

**Water Resources Research Center
2009 Annual Conference**

**Best Practices for Stakeholder
Engagement in Water Resources
Planning**

**Poster
Abstracts**

1. Forming the Agua Fria Open Space Alliance: Stakeholder concerns for natural resources in the Agua Fria River Basin

Author(s): Garry F. Rogers, Ph.D., President

Affiliation(s): Agua Fria Open Space Alliance, Inc.

Interested in the relationship between public lands and growing human population, a group of residents of the Upper Agua Fria River Watershed organized a series of meetings to learn more about public concerns and the need for action. The first meeting utilized a “focus-group” approach which allowed the 47 participants to discuss issues and choose those they considered to be most important. The majority of the group was concerned that damaging impacts are increasing. There was strong interest in taking action to prevent resource abuse, but there was uncertainty about the nature of the threats, the resource responses, and the appropriate mitigation strategies. We learned that continuing stakeholder engagement requires opportunities to participate in activities related to the central issues.

2. A Neighborhood Model for Addressing Urban Stormwater Pollutants

Author(s): James MacAdam

Affiliation(s): Watershed Outreach Coordinator, Watershed Management Group

Watershed Management Group (WMG) developed an innovative program to address nonpoint source pollution and stormwater management through an educational program with neighborhood residents. The two year program is focused on Tucson’s High School Wash and the surrounding Rincon Heights neighborhood. The core engagement process is a series of 10 public educational workshops on Best Management Practices (BMPs) for stormwater quality on right-of-ways in the Rincon Heights neighborhood. In this urban neighborhood close to the University of Arizona, stakeholders include renters, homeowners, landlords, and the UA, which owns several properties in the neighborhood. A core group of neighborhood residents participated in the design and placement of BMPs, engaged other neighbors and partners in the project, and leveraged significant resources for local watershed improvement.

In the first six months of the program, more than 100 people have been engaged through BMP workshops, and stormwater BMPs have been installed on 11 blocks in the neighborhood. Much interest and participation in the project has come from residents of other neighborhoods, including 7 citizens who have engaged in a WMG-led training to bring knowledge and lessons from this project back to their own neighborhoods. The poster presents lessons learned working with a neighborhood populated largely by renters (estimated 85% of residents) and students, and strategies for engaging these busy and transient stakeholders. It also discusses surprising successes that have come from engaging a core group of longer-term neighborhood residents, and how this project can become a model for other urban neighborhoods.

3. Public Attitudes toward Water Reuse in Southern Arizona

Author(s): Kerri Jean Ormerod, Christopher Scott, Anne Browning-Aiken

Affiliation(s) Dept of Geography & Regional Development; Dept of Geography & Regional Development/Udall Center for Studies in Public Policy; Udall Center for Studies in Public Policy, UA

Arizona is the fastest growing and driest region in the Southwest. Although conservation may delay the need for additional water resources, rapid urbanization, continued drought, and projected climate variability each points towards competition for increasingly scarce supplies. Effluent is often viewed as a “new” dependable water resource with the potential to enlarge municipal supplies through water reuse. Nonetheless, expanding water reuse is often met with

public opposition. This study aims to illuminate the importance of the social context in shaping public opinion of water reuse in three Southern Arizona communities: Casa Grande, Tucson, and Nogales. Here, we assess public perceptions by means of a community questionnaire covering a variety of water reuse options ranging from golf course irrigation to supplementing drinking water supplies. In addition, we survey attitudes concerning the suitability of water reuse, trust in regulators and local governments, and feelings about regional growth.

Close to 400 respondents overwhelmingly demonstrated concern about future water supplies in Arizona. While quantitative analysis of the data to determine common patterns of responses is currently in process, we expect that findings of this research can help inform policy makers and water planners when deciding how to optimize the outcomes of water reuse in Southern Arizona. This study sheds light on the social and political context relative to public perceptions of water reuse; however, further research will be required to fully comprehend public attitudes.

4. Upper San Pedro Partnership-Working towards Sustainability

Author(s): Susan Bronson

Affiliation(s): Upper San Pedro Partnership

More than 70,000 people share the Sierra Vista Subwatershed with the San Pedro Riparian National Conservation Area, established by Congress in 1988 as the first such area in the nation. Without a long-term water supply, neither the people of the area, nor the river will thrive. The 21 member agencies of the Partnership have been working together since 1998 to address these regional water needs.

Together, they have initiated, completed or supported over 100 projects including: new reclamation/recharge facilities in Bisbee and Huachuca City, storm water detention basins in Sierra Vista and on Fort Huachuca, the purchase of conservation easements to retire irrigated agriculture, leak detention and repair and artificial turf on Fort Huachuca, plumbing retrofit programs, toilet rebate and business retrofit programs, water conservation education programs, and revised codes, ordinances and policies.

The Partnership works with the Department of the Interior, Department of Defense, and Department of Agriculture to prepare annual reports for Congress that quantify progress toward reaching sustainable yield of groundwater resources. In 2006, they calculated the annual aquifer storage deficit to be about 5,200 acre-feet. However, they are also tracking other important indicators of sustainability as well, including regional aquifer water levels, streamflow, springflow, and hydraulic gradients to measure their progress.

5. Connecting Water Planning, Cooperative Modeling and Geographically Dispersed Participants in the Upper Gila River Basin

Author(s): Kristan Cockerill, Vincent Tidwell, Lacy Daniel, Amy Sun

Interdisciplinary Programs, Appalachian State University;

Geohydrology Dept, Sandia National Laboratories; Daniel Consulting;

Geohydrology Dept, Sandia National Laboratories

In 2004 the Arizona Water Settlements Act (AWSA) was signed into law, which provides New Mexico an additional 140,000 acre feet of water from the Gila Basin in any ten year period. In addition, the State of New Mexico will receive \$66M for “paying costs of water utilization alternatives to meet water supply demands in the Southwest Water Planning Region of New Mexico”. Further, if New Mexico decides to build a project to divert Gila basin water, the state will have access to an additional \$34-\$62 million. To help capitalize on this opportunity, Sandia National Laboratories, working with the New Mexico Interstate Stream Commission and the Gila-San Francisco Water Commission has convened a collaborative modeling team

The objective of this team is to develop decision tools to support implementation of the articles of the ASWA. Because of the geographically dispersed nature of the participating stakeholders implementation of computer-supported collaborative work (CSCW) was necessitated. CSCW was used to facilitate communication through web conferencing and email, data management through web-based file sharing, and in cooperative development of a system dynamics model. The case study reflects that, although it is not panacea, cooperative modeling utilizing CSCW can be a successful way to create a sense of community among geographically dispersed citizens and decision-makers to address contentious and complex water management issues. The purpose of this paper is to highlight “lessons learned” relative to applying cooperative modeling within a CSCW environment.

6. Consumer Social Responsibility

Author(s): Dr. Sabrina V. Helm

Affiliation(s): Norton School of Family Studies & Consumer Sciences, University of Arizona

Water is crucial to Arizona’s economy and to the health and well-being of its residents, and central concerns have been supply and quality. However, water conservation policy also needs to address the lack of individual perceptions of responsibility in water conservation on the consumer level. Social responsibility, i.e. the obligation toward the good of a larger social unit as opposed to the self alone, is a term usually applied to organization. An ethical or ideological concept, social responsibility can also be applied to consumers. No coordinated effort by corporations, organizations, and/or governments concerning global minatory trends, such as water scarcity, will be successful without consumer participation. Consumers are a pivotal stakeholder-group in the success of water conservation projects.

Consumer Social Responsibility (ConSR) is a concept which holds that consumers are accountable for their consumption behavior and its impact on the larger social good. However, ConSR has not been conceptualized or empirically examined in the context of water consumption. This gap is the starting point for a five-year research project that aims at answering the following research questions:

- How can ConSR be conceptualized and measured with respect to water consumption?
- What are determinants and consequences of ConSR as perceived by consumers?
- How can ConSR be managed in the context of water conservation?

The project is in its early stages; contacts and potential cooperation partners are sought.

7. City of Tucson/Pima County Water and Wastewater Study

Author(s): Nicole Ewing Gavin and Melaney Seacat

Affiliation(s): City of Tucson City Manager’s Office; Pima County Wastewater Reclamation Department

The purpose of the study is to develop a shared understanding of the facts and planning variables and work collaboratively toward a sustainable water future for the Tucson region. Intermediate goals of the study include 1) improving City-County collaboration on water and wastewater issues, 2) assembling a fact base about our water and wastewater systems and resources, 3) City and County agreement on specific issues including conservation standards and expanding the reclaimed system, the location of population growth and urban form, addressing environmental needs for water, and approaches to securing new water resources.

An extensive public involvement effort was established to include all interested stakeholders in the process – the majority of the residents of the Tucson metropolitan area. A 12-member citizen oversight committee was appointed to oversee.

Outreach was done to the general public, to utility customers, and to targeted groups and individuals identified as key stakeholders. Public meetings were the primary vehicle for public involvement; however a variety of other steps were taken to make the process inclusive, accessible, and responsive.

The process is ongoing, but Phase 1 led to a report documenting baseline data critical to moving forward. Lessons learned include the need to use a variety of ways to reach people, go to people rather than asking them to come to you, find ways to get people actively engaged, let people know they are being heard, focus on facts and recognize divergent opinions, have a clear scope and identify common understanding of the facts, be flexible in response to stakeholder suggestions.

8. Rainbow Lake Quality Enhancement

Author(s): Al Crawford

Affiliation(s): Show Low Creek Watershed Enhancement Partnership (SLC WEP)

Rainbow Lake was found to be impaired by the Arizona Department of Environmental Quality (ADEQ) in 1999, primarily due to aquatic weed growth, exacerbated by recycling of the biomass and by excessive nutrients mostly left over from the time that the lake was surrounded by homes with septic tanks. A Total Maximum Daily Load (TMDL) study approved in 2000 confirmed this problem.

The stakeholders include property owners on the lakefront, Show Low Irrigation Company, the town of Pinetop-Lakeside, the local chamber of commerce, Arizona Game & Fish, the city of Show Low, Navajo County, ADEQ, and the Arizona Department of Water Resources (ADWR).

A watershed partnership was established with these stakeholders in 1992 under the Rural Watershed Act, but became inactive from lack of funding and a plan to correct the problem. The SLC WEP was resurrected in 2002 with the help of ADWR and NEMO; a watershed management plan was developed and published. ADEQ provided a small 319 grant in 2005 for a project to implement 2 demonstration vegetated buffer strips (VBS) and to use outreach to educate and motivate property owners to plant their own buffer strips as one means to reduce nutrient storm water flow into the lake. The 2 buffer strips were planted last spring using volunteers. Master Watershed Stewards were trained and are monitoring and measuring the preliminary results.

Lessons learned include: (1) Engage the vested stakeholders; (2) Use multiple means of public communication to raise visibility of the project; (3) Take full advantage of the technical support available from ADEQ, ADWR, AZGF, and other agencies.

9. Establishing Pilot Programs for Supporting Environmental Water Needs

Author(s): Dr. Sharon B. Megdal, Joanna Bate, and Andrew Schwarz

Affiliation(s): Water Resources Research Center, UA

Most riparian areas in the Southwest have been lost or degraded in the last hundred years, and many riparian enhancement projects have insecure or insufficient water supplies. This poster presents a study of community-based programs to provide water for the environment, such as donation programs and Conserve to Enhance, a mechanism using voluntary municipal water conservation.

Donation programs have been implemented in several communities to fund environmental water needs. These donation programs increase public awareness of local water

issues and offer water customers the opportunity to contribute directly to projects that improve local environmental amenities. Schwarz and Megdal developed an alternative funding concept, called Conserve to Enhance that connects individual water use behavior with environmental concerns to generate funds for the purchase of water for the environment. It provides water customers the option of donating the money they save through voluntary water conservation to a fund used to purchase water for environmental enhancement projects.

Outreach efforts with municipal officials, water utilities, and environmental organizations are being conducted to identify possible partners to develop a pilot program that uses these mechanisms. A survey is being developed and distributed in several communities to assess local public support for these types of programs and gathering community input about program design and implementation. The results of these efforts will be summarized as guidelines for communities who are interested in implementing a program to pay for water for the environment.

10. Walking in their boots – Facilitating change in water strategies in rural Arizona

Author(s): Jan Holder

Affiliation(s): Gila Watershed Partnership

This poster addresses the challenges that face the Gila Watershed Partnership in facilitating change in water related issues including introducing new resources, techniques and technologies, understanding new water regulations, and modification of water use. Rural stakeholders, who include agricultural producers, local businesses, organizations, and rural governments, tend to resist change, and mistrust information from outside the community. Our work has taught us that to engage critical stakeholders, we need to know their histories and backgrounds, understand their issues and priorities, and address their immediate and long-term concerns. In order to facilitate behavioral change, we have found it is critical to involve stakeholders in the decision-making process, hire as much as possible from within the community, and ensure that the stakeholders get what they need out of the process.

11. Stakeholder Involvement and Priority-Setting for Transboundary Aquifer Assessment: The Case of the Santa Cruz and San Pedro River Aquifers

Author(s): Prescott Vandervoet, James Callegary, Sharon Megdal, and Christopher Scott

Affiliation(s): Udall Center for Studies in Public Policy, UA; United States

Geological Survey; Water Resources Research Center, UA; Udall Center for Studies in Public Policy/Dept Geography & Regional Development, UA

The Transboundary Aquifer Assessment Act, passed by Congress as Public Law 109-448 on December 6, 2006, authorizes the Secretary of the Interior to cooperate with the States and other U.S. and Mexican stakeholders along the southern international border to conduct hydrogeologic characterization, mapping, and modeling for priority transboundary aquifers. The San Pedro and Santa Cruz River Valley aquifers were designated as two of four priority transboundary aquifers by the Act. The Transboundary Aquifer Assessment Program of Arizona (TAAP-AZ) is the Arizona component of assessment activities; related assessments are also occurring in New Mexico and Texas.

Binational meetings and field visits have been organized by TAAP-AZ in an effort to convene stakeholders and outline priorities for future aquifer assessment activities. Multiple levels of government as well as academic institutions and non-governmental interests have been engaged in the priority-setting process. The Upper San Pedro Partnership already provides a network for stakeholders in that region, but the Santa Cruz River does not have a similar framework for stakeholder engagement.

The engagement processes involved in the formation of a working group of stakeholders have brought to the fore existing challenges due to differing stakeholder priorities. One of the immediate products of the stakeholder engagement process involves an electronic database of reference materials related to hydrology, geology, land use, water quality, and institutions of the transboundary Santa Cruz River Valley aquifer. The compilation of such materials has only been possible with the assistance of the multiple stakeholders who have made available their reference materials related to the study area.

12. What it means to provide institutional support for the integration of knowledges and actions: a study of the AWI

Author(s): Clea M. Senneville

Affiliation(s): School of Sustainability & the Consortium for Science and Policy Outcomes, ASU

This project is a study of the role of institutions that negotiate the relationships between communities of knowledge and action. It considers the qualities of institutions devoted to facilitating communication, knowledge-sharing and collaboration, and supporting conditions for mutual understanding among actors and stakeholders of a particular problem context. “Stakeholder engagement,” in myriad creative forms, is an essential aspect of such institutions’ efforts.

It focuses on the Arizona Water Institute (AWI), an organization that functions to support interaction among communities involved primarily in knowledge and information (e.g. university scientists), and communities involved in “action” (e.g. practitioners). The stakeholder population relevant to the mission and objectives of the Arizona Water Institute are federal agencies, Indian tribes, state agencies, local and regional entities, watershed groups, regional and municipal providers, private sector, professional associations and consultants, agricultural community, and environmental community. Specific stakeholder engagement efforts by AWI include publicly available reports and presentations of collaborative research projects, and highly participatory workshops.

The research involves understanding AWI: what it sees its role as and how it is addressing and engaging with stakeholder needs – particularly the proposal review process, its allocation of funding, and, to some degree, “lessons learned” from completed collaborative projects. Further, this research examines AWI’s actions, processes, and outcomes relative to its stated objectives, identified stakeholder needs, and expectations. The ultimate intent of this project is to offer the academy a novel approach for the study of similar institutions, as well as to contribute to practical conversation on “effectively” integrating the operations, products, and perspectives of information-oriented and decision-making communities.

13. Oak Creek Watershed-Students educate to Leave No Trace

Author(s): Barry Allan and Katherine Allan

Affiliation(s): Oak Creek Canyon Task Force

An important part of the Oak Creek Watershed is Oak Creek Canyon, which is visited by hundreds of thousands of people annually. Our Keep Oak Creek Canyon Beautiful anti-litter program has been very effective in past years helping to reduce pollution of Oak Creek, a designated outstanding watercourse. The poster artwork will be printed as handouts and used by students in our Trailhead Ambassador program which is a branch of the KOCCB anti-litter program. Students will be visiting campgrounds and day use areas throughout Oak Creek Canyon during the summer to educate visitors on outdoor ethics. The goal of the program is to eliminate litter, pet waste, used diapers etc. ultimately to reduce E.coli levels in Oak Creek.

The students will also be encouraging visitors to use our website www.oakcreekcanyontaskforce.org for any information they need regarding Oak Creek Canyon.

The web site is designed to be part of a continuing education process and appeals to visitors of all ages to also become “Ambassadors” because Oak Creek is part of their legacy, too.

14. Examining Stakeholder Engagement Through Social Network Analysis

Author(s): Adam Springer

Affiliation(s): School of Natural Resources, UA

This poster describes an ongoing, longitudinal social network analysis study being conducted with two watershed stakeholder groups in the Cienega Creek Watershed: the Cienega Corridor Conservation Council and the Sonoita Valley Planning Partnership. Social network analysis is a technique which has received widespread attention in numerous disciplines, but has remained relatively untapped in the environmental sciences. The purpose of this study was to analyze whether social network analysis methodology could be useful in understanding the structure and functionality of watershed stakeholder groups. Social network analysis relies on complementary visual and mathematical components. Diagrams can be created that show the linkages between stakeholders and the structure of their organizations, with statistics being calculated for characteristics such as the importance of any individual in moving resources within the network or the density of the social structure. Fifty-two participants from the two groups elected to participate in the study and provided data about their relationships with other stakeholders as well as their involvement in a variety of resource management activities.

At the conclusion of the first year of the study, participants were provided with diagrams and statistical analysis of their networks. These results have been directly utilized by the groups in securing funds, recruiting community support and strategic planning. Participants have widely reported that the study has improved the groups’ resilience in responding to internal and external challenges. These results indicate that social network analysis has much potential for further use in the watershed management activities.

15. DCDC (Decision Center for a Desert City) A boundary organization enhancing science-society collaboration for a sustainable water future

Author(s): Dr. Patricia Gober (PI) Katja Brundiers

Affiliation(s): Decision Center for a Desert City, Global Institute of Sustainability, ASU

Central Arizona, with its high exposure and growing population, is at ground zero for climate change. Its leaders must quickly secure sustainable water futures despite deep uncertainty regarding the region’s climate future and the best ways to model it. DCDC has engaged in a synergistic science-practice collaboration to develop an interactive model called WaterSim to support this process, simulating climate, land use, population growth, and water policy. WaterSim creates ‘What-if’ scenarios to explore different strategies for water management and their consequences.

DCDC seeks collaboration with a wide spectrum of stakeholders, including water managers, developers, city managers, and end users.

DCDC co-produces knowledge via a differentiated approach to stakeholder engagement. This poster presents selected projects to illustrate the different approaches, including: (i) WaterSim, designed to support decision making under uncertainty; (ii) participatory research projects, generating the science behind and beyond WaterSim; (iii) Water/Climate Briefings, a means of engaging with the wider public.

Common lessons learned: (i) include stakeholders early—beginning with the problem definition; (ii) approach science-society collaboration as an iterative, long-term relationship—

engendering needed trust; (iii) generate commitment among stakeholders and scientists alike to support each other in achieving results that are important for only one party (e.g. scientific papers, applicable solutions); (iv) there is a fine line between science and advocacy—DCDC acts as a boundary organization in the emerging field of transacademic research for sustainability.

16. Rainwater Harvesting Certificate and Demonstration Program

Author(s): Cado Daily

Affiliation(s): Cochise County Cooperative Extension Water Wise Program/ Dept of Geography & Regional Development, UA

The project addresses the issue of groundwater overdraft. Stakeholders include all users of the groundwater resource. The project involved a collaboration with University of Arizona staff and Texas Cooperative Extension in the development of a program and manual on rainwater harvesting for use by other Arizona Cooperative Extension programs statewide. It also involved collaboration with the Natural Resource Conservation Service and a local rancher on passive rainwater harvesting work, the City of Sierra Vista and with the University of Arizona South Foundation on the installation of active rainwater harvesting systems. Residents participated (20 enrolled) in a 5 class series totaling 20-25 hours of hands-on construction of and instruction on rainwater harvesting systems.

The project resulted in the construction of an erosion control structure and passive and active rainwater harvesting structures, including a 2500 polyethylene tank pressurized system to supply irrigation water to the City of Sierra Vista Animal Care Center (the first active rainwater harvesting system to be constructed on a City of Sierra Vista facility). Participants gained increased knowledge on rainwater harvesting and also took home for their use the 55 gallon barrels constructed during the project. It is anticipated that at least two of the demonstration projects will be used for stakeholder education.

Organizers learned that there is greater interest in stakeholder participation in rwh systems than was anticipated. Patience and good communication skills, energy, attention to detail are essential to assure confidence in functioning rwh systems. It is also important to be sensitive to established roles and power structures.

17. Evaluation of Paleohydrologic Data in Drought Planning for California

Author(s): Melissa S. Mauzy, Connie Woodhouse, Jeanine Jones

Affiliation(s): Graduate Certificate in Water Policy Program, UA; Dept of Geography & Regional Development, UA; California Dept of Water Resources

The California Department of Water Resources (CDWR) requires urban areas of greater than 3000 customers to assess and demonstrate water supply reliability under drought conditions for water management plans every five years. California Urban Water Management Plans (UWMPs) are based on instrumental hydrologic records that span a century at most. Water providers are asked to evaluate the impact of single and multiple dry years for their respective watersheds based on worst cases in the instrumental record, and demonstrate contingency plans for periods of shortage. Tree-ring based reconstructions of stream-flow and precipitation have repeatedly confirmed a broader range of conditions than the instrumental record depicts. In this project, a subset of the UWMPs is being evaluated to determine if paleohydrologic data indicates greater vulnerabilities to drought when compared to assessments based on the instrumental record. With this project, the CDWR will be considering the utility of incorporating paleohydrologic data into a legislatively mandated water planning process.

This partnership between the University of Arizona and CDWR will result in a proof-of-concept study that could be widely implemented in urban drought planning and applicable to

other state drought plans. Results will be communicated to CDWR's stakeholders via a workshop, and project methods and results will be made available through the CDWR drought preparedness website which will further educate stakeholders and other agencies interested in applying paleohydrologic data to drought planning.

18. Optimization of Water/Wastewater Efficiencies in Rural Arizona Towns and State Parks.

Author(s): Brian Billy

Affiliation(s): Dept of Civil Engineering and SAHRA (Sustainability of semi-Arid Hydrology and Riparian Areas), UA

The need to study the link between water and energy usage is vital to the state of Arizona in terms of its future economic development and overall quality of life. Small rural communities routinely spend over 50% of their energy budget to move and treat water. This can be attributed to rising energy costs, lack of funding, and inefficient systems' operation. The energy component utilized in the transport of potable water and wastewater processing is the focus of this study. A Phase I study, conducted by UA and NAU and funded by Arizona Water Institute, established baseline energy usage conditions for selected rural Arizona communities and state parks. The study involved on-site visits to each facility, meetings with water/wastewater personnel, collection of operations' data, and calculating the amount of energy (kWh) required to transport/process potable and waste water. The results of the study showed that faulty/unreliable metering devices, inadequate record keeping of flow data (leakage), inability to pinpoint wasteful energy devices, and non-implementation of energy/water audits are key deficiencies.

A Phase II study is underway to examine cost-benefit models to assist these small communities in their operations to minimize costs through evaluating which parts of the systems are the most energy-intensive and adjusting their operation scheme. The intent is to derive an algorithm that will help compare and normalize differences in the technical, operational and policy constraints that uniquely characterize each site. It is expected that the findings of these studies will assist rural, tribal, and private utilities in developing effective management schemes for their facilities in order to minimize costs.

19. The East Valley Water Forum

Author(s): Teresa Makinen

Affiliation(s): Makinen Professional Services and East Valley Water Forum

The East Valley Water Forum is a partnership of tribal, public and private water agencies and interested stakeholders involved in water resource management in the East Salt River Valley of Arizona. Our mission is to develop reliable water supplies through partnerships and a cooperative regional approach to water resource planning and management. Members share ideas, identify common interests, and explore water infrastructure development and resource strategies to ensure that groundwater remains a long-term viable source of water.

For the past six years, Forum members have worked together to better understand the regional implications of groundwater pumping and recharge in the ESRV. The impacts of current groundwater pumping and recharge were investigated and projections of future pumping and recharge were assembled. The projections were fed into a regional groundwater model, and the results were displayed in three dimensions with assistance from Arizona State University's Decision Theater. To answer the question of what should be done about the projected depletion of groundwater supplies in the ESRV region, Forum members identified three "scenarios: 1 "Business as usual", 2 "Maximize renewable resources/no new pumping after year 2020", and 3

“Focus on problem areas”. A groundwater model developed by the Arizona Department of Water Resources was applied to each scenario and the results analyzed.

The work resulted in a set of recommendations. Key among these recommendations was that East Valley water providers should continue collaborative work through the East Valley Water Forum, with the goal identifying voluntary regional cooperation strategies to manage the groundwater basin for the benefit of all.

20. Granite Creek Watershed Project

Author(s): Michael Byrd

Affiliation(s): Prescott Creeks

The Granite Creek Watershed includes nine creeks totaling approximately 60 linear miles and four lakes, including two impaired waterbodies. The project will concentrate on Granite Creek and its tributaries from the headwaters downstream to, and including, Watson Lake.

The objective is to determine potential causes for the pollutants of concern so that future on-the-ground efforts can focus on priority projects, so that in the near future Granite Creek and Watson Lake will meet water quality standards.

The Granite Creek Watershed Improvement Council (WIC) is a new effort that includes: Prescott Creeks, Arizona Department of Transportation, City of Prescott, Prescott National Forest, Yavapai County, Yavapai-Prescott Indian Tribe, Master Watershed Stewards, NEMO (Nonpoint Education for Municipal Officials), River Network, and Arizona Department of Environmental Quality. The WIC consists of stakeholders currently active in water quality issues in the watershed and the community. All members have been active in attending meetings, commenting on planning, and have committed to continued involvement in the project. Members have taken responsibility for leading various parts of the planning and implementation efforts.

Participants are knowledgeable about water quality challenges and eager to coordinate efforts. The WIC will work together to create a watershed plan for the Granite Creek Watershed and an on-the-ground implementation project. Lessons learned through this course of action will be documented to assist in making the process reproducible for other watersheds.

21. The Little Colorado River Watershed Coordinating Council

Author(s): David Newlin

Affiliation(s): Little Colorado River Watershed Coordinating Council

The Little Colorado River (LCR) Watershed Coordinating Council (WCC) is an alliance of local government, tribal, public and private watershed stakeholders dedicated to watershed resource management and conservation strategies within the Little Colorado River Watershed.

The Little Colorado Watershed covers two states, six counties, three tribes, eleven municipalities and many other entities and stakeholders who manage and regulate water resources. The WCC functions as an Action Team of the Little Colorado River Plateau RC&D, headquartered in Holbrook, AZ.

The LCR WCC coordinates education, networking, outreach and implementation of management and conservation practices through partnering with local, state, and federal agencies, tribes, communities, companies, organizations and other stakeholders. Its first goal is to build on existing resources to develop a comprehensive watershed management plan.

The guiding principles to which the LCR WCC is committed include:

- Coordination of all local water stakeholders and the public to work together
- Interdependency of all stakeholders and peoples, historically, culturally and currently
- Informed resource decision-making and management of the watershed's resources
- Scientific research in the watershed

- Education for future watershed needs protection and stewardship
- Wise stewardship of the watershed
- Partnership with natural resource, land and water management agencies and other stakeholders

22. Collaborative Efforts on the Eagle Creek Watershed

Author(s): Chase L. Caldwell

Affiliation(s): Upper Eagle Creek Watershed Association

The small ranching community in the Eagle Creek watershed was faced with a diminishing economy caused by a combination of increased federal regulations, drought, a reduction in livestock numbers and seemingly overwhelming issues with endangered species. Located in eastern Arizona on the Apache Sitgreaves National Forest, the property owners and ranchers came together to solve these challenges.

The Stakeholders were ranchers, land owners, citizens and the Forest Service supported by others interested in the area. These included many other government agencies, sportsmen's groups, and others interested in the community.

Concerned citizens began meeting in the mid 1990's and in 2003 the Upper Eagle Creek Watershed Association was organized. The group applied for and was granted a 501c3 non-profit status for the purpose of fund raising. From there regular meetings were held that included all of the stakeholders and supporters with the intent of accomplishing four main objectives:

1. To work together to preserve the heritage and traditions;
2. To improve and preserve the watershed and other valuable resources;
3. To protect, enhance, and increase habitat for wildlife and domestic Animals;
4. To find sustainable methods of economic survival within the Community.

The UECWA has been active in moving forward with these objectives and has collaborated with the Forest Service, AZ Game and Fish Department, the USFWS, and many other agencies to raise funds for range improvements all across the watershed. These have included protection of riparian areas and sensitive habitats, supported the FS thinning and burning projects and aided ranchers in developing alternative grazing programs that increase productivity while improving rangeland condition.

Lessons learned: Development of trust among all stakeholders and supporters is critical to moving forward. Ongoing education of the members has been essential to the understanding of the complex issues and developing a willing attitude to participate.