Regional Collaboration Report

National Inventory of Regional Collaboration Among Water and Wastewater Utilities

Final Report

Prepared by

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May 2012

Project funded by the AWWA Technical and Education Council and
Sponsored by the M&LD Strategic Management Practices Committee
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Executive Summary

Overview
Utilities face a number of challenges, many of which are anticipated to represent a “new normal” including economic challenges, increasing pressure on water resources, and increasingly complex regulations. Regional collaboration among water and/or wastewater utilities can provide benefits to participants across a wide range of these operational and infrastructure areas. A National Inventory of Regional Collaborations among water and/or wastewater utilities was conducted to identify areas of collaboration, structures to facilitate collaborations, and recommendations and barriers to collaborative efforts. This new information has been synthesized with previously published literature on regional collaborations, in an effort to demonstrate to utilities various models of successful collaborations.

Research Methods
The American Water Works Association’s (AWWA) Strategic Management Practices Committee (SMPC) began exploring alternative drivers, structures, and processes for regional collaboration in 2009, following on a study conducted by the four largest water utilities in the San Francisco Bay Area that was funded by the Water Research Foundation. A Phase 1 survey to the Association of Metropolitan Water Agencies (AMWA) members was used to select collaboratives for the detailed survey. The current study combines the surveys from 28 collaboratives that were completed in 2009/2010 by SMPC members with an additional 17 collaborative surveys that were conducted by a team at the University of Colorado Boulder (CU). The participants in the survey were generally emailed an advance copy of the interview questions. In most cases, the individual filled out most of the information on the survey and returned it to the SMPC or CU representative prior to the interview itself. Then a 15 to 90 minute interview was conducted with the representative of the collaborative. The surveyor then finalized answers to the various survey questions in the survey document. Next, the data from the 45 collaboratives was compiled and analyzed. To the extent feasible, missing information in the surveys was obtained via online research.

In addition to gathering information on regional collaborations through surveys, an extensive literature search was conducted. Previous reports and conference papers on regional collaborations among water and wastewater utilities were reviewed. These publications included additional case studies and information that was used to supplement the findings from the current study.

Demographic Profile of Collaboratives

Participants. The number of participants in each collaborative varied widely, from 2 to 113 entities. The median collaborative size was 7. The majority of the participants were cities or towns (and their associated water or wastewater utilities; including Native American tribal communities), with a number of water authorities and utility districts, and a few agencies (such as US Fish & Wildlife Service, Federal Highway Administration, state and federal environmental protection agencies). More of the collaboratives in this study included drinking water utilities than wastewater utilities. Certain agencies, particularly the larger utilities, were members of a number of different collaboratives,. For example, the
East Bay Municipal Utility District, Fairfax Water, the City of Forest Grove (OR), and the Cobb County-Marietta Water Authority each were members in three or more collaboratives in the survey.

**Location.** The 45 collaboratives surveyed were distributed over 18 different states (including Washington D.C.). When utility collaborations previously reported in the literature review were included, nearly all areas of the country were represented, except for the non-coastal northwest (Idaho, Montana, Wyoming, and North Dakota). It is unclear if collaborations are more rare in these areas due to greater distance between populated areas or if collaboratives exist in these areas that have not been documented. In most cases, all of the members within a collaborative are from within a single state, although in a few cases where watershed issues were the primary drivers for partnership, the collaboratives have spanned up to 5 states (i.e. the Potomac River Basin Drinking Water Source Protection Partnership).

**Age.** The collaboratives that participated in the study were formed from 2 to 54 years ago, with a median age of 8 years. The age of the collaborative did not correlate with the size of the collaborative.

**Formal Planning Documents.** Sixty-eight percent of the collaboratives have a mission or vision statement, but only 51% had a feasibility study or regional collaboration plan, and 24% had a strategic plan. Only one collaborative indicated that it had all three types of formal planning documents, while 12 of the 45 collaboratives (27%) had none of these formal planning documents.

**Governance**

A wide range of governance structures exist across the surveyed collaboratives, ranging from informal to more formal governance models. Among the 45 collaboratives, the types of governance included: informal cooperation, memorandum of understanding (MOU), contractual assistance, Joint Powers Agency (JPA), intergovernmental agreement (IGA), and 501(c)(3) non-profit entities. Note that the study explicitly excluded ownership transfer arrangements. These examples of regionalization where a new regional entity takes over the assets and ownership of existing separate utilities have been well-described in previously published reports (i.e. US EPA 2002, 2009). It appears that nearly any kind of governance structure can work for about any type of collaboration activity, depending on the willingness of the parties. No strong correlations between areas of collaboration and governance structures were identified.

**Financial Management**

The most common financial arrangements were pro rata or membership dues. Pro rata was much more common among collaboratives that have a formal, compared to an informal, governance structure. Participation based and in-kind services as financial arrangements were only found among the formal governance structures.

**Collaboration Areas**

Twelve general areas of collaboration were identified: infrastructure assets, training and development, environmental assessment, operation concerns, customer service, recreation needs, emergency planning/response, technological research, cost reductions, water supply concerns, and...
legislative/regulatory issues. A correlation analysis between the areas of collaboration and the drivers for forming the collaborative indicates that most collaboratives likely expanded their collaboration activities beyond those that initially brought the group together.

A few of the “new normal” drivers for the formation of the collaborative are highlighted below.

- Future water supply and source water sharing were key drivers for nearly half of the collaboratives in the study. While most of these were surface water supply issues in the face of drought and/or growing population driving demand, others included balancing recreational needs and managing ground water.

- Operational efficiency was a key driver for a number of collaboratives. Operationally focused partnerships appear to have helped the members leverage economies of scale. For example, operational collaborations involve collective metering and billing practices. Other examples include, remote monitoring of small facilities by larger utilities.

- Emergency planning and security is another area that utilities appear to have addressed efficiently via collaboration. In particular, arranging in advance for sharing of resources in the face of unexpected emergencies can be valuable. For example, the Southern Maine Regional Water Council has executed mutual aid agreements among its members. In some cases this includes infrastructure, such as building pipelines to inter-tie systems. In other cases, it is arranging for equipment sharing, loaning operator expertise, etc. Examples of collaboratives working on these issues include the Shelby-Frankfort Water Management Group (KY) and the Central Iowa Regional Drinking Water Commission.

- Regulatory responsiveness is another important area of collaboration. Utilities can work together to give feedback into the legislative processes that impact their operation. For example, the Spartanburg County Water Managers Association (SC) indicated that members worked together on supporting or opposing water related legislative issues. Utilities can also pool resources to study ways to comply with new regulations.

- Workforce and training offers another opportunity for collaboration. The need to keep up-to-date with new information can be shared. Utilities can pool funds to send an individual to a technical conference, and then that individual returns and shares their new knowledge. This is the primary activity associated with the Prince William County Service Authority collaborative on training programs. Entities can also combine forces to help recruit and train new operators.

- Finally, several collaboratives shared resources related to communication with the public. The Catawba-Wateree Water Management Group (NC) listed public education about water issues among the three key areas of collaboration. Consistent messaging with regard to water conservation can be particularly valuable.
Benefits of Regional Collaboration

Many different benefits achieved through collaboration were identified. These fell into 19 themes that were identified by more than one collaborative. The most commonly cited benefits were: saving money; enhanced stature for advocacy with regulatory agencies and legislative bodies; information sharing and communication; better management of water resources across basins, sharing arrangements, and/or resulting water supply reliability; and shared operational procedures and/or models. These five benefits were described by nine or more different collaboratives in the study.

Lessons Learned

Thirty-nine of the 45 collaboratives shared critical factors that led to their success. In general, there was much less consensus among these factors compared to the benefits. The most common success factors were: strong, frequent, and/or open communication among members; a defined agreement or structure of the collaborative; leadership; and building relationships among collaborative members.

Key challenges or constraints faced by the collaborative were described by 34 collaboratives. Fifteen different challenges were shared by two or more collaboratives. The most commonly cited challenges were: financial; logistics; politics or bureaucracy; and legal, legislative, and/or regulatory. These four categories of challenges were cited by 9 to 6 different collaboratives. Under financial issues of concern were loss of control, transparency of cost accounting, and limits on the organization due to lack of a budget. Logistical issues were primarily related to finding times and venues to meet, and frequency of meetings. One group indicated that “ensuring regulatory agencies maintain a spirit of partnership” was a challenge.

Finally, only 25 collaboratives described significant roadblocks or barriers to sustaining a collaborative partnership. The most commonly cited barriers were: politics, relationships, willingness to compromise, funding, and trust. Each of these issues were cited by four to eight different collaboratives. For example, one collaborative cited “External issues unrelated to water, imposing attitudes, resentment and even retaliation between entities and their governing bodies.” Another indicated “basin-wide political dynamics.” Lack of trust was cited as a barrier, and building trust as a critical factor for success.

Case Studies

Five collaboratives spanning a range of drivers and governance structures are presented as detailed case studies. These successful collaboratives provide detailed examples of the successful models for collaboration. These collaboratives are:

- Catawba-Wateree Water Management Group (WMG), SC and NC;
- Hampton Roads Planning District Commission (HRPDC) Directors of Utilities Committee, VA;
- Jordan Lake Partnership, NC;
- Shelby-Frankfort Water Management Group (WMG), KY;
- Bay Area Clean Water Agencies (BACWA), CA.

Summary and Conclusions

Regional collaboration can be an efficient means to address a number of challenges. Collaborations can start informally and may evolve over time to more formal arrangements. Collaboratives can also form
around one or two issues and then as trust is developed and benefits are realized they may expand into more areas of collaboration. Open communication, trust, and leadership (formal based on an established structure, but more often informal as driven by key individuals) seem to be key ingredients for success.

There did not appear to be significant benefits, lessons learned, or roadblocks that specifically correlated to a type of collaborative governance structure or area of collaboration. The keys to success regardless of the collaboration type or mechanisms was to build trust among the collaborators, facilitated by transparent processes and open communication, that helped to build relationships between the collaboratives that would persist across leadership changes. The important message is that regional collaboration can provide a range of benefits and a specific collaborative model is not necessary to realize these benefits.
Section 1: Introduction
The overall goal of the American Water Works Association (AWWA) National Inventory of Regional Collaborations Project is to characterize existing regional collaborations among water and wastewater utilities, using a detailed survey method. The information gathered was used to highlight effective areas for regional collaboration, types of governance structures for collaboration, and identify barriers and benefits for utilities interested in regional collaboration efforts. A detailed survey method was used to gather information on 45 regional collaboration efforts among utilities. These collaboratives provided information on the members of the collaborative, drivers that fostered their collaboration, the functional areas of collaboration, and the benefits from these collaborations. This report provides an analysis of the survey data and summarizes the results.

Section 2 of this report gives a background on utility collaborations, addressing the ‘new normal’ environment for water utilities and motivations for this research. Section 3 of the report describes the research methods that were used for this study. The survey process, data collection, and data analysis methods are detailed. In Section 4, the characteristics of the collaboratives that participated in the survey are summarized. Section 5 highlights some of the prevalent and currently timely drivers for collaboration. Seven specific collaboration drivers are highlighted, with a few specific examples of collaboratives formed on the basis of these drivers provided from the current study and/or the literature search phase of the research. Section 6 describes the spectrum of governance structures of the collaboratives, ranging from informal collaboration, formal collaboration, to complete regionalization that subsumes the previously independent entities. Section 7 describes management systems used to provide collaborative services, the fostering of sustainable and growing collaborations, and financial management approaches. Section 8 summarizes the benefits of regional collaboration and section 9 highlights lessons learned.

Finally, five case studies for effective collaboration that span economic, environmental, and social benefits are presented in greater depth. The report concludes with a summary of the results and discussion of further research needs.

At the end of the report, three extensive appendices are provided. The first is the detailed literature review. The second is a more detailed presentation of the quantitative data gathered from the 45 collaboratives and analysis of correlations among the collaborative characteristics. The third and final appendix includes a table of the ~75 collaboratives that were identified in Phase 1 of the study (that preceded the current effort).
Section 2: Background

Water and wastewater utilities face an increasingly complex landscape. Some recent challenges that are likely to persist into the foreseeable future include tight budgets, revenue that is flat or decreasing, water use rates that are decreasing or flat, increasing regulations, and the need to communicate with the public being served, including public messaging in the face of rate pressures. In addition, transient issues may arise that require new efforts, such as security concerns and emergency planning post 9/11. (Means et al. 2005). Regional collaboration may help utilities to efficiently address a variety of these modern challenges. It is therefore of interest to learn from experience to determine what areas of collaboration may be particularly beneficial, governance structures that mesh well with particular goals, and financial models that are appropriate. In particular, the benefits realized from existing collaborations and lessons learned that they can pass on to others may help facilitate the formation of new regional collaborations.

The roots of this effort began in 2001, with an informal collaborative among four of the largest water utilities in the San Francisco Bay Area (East Bay Municipal Utility District, Santa Clara Valley Water District, San Francisco Public Utilities District, and Contra Costa Water District). The agencies worked to address security from terrorism, use new smart technologies for controlling water systems, arrange inter-tying of the water systems to provide emergency backup, reduce the cost of water treatment chemicals and collaborate on workforce development and maintenance practices. The Water Research Foundation then sponsored these agencies to conduct a study on alternative structures and processes for regional collaboration (Yep, personal communication, 8/18/2011; Means et al. 2010). Those initial efforts led to the current initiative of a regional collaboration survey (study).

A literature review conducted in association with the current study (Bielefeldt et al. 2011) found two previous reports by the US EPA (2002, 2009) that provided an overview of utility collaboration partnerships, each with some specific case study examples. Collaboration guides for specific drivers and/or locations have also been published, such as: security information (US EPA 2005), Southern California brine concentrate management (US Dept. of Interior 2009), and Wisconsin storm water (Axness 2007). However, there was a need for a more comprehensive picture of regional utility collaborations, the range of collaboration opportunities, and recommendations for best practices. These goals formed the basis for the study described in this report.
Section 3: Research Methods

The goal of this project was to characterize existing regional collaborations among water and wastewater utilities. The information is desired in order to provide helpful information for utilities interested in regional collaboration efforts. The information compiled included drivers that fostered collaboration, the functional areas that utilities collaborate on, and the benefits from these collaborations. The data collected to support the research were conducted in two primary phases, followed by analysis. More specific information on these processes are provided in the following sections.

3.1 Phase 1 survey by the Association of Metropolitan Water Agencies (AMWA)

In 2009, a Phase 1 survey was emailed to all Association of Metropolitan Water Agencies (AMWA) members in order to compile a preliminary list of possible collaboratives to interview. This Phase 1 interest survey identified nearly 75 examples of collaborative efforts. A list of these collaboratives is summarized in Appendix C.

3.2 Phase 2 Initial survey by the Strategic Management Practices Committee (SMPC)

After the Phase 1 survey was completed, the SMPC subcommittee developed a detailed survey to gather information on various collaborative models with an intent of building a fairly comprehensive inventory of utility collaborations. The goal of the survey was to determine successful collaboration practices, and disseminate this information to the utility community. The Phase 2 survey targeted information in six categories: general information (i.e. mission, drivers, objectives), governance, collaborative services/activities/initiatives, financial management, benefits, and lessons learned. The utilities identified with the Phase 1 survey were narrowed down to 54 desirable participants for this Phase 2 detailed survey.

The Phase 2 detailed survey was initially conducted by SMPC members in 2009 and 28 surveys were completed. As part of the interview process, generally the survey questions were emailed prior to the scheduled interview and sometimes the responses were filled out by the utility and sent back to the interviewer ahead of time. The interviews were conducted over the phone and typically lasted 30 to 60 minutes. During the verbal discussion, the interviewer from the SMPC filled in any missing information. The final version of the completed survey was emailed back to the interviewee for review.

3.3 Phase 2 Additional surveys with literature search by the University of Colorado (CU)

Due to the time required for the interviews and limited resources of the SMPC, a Request for Proposals was prepared to hire a contractor to complete additional surveys, analyze the resulting data, and develop a report on regional collaboration. A team from the University of Colorado Boulder was selected for this task. The team initially met with a member of the SMPC regional collaboration subcommittee to identify the collaboratives of greatest interest to interview. Meetings with representatives from about three collaboratives were set up at the 2011 AWWA ACE Conference in Washington, D.C. Additional interviews were conducted over the phone using the same survey and methods as were employed in Phase 2 by the SMPC members. In total, the CU project team surveyed 17 additional collaboratives.
A summary of the 45 interviews conducted is provided in Table 1, with the collaboration, state, contact name, and interviewer(s). Most of interviews were with member entities within the collaborative. These are listed in the second column if the interview wasn’t directly with a representative of the collaborative.
**Table 1. Summary of interviews**

<table>
<thead>
<tr>
<th>Collaborative</th>
<th>(URL, if available)</th>
<th>Interviewed Entity (if different)</th>
<th>State</th>
<th>Interviewer</th>
</tr>
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<td>Cobb County-Marietta Water Authority</td>
<td>SC</td>
<td>SMPC</td>
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<td>CU</td>
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<td>Des Moines Water Works</td>
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<td>Shelby-Frankfort Water Management Group</td>
<td></td>
<td>Louisville Water Company</td>
<td>KY</td>
<td>SMPC</td>
</tr>
<tr>
<td>Southern Maine Regional Water Council</td>
<td>(<a href="http://www.smrwc.org/">http://www.smrwc.org/</a>)</td>
<td>Portland Water District</td>
<td>ME</td>
<td>SMPC</td>
</tr>
<tr>
<td>Spartanburg County Water Managers Association</td>
<td></td>
<td>San Juan Water District</td>
<td>CA</td>
<td>SMPC</td>
</tr>
<tr>
<td>Steering Committee – Wastewater</td>
<td></td>
<td>Detroit Water and Sewerage Department (DWSD)</td>
<td>MI</td>
<td>CU</td>
</tr>
<tr>
<td>STOPR Group</td>
<td></td>
<td>Toho Water Authority</td>
<td>FL</td>
<td>SMPC</td>
</tr>
<tr>
<td>Sub-Regional Operating Group (SROG)</td>
<td>(<a href="http://phoenix.gov/PCD/srog.html">http://phoenix.gov/PCD/srog.html</a>)</td>
<td></td>
<td>AZ</td>
<td>SMPC</td>
</tr>
<tr>
<td>Tualatin Basin Water Supply Partnership</td>
<td>(<a href="http://www.tualatinbasinwatersupply.org/">http://www.tualatinbasinwatersupply.org/</a>)</td>
<td></td>
<td>OR</td>
<td>SMPC</td>
</tr>
<tr>
<td>Upper Occoquan Service Authority</td>
<td>(<a href="http://www.uosa-construction.org/">http://www.uosa-construction.org/</a>)</td>
<td>Prince William County Service Authority (PWCSA)</td>
<td>VA</td>
<td>CU</td>
</tr>
<tr>
<td>Val Vista Water Treatment Plant (WTP)</td>
<td></td>
<td>City of Mesa</td>
<td>AZ</td>
<td>SMPC</td>
</tr>
<tr>
<td>Virginia Water and Waste Authorities Association (VWWAA)</td>
<td>(<a href="http://www.rcpsa.com/vwawa/">http://www.rcpsa.com/vwawa/</a>)</td>
<td>Prince William County Service Authority (PWCSA)</td>
<td>VA</td>
<td>CU</td>
</tr>
<tr>
<td>Washington Metropolitan Area Water Supply Coordination</td>
<td></td>
<td>Fairfax Water</td>
<td>DC</td>
<td>CU</td>
</tr>
<tr>
<td>Water Service &amp; Economic Development</td>
<td></td>
<td>Cleveland Division of Water</td>
<td>OH</td>
<td>SMPC</td>
</tr>
<tr>
<td>Water Technical Advisory Committee (TAC)</td>
<td></td>
<td>Detroit Water and Sewerage Department (DWSD)</td>
<td>MI</td>
<td>CU</td>
</tr>
</tbody>
</table>
3.4 Data Organization and Analysis
The data from Phase 2 was compiled as separate documents for each collaborative. The information from these documents was then compiled under distinct information categories. Table 2 outlines the information categories and the specific data elements addressed within each category. The organization was selected to enable easy sorting of the information to facilitate the identification of overall characteristics of the collaboratives and any correlations between the information categories.

Table 2. Organization of the Collaborative Data

<table>
<thead>
<tr>
<th>Information Category</th>
<th>Specific Data Elements</th>
</tr>
</thead>
</table>
| Summary Information  | • Type of Collaboration (Governance Structure)  
|                      | • Number and type of collaborators (i.e. water, wastewater, city, etc.) and the total number of collaborators  
|                      | • Total population served  
|                      | • Year collaborative founded  
|                      | • Mission or Vision Statement (Yes/No)  
|                      | • Feasibility Study or Regional Collaboration Plan (Yes/No)  
|                      | • Strategic Plan (Yes/No)  
|                      | • Financial approach  
|                      | • Date of interview  
|                      | • Key activity drivers/current activities  
|                      | • Key areas of collaboration  
| Collaboration Agencies & Population | • Member Agencies Involved in Collaborative  
|                                     | • Population of each Member Agency  
|                                     | • Type of agency (i.e. water, wastewater, city)  
| Respondent Information | • Address  
|                       | • Contact Name  
|                       | • Contact Title  
|                       | • Contact Phone Number  
|                       | • Contact Email  
|                       | • Collaboration Websites  
| Regional Collaborative Information | • Member agencies involved in collaborative  
|                                      | • Mission statement  
|                                      | • Mission statement source  
|                                      | • Key objectives of collaborative  
|                                      | • Agency that commissioned and led the collaborative initiative  
|                                      | • Overall scope of feasibility study or regional collaboration plan  
|                                      | • Date when collaboration officially initiated  
| Governance Structures | • Governance structure alternatives evaluated  
|                        | • Description of final governance structure defined for collaborative  

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<table>
<thead>
<tr>
<th>Information Category</th>
<th>Specific Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative Services</td>
<td>• Description of any specific decision making process agreed upon to resolve issues</td>
</tr>
<tr>
<td></td>
<td>• Description of any policy issues addressed during formation of collaborative</td>
</tr>
<tr>
<td></td>
<td>• List of key areas of collaboration</td>
</tr>
<tr>
<td></td>
<td>• Description of specific operational and/or business responsibilities of collaborative</td>
</tr>
<tr>
<td></td>
<td>• Assets/infrastructure shared by participating agencies</td>
</tr>
<tr>
<td></td>
<td>• Description of ownership structure of assets in case of shared services/infrastructure</td>
</tr>
<tr>
<td></td>
<td>• Operational performance metrics defined and tracked by the collaborative</td>
</tr>
<tr>
<td>Financial Management</td>
<td>• How activities of collaborative are financed and/or funded</td>
</tr>
<tr>
<td></td>
<td>• How costs of activities are shared among the participating agencies</td>
</tr>
<tr>
<td></td>
<td>• Costs incurred in conducting feasibility study or plan or in formation of collaborative</td>
</tr>
<tr>
<td>Benefits of Regional Collaboration</td>
<td>• General outcomes and benefits achieved through collaboration</td>
</tr>
<tr>
<td>Lessons Learned</td>
<td>• Critical factors that led to success of collaborative</td>
</tr>
<tr>
<td></td>
<td>• Key challenges/constraints faced by collaborative</td>
</tr>
<tr>
<td></td>
<td>• Any significant roadblocks or barriers others should be aware of</td>
</tr>
<tr>
<td></td>
<td>• Other comments</td>
</tr>
</tbody>
</table>

Many of the surveys were missing responses to some of the questions. Additional web research was conducted by the CU team in an attempt to fill in the missing information. For example, several surveys lacked a complete list of collaborators, their type, and the population served by each. A draft version of this report was reviewed by the regional collaboration subcommittee members of the SMPC. Their feedback was instrumental in structuring the report and highlighting information of interest.
Section 4: General Information
This section summarizes some of the main characteristics of the collaboratives that participated in the survey. Detailed graphs and tables of the information are presented in Appendix B.

4.1 Participants in Collaborations
Each of the collaboratives provided a roster of their members. A total of 696 different entities were represented among the 45 surveyed collaboratives. Many more of the collaboratives focused on drinking water issues (27) compared to wastewater issues (9), in addition to some with strong collaboration between both water and wastewater utilities (9).

Towns, cities, and/or county entities comprised the majority of the collaborative participants (359 or 52%). Native American tribal communities were counted under town/city/county collaborators. The median number of town/city/county participants per collaborative was 3. The Apalachicola-Chattahoochee-Flint (ACF) Stakeholders in Georgia was the collaborative with the largest number of town/city/county collaborators at 76.

Other participants in the collaboratives included universities, independent corporations, and government agencies such as the US Environmental Protection Agency (EPA) or the US Fish and Wildlife Service (157 entities or 23%). Each collaborative included between 0 and 24 “other” participants. The median number of “other” participants in the collaboratives was 2.

The total number of individual entities participating in each of the 45 collaboratives ranged from 2 to 115, with a median collaborative size of 7. The majority of collaboratives (58%) involved between 1 to 9 different utilities. Only 4 collaboratives out of the 45 total had 12 or more utilities involved. The Metropolitan North Georgia Water Planning District had 33 utility participants, the largest number in the survey.

4.2 Location of Collaborations
The states where each collaborative is primarily located in is shown in Figure 1. Eighteen different states (including Washington DC) are represented. Both coastal areas are well represented, but there are few examples from the Midwest and northwestern states. In most collaboratives all of the participants are in a single state. Three collaboratives focused on water-basin issues and included participants from multiple states. The Catawba-Wateree Water Management Group has members in both North Carolina and South Carolina. The ACF (Apalachicola-Chattahoochee-Flint basin) Stakeholders (represented in the survey by the Cobb Country – Marietta Water Authority) includes entities in Georgia, Alabama, and Florida. Also, the Potomac River Basin Drinking Water Source Protection Partnership includes agencies in Maryland, Washington DC, Virginia, Pennsylvania, and West Virginia.
Although there is a perception that regional collaborations are likely to be closely co-located geographically, some examples exist of somewhat distant collaborations. For example, the City of Panora, IA, collaborated with the Des Moines Water Works; located about 45 miles away [US EPA 2002, US EPA 2009]. The Metropolitan Washington Council of Governments (COG) collaboration spans 3020 square miles (Means et al. 2010). The locations of collaborations reviewed in various literature documents are indicated on the map by an L. When the body of literature is added to our survey, it is clear that regional collaborations between water and/or wastewater utilities have been documented in most states.

### 4.3 Age of Collaborations

As shown in Table 3, there is also a widespread range for the date that the surveyed collaboratives were formed, with only a few formed in the last couple of years. Several collaboratives were founded between 3-5 years ago, 6-10 years ago, and 10 collaboratives began more than 20 years ago. The oldest collaborative was the Metropolitan Washington Council of Governments – Prince William County Service Authority founded in 1957. An even older collaboration was cited in the literature, the Metropolitan Water District of Southern California that was established by a legislative act in 1928 (Means 2010; AWWA RF / US EPA). Long standing collaborations indicate a successful collaboration that has retained its usefulness to members.
Table 3. Age of the collaboratives in the study (as dated from the 2011 interviews)

<table>
<thead>
<tr>
<th></th>
<th>≤ 2 years</th>
<th>3-5 years</th>
<th>6-10 years</th>
<th>11-20 years</th>
<th>&gt;20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of collaboratives</td>
<td>2</td>
<td>8</td>
<td>19</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Percentage of collaboratives</td>
<td>5</td>
<td>18</td>
<td>43</td>
<td>11</td>
<td>23</td>
</tr>
</tbody>
</table>

* one of the surveyed collaboratives did not report a year they were founded

4.4 Population Served by the Collaboratives

The population served by the utilities and/or municipal entities within a collaborative were determined. These populations were rarely provided in the survey information and were mostly determined using US Census Data (U.S. Government, 2010; IDCide.com, 2010). The individual entities within the collaborative served a wide range of population sizes, ranging from 126 (Town of Braswell in Metropolitan North Georgia Water Planning District) to >25 million (State Water Contractors of California in the Multi-Agency Benchmarking Program). The largest majority served 10,000 to 50,000 people. When the populations of the individual entities within a collaborative were summed, 37 of the 45 collaboratives served 0.5 million to 10 million people. The largest collaborative in our study served ~36 million people via the Multi-Agency Benchmarking Program described by the Los Angeles Department of Water & Power (LADWP).

4.5 Formal Planning Documents

Some of the collaboratives had a formal mission statement, feasibility study or regional collaboration plan, and/or a strategic plan. However, quite a few of the surveys left these questions blank and whether or not the collaborative has such a document is unknown. Mission statements for the collaborations were common, but 25% or less of the collaboratives indicated the completion of a feasibility study / collaboration plan or strategic plan.

Table 4. Number of Collaboratives with Each Type of Formal Planning Document

<table>
<thead>
<tr>
<th>Formal Planning Documents</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission Statement</td>
<td>28</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Feasibility study or regional collaboration plan</td>
<td>9</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>Strategic Plan</td>
<td>11</td>
<td>7</td>
<td>27</td>
</tr>
<tr>
<td>All 3 Types of Formal Planning Documents</td>
<td>1</td>
<td>12*</td>
<td></td>
</tr>
</tbody>
</table>

* includes collaboratives with all no and/or unknown

4.6 Summary

The collaboratives in the survey covered a wide variety of sizes, locations, ages, and degree of formal planning. Although various attempts were made to find correlations between the various demographic
characteristics of the collaboratives, none were found. Details on these analyses are provided in Appendix B.
Section 5: Drivers for Collaboration

5.1 Survey Information

Although there were several key activity drivers described by each collaborative, the majority of these could be grouped into 12 main categories, described in Table 5. These same 12 categories were also used to categorize the key areas of collaboration, to explore the transition between drivers for the collaboration and current areas of collaboration. For surveys that had blanks in these sections, information from other sections provided this data.

Table 5. Key activity drivers/current activities categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct or Purchase Assets/Infrastructure</td>
<td>The construction of a shared pipeline for water resources</td>
</tr>
<tr>
<td>Training &amp; Development</td>
<td>Shared training for staff or operators on various issues or regulations</td>
</tr>
<tr>
<td>Environmental Assessment</td>
<td>Water quality monitoring</td>
</tr>
<tr>
<td>Operational concerns/efficiencies</td>
<td>Share best practices</td>
</tr>
<tr>
<td>Customer Service</td>
<td>Public relations; explanations about water service and billing rates</td>
</tr>
<tr>
<td>Recreation Needs</td>
<td>Allocating water resource for recreational purposes</td>
</tr>
<tr>
<td>Emergency Planning/Response + Security</td>
<td>Security information sharing and planning for emergency scenarios</td>
</tr>
<tr>
<td>Technological Research</td>
<td>Research on specific technologies like desalination</td>
</tr>
<tr>
<td>Cost Reductions</td>
<td>Saving costs by bulk purchasing of chemicals or other methods of cost reductions</td>
</tr>
<tr>
<td>Water Supply Concerns</td>
<td>Allocating and/or managing common water resources</td>
</tr>
<tr>
<td>Legislative/Regulatory Issues, including new regulations</td>
<td>Addresses responses and treatment updates for new regulations; responds to legislative issues</td>
</tr>
</tbody>
</table>

Table 6 shows the number of collaboratives where the drivers for forming the collaborative effort fell into each of the 11 categories. The median number of drivers listed for each collaborative was 2. In contrast, the median number of total collaboration areas was 4 (see Appendix B for more detailed information). In fact, 31 of the 45 had more total number of collaboration areas than drivers. This indicates that most collaboratives likely expanded their collaboration activities beyond those that initially brought the group together. Alternatively, the survey questions were somewhat unclear and elicited different responses to key drivers versus key areas of collaboration.
Table 6. Key Drivers for Forming Regional Utility Collaborations

<table>
<thead>
<tr>
<th>Driver for Collaborative Formation</th>
<th>Number of Collaboratives</th>
<th>Driver for Collaborative Formation</th>
<th>Number of Collaboratives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply concerns</td>
<td>21</td>
<td>Customer service</td>
<td>7</td>
</tr>
<tr>
<td>Legislative / regulatory issues</td>
<td>17</td>
<td>Training and workforce development</td>
<td>5</td>
</tr>
<tr>
<td>Cost reductions</td>
<td>13</td>
<td>Technological research</td>
<td>3</td>
</tr>
<tr>
<td>Operational concerns / efficiencies</td>
<td>9</td>
<td>Recreation needs</td>
<td>3</td>
</tr>
<tr>
<td>Construct or purchase assets or infrastructure</td>
<td>9</td>
<td>Emergency planning, response and security issues</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Assessment</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most of the collaborations reported in the literature by the US EPA were driven by drinking water quality problems. Other literature reports have focused on collaborations around specific drivers such as security information (US EPA 2005), emergency planning (Means et al. 2010), desalination waste (US Dept. of Interior, Bureau of Reclamation, 2009), and storm water management (in Wisconsin, Axness 2007).

More specific examples for the most common and/or timely issues facing water utilities are described in the following sections.

5.2 Future Water Supply and Source Water Sharing

As water demand steadily increases in many areas from population growth and climate change stresses water supplies, future water supply and source water sharing concerns are proliferating (Levin et al. 2002; Means 2005; Pacific Institute 2009). In some areas the challenge of providing adequate water supply has been a concern for decades and collaborations have been fostered due to these needs. For example, the City of Hillsboro Joint Water Commission (OR), the Upper Occoquan Service Authority (VA), and the Maine: Peace River Manasota Regional Water Supply Authority (FL) have collaboratively dealt with water supply issues since 1971, 1980, and 1982, respectively. Other collaboratives, like the ACF Stakeholders, have recently suffered droughts, prompting collaboration to address these issues. Water supply drivers can range from current and future water supply concerns including source water sharing, recreational needs, exchange rights, surface and groundwater management, and source water quality. Six specific examples of regional collaboration driven by water supply and allocation concerns are highlighted below.

Each of the entities involved in the City of Pueblo Flow Program, CO, had various water supply and source water sharing related drivers, ranging from recreational to exchange rights, that fostered the need for a collaborative among the Board of Water Works, Southeastern Water Conservancy District, Colorado Springs Utilities, and the Cities of Aurora, Fountain, Colorado Springs and Pueblo. These drivers included: maintaining 100 cubic feet per second flow through the City of Pueblo, wanting to
construct a new pipeline from the reservoir to the service area, wanting an exchange right to move agricultural water into the reservoir, expanding the reservoir, the desire for an exchange right into the reservoir, and having a rafting course on the main stem of the Arkansas River on a quarter-mile stretch through the center of town. Since six government entities were involved, everyone agreed that an intergovernmental agreement (IGA) would be necessary. Since its formation in 2004, this collaborative has successfully addressed the needs of each entity, while creating a better relationship between all parties.

The Jordan Lake Partnership, NC, was also driven by concerns for immediate and future water supply needs. Drivers for this collaboration were a severe drought and the nature of the Jordan Lake allocation process, which required the City of Durham and Chatham County to collaborate with the State before additional allocation requests could even be entertained. These partners are now committed to working collaboratively to enhance the sustainability and security of the region’s water supply resources through conservation and efficiency, interconnection, and coordinated planning and development of the Jordan Lake water supply. In addition, the Partnership will demonstrate that local governments can work together in a cooperative fashion to create environmentally sustainable, secure and mutually beneficial water supply strategies for Jordan Lake. This is a relatively recent collaboration, officially entering into an MOU in 2009, but seems to have been successful, especially since the creation of the Partnership alone was cited as a major accomplishment for the signatories and the Region.

The East Valley Water Forum, AZ, was formed in 2003 due to the need for open exploration of regional groundwater management issues. This partnership of tribal, public and private water agencies, and interested stakeholders makes consensus-based decisions regarding water policy issues in the East Salt River Valley. The scope of the collaboration initially included conducting infrastructure mapping to identify facilities and lines, developing groundwater scenarios, developing a regional hydrogeologic model, developing an East Valley Water Resource Management Plan, and then to develop groundwater modeling of drought scenarios based on the previous mapping and modeling results. Recent movement towards appropriate artificial recharge of regional aquifers and using groundwater as a supply of last resort rather than earliest convenience demonstrates the success of this collaborative.

The Lake Erie Water Quality Collaborative is a loose network of plant managers along Lake Erie that collaborate primarily on plant operational issues including lake freeze, taste and odor issues, Lake Erie’s dead zones, and the unknown impacts of climate change on the lake’s behavior. This collaboration formed informally through Ohio AWWA meetings in the spring of 2007 and has not matured into a formal entity with decision making processes or policy issues. There is simply the verbal understanding that utilities will be proactive about sharing information, with emails at least once per month. This informality has proven to be beneficial to the entities involved, with a better understanding of the ‘real time conditions’ of Lake Erie, an expanded knowledge base, and better anticipation of conditions so as to better manage plant operations.

The Apalachicola-Chattahoochee-Flint (ACF) Stakeholders formed due to the 2007 drought in the Southeast and an ongoing law suit regarding the ACF River Basin. The lawsuit has been tied up in court for the past 22 years. The group was driven by the need to compromise on a water sharing solution
since the states have made little headway, despite a ruling giving Alabama, Georgia, and Florida three years to settle their differences and negotiate an agreement. Therefore, this collaborative includes 77 entities, representing different cities, counties, industries, businesses, fishermen, farmers, conservation, and recreation groups from all three states, who incorporated as a 501(c)(3) nonprofit organization in September 2009. Their objectives include providing leadership in a consensus based basin wide vision and a unified voice for the ACF Basin, implementing solutions that are based on the best available technology and science, and to pursue appropriate change to institutional structure, policies, and procedures in implementing the solutions set forth by this entity.

The Peace River Manasota Regional Water Supply Authority (encompassing the Charlotte, DeSoto, Manatee and Sarasota counties in Florida), was driven by the declaration of the region as a ‘water critical area’ by the water management district, necessitating the development of an alternative water supply for the area. This collaboration first formed by inter-local agreement between the four counties in 1982 and became a fully functioning regional water supply agency in 1991. As a result of this collaboration, water supply systems have become interconnected, increasing reliability and the ability to obtain grant funds is greatly enhanced to offset local expenditure.

These examples show the range of water supply concerns that can be addressed through regional collaboration. While many of these are formal arrangements, informal collaboration can also provide benefits. The formal structure can help bring together diverse interests to work toward common goals.

5.3 Operational Efficiency

Another key driver for water utilities includes operational efficiency, or doing more with less. Although this has always been a concern, the recent economic situation has increased difficulties for utilities driving new collaborative formation for controlling infrastructure costs, sharing funding for water treatment, storage or transmission facilities, achieving economies of scale, cost control and operational efficiencies. This is particularly timely since water consumption in many areas is flat or declining, reducing traditional revenue streams to utilities. Despite aging facilities and infrastructure, customers are reluctant to see service rates rise, forcing utilities to be more efficient. This can be particularly challenging for small utilities. Therefore, the US EPA (2009) and the Rural Community Assistance Partnership (RCAP; Martin 2010) both advocate regionalization or other collaboration approaches for water utilities to gain operational efficiencies. Some successful collaboration examples from the current study are highlighted below.

The City of Hillsboro Joint Water Commission, OR, was driven by the opportunity to share funding of water treatment, storage, and transmission facilities serving the cities. Other drivers that contributed to establishing the collaborative included a new Bureau of Reclamation dam being constructed to store water for municipal purposes and new drinking water regulations on the horizon requiring additional treatment. The City of Hillsboro initiated the collaborative with the City of Forest Grove in 1971, with 3 entities joining since to establish a jointly owned system. Since establishing the jointly owned system, water quality has improved, supply is more reliable, and there have been fewer challenges with regulatory compliance.
The drivers for the Sub-Regional Operating Group (SROG), AZ, as described by the City of Mesa, included a sub-regional approach to controlling infrastructure costs, achieving regional economies of scale and enhancing regional stewardship of the environment. This multi-city collaboration formed an IGA in 1979 and coordinates the wastewater plans of the region, monitors compliance of local governments, enforces state and EPA standards for wastewater in the region, coordinates reuse plans for effluent and residual solids, and coordinates the financial aspects of the SROG program. Overall benefits achieved by the collaborative include area-wide water quality planning, capital investment reduction, and maximizing beneficial use of reclaimed water.

The Val Vista Water Treatment Plant (WTP), AZ, is an IGA established in 1973. It was also fostered by drivers for economies of scale, cost control and operational efficiencies. The Val Vista WTP objectives include cost control and containment, regulatory compliance efficiencies, workable governance structure, achieving the best interests of the citizens for both communities, and identifying synergies for a common water treatment plant. The collaboration has been successful in reducing operating and capital expenditures, incorporating synergies in the operation of the plant, and balancing their approach to the use of limited natural resources.

The Eastern Meter Management Association was established in 1989 to address the concerns of water meter managers and develop solutions to improve each utility’s meter maintenance program. The key driver for this collaborative was collective meter and billing practices, and representing the membership to vendors and manufacturers. The benefits of this collaborative include networking, providing a forum for common meter management problems, a source for current and new meter information and a pool of resources and ideas for manufacturers and vendors, as well as utilities, on product performance and industry needs.

5.4 Emergency planning and security
Since Sept. 11, 2001, security concerns have become more prominent for water and wastewater utilities. Regulations have required security vulnerability assessments and site security plans. Many security responses coincide with emergency planning. Emergency planning includes response to natural disasters like floods or earthquakes. Ways to meet these challenges can include enhancing physical security, creating infrastructure (i.e. inter-tie pipelines between communities that could be used if a drinking water plant needed to be taken off-line), and better communication and coordination. Utilities can also make plans to share specific equipment in the case of an emergency, which can save money because all utilities are not required to purchase their own equipment. (Copeland and Cody 2007; Grigg 2003)

Only one utility interviewed, the Bay Area Security Information Collaborative (BASIC), listed any of its drivers as related to emergency planning and security, but several utilities expanded into that area after formation and it is becoming one of the more vital topics for utility collaboration. Coordinating emergency planning and responses among San Francisco Bay Area water utilities was the main driving force behind the formation of BASIC. These utilities met in response to 9/11 and agreed to form BASIC to help coordinate their responses to security issues. Collaboratives that have expanded to address the
areas of emergency planning and security issues include the Central Iowa Regional Drinking Water Commission, Shelby/Frankfort Regional Water Management Group (KY), Portland Regional Water Providers Consortium (OR), the Prince William Council of Governments (VA), and the San Juan Water District: Regional Water Authority (CA); four of these five collaboratives existed prior to 9/11.

5.5 Regulatory responsiveness

Regulatory responsiveness is a critical issue for both water and wastewater utilities. Drinking water utilities must respond to new regulations to protect public health, which often include more stringent requirements for contaminants that are already regulated, as well as the regulation of additional contaminants. Wastewater plants face a host of potential new regulations about environmental discharge qualities, including TMDLs and regulations for pharmaceuticals and personal care products. This is becoming increasingly important as more and more research is conducted into the impacts of minute pollutants on our ecosystems and human health. Addressing these regulations can be quite challenging due to the potentially volatile combination of politics, science, engineering and public concerns involved. (Means 2005)

The Director of Utilities Committee as described by the Hampton Roads Planning District Commission arose out of an opportunity to provide a coordinated and coherent position to the Commonwealth of Virginia on the role of all levels of government as it relates to long and short-term planning, resources, operations, regulations, permits, and water rights. In addition, beginning in the early 2000s, regulatory issues in wastewater drove an expansion of the collaborative. This collaboration has proven cost effective by pooling resources and providing good ideas that help out the entire group, rather than just one or two entities. The group also has a strong influence at the state level on water legislation and regulations, enhancing the effectiveness and speed of state-local communication and feedback.

One of the key drivers for the formation of the Anderson Regional Joint Water System, SC, was to coordinate legislative and regulatory response. The jointly owned and operated water treatment plant creates the foundation for the collaborative, allowing for the collaborative to also cooperate on regulatory issues. The organization was chartered in February 2000, and the system was purchased and began operation in April 2002. Each member agency is financially insulated from non-participating expansion costs.

The Portland Regional Water Providers Consortium, OR, was formed due to concern that the Metro regional government would take over the water planning role. Other drivers included a closing window on municipal water rights being easy to obtain from the state, rapid population growth in the early 1990’s, key leadership, and opportunities for more collaboration in the face of increasing federal regulation impacts from the Endangered Species Act, Clean Water Act, and Safe Drinking Water Act. They officially formed in October 1996 under an IGA. Since then, the regional conservation program has gained greater acceptance, helping many members meet State requirements for conservation and management plans to support water rights. They have also built trust between members, allowing the region to speak with one voice on some policy and program matters. Most importantly, they were
successful in avoiding a Metro-led water planning effort and have become the go-to entity for collaboration with Metro growth management programs.
5.6 Workforce – training, knowledge retention, succession planning

Workforce issues have been recognized as a concern for the past decade. There are a number of converging factors that contribute to workforce concerns in the water and wastewater industry. First, many of the most senior and skilled workers are nearing retirement. This creates a need to both attract new employees and a need to train these workers. In addition, water and wastewater treatment operations are becoming increasingly complex, requiring the workforce to continuously update its knowledge. These continuing education requirements for operator licenses are not new, but the specific types of educational needs continue to evolve. (Means 2005; Ritchie 2011)

Regional collaboration can address all of these issues. To recruit new workers, utilities can join forces for recruiting. This has occurred via the Bay Area Water/Wastewater Workforce Development Collaborative (BAYWORK) and an Employ Florida Banner Center for Water Resources. These collaboratives were formed in 2009 and 2010, respectively [see summary in the Literature Review]. Utilities can also collaborate to provide regional training sessions for employees and share the costs, or pool resources to send a single representative to a key conference or workshop and bring back information to share with the larger group. For example, the Anderson Regional Joint Water System coordinates the professional training and development for all 15 member entities. The costs of the training and development sessions are billed per services rendered. This collaboration has provided increased training opportunities for its member entities.

The Regional Training Program by Prince William County Service Authority (PWCSA) was driven by the need to reduce costs and provide more training to more people. Instead of various utilities trying to send people off for training courses everywhere, they realized that by doing it together and establishing a regional training program they could share resources and offer courses for everyone in the region. This has lowered costs and provided more training to more people. PWCSA has stated that it’s been a great success for the past 3 or 4 years, especially since it’s not anything formal, just everybody sharing resources. Funding comes from each utility’s training budget on a course by course basis and the training sessions offered are guided by the needs and requests of all utilities.

5.7 Communicating with the Public

Another common driver in the formation of several collaboratives was to improve customer service and communicate more effectively with the public. This is an important driver since costs have increased in many areas due to the economic situation, water stress factors, and regulatory requirements. Increases in cost are generally coupled with increases in customer concerns and complaints. Improving customer relations can lead to better understanding of costs and better service in general.

The Water Service & Economic Development collaborative, OH, was driven both by the community and the Cleveland Division of Water (CDW). The community drivers included breaks or leak histories in their water mains due to lack of investment for maintenance and neglect of infrastructure, as well as lack of political will for raising finances. Drivers for the Cleveland Division of Water included wanting stability in the customer base, wanting better economic development in the communities, and a desire to maintain a high level of service to the customers. The collaboration has been successful, addressing water main
problems and resolving water quality problems through cleaning and lining. In addition, suburban communities have built a greater trust in CDW, developed a sense of partnership, and seen their dollars at work through tangible results within the community.

The Detroit Water & Sewer Department (DWSD) Technical Advisory Committee (TAC) formed their collaborative due to a need for customer involvement in the development of their 50-year Water Master Plan. This need arose primarily from the customers not feeling real involvement and not understanding the rate model. To some extent, as a result of not understanding the rate model, the customers felt that it was unfair and there were some movements to leave the system. So Detroit said that they wanted to work with the customers on those issues and, after the initial skepticism, developed into the TAC partnering agreement. As a result, there has been enhanced system financial security through the implementation of new contracts, reductions in capital investment through collaboration with customers, improved service, and improved relationships that also translate into reduction in legal disputes.

5.8 Knowledge Management

Traditionally utilities have refrained from sharing information for various reasons, but recently have realized that by sharing and managing knowledge they can not only save costs, but coordinate efforts to create information databases. These databases have helped better understand ecological impacts, performance and benchmarking, project delivery aspects, and experiences with different types of technologies. A few examples of collaboratives with strong knowledge management drivers are highlighted below.

The Bay Area Clean Water Agencies (BACWA) had several drivers for formation, including collecting data on aquatic life and quality of waters of the San Francisco Bay System, coordinating their work on data collection with related work of other agencies and organizations, interpreting the data collected to assess the effects of pollution and other factors on the Bay, and to manage this data to assure its continued usefulness. BACWA has enabled better coordination on regulatory and policy issues and created a single point of contact with regulatory agencies, simplifying negotiations. By pooling funds, more expensive technical studies have been undertaken and information sharing exists across more than 100 wastewater agencies in the Bay Area.

The LADWP: Multi-Agency Benchmarking Program was initiated to share performance and benchmarking among the agencies on key water facilities. It then grew to processes and procedures that are common to water agencies like delivering projects, planning, design, construction, and construction management. The biggest benefit was the chance to get together and talk through challenges and accomplishments among the organizations. This collaborative ended in 2010 once funding, sharing of projects and sharing of lessons learned ran its course.

Colorado Municipal Forum on Trenchless Technology was driven by the need to share experiences with trenchless technology among municipalities to lessen the dependence on industry provided information and to increase the success and confidence in using the techniques. This collaborative evolved from a national program initiated in 1998, and the Colorado Forum consists of five entities. The program is organized, moderated, and financed through the Trenchless Technology Center (TTC) in Louisiana. It has
provided an improved understanding of how to use trenchless technologies successfully, identified problem issues that need attention through research, improved confidence in the appropriate use of various techniques and overall created a successful collaboration that has benefited municipalities, the Trenchless Technology Center and the trenchless technology industry.
Section 6: Spectrum of Governance

6.1 Summary of Survey Data

The governance structures of the 45 collaboratives ranged from informal to more formal contractual arrangements. Ownership transfer or regionalization which formally creates a new entity that takes over tasks of formerly separate entities were not targeted as participants in the survey. Table 4 from the US EPA describes a range of potential collaboration or partnership arrangements.

Table 7. System Partnership Spectrum (U.S. EPA 2002, 2009)

<table>
<thead>
<tr>
<th>Informal Cooperation</th>
<th>Contractual Assistance</th>
<th>Joint Powers Agencies (JPA)</th>
<th>Ownership Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ → → Increasing Transfer of Responsibility → → →</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinate with other systems, but without contractual obligations</td>
<td>Utilities contract with another system or service provider, but contract is under the system’s control</td>
<td>Creation of a new entity designed to serve the systems that form it</td>
<td>Takeover by an existing entity or a newly created entity (regionalization)</td>
</tr>
</tbody>
</table>

Examples:
- Sharing equipment
- Sharing bulk supply purchases
- Mutual aid arrangements
- O&M
- Engineering
- Purchasing water
- Sharing system management
- Shared operators
- Shared source water
- Acquisition and physical interconnection
- Acquisition and satellite management
- Transfer of privately-owned system to new or existing public entity

The majority of collaboratives were classified as contractual assistance, with the spectrum of governance structures shown in Table 8. At the time these surveys were conducted one collaborative hadn’t finalized a governance structure. Although it was expected that the more formal governance structures would have formal planning documents, this was not found to be the case (see details in Appendix B).

Table 8. Governance Structure of the Collaboratives

<table>
<thead>
<tr>
<th>Governance Structure</th>
<th>Number of Collaboratives</th>
<th>Percentage of Collaboratives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal cooperation</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Contractual assistance</td>
<td>23</td>
<td>52</td>
</tr>
<tr>
<td>Memorandum of Understanding (MOU)</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Intergovernmental Agreement (IGA)</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Joint Powers Agency (JPA)</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>501 (c)(3) organization</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Some governance structures are more common for some types of collaboration, with results summarized in Figure 2. Contractual assistance was represented among all areas of collaboration, while informal collaboration was represented among 9 of the 11 collaboration areas; IGAs spanned 10 areas, JPAs spanned only 6 areas, 501(c)(3) 6 areas, and MOUs 3 areas. Some collaboration areas are “richer” in a particular governance structure compared to the overall average of the collaboratives (from Figure 17). Contractual assistance governance was over-represented in collaboratives involving new regulations. Informal cooperation is more common for cooperation on training/development issues. Intergovernmental Agreements (IGA) were over-represented among collaborations for new regulations, security/emergency preparedness, and recreation need. Joint powers authority (JPA) was rare overall; of all collaboration areas it was most common among the security/emergency preparedness collaboratives. Similarly, MOUs were primarily found in the training/development collaboratives.

Figure 2. Governance Structures vs. Areas of Collaboration
6.2 Informal Collaboration

Informal collaborations involve utilities and entities meeting together to share information and work together without any formally binding arrangements. Informal collaborations have been poorly documented in published literature, with only 1 example found (EPA 2002). In this case, the initially informal collaboration between the City of Panora, IA, and nearby Des Moines, IA, described in 2002 was later described in 2009 as contractual assistance (US EPA 2002; US EPA 2009).

Several of the collaboratives interviewed have an informal governance structure. The Lake Erie Water Quality Collaborative remains a loose network of utilities that share information, with no real decision making process or policy issues, but as previously mentioned, this informal structure is one of the benefits of the collaboration. There is simply the verbal understanding that utilities will be proactive about sharing information, with emails at least once per month. Since the spring of 2007, this collaborative has provided a better understanding of the ‘real time conditions’ of Lake Erie, expanded the knowledge base, and improved anticipation of conditions so as to better manage plant operations.

The LADWP Multi-Agency Benchmarking Program was very informal, where everyone had a website or common platform that everyone had access to and would input projects with various costs and evaluation in order to compare and contrast to the other projects to determine common elements as far as design or construction management costs. The group would informally meet together to come up with some best management practices on various areas of planning and cost estimating. This collaborative ended in 2010 once funding, sharing of projects and sharing of lessons learned ran its course.

The Arizona Customer Service Professionals in the Town of Gilbert also have a very informal collaborative where leaders from Gilbert, Tempe and Scottsdale coordinate the meetings between 23 entities. The group has been meeting since 2007. Any participant can submit a topic for discussion, all participants have equal say regardless of size, and minutes are issued by one of the participants. The only policy issues discussed during the formation of the collaborative was the need to adhere to utility-specific policies about vendors paying for donuts & coffee. This collaboration has seen improved sharing of information and ideas, team building, coordination and consistency of local policies, smaller utilities have benefited from the scale of larger utilities, improved efficiency especially with regards to training opportunities and conferences, and even sometimes collaborating on commodity and shared purchases.

Keeping the collaborative informal has worked for the group by allowing all participants to raise ideas and issues, keeping the collaborative relevant and participants engaged. In addition, the group receives a huge payback in terms of these benefits for a relatively small investment of time and money.

Groups with common interests may want to consider initially meeting together informally and building trust, prior to evolving to a more formal structure. One collaborative characterized informal collaboration as easy to start, but also easy to dissolve without the right leadership. Informal collaboration was listed as a potential governance model explored by other collaboratives in the study, including the East Valley Water Forum, AZ. The Sub Regional Operating Group (SROG) with the City of Mesa, AZ, and others, stated that they considered informal collaboration without an IGA, but members
feared loss of control and cost recovery. The Southern Maine Regional Water Council also considered informal collaboration without a legislative charger, but this system was viewed as too weak.

6.3 Formal Collaboration
A wide array of governance structures for formal collaborations among water and/or wastewater utilities have been previously documented. The majority of these collaborations were contractual assistance or joint powers agencies (JPA). The majority of these collaborations were driven by the need for improved drinking water quality and/or supply. A few examples of these collaboratives are summarized in Table 6. See more detail in Appendix A Literature Review. Examples from the current study are described in the following paragraphs.

Table 9. Examples of Formal Collaborations Previously Documented

<table>
<thead>
<tr>
<th>Utility and/or Collaboration, State</th>
<th>Governance Structure</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atoka County Rural Water District #1, OK</td>
<td>Contractual assistance</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Aurora, SD, with larger Brookings, SD</td>
<td>Contractual assistance</td>
<td>EPA 2002</td>
</tr>
<tr>
<td>Bay Area Clean Water Agencies (BACWA), CA</td>
<td>JPA</td>
<td>Means 2010</td>
</tr>
<tr>
<td>Brookfield and New Milford, CT</td>
<td>Contractual assistance, ownership transfer</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Canyon Regional Water Authority, TX</td>
<td>JPA with interconnection</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>City of Panora, IA, with larger Des Moines, IA</td>
<td>contractual assistance, interconnection</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>Jefferson Communities Water System, FL</td>
<td>JPA (regionalization)</td>
<td>EPA 2002</td>
</tr>
<tr>
<td>Lee County Water Plant, NC</td>
<td>Contractual assistance</td>
<td>EPA 2002</td>
</tr>
<tr>
<td>Logan-Todd Regional Water Commission, KY</td>
<td>JPA with interconnection</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>Public wholesale water supply district #23, KS</td>
<td>JPA</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Region 18 School District, CT</td>
<td>Contractual assistance, system consolidation</td>
<td>EPA 2006</td>
</tr>
</tbody>
</table>

The BACWA collaborative was previously studied and was also interviewed in the current study. Its governance structure is based on a JPA. The JPA is represented by members from the 54 participating agencies and supplemented, as needed, with consultant support. The five largest water pollution control agencies in the San Francisco Bay Area are the signatory members. The JPA is governed by a five-member Executive Board, with an Executive Director and several technical committees. The Board meets monthly to consider recommendations from committees, manage the activities of BACWA and approve all expenditures. BACWA’s JPA states that if one of the signatory members withdraws, the JPA will dissolve, thereby incentivizing the Board members to work together.
Another formal collaborative is the Prince William County Service Authority (PWCSA) Regional Training program, previously discussed in section 5, which is organized by PWCSA and governed through memoranda of understanding (MOUs) that everyone signed including 6 larger entities and several smaller cities. They stress that it’s not a formal bureaucracy and that everyone is just sharing their resources. After the initial startup and organization for sending out information, it has been basically running on its own.

The City of Pueblo Flow Program formed an intergovernmental agreement (IGA) since there were six government entities involved. They also utilize a recovery of yield (ROY) committee with a technical representative from each government entity to keep track of the exchanges and discuss downstream storage as needed. Negotiations on the IGA were handled by the utility administrators and their technical representatives. Attorneys were not involved in the negotiations; they drafted the agreement after the administrators and technical folks reached a consensus, which was part of the key factors leading to the success of the collaborative. Having an IGA not only created a better working relationship between the six parties involved, but keeps all parties engaged on an ongoing basis, and at times is even used as an educational tool to inform individuals or groups about the value of the agreement and the services it provides to the six organizations. The ROY committee continues to meet almost quarterly to make sure that the downstream storage is ready for operation each year.

The Val Vista Water Treatment Plant was founded in 1973 and is a collaboration between the smaller City of Mesa (interviewed) and the City of Phoenix, AZ. They decided on an IGA governance structure and did not evaluate other alternatives, stating that an IGA is the best approach to forming a collaborative between cities. They conduct quarterly meetings to review operational and financial issues, with separate meetings held as necessary to discuss and resolve any outstanding issues. Critical factors to success were stated to be a defined agreement that is workable and understood by the parties, the periodic meetings, and open communication channels to discuss and share information. Challenges have included financial constraints, and the effect of increased growth or lack of growth by one or more parties and its effects on operational and financial positions. Benefits achieved through collaboration were stated to be reduced operating and capital expenditures, synergies incorporated into the operation of the plant, and a balanced approach to the use of limited resources.

The ACF Stakeholders were incorporated as a 501(c)(3) nonprofit organization in September of 2009. The collaborative has an 8-member Executive Committee with 2 members from each sub-basin (Upper Chattahoochee, Flint, Lower/Middle Chattahoochee, and Apalachicola) selected by Governing Board members. There are 56 members on the Governing Board, representing 14 different stakeholder Interest Caucuses. The specific decision making process that the ACF Stakeholders consciously chose to incorporate into their governance structure represents a consensus view of the membership. Thus, every member of the Governing Board must accept or ‘live with’ each decision or recommendation made by the group in order to have a stronger impact when taking a position on an issue.

BASIC represents another approach to formal collaboration, organized via contractual assistance. BASIC (the Bay Area Security Information Collaborative) is the group of 9 entities formed to address security
concerns in 2001, shortly after 9/11. Once BASIC realized that they were going to officially form a group, they developed a simple charter article that included membership, meeting frequency, size of agencies invited to participate, joint financing associated with projects, and improvements they wanted to address. Beyond that they saw no reason to evaluate alternate governance structures and still don’t.

BASIC has provided its members the ability to compare and contrast security practices and strengthen their water security programs. The collaborative has developed threat response procedures with lists of options. They also conducted a tabletop exercise in conjunction with the FBI, California state and local public health agencies, other public water agencies, HazMat agencies, and fire and police departments to address a potential intentional contamination of pipelines throughout the Bay Area.

6.4 Regionalization

According to RCAP, “Regionalization can mean many things, ranging from the physical interconnection or consolidation of two or more systems, to administrative solutions such as cooperative purchasing, contract operations or billing, and numerous other cooperative ventures.” (Martin, 2010) However, in this section we will specifically focus on ownership transfer, where one entity takes over another or a new entity is created that replaces the others. These types of ownership transfer arrangements were not part of the target group surveyed in this study. However, there are lots of examples of these transfers in published literature.

One of the key issues in this approach is physical distance. In most cases, a nearby larger utility builds a pipeline to interconnect to the nearby smaller community. The pipeline examples in the US EPA reports (2002, 2006, 2009) were all within 5 miles. Thus, economy of scale is realized in the treatment of the water or wastewater and delivered to a smaller community. The RCAP “Case for Regionalization of Small Systems” report stated that 86% of water systems are within 5 miles of the next closest system, indicating that there may be ample opportunities for such interconnected systems to be cost effective. Arrangements can also be made where a neighboring utility will buy water wholesale but retain its own water distribution and billing. These types of arrangements are generally categorized as “contractual assistance.”

Three US EPA reports (2002, 2006, 2009) included ten ownership transfer examples, which are summarized in Table 7. In all cases there were problems with the drinking water (water quality and/or supply consistency) with existing small systems that were solved by transfer or tie-in with larger systems or the creation of a new larger entity. These regional solutions take advantage of economy of scale. These examples spanned ownership transfers that occurred from 1992 to 2008. In all cases, water quality and reliability were improved. In some cases, customer costs increased but these were lower than if separate, small utilities had to make the necessary infrastructure improvements on their own to deliver water of sufficient quality.

The case examples show that in some cases the State took a leadership role in encouraging the collaboration. RCAP provided examples of states that are actively promoting regionalization. The State of Texas requires that any new system proposed must have demonstrated that there were not opportunities to receive water from an existing provider. Specifically, Title 30 of the Texas
Administrative Code, Part 1, Chapter 20, Subchapter D, Rule 290.39 states: “this subchapter has been adopted to ensure regionalization and area-wide options are fully considered” (Texas Administrative Code). New Mexico, Kentucky, Washington, Maryland, and Pennsylvania were also cited as states that have actively encouraged regionalization and/or support of comprehensive water planning that encourages collaboration. In the wake of Hurricane Katrina, the Mississippi Gulf Coast Region Utility Act was passed in 2006 to create regional infrastructure. The act authorized 6 county utility authorities to be created. Hancock, Harrison, and Jackson counties had previous authorities or management districts that were subsumed into the new county authorities; 2 counties created new entities; the George County Utility Authority was subsequently dissolved. [Martin, 2010]
<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsfield, NH</td>
<td>Investor-owned Pittsfield Aqueduct Company serving 1860 residential customers (in violation of SWTR and water sometimes unsafe) sold its system (treatment plant and distribution system) to larger Pennichuck which upgraded the treatment facilities; satellite operation with remote monitoring; 5% reduction in water rates for Pittsfield (1998) [~45 miles away MQ]</td>
<td>EPA 2002</td>
</tr>
<tr>
<td>Clarion Township General Authority (CTGA), PA</td>
<td>CTGA with 203 connections was purchasing water Pennsylvania-American Water Company (PAWC); sold its water system to PAWC (a large investor owned system); ~20% reduced water rates to township customers, 148 new connections, repaired distribution system</td>
<td>EPA 2002</td>
</tr>
<tr>
<td>Brookfield and New Milford, CT</td>
<td>Several small public water systems with serious contamination issues were eliminated, with water supplied with United Water Connecticut (UWC) distribution system</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Isle of Pines Water System, SC</td>
<td>Small water system with 18 connections had low quality water source, frequent distribution line break, and no properly trained operator; country build 4000 ft of pipeline to connect to town of Chapin which will assume ownership when construction loan repaid</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Eastern Wyoming Public Service District, WV</td>
<td>New regional water system formed by county commission that consolidated 15 old/small systems and serve 6,500 people; will extend water service to several previously unincorporated areas</td>
<td>EPA 2006</td>
</tr>
<tr>
<td>Ellsworth Estates Water Company / Connecticut Water Company (CWC)</td>
<td>State mandated ownership transfer; first operated as satellite system and then interconnected with 1.2 mile pipeline; saved $170/quarter/customer vs. required upgrades alone; CWC is an investor-owned water system, serves &gt;286,000 people in 41 communities</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>White Sand Beach Water Co. / Connecticut Water Co (CWC)</td>
<td>Technical and financial challenges of small private owned system serving 148 seasonal customers; sold to CWC which was operating satellite system at Sound View; built 1.4 mile interconnection; better quality and quantity of water for customers but increased customer cost $193/year</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>Prairieton Water Co. / Indiana American Water Company, IN</td>
<td>Prairieton served 675 people but violated nitrate limit; transferred ownership to IAWC (privately owned, serving 700,000 in 35 towns), interconnected with new pipeline</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>Mountain Regional Water Special Service District, UT</td>
<td>Combined 12 small systems serving 4000 connections</td>
<td>EPA 2009</td>
</tr>
<tr>
<td>Possum Kingdom Water Supply Corporation, TX</td>
<td>Consolidated 60 small, privately owned, non-compliant systems serving ~1900 connections; new system a 1 MGD surface water treatment plant and maintains ~325 miles of distribution pipe</td>
<td>EPA 2009</td>
</tr>
</tbody>
</table>
Section 7: Management
This section addresses several management concerns of collaboratives, including collaborative services, establishing sustainable and growing collaborations, and successful financial management strategies.

7.1 Collaborative Services
In some cases, a collaborative will offer particular services to its members. These were generally listed as specific operational and/or business responsibilities of the collaborative. Informal collaborations typically did not list any of these responsibilities, beyond providing a forum to share ideas and facilitating the exchange of information. When the collaborative owned treatment utilities, it was responsible to ensure effective management of the facility in compliance with applicable rules and regulations. Other responsibilities included coordinating meeting logistics, disseminating information to all parties of the collaborative (such as policies decided by the governing board), administering joint purchasing/bidding, maintaining operation of the website and communicating with the public regarding water conservation, rates, etc. The collaboratives may also coordinate studies and technology evaluations of interest to the group. Two examples of the service areas provided by collaboratives to their members are highlighted below.

The Bay Area Clean Water Agencies (BACWA) is primarily focused on technical issues and its members collaborate through several technical committees. These committees address issues related to air quality and regulations, Bay Area pollution prevention, biosolids, collection systems, laboratory analytical methods and protocols, permits, and water recycling. BACWA also has three information-sharing groups related to Bay Area maintenance, engineering, and operations information.

The Catawba-Wateree Water Management Group (WMG), NC, collaborates in areas regarding water supply, drought response and public education about water issues. The WMG funds and manages projects and studies that will either directly or indirectly increase the usefulness of the Catawba system for human purposes while maintaining the ecological integrity. The WMG’s five year strategic operating plan has both annual goals and objectives, and tracking progress toward the completion of these goals is the current metric of success.

7.2 Sustainable and growing collaborations
A key indicator of successful management of a collaborative is whether or not it is sustainable and/or growing. Collaboratives that are sustainable have proven able to last for a long time without damaging relationships or creating additional issues. About 30% of the collaboratives in this study have been working together for 11 or more years, indicating sustained activity. Growing collaboratives have demonstrated an ability to work beyond the initial driver that brought collaborating entities together. Several examples are described below. Of the 45 collaboratives who participated in this study, 69% listed more areas of current collaboration than initial drivers.

BACWA is an excellent example of a growing collaboration, having begun to work primarily on Bay Area Pollution issues and grew into several technical and information sharing groups that still look at Bay Area Pollution, but have expanded their range. BACWA has benefited through better coordination on
regulatory and policy issues, sharing funds and resources to conduct more expensive technical studies, and establishing shared information between more than 100 wastewater agencies in the Bay Area.

One of the oldest collaboratives interviewed is the City of Hillsboro Joint Water Commission (JWC), formed in 1971. The City of Hillsboro JWC collaborates in areas of water treatment, storage, transmission, conservation and quality. Management responsibilities of all matters related to the jointly owned system are assigned to one of the partner agencies, and in this case have been continuously provided by the city of Hillsboro. The collaborative has benefited through higher water quality, more reliable supply and regulatory compliance.

The Val Vista WTP formed in 1973 and the cities involved are responsible for the construction, operation and maintenance of the water filtration facilities and to make common use of the plant and transmission line. All of the assets and infrastructure for the plant and transmission line are shared by the collaborative in accordance with the IGA. In addition, any support services such as accounting or management are also shared by the collaborative. Thus the collaborative has successfully reduced operating and capital expenditures, incorporated synergies into the operation of the plant, and balanced approaches towards using limited resources.

### 7.3 Financial Management

The financial management approaches used by each collaborative were categorized between: pro rata, membership dues, none, per event, costs equally shared, participation based, in kind services, or pro rata/per event, depending on the survey responses (Table 11). The most common financial arrangements were pro rata or membership dues. Costs shared equally or no financial management were much more common financial models for informal collaboratives compared to collaboratives with more formal governance. Participation based and in-kind services were financial management approaches that were only found among collaboratives with formal governance structures. In addition, pro rata was much more common among collaboratives with formal governance compared to informal governance. Further discussion of these financial approaches and some specific examples are provided below.

#### Table 11. Financial Approach of Collaboratives

<table>
<thead>
<tr>
<th>Financial Approach</th>
<th>Number of Collaboratives</th>
<th>Percentage of Collaboratives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro rata</td>
<td>13</td>
<td>31</td>
</tr>
<tr>
<td>Membership dues</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>Per event</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Costs shared equally</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>In-kind services</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Participation based</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

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Three of the 45 collaboratives did not specify the financial management used.

### 7.3.1 Pro rata

Pro rata was the most common cost model of the collaboratives in the study. A system of pro rata financial management means that collaborating entities paid in proportion to a standard amount, either based on the benefit gained by the entity, water amounts used, overall costs or a pre-defined standard. Several examples of previously discussed collaborations utilizing this type of financial management are listed below:

- Each entity in the City of Pueblo Flow Program pays a pro-rata share of the $50,000 readiness-to-serve charge to use the agricultural reservoir. The pro-rata basis for dividing the $50,000 cost is based on the quantity of water that each entity stored during the year in the reservoir.

- The Sub-Regional Operating Group with the City of Mesa also works on a pro-rata basis. Each member pays a proportionate share of the related treatment costs based on flows and loads. Members also contribute to capital costs related to purchased capacity.

- The Val Vista WTP, AZ, collaborative costs are based on the flows and capacity of each partner. Costs dedicated to one partner will be assigned to that partner.

- Each member in the Directors of Utilities Committee in the Hampton Roads Planning District Commission budgets annually for basic water and wastewater program support provided by HRPDC staff, as well as the time and expense to participate on the committee and various subcommittees. The amount is determined on a pro rata basis tied to the number of metered water or sewer accounts. Some agencies may choose to support projects that are not related to their specific services. The annual budget is about $750,000 for both programs and projects, including staff.

### 7.3.2 Membership dues

Charging membership dues and fees was the second most common cost model of the collaboratives in the study. Membership fees and dues were sometimes scaled based on the size of the utility and sometimes standard across all collaborating entities in order to cover costs. Several examples of previously discussed collaborations utilizing this type of financial management are listed below:

- The Catawba-Wateree Water Management Group is financed through membership dues, grants, and partnerships to leverage funds. The total budget is determined by the group, with the amount determined proportioned based on relative water withdrawal to set annual dues. The total annual budget runs around $500,000, with the two largest entities paying the bulk of the load, at $350,000. All other entities pay significantly smaller amounts, but still retain equal ‘one vote’ status, which has caused some issues.

- The Mid-Arkansas Water Alliance is a not-for-profit membership corporation that includes 25 member agencies. It charges $750 annual membership dues that are used to finance the
activities of the collaborative, which include securing long-term sources of high quality drinking water for its membership.

- The Portland Regional Water Providers Consortium shares its costs among the ~26 member entities using a dues formula defined in the IGA. The formula is based on the size of the entity, 50% from the number of customer accounts and 50% based on the annual average water demand from the prior year. Two members have indexed dues (Metro and another city outside the region that is only participating based on the conservation program). This money is used to implement regional conservation programs, a regional emergency preparedness program, purchase emergency portable distribution systems, GIS mapping of regional transmission and storage, and update the regional water supply plan every 5 to 10 years.

- The City of Hillsboro Joint Water Commission is financed through payments by the 5 agency partners. Operating costs are allocated based on a rolling 12-month average of water delivers from the Joint Water Commission. Capital costs are based on ownership shares.

7.3.3 No Defined Financial Structure
Nine of the collaboratives had no defined financial management structure at the time of the interview for varying reasons. Several examples of previously discussed collaborations utilizing this type of financial management are listed below:

- The Lake Erie Water Quality Collaborative had no financial impact or need due to the lack of a formal organization.

- The Central Iowa Regional Drinking Water Commission has voluntary activities so they’re funded as part of individual utility budgets; there is no separate funding for the commission. There are no costs to share; all members contribute time and planning expertise.

- The San Diego County Regional Procurement Committee also has no formal financial management, everyone pays their own costs.

7.3.4 Per event
The per event cost model is a participation based model that only charges utilities per event in which they participate. Only three collaboratives in the study used a per event cost model:

- Each member in the Colorado Municipal Forum on Trenchless Technology pays its own attendance costs for those who come to a specific meeting.

- The Prince William County Service Authority Regional Training Program is funded from the training budget that each utility has on a course by course basis. If member agencies are interested in the training then they can come and buy a seat, or multiple seats, depending on how many people want to attend from each utility.
- Five signatories to the BACWA JPA provide approximately 65% of the annual budget and the remaining member agencies pay per event to cover additional costs.

**7.3.5 Costs equally shared**
Another type of financial management involves equally sharing costs between utilities regardless of size or participation. All three of the examples from this study are described below:

- The LADWP Multi-Agency Benchmarking Program ran from 2004 to 2010, with 33 entities that shared costs equally, with each member agency providing approximately $10,000 to help pay for studies and the consultancy for the first couple of years. After the funding ran out, which also corresponded with a decreased need for sharing lessons learned and management practices, the collaboration ended.

- The San Diego Integrated Regional Water Management Program equally shares costs among the three lead agencies. They are budgeted to provide for a multi-year contract, with approximately $300K to $400K each.

- The Shelby-Frankfort Water Management Group, KY, is financed using grants, loans and contributions from members. All costs are equally shared.

**7.3.6 In-kind services**
In-kind services can include time or other resources that provide benefit to the collaborative rather than spending money. Only two collaboratives that were interviewed listed in-kind services as their financial management. Both were collaboratives in which the City of Mesa, AZ, participates:

- The East Valley Water Forum is a collaborative among 6 entities. It was provided a grant from the Arizona Department of Water Resources for initial funding in 2003. Those who participate in the collaboration now provide in-kind assistance through time or other resources.

- The Gila River Indian Community Water Rights Settlement Act of 2005 also shares costs of activities among members through in-kind services. Each party pays its own operational costs. The City of Mesa delivers the reclaimed water to the Community at no cost. Mesa also pays for the energy-only portion of the Colorado River water. The federal government pays the fixed OM&R portion of the Colorado River water on behalf of the Community through the Lower Basin Development Fund. The annual budget is about $500,000 and the two largest entities carry the bulk of the load at approximately $350,000. All other members pay smaller amounts, yet all retain equal ‘one vote’ status, which can be an issue at times.

**7.3.7 Participation based**
This type of financial management utilizes participation fees on specific projects that member agencies can choose to collaborate on. Only two of the collaboratives in the study used a participation based cost model:
• The Bay Area Security Information Collaborative has a participation based clause in the charter. The clause says that if the BASIC group embarks upon a project costing money, each agency can choose to participate to receive the benefit of the project, with equally shared contributions from all participating agencies. When BASIC created an emergency planning exercise, it was paid for by member utilities that chose to participate.

• The Jordan Lake Partnership, NC, supports the costs of its activities via participating agencies that are billed proportionate to their participation and/or benefit from the service provided.

7.3.8 Pro rata/per event
Some collaboratives use a combination of the pro rata and per event cost models discussed above:

• The Anderson Regional Joint Water System costs are managed both by pro-rata and per-event strategies. Capital costs are tied to each member agency’s purchased treatment capacity, with all variable O&M costs allocated pro rata on monthly sales among members. Laboratory and training costs are paid per event. Debt service costs are paid according to ‘owned’ capacity.

• The Spartanburg County Water Managers Association discusses and decides on their financing as needed. Costs to fund training sessions are sometimes pro-rated based on the size of the system and sometimes a flat fee per event.
Section 8: Benefits of Regional Collaboration

8.1 Survey method and responses
The collaboratives were asked to “describe the general outcomes and benefits that were achieved through the collaborative.” The survey form was pre-loaded with 5 numbered spots. However, collaboratives were not required to fill in 5 items. As such, the number of items included ranged from zero (3 collaboratives) to seven (4 collaboratives); the median number of benefits listed was three. The total number of benefits described by all of the collaboratives was 144.

8.2 Content analysis of benefit responses
An ethnographic approach was taken to explore the range of themes in the benefit statements. First, all of the responses were read, and classified into different themes. A few ideas did not easily fit into 1 or more of these areas. After the themes were identified, all of the statements were re-read and if they fit into one of the areas, this was logged. Sometimes a single collaborative had more than 1 benefit listed that fit into the same general category (i.e. multiple specific types of cost savings), but each theme was only counted once per collaborative. After this initial scoring was conducted by Bielefeldt, all of the benefit statements were analyzed for the 20 themes independently by Relph. Then inter-rater reliability statistics were calculated.

The 19 benefit categories that were described by more than one collaborative are listed below (Table 12). Quotes from the collaborative interviews that exemplify each theme are shown as examples. Four theme areas were most common: saving money or lower costs; regulatory/policy coordination, influence, and communication with legislatures and regulators; information sharing and communication benefits; and shared water resources planning to create more reliable water supplies.

Table 12. Collaborative Benefit Areas

<table>
<thead>
<tr>
<th>Benefit area</th>
<th>Example statements</th>
<th># of collaboratives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save money, lower costs</td>
<td>“avoided capital costs”, “economy of scale created was realized as a significant benefit from this effort”</td>
<td>16</td>
</tr>
<tr>
<td>Information sharing, better communication</td>
<td>“improved communication between water systems”</td>
<td>16</td>
</tr>
<tr>
<td>Shared resources, water basin planning, reliable water supply</td>
<td>“Agreement on impacts and solutions for future groundwater basin management”</td>
<td>16</td>
</tr>
<tr>
<td>Clout, cooperation, and/or advocacy with regulators or policy makers</td>
<td>“single point of contact with regulatory agencies simplifies negotiations”</td>
<td>15</td>
</tr>
<tr>
<td>Shared, common, and/or consistent procedures, models, demand projections</td>
<td>“Regionally consistent programs and reporting practices”</td>
<td>9</td>
</tr>
<tr>
<td>Collaborative partnership itself, the collaboration framework</td>
<td>“Provides a framework for further consolidation and collaboration efforts by members”</td>
<td>9</td>
</tr>
<tr>
<td>Ability to win grants or loans</td>
<td>“Regional group is more attractive for grants and low interest loans”</td>
<td>7</td>
</tr>
<tr>
<td>Security, emergency, and disaster</td>
<td>“Performed/planned an emergency scenario and did a desk top”</td>
<td>6</td>
</tr>
<tr>
<td>Benefit area</td>
<td>Example statements</td>
<td># of collaboratives</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>preparedness</td>
<td>exercise that was a valuable thing&quot;</td>
<td></td>
</tr>
<tr>
<td>Training: shared, increased, better</td>
<td>“not all utilities have funding/personnel to send people to industry conferences.... If one member of the collaborative can attend the conference, they can share what they learned with the group, reducing the travel expense and personnel commitment for the other members.”</td>
<td>5</td>
</tr>
<tr>
<td>Share infrastructure (that saves money)</td>
<td>“Consolidated water treatment works, avoided capital costs”</td>
<td>5</td>
</tr>
<tr>
<td>Water quality benefits</td>
<td>“water quality problems have been resolved”</td>
<td>5</td>
</tr>
<tr>
<td>Better technical studies by pooling funds; shared research priorities</td>
<td>“Pooling of funds allows more expensive technical studies to be undertaken.”</td>
<td>5</td>
</tr>
<tr>
<td>Regulatory or permit compliance</td>
<td>“Regulatory compliance including SSOs, groundwater, water treatment all benefit from collaboration and committee’s help”</td>
<td>5</td>
</tr>
<tr>
<td>Future plans or benefits</td>
<td>“Future projects that would generate positive outcomes/benefits....”</td>
<td>5</td>
</tr>
<tr>
<td>Industry, business, manufacturer collaboration benefits</td>
<td>“members benefit from being able to voice their needs and opinions to the manufacturers while simultaneously being kept informed of the latest products and trends in the industry;7. manufacturers and vendors benefit from getting information directly from the utilities; not only on product performance, but also about needs that should be filled within the industry.”</td>
<td>4</td>
</tr>
<tr>
<td>Operational synergy</td>
<td>“Synergies incorporated in the operation of the plant.”</td>
<td>4</td>
</tr>
<tr>
<td>Minimize disputes, resolve disputes</td>
<td>“Improved relationship – reduction in legal disputes.”</td>
<td>3</td>
</tr>
<tr>
<td>Public trust, information sharing</td>
<td>“Intangible benefit – suburban communities have built a greater trust in CDW”</td>
<td>3</td>
</tr>
<tr>
<td>Improved customer service</td>
<td>“Improved service through Wholesale Automated Meter Reading Software.”</td>
<td>3</td>
</tr>
</tbody>
</table>

Many of these benefits can be loosely characterized into supporting the triple bottom line through the three pillars of sustainability: economic, environmental, and social. Each of these areas will be elaborated on below, with some specific examples provided to highlight each dimension.

### 8.3 Economic Benefits

Economic benefits were frequently cited by the collaboratives. Some of these benefits were in terms of avoided capital costs due to shared infrastructure. Lower operation and maintenance costs were cited due to economy of scale when negotiating chemical purchasing or shared monitoring. Cost savings associated with employee training were also cited. Better ability to compete for grants and receive loans is another economic benefit. Examples of economic benefits are listed in Table 9.
### Table 13. Economic Benefits

<table>
<thead>
<tr>
<th>Collaborative</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson Regional Joint Water System</td>
<td>Consolidated water treatment works avoided capital costs</td>
</tr>
<tr>
<td>Arizona Customer Service Professionals</td>
<td>Improves efficiency; one member of the collaborative can attend a conference, share what they learned with the group, reducing the travel expense for other members. Can piggy-back on commodity purchases, e.g. pre-printed statements.</td>
</tr>
<tr>
<td>Central Iowa Regional Drinking Water Commission</td>
<td>Economies of scale for capital costs</td>
</tr>
<tr>
<td>Consortium for High Tech Investigation in Water and Wastewater (CHIWAWA)</td>
<td>Two Universities have been successful in securing State and Federal funding to carry out needed research</td>
</tr>
<tr>
<td>Detroit Water and Sewerage Department Technical Advisory Committee</td>
<td>Capital investment reduction thru collaboration with customers</td>
</tr>
<tr>
<td>Hampton Roads Planning District Commission: Directors of Utilities Committee</td>
<td>Cost effective for localities – both staff and water conservation advertising</td>
</tr>
<tr>
<td>Lake Allatoona/Upper Etowah River Comprehensive Watershed Study</td>
<td>Reduces individual jurisdictions costs and frustrations High priority for securing federal funds</td>
</tr>
<tr>
<td>City of Mesa: Gila River Indian Community Water Rights Settlement Act of 2005</td>
<td>Increased share of water for community at no cost</td>
</tr>
<tr>
<td>Mid Arkansas Water Alliance</td>
<td>Economy of scale created was realized as a significant benefit</td>
</tr>
<tr>
<td>Prince William Council of Governments</td>
<td>Saves money through cooperative purchasing</td>
</tr>
<tr>
<td>Prince William Regional Training Program</td>
<td>Saves money</td>
</tr>
<tr>
<td>San Diego County Water Authority: Regional Procurement Committee, CA</td>
<td>Better bids = pay less for contracts</td>
</tr>
<tr>
<td>Shelby/Frankfort Regional Water Management Group</td>
<td>Regional group is more attractive for grants and low interest loans</td>
</tr>
<tr>
<td>STOPR Group, FL (Toho Water Authority)</td>
<td>Regional compliance monitoring plan saved the individual members significant funds as compared to what would have been required for each individual utility to have a separate monitoring program</td>
</tr>
<tr>
<td>Val Vista WTP (City of Mesa), AZ</td>
<td>Reduced operating and capital expenditures</td>
</tr>
</tbody>
</table>

Although these collaboratives did not quantify their cost benefits, other studies reported in the literature have estimated the economic benefits of collaboration. For example, Cromwell and Rubin (2002) estimated the sub-regional approach to consolidation that would create three large water and wastewater supply entities in the Lehigh Valley (PA) would save the average household $170 per year, representing a region wide total savings of $41 million per year by 2020. The complete consolidation scenario to create a single regional entity to own and manage all water and wastewater suppliers saved even more at $260 per year per household and region wide savings of $56 million per year by 2020. [Cromwell and Rubin, 2008, AWWA RF] A 2009 US EPA report reported that CWC saved Ellsworth $170 per quarter via consolidation, based on avoided operating costs for their own facility of ~$80,000 per
A capital cost for the interconnection was about $18,000 to $144,000 less than the capital cost estimates for their own facility.

The actual dollars saved through cooperative purchasing agreements have generally not been well quantified. The 2009 US EPA report profiled the Northeast/Merrimack Valley Consortium (MVC) of Water and Wastewater Facilities in Massachusetts, with the primary benefit of the informal collaboration being the shared purchase of lab supplies and treatment chemicals by the 35 municipal systems. The same document profiled the TCWUD where some systems saved about $3000 per year in water testing and the small town of Burke saved $90,000 by tying into the system and avoiding the cost of digging new water supply wells. Cooperative purchasing benefits can also include water purchasing, as in the case of the CRWA. (http://www.epa.gov/ogwdw/smallsystems/pdfs/casestudies_smallsystems_gainingoperational.pdf)

Another example of cooperative purchasing was detailed for the Southern Maine Regional Water Council (SMRWC) [http://www.smrwc.org/pdfs/smrwc%20brochure.pdf] In 2009, the Baltimore Regional Cooperative Purchasing Committee (BRCPC) agreed to work together with the Washington Council of Governments (COG) to plan and create contracts for mutual benefit. The Public Works subcommittee developed a bid for regional purchase of chemicals for water and wastewater treatment that was scheduled to open in January 2011. [http://www.baltometro.org/content/view/66/118/]

### 8.4 Environmental Benefits

Only a few of the collaboratives listed environmental impacts among the benefits. These elements are summarized in Table 14. The water quality in environment (such as receiving water body, a river or lake) is an environmental benefit, while drinking water quality is more of a public health benefit. Some of the statements by the collaboratives were vague in this regard. In addition, planning for regional water supply issues was previously discussed in Section 5.2.
### Table 14. Environmental Benefits from Collaboration: Examples

<table>
<thead>
<tr>
<th>Benefit area</th>
<th>Collaborative, State</th>
<th>Environmental Benefit Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared resources, water basin planning, reliable water supply</td>
<td>East Valley Water Forum, AZ</td>
<td>Agreement on impacts and solutions for future groundwater basin management</td>
</tr>
<tr>
<td>Water quality benefits</td>
<td>Upper Occoquan Service Authority, VA</td>
<td>Protect environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved Chesapeake Bay water quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meet all water quality standards with growth within limits of policy</td>
</tr>
<tr>
<td></td>
<td>Cleveland Water Service &amp; Economic Development, OH</td>
<td>Water quality problems have been resolved through cleaning and lining</td>
</tr>
<tr>
<td></td>
<td>City of Mesa: The Sub-Regional Operating Group (SROG), AZ</td>
<td>Area-wide water quality planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximize beneficial use of reclaimed water</td>
</tr>
<tr>
<td></td>
<td>City of Hillsboro Joint Water Commission, OR</td>
<td>Higher water quality</td>
</tr>
<tr>
<td>Better technical studies by pooling funds; shared research priorities</td>
<td>Consortium for High Tech Investigation in Water and Wastewater (CHIWAWA), TX</td>
<td>It is expected that significant successes in the area of desalination will occur once some of the proposed/ongoing research has been completed.</td>
</tr>
</tbody>
</table>

#### 8.5 Social Benefits

A number of the benefits of regional collaboration among water utilities could be classified as social benefits. These include improved customer service, greater public trust facilitated by improved information sharing, increased training and knowledge sharing, and relationships with regulatory agencies. Examples of these social benefits are highlighted in Table 11.
<table>
<thead>
<tr>
<th>Benefit area</th>
<th>Collaborative, State</th>
<th>Social Benefit Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information sharing and communication</strong></td>
<td>Bay Area Clean Water Agencies, CA</td>
<td>Information sharing across the more than 100 wastewater agencies in the Bay Area.</td>
</tr>
<tr>
<td></td>
<td>BASIC - Bay Area Security Information Collaborative</td>
<td>members highly value the ability to compare and contrast security practices and share information</td>
</tr>
<tr>
<td></td>
<td>Catawba-Wateree Water Management Group (WMG)</td>
<td>Improved communication between water systems</td>
</tr>
<tr>
<td></td>
<td>Lake Erie Water Quality</td>
<td>Benefit of expanded knowledge base; a greater appreciation and understanding of issues faced by other utilities</td>
</tr>
<tr>
<td><strong>Cooperation and advocacy with regulatory agencies</strong></td>
<td>Bay Area Clean Water Agencies, CA</td>
<td>Better coordination on regulatory and policy issues. Single point of contact with regulatory agencies simplifies negotiations.</td>
</tr>
<tr>
<td></td>
<td>Detroit Water and Sewerage Department (DWSD): Steering Committee - Wastewater</td>
<td>Facilitated significant agreement with regulators on large CSO projects.</td>
</tr>
<tr>
<td></td>
<td>Hampton Roads Planning District Commission: Directors of Utilities Committee</td>
<td>Group has strong influence at State level on water legislation and regulations. If State forms an advisory committee, they come to PDC for people. And once the PDC has a rep on the committee, he/she is able to communicate two ways – both from PDC to State and from 16 organizations/entities into the State. Enhances effectiveness and speed of state-local communication and feedback.</td>
</tr>
<tr>
<td></td>
<td>Mid-Arkansas Water Alliance</td>
<td>The sheer population that is affected (over 750,000 people) by this many utilities enabled us to obtain and keep the attention of the COE, Congressional Delegation and many other decision makers.</td>
</tr>
<tr>
<td></td>
<td>Prince William: Board of Virginia Association of Water and Waste Authorities</td>
<td>Legislatures like having an organization they can ask questions. They appreciate that there’s somebody out there that will talk to them.</td>
</tr>
<tr>
<td></td>
<td>San Juan Water District: Regional Water Authority</td>
<td>more clout with county council</td>
</tr>
<tr>
<td>Benefit area</td>
<td>Collaborative, State</td>
<td>Social Benefit Statement</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dispute resolution</td>
<td>Detroit Water and Sewerage District TAC</td>
<td>Improved relationship – reduction in legal disputes.</td>
</tr>
<tr>
<td></td>
<td>Washington Metropolitan Area Water Supply Coordination</td>
<td>Keeps 3 utilities from fighting</td>
</tr>
<tr>
<td>Increased training</td>
<td>Prince William: Regional Training Program</td>
<td>More training opportunities for more people.</td>
</tr>
<tr>
<td>Public trust</td>
<td>Shelby/Frankfort Regional Water Management Group</td>
<td>Improved community and stakeholder understanding of water supply issues and needs Intangible benefit – suburban communities have built a greater trust in CDW A greater sense of partnership than CDW imposing its will Seeing dollars at work – tangible results within the community</td>
</tr>
<tr>
<td>Improved customer service/relations</td>
<td>Detroit Water and Sewerage Department (DWSD): TAC</td>
<td>Capital Investment reduction, thru collaboration with customers. Improved service (pressure / distribution / meter maintenance) through Wholesale Automated Meter Reading Software Better understanding and agreement among suburbs/members on how the cost of water is priced</td>
</tr>
<tr>
<td></td>
<td>Central Iowa Regional Drinking Water Commission</td>
<td></td>
</tr>
<tr>
<td>Relations with industry and manufacturers</td>
<td>San Diego County Water Authority: Regional Procurement Committee</td>
<td>Contractors and labor have said they like this – they get a “heads up” on what is going out to bid Identification of problem issues that need attention through research, better inspection, etc. (a strong benefit to the TTC) Improved confidence in the appropriate use of the various techniques. (a strong benefit to the industry)</td>
</tr>
<tr>
<td></td>
<td>Colorado Municipal Forum on Trenchless Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eastern Meter Management Association</td>
<td>Members benefit from being able to voice their needs and opinions to the manufacturers while simultaneously being kept informed of the latest products and trends in the industry; manufacturers and vendors benefit from getting information directly from the utilities on product performance and about needs that should be filled within the industry.</td>
</tr>
</tbody>
</table>
Section 9: Lessons Learned

There were three questions related to lessons learned on the survey:

- What were the critical factors that led to the success of the collaborative
- Please describe the key challenges / constraints faced by the collaborative
- Please describe any significant roadblocks or barrier that others should be aware of

There was often an overlap of the ideas presented in the responses to these questions. Something identified as a success factor for one collaborative was sometimes a barrier for others. Results are summarized below.

9.1 Critical factors for success

For success factors, most collaboratives listed just a couple of key ideas (median was 2 points); six collaboratives left this question blank and at most there were only five distinct ideas for a single collaborative. The total number of critical success factors listed across all 45 collaboratives was 89 (far fewer than the benefits). There was a great diversity of ideas evident here. Some common themes were: the collaborative must address a common need/driver for collaboration; trust; leadership; flexibility; commitment; open communication; building relationships; voluntary participation; and equity. In addition, there were somewhat opposite ideas of the benefits of an informal collaboration model versus having a defined structure and agreement. Several examples of critical success factors listed by previously discussed are listed below:

- BASIC works because it is a group of people who are ‘doing something they would anyway, just letting the group benefit from it instead.’ Participants say that the dividends from communication and information sharing, in particular, cannot be overstated. Because they are in constant communication with each other by email, members can find out quickly what is going on.

- The City of Pueblo Flow Program considers one of its critical factors leading to the success of the collaborative as not involving the attorneys until it was time to write up the agreement and after details of the agreement was worked out by the technical committee.

- In contrast with the City of Pueblo Flow Program, the DWSD Steering Committee said that developing solid relationships with the lawyers was one of their key factors for success, since the lawyers know more about the settlement agreements and legal reasoning behind them, which drive a lot of the rate methodology and oversight of the wastewater treatment process. Aside from knowing the lawyers, the regulators are also very important to have a relationship with, especially since they’re involved more heavily on the wastewater treatment side than the water side.

- Lake Erie Water Quality Collaborative considers the fact that the utilities have chosen to keep the collaborative informal, simple and manageable one of the critical factors leading to their
success. They also note the fact that the utilities are not overly complicating the organization or the collaboration’s communications with formal burdensome processes is helpful and the fact that Lake Erie is the common source water in itself is a key factor in the utilities’ willingness to work together.

- The Water Service & Economic Development collaborative as described by the Cleveland Division of Water had critical factors leading to their success that were entirely opposite of Lake Erie WQ. The fact that they had a complicated, formal agreement for their collaboration was part of their success. In addition they listed bonding capacity and political will as well as the attitude expressed by a previous Commissioner that extended a sense of ownership and partnership for solving problems.

- The Detroit Water & Sewer Department TAC listed three critical factors leading to success as leadership support, key customer support and an intellectual foundation found in their 50-year Master Plan. Discussions with DWSD TAC also mentioned having a really good conflict as a key to their success, since people get interested in the conflict and want to be involved in solving it. They also mentioned that having the lawyers involved in looking at the collaborative formation process in the beginning really helped out. As the engineers came up with something they thought would work, the lawyers and elected officials would say no way, so keeping them involved throughout the entire process helped prevent setbacks and additional conflicts.

- The Prince William County Service Authority has several ongoing, informal collaboratives with nearby utilities and agencies. Some of the critical factors leading to the success of these varying collaboratives include a willingness to talk with one another and leadership issues with the utilities. Some of the utilities just prefer to go it alone, whereas others have enjoyed collaborating and have built up a good friendship. Once some utilities were able to let go of worrying about turf or someone stealing a good idea, collaboration increased and it ends up helping everybody.

### 9.2 Challenges and constraints

For the key challenges or constraints faced by the collaboratives, there were 77 different ideas presented. The most common challenges and constraints were financial, politics/bureaucracy, time, legal / regulatory, sustaining interest, trust, consensus building, and past poor relationships. Eleven of the collaboratives did not provide a response to this question. Several examples are described below:

- The Anderson Regional Joint Water System’s own governance structure is a challenge for them, since their design protects members from individually unwanted expansion costs. Thus, non-participating members can exercise almost veto power over debt issues.

- BASIC struggled with inactivity and a subsiding level of challenge, creating difficulties for members to actually focus on something collaboratively that needed to be done. Post 9/11 there were brand new challenges associated with water security and every single meeting was extremely important, so there was always a clear agenda, objectives, and thinking about what
our most current challenges were to work through. However, when the energy is low, getting
together in the meeting format, even quarterly, becomes a lower priority, and the same people
end up having to bear the burden of projects.

- Some of the key challenges and constraints faced by the City of Pueblo Flow Program included
  the personalities involved in the negotiating groups and getting everyone educated to what the
  facts of the situation were; this discussion was challenging since several agencies didn’t trust
  one another.

- Since not every utility had water issues or needed additional water immediately, it was tough to
  keep everyone focused on long term needs in the Mid-Arkansas Water Alliance. In addition, one
  of the most difficult challenges they faced were untimely delays by the US Army Corps of
  Engineers.

- The East Valley Water Forum cited security issues on infrastructure mapping due to 9/11 as one
  of the challenges/constraints faced by the collaborative. Others include ensuring regulatory
  agencies maintain a spirit of partnership and creating clear ‘sideboards’ for discussions in
  advance to prevent scope encroaching into other areas.

- The Gila River Indian Community Water Rights Act of 2005 faced challenges including numerous
  questions and concerns from legislature members, having the capacity to follow the
  negotiations throughout the legislative process to ensure issues can be represented properly
  and timely and federal bureaucracy.

- The City of Mesa when discussing the Sub-Regional Operating Group (SROG) collaborative
  described their key challenge as maintaining transparency of cost accounting for the
  collaborative. The SROG involves 5 member entities and uses a pro rata cost model.

- The same informality that Lake Erie Water Quality Collaborative notes as a critical factor leading
  to the success of the collaborative was also noted as a key challenge since it can impair
  sustaining the interest in the collaborative. The same factors that made the collaborative easy to
  start could also make it easy to end as well.

- The Portland Regional Water Providers Consortium described several key challenges and
  constraints facing their collaborative. The key personalities and drivers behind the elected
  boards, councils, and commissions of the individual members can change over time and make it
  feel like ‘herding cats’. The revolving membership, with some dropping out and either returning
  or not returning and others being added also provide challenges. Logistics of meeting planning
  and operation issues for such a large body, as well as getting a quorum at a meeting to take
  action is another challenge. The way the governance structure is set up, each member’s decision
  making body has to approve amendments to the main IGA, so if one person doesn’t sign, the
  whole process is stymied. In addition, by-laws had to be written early on to accommodate
  entities that dissented on policy actions and, for instance, did not want their name on a letter.
Lastly, building trust between the largest entity, the City of Portland, and the rest of the members took time and has to be maintained, particularly since Portland provides the staffing and financial control functions.

- The Southern Maine Regional Water Council (SMRWC), as described by the Portland Water District, had some challenges regarding the amount of power they would wield. Other associations serving utilities were concerned that the SMRWC would usurp their influence or relevance. In addition, local municipalities with a more growth-oriented strategy were concerned about the additional power of the collaboration.

- One of the challenges faced by the San Diego County Regional Procurement Committee was accomplishing the goal of not getting in each other’s way, while respecting that each agency has its own priorities.

- The Tualatin Basin Water Supply Partnership had several challenges that impacted their collaborative. First there was apprehension about committing to the partnership and people looking out exclusively for benefits for their own jurisdictions. Then there was concern over what they will lose in the transaction versus what will be gained. One of the biggest challenges was fear of what’s not unknown in the change, even if the current circumstance is not great (the devil we know versus the devil we don’t).

Many of the challenges and constraints are unique to specific collaborations, although these ideas serve as cautions for other utilities considering regional collaboration. Plans should be made in advance to anticipate potential difficulties and then avoid or minimize their impacts.

### 9.3 Barriers and road blocks

The lowest response on the survey was to the roadblock and barriers question, with 20 collaboratives providing no response and only 47 different ideas presented (up to 5 from a single collaborative). Most collaboratives identified 1 key area of concern. Common themes were: trust, politics, funding, size (challenges with very large number of collaborators), relationships, personalities, differing values, willingness to compromise, and ability to resolve disputes. Other ideas included crossing geopolitical boundaries (crossing state or county lines), partnership in some areas despite ongoing disputes/litigation, and long-term commitment. Many of these barriers and road blocks repeat some of the challenges and constraints discussed above. Specific examples from this study are highlighted below.

- The City of Pueblo Flow Program cited lack of trust as the major roadblock between the negotiating groups. This lack of trust also made it challenging to discuss ‘facts’ of a situation and a neutral party that everyone trusts seemed necessary to explain the facts to the group.

- The Jordan Lake Partnership described basin-wide political dynamics that could impose barriers or roadblocks to the collaborative.
• The City of Hillsboro Joint Water Commission indicated differences in values regarding the sophistication and redundancy of the system and its facilities.

• The City of Mesa Sub-Regional Operating Group listed their barriers as compromising and willingness of each member to share in the partnership.

• There were several barriers faced by the Val Vista WTP including disputes related to operational and financial changes, addressing these disputes fairly and equitably by the parties, and enabling a reasonable give and take by each party to ensure the collaborative moves forward.

• One of the significant roadblocks or barriers facing the Lake Erie Water Quality Collaborative is forming a loose network across state lines (check that member agencies are actually in multiple states?)

• The Cleveland Water Service & Economic Development collaborative indicated the necessity for ‘out of the box’ thinking and attitude as a significant barrier. They also discussed perception management as critical and a potential barrier if not addressed appropriately. In addition, more outreach is really needed to propagate.

• One of the barriers the Hampton Roads Planning District Commission faced was the lack of ability to require localities to change policies or standards to be regionally consistent. In order to solve this problem they indicated peer pressure as a potential solution for some instances, but then there was the risk that some members may withdraw funding, which could then lead to ‘free rider’ benefits.

• The Peace River Manasota Regional Water Supply Authority described parochial attitudes and breaking through political boundary barriers as one of their key roadblocks. These often arose from external issues unrelated to water, and resulted in imposing attitudes, resentment and even retaliation between entities and their governing bodies. They indicate that the key is having awareness of the issue(s) and the sentiments of the elected and appointed officials as well as keeping utilities focused on the core mission.

• One of the biggest roadblocks for the Arizona Customer Service Professionals was the need for upper management of the participants to understand the value of the collaborative and support the time required to make it work.
Section 10: Case Studies of Effective Collaboration
The following pages highlight six different examples of highly effective regional collaboration among water utilities:

- Bay Area Clean Water Agencies
- Catawba-Wateree Water Management Group
- Hampton Roads Planning District Directors of Utilities Committee
- Jordan Lake Partnership
- Lake Erie Water Quality Collaborative
- Shelby-Frankfort Water Management Group
The Bay Area Clean Water Agencies (BACWA) was driven by several purposes from collecting data on aquatic life and quality of waters to assessing effects of pollution on the San Francisco Bay System to developing and disseminating information about the Bay. BACWA objectives include supporting regulatory compliance by members, promoting stewardship of the Bay environment, seeking regional solutions and promoting regional collaborations and partnerships.

**Governance**

The JPA is represented by members from the 54 participating agencies and supplemented, as needed, with consultant support. The five largest water pollution control agencies in the San Francisco Bay Area are the signatory members. A five-member Executive Board, with an Executive Director and several technical committees govern the JPA. The Board meets monthly to consider recommendations from committees, manage the activities of BACWA and approve all expenditures. BACWA’s JPA states that if one of the signatory members withdraws, the JPA will dissolve, thereby incentivizing the Board members to work together.

**Financial Management**

Five of the signatories to the JPA provide approximately 65% of the annual budget. The remaining funds are provided by agencies designated as members and roughly in proportion to the mass of metals discharged annually. All revenues are pooled and expenditures determined by an annual workplan approved by the Executive Board.

**Lessons Learned**

A shared commitment to funding the technical work necessary to understand and address water quality impacts of wastewater discharges to the San Francisco Bay was critical for success of the collaborative. Ensuring consensus on key policy and regulatory issues can be challenging. In addition, distributing information/establishing communication with the large number of wastewater utilities in the Bay Area presents its own set of challenges.
Charlotte Mecklenburg Utilities:
Catawba-Wateree Water Management Group

A proposal during relicensing by the Federal Energy Regulatory Commission (FERC) for the power company to start charging water withdrawal fees to utilities led to the formation of the Catawba-Wateree Water Management Group (WMG). The power company had not previously exercised its long-standing right to charge fees and the fees initially proposed were exorbitantly high. Creating the Catawba-Wateree WMG, including water utilities, wastewater utilities and cities, allowed this fee to be lowered significantly. The objectives of the collaboration now span supply and demand side opportunities, preparing for drought, and public education about water issues. The WMG funds and manages projects and studies that will either directly or indirectly increase the usefulness of the Catawba water system for human purposes while maintaining the ecological integrity.

**Governance**
The governance structure alternatives evaluated include non-profit organization and an unincorporated association. The Catawba-Wateree WMG became incorporated in December 2007 as a 501(c)(3) organization. Each member organization has one vote. Some decisions require a consensus, some require a majority vote. The spirit of the collaborative is to remain as non-political as possible and function as a technical resource that can contribute to the formation of policy. Also, membership has been limited to specific organizations according to established criteria.

**Financial Management**
The activities of the collaborative are financed by membership dues, grants, and partnerships to leverage funds. The total budget is determined by the groups and the amount is proportioned based on relative water withdrawal to set annual dues for each member. The annual budget for the WMG is about $500,000, with two agencies carrying the bulk of the load, yet all agencies retain equal voting status (which has been a contentious issue at times).

**Lessons Learned**
Some of the critical factors leading to the success of the collaborative include a willingness to collaborate and cooperate around the common goals established for the WMG, despite the fact that many of the members do not always have common interests in other issues in the region. Therefore, differences between members on other issues are set aside when working on WMG issues and projects.

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**Snapshot**
Location: NC, SC
Total Pop. Served: 1,049,343
Member agencies: 18
Founded: 2005
Governance: 501(c)(3)

**Mission Statement**
The Catawba-Wateree WMG exists to identify, fund and manage projects that help extend and enhance the capacity of the Catawba-Wateree River to meet human water needs while maintaining the ecological health of the waterway.

**Benefits**
- Improved communication between water systems
- Completion of regional-based projects that are getting more substantial and more meaningful with time
- Biggest accomplishment to date is the creation of the collaborative effort itself
- Working on developing business practices, putting legal services in place, and other basics to function as an organization
Hampton Roads Planning District Commission: Directors of Utilities Committee

The Hampton Roads Planning District Commission (HRPDC) Directors of Utilities Committee formed as an opportunity to provide a coordinated and coherent position to the Commonwealth of Virginia on the role of all levels of government as it relates to short and long term planning, resources, operations, regulations and permits/rights for water. Beginning in the early 2000’s regulatory issues in wastewater drove an expansion. The objectives of the collaboration now include improving groundwater management and mitigation, the development of a water conservation plan, and building a public education program on conservation.

Governance

The governance structure for the HRPDC involves a committee composed of top executives from each utility or organization that provides water, sewer, or public works. The Committee makes decisions on a consensus basis and only vote when they need to make a decision and cannot reach a consensus, which rarely happens.

Financial Management

Each utility budgets annually for basic water and wastewater program support provided by HRPDC staff, as well as the time and expense to participate on the committee and various subcommittees. The amount is determined on a pro rata basis tied to the number of metered water or sewer accounts. Some agencies may choose to support projects that are not related to their specific services. The annual budget is about $750,000 for both programs and projects, including staff.

Lessons Learned

Some of the critical factors leading to the success of this collaborative include routine conversations adding to the strengths of relationships between directors and staff on subcommittees. The combination of a good staff at PDC handling affairs of the committee and the strengths of relationships being built has led to ongoing local support for the program at staff and governing body level.

One of the key challenges faced by the collaborative was over-commitment by the committee and staff, which leads to failure, frustration and lack of confidence in the staff for the next project. Another constraint faced was lack of consistency of data across the region, it was necessary to recognize differences between entities and situations. The collaborative also has no ability to require localities to change policies or standards to be regionally consistent. Peer pressure may help in some instances, but there is a risk that members may withdraw funding. This could eventually lead to ‘free rider’ benefits.

Comments

Relationships that have been built go beyond the core work setting and become more personal in very appropriate ways. For example, members of the committee supported and rallied around another member with health issues.
Don’t shy away from challenges – for example, security issues. Work together and think regional monitoring solutions.
Meet with health directors semiannually for informal information Exchange.

Snapshot

Location: VA
Total Pop. Served: 1,018,216
Member agencies: 19
Founded: 1993
Governance: Contractual Assistance

Mission Statement

No formal mission statement.

Benefits

• Cost effectiveness for localities in both staff and water conservation advertising
• Pooling of resources on feasibility studies and PDC staff can do it for them
• Strong influence at the state level on water legislation and regulations
• Enhances effectiveness and speed of state-local communication and feedback
• Regulatory compliance including SSOs, groundwater, water treatment all benefit from collaboration and committee’s help
• Information exchange and effective relationship-based working group
• Mutual aid for disaster response has improved
• Regionally consistent programs and reporting practices
City of Durham Department of Water Management:
Jordan Lake Partnership

The Jordan Lake Partnership resulted from several water supply related drivers. Chatham County had a short term need for water supply and was limited by its water treatment plant’s capacity. The City of Durham, in the wake of a severe drought, wanted to enhance its reliability. Both entities were also looking down the road for their future water supply needs. In addition, the nature of the Jordan Lake allocation process is that both the communities and the State are required to work together up front before any requests for additional allocation will be entertained.

Governance
Several governance structure alternatives were considered in the formation of the collaborative. The final governance structure is based on an MOU for inter-local cooperation, with the activities and management guided by the Partnership Management Team. This Team consists of the manager from each signatory and is chaired by the manager of the lead agency, the City Manager of the City of Durham. The Team meets at least annually and each representative has one vote on all matters. Decisions are generally made on a consensus basis, but the MOU also allows the vote of a simple majority.

Financial Management
Each signatory participates in supporting the costs of each year by payment to the City of Durham. There are two levels of payment depending on the number of water service connections. The participating organizations are also billed proportionate to their participation or benefit from each service provided.

Lessons Learned
One of the critical factors for the success of the collaborative was having an outside organization facilitating the development process. This kept the process moving forward consistently, allowing the participating utilities to contribute to the process, without the staff having to squeeze it into their routine responsibilities. The third party perspective was also helpful in calming some of the political concerns expressed by community leaders.

The collaboration also faced several challenges and constraints. They needed to separate economic development, growth, and land use issues and the related politics from water supply planning and operations. In addition, the growth projections by utilities in the Partnership are not determined in a consistent manner. The regulatory issues related to inter-basin transfers will potentially play a role. Basin-wide political dynamics could impose barriers or roadblocks, thus education and careful cultivation of policy makers is a key.

Other Comments
One of the more important future impacts of the Jordan Lake Partnership is the impact that it could have on policy making and legislative process regarding river basin planning. The Partnership could be a model for how all relevant parties – federal, state, and local governments; planning boards and commissions; water suppliers; environmental groups; and the general public work together in a collaborative framework – as opposed to a combative and litigious one.

Snapshot
Location: NC
Total Pop. Served: 1,037,671
Member agencies: 12
Founded: 2009
Governance: Contractual Assistance

Mission Statement
The Partners will define Jordan Lake’s role in a long term, sustainable and secure regional water supply for the Triangle Region through regional water supply planning, operating under the principles of regional collaboration, environmental stewardship, mutual and collective benefit, and financial sustainability.

Benefits
• Creation of Partnership alone was a major accomplishment for signatories and region
• Future projects that would generate positive outcomes or benefits

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Cleveland Division of Water:
Lake Erie Water Quality Collaborative

The development of the Lake Erie Water Quality Collaborative arose from a loose network of plant managers and their assistants along Lake Erie primarily to deal with plant operational issues. These plant issues included lake freeze, taste and odor issues, and Lake Erie’s dead zones. The objectives of this collaboration include exchanging information on treatment processes that work well and providing a best practices sharing venue.

Governance
No governance structure alternatives were evaluated, since this is a loose network of utilities with no formal structure for decision making processes or policy issues. There’s a verbal understanding that the utilities will be proactive in sharing information and will share via email at least once per month.

Financial Management
There is no financial impact, or need for financial management, due to the lack of a formal organization.

Lessons Learned
One of the critical factors leading to the success of the collaborative is that the utilities have chosen to keep the collaboration informal, making it simple and manageable. Since the utilities are not overly complicating the organization, the collaboration’s communications remain un-burdensome and the utilities are more willing to work together and share information. However, since the organization remains informal, continuing the interest might become challenging. Another challenge is that the network is highly driven by the current participating individuals, and changes to that could make it easy to end. One potential roadblock that others should be aware of is collaborating with utilities across state lines, where forming loose networks can become a barrier.

Snapshot
Location: OH
Total Pop. Served: Unknown
Member agencies: 33
Founded: 2007
Governance: Informal

Mission Statement
None.

Benefits
• A better understanding of the “real time condition” of Lake Erie (i.e. Algae conditions, temperature)
• Anticipate conditions so as to better manage plant operations
• Benefit of expanded knowledge base
• Greater appreciation and understanding of issues faced by other utilities
Louisville Water Company:  
Shelby-Frankfort Water Management Group

The Shelby-Frankfort Water Management Group (WMG) formed due to a need for additional water supplies and treatment capacity for potential drought and growth. Source water limitations also propagated a need for an alternate water source. Key areas of collaboration include water supply, emergency operations, and operation of proposed regional facilities.

Governance
Several governance structure alternatives were considered in the formation of the collaborative including a regional water commission, inter-local cooperation agreement, a Chapter 58 or non-profit corporation, water association or contractual agreements. At the time of the interview the governance structure was not yet finalized.

Financial Management
The activities of the collaborative will be funded through grants, loans and contributions from members. Costs will be equally shared by members.

Lessons Learned
There were several critical factors identified that led to the success of the Shelby-Frankfort Regional WMG. Common interests and needs were identified, equality among partners created, improved communication and relationship among members, and developing political and community support for regional water supply.

Key challenges and constraints also involved relationships among members, since not all members initially trusted each other or had an effective business relationship. The Louisville Water Company in particular, due to its size, was not trusted by the water districts. They also identified different levels of need and existing business relationships as another constraint. Securing funding also provided a challenge. Developing political and community support for regional water supply solutions was one barrier identified as something that others should be aware. Another roadblock involved developing effective working relationships among members and stakeholders.

Snapshot
Location: KY  
Total Pop. Served: 935,357  
Member agencies: 6  
Founded: 2008  
Governance: Not yet finalized

Mission Statement
None established.

Benefits
- Emergency cooperation  
- Stronger business relationships with existing business partners  
- Regional group is more attractive for grants and low interest loans  
- Improved community and stakeholder understanding of water supply issues and needs
Section 11: Summary, Conclusions, and Further Work

This study provided some examples to illustrate the breadth and diversity of regional utility collaborations. The survey of regional water utility collaborations has provided many examples of benefits that can be realized when utilities enter into partnerships. These benefits cross all types, from financial to water quality to social. These collaborations may be very informal or have increasingly complex structures. The governance and financial arrangement that will work best seem unique to a given group, such that a single model is not best for particular drivers, size, or other characteristics. The take home message is that each utility should evaluate if it could benefit from a collaborative arrangement with nearby utilities. Starting small and informal might be a good first step, and as trust and relationships build, opportunities to expand the areas of collaboration can be explored. A forum to share information about the process of building a collaborative could help other utilities to build such relationships more smoothly. Utilities may wish to contact individuals currently involved in successful collaboratives that are similar to what is envisioned in order to receive advice.

The current information on utility collaborations is not intended to be exhaustive. There are therefore opportunities for further work. There were about 30 collaborations identified in the Phase 1 survey that were not interviewed in-depth during Phase 2. There appear to be some states not represented by known utility collaborations, but it is unclear if there are state-specific rules that have discouraged collaboration or other factors (such as geographical distance, lack of water stress, etc.). In addition, very few collaborations in the current study focused around wastewater. It would also be interesting to interview multiple members of the collaboration (such as a large and a small utility or city) to see if their perspectives on the benefits and challenges of the collaboration differ. It might also be interesting to try to gather information on collaboratives that have disbanded, to determine why and if there are generalizable lessons for others.
Works Cited


http://www.idcide.com/


Appendix A: Literature Review

Regional Collaboration Literature Review

To: AWWA Technical & Educational Council
Strategic Management Practices Committee (SMPC)

Regarding: National Inventory of Regional Collaboration Project
Contract Item #2, Deliverable 1, Literature Review

Date: August 1, 2011; Revised August 26, 2011

From: Angela R. Bielefeldt, PhD, PE
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Department of Civil, Environmental, & Architectural Engineering
Executive Summary

The goal of this literature review was to identify and summarize previous publications that evaluated regional collaborations between water and/or wastewater utilities. These collaborations range from informal to rigid contractual arrangements or even new entities or ownership transfer arrangements. These collaborative arrangements were variously described as partnerships, cooperations, and public-public partnerships (PuPs). A handful of publications review various types of collaborative arrangements, and provide pros and cons for these arrangements. A few documents also provide guidance to help facilitate collaborations around specific issues, such as brine concentrate management, storm water, regionalization of small rural utilities, security, and water planning. These guidance documents were generally specific to a given location or region, and typically sponsored at a state level (California, Wisconsin, Pennsylvania, and Northern Australia, for example). Most of the collaboration examples were between similar entities (i.e. drinking water utilities collaborating with other drinking water utilities), but there are also a few examples of cross-sector collaboration (i.e. a wastewater utility with a drinking water utility). Some public water/wastewater utility collaborations include industrial partners, universities, non-profit groups, and energy utilities, etc.

Many of the larger and/or more formal collaboratives have websites that share information about their mission, participants, formal administrative structure, etc. In some cases the benefits realized from the collaborative activities have been quantified and documented. However, these sites generally do not provide insight into lessons learned or any struggles with the collaborative arrangements.

There seemed to be a general consensus that appropriately designed and executed partnerships can offer significant benefits, potentially spanning economic, financial, managerial, technical, and/or natural resource issues. Governmental entities and professional organizations recognize these benefits, and the US EPA and other groups are encouraging such collaborations. In a few instances, state funding has been provided to execute studies to explore formal collaborative arrangements among entities in a given region, motivated by specific goals. However, it was sometimes difficult to follow-up on the study and determine what, if any, collaborations grew out of this “top down” motivated activity. A few studies noted that highly successful collaboratives sometimes attracted more utilities wanting to participate, but in some cases scale and size could not readily accommodate expansion and additional groups grew out of the same model. It did appear that collaborative activities were growing across a spectrum of activities and level of formalization.
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## List of Acronyms

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<td>American Public Works Association</td>
</tr>
<tr>
<td>AMWA</td>
<td>Association of Metropolitan Water Agencies</td>
</tr>
<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
</tr>
<tr>
<td>CBO</td>
<td>community-based organizations</td>
</tr>
<tr>
<td>EBMUD</td>
<td>East Bay Municipal Utility District</td>
</tr>
<tr>
<td>JPA</td>
<td>Joint Powers Authority or Joint Powers Agency</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>NACEPT</td>
<td>National Advisory Council for Environmental Policy and Technology</td>
</tr>
<tr>
<td>NACWA</td>
<td>National Association of Clean Water Agencies</td>
</tr>
<tr>
<td>NAWC</td>
<td>National Association of Water Companies</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organization</td>
</tr>
<tr>
<td>PuP</td>
<td>Public-Public partnership</td>
</tr>
<tr>
<td>RCAP</td>
<td>Rural Community Assistance Partnership</td>
</tr>
<tr>
<td>RWA</td>
<td>Regional Water Authorities</td>
</tr>
<tr>
<td>SMPC</td>
<td>Strategic Management Practices Committee</td>
</tr>
<tr>
<td>US EPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>WEF</td>
<td>Water Environment Federation</td>
</tr>
</tbody>
</table>
Introduction

The overall goal of the AWWA National Inventory of Regional Collaborations Project is to characterize existing regional collaborations among water and wastewater utilities, using a detailed survey method. The information gathered will be used to help develop a guidance framework for utilities interested in regional collaboration efforts. The information compiled will include drivers that foster collaboration, the functional areas that utilities collaborate on, and the benefits from these collaborations. This literature review summarizes what is known about water and wastewater utility collaborations from previous studies and information readily available online.

Utility collaborations can range from completely informal (such as for information sharing) through contractually dictated arrangements with complex cost-sharing arrangements. At the extreme, individual utility identities may be superseded entirely by a new entity, in which case the arrangement would no longer be termed a collaborative for the purposes of this study. Although many examples of regional collaborations can be easily identified using a simple Google-search on the web, published information on the benefits and best practices for collaborative efforts between utilities are rather sparse. In addition, most of the collaboratives discussed online have been driven by location-specific constraints such as water resources sharing and planning. However, utility collaborations can provide a wide range of benefits, such as economic, economies of scale, elimination of duplicated services and/or efforts, and increased flexibility (Means et al. 2010).

Of particular interest in this study are collaborative arrangements that are more elective in nature but able to yield significant benefits to all parties. Such a collaborative formed the impetus for the current study. In 2001, four of the largest water utilities in the San Francisco Bay Area began an informal collaborative of operational practices. The agencies involved were the East Bay Municipal Utility District, Santa Clara Valley Water District, San Francisco Public Utilities District, and Contra Costa Water District. The collaboration addressed many areas where working together was more effective than working alone, including: a) addressing security from terrorism, b) using new smart technologies for controlling water systems, c) inter-tying water systems to provide emergency backup, d) workforce development, e) maintenance practices, and f) efforts to reduce the cost of water treatment chemicals. To further develop the collaborative effort, the utilities got approval from the AWWA Water Research Foundation to conduct a study on alternative structure and processes for regional collaboration. That study was completed in 2009 and the results have been presented at the AWWA, AMWA and other conferences. (Yep, personal communication, 8/18/2011; Means et al. 2010)

The results of the AWWA WRF study and the concept of regional collaboration was adopted by the AWWA Strategic Management Practices Committee (SMPC) as one of value to utilities across the U.S. The efforts to date have included a national survey conducted with the Association of Metropolitan Water Agencies (AMWA) and agency surveys conducted by the SMPC. This project is a further effort to categorize and document the range and benefits of regional collaborative efforts across the U.S.

This literature review is organized into three sections. The first section provides an overview of the system partnership spectrum and definitions of each level of system partnership. In some cases a set of
utilities may participate in some highly formal arrangements, in addition to a number of informal collaborations. However, the informal collaboration efforts are often poorly documented. The concept and application of regionalization for small water and wastewater utilities is also examined.

The second section, Utility Collaboration Efficiencies, briefly describes different cooperation opportunities that can yield benefits. Examples of collaborations working on each of these drivers are provided, as summarized from other studies or as identified from websites. However, only larger and/or formal collaborations have dedicated websites and in some cases all of the multiple areas of collaboration (particularly the informal activities) may not be described.

The appendices of the report provide summaries of key literature sources, including a section on Global Utility Collaborations such as: public-public partnerships (PUP). Published information on collaborations in Africa, Finland, and Australia are examined along with several useful TRaCK reports on collaborative efforts in Australia’s tropical north.
Utility Partnerships and Collaborative Arrangements

In May 2006, seven prominent national organizations and agencies entered into a Statement of Intent to “formalize a collaborative effort among the signatory organizations in order to promote effective utility management”: the Association of Metropolitan Water Agencies (AMWA), the American Public Works Association (APWA), the American Water Works Association (AWWA), the National Association of Clean Water Agencies (NACWA), the National Association of Water Companies (NAWC), the US EPA, and the Water Environment Federation (WEF). Ten attributes were identified for effective management of water sector utilities: product quality, customer satisfaction, employee and leadership development, operational optimization, financial viability, operational resiliency, community sustainability, infrastructure stability, stakeholder understanding and support, and water resource adequacy. These ten attributes are common between water utilities and can present challenges which may be more efficiently addressed by regional collaboration. (U.S. EPA, 2007)

The US EPA strongly supports and promotes water and wastewater utility collaboratives. However, so far the US EPA has limited their involvement to raising awareness, encouraging collaboration, and documenting case studies and practices rather than providing any formal guidance, with the exception of a publication on security-information collaboratives in 2005. The range of cooperation types from informal to ownership transfer are described in Table 1. System Partnership Spectrum (U.S. EPA, 2002) (U.S. EPA, 2009)1.

Based on the 2010 AwwaRF Regional Utility Collaboration study (Means et al. 2010), it was determined that all collaborators must reach consensus on the level of formality of the collaboration. The group generally favored a “semi-formal” approach using a simple and flexible charter signed by senior managers at participating utilities. The charter can outline the breadth and expectations for the collaborative. To execute the goals, working groups should be formed with oversight by a steering committee (comprised of high-level representatives from each participating utility).
### Table 1. System Partnership Spectrum (U.S. EPA, 2002) (U.S. EPA, 2009)

<table>
<thead>
<tr>
<th>Informal Cooperation</th>
<th>Contractual Assistance</th>
<th>Joint Powers Agencies (JPA)</th>
<th>Ownership Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinate with other systems, but without contractual obligations</td>
<td>Utilities contract with another system or service provider, but contract is under the system’s control</td>
<td>Creation of a new entity designed to serve the systems that form it</td>
<td>Takeover by an existing entity or a newly created entity</td>
</tr>
</tbody>
</table>

→ → → **Increasing Transfer of Responsibility** → → →

**Examples:**
- Sharing equipment
- Sharing bulk supply purchases
- Mutual aid arrangements
- O&M
- Engineering
- Purchasing water
- Sharing system management
- Shared operators
- Shared source water
- Acquisition and physical interconnection
- Acquisition and satellite management
- Transfer of privately-owned system to new or existing public entity

**Case Studies:**
- **Northeast/Merrimack Valley Consortium of Water and Wastewater Facilities (MVC), Massachusetts**
  - City of Panora Water System, Iowa
  - Lee County Water Plant, North Carolina
  - Aurora South Dakota, interconnect to Brookings
  - Region 18 School District, CT
  - Atoka County Rural Water District #1, Wardville, OK
- **Tripp County Water User District (TCWUD), South Dakota**
- **Logan-Todd Regional Water Commission (LTRWC), Kentucky**
- **Canyon Regional Water Authority (CRWA), Texas**
- **Jefferson Communities Water System, Florida**
- **Water Supply Dist. #23, KS**
- **Ellsworth Estates Water Company/The Connecticut Water Company, Connecticut**
- **Prairieton Water Company/Indiana American Water Company, Indiana**
- **Mountain Regional Water Special Service District, Utah**
- **Possum Kingdom Water Supply Corporation, Texas**
- **Pittsfield, New Hampshire**
A study from the U.S Department of the Interior categorized the options for institutional arrangements within the context of regional brine management systems, as summarized below in Table 22. Nine examples spanning these different options were provided.

Table 2. Pros and Cons of Regional Brine Management Systems

<table>
<thead>
<tr>
<th></th>
<th>Multiple Owners</th>
<th>Joint Powers Authority (JPA)</th>
<th>Single-Owner multiple contracts</th>
<th>Single Owner special district</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td>Each agency-owner pays for its portion</td>
<td>Broader array of financial options</td>
<td>1 owner controls construction, compliance, operation</td>
<td>Easy and quick to set up</td>
</tr>
<tr>
<td></td>
<td>Each agency-owner responsible for its portion</td>
<td>Cost sharing</td>
<td>Costs shared via contracts</td>
<td>1 owner controls construction, compliance, operation</td>
</tr>
<tr>
<td></td>
<td>No single agency responsible</td>
<td>Can add members over time</td>
<td>Can include users public, private, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benefit from exercising power of another agency through the JPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>High level of cooperation</td>
<td>Agreement is time and labor intensive</td>
<td>May increase cost due to higher interest rate</td>
<td>Use requires membership in district</td>
</tr>
<tr>
<td></td>
<td>Detailed agreement</td>
<td>Extra admin costs to operate the JPA</td>
<td>Inequity of cost share could occur</td>
<td>Ability to private companies to use could be limited</td>
</tr>
<tr>
<td></td>
<td>No single agency secures financing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>City Los Angeles/WBMWD</td>
<td>Santa Ana Watershed Project Authority</td>
<td>Metropolitan Water District of Southern California (MWDSC)</td>
<td>Metropolitan Water District of Southern California (MWDSC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Encina Wastewater Authority</td>
<td>Calleguas Municipal Water District (MWD).</td>
<td></td>
</tr>
</tbody>
</table>
A Joint Powers Authority or Joint Powers Agency (JPA) is a group of legally distinct entities, each of which has its own governing board and is independent from other member agencies. JPAs are established by entering into an agreement for joint exercise of power, a JPA agreement. The JPA agreement establishes operational constraints, the composition of the governing board, funding arrangements, staffing, financial provisions, and the duration of the authority (Stava, Jeff, 2006).

A special district is “any agency of the state for the local performance of governmental or proprietary functions within limited boundaries” (Government Code 16271 [d]). A special district has four characteristics (Special District Fact Sheet, 2006):

- It is a form of government
- It is governed by a board
- It provides services and facilities
- It has a defined service area or boundary

Special districts are formed either under a generic principle act or as a special action for unique circumstances. Most water agencies that are special districts are single function, enterprise, independent districts. This means that the district has a single function (for instance, providing water services). Such a district is managed like a business in that services are paid for via user fees, and it has an independently elected or appointed Board of Directors (Mizany and Manatt, 2002).

**Regionalization**

Several reports and articles review regionalization in water and wastewater utility management. Regionalization can be highly compatible with a watershed management approach.

Regionalization constitutes fundamental *structural* and *institutional* change in the way water and wastewater utility services are provided. Regionalization reflects *structural* change in terms of consolidating water utility ownership, operations, or management within a politically geographic or hydrogeologic area. Regionalization reflects *institutional* change in terms of establishing public policy and resource planning frameworks that encompass regional considerations (Beecher, Higbee, Menzel, & Dooley, 1996).

In general, much of the literature regarding regionalization agrees on the technical and economic benefits of these arrangements, but notes a common frustration with the institutional context of implementation (Beecher, Higbee, Menzel, & Dooley, 1996) (Jones, et al., 1992).

Regionalization for small water and wastewater systems has the strongest drivers. These systems face increasingly stringent regulations under the Safe Drinking Water and Clean Water Acts (SDWA & CWA) coupled with rising capital and operating costs. In the end, rural residents pay, on average, 3 to 4 times more than their urban counterparts for these services (U.S. EPA, 1999). Regionalization, or restructuring/combining some of these small water and wastewater systems, creates economies of scale and helps maintain financial viability for these systems. (Martin, 2010)
San Diego County is one example of an area where regionalization is being considered and could be highly beneficial for the region. Despite previous mergers there are currently 24 separate agencies in San Diego County. As operating losses increase due to plummeting sales and high prices in many regions, more water districts are considering collaboration among utilities to save on administration and operating costs. Four San Diego water districts in North County (Fallbrook, Valley Center, Rainbow and Yuima) are considering functional consolidation, where one agency or a joint powers authority (JPA) performs tasks for all four water districts. (William Osborne, 2011)

An AwwaRF study in 2006 called for a new paradigm of “benefits and issues” rather than “pros and cons” to examine the potential for achieving economic benefits from enhanced regional collaboration among the several publically owned water and wastewater utilities in Lehigh Valley, Pennsylvania (Raucher, et al., 2006). A follow-up study in 2008 used this paradigm to show that there was a window of opportunity during which these utilities could save tens of millions of dollars each year (or potentially as much as $260 per year per household) through enhanced regional collaboration through improved planning, financial management, risk reduction, facilities planning, infrastructure management and workforce management, with many of these opportunities lost if action wasn’t taken soon (Cromwell & Rubin, 2008).

One of the barriers to regionalization of small systems includes a lack of credible evidence or statistics on the degree of regionalization, despite the clear benefits. Other barriers include fears regarding the loss of autonomy, lack of knowledge, absence of a coordinating entity, lack of state or regional leadership, lack of support, lack of communication, large initial capital costs, geographic distances, and deteriorated condition or small size of some systems that are not easily overcome. These barriers are discussed in detail in the Rural Community Assistance Partnership (RCAP) report (Martin, 2010) along with recommendations and potential regional solutions.

The Green Bay Metropolitan Sewerage District discusses regional collaboration in their 2009 Strategic Plan, suggesting that the future landscape for environmental service delivery in northeast Wisconsin has more unique opportunities than ever before for collaboration among regional stakeholders. Challenges including prospective regulatory requirements, limited physical resources and technical expertise, rising costs and changing workforce demographics are looked at as an opportunity to form collaborative partnerships rather than roadblocks. (Green Bay Metropolitan Sewerage District, 2009)

**Collaborative Framework**

Regardless of the formal management structure of a collaborative that is selected, elements that will foster a successful collaboration have been identified (Means et al. 2010).

- Shared vision and common ground – to bring potential collaborators together
- A champion – to initiate and follow through on activities, a strong leader
- Structure – work plan, MOU, measurable goals, core group, leadership
- Formal written agreement
- Trust and relationships – create and develop relationships, build trust

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These elements then function within a framework that will move through the following stages (Means et al. 2010):

- **Plan and initiate collaboration**
- **Identify joint opportunities and establish goals**
- **Develop action plan**
- **Take action** – facilitated by clear communication
- **Evaluate and adapt** – evaluate accomplishments against action plan

As part of the AwwaRF study (Means et al. 2010) the Bay Area Collaboration group explored different collaboration models, with results summarized below in Table 3. They settled on the semi-formal option (row three of the table) as a good balance of flexibility and efficient functionality.
### Table 3. Bay Area collaboration model options (Means et al. 2010)

<table>
<thead>
<tr>
<th>Model</th>
<th>Attributes</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Collaboration</td>
<td>Stand-alone utility</td>
<td>No effort required to communicate or work together.</td>
<td>No collaboration among utilities can lead to duplicated efforts, conflicting interests, competition for the same talent pool, non-cost-effective solutions to water quality issues, no coordination in an emergency event, etc.</td>
</tr>
<tr>
<td>Ad Hoc Manager Meetings</td>
<td>Monthly informal meetings among operations managers of the four largest utilities in the Bay Area.</td>
<td>Allows maximum flexibility and does not require formal actions by each utility.</td>
<td>The informality is not strategic and does not gain the greatest results. The structure depends on individuals and not on defined purpose and procedures. The collaboration might become unsustainable in the absence of any of the four managers.</td>
</tr>
<tr>
<td>Four-Utility Steering Committee and Semi-formal Working Groups</td>
<td>The operations managers from each utility become a Steering Committee.</td>
<td>Promotes collaboration in strategic topics and create a steering concept to guide and monitor the progress of Working Groups.</td>
<td>Only directly represents the interest of four utilities and does not necessarily represent a broader Bay Area approach.</td>
</tr>
<tr>
<td>Four-Utility Charter Collaboration</td>
<td>The collaboration is formalized by a charter establishing the four-utility Steering Committee and Working Group.</td>
<td>Provides a charter that defines and formalizes the purpose and guidelines for collaboration.</td>
<td>Only represents the interest of four utilities and does not represent a broader Bay Area approach.</td>
</tr>
<tr>
<td>Ten-Utility Chartered Collaboration</td>
<td>The collaborative expands the four-utility charter to include a greater number of Bay Area utilities.</td>
<td>Represents a broader Bay Area interest.</td>
<td>Represents a much larger group which could present logistics problems. Likely more difficult to make decisions than with a smaller group.</td>
</tr>
<tr>
<td>Shared Functions</td>
<td>Utilities formally share certain functions ranging from administrative to maintenance. An extreme case involves formal merging of utilities.</td>
<td>Can decrease duplicated efforts. Can reduce collective costs (such as administrative and operation and maintenance) from better economy of scale.</td>
<td>Loss of local control. May be less responsive to local needs. May require costs related to institutional, governance, administrative, and other changes.</td>
</tr>
</tbody>
</table>

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Areas for Effective Collaboration

A 2002 and 2009 report by the US EPA examined system partnerships solutions as a tool for building water system capacity, especially for small systems. Small systems face several common technical, financial, and managerial challenges and small partnership solutions could potentially lead to improved outcomes. Several case studies spanned the spectrum of types of system partnerships and summarized the benefits of the partnerships (Table 43).


<table>
<thead>
<tr>
<th>Small System Challenges</th>
<th>Potential Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical</strong></td>
<td></td>
</tr>
<tr>
<td>• Inadequate &amp; deteriorated infrastructure</td>
<td>• Shared, new, or upgraded infrastructure</td>
</tr>
<tr>
<td>• Limited/poor source quality/quantity</td>
<td>• Locate higher quality/quantity source water</td>
</tr>
<tr>
<td>• Lack of operations &amp; maintenance expertise/certified operator</td>
<td>• Access to a certified operator and additional expertise</td>
</tr>
<tr>
<td>• Better treatment technologies available</td>
<td></td>
</tr>
</tbody>
</table>

| **Financial**                                   |                                                                                     |
| • Diseconomies of scale (few households = high costs) | • Reduced costs = safe and affordable water at full pricing                          |
| • History of low rates = resistance to full-cost pricing | • Greater economies of scale achieved through shared services                        |
| • Limited knowledge of financing options        | • Better access to funds                                                             |
| • Small systems are often in economically disadvantaged areas |                                                                                   |

| **Managerial**                                  |                                                                                     |
| • “No time” or limited part time management attention | • Expertise in water system planning/operations                                      |
| • Lack of expertise in long-term water system planning/operations | • Accelerated path to obtaining the managerial skills and structure required to adequately oversee the water system |
| • Lack of focus – providing water is not the system’s primary purpose |                                                                                   |

Since 86% of America’s 54,000 community water systems are small systems serving less than 3,300 people and 86% of these small systems are within 5 miles of another system (U.S. EPA, 2002), there are numerous opportunities for beneficial system partnerships.

Rather than the four general areas of collaboration listed in the table above, the AwwaRF Model for Regional Collaboration Report (Means et al. 2010) focused on four more specific areas for collaboration: Water Quality, Asset and Management, Emergency Preparedness, and Workforce Development. However, other areas for beneficial collaboration are clearly possible.

The following sections will highlight some key areas for utility collaboration and provide some examples from the literature and individual collaboration websites.
Watershed Management

As early as 1993, an article titled “Comprehensive Watershed Management: A View from the EPA” reviewed the US EPA’s official position on the Clean Water Act (CWA) reauthorization and promoted the establishment of partnerships and collaborations for watershed-based management of water resources. A fragmented approach to water quality can no longer be afforded. The EPA’s conception of water management consisted of: (1) recognizing the interconnectedness of ecosystem resources, (2) identifying priorities and tailoring solutions, (3) building partnerships, (4) integrating programs, and (5) securing local commitment to implementation. Comprehensive management involved every level of government (federal, state, and local), as well as universities (including collaborators who recognize the need to build interdisciplinary relationships). Also, a “nested” approach recognizes a progression from smaller, localized watersheds to the larger, encompassing water basin; planning and management for the smaller entities must be incorporated within planning and management for the larger entity. New umbrella institutions (such as interstate regional agreements) may be needed. Watershed teams can be used for developing a vision, building understanding, and facilitating implementation. (Wayland, 1993)

A 2009 report published by NACEPT, advising and making recommendations to the US EPA, addresses concerns about the long-term sustainability of water sector utilities and examines regional collaborations and partnerships as a potential solution. This report gives a brief background of regional collaborations and their drivers, identifying some of the key questions regarding regional collaborations: What is meant by regional collaborations and partnerships? Are there indicators that would help the US EPA to identify the types of utilities that would benefit from such collaborations? What do successful regional collaborations have in common? What are the barriers to collaboration? What can the US EPA do to promote, encourage, and support water integrated resource planning, watershed management, regional collaboration, and a sustainable water sector? The report does not seek to answer these questions.

The report tasks the EPA to encourage the collaborative process and asks the EPA to lead by example by applying the watershed approach across US EPA water programs:

To meet the growing challenges of sustainable water management, EPA needs to think beyond a single statute’s regulatory requirements to solve problems. Today, watersheds are the more appropriate unit and scale of management for an integrated approach to managing the nation’s water resources. Applying the watershed approach across EPA water programs would better inform the effective application of regulations and resources to solve the most pressing problems. By recalibrating EPA’s agenda internally, a strong “lead by example” message is sent, lending credibility to EPA efforts to support sustainable water resources management and innovative approaches.

In sum, while EPA recognizes regional collaboration as an effective tool for improving the long-term service of water sector utilities, identifying the specific function that EPA could play in promoting this approach is more challenging. The answer is not straightforward because many of the activities needed to create regional cooperation and partnerships lie outside the traditional roles of EPA. (National Advisory Council for Environmental Policy and Technology, 2009)
Many of NACEPT’s recommendations to the US EPA for providing better technical guidance, education and outreach on regional collaboration are akin to the objectives for this AWWA survey project. These actions include: reviewing the existing body of literature and programs; updating/consolidating/streamlining the information; conducting research and gathering new information; partnering with water sector professional organizations to create new, utility-focused initiatives in education, communication and outreach; and creating an accessible, centralized Web-based repository of tools and resources. (National Advisory Council for Environmental Policy and Technology, 2009)

The 1995 Framework for Watershed Management report concerns the development of a strategic planning approach to watershed management. The report notes that several states (North Carolina, South Carolina, Washington, Nebraska, and Massachusetts) are implementing statewide frameworks incorporating watershed management principles. The essential elements of the continuous management cycle are listed: strategic monitoring, basin assessment, prioritization and targeting, developing management strategies, management plan and documentation, and implementation. (Clements, Crager, Beach, Butcher, Marcus, & Schueler, 1995)

Researchers used a fictitious community to demonstrate an application of the framework. The role of planning in providing a forum for collaboration among key stakeholders, without a regulatory mandate to participate, is emphasized. Some of the tools for facilitating watershed management identified in the report were: environmental indicators and data integration methods, quantitative risk assessment, water-use attainability analysis, procedures for setting site-specific water quality standards, ecological restoration information, pollution trading guidance, monitoring consortiums, information management and analysis, administrative structures to implement watershed approaches, and watershed zoning. Impediments to statewide watershed management include: legal, institutional, and financial impediments; uncooperative stakeholders; mistrust and cynicism; and transitional issues. Recommendations are made for implementing the watershed framework within constraints. (Clements, Crager, Beach, Butcher, Marcus, & Schueler, 1995)

Examples of collaboratives with watershed protection and/or planning as key drivers include:

- Cape Cod Water Protection Collaborative (2011)
- Mokelumne River Water Forum (2010)
- Santa Ana Watershed Project Authority (US Dept. Interior)

More complete discussions of these collaboratives are provided in Appendix A.

**Water Quality**

Water quality is often one of the elements in watershed management. However, a number of reports identify water quality as a driver for regional collaboration (rather than the somewhat broader umbrella of watershed management). For example, the Bay Area Clean Water Agencies (BACWA) is a JPA driven by water quality in San Francisco Bay. Among its many collaborative activities, the Bay Area Working Group has a water quality goal which includes sharing information on best practices, communicate on
water quality issues, and reduce laboratory costs. They also strategized on future directions including regulatory/legislative coordination, emerging water quality issues, coordinating on research funding, and collaboration on technology assessment. The group has a semi-formal approach with quarterly meetings. Pollution of the Potomac River and protection of the Chesapeake Bay were drivers in formation of the Environmental Program as part of the Metropolitan Washington Council of Governments. (Means et al. 2010).

**System Capacity Development**

In many small areas, the expense to maintain their own water treatment facility and maintain compliance with the drinking water regulations is too high. Seasonally, some systems may face water shortages. Treatment difficulties such as nitrate contamination, microbial contamination, arsenic or other water quality concerns can be less expensive in larger scale treatment works. In this case, purchasing water from an adjacent community is a good option. Alternatively, entities can band together to pay for new treatment facilities. The transmission pipe to interconnect the systems may be either individually or jointly owned/maintained. Examples of these arrangements include Aurora, South Dakota, purchasing water from Brookings (US EPA 2002); The Lloyd Water Works Authority merged into the Jefferson Communities Water System, a Joint Powers Agency in Florida (US EPA 2002); interconnections between eight systems in South Dakota as part of the Tripp County Water User District (US EPA 2009); the Logan-Todd Regional Water Commission, KY, comprised of 12 small municipal and county water systems is a joint powers agency which identified a new water source for all parties and interconnected the various systems (US EPA 2009).

**Security**

In 2005, the U.S. EPA published a guide for water utilities to create their own security-information collaboratives using three case studies: the Bay Area Security Information Collaborative, the Milwaukee Inter-Agency Clean Water Advisory Council, and the Newport News Waterworks Collaborative (U.S. EPA, 2005). As security concerns have become prominent since the terrorist acts on September 11, 2001, many water and wastewater utilities have had to improve security to respond to potential threats. This guide provides information on a variety of collaboration governance structures, benefits, operation and maintenance, lessons learned from case studies as well as some sample resource documents to help utilities establish their own collaborative based on their specific needs.

The Seattle-King County, Washington Community Case Study, described below, is one example of a case study documented by the US EPA to share security and preparedness practices with water sector utilities. Although not intended as a guidance document, this case study provides examples of security and preparedness practices at water utilities in the Seattle-King County area in order to share these practices with other water sector utilities. One of the objectives of the project team was to promote collaboration by improving understanding of the relationship between implementing security program features and how various community agencies are linked through these practices. The case study showed that one of the main lessons learned was that collaborative partnerships with other interdependent sectors is essential for enhancing water sector security and preparedness. The EPA’s support going forward is “to raise awareness and encourage adoption of effective practices that
individual communities and utilities may determine appropriate... not a promulgation of guidance or requirements” (U.S. EPA, 2007). Water security was also identified as an area of collaboration by the Metropolitan Washington Council of Governments Environmental Program, although not an initial driver (Means et al. 2010).

Emergency Preparedness
Emergency preparedness typically includes planning to improve communication and coordination among water and/or wastewater utilities along with regional emergency managers. The Federal Emergency Management Agency (FEMA) encourages Mutual Aid and Assistance Agreements between water and wastewater utilities, and has included the model agreement for the Water/Wastewater Agency Response Network (WARN) on its website (http://www.fema.gov/emergency/nims/Preparedness.shtml; http://www.fema.gov/txt/emergency/nims/ww_utility.txt). The WARN initiative has been successfully activated in response to multiple events to include floods, droughts, hurricanes, tornados, and contamination. More specific information regarding WARN can be accessed at www.NationalWARN.org. In addition to formal mutual aid agreements like WARN, it is recommended that parties to such an agreement or less formal collaboratives engage in the following activities:

FEMA recommended process to prepare for emergencies (http://www.fema.gov/emergency/nims/Preparedness.shtml) is the framework applied in ANSI/AWWA G440: Emergency Preparedness Practices, which defines the minimum requirements for emergency preparedness for a water or wastewater utility.

Emergency preparedness is listed among the three key goals of the Regional Water Providers Consortium in the Portland, OR, metropolitan area (http://conserveh2o.org/about). The group started in 1997 and has grown to 23 water providers. The consortia’s strategic plan set goals for emergency preparedness, and an Emergency Planning Committee formed in 2001 was tasked with fulfilling those goals, such as compiling an emergency contact list, enacted interagency agreements with neighboring water provides, trained staff in an incident command system, conducted exercises to improve coordination, discussed emergency interconnections, and purchased emergency portable water distribution systems. (http://conserveh2o.org/about/programs/emergencies)

In the California Bay Area alone, Means et al. (2010) identified multiple groups associated with emergency planning and coordination: the Bay Area Security Information Collaborative (BASIC), the California Utility Emergency Association (CUEA), the California Water/Wastewater Agency Response Network (Cal-WARN), and the four utilities in the “Tailored” Bay Area Working Group (East Bay...
Municipal Utility District, Santa Clara Valley Water District, San Francisco Public Utilities District, and Contra Costa Water District). The Bay Area Working Group has a semi-formal structure with meetings held semi-annually or annually. For example, the Bay Area Working Group conducted an all-day tabletop exercise which utilized the National Exercise Program “Situation Manual” and the Bay Area Mutual Aid Agreement Capacity Assessment Form. The exercise was attended by over 40 participants from the four utilities. Their four objectives (as quoted from Means et al. 2010) were:

- Coordinate emergency preparedness and business continuity planning among utilities before an event occurs
- Leverage investments in emergency response infrastructure (equipment, supplies, materials)
- Maximize limited resources available during emergency response activities to coordinate with each other and the State Office of Emergency Services
- Develop an organizational structure and process that facilitates utility coordination during a regional emergency event

**Workforce**

Critical work force needs for utilities include expanding the labor force and on-going training needs for the existing work force. Water and wastewater utilities have an aging workforce and anticipate 30-50% of the current workforce will retire over the next 10 years (AWWARF). Training activities can be shared by utilities, in addition to exploiting technology options for distance training (video conferencing, online, etc.). A 2010 AWWARF report presents a collaborative framework for workforce collaboration (see below).
Framework for workforce collaboration initiatives, Figure 5.1 from Brueck et al. 2010 (WRF)

The most applicable areas in the context of this study are the local initiatives that might be promoted utility-to-utility. These local possibilities were described as: employee training (safety, certification, exam preparation, and leadership via cost sharing model, sharing videos and webinars), recruiting (particularly exploiting technologies), sharing services, raising awareness, assessing needs, and working with Workforce Investment Boards (WIBs).

BAYWORK is the Bay Area Water/Wastewater Workforce Development Collaborative. The four initial utilities who formed BAYWORK are the San Francisco Public Utilities Commission, East Bay Municipal Utility District (EBMUD), Santa Clara Valley Water District, and Union Sanitary District; with the North Coast County Water District also a signatory on the 2010 Charter Article. The kickoff meeting was held in June 2009 at EBMUD. It has since expanded to utilities in 6 counties, with executive committee members additionally from San Jose and Sunnyvale. They conduct studies on workforce needs in addition to working with educational institutions and WIBs. [http://www.coeccc.net/Environmental_Scans/water_scan_bay_09.pdf](http://www.coeccc.net/Environmental_Scans/water_scan_bay_09.pdf);

Florida’s workforce initiatives for the water sector were described in the 2010 AWWARF report. The initiative grew out of a successful Florida Energy Workforce Consortium (FEWC) formed in 2006. The

Appendix A-22
Employ Florida Banner Center (for energy) and the Jacksonville Electric Authority (JEA) at the time were trying to create a Banner Center for the Water Sector. At web-search in 2011 found 11 Banner Centers in Florida, with the Water Resources center started in 2010 and based in Lake City at Florida Gateway College (http://www.workforceflorida.com/PrioritiesInitiatives/BannerCenters/WaterResources.php; http://www.waterbannercenter.com/).

Other local examples of training and workforce collaboration include the example from the City of Panora, Iowa, where Des Moines, IA, operators mentored Panora’s grade 2 certified operator to obtain grade 3 certification (US EPA 2002).

Beyond the work force examples provided above, smaller utilities may agree to share operating staff, billing staff, and/or monitoring activities. At the Lee County Water Plant in Sanford, North Carolina, a contractual assistance arrangement was made for management, billing, operation, and maintenance with a private sector firm (US EPA 2002). In the realm of monitoring, the City of Panora Water System, IA, is being remotely monitored by Des Moines Water Works (US EPA 2002).

**Chemical Purchase**

Due to the rising costs of chemicals and potential benefits realized from economy of scale, utilities can benefit by entering into partnerships to negotiate and purchase laboratory supplies and/or treatment chemicals. For example, the Northeast/Merrimack Valley Consortium of Water and Wastewater Facilities, Massachusetts, formed in the mid-1980s and 35 municipal systems purchase laboratory supplies and treatment chemicals together. The responsibility to serve as buying agent rotates between the utilities, with 1 buying agent and two additional systems providing support so that they are adequately familiar with the process when they rotate into the buying agent role. Systems cannot pursue vendors independent of the consortium, with a self-enforcement system. The consortium successfully reduced chemical costs, and was so successful that other utilities wanted to join. Therefore, the model has been reproduced with other smaller consortiums in Massachusetts. (US EPA 2009)


**Summary**

The drivers that bring regional utilities together may fall into general categories, or may be highly specific to a given area (such as brine management). The individual entities must work together to identify the formality and financial structure that best meets their goals. Successful collaborations often
extend their shared activities beyond initial drivers, as relationships are developed and further efficiencies and benefits become evident.
### Literature Review Appendix A: Utility Collaboration Examples in the U.S.

Four of the case studies in the 2009 US EPA utility collaboration report are summarized below in Table 5.

#### Table 5. Case Study Summaries and Benefits (U.S. EPA, 2009)

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Snapshot</th>
<th>Year</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVC (Informal Cooperation)</td>
<td>35 municipal systems negotiate for and purchase lab-oratory supplies and treatment chemicals together.</td>
<td>Formed in mid-1980s</td>
<td>shared service maintains secure supply and high-quality</td>
</tr>
<tr>
<td>Panora (Contractual Assistance)</td>
<td>Panora partnered with neighboring system to purchase water and receive training.</td>
<td>2002</td>
<td>shared infrastructure interconnect water line</td>
</tr>
<tr>
<td>TCWUD (Joint Powers Agency)</td>
<td>The systems served by TCWUD continue to operate and maintain their own distribution systems without TCWUD’s involvement.</td>
<td>2002</td>
<td>higher quantity/quality water, shared infrastructure</td>
</tr>
<tr>
<td>LTRWC (Joint Powers Agency)</td>
<td>12 autonomous water systems maintain ownership, operating and maintenance responsibility for their distribution infrastructure.</td>
<td>1995</td>
<td>higher quantity/quality water, shared infrastructure, better treatment technologies</td>
</tr>
</tbody>
</table>

Several examples of utility collaborations are briefly discussed below.
Bay Area Clean Water Agencies
The Bay Area Clean Water Agencies (BACWA), CA, was founded, and continues, to assist agencies in carrying out mutually beneficial projects, and to facilitate the development of scientific, economic and other information about the San Francisco Bay environment and the agencies that work to protect it and public health. The signatory agencies include: Central Contra Costa Sanitary District East Bay Dischargers Authority East Bay Municipal Utility District (EBMUD), the City and County of San Francisco, and the City of San Jose. (Bay Area Clean Water Agencies, 2011) This collaboration was included in the AWWA TEC survey, so more detailed information was acquired and will be presented in a future deliverable.

BAYWORK
BAYWORK is a joint venture between water/wastewater utilities in six counties in the Bay Area, CA. With an executive committee including representatives from EBMUD, SFPUC, Santa Clara Valley Water District, and more, this regional collaboration promotes water careers as both professionally fulfilling and aligned to the greatest public health and environmental cause of our day. Its goals also address one of the water community’s top concerns in the coming decade—the expected retirement of 30% of the water workforce and the need to recruit new talent to the field. Major milestones thus far include a study in collaboration with the Bay Region Centers of Excellence regarding future labor needs, the hosting of a summit meeting with community colleges and workforce development boards to collaborate on shared program development, the launch of a job opportunity map, collaboration with www.h2opportunity.net to publish Bay Area related job opportunities, the pilot development of a video demonstrating a standard operating procedure (SOP) for use across utilities, and more. The group has plans to launch a website in the near future and publish a charter outlining the origin and objectives of BAYWORK. (San Francisco Public Utilities Commission, 2010)

Cape Cod Water Protection Collaborative
The Cape Cod Water Protection Collaborative exists to offer a coordinated approach to enhance the water and wastewater management efforts of towns, the Regional Government and the broader community. The Collaborative seeks to protect Cape Cod’s shared water resources and to provide access to cost effective and environmentally sound wastewater infrastructure. The Collaborative seeks funding support for the Cape communities, establishes priorities, directs strategy, builds support for action, and fosters regionalism. The governance structure includes a 17 member Governing Board, 6 member Steering Committee, Executive Director and staff provided on a contract basis by other County departments. The 2009 top priorities are: (1) Pursue federal and state funds to support Cape Cod community water and wastewater initiatives, (2) increase public awareness of nitrogen’s impact on Cape waterways, (3) begin development of regional wastewater management plan, (4) administer shared watershed grants, (5) develop and maintain a detailed database outlining status of water and wastewater management efforts in each of the 15 Cape communities, and (6) encourage regionalism. (Cape Cod Water Protection Collaborative, 2011)

Chevron - EBMUD Water Recycling
The East Bay Municipal Utility District (EMBUD) and Chevron collaborated to build a water recycling plant at the Chevron Richmond refinery, saving 3.5 MGD of fresh water. (Chevron, 2011)
Common Waters Program
The Common Waters Program within the Delaware River Basin is a collaboration of water utilities and consumers with regional public and non-profit organizations to provide clean water and protect water quality by focusing on forested headwaters protection. (Brodhead Creek Regional Authority, 2011)

Delta Levees Special Flood Control Projects
The East Bay Municipal Utility District (EMBUD) has partnered with Reclamation Districts for decades to support levee strengthening. (Diemer, 2010)

Ellis County municipality collaborations
Two municipalities in Ellis county, Texas -- the Ennis municipal wastewater system and Garret (a smaller municipality tagged onto Ennis) -- showed a willingness to work together while remaining autonomous. When an issue came up regarding wastewater standards violations, environmental agencies pointed out the inequality of risk since the city changed its ordinance in 2010. This new agreement levels the burden of risk in the face of possible wastewater treatment violations and shows not only an example of good collaboration, but also the ramifications of overlooking issues. (Ennis Daily News Editorials, 2011)

Missouri Water Utilities Partnership (MOWUP)
There are eight communities participating in the MOWUP to provide a coordinated approach for advanced municipal energy savings and greenhouse gas reduction. The purposes of the collaboration include helping municipalities reduce utility costs in water and wastewater treatment plants, improving reliability and performance of those community assets, minimizing the impact of water treatment utilities on the environment, and developing individual Energy Management Plans for each community’s water treatment utilities through a pilot program. (Missouri Water Utilities Partnership, 2010)

Mokelumne River Water Forum
The Mokelumne River Forum, formalized by MOU in 2005, was developed to address the variety of stakeholder issues within the river basin and provide opportunities for working together to improve water supplies and watershed management. Members of the Forum include the California Department of Water Resources, Alpine County, Amador County, Amador Water Agency, Calaveras County Water District, Calaveras Public Utility District, City of Lodi, City of Stockton, East Bay Municipal Utility District (EBMUD), Jackson Valley Irrigation District, North San Joaquin Water Conservation District, San Joaquin County Flood Control and Water Conservation District, Mokelumne River Water and Power Authority, Stockton East Water District, Central San Joaquin Water Conservation District, and Woodbridge Irrigation District. (Mokelumne River Forum, 2010)

Monterey Bay Regional Desalination Project
The Regional Water Project is a water desalination partnership among the Monterey County Water Resource Agency, Marina Coast Water District, and California American Water. These stakeholders represent a diversity of interests but ultimately work together to ensure an adequate and reliable water supply for the Monterey region. Several facilities including wells, pipelines, pump stations and a

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desalination plant are being constructed, operated and managed through this collaboration. (2011 Monterey Bay Regional Desalination Project, 2011)

**The New Mexico Environmental Finance Center (NM EFC)**

The NM EFC is assisting nine regional areas to work collaboratively to address water conservation and drought management. Each of the nine groups wrote a final report that is posted on the website. For example, the Upper Hondo region in New Mexico formed the Upper Hondo Collaborative Group. The current status of these groups is not evident from the NM EFC website, so follow-up would be needed to determine outcomes from these collaborative planning activities. (New Mexico Environmental Finance Center, 2007)

**NREL Collaborations**

NREL has several ongoing collaborative efforts with government agencies, non-governmental organizations (NGO) and local water/wastewater utilities. Through collaborative efforts with government agencies, the Energy Management Initiative for Public Wastewater and Drinking Water Utilities seeks to reduce municipalities’ energy costs at water and wastewater treatment plants by at least 20%, minimize the impact of water and wastewater treatment utilities on the environment, and share experiences, benefits, and lessons learned with other utilities. NGO collaboration currently involves exploring water resource management as a tool to reduce energy consumption and CO₂ emissions. Local Colorado water and wastewater utilities, partnered with NREL, provide hands-on access to facilities’ technology, data, and personnel, for energy efficiency and renewable energy expertise. The major aversion in these collaborations was high capital cost investments. Common collaboration deficiencies included energy monitoring devices, detailed knowledge of energy usage for each process, technical/analysis expertise, personnel time to analyze information, SCADA system differences, and varying needs for large and small utilities. (Macknick, 2010)

**Regional Water Authorities**

There are several Regional Water Authorities (RWA) that are joint powers authorities (JPA) formed to serve and represent regional water issues. Several examples of RWAs include RWA Northern California (Regional Water Authority, 2009), Freeport Regional Water Authority (Freepoint Regional Water Authority, 2009), CA; Canyon Regional Water Authority (Canyon Regional Water Authority), TX; Western Regional Water Commission (Western Regional Water Commission, 2008), NV; Gateway Region Integrated Regional Water Management JPA (LA Gateway Region IRWM JPA, 2009), CA; and the Coachella Valley Regional Water Management Group (Coachella Valley Regional Water Management Group, 2011), CA.

**Sonoma-Marin Saving Water Partnership**

The purpose of the Sonoma-Marin Saving Water Partnership is to establish the financial obligation for eight local water utilities, Marin Municipal Water District and Sonoma County Water Agency, identify and recommend implementation of water conservation projects and to maximize the cost-effective projects for the Partnership. The Partners are committed to remain as members in good standing of the California Urban Water Conservation Council (CUWCC) and implement the Best Management Practices
(BMPs) for water conservation. The Partners will implement or use best efforts to secure the implementation of any water conservation requirements. (Sonoma Marin Saving Water Partnership, 2011)

**Saving Water Partnership**
The Saving Water Partnership includes 18 utilities in the regional Seattle Area that fund water conservation programs through the 1% Water Conservation Initiative. The goal of the initiative is to reduce personal and business water consumption by 1% every year for ten years in order to save approximately 14.5 million gallons per day (MGD), matching the estimated needs of the growth level within the county over the next ten years. The 2009 report highlights several of the programs accomplishments and results. In its 9th year, despite significant population growth, the regional water system uses the same amount of water that it did in the early 1960s, with 9.0 MGD total savings since the start of the program in 2000. The 2010 report hasn’t been released. This collaboration hosted several different groups and programs to reach out to personal and business consumers to promote conservation measures and education as well as improve customer service. Other policy objectives include resource stewardship, endangered species protection, cost-effective extension of existing supplies, and reliability. (Seattle Water Supply System Regional 1% Water Conservation Program, August 2010) (Saving Water Partnership, 2005).

**SMUD/SRCSD - Electric and Wastewater Utility Collaboration**
The Sacramento Municipal Utility District (SMUD) and the Sacramento Regional County Sanitation District partnered to implement the Biogas Enhancement Pilot Test Project. This project evaluated the feasibility of using waste materials to generate additional biogas and determine ideal performance parameters. The study detected incremental production of biogas and no fatal flaws that would impact implementation or operation of a full-scale program. Some performance parameters fell short, requiring further analysis and plant design modifications before constructing a permanent facility. SMUD/SRCSD received $1.5 million in grant funding to construct the facility from the U.S. Department of Energy and the California Energy Commission. (Ave, 2010)

**Upper Hondo Collaborative Water Group**
The Upper Hondo Collaborative Water Group (New Mexico) started on October 25, 2004 to “develop an economical and feasible way to meet the water demand of the Upper Hondo area with a sustainable water supply.” The group developed a basic agreement and a scope of work for a planning consultant to develop alternatives for water supply. Some of their issues and concerns include depleting and limited water supply coupled with future growth and impact of subdivision approvals on water supply, concerns about water rights, increased water demand, ability to create consistent water conservation measures across area, ability to educate public on gravity of challenge and need for conservation and impact of septic systems in the area on groundwater.

The collaboration came together due to a recognized need for region-wide collaboration and planning in a sustainable way and because any potential solution(s) would be expensive, all participation was voluntary but an assessment of non-participants showed mainly small water systems with limited...
resources. Some of the major obstacles to collaboration included distrust of participants based on past experiences, wide variations in water supply available to providers, and concurrent state-wide water planning.

At the time of the report some cities and utilities have signed the Letter of Commitment, but many of the smaller systems required more time to review the agreement before signing due to seasonal population and Boards of Directors meetings timing. The purpose of the agreement is to work together to collect information needed to understand the water resources of the area and to acquire a planning grant to develop options to provide the area with sustainable water supply. After signing the agreement, the group wants to hold a workshop on funding sources and strategies with representatives from various funding agencies and to pursue funding opportunities for the Scope of Work.

Long term activities planned include creating consistent and uniform conservation measures across the area, educating the public on the gravity of the water resource situation and need for further conservation, developing subdivision regulations that promote sustainable water use, and achieving a sustainable water supply for the area.

Funding for both planning studies and coordinating the group for short and long terms appears to be the major obstacle for the collaboration. The collaboration ‘best practices’ noted included positive previous experience of participants in collaboration and that “participants believe that good planning is benefited by responsible leadership, by effective facilitation of meetings, and by committed staff people who follow through on decisions made by the group.” The Method of Management (Appendix A) defines the Management Committee, voting rules, term appointments, and Fiscal Agent (might add under governance subsection).(Also might want to see about interviewing this collaborative for updated information). (Upper Hondo Collaborative Water Group, 2005)

**Water Research Foundation Collaboration**

The Water Research Foundation Collaboration website has a sub-section devoted to enable enhanced collaboration between water, wastewater, and energy utilities in California (Water Research Foundation, 2011).

**Water Resources Technical Advisory Committee (WRTAC)**

The Water Resources Technical Advisory Committee (WRTAC) was authorized in 2002 by the Tennessee Water Resources Information Act with goals to provide a regional water supply planning program, promote collaboration among utilities, municipalities and counties to address water resource/supply issues and to secure adequate funding. One of the unique challenges the state of Tennessee faces that has driven the need for successful collaboration is their historic dependence on the U.S. Army Corps of Engineers and the Tennessee Valley Authority for water resources planning and management. As more responsibility has been gradually shifted over to state agencies the need for more sophisticated planning, management, funding and personnel has increased. (U.S Army Corps of Engineers, 2009)
WateReuse Colorado

The WateReuse Association is a nonprofit organization whose mission is “to advance the beneficial and efficient uses of high-quality, locally produced, sustainable water sources for the benefit of society and the environment through advocacy, education and outreach, research, and membership. There is an Australian Division and sections in Arizona, California, Colorado, Florida, Nevada, and Texas. Members of WateReuse Colorado includes Aurora Water, Colorado Department of Public Health & Environment, Colorado School of Mines, Colorado Springs Utilities, Denver Water, City of Westminster, Carollo Engineers, CDM, Kennedy/Jenks Consultants, Plum Creek Wastewater Authority, Richard P. Arber Associates, Stratus Consulting, Tetra Tech, and Trussell Technologies. The by-laws specify membership, eligibility to vote, finances, and governance. Section finances come primarily from membership dues and event fees. The section is governed by a board of directors, officers of the board, and a national representative that services on the WateReuse Association’s Board of Directors. (WateReuse Association, 2011)

Western Urban Water Coalition

The Western Urban Water Coalition is national association of municipal water utilities created in 1992 with 13 members that aim to provide a new and distinct perspective on modern West water resources management. The member agencies represent large cities in Arizona (Phoenix), California (EBMUD, Metro District Southern CA, San Francisco, Santa Clara Valley), Colorado (Aurora, Denver), Nevada (Las Vegas, Reno, Southern Nevada), and Washington (Seattle). The collaboration is governed by a board of directors and has committees addressing issues including the Clean Water/Safe Drinking Water Acts, climate change, Colorado River, Endangered Species Act, and water conservation, reuse & recycling. (Western Urban Water Coalition, 2011)

Whatcom Water Alliance

Whatcom County Water Alliance, Washington, has two goals: (1) improve coordination, collaboration and communication in Whatcom County to achieve greater efficiency in delivering water supplies, and (2) to promote common water conservation programs for more effective public outreach campaigns. The Alliance includes six cities and six water districts. (City of Bellingham, 1996-2011)

Wisconsin Municipal Storm Water Collaboratives

This report discusses several storm water collaboratives that have formed in Wisconsin to make a more efficient and effective permit complying process. These collaboratives include the Northeast Wisconsin Storm Water Consortium (NEWSC), Madison Area Municipal Storm Water Partnership (MAMSWaP), Regional Storm Water Protection Team (RSPT; Duluth-Superior), Chippewa Valley Storm Water Management Forum, Clean Ways for Waterways (Washington County), La Crosse Urban Municipal Storm Water Group, Waukesha County Storm Water Information and Education Partnership, and Marathon County Metropolitan Planning Commission Storm Water Management Sub-Committee. All of the partnerships have formal agreements except for NEWSC. Six of the eight groups use annual contributions to a fiscal agent to pool funds for staff or educational program support. The remaining two programs manage funding on a project-by-project basis with dollar contributions and in-kind services. Some of these collaborations sometimes include non-municipal, university, non-profit organization,
and/or business members. This report notes that “there is no one generic ‘model’ of a collaborative group that could be put forward for others that may want to initiate their own partnership,” indicating that each unique situation driving the collaborative formation also leads to unique arrangements. (Axness, 2007)
Literature Review Appendix A: Global Utility Collaborations

Global water systems face many of the same changes and challenges as water and wastewater utilities in the U.S. A call for papers for a special issue of the *Journal of Cleaner Production* highlights the importance of international collaboration to address and analyze global ecological, economic, ethical and societal issues. Public-public partnerships (PUP) are frequently referred to in international collaboration structures and are discussed below along with several examples of utility collaborations outside of the United States. The Water Operators Partnership in Africa, bilateral collaboration in municipal water and wastewater services in Finland, and the Western Coastal Board in Australia are some case studies discussed below. The Tropical Rivers and Coastal Knowledge (TRaCK) research hub has published several reports and guides for collaborative water planning in Australia’s tropical north region.

*Journal of Cleaner Production call for papers*

A call for papers for a special issue of the Journal of Cleaner Production highlights the importance of international collaboration to address and analyze global ecological, economic, ethical and societal issues. The water and wastewater utility collaborations surveyed in this research project could contribute to several of these concerns including:

- Water shortages, depletion, wastage, conflicts over access and rights to surface and groundwater resources.
- Water storage, delivery, fetching, wells.
- Water and education - wellness, vitality, consumption and conservation practices.
- Water and environmental wellness - climate change; ecological disasters.
- Water and human settlements, avoiding pollution and protecting the environment, maximizing the utility of water resources.
- Water, natural habitats and landscaping.
- Water and health - world population growth, hygiene, cleaning wounds, birth, nourishment, hydration, bathing, laundry.
- Water and wealth - economic prosperity, livelihoods, innovations, natural resource management, trade agreements, corporate social responsibility and accountability.
- Water and politics - policy and regulation, human rights, population, systems of decision making and resource accessibility, advocacy, prosperity, peace.
- Water and food - “virtual water”, farming, beef production, soy production, low impact agriculture, organic farming, horticulture, aquaculture.
- Water innovations and technology - desalination, decontamination, reverse osmosis, carbon nanotubes, biomimetics, water recycling.
- Water quality and strategies to address natural concentrations of arsenic, boron, and other potentially toxic substances in water supplies, or the contamination of
groundwater and well supplies by saline intrusion, or by fecal wastes, nitrates, pesticides, hormones, endocrine disrupters and other human made substances.

- Improved prevention and/or clean-up of water contaminated by gaseous, liquid & solid industrial, agricultural and municipal emissions & wastes.
- Water abundance/excesses/scarcity - rain, storms, dew, snow, rising sea levels.
- Water quality and availability as affected by waste and waste discharges, successful remedial actions taken.

(Kevany, 2010)

**Public-Public Partnerships (PUP)**

“A public-public partnership (PUP) is a twinning arrangement, with a stated non-profit motive, that aims to improve public water services in one or more of the partner regions. By definition, PUPs can include only public partners (though this has been challenged of late with the introduction of ‘Water Operator Partnerships,’ as discussed below). The PUP concept officially emerged as a potential alternative to public-private partnerships (P3s) in water around 2000, though the idea of inter-public collaboration has a much longer history. Interest in water PUPs has since grown significantly, chiefly as a result of research by Public Services International Research Unit (PSIRU).

PUPs can be categorized according to partnership arrangement. In brief, PUP actors are termed ‘public,’ but that simply means they are non-profit and not from the private sector. A PUP does not have to be between government-run public authorities, such as two municipal water utilities; it can also include community-based organizations (CBOs), public sector trade unions and non-governmental organizations (NGOs). Another way to categorize PUPs is according to objectives. (Our Water Commons, 2010)"

A 2009 report encouraging PUP promotion in the water industry provides case studies from several countries and guidance on forming, governing and financing PUPs (Hall, et al., 2009).

**The Water Operators Partnership (Africa)**

The Water Operators Partnership in Africa was created in 2008 by the United Nations Division for Sustainable Development (UN DSD) and is part of the Global Water Operators Partnership. Many of the Millennium Development Goals (MDGs) that outline water and sanitation targets in African countries have been missed and will continue to be behind unless progress is accelerated. Through establishing direct and effective partnerships and networking between operators, the WOP-Africa intends to surmount the challenges of attaining drinking water supply and sanitation MDGs. WOP Africa’s mission is to “foster the development and the improvements of WSS services through increased collaboration between water operators for advocacy, learning, networking and support partnerships among peers.” (The Water Operators Partnerships - Africa)

**Bilateral Collaboration in Municipal Water and Wastewater Services (Finland)**

“Several forms of supra-municipal cooperation between water and wastewater utilities have evolved in Finland since the 1950s: bilateral contract-based, municipal federations or authorities operating on a
wholesale basis as well as supra-municipal companies. These may take care of community water supply or sewerage, or both. This paper explores and analyzes the most common form of cooperation: contracts for water and wastewater services between neighboring municipalities. (Kurki, Katko, & Pietila, 2010)"

Municipal Collaboration Association (MCA) „North-Kurzeme“
In 1997, nine local municipalities (in the northwest corner of Latvia) established the municipal collaboration association (MCA) „North-Kurzeme“. The following year, two low-density populated coastal municipalities, together with two neighboring ones, established a non-for-profit municipal enterprise (NME) „Ziemelkurzeme“ in order to manage jointly drinking water supply and wastewater treatment as well as other communal services and road maintenance in the coastal region. (Ernsteins, 2011)

Western Coastal Board (Australia)
This project was designed to facilitate improved collaboration, investment and alignment for coastal planning and natural resource management in the Western Coastal Region, Australia. The Western Coastal Board recognized that the region would benefit from a scheduled process to foster regular coastal collaboration and priority-setting.

The art of collaboration, too, is not new, and the range of activities that occur in coastal planning and NRM rely in large part on the solid relationships that exist in the region. While there are myriad examples of collaboration, most occurs through discrete initiatives and is focused on the immediate task at hand rather than having the opportunity to take a regional perspective. In addition, few processes that do occur at regional level with a broad agenda include different levels of staff. Perhaps as a result of exposure to change, it has been observed that a significant amount of the productive collaboration in the region occurs as a result of personal relationships and trust, as opposed to organizational relationships and trust. When people leave positions or organizations, the relationship between organizations and the appetite for collaboration often appears to change, and this shift in ownership represents a substantial challenge. While several regional organizations undertake their own priority-setting exercises, there are few established and regular avenues for collaborative discussion on priorities, risking regional ownership. (Western Coastal Board 2009, 2009)

This pilot project developed the foundations of an annual cycle, but recognizes that the cycle itself should be refined and confirmed with regional stakeholders in subsequent periods and beyond for continuous improvement.

Tropical Rivers and Coastal Knowledge (TRaCK) (Australia)
The TRaCK research hub has published several reports and guides for collaborative water planning in Australia’s tropical north region. This Collaborative Water Planning Project is the one of the only documents reviewed that has several similarities to the AWWA survey project’s approach, by developing a guidance framework for utilities interested in regional collaboration efforts and compiling information on drivers that foster collaboration, the functional areas that utilities collaborate on, and the benefits

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from these collaborations. Many of the insights and approaches to this study can be applied to this project.

For all the recent discussion on the virtues of community-government partnerships, there is insufficient clarity and agreement amongst various parties as to what constitutes a partnership or collaboration, and how collaborative procedures actually operate. This highlights the ill-defined and nebulous nature of the community-government partnership principle, due, at least in part, to the way power, responsibility and authority are understood by politicians and government agency staff involved and the way that, as a result, these ‘partnerships’ are then implemented and evaluated. While some may see empowering the community as potentially providing better outcomes from the implementation of government policy, others may see it as eroding the power, responsibility and authority of a democratically elected government. Depending on circumstances, both may be correct. Tensions between citizen participation and representative democracy gives rise to a variety of competing and sometimes contradictory interpretations and definitions of terms such as ‘partnership’ found in the literature on citizen participation, public involvement and participation and community engagement in government, and is mirrored in the literature on the role of citizens in natural resource planning and management. In practice, government water planners and those they involve in the process from community and industry may also understand such terms differently. For example, some may see ‘partnering’ as working together or collaborating with others in a way that involves re-negotiating authority and responsibility. Others may see partnering as simply a relatively passive process of informing or consulting and seeking opinions of those who may be affected by water planning processes. This ambiguity extends to a wide range of terms relating to public participation in the water planning process, including ‘collaboration’.

In this Collaborative Water Planning Project the research team has used the term collaboration to mean ‘actively working together’. The research team is interested in better understanding the processes by which people engage in an active process of working together to manage water; in how collaborative procedures actually operate in the water management context. Government agencies usually initiate and lead water planning processes. This usually involves informing and consulting with community and industry affected by the outcomes of such a planning process. Collaborative approaches need to involve citizens more actively, as members of water planning committees, learning about water issues, undertaking joint fact-finding and deliberating over decision-criteria, making decisions together about advice to government on water planning matters. Implicit is the notion of inter-dependence, where the parties have something to gain from collaborating, indeed, believe they can only achieve their respective outcomes by doing so.

It is in this setting that the TRaCK Collaborative Water Planning Project has sought to understand the practice of collaborative water planning, and in particular, the barriers and enablers to effective public participation. TRaCK, the Tropical Rivers and Coastal Knowledge Research Hub, is a consortium led by Charles Darwin University, CSIRO, Griffith University, Land & Water Australia, the North Australian Indigenous Land & Sea Management Alliance and the University of Western Australia. In 2007, TRaCK was
established as a research hub under the Commonwealth Environmental Research Facilities Program. TRaCK aims to provide the science and knowledge needed by governments, communities and industries for the sustainable use and management of Australia’s tropical rivers and estuaries.

The Collaborative Water Planning Project seeks to improve water planning efforts at two levels:

- nationally: by developing a tool-kit of good practices to engage industry, Indigenous and rural communities; by setting guidelines and benchmarks to monitor and evaluate collaboration in water planning; by establishing procedures that integrate Indigenous values into water planning; and

- regionally: by assisting north Australian water agencies to improve water planning approaches; by helping to minimize conflicts between parties; by providing models and case studies for good collaboration; by helping stronger, long-term relationships between stakeholders.

Water planning has undergone a series of phases over time during which different paradigms have been evident. Water planners have been, and continue to be, variously concerned with engineering efficiency, economic development, environmental sustainability and community and industry collaboration. The agencies within which they work also exist within a political environment, with staff working both as agents of the government of the day, as well as servants of the public.

Further complexity, confusion and contestation arise from the interplay of potentially competing paradigms within the water sector, including market-based decision making, engineering solutions and the demand for political action to halt the decline of freshwater ecological systems. Developing a toolkit of good practices in water planning may involve making tools that allow water planners to reflect on and, where necessary, adapt the structure and culture of their agencies in response to the internal barriers and enablers to collaborative water planning that they identify, as much as it is about seeking tools to build better ways to work with others outside their agency. Analysis of the prospective case studies will further understanding of this theme, particularly in terms of implications for water planning in northern Australia.

There also appears to be a lack of a systematic, widely applied monitoring and evaluation framework for collaboration in Australian water planning. The discourse of collaboration (including citizen participation) has become increasingly evident in water planning legislation, policy, and practice for over two decades. However, a systematic framework for the evaluation of the outcomes and impact of collaboration in water planning appears lacking – both in terms of monitoring and evaluating the quality of the collaborative process, and in terms how it may have influenced on-ground water management outcomes. The lack of rigor in applying the term often results in water planners, and their government agency supervisors operating in an environment where terms such as ‘involve’, ‘consult’, ‘collaborate’ and ‘partner’ retain a cultivated ambiguity. Some have claimed that the outcomes expected of deliberative forms of
collaboration are naïve and unrealistic underscoring limitations to current political and social theories of collaboration, deliberation and social learning. The dilemmas of when to collaborate, with whom, for what purpose, how frequently and by what methods, and how to report back on the usefulness of these collaborative endeavors arise. Empirically tractable methods for assessing collaborative outcomes are currently under-developed, particularly those suited to deliberative processes. Reporting on such matters logically involves comparing collaborative outcomes to those achieved using other approaches, meaning that the processes and outcomes achieved using other non-collaborative water planning paradigms would also be best evaluated using a similar framework. (Tan, Jackson, Oliver, Mackenzie, Proctor, & Ayre, 2008)

Volume 1 of Collaborative Water Planning: Context and Practice Literature Review (Tan, Jackson, Oliver, Mackenzie, Proctor, & Ayre, 2008), also provides an overview of the region’s water planning processes and implementation. The report points out the need for transparency in collaboration processes:

It is precisely for the purposes of reconciling conflict between stakeholders that the water planning process is required to be transparent. The whole planning process and management system is required to provide a much greater capacity to make trade-offs between competing uses in ways that will gain and maintain community support. (Tan, Jackson, Oliver, Mackenzie, Proctor, & Ayre, 2008)

A follow-up legal and policy report by TRaCK in 2009 (Tropical Rivers and Coastal Knowledge (TRaCK), 2009) makes a total of 17 proposals in relation to eight major areas for improvement in collaborative processes in water planning. These major areas are:

- Collaborative water planning requires the development of clear legislative objectives
  - Legislation in each jurisdiction should provide a statement of objectives that specifically refers to collaboration in water management and planning… it would be helpful for all jurisdictions to adopt a common statement of principles relating to collaboration, outlining what it means, the objectives that collaboration should achieve, and what levels of collaboration are required in different circumstances
- Promoting collaboration through deliberative processes
  - Stakeholder engagement is strongly supported by the national water policy, the National Water Initiative.
- Promoting collaboration through transparency
  - The NWI emphasizes the importance of technical assessments and socio-economic analysis to improve decision-making…. Provide for reports to be made publicly available. Satisfaction of this requirement in and of itself does not mean that decisions are transparent. Transparency in decision-making processes is a concept which is relatively new to the management of water, where decisions have long been the domain of administrators as experts. How best to provide for transparency in decision making remains a continuing challenge throughout Australia.
- Ensuring decisions are based on accurate information and analysis
- Improving the understanding of water plans
Attention should be given to clear and concise writing of water plans. At present, they are often difficult to understand and expressed in an overly complex manner... On the other hand, plans may contain terms that are broad, imprecise or subjective; and performance indicators may be so general that it is difficult to ascertain whether they have been achieved.

- Providing for indigenous interests in water planning
  - Attempt to steer a course between the strict legal requirements of native title, and the wider approach that indigenous social, spiritual and customary objectives have intrinsic value and should be considered in planning.

- Identifying and using appropriate dispute resolution processes
  - Few policy guidelines exist across the jurisdictions for mediation of disputes, or the use of conflict resolution mechanisms in water planning... existing policies related to the use of conflict resolution mechanisms appear to be underdeveloped.

- The importance of adequate resourcing

The same 2009 report also provided several lessons from case studies:

- Respondents indicated they wanted a greater level of transparency in the relationship between their contributions and the planning outcomes
- Seeking feedback from the community is not the same as collaboration
- Clarity around the process, role and rationale of participation is a requirement for effective collaboration
- Participant commitment to the process depends on the extent of input into actual decision-making
- Better methods are needed to make trade-offs in a collaborative way
- There is still an absence of adequate Aboriginal participation and representation
- Integrating knowledge is complex, particularly in making sense of local, cultural and scientific forms of information
- Different techniques of community engagement will yield different forms of input into the planning process
- Government agencies, operating in north Australia at least, are not yet fully convinced of the benefits of properly collaborative processes, as distinct from consultative processes.

Some of the barriers to collaboration found in TRaCK’s research include:

- Achieving greater levels of community confidence in the adequacy and accuracy of the technical information used in planning
- Resolving or managing the presence of residual and unresolved tensions in the community
- Finding more appropriate forums for meaningful indigenous participation
- Finding better ways to communicate science

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• Reducing the perception that outcomes are pre-determined through improving transparency of decision-making
• Designing ways to increase administrative flexibility in the planning process
• Resolving the disjuncture between agency planning requirements and community expectations and needs
• Reducing the high demands on regional water planners
• Building capacity and social learning to address the highly varied capacity and constraints among panel members
• Finding ways to provide more opportunities for deliberation & negotiation among panel members

Some key findings that assisted collaboration were also reported:

• Clarity of process and terms of reference
• High motivation and commitment from community leaders
• High sense of identity and place amongst participants
• Multi-agency representation
• Shared vision for the region amongst the majority of panel members
• Regional staff commitment and support
• Opportunities for review of technical information
• Active pursuit of broad community representation by agencies
• Community support for planning and water reform

(Tropical Rivers and Coastal Knowledge (TRaCK), 2009)

Another TRaCK guide from 2009 provides guidelines for monitoring and evaluating (M&E) public participation (i.e. social dynamics, contribution to decision-making, improving outcomes, catalytic change), develops an M&E strategy and lists several tools for M&E. (Mackenzie, Nolan, & Whelan, 2009)
Literature Review Works Cited


Appendix A-41

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Texas Administrative Code.


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Appendix B: Detailed survey results
This section provides some graphs that summarize various demographic characteristics of the collaboratives and were used to explore potential correlations between the characteristics of the collaboratives.

Participants in Collaborations

![Figure B1. Numbers of Different Types of Entities Participating in the 45 Collaboratives](image)

[Many different individual entities were represented among the 45 collaboratives in the Phase 2 study.]
Figure B2. Total Number of Utility Collaborators in Each of the 45 Collaboratives

[The collaboratives ranged in size from having a small number of utility partners (just 2) to very large.]

Figure B3. Number of the 45 Collaboratives with only drinking water (DW) or wastewater utility participants

[Most collaboratives included entities that dealt with both drinking water and wastewater, although the focus of the collaboration itself was more commonly on drinking water issues.]
Figure B4. Number of the 45 Collaboratives comprised of different types of entities.

[Most collaboratives included both utilities and other types of partners, such as towns or regulatory agencies.]

Figure B5. Total number of all collaborating entities in each of the 45 collaboratives

[When all of the entities participating in the collaboratives were counted, rather than just utility partners as in Figure B2, a wider range of collaboration size is evident – ranging from 2 to more than 30 partners.]
Figure B6. Population served by the entities represented within the 45 collaboratives

[Some of the entities participating in the collaboratives were very small, serving less than 500 people, while others were very large, serving more than 1 million people]

Figure B7. Total Population served by each of the 45 Collaboratives

[When the total population served by the member entities were added, each collaboration served either <500,000 people to greater than 10 million people]
Figure B8. Total population served by each of the 45 collaboratives versus the age of the collaborative

[It was expected that older collaboratives might serve a larger population due to growth over time, but this was not found to be the case.]

Figure B9. Total population served by each of the 45 collaboratives versus the Number of Entities in the Collaborative

[It was expected that collaboratives with more members might serve larger populations, but that was not found to be the case.]
Figure B10. Number of member entities in each of the 45 collaboratives versus the age of the collaborative

It was expected that older collaboratives might be larger, due to the addition of members over time. This expected trend was not found.

Figure B11. Graph illustrating total number of entities in the collaborative versus age of the collaborative (with each symbol scaled to illustrate the total population that the collaborative serves)

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Figure B12. Governance structure of the collaboratives that have a mission statement

[It was assumed that the more formal governance structures are more likely to have a mission statement, but there were also a number of informal collaboratives with mission statements and formal collaboratives without mission statement, as shown below.]

Figure B13. Governance structure of the collaboratives that did not have a mission statement

Appendix B-7
Figure B14. Key drivers and areas of collaboration among the 45 collaborations
(each collaboration can work on multiple areas)

Figure B15. Number of different areas of collaboration that each of the 45 collaborations is involved in
Appendix B-8
## Appendix C: List of Collaboratives from Phase 1

<table>
<thead>
<tr>
<th>Collaborative</th>
<th>Organization</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora Water</td>
<td>Hillsboro Barney Reservoir Joint Ownership Commission</td>
<td>Riverside Public Utilities: Interagency Legislative Group</td>
</tr>
<tr>
<td>Bay Area Clean Water Agencies</td>
<td>Hillsboro Joint Water Commission</td>
<td>Riverside Public Utilities: MOU with Western Municipal Water District</td>
</tr>
<tr>
<td>Bay Area Security Information Collaborative</td>
<td>Jordan Lake Partnership</td>
<td>San Diego County Water Authority: Regional Procurement Committee</td>
</tr>
<tr>
<td>Cascade Water Alliance</td>
<td>Louisville: Shelby/Franklin Regional Water Management Group</td>
<td>San Francisco Bay Area Water Utility Operations Collaborative</td>
</tr>
<tr>
<td>Catawba-Wateree Water Management Group (WMG)</td>
<td>Maine: Peace River Manasota Regional Water Supply Authority</td>
<td>San Juan Water District: Regional Water Authority</td>
</tr>
<tr>
<td>Central Arkansas: Mid-Aransas Water Alliance</td>
<td>Mesa: Arizona Municipal Water Users’ Association</td>
<td>Spartanburg County Water Managers Association</td>
</tr>
<tr>
<td>Central Arkansas: North Belt Transmission Main Project</td>
<td>Mesa: East Valley Water Forum</td>
<td>Toho Water Authority: Collaborative Partnership of STOPR</td>
</tr>
<tr>
<td>Greater Cincinnati Water Works: Collaborative Efforts</td>
<td>Mesa: Greenfield Wastewater Treatment Plant</td>
<td>Tualatin Basin Water Supply Partnership</td>
</tr>
<tr>
<td>Cleveland Lake Erie Water Quality</td>
<td>Mesa: The Gila River Indian Community Water Rights Settlement Act of 2005</td>
<td>WSSC: Cooperative purchase of chemicals</td>
</tr>
<tr>
<td>Cleveland Water Service &amp; Economic Development</td>
<td>Mesa: The Sub-Regional Operating Group (SROG)</td>
<td>WSSC: Emergency mutual aid</td>
</tr>
<tr>
<td>Cobb County: ACF Stakeholders</td>
<td>Phoenix Metro Customer Service Professionals</td>
<td>Cleveland Regional Prosperity Initiative</td>
</tr>
<tr>
<td>Cobb County: Metropolitan North Georgia Water Planning District</td>
<td>Portland Regional Water Providers Consortium</td>
<td>Cobb County: Lake Allatoona / Upper Etowah River Comprehensive Watershed Study</td>
</tr>
<tr>
<td>Colorado: Municipal Forum</td>
<td>Portland Water District: Southern Maine Regional Water Council</td>
<td></td>
</tr>
<tr>
<td>Dayton Water Department: Dayton Strategic Water Initiative</td>
<td>Potomac River Basin Drinking Water Source Protection Partnership</td>
<td>Colorado: Front Range Standards</td>
</tr>
<tr>
<td>Des Moines: Central Iowa Regional Drinking Water Commission</td>
<td>Prince William: Coordinate water quality and water sampling with adjacent jurisdictions</td>
<td>Downriver DPW Group</td>
</tr>
<tr>
<td>DWSD: Technical Advisory Committee</td>
<td>Prince William: Hydrant Meter Program</td>
<td>Mesa: Val Vista Water Treatment Plant</td>
</tr>
<tr>
<td>Eastern Meter Management Association</td>
<td>Prince William: Shared GIS capability</td>
<td>Mesa: Northwest Water Reclamation Plant</td>
</tr>
<tr>
<td>Gaston County Unified Utilities</td>
<td>Raleigh Public Utilities: Lower Neuse Basin Association</td>
<td>Mesa: Steering Committee of the Superstition Vistas</td>
</tr>
</tbody>
</table>

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