas and enters the riverbed through outfalls. Storm and wastewater typically contains high levels of inorganic nitrogen, and nitrate contamination of groundwater in Phoenix is high. The aim of this research was to examine the potential for Salt River wetlands to attenuate nutrients along flowpaths under varying flow conditions. Samples were collected along flowpaths of different lengths (20-1,000 meters) downstream of six large, perennially flowing outfalls during baseflow and immediately after storm events. Total discharge into the wetlands increased during storm events as compared to discharge prior to storm events. Total inorganic nitrogen loading was higher during storm events as compared to baseflow. However, removal of inorganic nitrogen along flowpaths was high during both base- and stormflow. Flowpath length appeared to play a strong role in nitrogen removal, with longer flowpaths consistently supporting close to 100% removal of nitrate. Dissolved oxygen levels in the wetland also played a role; this was unsurprising, as sub-oxic conditions are required for microbial removal of nitrate. As water conservation practices in Phoenix increase, less wastewater is likely to reach the bed of the Salt River, potentially resulting in the loss of “accidental” wetlands. The results of

this study indicate, however, that protecting these wetland environments may be important for sustaining better groundwater quality in Phoenix.

School of Life Sciences, Arizona State University, PO Box 874501, Tempe, Arizona 85287-4501

Rose, Courtney, and Julia Fonseca. ***Protecting Riparian Areas with Cultural Resources Conservation Strategies.***

Pima County's modeling of the distribution of cultural resources shows that many significant archaeological sites overlap with critical riparian areas. The preferred mitigative strategies for cultural resources involve conservation and protection of significant archaeological and historic sites. Some of these approaches in the management of cultural resources have already protected important riparian areas. Our poster describes various strategies and tools currently being used in Pima County to protect cultural and restore natural resources along streams, springs, and riparian areas.

Pima County Office of Sustainability and Conservation, 201 N. Stone Avenue, 6th floor, Tucson, Arizona 85701

Sitzmann, Paul. ***Agua Fria National Monument Riparian Conservation, Restoration and Youth Engagement.***

The Agua Fria National Monument, managed by the Bureau of Land Management (BLM), is located approximately 40 miles north of Phoenix. The monument encompasses many riparian areas that support and abundance of wildlife species and historically supported native people. Due to riparian resource concerns, the BLM implemented OHV barriers and season of use restrictions for livestock use in the riparian areas of the monument. These actions have noticeably improved the riparian health within the monument. Riparian vegetation recruitment has increased as a result of these actions.

In an effort to both document these changes and engage youth, the BLM has partnered with the Audubon Society to implement both riparian and wildlife monitoring projects. Intercity youth have been provided the opportunity to participate in hands on activities such as Multiple Indicator Monitoring (MIM), fish monitoring and bird monitoring. Students that excel in the initial stages of the program are offered summer internships to conduct Yellow-billed Cuckoo surveys and habitat assessments with the Audubon.

The BLM has also developed a natural resource certificate through Phoenix College where students are taught fundamentals of riparian ecology and apply hands on projects. Students within the "BLM Field School" conduct in depth riparian monitoring and vegetation restoration projects within riparian areas of the Agua Fria National Monument. After the 16-week program, students earn 12 college credits and a Natural Resource Certificate.

This project has won multiple awards, including:

- 2014 Award of Excellence from the Arizona Chapter of the American Society of Landscape Architects
- 2013 Merit Award and the Award for Advanced and Innovative Application of Design-Build Best Practices from the Design-Build Institute of America
- 2013 Honor Award from the American Council of Engineering Companies
- 2012 Crescordia Award from Valley Forward (now Arizona Forward)

Agua Fria National Monument, 21605 N. 7th Ave, Phoenix, Arizona 85022

Stempniewicz[1], Victoria, Krista Sparks[1], Sharon Masek Lopez[1], Abraham E. Springer[1], and Lawrence E. Stevens[2].** ***Development of Monitoring Studies for Springs and Ephemeral Channels Within Four Forest Restoration Initiative (4FRI) Treatment Areas.

The Four Forest Restoration Initiative (4FRI) is a forest restoration project being conducted by the U.S. Forest Service and collaborators primarily to improve and ensure forest health and reduce the risk of catastrophic wildfire in four Southwestern national forests. 4FRI calls for restoration of springs and degraded ephemeral channels within treatment areas. Inventory data of pre-treatment conditions are needed for restoration and monitoring plans to be appropriately designed and implemented.

Very little is known about current conditions of the 39 miles of identified ephemeral channels in the Coconino and Kaibab National Forests treatment areas. Likely causes of degradation include reduced ground cover, presence of noxious weeds, tree encroachment, and the absence of natural fire, resulting in heavy channel erosion. There is no known standardized method to inventory ephemeral channels. A systematic inventory and monitoring process needs to be designed for semi-arid ponderosa pine forests in order to determine how to effectively restore these degraded channels. Preliminary research includes collection of historical data, conferring with land managers, literature reviews, and collaboration with local experts.

The U.S. Forest Service identified 74 springs within the proposed 4FRI treatment area. Additionally, 85 springs were identified outside of 4FRI treatment, but within 8 km (5 mi) of the treated area. Springs were cross-checked with the Springs Stewardship Institute database to determine extent of data. A total of 36 sites with no recorded prior inventory were surveyed for georeferencing, photography, water quality and discharge measurements, and present plant species. A monitoring study will be designed to test impacts of forest restoration treatment on springs using inventory data of springs within and outside of 4FRI treatment areas.

[1]School of Earth Sciences and Environmental Sustainability, Northern Arizona University, Flagstaff, Arizona 86011; and [2]Springs Stewardship Institute, Museum of Northern Arizona, Flagstaff, Arizona 86001

Tackett, Ian. ***Restoring the Salt/Gila Rivers: The Tres Rios Environmental Restoration, Phase 3A and 3B.***

Logan Simpson Design Inc. (Logan Simpson) was part of a multidisciplinary design build team responsible for the environmental restoration and rehabilitation for an approximately 1.5-mile reach of the Salt/Gila River between 107th and 119th Avenues for the US Army Corps of Engineers, as sponsored by the City of Phoenix.

The long-term goal of this project was to restore native Sonoran Desert aquatic and riparian habitats along this Salt/Gila River reach. Multiple iterations of hydraulically-modeled, site-sensitive riverbed recontouring (grading) plans were prepared and evaluated for hydraulic efficiency and cost effectiveness. The plans were developed with the intent to preserve important existing Cottonwood/Goodding's willow groupings that had been inventoried by Logan Simpson and known threatened and endangered species (yellow-billed cuckoo and southwestern willow flycatcher) habitats, to replicate as closely as possible historic braided stream patterns and cross sections, to seamlessly accommodate storm drainage inflow sources into the overall restoration plan, and to create sustainable, stratified native aquatic and riparian habitats. The project included the restoration of riparian and wetland marsh habitats, open water, and other upper terrace floodplain habitats along the River reach and the removal of exotic, invasive and/or noxious plants (predominantly salt cedar). Logan Simpson led the watercourse layout and alignment study, was the lead restoration designer, developed the restoration chapter of the design analysis report, and prepared native plant inventories, landscape and wetland restoration plans, a storm water pollution prevention plan, a spill prevention control plan, and operations and maintenance guidance to assure long-term success of the project.

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Verburg, Edwin, Catlow Shipek, Claire Zucker, and others. ***Restoration of Riparian Habitat Using Reclaimed Water in the Tucson Area.***

The City of Tucson and Pima County found common ground in an Intergovernmental Agreement (IGA, 2011) that focused on the restoration of riparian areas to ensure a sound future for native plant and animal species. The IGA set aside reclaimed water for riparian areas that would be undertaken by a number of governing bodies that contribute to the Conservation Effluent Pool (CEP). The CEP allows for an allocation of reclaimed water and effluent over the course of two periods of time. During the first five years, 5,000 acre feet are available, while up to 10,000 acre feet can be allocated in subsequent years.

The Community Water Coalition (CWC) was interested in helping facilitate the use of this resource, and approached the Mayor, and subsequently the County Administrator, about serving as a host to a task force that would help identify candidate project sites for the use of the CEP. Representatives from the CWC, City, County, and Pima County Association of Governments served on the group.

During the course of a little over a year, task force members identified 19 project sites for review and consideration. After review and deliberation, 13 candidate project sites were selected and placed into three groupings: 1) immediate potential, 2) strong potential, and 3) long-term potential. There are four project sites that are in the immediate potential grouping and can be implemented in the very near term. Of the 13 project sites, 10 have governing bodies that will serve as sponsors (City of Tucson, Pima County, and the Pima County Flood Control District). Recommended projects offer a mix of those near downtown and farther out. There is sufficient water under the CEP allocation to provide for the requirements of the 13 projects, and subsequent projects that may be identified in the future.

The City and County recently appointed Administrators to oversee the review of applications and annual reporting related to approved projects. It is anticipated that two projects will be implemented in the next six months to a year.

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Wilson, Natalie R. [1], Laura M. Norman[2], Miguel Villarreal[2], Leila Gass[2], Ron Tiller[3], and Andrew Salywon[4]. *Temporal Study of Cienegas at Cienega Creek Using Multispectral Satellite Imagery.

Desert wetlands, in particular those slow moving bodies of water known as cienegas, are important sites for biodiversity in arid landscapes and serve as sensitive indicators of hydrological functioning on the landscape level. One of the most extensive systems of cienegas, historical or extant, in southeastern Arizona lies along Cienega Creek. Satellite imagery analysis is often used to determine landscape level trends but cienegas present a challenge to traditional analysis methods. The Normalized Difference Vegetation Index (NDVI), a classic measure of vegetation greenness, reacts counterintuitively to open water and is affected by bare ground, both common occurrences in cienega habitats. Other remote sensing indices balance sensitivity to these environmental elements. This research explores these indices, applying them to Landsat Thematic Mapper satellite imagery from 1984 to 2011. The indices were compared for suitability in examining desert wetlands and trends in cienega productivity were determined. This research is valuable for scientists studying cienegas in other arid land ecosystems and for local BLM land managers seeking to restore or conserve local landscapes.

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Zugmeyer, Claire[1], and Akitsu Kimoto[2]. ***Tracking Wetland Conditions of an Effluent-Dependent River: the Lower Santa Cruz Living River Project***

Throughout Arizona the release of effluent is maintaining flows of many river reaches. Along the lower Santa Cruz River in Pima County, two major regional facilities release effluent into the river. These two facilities are undergoing significant upgrades. The release of higher-quality water is a key ingredient in supporting wetland health along the river, but how can we gauge conditions of this valuable ecosystem and community amenity? Pima County and Sonoran Institute have partnered to develop an annual report series to track and communicate wetland conditions. The Living River annual reports chart the status of the lower Santa Cruz River by presenting data on 16 indicators of wetland health with easy to follow text and engaging graphics. The first report on the 2013 water year, prior to the completion of upgrades, will be published in fall 2014. A committee of technical experts were provided with a detailed summary of what was known about the river in the *Historical Conditions of the Effluent-Dependent Lower Santa Cruz River* report (March, 2013). Using this knowledge, the committee selected appropriate indicators for the lower Santa Cruz River. How these indicators were selected is documented in the *Selection of Indicators of River Health for Effluent-Dependent Streams in the Arid West: The Living River Project on the Lower Santa Cruz River, Pima County, Arizona* (March, 2014).

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