

A Case Study of Public Trust, Collective Action, and Water

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Abstract

Public trust is a critical component in the governance of public resources. The structure of that governance can have a profound impact on the level of trust citizens have in the way resources are allocated. This study relates the findings of an exit poll conducted during the primaries for the 2016 presidential elections. The questions related to the level of trust voters had regarding their local government and their subsequent attitudes toward the water conservation messaging from those governments. The findings support national survey findings that citizens in the United States have a high level of trust in local government, which enables longer-term solutions to collective action problems.

Keywords: public trust, governing a commons, common pool resources, collective action

1. Introduction

It is challenging to establish the governance of a public resource, also known as a “commons” or “common pool resource,” in an effective manner that enables the long-term viability of

that resource. The issue at stake is one of getting people to set aside their immediate short-term individual interests in order to work together in their long-term best interests. This is what is known as a collective action problem. To effectively govern a commons, Elinor Ostrom (1990; 2010) describes six social conditions that are conducive to establishing collective action in which mutually beneficial institutions can be established with relatively low cost. But establishing these conditions can be difficult among large groups with varying interests, unless there is a high level of public trust, which lends credibility to the derived institutions. This raises questions regarding what public trust is based upon; because without it, the incentive to return to individual action is high.

Peters, Covello, and McCallum (1996) conducted a study of the components of public trust and credibility. They found that trust and credibility are broadly dependent upon three primary factors: perceptions of knowledge and expertise; perceptions of openness and honesty; and perceptions of concern and care (Peters, Covello, & McCallum, 1996, p. 44). For governmental institutions, the perception of commitment adds an additional factor, one that increases trust and credibility more than any other. The circumstances surrounding the establishment and ongoing operations of the North Texas Municipal Water District provides an institutional history that enables aspects of Ostrom's conditions and principles, as well as public trust doctrine, to be examined at a regional level to determine their interoperability, as well as their influence on incentives for greater levels of individual behavioral changes that are mutually beneficial.

This study examines several areas of public trust in the North Texas region and their impact on the effectiveness of the governance of the watershed. We first review the necessary conditions for successful collective action in the management of Common Pool Resources that Ostrom (1990) identifies and compare them to the conditions present within the area currently serviced by the North Texas Municipal Water District (NTMWD), when it was formed. We further examine the institutional design of the North Texas Municipal Water District to determine the extent to which the district reflects Ostrom's eight principles for governing a commons (1990). We then compare the level of public compliance with the water restrictions (reported by the NTMWD) to surveyed levels of public trust components. The concluding section discusses how various components of public trust and social capital may influence the willingness of individuals to participate in collective action initiatives.

2. Common Pool Resource Management

Communities working together to construct a feasible solution to water conservation, or any resource management goal, faces many barriers but can be achieved. The phrase "the tragedy of the commons" was coined by Garret Hardin (1968) and refers to the environmental degradation expected to occur when multiple individuals use a scarce common resource in individualistic ways. It takes participants that are willing to participate in governance structures based upon long-term common interests versus short-term individual interests. When that occurs, Common Pool Resources (CPRs) can be run in a way that avoids individualistic behaviors, such as excessive withdrawals from the common resource, and minimizes administrative costs (Ostrom, 1990). Based upon multiple case studies, Ostrom (2010, pp. 661-62) summarizes the following social conditions conducive to group

cooperation to produce mutually beneficial outcomes.

1. Communication is feasible with the full set of participants
2. Reputations of participants are known
3. High marginal per capita return for participants in successful collective efforts
4. Entry or exit capabilities for key participants so that no one will be taken for granted
5. Longer time horizon
6. Agreed-upon sanctioning capabilities

While emphasizing that there are no hard and fast rules that apply across all possible situations, Ostrom does derive eight institutional design principles that help to link the social conditions to institutional design for managing a commons.

1. Define clear group boundaries.
2. Match rules governing use of common goods to local needs and conditions.
3. Ensure that those affected by the rules can participate in modifying the rules.
4. Make sure the rule-making rights of community members are respected by outside authorities.
5. Develop a system, carried out by community members, for monitoring members' behavior.
6. Use graduated sanctions for rule violators.
7. Provide accessible, low-cost means for dispute resolution.
8. Build responsibility for governing the common resource in nested tiers from the lowest level up to the entire interconnected system. (Ostrom, 1990, p. 90)

Ostrom emphasizes that when people follow rules and utilize mutual monitoring, reinforcing institutional arrangements and individual strategies can bolster one another to maintain enduring patterns of consistent but not perfect rule-abiding behavior (Ostrom, 1990).

But a self-government solution is not guaranteed; in fact it can be elusive among large groups with varying interests. In these situations, if the political forces do not assist with obtainment of low-cost and enforceable agreements, success can be demanding and expensive to obtain (Ostrom, 1990).

Ostrom presents a set of strategies and circumstances that can minimize costs and maximize the resilience of the institution charged with governing the commons. By nature, it is assumed that humans will overuse their fair share of supplies because in the words of Hardin "ruin is the destination in which all men rush" in pursuit of their own best interest (Hardin, 1968). Even Aristotle expressed that man thinks of his own and not the common interest (Politics, Book II, Ch. 3, 350 BCE / 1912). However, water resources can be limited (in the case of drought) and therefore, residents must realize this is not just an individual problem but also a

community issue; thus, relying on public trust to work together to define a workable solution.

3. The North Texas Municipal Water District Governance Model

One of the new entities the Texas legislature established during this era of modern water planning was the North Texas Municipal Water District (NTMWD) (Sloan, 1994). In 1951, the Tri-County Reservoir Association was formed by local leaders from ten communities located primarily to the north and east of Dallas, Texas. The members of the association were all persons of high stature within their respective communities and were well known to each other and the distances between the communities were such that regular communications were feasible for all. The Association requested that the State Legislature authorize the formation of the North Texas Municipal Water District and empower it with the authority to develop, finance, construct, and operate facilities to meet the area's current and future water needs. This request demonstrated the long-term time horizon, the political importance of each member, and the high marginal return for each if the endeavor succeeded. The NTMWD's ten founding member cities, along with three recently joined, has representation on the NTMWD Board of Directors, and has the ability to sanction noncompliant members. These social conditions present at the founding of the district reflect those identified by Ostrom.

The district has clearly defined boundaries and is financed through revenue bonds although its charter allows for it to levy taxes. The state charter ensures that the rule-making rights of community members are respected by outside authorities and this pay-as-you-go type of funding has allowed the district to avoid many political battles that an entity competing in the tax base would find itself engaged (Sloan, 1994), while matching the rules governing use of the common watershed to local needs and conditions. The board's representative makeup provides a system for monitoring members' behavior as well as a low-cost means for dispute resolution. Another unique feature of the district is its authority to serve any community provided the voters of that community approve of the affiliation; it cannot force its services on any community uninvited. This voluntary contractual basis in the sharing and provision of a resource has allowed for economic development that would be unimaginable under alternative forms of governance. The structure takes full advantage of the eight institutional design principles outlined by Ostrom (1990; 2010).

The primary challenge facing the NTMWD and its member cities is developing the 'new' water resources necessary to fulfill the projected demands of a rapidly growing population and economic development. Fully 22% of the 'new' water resources will come from conservation. While there are several passive measures that are going into place at no cost to the water district, such as low-flow plumbing fixture rules and appliance standards (57% of water savings), almost 10% of water savings is expected to come from education of the public (Region "C" Water Plan 2016, Table K.2). The planned cost savings is significant when compared to increased enforcement efforts for time-of-day irrigation restrictions; voluntary water use modifications are projected to cost one fourth as much to implement (Region "C" Water Plan 2016, Table K.3).

These approaches to planning and provision of water resources are examples of public policy innovations to solve collective action problems. But to effectively design and implement

innovative public policies, the methods used to gain public cooperation is critical. There are many barriers to cooperation ranging from issues of fairness to something as basic as gaining agreement that a problem even exists. The primary mechanism that allows these many barriers to be overcome is public trust. Ostrom (1990) suggests that contingent cooperation is a method that can be used to build public trust among the users of a resource they have in common (a common pool resource). Contingent cooperation can be described as the simple social contract, “I will if you will.” Done in small increments, this type of cooperation provides the familiarity, understanding, and history necessary for the users of a resource to cooperate on ever-larger scales, increasing the benefits for all. This concept provides the basis for this study; how robust are the formal institutions that have been established by contingent cooperation and the building of public trust through the public’s perception of local governments’ concern and care; openness and honesty; and knowledge and expertise? Does the NTMWD, as a governmental institution, contribute to the public’s perceived levels of commitment of the organization?

3.1 Public Water Use Within The District

As a baseline reference, the NTMWD treated and delivered 102.1 billion gallons delivered during the 2010-2011 Water Year to a regional population of just over 1.6 million people (<https://ntmwd.com>). This is just slightly more than the amount delivered in the 2008-2009 Water Year. What is remarkable about these numbers is the issue of an invasive species that forced the suspension of water transfers from Lake Texoma, resulting in the loss of 28% of NTMWD's total water supplies. In response to the ongoing drought and the loss water supplies from Lake Texoma, NTMWD continued to reinforce the water resources management strategies within its Drought Contingency and Water Emergency Response Plan to facilitate water use reductions. Even with these restrictions however, water use continues to grow in the area due to the increasing population of the area. In May of 2014, a closed pipeline restored the flow of water from Lake Texoma, but the continued growth in the area and the weather conditions meant that the water use restrictions remained in place.

The target for the five-year (2012) municipal per capita water use for all NTMWD Member Cities and Customers (direct and indirect) is 170 gallons per capita per day based on a five-year rolling average which represents a reduction of 6 gallon per capita per day from Texas Water Development Board’s (TWDB) projected municipal per capita use without low-flow plumbing fixtures or other conservation measures (North Texas Municipal Water District Water Conservation and Drought Contingency and Water Emergency Response Plan 2008). The target for the ten-year (2017) municipal per capita water use for all NTMWD Member Cities and Customers (direct and indirect) is 165 gallons per capita per day based on a five year rolling average which represents a reduction of 11 gallons per capita per day from TWDB’s projected municipal per capita use without low-flow plumbing fixtures or other conservation measures. The 2015 Region C Water Plan anticipates that the NTMWD will exceed its current authorized water resources by over 91,000 acre-feet per year in 2020; and that is providing that climate conditions support that level of diversion from those resources. This is why the NTMWD and the TWDB are eager to encourage water conservation by retail water users.

3.2 District Conservation Programs

Fully 22 percent of the future water supply for the NTMWD is expected to come from conservation and reuse strategies. The NTMWD however, is a regional wholesale water supplier and therefore does not interact directly with the retail consumer; so the role it plays in public education is one of a support role. These efforts were begun in 2003, when the NTMWD began holding a series of water conservation workshops with staff of Member Cities. Additionally, the NTMWD presents programs to area cities, civic organizations and other groups concerning the need for water conservation and strategies that can be implemented on an individual and corporate level. Finally, the district provides conservation information including brochures on water-saving measures and xeriscape landscaping to interested civic groups and schools (North Texas Municipal Water District Water Conservation and Drought Contingency and Water Emergency Response Plan, 2008). The district reported the following results from these efforts.

During the drought period from 2005–07 and the drought period from 2011–2015, the NTMWD experienced reductions in water deliveries within the region served. The reductions, an estimated 200 million gallons per day during peak summer months and an annualized reduction in water deliveries of 10–12 percent can be attributed to the conservation strategies initiated in the communities served.

During the summer of 2014, consumers reduced water use by 27%. *Consumers recognized the severity of the drought and responded by adhering to the most stringent lawn watering restrictions in north Texas* [emphasis added]. The 2011–2015 drought ended with above-average spring rain events returning the reservoir levels to full capacity. On May 1, 2015, an updated Water Conservation plan was implemented. A new normal for landscape watering is to only operate an automatic irrigation system or sprinkler when water is needed to supplement rainfall. (<https://www.ntmwd.com/waterefficiency.html>)

By acknowledging the necessity of consumers understanding the severity of the drought and the ongoing need for conservation, the NTMWD demonstrates the importance of public trust. Without public trust, Ostrom's concepts of communication being feasible with the full set of participants and the reputations of participants (namely the local elected and appointed officials) being known would be nullified. Public trust then, as a crucial part of coordinating a quasi-voluntary conservation effort, is a mandatory component. This requirement is born out on the state level (Texas) and the local level (North Texas) and evidenced by a 2016 national Gallup Poll (McCarthy, 2016) showing Americans have greater trust in local versus state governments.

4. Methodology

In an effort to both confirm the levels of public trust within the region served by the NTMWD and to identify which, if any, components of public trust may be lacking, an exit poll was conducted during the March 2016 primary elections in the NTMWD service area.

One hundred people from three polling stations participated. The polling stations were chosen based upon similar demographics, incomes, and ethnicities, which were also representative of the NTMWD service area as a whole. The survey consisted of five questions.

1. How much trust and confidence do you have in the local governments in the area where you live when it comes to handling local problems -- a great deal, a fair amount, not very much, or none at all?
2. How interested are you in keeping up with news and information about the activities of your local government -- a great deal, a fair amount, not very much, or none at all?
3. Do you believe the information provided by local governments in the area is accurate -- a great deal, a fair amount, not very much, or none at all?
4. Does your local government provide enough useful information for you to make informed decisions regarding issues like water conservation and recycling -- a great deal, a fair amount, not very much, or none at all?
5. How much effect do you think the water conservation education efforts of local governments has on the water usage of your friends and neighbors -- a great deal, a fair amount, not very much, or none at all?

Question one addresses perceptions of knowledge and expertise; question two addresses a self-assessment of knowledge interest; question three addresses perceptions of openness and honesty; question four addresses perceptions of concern and care; and question five addresses the perception of commitment, as described by Peters, Covello, and McCallum (1996, p. 44).

4.1 Data Collection

The data were collected from area citizens in one day via an exit poll during the March 2016 Texas Presidential primary. Three polling stations in two zip codes that have highly similar socioeconomic and demographic factors. The questions were administered verbally and the participants' sex was noted, but no other identifying factors.

4.2 Results

The data were separated by zip code and the responses were coded as:

- Great deal = 5
- Fair amount = 4
- Not very much = 3
- None at all = 2
- No opinion = 1

Questions one and two had by far the highest means: 4.12 and 4.44 indicating that voters had a high degree of trust in their local government and a high degree of confidence in their own level of interest and awareness of local issues. See table 1.

Table 1. t-Test: Two-Sample Assuming Unequal Variances

<i>Question 1</i>	<i>Zip Code 1</i>	<i>Zip Code 2</i>
Mean	4.12	4.02
Variance	0.556734694	0.550612245
Observations	50	50
Hypothesized Mean Difference	0	
df	98	
t Stat	0.671959576	
P(T<=t) one-tail	0.251595256	
t Critical one-tail	1.660551217	
P(T<=t) two-tail	0.503190512	
t Critical two-tail	1.984467455	

<i>Question 2</i>	<i>Zip Code 1</i>	<i>Zip Code 2</i>
Mean	4.36	4.44
Variance	0.561632653	0.414693878
Observations	50	50
Hypothesized Mean Difference	0	
df	96	
t Stat	-0.572502574	
P(T<=t) one-tail	0.284159958	
t Critical one-tail	1.66088144	
P(T<=t) two-tail	0.568319915	
t Critical two-tail	1.984984312	

Questions three and four dealt more specifically with the voters' level of satisfaction with the transparency of local government in regard to information availability and quality. In this area, satisfaction, while still positive, was significantly lower, with mean values ranging from 3.54 to 3.8. See table 2.

Table 2. t-Test: Two-Sample Assuming Unequal Variances

<i>Question 3</i>	<i>Zip Code 1</i>	<i>Zip Code 2</i>
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Mean	3.54	3.64
Variance	1.600408163	0.643265306
Observations	50	50
Hypothesized Mean Difference	0	
df	83	
t Stat	-0.472068667	
P(T<=t) one-tail	0.319058273	
t Critical one-tail	1.663420175	
P(T<=t) two-tail	0.638116546	
t Critical two-tail	1.98895978	

<i>Question 4</i>	<i>Zip Code 1</i>	<i>Zip Code 2</i>
Mean	3.8	3.7
Variance	0.857142857	0.663265306
Observations	50	50
Hypothesized Mean Difference	0	
df	96	
t Stat	0.573462344	
P(T<=t) one-tail	0.283836338	
t Critical one-tail	1.66088144	
P(T<=t) two-tail	0.567672675	
t Critical two-tail	1.984984312	

The final question regarding the impact of government provided information on others also demonstrated a positive attitude from voters. People are able to see the habits of those in their neighborhoods due to proximity and familiarity. It is easy to tell if someone is cheating on watering restrictions – the evidence is the stream of runoff leading to the culprit’s home. The same is true with the recycling cans on trash day. See table 3.

Table 3. t-Test: Two-Sample Assuming Unequal Variances

<i>Question 5</i>	<i>Zip Code 1</i>	<i>Zip Code 2</i>
Mean	3.64	3.66
Variance	0.724897959	0.882040816
Observations	50	50
Hypothesized Mean Difference	0	
df	97	
t Stat	-0.111561754	
P(T<=t) one-tail	0.455700713	
t Critical one-tail	1.66071461	
P(T<=t) two-tail	0.911401425	
t Critical two-tail	1.984723186	

These high levels of trust in local government coincide with the demonstrated willingness of the NTMWD customers (voters) to comply with the requested water use restrictions. It also

indicates that customers would appreciate more relevant information on issues facing the water district and the impact those issues will have on their lives.

5. Conclusion

The high level of public trust in local government reinforced by the NTMWD's governance structure, which has a design consistent with Ostrom's Eight Principles for Governing a Commons (Ostrom 1990, p. 90), to successfully operate in a long-term and resilient manner. The aspects of communication and participant reputations are known and there is high margin per capita return in the success of the NTMWD conservation efforts both in terms of individual property values and the collective benefits of continued economic development. A strong sense of community provides a longer time horizon and the sanctioning activities are graduated and considered fair. This set of circumstances helps solidify the resiliency of the NTMWD within its current operating parameters. If hydrologic conditions deteriorate in the future, requiring additional conservation measures, additional public education efforts will need to be put in place to maintain a high level of public trust. The institutional framework is in place to maintain the common-pool resource of potable water; the challenge will be to maintain transparency and a sense of fairness to ensure its continued resiliency.

The critical takeaway in this study is the increased probability of success when addressing allocation problems at the local level versus a state or national level. It shows that with an ability of individuals to monitor and effect outcomes, people have a greater sense of trust in governance. When a distant entity attempts to enforce solutions, the degree of trust is lost stemming from a perceived loss of control (Ostrom, 1990). Solutions properly crafted at the local level are typically more resilient due to the issues that Ostrom found: contingent cooperation builds trust that can be leveraged to facilitate larger projects. But if the cooperation is mandated before trust is established, the project is unlikely to succeed, much less demonstrate resilience.

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