Final Report to the OSU Water Center
OAES/OCES Water Grants Program

Project Title: Responsible Outdoor Water Use for Oklahoma.

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Project Period: January 1, 2014 to December 31, 2014 (project extended to June 30, 2015)

Descriptors: Extension: Water Conservation, Climate Change, Water Availability, Drought, Municipalities, Outdoor Water Use, Planning, Water Utility Managers, City Managers.

Publications: None

Students involved in this project.

Student Status	Number	Disciplines
Undergraduate	1	Ag Communications/Ag Business
M.S.	2	Horticulture
Ph.D.	1	Crop Science
Post Doc	1	Horticulture
Total	5	

Goal: The goal of this project is to create a framework and structure towards a statewide outdoor water conservation and responsible water use program for use by Oklahoma municipalities and citizens across Oklahoma.

Objectives: The primary objective of this project is to develop, publish, and disseminate a comprehensive responsible outdoor water use and conservation guidebook for use by municipalities across Oklahoma. The secondary objective of this project is disseminating project information throughout Oklahoma and to make the information readily available through use of the OSU Oklahoma Water Resources Center website which can be accessed at http://water.okstate.edu.

Rationale/Benefits: In early 2013, the City of Oklahoma City (OKC) released water from Canton Lake to increase flow from the North Canadian River and ultimately to Lake Hefner in Oklahoma City. This release was to ensure adequate potable water supply for the customers of the City of OKC Utilities. At the time of the release, it was deemed necessary by the City of OKC due to the droughts of 2011 and 2012 and the outlook for continued drought in 2013 and beyond. Unexpectedly, rainfall in 2013 in OKC was well above normal with averages nearly double the normal rainfall amount

through August 2013. One of the primary concerns for citizens outside of OKC, especially those near Canton Lake, is that citizens and customers of the OKC Water Utilities were not necessarily taking adequate water conservation measures during the drought. In addition to these concerns, it is expected that the City of OKC will eventually need to invest millions of dollars in infrastructure to deliver water from Southeastern Oklahoma to OKC. In fact, the City of OKC has purchased water rights from Sardis Lake in Southeastern Oklahoma, but is currently in deliberation with the Chickasaw and Choctaw Tribes concerning ownership and rights to this water.

Up to 50% or more of municipal water use is used outdoors for non-consumptive uses, mostly landscape irrigation, during the summer months. This is the period of highest water demand during the year. Beginning in 2013, the City of OKC Utilities Department and the Oklahoma City Water Utilities Trust partnered with the Oklahoma Cooperative Extension Service (OCES) and the OSU HORTLA to develop a comprehensive water conservation and responsible water use program for the citizens of OKC. To date, thousands of City of OKC Water Utility customers have been educated on proper outdoor water use and irrigation, plant selection, and best landscape management practices to conserve Oklahoma water resources. While this project is proceeding and is serving to be a successful program for OKC, it is in its infancy and is solely focused on OKC. To date, other municipalities in Oklahoma are also very interested and are attempting to develop and promote water conservation, especially outdoor water conservation, but no statewide program exists to help these municipalities.

The City of Altus is currently in Stage 3 water restrictions which limits outdoor watering to one day per week. The City of Oklahoma City is currently in Stage 1 water restrictions which limits outdoor watering to every other day. Cities such as Lawton, Norman, Enid, and Western OK municipalities have implemented some type of water conservation measures as well, but a concentrated, consistent effort is not there due to a lack of organized guidance and best practices from the State and local agencies. Therefore, it is critical for OCES to provide guidance, backed by science, to assist these communities with proper use of outdoor water including proper plant selection and management practices.

Methods:

The tangible output for this project is a “comprehensive responsible outdoor water use and conservation guidebook for use by municipalities across Oklahoma.” This guidebook will be modeled after the “Guidebook of Best Practices for Municipal Water Conservation in Colorado.” A second goal of the project is to disseminate project information through the Oklahoma Water Resources Center website. The guidebook is currently under peer-review at the time of this final report. It is expected that the guidebook will be published through OCES in early 2016. The guidebook (hardcopy) will then be disseminated directly to municipalities throughout the State in spring 2016. It will also be made available as a free digital resource in spring 2016 through the OSU Water Center website and the OSU thinkwater website.

Information gathering method:

Information was gathered using meetings, email surveys, and phone interviews. Participants were contacted in several ways in order to make sure every water manager or utility manager had the opportunity to attend a meeting, answer an email survey, or take part in a phone interview.

Meetings:

Meetings were held in each of the geographic areas of the State of Oklahoma. The meetings were conducted in a participatory manner. The participants were guided through a process of open-ended questions that encouraged presented to the participants.

The questions were as follows:

1. What should be included as part of an ideal municipal water use plan?
2. What are the top ten or top five best practices for Responsible Water use in Oklahoma?
3. How can OSU/Cooperative Service best serve municipalities with water conservation programming/planning?

Email Survey:

After the participatory meetings were held throughout the State an email survey was developed using OSU IRB protocols. The email surveys enabled a larger group of water managers to provide their best practices and experiences throughout the state.
The content of the email survey was:

Phone Interviews:

Phone interviews were also offered as a way to reach out to municipal water managers.

Coverage:

Taken all together, the meetings, email surveys, and phone interviews offered multiple modes in which utility water managers could provide input into the best practices that they use for responsible water use and the main issues that face them in delivering water to municipalities.

Description of Participants:

The participants were predominately utility managers from municipalities. In some cases city managers of smaller cities participated in the meetings.

Findings and Significance:

Overall Participation:

Participation was sufficient during the water meetings to conduct useful participatory activities. Higher attendance would have been preferred. It was clear that utility managers and water managers were quite busy and many had not been contacted by Oklahoma Extension before. In many of the smaller towns it was realized that often the city manager is the main person making the water management usage decisions. Each respondent represented a city or municipal water district.

#	Data Sources	# of Respondents
1	Central Oklahoma Water Meeting	3
2	NW Oklahoma Water Meeting	7
3	SW Oklahoma Water Meeting	3
4	NE Oklahoma Water Meeting	3
5	SE Oklahoma Water Meeting	1
6	Webinar	0
7	Email Survey Respondents	5
8	Phone Survey Respondents	0
9	Attendance at Oklahoma Water Board Agricultural Use Meeting	

Brainstorming:

Participants were asked to provide insight for “Best Practices” or ideas for outdoor water use in Oklahoma. To begin the brainstorming process, facilitators provided 10 areas for participants to categorize their ideas under.

Categories:

1. Education through Oklahoma Cooperative Extension
2. Municipal Water Ordinances
3. Mesonet recommendations
4. Recommended Plants for Landscape in Oklahoma
5. Efficient Irrigation Technology
6. Certification for Irrigation Installation Companies
7. Irrigation System audits
8. Greywater Use/Recycled or Reclaimed Water Use
9. Water Customer Surveys/Info Gathering/Promotion
10. Integration of Indoor and Outdoor Water Conservation Projects

Some Ideas Suggested by Category:

Education through OSU/Oklahoma Cooperative Extension

- Training for city officials to help implement water conservation techniques – Workshops for municipal water staff.
- OCES could build engagement strategy for the state. Create constant interaction with key water managers.
- Advocacy from OSU higher-ups.
- OCES could develop a customized program to engage companies and raise awareness.
- OCES/OSU could develop a coalition to provide consistent message, and partner with businesses to award those that take measures toward better water use.
- OSU pushing state decision makers to make changes, then municipalities could help with code regulation.
- Provide organized information to municipalities to promote information and include things in monthly bill.

Municipal Water Ordinances

- Not raising rates is not an option. Municipalities have no other options.
- Custom pricing creates incentive to make better usage decisions. A block rate system or special rate system could help
    - example: Smart Hours type system for water use.
- Deal with water rate shock through preemptive education.
- Water use information on water bills, seasonal water use educational material included in bills.
- Municipalities must implement strategies to involve the whole supply chain in the effort.
- Municipal implementation of plans to deal with political pressure regarding water issues.
- Transparency regarding water supply.
- Move to a 2 meter system.

Mesonet recommendations

- Incorporate Mesonet information into municipal education strategies/water bill information.

Recommended Plants for Landscape in Oklahoma

- Encourage more hardscapes, sidewalks, less grass between sidewalks and roads, use mulch etc.
- Provide incentives for Xeriscaping/Zeroscaping
- Provide resources for native drought tolerant plants and incentives for private sector participation in better landscaping practices.
- Provide education so that nurseries become more relevant to customers.
- Provide examples, people need to see it working before they will be able to move forward implementing new landscapes themselves.

Efficient Irrigation Technology

- Strategies to get proper (smarter) irrigation heads installed more widely.
- We need to educate homeowners on options and provide more incentive for them to make better choices.

Certification for Irrigation Installation Companies

- Regulate irrigation head installation.
- Regulate irrigation contractors and require state licensing.

Irrigation System audits

- Require a grand irrigation scheme for public parks.
- Require irrigation regulation for public parks
- Greywater Use/Recycled or Reclaimed Water Use
- Much of this is dependent upon plumbing code. Plumbing code needs to change to make this easier.
- Consumers mindsets have to change, many are dissatisfied by low-flow, ultra low flow and other water saving options.
- Most consumers are not in a position to implement greywater or reclaimed water strategies.
- Educate people through working examples.

Water Customer Surveys/Info Gathering

- Work to integrate many municipalities with a unified website and unified campaign.
- Point customers to squeezeeverydrop.com
- Promote info through monthly water bills.
- There is little interest in most campaigns or websites; we must find ways to increase interest and concern.
- Conduct water conservation open house meetings where customers talk to municipal water managers.
- Integration of Indoor and Outdoor Water Conservation Projects

- We need a common Oklahoma entity for promoting efficient indoor and outdoor water use.
- Customers are often not satisfied by

The Top 5 Best Practice Focus Areas Selected by Participants:

- Collaboration between all parties to create more unified approaches to water conservation, including
- Formation of a water coalition.
- Better education strategies to reach consumers, including dissemination of key information through water bills, integrated statewide website etc.
- New pricing structures and creative campaigns for water use (example: OG&E Smart Hours)
- Regulation of irrigation projects, specifically large scale irrigation systems such as city parks.
- Provide working examples of water conservation around the state for people to see for themselves.

Conclusions:

There are many ideas on what must be done to conserve water and ensure water resources for the future. While there does not seem to be any single solution, there are however, many ideas that when effectively combined could provide great benefit to the sustainability of our state's water resources. One thing is for sure, we must continue to educate the public about water conservation and provide them with resources to act on this knowledge, as we become better stewards of our state's water resources.

Some comments/ideas suggested by the SW region group by category:

Education through OSU/Oklahoma Cooperative Extension

- There is a healthy amount of denial about water issues. It will take more education to overcome this issue in a positive tangible way.
- Educate the public on water issues – many people believe municipalities are not facing water issues, but rather that they are just trying to make more money from people.
- Educating the next generation about smart water usage and water issues is very important. We need to influence children and teach them more about drought.

Municipal Water Ordinances

- Implement higher rates for higher users. It is working well in Waurika.
- Municipalities need to be equipped to issue fines to those that misuse water, or improperly irrigate.
- Water is way too cheap for the work it takes to get it to customers. People don't realize what they have, many

- Municipalities are not recouping the money they invest in water infrastructure.
- Implementing water restrictions can have a significant impact on water consumption, but it also will cut into water revenue.
- Uniformity of water restrictions within a region might help with water conservation.
- Water and sewer utilities often generate 50 percent or more of city funds. Water funds support other city
- Operations and little is available to improve water infrastructure.
- Implement creative ordinances. Fredrick has implemented some of the same drought related pricing
- Structures for water that many Texas towns have.
- Flexible water rates are important for municipalities.
- Property tax for municipalities would greatly help ease pressure on funding for infrastructure and allow
- Communities the financial flexibility needed implement water conservation.
- Oklahomans pay far less for water than those in other parts of the country. We must increase water rates.
- Implement smart metering systems
- Constant unfunded state and federal mandates put ever-increasing pressure on municipalities. There needs
- To be more resources to assist communities in meeting these mandates.

Efficient Irrigation Technology

- Modern irrigation technology is important
- Certification for Irrigation Installation Companies
- Oklahoma doesn't regulate irrigation. Other states have been doing this for years and Oklahoma would benefit from doing this - irrigation regulation is important

Greywater Use/Recycled or Reclaimed Water Use

- Reuse wastewater for sectors like Ag and the oil and gas industry.
- If municipalities could find ways to capitalize on wastewater it would help tremendously.
- Water reuse for drinking water is too expensive for municipalities to do, but using wastewater on golf courses and in parks would be a great option.
- Use greywater and wastewater in grazing areas.
- Some communities have built wetlands to naturally aid in filtering wastewater

Water Customer Surveys/Info Gathering/Promotion

- Open communication about water resources and water levels with community.
- Educate public on water issues.

Integration of Indoor and Outdoor Water Conservation Projects

- There is a lack of communication between towns about water supply and water issues. Many towns that buy water from other communities are not kept aware of the state of water in the communities they buy from.
- Texas, Colorado and New Mexico have become much more serious about water issues across the board.
- Oklahoma must become serious about water conservation issues.

The Top Best Practice Focus Areas Selected by NE Oklahoma Participants:

After the brainstorming session, the participants were asked to think back over their comments and suggestions to pick out the top few ideas they view as the most important to focus on. They listed these areas as the most important focus areas:

- Education about water issues
- More revenue sources for municipalities to alleviate financial pressure
- Increased water rates to reflect the true cost of getting water to customers
- Smarter water meters and irrigation
- Water reuse and water use regulations

Conclusions:

The Southwest Oklahoma meeting was well attended, with six communities from the region represented. The concerns by water managers in this region were similar to the concerns expressed by those in the Northwest region meeting. It was expressed that OSU Cooperative Extension can play a role in helping educate and promote drought education and issues such as wastewater recycling so that municipalities face less resistance in this area. Water managers also expressed a need for higher water rates to reflect the true cost of getting water to their community. The biggest concern expressed however was the pressure on the water departments and the need for more revenue streams. Many expressed that most of the water revenue does not come back to the water department, but they are faced with ever increasing needs for infrastructure and quality improvements with little financial power to do them.
There are many ideas on what must be done to conserve water and ensure water resources for the future. While there does not seem to be any single solution, there are however, many ideas that when effectively combined could provide great benefit to the sustainability of our state's water resources. One thing is for sure, we must continue to educate the public about water conservation and provide them with resources to act on this knowledge, as we become better stewards of our state's water resources.

Appendices:

Email Survey Protocol

Oklahoma Municipal Outdoor Water Use Email Survey Protocol

As a water/utility manager in the State of Oklahoma, your input is valuable in describing the greatest needs of water/utility managers in managing and improving municipal outdoor water use. The following survey questions are part of the information gathering process for developing the Oklahoma Best Practice Municipal Outdoor Water Use Guidebook.

This research has been approved by the Institutional Review Board at Oklahoma State University and your rights as a human subject will be protected. Your responses will be confidential and reported collectively. You have the right to refuse participation in this email survey; however, your input is valuable in creating a guidebook for municipal outdoor water use in Oklahoma.

I am working on behalf of the Oklahoma Cooperative Extension Service to conduct gather information from water/utility managers across the state as we create a guidebook for municipal outdoor water use conservation. Your input and insights will help us understand the concerns of water managers in Oklahoma. The information from this email survey will be kept confidential. Information you provide will be used only for developing the guidebook and for OSU research publications and will not be connected to your name nor municipality. The information will not be used for any other purposes. If you are willing to participate in this survey please indicate so by filling in your name.

Survey Questions:

1. What is your name?

2. In what region of Oklahoma is the municipality you work for located?

3. What are the biggest struggles you deal with as a water manager for your municipality?

4. What are the water issues facing your county that you live and work?

5. What single strategy would be most effective at improving municipal outdoor water use in your community?

6. How important is water conservation for your municipality?

7. Do you believe the public is aware of water issues in your region?

8. Does infrastructure play a part in the issues you face as a water manager?

9. How can OSU Cooperative Extension assist in improving outdoor municipal water use and water conservation in your municipality?

10. If necessary for the study, can we call you for more information?

Conclusion:
Thank you for participating in this email survey. We are grateful for your willingness to contribute as we build this guidebook. We will be working to compile all the information we have received through this process and we will have a guidebook ready in 2015. We will keep you informed as to the progress of the guidebook. Again, thank you for your participation. Do you have any questions for me?

Responsible Outdoor Water Use for Oklahoma Logic Model

Inputs	Outputs		Outcomes-Impact		
	Activities	**Participation**	**Short Term**	**Medium Term**	**Long Term**
What we invest	What we do	Who we reach	What the short term results are	What the medium term results are	What the ultimate impact is
<u>Time</u> 2014 <u>Research/Extension</u> Justin Moss Malarie Gotcher John Schroeder Claude Bess Leland McDaniel Gary Strickland <u>Municipal Advisory Board</u> Municipal Reps from across OK <u>Project Advisory Board</u> OCES Extension Educators and Specialists Faculty Scientists <u>Project Funds</u> OCES <u>Meeting Facilites</u> OSU Wes Watkins Center OCES County facilities <u>Travel</u> Meeting locations: Stillwater, Tulsa, Oklahoma City, Ardmore, and Altus	<u>Creation of Advisory Boards</u> Municipal Advisory Board Project Advisory Board <u>Literature Review</u> Thorough literature review of water ordinance, water restriction, and/or water conservation programs across the United States with emphasis on those in the Southern and Western United States. <u>Case Studies</u> Case studies of specific examples of successful and non-successful factors of water ordinances and conservation programs across the United States with emphasis on those in the Southern and Western United States.	Water managers Water utilities and municipalities Local governments Rural water districts Irrigation professionals Landscape managers Turf managers Irrigation professionals, OCES Educators Faculty Scientists Industry professionals USDA representatives Distributors Retailers Public	<u>Learning</u> Practices towards responsible outdoor water use in Oklahoma <u>Awareness</u> Proper outdoor water use and irrigation Environment Water conservation Plant water use and needs Climate Public perceptions of outdoor water use <u>Knowledge</u> Irrigation techniques Efficient irrigation technologies Environment Plant water use and needs Soil factors <u>Attitudes/Opinions</u> Willingness to change/alter water use in both residential and non-residential settings Environmental perceptions of water use and availability in Oklahoma <u>Skills</u> Proper irrigation timing and amounts Irrigation audits Soil management <u>Motivations/ Aspirations</u> Financial Public relations Environmental protection Moral	<u>Action/ Behavior/ Practice</u> Municipalities and water districts adopt the best management practices into their current or new city ordinances and/or water restriction and/or water conservation programs <u>Decision-making/ Policies</u> Municipal governments and rural districts will utilize science, reduced water use plants and cultivars, efficient irrigation, soil testing, and plant water needs to irrigate crops properly rather than relying solely on experience, feel, history, anecdotal data, and public perceptions.	Increase the longevity of Oklahoma water resources by reducing outdoor water use statewide. Municipal and rural water customer implementation of best management practices towards responsible water use in OK which will conserve water resources and mitigate off-site losses of nutrients to the environment while decreasing water and nutrient inputs. Urban sustainability of water resources even under population growth Increased profitability and/or reduced risk of municipalities and water districts Increased water conservation, Improved surface water quality, Healthier environment, Increased irrigation efficiencies, Improved quality of life/increased satisfaction with quality of life due to water resource conservation