WATER EFFICIENCY CASE STUDIES - SUMMARY MEMO

October 2017
Water Efficiency Case Studies Summary
Memo
October 20, 2017

To: Brad Wind, Esther Vincent, and team at Northern Colorado Water Conservation District

From: Peter Mayer, P.E., Principal, Water Demand Management.

This memo provides case studies of four regional water efficiency programs that may be instructive to Northern as it considers developing an urban water efficiency program. Case studies on the following entities are included:

1. Arizona Municipal Water Users Association
2. New York City Department of Environmental Protection
3. Metropolitan Water District of Southern California
4. Jordan Valley Water Conservancy District

The case studies present varied models of regional water efficiency implementation from across the United States from both large and mid-sized entities. Three of these programs are well established and one (NYC) is still under development. A detailed description of each program is presented in this memo and from these common themes emerge. Key components associated with a successful regional water conservation program are:

- A clear sense of purpose and set of goals for the program;
- Full time staff with an annual budget;
- Program planning with member entity input;
- Regular meetings and close cooperation with member entities on implementation and education;
- On-going training and engagement.

The specific case studies are presented here.

The review of case studies was performed to inform potential water efficiency programs that Northern Water could consider offering its allottees and stakeholders. A menu of such programs will be compiled based on the case studies.
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I. Arizona Municipal Water Users Association

In Arizona, the Central Arizona Water Conservation District (often shorthanded as CAP or CAWCD) is not required to implement conservation per the Reclamation contract. That requirement is met by Arizona’s conservation requirements under the Groundwater Management Act. CAWCD has often discussed being more directly involved in implementing conservation efforts, but they are not a provider, so they play more of a general support/partnering role where there is a fit.

The Arizona Municipal Water Users Association (AMWUA) was originally incorporated in 1969 by the mayors of Phoenix, Mesa and Scottsdale who believed that cooperation would be necessary to secure and maintain water and water rights for urban uses. Today AMWUA includes 10 members.

When the Arizona Supreme Court limited the transportation of groundwater in 1976, AMWUA became a leading advocate for changes to the state’s groundwater laws. AMWUA was a key player in the development of the assured water supply requirements and other laws to protect municipal water uses.

AMWUA’s Regional Conservation Program is a collaborative effort of the conservation staffs of the ten AMWUA municipalities, working with local, state and federal agencies, professional associations, universities, and AMWUA staff to advance water use efficiency and conservation across the Phoenix metropolitan area.

The Regional Conservation Program was initiated in 1982 to assist the AMWUA members in complying with the recently enacted Groundwater Management Act, which included mandatory conservation requirements for large municipal water providers. The Association provided staff support and a forum through which the members pooled limited resources, identifying, evaluating, developing, and implementing successful programs. Working collectively, the members were able to meet their objectives more quickly and cost-effectively than they could have individually.
Over the course of the ensuing decades, AMWUA’s member municipalities have each expanded and honed their individual programs to specifically address their unique demographics, water resource portfolios, infrastructure, and water management objectives. Each employs professional conservation staffs to assist their residents and businesses.

The Regional Conservation Program remains central to conservation efforts across the greater Phoenix area, complementing, expanding, and supporting individual member programs and collaborating and sharing with other providers and agencies across the state and beyond.

The program is developed and implemented by the conservation staffs of the ten-member municipalities, assisted by AMWUA staff. The working partnership includes representatives from other agencies, organizations, associations, interest groups, and universities.

The program facilitates communication and information sharing to increase efficiency, limit redundancy, and promote a visible and consistent regional message. Staffs hone collective and individual strategies, review and contribute to the programs and policies of other water-related agencies, identify common issues and needs, and develop measures that support and advance the varied objectives and programs of the membership.

By pooling funding and the diverse expertise of its membership and partners, AMWUA has assembled an expansive toolbox of award-winning educational materials, training, outreach, and messaging (like the Water Use It Wisely program shown in Figure 2) that have had a substantial and long-term impact on the region.

Since the program’s inception, landscape water use has been a major focus for the program. The residential sector and the commercial, industrial, and institutional sectors are also addressed. In the 1980s and 1990s, facilitating the use of reclaimed water was another significant focus.

AMWUA’s annual programming budget for their regional program is $90k. That allows them to build and update publications and websites, half fund an FTE at Extension to implement a landscape professional training program (the other half of the FTE at extension is funded by Arizona Dept. of Water Resources), and supports other projects. AMWUA currently has about 1.5 FTE ($120K for staffing benefits, etc.). Total program annual cost: $210,000. AMWUA is an example of the remarkable things that can be accomplished with a modestly funded regional effort.
For AMWUA, FTE staffing is critical. AMWUA staff rely heavily on the input of the members, similar to MWD's approach with regional providers. It takes staff to organize and convene meetings of the members, manage projects, collect data, etc. Partnerships—with other water agencies, universities, the green industry, and others—have expanded their reach and effectiveness tremendously. It takes staff to build those relationships long-term and to assist program partners with their efforts, as well. For AMWUA, getting money for projects is easier than hiring staff.

AMWUA provides a valuable forum for the members to share expertise, information, ideas, challenges, and successes. The AMWUA regional providers have met at least monthly for 35 years and they work to build shared solutions that often take time to implement. It has proven cost effective and it is efficient. AMWUA members essentially share staff and the knowledge they offer. An example of this is how the knowledge of a local irrigation guru has been shared among AMWUA cities. The expert is on-call to whenever expertise is required, a particular benefit when there is high turnover of water utility staff. Its ultimate success is that more experienced member staffs mentor the newer staffs.

AMWUA offers shared publications and websites to members. These information hubs form the core of the regional effort and provide a visible common language and common message, that is shared by all the cities, the partners, and the green industry and beyond. Publications and the web site are highly professional and developed through the ongoing stakeholders process. AMWUA has the benefit of a membership of large cities with well-established conservation commitments, policies, and programs. Though staffing and programming vary considerably across the membership, there is substantial commonality among the members and a level of expertise that lends itself to shared regional efforts.

AMWUA’s Regional Conservation Program includes two non-member partner providers, Tucson Water and, more recently, the City of Flagstaff. These two communities are very similar in size and sophistication of demand management efforts. Smaller communities have asked to participate in the regional program, but in AMWUA’s experience, the needs of these communities are often dramatically different. They typically require more basic information and assistance and often don’t even know where to begin, and with a few staff running an entire water utility, they likely don’t have the capacity to do much. The more like-sized and situated they are, the easier it is to find a way to assist them collectively. Supporting these smaller communities would bleed limited staff time away from the members the organization serves.

AMWUA connects smaller providers to other resources, such as the Arizona Department for Water Resources, the Alliance for Water Efficiency, and EPA WaterSense. AMWUA shares information, publications, and similar resources with these smaller communities at cost of printing and partners with the Department of Water Resources, as practical, to provide other assistance. AMWUA is seeking more focused support for these smaller providers at the national level through the Alliance for Water Efficiency.
Providers and others from across the state are invited to join the Arizona Water Conservation Information Sharing Group. The InfoShare, as it is known, was created to facilitate wider dissemination of information and to offer a network to these smaller providers and the broader water conservation community. The contact list is maintained by a volunteer conservation professional and meetings are hosted around the state quarterly. Between meetings, information is disseminated via email.

Staff describe AMWUA as first and foremost, an advocacy organization. It exists to defend its members’ ability to provide assured, safe, and reliable water supplies to their communities. AMWUA retains a unique team with diverse backgrounds and expertise to support the members and mission. The professional staffs identify and research issues and offer independent analysis to AMWUA, assist in policy development, advocate on behalf of the organization, and facilitate the development of programs and resources.
II. New York City Department of Environmental Protection

Abundant, clean drinking water is one of New York City’s most valuable resources. Indeed, the successful development of new water supplies in a nearly unbroken search from the early 1800s through the mid-1900s has been a critical factor in the city’s transformation from a trading post to a global metropolis. The New York City Department of Environmental Protection (DEP) works under the authority of the New York City Water Board to operate and improve the water supply system including investment of more than $10 billion to complete the largest ultraviolet treatment plant in the world for the Croton watershed, a third water tunnel, new water mains, and the repair of dams and other critical infrastructure.

DEP has conducted a variety of water conservation programs in New York City dating back to the 1990s when thousands of fixtures were replaced with low flush models. But only in recent years has New York become interested in a broader approach that includes water use and efficiency of the 20+ communities north (upstate) of the City that purchase water wholesale from DEP under long-term contracts. These upstate water providers make up about 10% of the total water demand in the NYC system.
Figure 3: NYC water system
Interest in a regional approach to conservation across the service area was spearheaded by and infrastructure project. In 2021, The Delaware Aqueduct, a massive and essential conduit for New York City, will be shut down for six to eight months to allow DEP to connect a new bypass tunnel around the main area of concern. During this time DEP will need to augment its available supply and minimize water demand. DEP has evaluated various options and has rejected costly augmentation projects to bring in water on a temporary basis from New Jersey or Nassau County. Instead, DEP has developed a cost-effective program with a focus on water demand management, conservation and efficiency to ensure an adequate supply of water during the shutdown of the aqueduct.

DEP’s near-term goal is to reduce demand regionally by 50 million gallons per day (50 mgd) through five strategies:

1. Municipal Water Efficiency Program
2. Residential Water Efficiency Program
3. Non-Residential Water Efficiency Program
4. Water Distribution System Optimization
5. Water Supply Shortage Management

DEP will track the implementation of this Water Demand Management Program and progress toward the goal by reporting on the progress of the strategies and initiatives in an annual update to their water demand management plan.

In 2014, DEP contracted with Peter Mayer and WaterDM to develop a series of Water Demand Management plans for selected upstate water providers who purchase water wholesale from the NYC system. Approximately 10 plans have been developed to date for communities including Yonkers, Ossining, Scarsdale, Tarrytown, Mount Vernon, Greenburg, the Westchester Joint Water Works, SUEZ Westchester, and several others. This planning project has been funded at a cost of approximately $100,000 per year for WaterDM and associates consulting time and less than 0.5 FTE within DEP, shared across several positions.

Once a plan is complete, the community moves to the implementation phase. For regional program implementation, DEP has committed up to $17 million as part of the Water for the Future program. Participating utilities qualify based on the population they serve so larger
providers like Yonkers may qualify for well over $3 million. Smaller providers typically qualify for $500,000 or more for program implementation.

Key recommendations from the upstate planning process have included improved water loss control measures and accounting, monthly billing and improved billing practices, and limited fixture retrofits. A short-term emergency response plan has also been identified and if necessary developed for each community.
III. Metropolitan Water District of Southern California

1. Metropolitan Overview
The Metropolitan Water District of Southern California (Metropolitan) was established in 1928 under an act of the state Legislature to provide supplemental water supplies to its member agencies in Southern California.

Metropolitan is a public agency and a regional water wholesaler that serves about 19 million people across six Southern California counties. It is governed by a 38-member board of directors representing 26-member agencies that purchase some or all of their water from Metropolitan.

The mission of Metropolitan is to provide its 5,200-square-mile service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

Metropolitan draws water from the Colorado River through the Colorado River Aqueduct, which it owns and operates; from Northern California via the State Water Project; and from transfer arrangements and local programs.

2. Water Demand Management
Spurred by drought in the 1970’s, Metropolitan began actively pursuing water demand reductions in 1976 and has continued and expanded these efforts over the past 40 years.

Over the years, Metropolitan has successfully coordinated regional conservation efforts by regularly meeting with the practitioners among the member and retail water agencies in the region. The conservation and planning managers of these agencies convene at Metropolitan on a monthly basis to discuss Metropolitan’s regional program and their local efforts. These meetings have provided valuable guidance and feedback from people that work in the field of water use efficiency. A subset of these conservation professionals has been established as a Program Advisory Committee (PAC), comprised of staff from member agencies, retail agencies, and Metropolitan. The PAC is convened annually to develop recommendations for updating Metropolitan’s conservation program. The PAC performs the following functions:

- Identifies opportunities to improve water savings, regional benefits, and cost effectiveness
- Develops research priorities to guide the future of the conservation program
- Evaluates potential technologies and new implementation approaches
- Identifies new devices or services that should be considered for the conservation program
- Helps evaluate performance of existing programs, including verification of water savings
- Identifies opportunities for legislation and regulation to advance water use efficiency
- Develops protocols for evaluation, measurement and verification
- Develops general criteria that can be used to determine incentive amounts
- Develops recommendations on reasonable saturation levels for various devices
- Develops general criteria for sunset provisions for incentives
Most recommendations that Metropolitan staff brings to the Board regarding the regional conservation program have been reviewed with the PAC in order to get advice and feedback from water use efficiency participants.

Today, Southern California faces an extraordinary water challenge with severe drought conditions impacting the region. Metropolitan responded to this challenge with an unprecedented investment in long-term conservation and demand management.

Dry conditions in 2013 and 2014 were followed by a record low Sierra Nevada snowpack in 2015, triggering a historic set of water management actions throughout the state. Gov. Jerry Brown in April 2015 ordered the first-ever statewide mandatory conservation targets for cities, i.e., a 25 percent reduction in urban water use compared to 2013 levels. That same month, Metropolitan through its allocation plan enacted reductions in water deliveries to its 26-member agencies, effective July 1, 2015.

The water use efficiency programs and policies implemented by Metropolitan have demonstrably reduced per capita use, as shown in Figure 4. While per capita water demands declined between 1985 and 2015, the trend was not uniform. For example, dramatic demand reductions occurred in 1991, 2008, and 2015 due to drought conditions and mandatory drought response measures.
Figure 4: Average annual gross gallons per capita per day (gpcd) across the Metropolitan service area.

Figure 5 shows the same per capita use data along with winter precipitation, which is indicative of dry periods and drought in the region. The impact of the drought from 2011 – 2015 on precipitation levels is evident in this chart. Water demand is heavily influenced by policies such as drought restrictions that are imposed from year to year so the relationship between gpcd and precipitation is impacted.
The next sections briefly describe the water conservation program measures implemented by Metropolitan over the forty-year period from 1976 – 2016.


1976-77 – Severe drought. Metropolitan requests member agencies to reduce demands by 10%. Through member agencies delivered 50,000 conservation kits. Active conservation messaging begins.

1980’s – Elementary school education program introduced to create a greater awareness of the importance of water. Funding assistance to member agencies begins. Avoided cost set at $75 per AF (currently $195 per AF).\(^1\) 2.5 million toilets replaced (between 5 – 10% of the residential installed base).\(^2\)

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\(^1\) This is based on Metropolitan’s pumping costs and does not reflect the cost of new supply. For comparison, $3,600 per AF is the avoided cost used by Lake Arrowhead, CA, and in the Colorado Front Range area, 1 AF of water from the Colorado River (a source of Metropolitan’s supply) sells for more than $30,000.

\(^2\) Estimate based on 1985 population of LA Metro + San Diego Metro = 23 million.
million showerheads distributed. Rebate program established.

4. 1990 – 2014
Conservation budget of $352 million established (~$14 million total or $0.73 per capita per year).
1998 – Toilet flapper research conducted
2001 – Innovative Conservation Program (pilot competitive grants) launched ($560,000 per cycle currently). Coordinated regional efforts, Program Advisory Committee.
2008 – High-Efficiency Toilet (HET) Program introduced
2011 – Long Term Conservation Plan and non-incentive programs on public awareness and value of water. Landscape classes, large landscape audits, quality control.
2012 – new regional approach to rebates – available to all customers regardless of retail provider.
2012 – Water Savings Incentive Program targets unique CII projects. Bureau of Reclamation grant funding is used to fund a variety of CII efficiency applications including:
  • Pressure Regulation Valve Study
  • Commercial Site Audits Pilot Program
  • HVAC Cooling Towers Study
  • Device Saturation Surveys
  • Residential/Agency Leak Detection Study

5. 2014 – 2016
Turf removal program – Metropolitan expected to remove 175 million square feet of turf – more than triple the governor’s goal for the entire state. Rebate started at $0.30 per square foot (SF) of turf removed. Raised to $1.00 per SF and then to $2.00 per SF. $450 million conservation program budget (~$225 million per year). 75,000 landscape transformations (~average of $6,000 per transformation)
2015 - 3,000 people attend 100 landscape classes.
2015 – Premium HET toilet program introduced
2015 – Rebates offered for installation of high-efficiency sprinkler nozzles; originally set at $4 then reduced to $2 based on expected water savings.

Current and upcoming research topics include a comprehensive turf removal savings study, creation of a conservation planning model, and a participation and water savings analysis of Metropolitan’s pilot rain barrel rebates. Additionally, pilot research programs are being created to look at leak reduction methods, cooling tower efficiency, and the water savings impacts of household pressure reduction.
Figure 6: Metropolitan's turf rebate by zip code map.
Table 1: Metropolitan’s 2016 Conservation Incentives

<table>
<thead>
<tr>
<th>Conservation Items</th>
<th>Incentive</th>
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<tr>
<td>Premium high efficiency toilets</td>
<td>$40 each</td>
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<tr>
<td>High efficiency clothes washers</td>
<td>$85 each</td>
</tr>
<tr>
<td>Residential smart irrigation controllers*</td>
<td>$80 each</td>
</tr>
<tr>
<td>Commercial smart irrigation controllers*</td>
<td>$35 per irrigation station</td>
</tr>
<tr>
<td>High efficiency urinals</td>
<td>$200 each</td>
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<tr>
<td>Residential soil moisture sensors*</td>
<td>$80 each</td>
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<tr>
<td>Commercial soil moisture sensors*</td>
<td>$35 per irrigation station</td>
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<tr>
<td>Residential turf removal*</td>
<td>$2 per square foot</td>
</tr>
<tr>
<td>Commercial turf removal*</td>
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<td>Connectionless food steamers</td>
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<td>Cooling tower conductivity controllers</td>
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<td>pH cooling tower controllers</td>
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<td>High efficiency sprinkler nozzles*</td>
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<td>Rain Barrels</td>
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<td>Cisterns</td>
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</table>

*Measure reduces consumptive use

6. Metropolitan’s Self-Described “Lessons” Learned

The Following passages are drawn from Metropolitan’s recent “Overview of Efforts to Encourage Conservation” (2016):

Metropolitan has drawn from the many challenges and successes in implementing the regional conservation program over the years. This has resulted in many lessons learned that will help in further developing the program to deal with new challenges and conservation goals in the future:

- **The regional conservation programs allow Metropolitan the flexibility** to easily modify program elements to accommodate different scenarios. When imported supplies are low, Metropolitan can raise incentives, launch marketing campaigns, and increase budgets in order to enhance conservation activity. Conversely, if conservation activity needs to be managed within reduced budget constraints, Metropolitan can add controls to manage the programs within the new limits.

- **Allowing agencies to add additional conservation funding** through the regional programs on specific devices has been instrumental in increasing local conservation activity.

- **Even programs offering smaller savings provide a public service,** enhance water awareness, can lead to participation in other conservation incentive programs and can help establish water efficient behavior.
• Water conservation legislation, once enacted, is a very effective savings tool and Metropolitan is constantly looking to support new conservation initiatives to increase water conservation. Supplemental agency based- water conservation efforts help complement legislative efforts to strengthen standards. Supplemental efforts are needed to create public awareness about water conservation, offer incentives to change to a more water efficient item, and to stimulate the marketplace, which can lead to new standards in the long-run.

• Conservation distribution events held by Metropolitan and some member agencies, in which customers come to a given location and exchange their old non-conserving device for a free or discounted water efficient device, can be effective in increasing conservation activity.

• A contractor direct option program allows contractors to directly receive device rebates if the customer approves. This program has been beneficial in increasing commercial conservation activity, especially for large projects where the customer may not have the upfront funding needed. However, the increased activity from this program is not without its shortfalls, as noncompliant contractors have had to be removed from the program.

• When performed, in-store marketing efforts increase sales and rebates for targeted water efficient devices.

• Recent data automation improvements have replaced paper rebate applications with digital rebate applications, ensuring that the number of applications cannot exceed program budgets.

• Conservation research can lead to legislative changes to industry standards that improve water efficiency.
IV. Jordan Valley Water Conservancy District

Primarily a wholesaler of water to cities and improvement districts within Salt Lake County, Jordan Valley Water Conservancy District is a political subdivision of the State of Utah and one of the largest water districts in the state. It was created in 1951 under the Water Conservancy Act and was called the Salt Lake County Water Conservancy District until 1999.

Jordan Valley Water is governed by a board of nine trustees who represent eight geographical divisions. They are nominated either by the Salt Lake County Council or a city council, depending upon the division they represent. The Governor then appoints Trustees for a 4-year term from those nominated.

Jordan Valley Water has a retail service area primarily in unincorporated areas of the county, making up about 10 percent of its deliveries; approximately ninety percent of its municipal water is delivered on a wholesale basis to cities and water districts. From their web site, “Jordan Valley Water Conservancy District has a goal to reduce water use 25 percent by the year 2025.”

Jordan Valley has three full-time staff to operate its garden area and 2 full-time staff focused on conservation and efficiency programming. Jordan Valley also has two full-time data analysts on staff who are available to the conservation program team as needed.
Jordan Valley WCD offers the following programs:

1. **Turf Removal Rebates**

   Jordan Valley Water offers rebates of up to $1.50/sq ft exclusively to its retail customers who convert their park strip from lawn to a water efficient design. Jordan Valley Water estimates removing a lawn park strip will save an estimated 7,000-10,000 gallons of water every year.

2. **Landscape Consultation**

   Jordan Valley Water offers personalized landscape consultations to help customers make improvements to yards that will save water and increase efficiency. During the consultation, customers get watering suggestions, a copy of their water use history, a landscape profile, and specific landscape recommendations. Consultations are available on a first come, first-served basis beginning in the middle of March and ending in late August.

3. **Landscape Leadership Grants**

   Jordan Valley Water offers grants to businesses, institutions, builders, developers, and HOAs with highly visible landscaping projects that have potential for significant water savings. Projects must be located within the JVWCD service area, provide quantifiable water savings, and have high promotional appeal.
This is a matching grant program with up to a 50% match is available for new or converted water efficient landscapes. This program has a budget of $300,000 and two grants totaling $85,000 have been given out to date. Project 1 (completed) was $14K for a park turf conversion. Project 2 (funded) is $70K for a xeriscape demonstration garden at a school.

4. Conservation Garden Park

Jordan Valley’s Conservation Garden Park is located on ten acres in West Jordan, Utah and is easily accessible from all Wasatch Front communities. The Garden began with six examples of waterwise landscaping in a mock residential setting. It has since expanded to include interactive exhibits for educating the public on waterwise design, planting, and irrigation. It has become one of Utah’s premier water conservation teaching and demonstration gardens.

Programs operated from the Conservation Garden Facility include:

- Classes - A variety of classes and events on water conservation and landscape design and maintenance.
- Tours and school field trips
- Education Center Rentals – the facilities at the Conservation Garden Education Center are available for rent by the public. Jordan Valley Water allows rentals family reunions, wedding, events, or corporate retreat.
- QWEL Workshops for Landscape Professionals - Qualified Water Efficient Landscaper is a training program for local landscape professional. It certifies landscapers in the art and science of waterwise landscaping, and provides the general public with a better choice among professionals. QWEL certification requires 20 hours of classes following which an exam must be passed. This training program began in California in 2007 and has been modified for our Utah landscapes and conditions. The program is currently offered in Salt Lake and Iron Counties.

"The Qualified Water Efficient Landscaper training presents an affordable proactive local approach to reducing landscape water demand. QWEL provides graduates with knowledge in water efficient and sustainable landscape practices including water management and preservation of other valuable resources.” - QWEL Mission

Courtney Brown from Jordan Valley described the QWEL program, which is runs in cooperation with Utah State University as “excellent” and highly recommended.

QWEL Utah Website
5. Member Agency Assistance Program
Jordan Valley Water allows member agencies to apply for funding in the form of a grant for
conservation-related projects. Interested member agencies apply with a proposal outlining their
project, including costs and anticipated potential water savings to be achieved as a result of their
project.

Examples of projects that have been funded include toilet replacement programs, high-tech
irrigation controller systems, public education programs and demonstration gardens.

More about the Member Agency Grant Assistance Program

6. Model Water-Efficient Landscape Ordinance
Jordan Valley developed a model water-efficiency landscape ordinance, which five member
agencies (listed below) have adopted. Conservation staff continues to work with other member
agencies as well as Salt Lake County, in the design and implementation of ordinances for
commercial and residential development.

JWVCD Model Landscape Ordinance Adoptions:

- Salt Lake County
- Sandy City
- City of South Jordan
- West Valley City
- West Jordan City

View Commercial Model Ordinance

7. Program Costs
Annual costs for the Jordan Valley conservation program are shown in the table below. The
annual budget ranges from $1.2 - $1.8 million through 2020 including staffing increases from 1
up to 5 FTE and implementation costs.

Since 2000, Jordan Valley has spent an average of $60/AF for conserved water, including the
cost of constructing the conservation garden. In 2013 JWVCD spent about $1 million for its
conservation efforts, or a cost of about $40/AF of savings. Maintaining JWVCD’s existing
conservation efforts will cost $1 million annually, plus 3 percent inflation ($40/AF of savings). It is
projected that funding existing and enhanced programs will result in the same per capita savings
experienced to date.
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<td>$1,340,000</td>
<td>$1,693,000</td>
<td>$1,803,000</td>
<td>$1,833,000</td>
<td>$7,889,000</td>
</tr>
<tr>
<td>Cost per Person</td>
<td>$1.95</td>
<td>$2.08</td>
<td>$2.60</td>
<td>$2.74</td>
<td>$2.75</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9 - Jordan Valley Water Efficiency Program Cost Summary
## V. Case Studies Summary

<table>
<thead>
<tr>
<th>AMWUA</th>
<th>New York City DEP</th>
<th>Metropolitan Water District of S. Cal</th>
<th>Jordan Valley WCD</th>
<th>Northern Water (pre 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Served</td>
<td>~4,000,000</td>
<td>~1,000,000</td>
<td>~19,000,000</td>
<td>~200,000</td>
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<tr>
<td>Member Agencies</td>
<td>10</td>
<td>20+</td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td>Annual Budget</td>
<td>$210,000</td>
<td>~$4,250,000</td>
<td>$14,000,000 ($0.73/capita)</td>
<td>$1,200,000- $1,8000,000</td>
</tr>
<tr>
<td>$/capita served</td>
<td>$0.05</td>
<td>$4.25</td>
<td>$0.74</td>
<td>$7.50</td>
</tr>
<tr>
<td>Staff/FTEs</td>
<td>1.5</td>
<td>1</td>
<td>8</td>
<td>2.5</td>
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<tr>
<td>Annual Program Costs (non-staff)</td>
<td>$120,000</td>
<td>Not established yet.</td>
<td>~$13,000,000</td>
<td>$1,000,000</td>
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<tr>
<td>Program Start Date</td>
<td>1982</td>
<td>2015-2016</td>
<td>1976</td>
<td>NA</td>
</tr>
<tr>
<td>Program Impetus</td>
<td>Groundwater Management Act</td>
<td>Infrastructure project – Delaware Aqueduct shut down.</td>
<td>Drought response and long-term conservation</td>
<td>Stewardship and conservation</td>
</tr>
<tr>
<td>Relationship to Regional Partners</td>
<td>Corporate entity, founded by and for members</td>
<td>Regional wholesale water supplier and system operator</td>
<td>Regional wholesale water supplier and system operator</td>
<td>Regional wholesale water supplier and system operator</td>
</tr>
<tr>
<td>Goal</td>
<td>Sustainability, cooperation</td>
<td>Reduce demand by 50 mgd</td>
<td>25% reduction from 2013</td>
<td>25% by 2025</td>
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<tr>
<td><strong>Program Elements</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Funding/Grants</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Technical Support</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Cost-sharing</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Education</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Rebates/Retrofits</td>
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<td>X</td>
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<td>Information exchange</td>
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<td>Research/studies</td>
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<tr>
<td>Water Efficiency Planning</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CI/ water efficiency</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Distribution system optimization</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
VI. Efficiency Program Ideas for Northern from Case Study Examples

1. Focus Areas
   1. Landscape water use efficiency
   2. Residential water use
   3. Commercial, industrial and institutional sectors
   4. Water distribution system optimization
   5. Water supply shortage management
      a. Drought preparedness
      b. Drought response
   6. Peak demand management

2. Regional Coordination, Logistical Support and Program Administration
   1. Regional water efficiency coordinator
   2. Landscape demonstration gardens (Northern Landscape Efficiency Center?)
   3. Forum for sharing of expertise, information, ideas, challenges and success
   4. Annual, bi-annual water efficiency meeting
   5. Regional drought preparedness and coordination
   6. Small grants/funding for program implementation
   7. Model ordinances, green building codes, and regs for local adoption
   8. Regional voice for water efficiency and demand management
   9. Coordination with Northern allottees
   10. Coordination with CWCB, Colorado WaterWise, Center for Resource Conservation

3. Technical Support
   1. Planning assistance
   2. Water loss technical assistance
   3. Landscape and irrigation design and maintenance consultations
   4. Commercial and industrial water use expertise and auditing
   5. Water system leak detection
   6. Service line leak detection
   7. Customer-side leak detection
   8. Support, coordination, and sponsorship of research
   9. Pilot research programs
   10. Certifications for landscape professionals
4. **Education and Communication**

1. Consistent regional messaging for water efficiency and drought response
2. Shared educational materials, training, outreach and messaging
3. Shared publications and website
4. Landscape efficiency training and events
5. Value of water awareness campaign
6. Classes for the general public

VII. **References**

http://edmsidm.mwdh2o.com/idmweb/cache/MWD%20EDMS/003737512-1.pdf

New York City Department of Environmental Protection. 2017. Water Demand Management Planning Documents prepared by WaterDM.  
http://www.amwua.org/, communication with Carol Ward-Morris, Asst. Director, AMWUA

https://jvwcd.org/, annual reports and on-line information

http://www.mwdh2o.com/, annual report and info

http://www.bewaterwise.com/, MWD’s “one stop shop” for water efficiency