Forum on Water Management for Small Towns: Summary and Outcomes

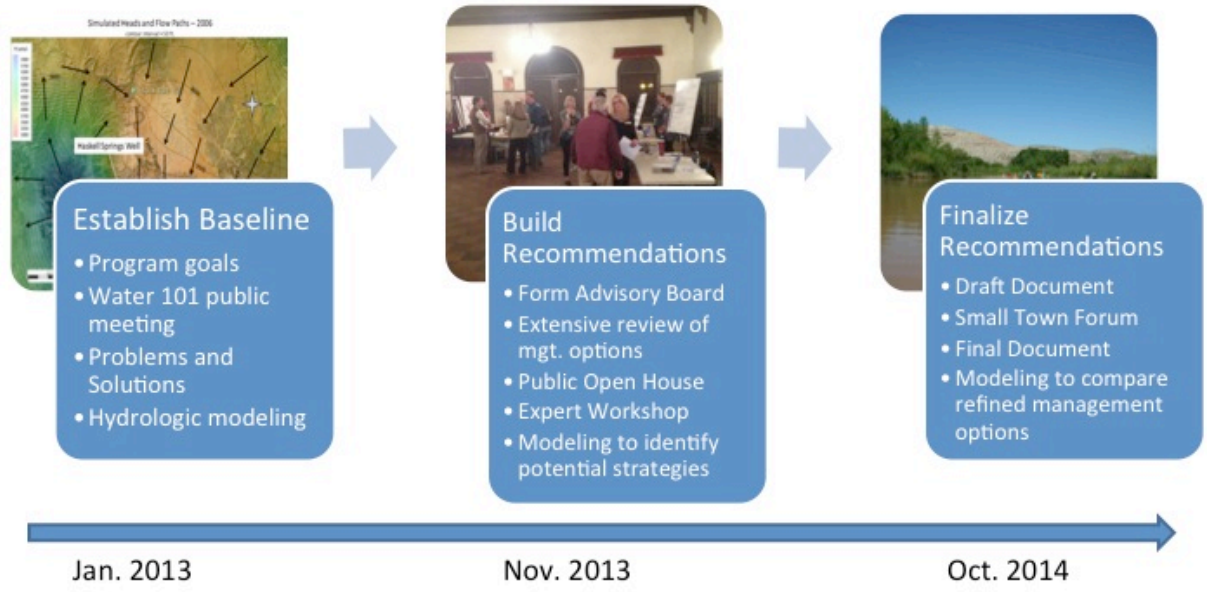
June 26th and 27th, 2014
Clarkdale, Arizona

In January 2013 the Town of Clarkdale, Arizona, began a multi-year process to create a Water Resources Management Program (WRMP) to protect the flowing Verde River while maintaining their water supply. As part of this process the Town hired the University of Arizona Water Resources Research Center to provide recommendations the Town could use to create their water management program.

In the 18 months since the project began, the Town and its project partners, WRRC and Lacher Hydrologic Consulting, executed the following tasks in support of the project:

1. Formed an advisory committee to help shape recommended strategies for the WRMP
2. Hosted public meetings and open houses to provide information on ideas for the WRMP and the hydrologic modeling process to the public and surrounding communities
3. Facilitated an expert forum to gain insight from water managers across Arizona on Clarkdale's water resource management challenges
4. Hosted a Small Town Water Forum to identify and develop strategies addressing the water management challenges unique to small towns and to review drafts of plans Clarkdale is developing for its Water Resources Management Program. Figure 1 provides an overview of the project.

Figure 1: Timeline for Creating Recommendations for the Town of Clarkdale Water Resources Management Program



This brief report provides a summary of the insights and ideas from the two-day Small Town Water Forum, held on June 26th and 27th, 2014 in Clarkdale, Arizona. The Forum was made possible by the generous support of the Walton Family Foundation and the Arizona Water Infrastructure Finance Authority. At the Forum, cities, towns and experts from Arizona and beyond (Table 1) discussed their water resource situations, water management challenges and solutions, and ideas for collective strategies to improve water management in small towns. The roster of participants was intentionally a mixture of communities with considerable experience in water management and planning, such as Payson and Sierra Vista, as well as those, like Clarkdale, that are still building their management programs. In addition to the 11 Arizona cities and towns, representatives from the Southeastern Colorado Water Conservancy District and the Orange County California Water District were invited to provide outside perspectives on water management and planning.

TABLE 1: SMALL TOWN FORUM PARTICIPANTS
City/Town or Organization Name
Town of Camp Verde
Town of Chino Valley
Town of Clarkdale
Cochise County Cooperative Extension
City of Cottonwood
Energy Policy Innovation Council
Town of Jerome
Orange County Water District (California)
Lacher Hydrological Consulting
Town of Payson
Town of Pinetop-Lakeside
City of Safford
City of Sedona
Sedona– Arizona Water Company
City of Sierra Vista
Southeastern Colorado Water Conservancy District
Town of Thatcher
Water Infrastructure Finance Authority
Western Resource Advocates
Yavapai County Water Advisory Committee

The Forum was designed to bring small towns together to share their water management challenges and successes, and to generate input and ideas for Clarkdale, in particular for the Town's WRMP. On the first day of the Forum, the WRRC, together with the Town of Clarkdale, shared the Town's water management challenges and ideas for a WRMP in order to get feedback from the other participants. The afternoon included a series of presentations on tools cities and towns can use, including financing options from the Arizona Water Infrastructure Finance Authority, techniques for conservation from the Southeastern Colorado Water Conservancy District, identification of opportunities for rainwater harvesting through the WRRC's Desert Rainwater Harvesting Assessment tool, and a database on energy policies created by the Energy Policy Innovation Council at Arizona State University. The remainder of the first day and the morning of the second were dedicated to each town or city sharing its water management story. In the afternoon of the second day, the WRRC led participants through an identification of strengths, weaknesses, opportunities, and threats (SWOT) regarding their ideas for improving water management in small towns. The SWOT exercises were first completed individually, then in groups of two, and then in facilitated groups of six. Finally, the Forum concluded with all participants together discussing action items for one of the many ideas that came out of the SWOT exercise. Details including the Forum Agenda, brief descriptions of tools and where to access them, detailed "Share Your Story" summaries, and participant evaluations of the Forum are included as supplemental information to this summary. This summary provides highlights from the Share Your Story portion of the Forum and ideas for improved water resources management from the Forum's SWOT analysis and discussion of ideas to improve water management in small towns.

Share Your Story

An important part of the Forum was the opportunity for each city or town to share its water management story. Before the Forum all participants were provided with a questionnaire to encourage each city or town to gather relevant information and present on similar topics. The presentations were very informal and

designed to allow the group to offer suggestions to the water management questions of the presenter or to learn from the experiences of the presenter. The following are highlights from these presentations. The Share Your Story questionnaire and a more complete summary for each participating town, city or organization are included in the supplemental materials.

Town of Camp Verde (Presenter: Stan Bullard, private water company owner)
Camp Verde relies on four private water companies in the town. Coordination between the town and the companies in regard to land-use planning is being investigated as a method for effectively managing the impacts of growth on groundwater supplies. This approach would also moderate the stresses imposed by new services on the existing older infrastructure and limited budgets of these small private companies. Currently, the town requires development costs to be paid up front by the developer, then repaid by water companies over time.

Town of Chino Valley (Presenter: Mayor Chris Marley)
Chino Valley is 100% dependent on groundwater and is exploring cost-effective options for groundwater recharge. Injection wells would be important in assuring recharge occurs in the targeted aquifer, which is situated beneath a layer of impervious clay. Both effluent and clarified stormwater could be applied toward recharge efforts.

Town of Clarkdale (Presenters: Mayor Doug Von Gausig, Ellen Yates and Kelly Mott Lacroix, WRRC)
Clarkdale has embarked on a far-reaching water management initiative to promote sustainable groundwater use and also to protect the flows of the Verde River. Following the 2006 purchase of the private water company in collaboration with Cottonwood, Clarkdale has created a public water utility to take over management of the potable water supply. The Town's Utilities Department works with the Town Council to develop and implement conservation policies using tools such as Arizona's Water Adequacy Program, landscape ordinances, increasing block rate pricing structures, and infrastructure repairs. In 2008 the Town adopted the Adequate Water Supply Requirement (SB1525). These combined measures have led to substantial water savings. A grant from the Walton Family Foundation allowed the Town to explore additional actions to promote sustainable water use, in part through partnering with groups like Lacher Hydrological Consulting and the UA's Water Resources Research Center to better understand groundwater hydrology, explore effluent reuse options and to develop a water resources management program.

Town of Jerome (Presenter: Former Mayor Jane Moore)
The water supply for Jerome is completely dependent on local springs that fluctuate depending on climate conditions. Land use ordinances are being researched to encourage sustainable development and better water management. Jerome has an upgraded wastewater treatment plant that generates about 56 acre-

feet per year (afy) of effluent. The downhill location of the plant in relation to the town complicates the prospect of effluent reuse in Jerome because the water would have to be pumped back uphill, significantly increasing the cost. Alternative uses include groundwater recharge, small-scale agriculture, instream flow augmentation of the Verde River, or leasing of the water to downstream users.

Town of La Junta, CO (Presenter: Tracy Bouvette / Southeastern Colorado Water Conservancy District)
Several small private water companies around La Junta are facing increasing maintenance costs, but customer bases are small (sometimes a few as 26 as connections) and funding options are extremely limited. The public utility, which has the power to tax or issue bonds, has been entering into partnerships and installing system interconnects with these private companies. The private companies still manage the operations and account billing, but have more reliable systems supported by the public utility. Through a larger customer base and more revenue, the public utility can provide the small private companies with better access to funding for targeted investments such as reductions in nonrevenue water, improved data collection, or increased water conservation that private water companies couldn't fund alone.

Orange County Water District/OCWD (Presenter: Adam Hutchinson, Recharge Planning Manager)
The OCWD offers a regional groundwater management approach. It supports the reliability of local supplies by providing the planning and oversight structure for recharge operations via the efficient capture of stream baseflows and stormwater flow. Very high-quality reverse osmosis (RO)-treated recycled water is also currently used for recharge, and may be eligible for other uses in the future. An incentive-based pricing system using an annually adjusted basin production percentage gives water providers flexibility in balancing their water supply portfolios while supporting costs for meeting the District's regional groundwater management targets.

Town of Payson (Presenter: Buzz Walker, Water Superintendent/Asst. Public Works Manager)
Groundwater recharge has been a critical component to Payson's water management efforts. The town currently operates 42 groundwater production wells. Payson also entered into a cooperative agreement with the sanitary district to build and operate the 40-acre Green Valley Park and lakes, which offers recreational opportunities to the community and provides an infiltration basin for aquifer recharge to help in sustaining the town's wells. Through a complex agreement with SRP, Payson is eligible to utilize water from the CC Cragin Reservoir that will also generate hydropower in the water-transfer pipeline; this water will feed into the new water treatment plant and contribute to the town's water supply for current use and groundwater storage for future use.

Town of Pinetop-Lakeside (Presenter: Andy Romance, Director of Engineering and Public Works)
Pinetop-Lakeside currently manages no public utilities. The largest water provider in the town is Arizona Water Company. The town is currently weighing the benefits and costs of establishing a public water utility versus collaboration with private water providers. Pinetop-Lakeside is seeking to achieve improved outcomes regarding per capita water usage, implementation of its land-use plan, and fire suppression preparedness.

City of Safford (Presenters: Mayor Chris Gibbs and Utilities Manager Eric Buckley)
Safford has been successful in developing relationships with other institutional partners in the region. Data collection and technological adaptation efforts have been improved due to assistance from the mining company Freeport-McMoRan (FMI), which has supported the drilling of several piezometer wells and experiments with a siphon system to augment the gallery infiltration system on Bonita Creek. Land owned

by the University of Arizona has been developed for two supplemental wells to broaden the water supply portfolio, but the town is still unable to meet demand outside its service area.

Town of Thatcher (Presenter: Mayor Bob Rivera)

Thatcher recently upgraded its wastewater treatment from a basic lagoon system to a wetland treatment system. The higher quality Class B effluent has additional allowable uses, but cannot be used on food crops. Thatcher has secured approval from ADOT, Graham County, and the railroad for the construction of a 4-inch line (uphill) through a ditch beneath the state highway, county roads, and the railway. The recycled water will be substituted for potable water and used to irrigate the recreational fields of a public park and the cemetery.

City of Sedona (Presenters: Charles Mosley, Director of Wastewater Department, and Keith Self, Division Manager at Arizona Water Company)

Sedona is moving forward with the use of recycled water for groundwater recharge through injection wells. Community members initially expressed reservations regarding contaminants of emerging concern (CECs). Effluent testing revealed that most CECs were filtered out at levels approaching 95-99% removal, and these test results have helped build public support for the recharge efforts. Monitoring of the injected effluent will continue, using tracers like sucralose (the main ingredient in sugar substitutes like Splenda) as indicators of the spread of the injected water plume. Arizona Water Company has effectively implemented a tiered water rate structure and water use has decreased. As a private water company regulated by the Arizona Corporation Commission, it has successfully raised rates to keep up with the cost of water supply delivery and infrastructure maintenance.

City of Sierra Vista (Presenter: Scott Dooley, Public Works Director)

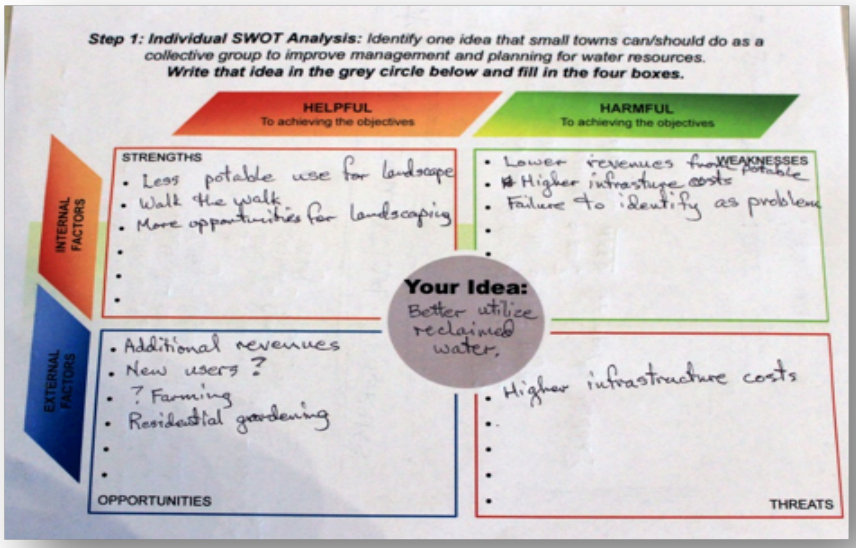
Sierra Vista has developed several initiatives to counteract the effects of a groundwater deficit from sustained pumping activity. Its Environmental Operations Plant generates and recharges Class A+ effluent via wetlands and infiltration basins to support baseflow in the San Pedro River, accrue recharge credits, and mitigate the impacts of the cone of depression in Sierra Vista. The San Pedro Recharge Program is in the process of designing a network of near-stream recharge basins to collect and recharge stormwater and other available sources of water in order to sustain base flows in the San Pedro River.

Ideas for Improving Water Management for Small Towns

Individual SWOT Analysis

To generate ideas for improving water management for small towns, the participants completed a SWOT exercise to identify opportunities to work collaboratively at a regional scale (see image on the right). Each participant was asked to come up with his/her idea or recommendation to improve management and planning for water resources, specific to small towns, and then think about the strengths, weaknesses, opportunities, and threats around implementation of that idea. As with a traditional SWOT analysis, strengths and weaknesses were considered internal factors from the perspective of a single town or water provider and opportunities and threats were considered external factors, from the perspectives of both the public and from a statewide stakeholder group focused on water issues (similar to the group convened for this Forum). Responses indicate that there may have been confusion about the difference between internal an external factors, but certain themes persisted throughout the SWOT exercise.

There were 22 forum participants who completed the SWOT exercise and as a result, 13 unique ideas were identified to improve small town water management and planning. These 22 SWOT analyses resulted in identification of 100 strengths and opportunities and 129 weaknesses and threats. Many times the same theme would be noted as both a strength and an opportunity or as a weakness and a threat.



Sample individual SWOT worksheet

The overarching theme presented at the beginning of the SWOT exercise was "collaborative work at a regional scale" and participants developed their main SWOT ideas with this regional collaboration in mind. Participants identified that collaboration could be used to broadly:

1. Develop and manage effluent resources;
2. Increase collaboration between private water companies and cities and towns, in general, and to overcome water shortages;
3. Identify common water management goals or a unifying problem on which to focus collaboration;
4. Develop a regional management plan;
5. Have a presence at the statewide level to improve services and financial stability;
6. Create and rely on a set of best practices in water management, including ordinances that promote water conservation, and have local communities all adopt/use similar practices and ordinances.

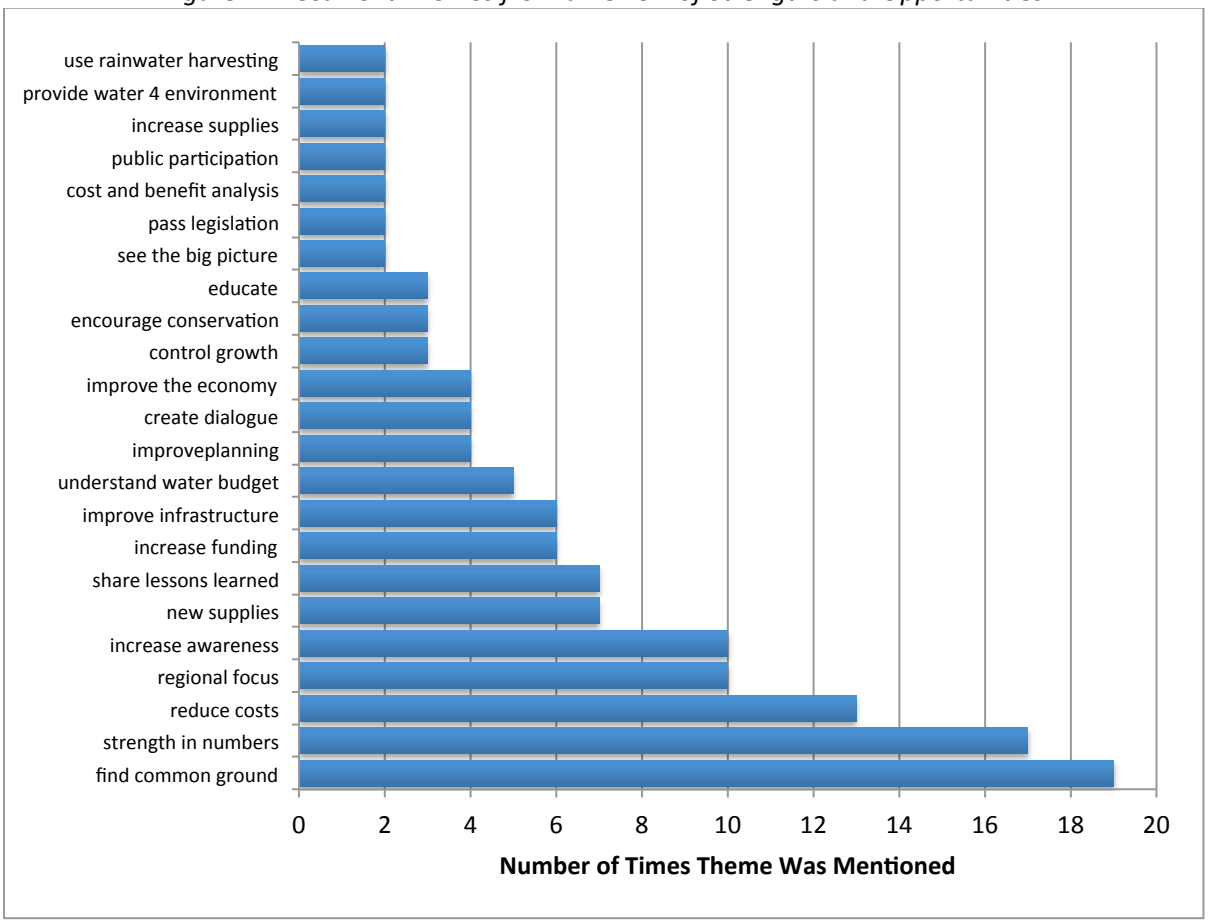
Other, more specific ideas included:

7. Implementing rainwater harvesting and stormwater recharge;
8. Better utilization of reclaimed water;

9. Creating a basin-wide groundwater management agency;
10. Concern that EPA and ADEQ prioritize the needs of the environment over the needs of human populations;
11. Educating the public on the carrying capacity of water sources, cost of importation alternatives, water shortages, and conservation measures;
12. Standardizing rate structure to a similar tiered system among small towns;
13. Explore mechanism to tie sewer rates to water use when the town does not own the water utility.

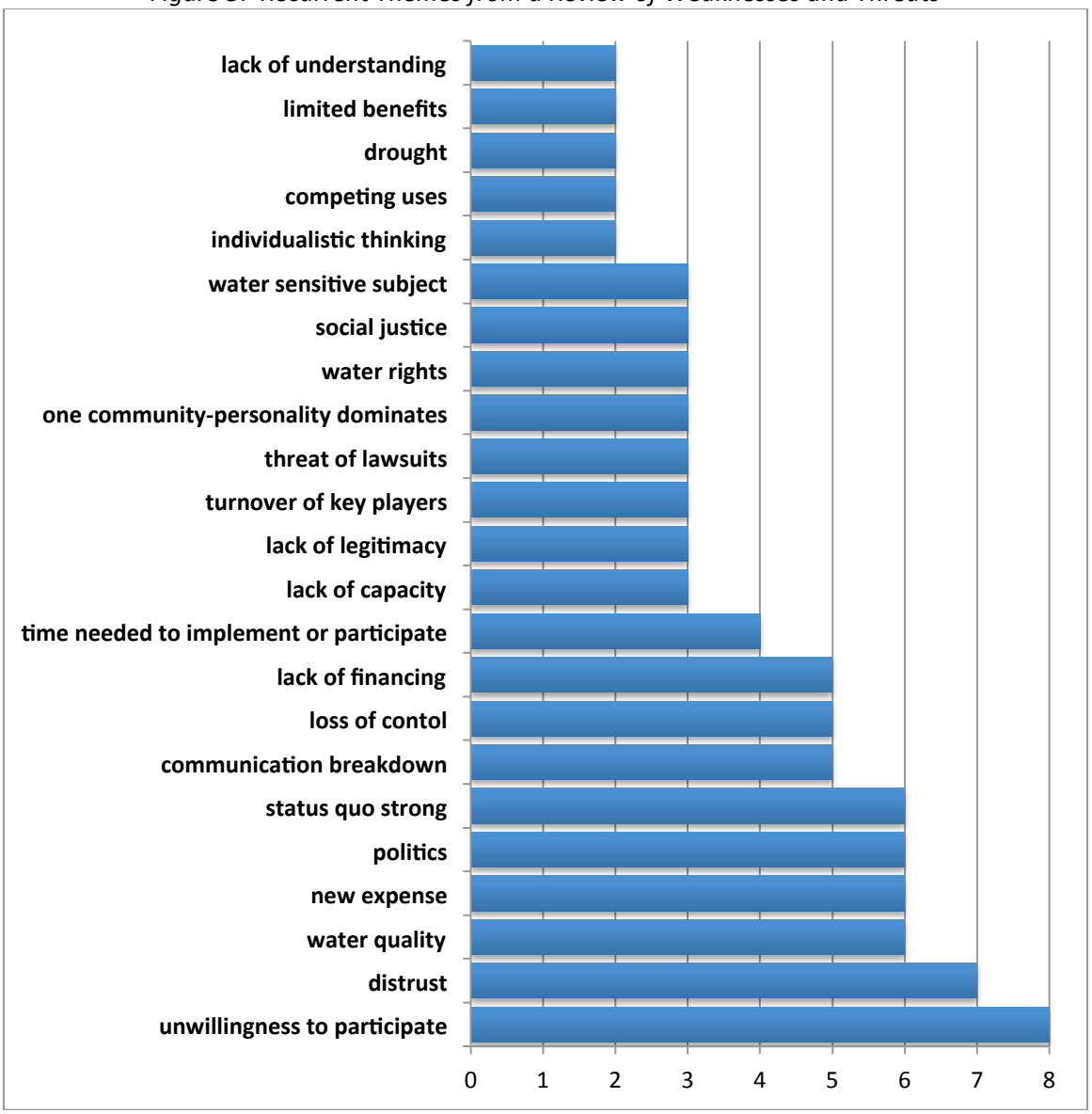
Among the 13 different ideas, many of the 100 strengths and opportunities were similar. The most frequently cited strengths and opportunities were: a) creating common ground among small towns, and b) the value of collective strength as it is engendered through that common ground. Participants also thought pooling resources to reduce costs and creating awareness were important strengths or opportunities for many of their ideas. Figure 2 lists all of the themes recorded more than once from the strengths or opportunities and how many times that theme was mentioned. There were an additional seven themes only mentioned once in the strengths and opportunities, including quality of life, decreasing lawsuits and increasing transparency.

Figure 2: Recurrent Themes from a Review of Strengths and Opportunities



There were 129 weaknesses or threats suggested for the 13 unique ideas for improving small town water management. For weaknesses and threats, there was less agreement across the different ideas and much more diversity in the themes. Although noted less than half as frequently as the most common strengths and opportunities themes, the most common weakness and threats themes were unwillingness to participate and distrust. Unwillingness to participate and distrust were noted in 11% (17 of the 129) of the total number of weakness or threats and in 25% of the ideas. Other more common themes cited that could prevent new approaches to management were: concerns with water quality, additional expenses, politics, and the strength of the status quo. Figure 3 shows only those themes indicated more than once in the weaknesses and threats. There were an additional 21 other weaknesses and threats themes including threats to the local economy, conflict with existing regulations, changes in climate and limiting creativity.

Figure 3: Recurrent Themes from a Review of Weaknesses and Threats



Group SWOT Analysis

The responses here are based on the individual and small group SWOT discussions. The format of the SWOT exercise was designed to gather a large number of ideas, develop those ideas further through discussion, and then narrow the many ideas down to just a few. At the conclusion of the three facilitated discussions conducted in groups of six, the top ideas from each group were:

1. Regional cooperation through a water advisory board;
2. Water authority that combines public and private systems;
3. Determining the best use of our reclaimed water;
4. Joint-exercise-of-power coalition to tackle water issues in the Verde Valley;
5. Overarching management plan at a basin scale (includes information, data, conservation actions and education).

Participants then used anonymous keypad polling to vote on the one idea for which the entire Forum would build action items. Based on the poll, the Forum closed with a discussion of a joint-exercise- of-power (JEP) coalition to tackle water issues in the Verde Valley (36% of votes). The overarching management plan idea received 26% of the votes and the regional cooperation idea received 16%. The selection of the joint exercise of power coalition idea was reflective of the fact that the majority of the small towns in the room were from the Verde Valley.

A JEP coalition to tackle water resource issues would be a way for multiple cities, towns or organizations in the Verde Valley to create/develop joint resources that can be applied to achieve collective goals (e.g., bolstering recharge or otherwise supporting baseflows). The group decided to focus on a JEP coalition focused on reclaimed water and stormwater, but acknowledged it could cover other aspects of water management. The advantages to this approach would be its ability to convene otherwise disparate folks, create economies of scale, and pool resources. The disadvantages would be reduced local control, the need for consensus among groups with different goals and concerns with equity. The people who would need to be involved at first would be those who are enthusiastic for this approach and then the coalition could gather others based on initial successes. It would also be important to identify stakeholders who would be impacted by the coalition and keep them informed and involved. The next steps for this idea would be to implement pilot projects, which can be good for “proof of concept” in that seeing the efforts in action on the ground might help others develop a more informed opinion. Interested cities and towns should also investigate where economies of scale are significant, and look for opportunities where pooling interests creates these economies of scale. Another next step would be to look at similar programs or coalitions and how they work so that the JEP coalition is not reinventing the wheel. There was also discussion that a first step could be an effort by towns and cities in the region to cooperatively change or create stormwater- or reclaimed water-use codes to provide uniformity across the Valley, which would benefit economic development. Finally, it was suggested that interested groups should not be discouraged by differing cultures within the jurisdictional boundaries because water does not care about such political lines; instead, the coalition should be based on the watershed boundary instead of jurisdictional boundaries.

The Value of Bringing Small Towns Together

The Small Town Water Forum was an opportunity to bring Arizona’s small towns and cities together to discuss water management and was an important event in the context of the Clarkdale WRMP project and the WRRC's program mission to help communities create a secure water future. To gauge whether this Forum was useful, as well as if another one should be held, the WRRC provided the participants with an online survey after the event. Overall, attendees who responded to the survey (18 responses out of 25

participants) found the Forum very useful, with an average rating of 8.5 on a 1 to 10 scale. In addition, all 18 respondents indicated another forum would be beneficial. One participant noted that it was "[v]ery useful to get all the organizations represented at such a high level. Story telling is critical to chang[ing] management and preparing for the future." This sentiment reflects the importance of the Share Your Story presentations as the single most valuable exercise of the Forum (average rating of 9.125). When asked what was the most valuable thing they learned at the Forum, participants discussed the value of understanding that each community is not in it alone, and that while they each face specific challenges, there are lessons to be learned from other approaches.

Participants who answered the survey also offered a number of ideas for the next forum. These proposals include a discussion of water supply development; legislative changes needed for better water management; what initiatives communities can enact even with the restrictions of Proposition 207[1]; and discussions of what communities have done since the 2014 Forum.

The feedback offered by the participants indicates that there is an unmet need in Arizona among small towns for a venue in which to discuss water management challenges and innovative practices. Unfortunately, neither the Town of Clarkdale nor the WRRC currently has funding to host a second forum. Financial assistance for attendees is particularly critical at a time when municipal budgets are generally strained and limit a town's ability to participate in such a Forum and benefit from the creative exchange of ideas and practices. The support of the Walton Family Foundation and the Arizona Water Infrastructure Finance Authority were, therefore, crucial to the success of this event, covering planning and logistics and coordinating travel and accommodations for the participants. The WRRC's mission necessarily focuses on providing assistance to Arizona communities in water planning and policy. Because of the strong responses from the participants regarding the value of this event, the WRRC is now committed to seek additional funding for a second forum.

Those interested in learning more about a future forum should contact the WRRC directly:

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(520) 621-3826

[1] Arizona Proposition 207, officially titled the "Private Property Rights Protection Act" was approved by voters in 2006, requiring the government to reimburse land owners when enacted regulations decrease the property's value and also prevents government from exercising eminent domain. (ARS 12-1134)

Forum on Water Management for Small Towns:
Appendix I – Agenda

Thursday, June 26th – Day 1, 10 am – 5 pm

10:00 am – 10:30 am	Welcome to the Forum (Town of Clarkdale & WRRC)
10:30 am – 11:30 am	An Innovative Approach to Local Water Challenges *Presentation of Clarkdale Primer & Draft Recommendations* Document (WRRC)
11:30 am – 12:00 pm Lunch	
12:00 pm – 1:00 pm	Continue Lunch and Discussion/Feedback on Clarkdale Water Resources Management Program Recommendations and Q&A
1:00 pm – 2:30 pm	Tools/Funding Opportunities • AZ Water Infrastructure Finance Authority (WIFA) • Southeastern Colorado Water Conservancy District • Energy Policy Innovation Council (EPIC) Database • DWHI Rainwater Harvesting Toolkit
2:30 pm – 2:45 pm	Break
2:45 pm – 5:00 pm	Share Your Story (20 minutes per Town) *What are your sources and uses of water?* *What are your top 3 water challenges?* *What innovative water management techniques have you used/plan to use?*
5:00 pm – 6:00 pm	Wine Tasting at Four Eight Wine Works
6:15 pm – 7:30 pm	Dinner at Su Casa

Friday, June 27th – Day 2, 8 am – 3:30 pm

8:00 am – 9:30 am	Share Your Story Continued (20 minutes per Town)
9:30 am – 9:45 am	Break
9:45 am – 10:45 am	Toolkit Cafés with Experts: • Reclaimed Water Use • Rainwater Harvesting • Financing • Water Districts • Conservation BMPs
10:45 am – 12:30 pm	SWOT (Strengths, Weaknesses, Opportunities and Threats) for Small-Town Water Management *What can/should small-towns do as a collective group to improve legislation, funding, information sharing etc. to improve management and planning for water resources?*
12:30 pm – 1:30 pm	Lunch (networking to meet new people)
1:30 pm – 2:45 pm	Create action items based on group SWOT analysis
2:45 pm – 3:15 pm	Concluding Remarks & Toolbox Takeaways

Forum on Water Management for Small Towns:
Appendix II –Tools

1. Arizona Water Infrastructure Finance Authority (WIFA)
   http://www.azwifa.gov
   WIFA is an independent agency of the state of Arizona and is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects. Generally, WIFA offers borrowers below market interest rates on loans.

   WIFA also awards Planning and Design Assistance grants. These grants provide funding for water infrastructure planning or design projects and prepare communities for necessary capital improvement projects.

2. Southeastern Colorado Water Conservancy District (SECWCD) BMP Tool Box
   www.secwcd.org/BMPToolbox
   The SECWCD is about 200 miles long, incorporating virtually all of the Arkansas River and its dependent communities. The District has integrated planning efforts among the communities served by the Fryingpan-Arkansas Project, a transmountain diversion that supplies southeastern Colorado with improved water supply for multiple uses.

   As a part of this effort, a conservation tool box has been created to address demand management issues throughout the basin. This tool box emphasizes the collection and use of data, which has also helped promote water conservation and evidence-based planning as a way to reduce demand.

3. Energy Policy Innovation Council (EPIC) Database
   www.energypolicy.asu.edu
   Energy policies made at the local level are difficult to find and monitor, but EPIC has created an online database of local energy policies that allows consumers and policy makers to explore trends and innovative approaches to energy policy across Arizona. This database holds to include ways that cities and towns are recognizing the water-energy nexus.

   On a separate matter, a municipality (or perhaps private developers) could partner with EPIC at ASU as part of a fee-for-use project to investigate its current policies and determine opportunities for improvements.

4. Desert Water Harvesting Initiative (DWHI) Toolkit
   www.wrrc.arizona.edu/dwhi
   The DWHI Toolkit is available online through the WRRC. It can be used to structure a facilitated assessment of a community's local resources and water harvesting opportunities and to determine how or whether certain water harvesting options could work in that community.

Forum on Water Management for Small Towns:
Appendix III – Detailed "Share Your Story" Summaries

Orange County Water District/OCWD (Presenter: Adam Hutchinson, Recharge Planning Manager)

The OCWD was formed in 1933 to protect the region's groundwater basin, which had begun to experience stresses such as notable depletion, subsidence issues, and saltwater intrusion. California water law supports this innovative system by requiring all well owners to pay to pump groundwater. This regional management approach supports the reliability of local supplies by providing the planning and oversight structure for the efficient capture and recharge of local flows (i.e., the Santa Ana River base flow as well as storm flow), as well as the strategic use of recycled water.

The OCWD employs several recharge facilities spread out over 1,590 acres (instream and off-stream locations), with infiltration rates that can average 10-12 feet/day. Over 100,000 afy of highly treated recycled water is stored through a complex groundwater replenishment system that first begand in 1975. Currently, there is no direct potable reuse (DPR). Given the very high quality of the RO-treated recycled water, the DPR conversation may move forward within the next 10 years if conditions (e.g., climate, drought, public sentiment) allow.

The OCWD serves as a wholesale water broker for 33 water providers. These providers are assigned a basin production percentage (BPP), which represents how much water providers can pump from aquifer before the price increases/equalizes with the cost of imported water (supplied by the Metropolitan Water District). The BPP, which currently hovers around 70%, provides an incentive for providers to switch to imported water as a way of decreasing their maintenance costs on groundwater pumping infrastructure. This incentive structure is used to protect groundwater levels. Thanks to managed aquifer recharge (MAR) planning, the OCWD can store 334,000 afy into the aquifer, which is three times the natural recharge rate. This allows for greatly enhanced resilience in regional water planning.

Town of Camp Verde (Presenter: Stan Bullard, private water company owner)

Camp Verde has four water companies in town. One of these private water systems dates to 1865 and the establishment of the original military facility of Fort Verde. The largest company currently serves about 1,600 customers. As private water companies, rate change cases must go before the Arizona Corporation Commission (ACC). Such reviews are generally expensive, particularly for smaller companies. The last review cost $50,000, and the cost of such a rate change case itself cannot be recovered through the rate change.

The oldest water system currently has two wells online, which cumulatively produce about 376 afy. There have been water quality challenges, particularly with arsenic exceedance. A WIFA loan of $1 million allowed for the acquisition of surface water rights through the CAP, but there were restrictions on surface water withdrawal by the U.S. Fish & Wildlife Service because of concerns regarding aquatic species in the river. As a result, a seven-mile line was built into town from the Mongini Well site, in part through an exchange of the CAP water with Scottsdale. There are two wells there in operation at present, with 4 million gallon storage and 4 pressure tanks. The new wells have experienced some fluctuating water levels;

water levels were at roughly 374 feet in 1999, then dropped around 25 feet in the 2000s, and then have more recently gone up again. Water loss is also an issue. There are approximately 45 miles of water lines underground. The current estimated water loss is around 14%. Until May 2014, however, the level was 25%. The discovery and repair of a leak has led to a notable improvement.

In terms of demand management, an increasing block rate was established in the last rate case (16 years ago), based on the requirements of the ACC, so users of over 50,000 gallons now pay a premium. There is currently no conservation tariff, but it will likely be required by the ACC the next time there is a rate change case. There is the possibility that coordination of water planning and local zoning rules would address the issuance of building permits and therefore how water companies would handle requirements to serve water to new developments. If the Town of Camp Verde were to pass a water adequacy ordinance, for example, a developer with a proposal for a new site would have to submit to the Town a certificate of water adequacy (as issued by ADWR), with indirect impacts on the private water utility. Water infrastructure development costs are generally paid up front by the developer, but the water company is supposed to pay back the costs, amortized over time.

Town of Chino Valley (Presenter: Mayor Chris Marley)

Chino Valley's water supply is 100% groundwater. There are two wells, but only one is currently in operation. The other well is sanded out, and there is no secondary supply. It produces about 500,000 gal/day at its peak in June. It serves about 700-800 customers *(rough estimates).* There are some arsenic hotspots in the Chino Valley area, necessitating regular water quality monitoring. Water use is about 90% residential. Most agriculture has left the area. The Town of Chino Valley is about 10,000, and the surrounding annexed area is equally as large. All surrounding residents are on private wells.

A notable water supply issue is tied to sheet flooding and inadequate stormwater collection systems. Finding ways of collecting that water, then allowing it to settle and clarify, could augment future injection projects. Injection wells would be very important, due to the presence of an impervious clay layer about 250 feet below ground, which prevents aquifer recharge via infiltration basins. Recharge projects would mitigate the ongoing depletion of the area's small aquifer (dropping at roughly one foot/year). Recharge would be helpful to mitigate this effect.

In terms of wastewater, there are about 300,000 gal/day of polished effluent released into recharge ponds. Increased effluent recapture could also be helpful, but is challenging because of large areas of low density, with residents dispersed across of 5 and 10 acre lots. Much of the area grew, and then incorporated later. It is generally not cost effective to attempt to put in sewer system infrastructure or purple pipes for recycled water in these areas. There are efforts to expand the wastewater system to the high-density pockets and plan for future effluent reuse (likely through injection wells). Monitoring of wastewater for injection would likely be necessary, however, since some residents connected to the sewer system are on private wells, and there could arsenic exceedance issues.

Town of Clarkdale – A full summary is prepared in the *Water Primer for the Town of* Clarkdale (available at: http://www.wrrc.arizona.edu/sites/wrrc.arizona.edu/files/clarkdale_primer_forweb.pdf)

Town of Jerome (Presenter: Former Mayor Jane Moore)

Jerome is a small former mining town with a local economy based largely on the arts and tourism. There is a year-round population of 500, but perhaps 2,000-3,000 visitors/day. The water supply for Jerome comes from eight springs. The spring water is collected into two lines and then chlorinated where the two lines meet. Annual water use is estimated at around 450 afy. The fire chief estimates a 20% rate of lost/unaccounted for water. There are a few commercial establishments (restaurants/bars/hotels) as well as some B&Bs with higher water uses. An estimated 2/3 to 3/4 of water use is residential. With the exception of a couple of small vineyards, there is little agriculture. Water rates are separated by residential and commercial use. The current water rates, based on the number of people per household, are: $25.36/month/1st occupant, then $33.20/month/2 occupants, and ~$41/month/3 occupants. Tiered water rates have been discussed, but not enacted as of yet. Commercial water rates are established at different levels. For a small business, the charge is currently $38.99/month. For restaurants/bars, the bill is based on number of seats. Bills are set up to read per 1,000 gallons. Very few customers use more than 10,000 gal/month.

Water challenges include fluctuating spring flows (strongly influenced by snowpack and major rain events), water line maintenance, and complications from a gravity-feed system. The water infrastructure was built well over 100 years ago by the United Verde Copper Company (succeeded by Phelps Dodge). The Town took over the water system around 1964, and maintenance has been an ongoing chore. The leaks were fairly severe in the 1970s, and the system was sometimes held together with baling wire. There was an occasional need for trucked-in water. Also, the area's acidic soils eat away at the early cast iron pipes. In the mid-1970s, there was a bond to repair 14 miles of main water lines into town. The gravity-feed system relieves the town of operating a pump, but the fluctuating pressures in the system require vigilant valve and regulator maintenance.

Increasing water storage capacity (now at ~600,000 gal) is another goal. Storage is currently for fire suppression, but it can serve as a back-up supply during drought conditions. The town's hilly topography complicates the placement of additional 200,000 gal storage tanks. Large commercial structures in town are now required to install sprinkler systems, in recognition of limited water supplies for firefighting and a local history of significant town fires.

In terms of innovative techniques, Jerome's small size allows for effective public outreach through word-of-mouth and postings in commercial spaces. Conservation incentives have been discussed, but are difficult to fund. In-town rainwater harvesting is being investigated, especially in regard to outdoor water use. Land use controls are also being researched as a way of encouraging sustainable growth patterns over time and managing the amount of water usage allowable for different commercial activities. Because of the small sizes of yards, and the general lack of lawns, outdoor water conservation is thought to be of limited opportunity. As for effluent management, Jerome has an upgraded WWTP that generates about 56 afy. Effluent reuse is also complicated by topography, since the plant is downhill from the rest of the Town. The treated effluent, which is regularly tested, is currently released into Bitter Creek. It percolates completely into the ground before it reaches the Verde. Other options include using the effluent to support small-scale agriculture or as a new water source for downstream water users.

Town of Payson (Presenter: Buzz Walker, Water Superintendent/Asst. Public Works Manager)

Payson's unofficial Town Motto: "If it's wet, we drink it!" The major components of the Payson Water Supply portfolio include: the wastewater treatment plant, groundwater, Blue Ridge/Cragin Reservoir (at a cost of $50 million for access/infrastructure), groundwater recharge, and a groundwater remediation site (to treat contaminated water, such as from residual dry cleaning chemicals). Current water use is about 1,600 afy, with about 8,000 connections and safe yield is 2,500 afy.

Water challenges include: 42 drought-sensitive in-town groundwater wells, growth pressures on a limited water supply, state laws not conducive to growth management *vis a vis* limited water supplies, restrictions on the expansion of the water system due to the presence of Tonto National Forest surrounding Payson on all sides, and limited funding opportunities.

Groundwater recharge will be a critical component to Payson's water management efforts. Payson will operate 12 aquifer storage and recovery (ASR) wells utilizing excess CC Cragin reservoir surface water. An example of effluent reuse for recharge efforts would be Green Valley Park, jointed paid for by the Town of Payson and the sanitary district. The Town owns the "bowl" of the reservoir and parkland, and the sanitary district provides enough water to take care of a 40-acre park/reservoir. The water percolates into ground and recharges the aquifer, which supports the town's wells. Excess treated effluent is used throughout Payson for golf course and sport field irrigation thus saving local groundwater for potable uses.

A central groundwater remediation treatment facility has been built in central Payson for treating contaminated water from seven central Payson wells contaminated by the improper disposal of dry cleaning chemicals and leaking underground gas station storage tanks. A cone of depression is also maintained to keep the contaminated water from flowing downstream. This system has been in operation for about 13 years and has reduced contaminant levels from 13,000 ppb to 5 ppb. (The federal standard is 5 ppb.)

Payson has also secured surface water rights in the Cragin (formerly Blue Ridge) Reservoir. The town filed for water rights in the Little Colorado River in 1994. As part of the transfer of the Blue Ridge Reservoir from Phelps Dodge to the Salt River Project in the early 2000s, Congress authorized Payson to utilize up to 3,500 afy from the renamed Cragin Reservoir. The water from Cragin Reservoir would be pumped over the Mogollon Rim, then gravity would carry the water downhill to a 3 MW hydropower station. The power generated could then be carried back over the mountain to power the pumps that empty the reservoir. The water is fed into a new Payson raw water pipeline near the head of the East Verde River. From there Payson's pipeline transports water 12.5 miles to a new hydroelectric generator and membrane filtration water treatment plant then an additional two miles into town to use for the public supply and excess water will be used for ASR work. The water's use is restricted, in that it cannot be severed and transferred to other users. Acquiring and planning for the use of these water rights so far has required four acts of Congress, with additional funding still needed. WIFA has been an instrumental partner in assisting with funding opportunities.

Town of Pinetop-Lakeside (Andy Romance, Director of Engineering and Public Works)

Pinetop-Lakeside has a year-round population of 4,200, but the arrival of summertime residents expands the Town to 21,000. There are no public utilities in the town. Arizona Water Co. is the largest water

provider. Sanitary sewer is provided through the Pinetop-Lakeside Sanitary District, but it is not directly affiliated with the Town. In terms of local conditions, the Town receives roughly 24 inches of rainfall annually. Elevation ranges from roughly 6,800-7,800 ft. There is a local irrigation water right dating to 1903 – predating the creation of SRP.

The lack of a public utility creates limits on what the Town can do to shape water usage, as well as in the implementation of land use plans and in fire suppression efforts. The current council is considering becoming directly involved in the water supply/management business. The alternate approach of collaboration and facilitation instead of outright ownership of a public utility is also being reviewed.

Town of La Junta, CO (Presenter: Tracy Bouvette / Southeastern Colorado Water Conservancy District)

La Junta was founded in 1892. The upstream Town of Pueblo has a water right going to 1865, and Pueblo relies on its rights for severe drought, which is problematic for downstream users. The Arkansas River is "too thick to drink, too thin to plow," and it tends to have low flows even in average years, yet its basin covers close to 25% of the state. Low flows negatively impact the local farming economy. The Town has experienced a decrease in population, due to the closure of a sugar beet factory and water exchanges with the Denver area that undercut the local agricultural economy. The Town currently has about 7,000 residents. There are 14 groundwater wells that provide 100% of the potable water. Reverse osmosis units are required to filter the groundwater. About 30% of the initial water is released as brine into the Arkansas River. Credits are given for this water flow.

Funding options are often limited. Small private water utilities have almost no opportunities. The public utilities do have access to state revolving funds. Construction loans are also available from the Colorado Water Conservation Board. There are some grant programs (federal and/or state) for conservation implementation as well.

Water quality issues are also a recurrent challenge in many areas. There are 18 private water companies under orders to cease operation in Colorado because of naturally occurring radionuclides. Treatment would cost millions of dollars. There are currently efforts to address these concerns in hopes of finding sustainable solutions.

In terms of innovative practices, water conservation efforts have paid large dividends. The Town realized that a reduction in its peak summer demand could reduce a third of its $6 million capital loan. There was subsequently a coordinated effort to remove most grass lawns in town to achieve these savings.

The public utility, which has the power to tax or issue bonds for maintaining/improving systems, has been entering into partnerships with small private water companies. The private water companies remain autonomous and still manage the operations and billing, but have a more reliable supply due to new interconnects with the public utility. Several local water companies have roots in a water truck route in the 1930s, which were later expanded to well service and 2-inch pipes in the 1950s through governmental grants/loans. Several of these small systems are failing (some with as few as 26 connections). The private companies still are faced with challenges, such as the lack of extensive maps and detailed infrastructure inventory. Board members are often older in age as well, and it is becoming increasingly difficult to find replacements for board members. These negotiations have resulted in three interconnections, with the possibility of five more in the coming years. Most of the expansion has been in the area of gravity-fed

systems. There is the possibility of including some with booster pumps, if the cost-benefit analysis works out.

Another innovative water management solution being pursued in the Arkansas River Basin is the creation of water authorities. Through an action at the County level, private water companies join forces to create a water authority, which then gives the private companies opportunities to pursue public funding and float bonds.

City of Safford (Presenters: Mayor Chris Gibbs and Eric Buckley, Utilities Manager)

Safford is one of only two Arizona municipalities that manages four public utilities (water, sewer, gas, and electric), although the service areas for the different utilities can vary substantially. Safford's water system has a service area that covers about 90 sq. miles. The water utility has 7,895 water connections serving 25,000 people. The WWTP, however, serves only the 10,000 residents within city limits. Over 1.2 billion gallons of effluent were produced in 2013 (~3,500 af). In past years, upwards of 4,400 afy have been produced (pre-drought). In terms of customer base, the system is about 90% residential. There are some large local users with limited conservation options. The state prison, for instance, used 4 million gal in the month of May 2014. The commercial customers have a flat fee for the WWTP sewer services. The sewer fee varies for households.

The Safford municipal system's primary water source is an infiltration gallery on perennial Bonita Creek. The land is mostly managed by the BLM. There are some endangered aquatic species in the creek. About three miles of aboveground pipes run through the canyon before exiting the canyon. The system is set up as a gravity feed system all the way to Safford. The system dates to the 1930s, and there are ongoing maintenance requirements. From about October to March, Bonita Creek can provide 100% of the water supply for Safford. Overall, Bonita Creek provides about 2/3 of Safford's water most of the year. After 19 years of drought, production has decreased about 20%. There is a difference in elevation of only 300 ft in the gravity-fed Bonita Creek system, which is not quite enough head to create an opportunity for small-scale hydroelectric power. The galleries are buried about 25 feet deep in the stream bed. Several tests are conducted regularly, the results of which are sufficient to preclude a designation of the sources by ADEQ as "under the influence of surface water". The water quality is much better than from well production. Only chlorine is needed for treatment.

The Town has 10 wells to supplement the water supply. Submersible pumps are typically operated in the wells. There are four active pressure zones. Booster zones are scattered around to help with water lift and pressurization. The reliability of individual wells has fluctuated over the course of the drought. Safford is located in a major agricultural area. Cotton is the main crop, with some hay and other crops.

Water rights play an especially crucial factor in the Upper Gila River Valley, given the allocation regime set forth in the Arizona Water Settlements Act of 2004. There is some surface flow in the Gila at present (June 2014), but a person could just about walk across and stay dry. Senior water rights holders downstream around Coolidge have to be satisfied before Upper Gila Valley users. Safford only uses subflow per the settlement agreement. The farmers have surface water rights, but they must also abide by the settlement agreement (which affects their total water allotment – a combination of surface water and groundwater). City of Safford is allocated about 9,704 afy under the current settlement within the zone from Bonita Creek

to the San Carlos Apache Reservation. About half of that is currently being used, so there is still room to grow within the allotment.

The farmers are forced to switch to groundwater pumping when there is low flow in the Gila, and Safford's wells can feel the impact. Overall, perhaps 30-40% of the wells in the valley are currently either dry or sucking sand. There are about 22,000 acres of farmland lying fallow because of the drought, the water settlement restrictions, and pump problems. Agricultural water conservation can be a double-edged sword. If farmers conserve more than 10% of their water rights, then the reliability of their water rights may be called into question. There is the added complication of retired farmlands. FMI's predecessor Phelps Dodge bought several farms in past years to gain access to water rights. At present, FMI has not actively used the rights.

The Water Reclamation Plant takes on about 900,000 gal/day. It could handle up to 2 million gal/day. It produces grade A+ effluent, most of which is pumped to a local golf course. Some has been made available for an adjacent hayfield for agricultural education.

The water utility has dealt with a range of challenges. The Safford Valley is rich in archaeological resources, so the installation of water mains can involve a fair amount of supervised digs – and potential delays. Water quality issues arise as well, especially regarding nitrates tied to the region's agricultural practices.

There have been significant expenses tied to storage tank construction/refurbishment, system maintenance, and the search for new water sources. The newer storage tanks cost about $6 million. There was an additional $3 million in debt for well field and transmission line improvements. WIFA has been a crucial partner in these projects. Because of careful management over time, communities tied to the public water utility have continued to enjoy high quality, lost-cost water for many years. Last year, however, a rate change was proposed and adopted. In some cases, rates went up at 300%. In the last few years, the drought has forced water restrictions and conservation-oriented rate increases. The rates now run from $1.44/gal up to $4.30/gal. This may still be cheap at the state level, but it was a cause of great discontent locally.

In search of water security and reliability, Safford has had success in applying several initiatives to improve its water management planning. The city utility has worked hard to develop a secure water storage system. There are 19.5 million gallons of storage in the system. These include steel welded tanks and concrete tanks. The largest component is an underground storage tank with a 10 million gallon storage capacity (dating to the 1970s). There were failures in the liner, and there was a substantial water loss. The lost water didn't appear for a long time, and then it resurfaced with little notice near the utility shed at Discovery Park. A tattletale drainage system was installed during the refitting in order to catch future leaks.

The search for new water sources is ongoing and has required cooperative efforts and the clearing of a variety of regulatory hurdles. Some sites for new wells were located on UA land, located 1.2 miles from the City. Permission was finally granted for transmission lines to cross BLM land and to follow a state highway. This expedited approval took 18 months. These two new wells will not have high water production levels (perhaps 700 gal/min), so they will only serve as supplemental water sources.

Data collection and technical adaptation are increasingly important for Safford's water system. The mining company Freeport-McMoRan (FMI) has assisted in the drilling of several piezometer wells. As the data collection process continues, more information will allow for better water management. FMI has also

helped in other projects, such as experimentation with a siphon system to augment the gallery infiltration system on Bonita Creek.

Water conservation has improved in response to the drought. Two years ago, the Mayor issued an emergency declaration for water restrictions. The ordinance was then reworded and categories of restrictions were created. This has led to a 16-17% reduction in water use. Perhaps a 30% reduction would be better. Even with the rate increases, about 20% of the revenues were cut by the conservation. Projects have been delayed, and in-house work becomes more common (as opposed independent contractor work).

Enforcement is a tricky subject. The ordinance, as currently written, allows for warning letters before a citation is issued. Only one citation has been issued to a major water user at present. Explanations of the water restrictions were sent out twice in the water utility bill. By way of comparison: Gayle Maberry (Clarkdale) described the signage placed all over town to alert neighbors to water alert levels. Ellen Yates (Clarkdale) mentioned that many warnings have been issued. Two citations have been issued in seven years.

Safford has developed an acute appreciation for the problems of water scarcity in times of extended drought. Being mindful of an old African proverb: "When the watering hole dries up, the animals look at each other differently," Safford hopes to build resilient partnerships with its neighbors in the future to help maintain mutually beneficial relationships during times of drought.

Town of Thatcher (Presenter: Mayor Bob Rivera)

Thatcher has 4,965 residents (2010 census). The Town does not currently have its own public water utility. Several hundred water connections are part of the Safford water utility, particularly in the older parts of the Town. Outside of Old Thatcher, there are a substantial number of private wells. The Town is in the process of consolidating local electric utility management for its residents from the local Co-op.

Thatcher recently upgraded its wastewater treatment from a basic lagoon system to a wetland treatment system, partly due to the encouragement of a cease and desist order. The effluent, produced at the rate of about 400,000 gal/day, is in the range of Class B, and cannot be used on food crops. ADOT, Graham County, and the railroad have agreed to allow a 4-inch line (uphill) through a ditch beneath the state highway, county roads, and the rail line to transport the recycled water for use as irrigation on certain publicly owned properties. Potable water would no longer be needed for these recreational fields or the cemetery. The goal is to have this improvement up and running within a year.

Water conservation is regularly promoted, especially through the reduction in outdoor water use. Convincing residents to switch to xeriscape landscaping is an ongoing challenge, however.

Public outreach and education remain very important in alerting residents to the issue of water scarcity and in encouraging water conservation. Mayor Rivera pointed out how he seeks to communicate the same message five times in five different ways. Reaching out to the school system has been especially effective in sharing the message with schoolchildren, who then can encourage water conservation at home.

City of Sedona (Presenters: Charles Mosley, Director of Wastewater Department, and Keith Self, Division Manager at Arizona Water Company)

Sedona has two private water providers – Oak Creek Water Company (serving about 1 sq. mi.) and the Arizona Water Company (AWC). (The issues facing the operation of AWC are explained after the discussion on effluent management.) The City of Sedona operates a wastewater treatment plant, which is located along Hwy 89A. At present, the effluent management plan envisions the continuation of about 100 acres of spraying, maintenance of the current 27 acres of wetlands, and development of up to 6 injection wells. The injection wells don't need much of a footprint – perhaps one acre/well, compared to other options.

Effluent disposal/reuse efforts have been dealt with quantity and quality issues in recent years. At the time of construction, ADEQ required as part of the permitting process that the water not leave the site. Production was initially about 600,000 gal/day. Once effluent production reached about 1.4 million gal/day, ADEQ required modifications to the effluent management plans to supplement the use of spray irrigation. Three options were reviewed: utilizing continuous spraying, utilizing wetlands, utilizing injection. Percolation rates were decreasing in the area being sprayed, due to chemical reactions in the soil. After a meeting with council, the decision was made to create 27 acres of constructed wetlands. It eventually became Sedona Wetlands Park. This was initially established as an effluent disposal project through evaporation and transpiration. There were impermeable soil layers beneath which prevented full infiltration. The CSAMT method was used to find suitable locations for test injection wells (at 30 to 60 day tests). As a result of the tests, there was evidence that up to 400 gal/minute could be injected.

Effluent quality issues went beyond questions of regulatory compliance, as there was notable concern in the community about contaminants of emerging concern (CECs). Testing of the effluent revealed that CECs were filtered out at levels approaching 95-99% removal. The pathogens would be more of a concern than the CECs. These results will be an important component of public education and outreach going forward. Monitoring of the injected effluent will continue into the future. Since sucralose (the main ingredient in sugar substitutes like Splenda) apparently was not showing much degradation in the treatment process, it could be used as an indicator of the spread of injected water.

Effluent treatment capacity has also been in flux. The initial plan contemplated the ability to achieve two million gal/day of treatment capacity. Tests indicated that only 1.4 million gal/day could be adequately treated due to changes in the strength of the wastewater entering the plant. Discussions with Prescott revealed that a similar challenge had been experienced there, and the response there served as a helpful model for Sedona.

Restaurant sewer charges have been revisited. Previously, restaurants had been charged based on their number of seats. Some restaurants found this approach problematic, since they might only serve breakfast, or lunch and dinner, or just dinner. Under the revised wastewater rate, sewer charges for restaurants are adjusted based on water usage. Alternately, if there is no water meter, there is the option of setting a sewer rate based on the square footage of the restaurant. Using water usage as a guide for setting rates has been explored; however, the bulk of the costs to the sanitary system is based on fixed costs, not just on the water usage. The charges are intended to reflect some of this cost structure.

A regional water credit program might spur on additional efficiencies and conservation initiatives. Sedona and other Verde Valley communities are not currently in an Active Management Area (AMA) or any other regional groundwater management district. If such a regional effort were to be created, other communities

might point out that Sedona's gpcd averages are high compared to their own. In such a system, water credits might be a useful tool to motivate additional water conservation.

Background on the Arizona Water Company (Keith Self)

The Arizona Water Company (AWC) was originally incorporated in 1955 in Bisbee when the Town of Bisbee got out of the water business. Since then, AWC has expanded throughout the state. AWC has 10,700 connections in the north-central region and serves most of Sedona and portions of other communities, including Oak Creek. In the early stages of the development of Sedona, each subdivision would have its own tank and well system. AWC began to purchase and consolidate these systems, with a focus on improving infrastructure. The current system utilizes 100% groundwater for its water supply. There are 22 wells with a daily demand of 3.5 million gal (about 3,500 afy). There are about 3,600 connections in Sedona. About 16% of the customer base is commercial in nature, mostly in Sedona.

Challenges for this system are similar to those already mentioned today. Maintaining aging infrastructure ranks high on the list, particularly given the complex interconnections among combined systems in the Sedona area. New regulations, such as those governing water quality, can be very demanding. Addressing revisions to the acceptable levels of arsenic is a case in point. Toward Rim Rock, arsenic levels approach 44 ppb in the groundwater. Closer to Sedona, the level is ~9 ppb. Also problematic is the effort to expand the system to meet new demands. A new gravity tank has been in discussion, but finding a location acceptable to the community has been very difficult. As a result, the alternative of using a buried tank with a booster pump is being explored.

In terms of innovative approaches, a range of tools is being used to promote water conservation. In recent years, a tiered water conservation rate was introduced. Since then, there has been an 8% decrease in water as a result. All of the different communities tied to the AWC system are now on the same rates. Investing in conservation and leak detection can be costly. The Sedona system received a particularly notable rate increase during its last rate case hearing before the ACC, which helps to defray such expenses. Additional conservation efforts could create further benefits, especially since the water consumption level in Sedona is currently at 345 gpcd (inclusive of commercial and residential users). A Best Management Practices guide (BMP) has been adopted to encourage conservation in landscape management and outdoor water use. Water waste rules are in effect, and investigations have been carried out. New homeowner programs have been implemented. Customer high water use notifications have been used as well. Leak detection has also been an ongoing project. "Nonrevenue water" losses were at 9-10% on average. So far, the conservation rates seem to have had the most impact on decreasing per capita water usage. (Terminology: Instead of a category such as "nonrevenue water" or "lost/unaccounted for water", AWC has three categories of water: sold, unsold, and unsold/accounted for.)

The AWC is also exploring ways of tying sewer rates to water use. Part of the complication involves the integration of potable water accounts and sewer accounts (currently set at a flat monthly rate of ~$13/mo.), which have been managed separately. A successful connection of the two could result in notable conservation dividends, since it could allow for a clear demonstration to customers of their water use. Understanding their comparable water use over time (including seasonally adjusted patterns) would lead to more informed customers, and potentially lower per capita water usage.

Getting approval from the ACC has been critical to allow for funds to maintain/improve infrastructure. In a sense, AWC can't afford not to submit a rate case to the ACC. In 2013, the ACC adopted a policy that would

allow systems to make infrastructure improvements without having to move forward with a rate change case. The Residential Utility Consumer Office (RUCO) has just filed a lawsuit challenging this policy out of the concern that it would result in the double billing of consumers, and the case is still working its way through the court system. This case is being watched with a great deal of interest.

A final note on the public/private water system discussion: A private water supplier can offer the benefit of a specialization in water provision (no distractions from other utility services) and experience/expertise. Cooperation with other entities remains crucial in planning and cost management. Negotiations over public rights-of-way are important, and good planning is critical to reduce failure of equipment and in the coordination of road replacement with utility maintenance/replacement.

City of Sierra Vista (Presenter: Scott Dooley, Public Works Director)

The U.S. Army installation of Fort Huachuca was established in 1875, and it remains a major employer in the area. The City of Sierra Vista grew up around the military base, and now has a population of 43,888 (2010 Census). In 1988, Congress created the San Pedro Riparian National Conservation Area (SPRNCA) in recognition of the unique attributes of the San Pedro River.

Addressing the groundwater deficit has been crucial in assuring the continued operations of Fort Huachuca and the City's economy. Water management efforts take a variety of forms. Groundwater recharge has been a major component of the WWTP program, which is responsible for about 2,500 afy of recharge. Cochise County has a water adequacy requirement, like Clarkdale and Yuma County. Regional cooperation has led to the establishment of regional recharge projects. Sierra Vista has participated in the Upper San Pedro Partnership (involving 21 different organizations) as a way of engaging with other local governments, agencies, and organizations in the watershed.

There have been a large number of studies funded by federal authorities, among others. It took quite a while to understand the components of the local hydrology and the effects of human consumption patterns. The resulting data have informed the development of action plans and the creation of numerous initiatives in targeting the most effective and efficient methods to address the cone of depression. The studies are available on the Upper San Pedro Partnership website (www.usppartnership.com).

Sierra Vista has implemented a variety of innovative approaches in its water management planning. New developments which create new stormwater volumes are required to find ways of shifting this stormwater into recharge areas, such as nearby washes. Building code changes have also been made in order to promote conservation. These include the establishment of low impact developments (LID) with landscape restrictions as well as the use of low flow toilets and other water-efficient fixtures. Sierra Vista was the first community in the state to adopt WaterSense standards. (Nearby Bisbee was second.) Sierra Vista probably has the largest municipal compost operation in the state. Biosolids from the wastewater treatment process are incorporated into the composting operations.

The Cochise Water Project has helped to promote voluntary water conservation, with special efforts to reach out to residents on well water who live in or near water-sensitive areas. A public-private partnership (supported in part through Walton Family Foundation support) has allowed a network of recharge basins to be constructed near the river to collect and capture stormwater/surface flow and allow it to percolate in order to support the groundwater levels and sustain base flows in the San Pedro. There is also a new toilet

replacement effort to change out 1.8 gal/flush toilets with 0.95 gal/flush toilets, for instance. Rainwater harvesting rebates and demonstration projects are also serving to increase awareness and promote conservation.

By way of comparison, Fort Huachuca can dictate a variety of compulsory conservation standards regarding on-base activities. The base has incorporated LID standards, applied reclaimed water to public recreation areas, and mandated water-efficient fixtures. The conservation efforts have been so successful that there are currently some problems with achieving sufficient sewer system flows for adequate sewer operations.

The City has made headway in addressing groundwater deficit issues, and other methods continue to be explored as ways of managing/recharging groundwater. The Environmental Operations Plant (a.k.a., the wastewater treatment plant) lies between the river and Sierra Vista's cone of depression created by groundwater pumping. The recharge basins there have very high infiltration rates. Their location helps to buffer the river from the effects of the cone of depression. This was the first recharge facility outside of an AMA that began accruing credits for future use.

The most critical local water management challenge remains how to address the impacts of the cone of depression created by groundwater pumping. The USGS modeling has helped to determine that recharge directly into the cone of depression might not have the intended effect, especially in the short- to medium-term. The use of the near-stream infiltration basins managed by the EOP has demonstrated that recharge could have dual benefits of protecting the river flows and addressing the cone of depression.

Other outstanding issues include the "Tribute Development" court case and the SPRNCA reserved water rights. A decision was recently handed down by a Maricopa County Superior Court, and an appeal is likely. There are also questions regarding the implications of the Gila River Adjudication on the San Pedro watershed.

Forum on Water Management for Small Towns:
Appendix IV – Participant Evaluation

Responses Received: 18

Number of Attendees (not including Clarkdale Team): 25

Response rate: 72%

Overall, attendees who responded to the survey found the Forum very useful (an average rating of 8.5 on a 1 to 10 scale) and all indicated that another Forum would be useful. One participant noted that it was "Very useful to get all the organizations represented at such a high level. Story telling is critical to change management and preparing for the future." This sentiment is reflected in the single most valuable element of the forum being the Share Your Story presentations (average rating of 9.125). When asked what their favorite aspect of the Forum was over half of the respondents to the survey indicated the opportunity to hear about other town's challenges and solutions. The remaining elements of the Forum, presentation on Clarkdale's water management issues and recommendations; tools and funding opportunities; evening social hour and SWOT exercise, all received an average score of about 7.5.

When asked what was the most valuable thing they learned at the Forum, participants discussed the value of understanding that each community is not in it alone, and that while they each face specific challenges there are lessons to be learned from other approaches. Specific responses included:

- Hearing about the similarities in each town's issues, and the governance issues each faces and how they address them.
- That private, small water providers do not always have their communities best interests in mind.
- Some different ideas we will have to look harder at.
- I gained an understanding of the differences and similarities of issues small systems face. All are unique, but some common threads
- Financing options; growing recognition of effluent as a critical resource; innovation/efforts to address local issues
- How the various towns have dealt with the drought in regards to rate structures, restrictions and media.
- What is being done, what is available, the hurdles of regulation that is likely to be encountered as one proceeds. The huge expense involved.
- Coming together, working together, sharing. That was a take-away from the SWOT priorities and that is a difficult thing to do but critical for water management.
- The need for collaboration and open lines of communication between all stakeholders.

Suggested improvements to a subsequent Forum included broadening the scope beyond the Verde Valley more, as the first part of the meeting was very focused on Clarkdale and the SWOT exercise ended up being about collaboration in the Verde Valley. Three participants thought that nothing should be changed. Other suggested improvements include:

- Limit comments from non-water providers.
- A matrix listing available actions municipalities can take to improve water management.
- More framing at the front end would help to manage participant expectations and help to guide participants in their role in the forum.
- I would add a legal component. Someone that can address the legal avenues to managing water in Arizona, the various legal structures that could be put in place, etc.
- More round robin discussions from the towns. I was very interested in hearing from them as to how they have been working through the water shortages.

As indicated above all participants who answered the survey thought another Forum should be held. Most survey respondents thought that a second forum should be 2-days long. The most common suggestion for topics at a second Forum was more share your story sessions, but including additional towns. Other ideas for topics to learn about or discuss at a second forum include:

- A list of water saving strategies, their effectiveness, cost to implement and if they are measurable
- Geology, forest issues and water
- More topics about water supply development and less about individual water system operations.
- More ideas on better use of reclaiming water and funding sources
- Legislative changes needed for better water management. Legal options to better manage groundwater, water use, zoning, etc.
- How legislation moves? Perspective on perseverance: Histories of major water projects.
- ACC impediments; land use/water use-what can communities do even with Prop. 207; resource planning; more on innovative strategies
- What did the communities do since the last forum? Did they use the tools? What happened?
- Randomly selected hypothetical situations and possible solutions. (brainstorming)