1. Title: Benefits and Costs of Water Reuse Programs in Texas

2. Focus Category: Wastewater, Water Supply, Management and Planning

3. Keywords: water reuse, Texas, integrated resource planning, water management

4. Duration: March 1, 2011 through February 28, 2012

5. Federal Funds Requested: $5000

6. Non-Federal (matching) Funds Pledged: $10,000

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9. Congressional Districts where project will occur: TX-003, TX-004, TX-011, TX-013, TX-019, and TX-020

10. Abstract

As Texas's population is expected to reach approximately 46 million by 2060, water managers will need to find more sustainable water supplies to accommodate this increase. Overallocation of many of the state's rivers, as well as overpumping of aquifers, makes these resources less reliable for meeting growing water demands. For this reason, many decision-makers are turning toward creative water reuse initiatives to augment dwindling supplies, as water use for municipal purposes has already increased exponentially over the last several years. According to the Texas Water Development Board (TWDB), at least five counties located throughout the state report more than ten million gallons per day of municipal water supply reuse: Potter, Midland, Lubbock, Collin, and Bexar. The first portion of this study examines similarities and differences between these counties to determine how each community incorporates reuse into their municipal water supply. Additionally, for a reuse project to be effective and successful, the local community must be onboard, and therefore should be included in the planning and implementation process. The second portion will survey residents of the five counties to analyze

and assess their perceptions regarding reuse, and to evaluate the extent to which they are willing to accept various reuse initiatives.

11. Statement of Critical Regional Water Problems

Diminishing water supplies are of growing concern in many Texas communities. Water managers struggle to find sustainable water resources to meet growing municipal demands. One consideration is implementing more aggressive water reuse initiatives, but in order to plan and employ successful reuse programs, it is imperative to first document and consider the social and environmental benefits and costs of water reuse.

12. Nature, Scope, and Objectives of the Research

Water agencies have used reclaimed and reuse water for many years as non-potable water resources. Water reuse saves clean, potable water resources by providing additional supplies for irrigation, industrial, and other uses (Hartley 2005). However, water reuse can also serve a critical role in meeting growing potable water demands (TWDB 2007). In many regions of the United States, a common practice includes releasing wastewater effluent into waterways to be reused directly downstream (Stephens 2005). In much of the nation, this direct reuse is an accepted resource. However, if not managed and promoted effectively, public reaction to these direct uses of reuse water can hinder projects and create increasing challenges for water managers (Po et al. 2003; Stephens 2005).

Texas is lacking firm, available water supplies to meet currently experienced population growth rates. Additionally, large portions of the state are drought-prone, which further depletes existing supplies. To be able to meet growing demands, water managers need to incorporate a number of strategies to achieve sustainable water resources, including water reuse. Texas contains a diversity of climatic regions and diverse community perspectives, which will therefore require different strategies and priorities for water management.

Having a better understanding of each region's water priorities, and the community's perceptions regarding potable reuse water supply, will provide information for water managers and stakeholders to more effectively plan and utilize various types of water reuse initiatives. Further, including the public in the planning process will increase the likelihood of acceptance of the chosen reuse programs. Inclusionary practices, incorporating community feedback in terms of both their perceptions and ideas, will provide frameworks for strong, community-backed wastewater reuse plans, within relevant local contexts.

The proposed research project focuses on two objectives.

Objective 1: According to the Texas Water Development Board, at least five counties, located throughout the state, report more than ten million gallons per day of municipal reuse: Potter, Midland, Lubbock, Collin, and Bexar. The first three are located in the western half of the state, much drier than the east, and the latter two are in north and central Texas, respectively. This study examines the similarities and differences between these counties, as well as the regions in which they reside, and investigates how each incorporates reuse into their municipal water

supply. Interviews of water managers and planners will provide insight into the decision-making processes: what types of reuse initiatives are being utilized, benefits and costs of each reuse program, and how or if the community was involved throughout the process. The researcher will also quantify effluent and reuse amounts to compare supply and demand for each county.

Interview questions for Objective 1 include:

- What water reuse strategies are being employed?
- What are the benefits and costs to this particular form of reuse?
- Were previous water shortages an impetus and are you planning for potential shortages?
- What socioeconomic factors were considered when planning the water reuse projects?
- Did you involve the local community in the planning process? If so, how?

Objective 2: For a reuse initiative to be successful, the local community needs to be included in the planning and implementation process. This portion of the research will survey a sample of residents, from the five counties mentioned above, to assess their perceptions concerning water reuse, what factor(s) convinced them to accept reuse plans, and to what extent they would be willing to utilize direct-to-reuse water sources.

Objective 2 utilizes public surveys to assess community members' perceptions of water reuse for their area. The survey will consist of both Likert Scale and open-ended questions. Questions for Objective 2 include:

- Describe your understanding and perceptions of reuse water.
- What do you see as acceptable uses for water reuse supply?
- Is reused water acceptable as a potable water source?
- Is water reuse acceptable only when there is a genuine need, for example, during a drought?

This research project, including interview and survey questions, is currently under review by the Texas State University-San Marcos Institutional Review Board (IRB).

13. Results Expected from this Proposal

Objective 1: Document the benefits and costs of water reuse programs, and provide a description, analysis, and comparison of successful reuse programs in Texas communities.

Objective 2: Demonstrate how water managers' reuse information management and promotion can influence community stakeholders' acceptance. This will aid in gaining a better understanding of factors influencing public perceptions related to reuse.

Results of this research will be shared with Texas water managers, planners, and stakeholders, to facilitate implementation of water reuse initiatives in future water plans, and will provide necessary frameworks for developing vital public water reuse education programs. As this study composes a large portion of my doctoral work, results will be presented at professional conferences and submitted for publication in a peer-reviewed journal.

References

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