Appendix 3C
Federal, State, and Other Municipal and Industrial Water Conservation and Reuse Programs and Resources

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3C Federal, State, and Other Municipal and Industrial Water Conservation and Reuse Programs and Resources

This appendix provides information related to municipal and industrial (M&I) water conservation and reuse programs and resources occurring at a federal agency level, Basin States level, and programs occurring outside of the Basin States. The following compilation is illustrative of the types of programs that have been implemented at various locations and resources that are available to support conservation and reuse programs. It is not intended to be an exhaustive list, nor is it an endorsement of any particular program.

The appendix is organized into sections based on federal agency programs and resources, non-governmental programs and resources, state programs and resources, and finally programs implemented outside of the Basin States.

3C.1 Federal Programs and Resources

Multiple federal agencies provide technical assistance and funding related to M&I water conservation and reuse. Some programs were initiated as a result of legal and regulatory mandates; others were established to promote agency policy related to M&I water management, conservation, and reuse. Funding generally comes in the form of loans or grant opportunities.

According to the M&I Water Conservation and Reuse Workgroup, the federal programs most influencing M&I conservation and reuse in the major metropolitan areas that receive Colorado River water are the U.S. Department of the Interior's (DOI) WaterSMART (Sustain and Manage America's Resources for Tomorrow) program and the U.S. Environmental Protection Agency's (EPA) WaterSense program, ENERGY STAR program, Drinking Water State Revolving Fund Program, and Clean Water State Revolving Fund Program. These programs are described in the following sections. Table 3C-1 summarizes these programs as well as other selected programs that provide funding or technical assistance related to M&I conservation and reuse.

3C.1.1 WaterSMART

In 2009, Congress passed the Omnibus Public Land Management Act of 2009 (Public Law 111-11). Title IX, Subtitle F of the Act – SECURE Water, directed the DOI to develop a sustainable water management policy. In 2010, Secretary of the Interior Ken Salazar established WaterSMART, combining existing programs with new initiatives to create a broad framework to manage the nation's water supplies. Through these programs, DOI is actively working with tribal, state, regional, and local water managers to address a range of issues associated with water scarcity. WaterSMART has enabled DOI and its partners to act in response to near-term and immediate water shortages and to plan for longer-term needs.

The Bureau of Reclamation's (Reclamation) WaterSMART goal is to further enable capability to increase available water supply for agricultural, municipal, industrial, and environmental uses in the western U.S. by 840,000 acre-feet (AF) by the end of 2015 through Reclamation's water conservation programs. WaterSMART consists of the following elements.

- WaterSMART Water and Energy Efficiency Grants: Provides funding to irrigation and water districts, tribes, states and other entities with water or power delivery authority. Projects should seek to conserve and use water more efficiently, increase the use of renewable energy, protect endangered species, or facilitate water markets. Projects are selected through a competitive process, and the focus is on projects that can be completed within 24 months and that will help sustainable water supplies in the western U.S.
- System Optimization Review: Provides an analysis of system-wide efficiency that focuses on improving the effectiveness and operations of a delivery system, district, or watershed. The review results in a plan of action that focuses on future water management improvements. Improvements

that are recommended in the review may then be eligible for funding under WaterSMART water and energy efficiency grants or other WaterSMART grant categories.

- Advanced Water Treatment Pilot and Demonstration Grants: Encourage pilot and demonstration projects that address the technical, economic, and environmental viability of treating and using brackish groundwater, seawater, impaired waters, or otherwise create new water supplies in a specific location.
- Grants to Develop Climate Analysis Tools: Provides financial assistance opportunities to universities, nonprofits, and other organizations with water or power delivery authority. Proposals will be invited to leverage non-federal money in a 50-50 cost-share manner with Reclamation on projects designed to enhance the management of water resources, including developing tools to assess the impacts of climate change on water resources and inform management decisions with respect to those impacts.
- Basin Studies: Reclamation partners with basin stakeholders to comprehensively assess current and potential water supply imbalances in river basins and impacts from climate change and to identify mitigation and adaptation strategies to address those potential impacts.
- Title XVI of Public Law 102-575 Water Reclamation and Reuse Program: Reclamation identifies and investigates opportunities to reclaim and reuse wastewaters and naturally impaired groundwater and surface water in the 17 western states and Hawaii.
- Cooperative Watershed Management Program: Provides financial assistance to establish and expand collaborative watershed groups. The purpose is to improve water quality and ecological resilience and to reduce conflicts over water through collaborative conservation efforts in the management of local watersheds.
- Drought Response Program: Provides funding for drought response and comprehensive drought plans to help avoid drought-related crises in the short term, while laying a foundation for climate resiliency in the long term.
- Resilient Infrastructure Program: Provides funding to prepare for new climate extremes and support healthy and resilient watersheds by proactively maintaining and improving existing infrastructure for system reliability, safety, and efficiency.
- Water Conservation Field Services Program: Provides funding and technical services in the areas of water management planning, demonstrations of innovative technologies, and implementation of conservation measures.

For additional information:
- www.usbr.gov/WaterSMART

3C.1.2 WaterSense Program

WaterSense is an EPA partnership program started in 2006 that seeks to help consumers make smart water choices that save money and maintain high environmental standards without compromising performance. Products and services that have earned the WaterSense label have been certified to be at least 20 percent more efficient without sacrificing performance. Products currently certified by WaterSense are new homes, toilets, bathroom sink faucets, urinals, showerheads, weather-based irrigation controllers, and commercial pre-rinse spray valves.

For additional information:
- www.epa.gov/watersense

3C.1.3 ENERGY STAR Program

ENERGY STAR is a voluntary, public-private partnership designed to reduce energy use and related greenhouse gas emissions. The program, administered by the EPA and the U.S. Department of Energy (DOE), has an extensive network of partners including equipment manufacturers, retails, home builders, energy service companies, private business, and public sector organization and is well recognized by energy consumers.

Since the 1990's, EPA and DOE have worked with utilities, state energy offices, and regional nonprofit organizations to offer them ENERGY STAR tools, strategies, and materials to enhance their local energy efficiency programs. Many of the energy saving efforts also result in water savings, and Energy Star qualifying

major appliances can include clothes washers, dishwashers, and water heaters.

For additional information:
- www.energystar.gov

3C.1.4 Drinking Water State Revolving Fund Program and Clean Water State Revolving Fund

The 1996 Amendments to the Safe Drinking Water Act created the Drinking Water State Revolving Fund (DWSRF) program. The DWSRF is a multifaceted tool for states to use to achieve the public health protection objectives of the Safe Drinking Water Act. States operate their own DWSRF programs and receive annual capitalization grants from EPA which they use to support low-interest loans and other types of assistance to public water systems. Additional provisions also allow state DWSRF programs to target extra assistance to communities with the greatest economic need.

For additional information:
- water.epa.gov/grants_funding/dwsrf

3C.1.5 Clean Water State Revolving Fund Program

Through the Clean Water State Revolving Fund (CWSRF), states and Puerto Rico maintain revolving loan funds to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the CWSRF programs are provided through federal government grants and state matching funds (equal to 20 percent of federal government grants). Today, all 50 states and Puerto Rico are operating successful CWSRF programs. Building on a federal investment of more than $36.2 billion, the CWSRFs have provided more than $100 billion in funding to communities to meet environmental standards, protect valuable resources, and ensure public health.

CWSRF programs operate much like environmental infrastructure banks that are capitalized with federal and state contributions. CWSRF monies are loaned to communities, and loan repayments are recycled back into the program to fund additional water quality protection projects. The revolving nature of these programs provides for an ongoing funding source that will last far into the future.

The CWSRFs fund a wide range of water quality projects including all types of nonpoint source, watershed protection or restoration, and estuary management projects, as well as more traditional municipal wastewater treatment projects.

For additional information:
- water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm

TABLE 3C-1
Selected Federal Funding and Technical Assistance Sources related to M&I Water Conservation and Reuse

Program Name	Eligible Applicants	Funding Level	Description
Bureau of Reclamation			
Water and Energy Efficiency Grants	States, tribes, irrigation districts, water districts, or water organizations with water or power delivery authority in the 17 western states.	Under Funding Group I, up to $300,000. Under Funding Group II, up to $1 million. Maximum federal cost-share is 50 percent.	Cost-shared assistance for projects that conserve and use water more efficiently, increase the use of renewable energy and improve energy efficiency, benefit endangered and threatened species, facilitate water markets, or carry out other activities to address climate-related impacts on water.
System Optimization Review	States, tribes, irrigation districts, water districts, or water organizations with water or power delivery authority in the 17 western states.	Up to $300,000 in federal cost-share will be available per project. Maximum federal cost-share is 50 percent.	An analysis of system-wide efficiency that focuses on improving the effectiveness and operations of a delivery system, district, or watershed. The review results in a plan of action that focuses on future water management improvements. Improvements that are recommended in the System Optimization Review may then be eligible for funding under WaterSMART Water and Energy Efficiency grants or other WaterSMART grant categories.
Advanced Water Treatment Pilot and Demonstration Grants	States, tribes, irrigation districts, water districts, or water organizations with water or power delivery authority in the 17 western states.	Varies.	Encourage pilot and demonstration projects that address technical, economic, and environmental viability of treating and using brackish groundwater, seawater, impaired waters, or otherwise create new water supplies in a specific location.
Grants to Develop Climate Analysis Tools	Universities, nonprofits, and other organizations with water or power delivery authority.	Maximum federal cost-share is 50 percent.	Projects designed to enhance the management of water resources, including developing tools to assess the impacts of climate change on water resources and inform management decisions with respect to those impacts.

TABLE 3C-1
Selected Federal Funding and Technical Assistance Sources related to M&I Water Conservation and Reuse

Program Name	Eligible Applicants	Funding Level	Description
Basin Studies	Studies focus on river basins or sub-basins in the 17 western states where imbalances in water supply and demand exist or are projected.	Maximum federal cost-share is 50 percent.	Reclamation partners with Basin stakeholders to comprehensively assess current and potential water supply imbalances in river basins and impacts from climate change and to identify mitigation and adaptation strategies to address those potential impacts.
Title XVI Projects	Sponsors of congressionally authorized Title XVI Projects in the 17 western states and Hawaii; typically municipalities and water districts.	Maximum congressional authorization is $20 million. Maximum federal share 25 percent.	Provides funding for planning studies and the construction of water recycling projects on a project-specific basis, in partnership with local entities.
Cooperative Watershed Management Program	Varies.	Up to $100,000 to first-phase grant recipients for a period of not more than 3 years. The federal share of expenditures accrued in first-phase grant activities will be funded 100 percent. Second- and third-phase grants will not exceed 50 percent of the total cost of the activities.	Provides financial assistance to establish and expand collaborative watershed groups. The purpose is to improve water quality and ecological resilience and to reduce conflicts over water through collaborative conservation efforts in the management of local watersheds.
Drought Response Program	To be determined – new program	To be determined – new program	Provides funding for drought response and comprehensive drought plans to help avoid drought-related crises in the short term, while laying a foundation for climate resiliency in the long term.
Resilient Infrastructure Program	States, tribes, irrigation districts, water districts, or water organizations with water or power delivery authority in the 17 western states.	To be determined – new program	Provides funding to prepare for new climate extremes and support healthy and resilient watersheds by proactively maintaining and improving existing infrastructure for system reliability, safety, and efficiency.

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Program Name	Eligible Applicants	Funding Level	Description
Water Conservation Field Services Program	State and local governments, irrigation districts, tribal communities, schools, and companies.	Varies.	Assists water agencies in the development of quality water conservation plans. In many cases, this technical assistance is provided by Reclamation staff. In other cases, it may be financial assistance through cost-sharing to support the entity in development of its plan.
U.S. Environmental Protection Agency			
Drinking Water State Revolving Fund	Community water systems, whether publicly or privately owned, and not-for-profit, non-community water systems. Federally owned systems are not eligible.	Varies per state formulas.	Capitalization grants to states, which are then authorized to provide low-cost loans and other types of assistance to public water systems to finance the cost of infrastructure projects. EPA grants each state with considerable flexibility to determine the design of its Drinking Water State Revolving Fund program and to establish funding priorities to reflect state water resource issues.
Clean Water State Revolving Fund	Any municipality, inter-municipal, interstate, or state agency for point source (§212) projects.	Varies per state formulas.	EPA provides grants or seed money to all 50 states to replenish the funds. The states, in turn, make loans to communities to finance improvements to their wastewater infrastructure. Water conservation and reuse loans have been made for the installation of meters, plumbing retrofits, recycling gray water, reuse, public education programs, and rate changes.

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Selected Federal Funding and Technical Assistance Sources related to M&I Water Conservation and Reuse

Program Name	Eligible Applicants	Funding Level	Description
U.S. Army Corps of Engineers			
Planning Assistance to States	States, local governments, other non-federal entities, and eligible tribes.	Varies. Ranges have been from $20,000 to $150,000.	Similar to the Basin Studies offered through WaterSMART. Typical studies provide only planning level of detail; recently has focused on water supply/demand, water conservation, water quality, environmental restoration, dam safety, and flood damage reduction.
U.S. Department of Agriculture Rural Development, Rural Utilities Service			
Water and Waste Disposal Direct Loans and Grants for Rural Communities	Local governments, tribes, and nonprofit associations.	Loans or loan guarantees up to 90 percent of value, repayable in not more than 40 years or the usable life of the funded facility, whichever is less. The maximum grant amount is 75 percent of the project costs.	The Water and Environmental Program provides funding for the construction of water and waste facilities in rural communities with populations of 10,000 or fewer. The program primarily funds the construction of drinking water and wastewater infrastructure. Also funds conservation measures including meters, leak detection and control equipment, gray water recycling, wastewater reclamation, and reuse.
Emergency Community Water Assistance Grants	Public bodies or governmental entities, private nonprofit corporations, political subdivisions of a state, and tribes.	$150,000 or $500,000, depending on category.	
Water and Waste Revolving Fund Grants	Qualified private nonprofit organizations.		Recipients use grant funds to establish a revolving loan fund. The loans will be made to eligible entities to finance pre-development costs of water and wastewater projects or short-term small capital improvement projects. Financing capped at $100,000 repayable in 10 years or less.

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Program Name	Eligible Applicants	Funding Level	Description
Department of Housing and Urban Development			
Community Development Block Grants	Principal cities of Metropolitan Statistical Areas, other metropolitan cities with populations of at least 50,000, and qualified urban counties with populations of at least 200,000.	No designated set-aside or limits for water infrastructure.	Funds available for planning and management efforts, as long as they are part of a community economic development project. Eligible water conservation measures include water meters, leak detection, water-efficient appliances, plumbing retrofits, gray water recycling, development of non-promotional water rate structures, wastewater reclamation, industrial reuse, and developing water use regulations.
Community Development Block Grants, State-Administered Community Development Block Grants	Cities with populations of less than 50,000 (except cities that are designated principal cities of Metropolitan Statistical Areas), and counties with populations of fewer than 200,000.	No designated set-aside or limits for water infrastructure.	Eligible activities for funding include the construction and improvement of water and sewer infrastructure. These improvements include water conservation measures such as plumbing fixture retrofits, gray water recycling, leak detection and control, and water-efficient appliances.
Department of Commerce, Economic Development Administration			
Public Works and Development Facilities Grants Program	States, cities, counties, and other political subdivisions of states, institutions of higher education, or a consortium of such institutions, and private or public not-for-profit organizations acting in cooperation with officials of a local government.	$500,000 to $2.5 million with a 50 percent local match required.	Funds public works infrastructure and development facilities, including improvements to drinking water systems and wastewater systems. Eligible water conservation measures include water meter leak detection, plumbing retrofits, gray water recycling, industrial reuse, wastewater reclamation, and reuse.

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3C.2 Non-Governmental Programs and Resources

The sections below describe non-governmental programs and resources.

3C.2.1 National Organizations

3C.2.1.1 Alliance for Water Efficiency

The Alliance for Water Efficiency is a stakeholder-based nonprofit organization dedicated to the efficient and sustainable use of water. The Alliance serves as a North American advocate for water-efficient products and programs and provides information and assistance on water conservation efforts. The Alliance has embarked on the following seven key tasks to support and enhance water conservation efforts, providing benefit to water utilities, water conservation professionals, planners, regulators, and consumers.

- Stand as a clear and authoritative national voice for water efficiency.
- Provide comprehensive information about water-efficient products, practices, and programs; what works and what does not work.
- Represent the interest of water efficiency in the development of codes and standards.
- Transform the market for fixtures and appliances.
- Coordinate with green building initiatives to institutionalize water efficiency.
- Train water conservation professionals.
- Educate water users.

For additional information:
- www.allianceforwaterefficiency.org

3C.2.1.2 American Water Works Association

Established in 1881, the American Water Works Association (AWWA) is the largest nonprofit, scientific, and educational association dedicated to managing and treating water. With approximately 50,000 members, AWWA provides solutions to improve public health, protect the environment, strengthen the economy, and enhance the quality of life. AWWA provides technical assistance through studies, standards, conferences, and manuals of practice to the potable water industry. One example of resources available from AWWA is the Water Loss Control Committee Free Water Audit Software©. This free software provides a nationally recognized systematic method to organize water diversion data and track its path through the distribution system.

For additional information:
- www.awwa.org

3C.2.1.3 WateReuse Association

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 betterment of society and the environment through advocacy, education and outreach, research, and membership. They provide technical assistance through studies, standards, conferences, and guidance to the water reuse industry.

For additional information:
- www.watereuse.org

3C.2.2 Other Resources

3C.2.2.1 Certification Programs

Voluntary certification programs for buildings seek to increase efficiency in energy and water usage. These programs include the U.S. Green Building Council's Leadership in Energy & Environmental Design program, the International Code Council's International Green Construction Code, the International Association of Plumbing and Mechanical Officials, Green Building Mechanical and Plumbing Code Supplement, CALGreen, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), and others.

For additional information:
- Leadership in Energy & Environmental Design www.usgbc.org/leed
- International Green Construction Code www.iccsafe.org/CS/IGCC
- International Association of Plumbing and Mechanical Officials www.iapmo.org/pages/iapmo_Sustainability.aspx
- ASHRAE Green Building Standards www.ashrae.org/greenstandard

3C.2.2.2 Research Foundations

Nonprofit research foundations continue to advance knowledge and understanding in the fields of water conservation and reuse. These foundations include the Water Research Foundation (WaterRF), Water Environment Research Foundation (WERF), and the WateReuse Research Foundation. These organizations provide valuable technical information through their completed and ongoing research.

For additional information:
- Water Research Foundation www.waterrf.org
- Water Environment Research Foundation www.werf.org
- WateReuse Research Foundation www.watereuse.org/foundation

3C.2.2.3 Alternative Funding Resources

In addition to federal and state resources that provide funding, additional funding opportunities are available through the use of private funding and nonprofit foundations. Private funding can come through the use of performance contracting and public-private partnerships, which provide alternate ways to fund improvement projects. Nonprofit foundations provide grants for projects they deem in agreement with their missions.

Existing water revenue streams can be supplemented by local programs that leverage public and private investments. While "non-traditional" financing approaches that access and mobilize private capital are still relatively underutilized and unfamiliar to many water providers, they offer an, as yet, untapped resource for implementing sustainable water management practices such as water conservation and efficiency. Examples of these innovative approaches include the following.

- Business Improvement Districts, Community Improvement Districts and other special assessment districts may be capable of providing municipalities (and water/sewer districts) with either revenue streams for water conservation, efficiency, reuse or green infrastructure improvements or self-financed partners capable of undertaking projects.

  Example: Wilshire Center BID's "Green Wilshire Center" program
  - www.wilshirecenter.com/green/building.htm
- The Property Assessed Clean Energy (PACE) program is a means of financing energy efficiency upgrades or renewable energy installations for buildings. Examples of upgrades range from adding more attic insulation to installing rooftop solar panels. In areas with PACE legislation in place, municipal governments offer a specific bond to investors and in turn loan the money to consumers and businesses to put toward energy retrofits. The loans are repaid over the assigned term (typically 15 or 20 years) via an annual assessment on their property tax bill. PACE bonds can be issued by municipal financing districts or finance companies and the proceeds can be used to retrofit both commercial and residential properties. A notable characteristic of PACE programs is that the loan is attached to the property rather than to an individual.

  For additional information:
  - www.pacenow.org
- Public-private partnerships may provide cost-effective capacity for conservation/efficiency/reuse and green infrastructure projects or programs.

  Example: West Coast Infrastructure Exchange
  - www.westcoastx.com
- Water conservation credit (or offset) programs are a method for reducing overall water demand through private party actions or market transactions. In these programs, property developers are required to offset increased or new water use through purchases or creation of "credits."

  Example: City of Santa Fe Water Demand Offset program
  - www.santafenm.gov/development_water_budgets
- "On-bill" programs include specific "service fees" added to water customers' bills and allocated to conservation, efficiency and watershed protection activities. While some on-bill programs create a mandatory contribution or fee, others rely on voluntary contributions to fund watershed health or conservation programs.

  Example: Windsor Efficiency PAYS program
  - www.townofwindsor.com/index.aspx?NID=819

- Dedicated leverage funds can be established combining various revenue sources to pay for watershed management or conservation programs.

  Example: North Bay Water Reuse Program
  - www.nbwra.org/costs-and-funding

3C.3 State Programs and Resources

In addition to federal and non-governmental programs, each Basin State has a statewide water planning process that generally includes conservation programs and targets to meet anticipated future water demand. These processes typically involve legal changes, such as ordinances and regulations, and state-funded programs that have been implemented to reduce M&I water demand.

As indicated in the overview of water planning in western states (New Mexico Office of the State Engineer (OSE), 2009), states in the Basin have completed formal water plans that include varying degrees of detail. Also, most states carry out water planning on a regional basis, allowing technical studies and communication among stakeholders to occur at a local level. Others have not completed regional plans for their entire state but have done some regional planning in key areas. Table 3C-2 is an overview of the ongoing statewide water planning process and conservation targets. The following sections provide an overview of the planning efforts occurring in the Basin States and summarize the legal framework and programs related to water conservation.

3C.3.1 Wyoming

The Wyoming State Engineer's Office is charged with regulating and administering water resources in Wyoming. The Wyoming Water Development Commission (WWDC) provides grant and loan funding for water supply reconnaissance and feasibility studies and construction projects. From 1997 to 2006, the WWDC, in conjunction with the State Engineer and the University of Wyoming, completed seven individual basin water plans, one for each major drainage basin of the state. In 2007, the results of these plans were summarized in the Statewide Framework Water Plan and recommendations for future updates were provided (WWDC, 2007).

The 2007 Wyoming Framework Water Plan has two objectives, each presented in a volume. Volume I inventories the state's water resources and related lands, summarizes the state's current water uses, projections future water needs, and identifies alternative decisions to meet indicated future water needs. Volume I presents information from the separate basin reports on a statewide basis. The second objective, and the subject of Volume II, is to provide future water resource planning direction to the State of Wyoming. This current plan provides information for decision making for a 30-year planning horizon.

As part of the river basin studies, water conservation opportunities available today were identified and their applicability discussed. Opportunities with the best economic, practical, and political components for implementation were recommended. For the Green River basin, which is part of the Upper Colorado River Basin, it was recommended to make conservation an opportunity that is evaluated in WWDC municipal master plans and watershed planning studies, to continue to monitor the conservation studies and efforts of other basins, to continue to widen public education and outreach programs, and to commit to discovering and implementing best management practices (BMPs) (WWDC, 2009).

A summary of the existing water conservation programs and resources in Wyoming is presented in the following sections.

3C.3.1.1 State Water Management and Conservation Program

The WWDC and the Wyoming State Engineer's Office, in partnership with Reclamation, initiated the development of a water conservation program for the state beginning August 1998. The purpose of this effort is to develop options for a water conservation program with targets of addressing water conservation practices, investigating strategies, evaluating methodology, analyzing implementation ramifications, evaluating impacts, and identifying sources of assistance.

The water conservation program has developed a directory of assistance programs available to water users and the public. Currently, 25 participating local, state, and federal agencies and organizations provide educational, technical, financial, planning, and policy assistance to water users and the public in pursuing voluntary water management and conservation implementation.

TABLE 3C-2
Water Resources Planning and Conservation Efforts Framework at State Level

Basin State	Water Planning Level	Latest Water Resource Plan (Year, Previous Efforts)	Institution Leading Conservation Regulatory Framework	Most Recent Statewide Water Conservation Plan and Target
Wyoming[1]	State and Seven River Basins	State: The Wyoming Framework Water Plan (2007, last published 1973). River Basin within the Colorado River Basin: Green River Basin Water Plan: 2010 (previous completed in 2001)	Wyoming State Engineer's Office and Wyoming Water Development Commission	Not available. General conservation opportunities are recommended.
Colorado[2]	State and Nine Basin Compact Commissions	State: Colorado's Water Plan (ongoing effort scheduled to be completed by December 2015). This work is being based on the Statewide Water Supply Initiative (SWSI) (2010, currently being updated), Interbasin Compact Committee, (IBCC) (ongoing), Basin Implementation Plans (scheduled to be completed in 2014), and Basin Roundtables (ongoing) results.	Colorado Water Conservation Board (CWCB)	SWSI 2010: No targets developed yet; 2050 gallons per capital per day (GPCD) demand projections for three conservation scenarios that included active and passive conservation (natural replacement of domestic fixtures): 142 (low); 126 (medium); and, 113 (high).
Utah[3]	State and 11 Major Hydrologic River Basins	State: Utah's Water Resources Planning for the Future (2001, last published in 1990). River Basins within the Colorado River Basin: Uintah (1999), West Colorado River (2000), Southeast Colorado River (2000), Kanab Creek/Virgin River (1993).	Utah Division of Water Resources (DWRe)	2003 Utah's M&I Water Conservation Plan: 25% by the year 2050: 220 GPCD Utah's M&I Water Conservation Plan: 25% by the year 2050: 220 GPCD
New Mexico[4]	State	State: Working Toward Solutions: Integrating Our Water and Our Economy, State Water Plan 2013 Review (New Mexico State Water Plan published in 2003).	OSE	Not available.
Nevada[5]	State and Major Suppliers	State: Nevada State Water Plan (1999, last published 1973). Water Conservation Statutes exist in Nevada that require Conservation Plans from suppliers as covered NRS 540.121 through NRS 540.151	Department of Conservation and Natural Resources, Nevada Division of Water Resources	Not available at state level. 2014 Southern Nevada Water Authority Conservation Program: 199 GPCD by 2035.

TABLE 3C-2
Water Resources Planning and Conservation Efforts Framework at State Level

Basin State	Water Planning Level	Latest Water Resource Plan (Year, Previous Efforts)	Institution Leading Conservation Regulatory Framework	Most Recent Statewide Water Conservation Plan and Target
Arizona[6]	State, Active Management Areas (AMA) and Community Water Systems	State: 2014 Arizona's Next Century: A Strategic Vision for Water Supply Sustainability by the Arizona Department of Water Resources (ADWR). Prior statewide planning efforts include the State Water Plan by the Arizona Water Commission (1975-1978), the 1994 Arizona Water Resources Assessment by ADWR, the 2010 Arizona Water Atlas by ADWR, the 2010 Governor's Blue Ribbon Panel on Water Sustainability Final Report, the 2011 Water Resources Development Commission Final Report, the 2012 Water Resources Development Commission Supplemental Report AMA: Active Management Assessment by ADWR; series of 5 Management Plans are required from 1980-2025, the Third Management Plans, 2000-2010 by ADWR are the most recent. Community Water Systems: 2009, System Water Plans update every 5 years	Arizona Department of Water Resources	Not available at state level. Management Plans set provider-specific targets. Third Management Plans (2000-2010) targets have been met. The Fourth Management Plans are in development and will set new requirements.
California[7]	Statewide and 12 regions	State: California Water Plan Update 2013 (updated every 5 years).	Department of Water Resources	2010 California 20X2020 Water Conservation Plan: 20% percent by 2020.

[1] Wyoming Water Development Commission, 2007.
[2] Colorado Water Conservation Board, 2011.
[3] Utah Division of Water Resources, 2001.
[4] New Mexico Office of the State Engineer, 2003, 2013
[5] Southern Nevada Water Authority, 2014.
[6] Arizona Department of Water Resources, 1994, 2010, 2011, 2015, 2015a, 2015b; ADWR/ADEQ, ACC, 2010.
[7] California Department of Water Resources, 2010, 2013.

The WWDC provides grant and loan funding for water supply reconnaissance and feasibility studies and construction projects. Applicants must be public entities such as municipalities, irrigation districts, service and improvement districts, or joint power boards. The existing programs are for project planning, construction, river basin planning, groundwater, and small projects.

For additional information:
- wwdc.state.wy.us/wconsprog

3C.3.1.2 Other Programs

Available water conservation resources for the state, as listed in the Water Management and Conservation Assistance Program Directory (WWDC, 2009a and WWDC, 2014) as follows:

- University of Wyoming Cooperative Extension is an educational and technical resource.
  - ces.uwyo.edu
- Wyoming Association of Conservation Districts is implementing a program to increase and enhance locally driven watershed planning and implementation efforts.
  - www.conservewy.com/WATER.html
- The Wyoming Water Association, a nonprofit corporation, is the only statewide water resources association. Founded in 1933 with the objectives of promoting the development, conservation, and utilization of water resources of Wyoming for the benefit of Wyoming people, the Association provides current information about state and federal funding programs that are necessary to maintain their facilities and develop other uses. The Association holds an annual conference (education seminar and annual meeting).
  - www.wyomingwater.org

3C.3.2 Colorado

Colorado has developed a unique approach to public involvement in water planning. Governor Hickenlooper issued an Executive Order in May 2013 directing the CWCB to develop Colorado's Water Plan (CWP). Creation of this plan is a grassroots effort drawing upon 8 years of unprecedented work, dialogue, and consensus building that water leaders from across the state have engaged in through the Interbasin Compact Committee and Basin Roundtable process (CWCB, 2014). Each of the eight[1] Basin Roundtables is developing a Basin Implementation Plan that has been incorporated into draft sections of the CWP. The draft CWP was released December 2014 (CWCB, 2014a) for public comments, and a final CWP will be submitted by December 2015. The Committee is composed of 27 members representing every water basin and water interest in Colorado. The group facilitates dialogue across basins and works on the list of near-term actions, around which there is consensus, to secure water for the future. The technical foundation for the Basin Implementation Plans and CWP is the SWSI. Since the 2002-2003 drought, the CWCB has been leading the most comprehensive analysis of Colorado water ever undertaken through the SWSI, which is regularly updated.

The CWCB is leading the CWP process in conjunction with other state water agencies (SEO, Water Quality Control Commission, Water Quality Control Division, and Division of Parks & Wildlife). Also, the CWCB is consulting with the Colorado General Assembly and the State Engineer (Colorado Division of Water Resources) and soliciting their input and guidance.

The CWCB is also responsible for approving water efficiency plans and provides technical assistance as well as grant money to develop or update these plans. The institutional framework driving these efforts and main programs is described below. Programs from other institutions have also been included.

3C.3.2.1 Water Conservation Act of 2004: (House Bill 04-1365)

In the Water Conservation Act of 1991 (House Bill [HB] 91-1154), the Office of Water Conservation within the CWCB was created to increase water use efficiency. The Water Conservation Act of 2004 (HB 04-1365) amends the previous act and changes the law to mandate that all covered entities must develop water conservation plans to be approved by the CWCB; expands the duties of the Office of Water Conservation, changing the name to the Office of Water Conservation and Drought Planning; and provides a funding source for water conservation and drought mitigation planning

[1] The eight river basins are as follows: (1) Arkansas Basin; Basins of the Colorado River System; (2) Mainsteam Colorado River Basin; (3) Gunnison River Basin; (3) Yampa River, White River, and Green River Basin; (4) Dolores River, San Juan River, and San Miguel Basins; (5) South Platte River Basin; (6) Republican River Basin; (7) North Platte River Basin; and (8) Rio Grande Basin (CWP, 2014a).

projects. According to the Water Conservation Act of 2004, all covered entities – retail water providers who sell 2,000 AF or more of water annually – must have a water efficiency plan on file with the state that has been approved by the CWCB. Each plan must include the minimum required plan elements as outlined in the Act. In addition, entities seeking financial assistance from the State must estimate and report the water savings from water conservation programs and measures and define water conservation goals (in terms of quantifiable savings).

For additional information:

- cwcb.state.co.us/water-management/waterEfficiency

3C.3.2.2 New Developments Permit Applications (House Bill 08-1141)

In 2008, recognizing the importance of integrating water conservation into water supply planning, Colorado adopted HB08-1141. The bill stated "...land use and development approval decisions are matters of local concern, but to ensure adequacy of water for new developments is a statewide concern and necessary for preservation of public health, safety, welfare, and the environment of Colorado." The new statute requires that all development permit applications, with the support of water supply experts, include information about the proposed development's water supply requirements, physical source, yield under various hydrologic conditions, conservation measures, and demand management.

3C.3.2.3 Reporting of Water Use and Water Conservation Data (House Bill 10-1051)

In 2010, the Colorado General Assembly adopted HB10-1051, which requires covered entities (retail water providers who sell 2,000 AF or more of water annually) to annually report water use and conservation data to be used for statewide water supply planning. The bill directed the CWCB to adopt guidelines regarding the reporting of water use and conservation data by covered entities (Guidelines) and to report to the legislature regarding the Guidelines. HB10-1051 directed the CWCB to develop reporting guidelines through a public participation process that included outreach to stakeholders from water providers with geographic and demographic diversity, nongovernmental organizations, and water conservation professionals. The reporting guidelines include clear descriptions of customer categories, uses, and measurements; how the guidelines will be implemented; and how data will be reported to the Board. Data reported under HB10-1051 will further support statewide water supply planning efforts by improving the quantity and quality of data available and improving consistency in the data reporting.

3C.3.2.4 New Housing Stock and Plumbing Code (House Bills 10-1358 and 10-1204)

The Colorado legislature adopted two new bills in 2010 related to new housing stock. HB10-1358 concerns a requirement for new home builders to offer home buyers water-efficient options. Effective January 1, 2011, builders must offer every buyer of a new single-family detached residence the opportunity to select one or more water-smart home options described further in the bill, which include water-efficient fixtures and landscaping. HB10-1204 adds the word "conservation" to the Colorado state plumbing code and allows the state plumbing board to be able to consider water conservation and efficiency standards when recommending changes to the code.

3C.3.2.5 Limit Use of Agriculture Water for Lawn Irrigation (Senate Bill 14-017)

In April 2014, the governor signed Senate Bill (SB) 14-017 concerning a limitation on the approval of real estate developments that use water rights decreed for agricultural purposes to irrigate lawn grass. The bill seeks to identify and quantify the types of best practices that could be used to limit municipal outdoor water consumption and to determine whether proposed legislation is needed to facilitate the implementation of those practices.

3C.3.2.6 Phase-In High- Efficiency Water Fixture Options (Senate Bill 14-103)

In June 2014, the governor signed SB14-103 concerning the phase-out of the sale of certain low-efficiency plumbing fixtures. Plumbing fixtures addressed by this bill are not WaterSense-listed (that is, lavatory faucets, shower heads, flushing urinals, tank-type toilets, tank-type water closets). Effective September 1, 2016, new low-efficiency plumbing fixtures shall not be sold in Colorado.

3C.3.2.7 2010 Statewide Water Supply Initiative, Portfolios, and Strategies to Address the M&I Gap

The Statewide Water Supply Initiative 2010 (CWCB, 2011) is a statewide planning tool that provides comprehensive information to water providers, state policymakers, and the General Assembly. Colorado faces a significant M&I water supply gap in 2050. This gap is defined as the difference between the projected M&I water demands and supplies from existing sources and the supplies from the Identified Projects and Processes. The M&I gap varies between 190,000 and 630,000 AF, depending on the success rate of the Institutional Provider Programs. By 2050, Colorado's M&I gap could be between 32 and 66 percent of new demands (CWCB, 2011).

Water conservation will be one of several important tools for meeting future M&I demands. The SWSI 2010 report (Section 7) provides reconnaissance-level estimates of the statewide water conservation potential (CWCB, 2011). It provides information about technical potential for water savings but does not determine how the saved water may be used or how much of the conserved water will be available to meet future needs. This is determined at a local level by water providers taking into account the economic feasibility as well as the political will necessary to accomplish higher savings. The Municipal and Industrial Water Conservation Strategies Report, Appendix L (CWCB, 2011) represents the latest effort by the CWCB to integrate water conservation into overall water supply planning and to estimate the statewide water conservation potential up to 2050.

3C.3.2.8 Draft No and Low Regrets Action Plan: Interbasin Compact Committee

In 2013, the Interbasin Compact Committee (IBCC) developed a draft No and Low Regrets Action Plan for water conservation (CWCB, 2013). The IBCC members developed a menu of options that received initial screening by the IBCC. The IBCC was asked to eliminate any potential specific actions that they "could not live with" as options and to add any missing items. Additional input from stakeholders was sought before the actions described in the draft plan were incorporated into the draft Colorado Water Plan or other planning documents. In addition, detail on how and with what funds a specific action will be implemented will be necessary for any action to be realized.

The No/Low Regrets Action Plan is based on the foundation of the Scenario Planning and Portfolio work conducted by the IBCC and the Basin Roundtables. This work has been incorporated into the draft copy of SWSI Chapter 7 update: Scenario Planning and Adaptive Management. This work indicates that the following strategies are necessary in preparation for any future scenario.

- Improve tracking and quantification of conservation.
- Establish a statewide conservation goal with intermittent benchmarks.
- Continue to support local implementation of best practices.
- Promote enabling conditions for use of conserved water.
- Develop new incentives for conservation.
- Explore legislative concepts and develop support.
- Implement education and outreach efforts.

3C.3.2.9 Guidebook of Best Practices for Municipal Water Conservation: Colorado WaterWise

The Colorado WaterWise is a nonprofit organization that promotes the efficient use of Colorado's water (Colorado Waterwise, 2010). The Xeriscape Colorado program is affiliated with this organization and is a leading source of information on low-water landscapes. With funds from the CWCB, they published the Guidebook of Best Practices for Municipal Water Conservation in Colorado, which includes water conservation best practices to assist urban water providers with selecting and implementing effective water conservation programs and measures. Colorado WaterWise also developed quality online resources for commercial, institutional, and industrial water conservation. Using the best practice as a basis, SWSI 2010 estimated low, medium, and high strategies for active water conservation savings.

3C.3.2.10 Memorandum of Understanding of Water Conservation and Stewardship and Best Management Practices: Metro Mayor Caucus

The Metro Mayor Caucus (Caucus) is a voluntary and collaborative regional organization composed of mayors from throughout the Denver metropolitan area. This organization started working on water issues in. In January 2005, a Memorandum of Understanding (MOU) on Water Conservation and Stewardship was signed by 28 jurisdictions and endorsed by 16 organizations (Metro Mayors, 2005) After signing the MOU, the Caucus teamed with the Colorado WaterWise Council to draft BMPs for water conservation (Metro Mayors and Colorado WaterWise Council, 2005). The BMPs are specifically intended to serve as a menu of options to water providers that want to enhance water conservation by reducing demand among their customers. In June 2005, these BMPs were adopted as an appendix to the Colorado Model Water Conservation Plan by the CWCB.

3C.3.2.11 Other Programs

For the State of Colorado, three agencies play key financing roles: the CWCB, the Colorado Water Resources and Power Development Authority (CWRPDA), and the Colorado Department of Public Health and Environment. These agencies award grants and loans to help local groups finance water projects, with revenues obtained through taxes and bond sales. Water conservation funds administered by the CWCB are the Construction Fund and the Severance Tax Trust Fund Perpetual Base Account that can be used for water supply systems rehabilitation. The Water Efficiency Grant Program, created in 2004 under HB05-12542, is also administered by the CWCB's Office of Water Conservation & Drought Planning. This grant program provides financial assistance to communities, water providers, and eligible entities statewide for water conservation and implementation as well as drought planning and implementation projects. This program was expanded under SB07-008 to include water conservation planning and implementation, education and public outreach, and drought mitigation and implementation as well as increased funding through June 30, 2020.

The major CWRPDA funding programs are the Small Water Resources Project Program and the Water Pollution Control Revolving Fund that could be used for reuse programs. Finally, the Colorado Department of Public Health and Environment and the CWRPDA work together in the administration and funding of the Drinking Water Revolving Fund.

For additional information:

- CWCB Severance Tax Trust Fund www.cwcb.state.co.us/LoansGrants/severance-tax-trust-fund-operational-account-grants
- CWCB Construction Fund www.cwcb.state.co.us/loansgrants/non-reimbursable-project-investment-grants
- CWCB Water Efficiency Grant Program www.cwcb.state.co.us/LoansGrants/water-efficiency-grants

3C.3.3 Utah

The Utah Division of Water Resources (DWRe) has advocated water conservation and efficiency for all water users in its state water planning efforts since the early 1980s. The DWRe is responsible for the state comprehensive water planning, which entails a statewide water plan and individual water plan for each of the state's 11 major hydrologic river basins. The DWRe also promotes water conservation through its water education program and the policies and recommendations of the Board of Water Resources and the Utah Water Conservation Advisory Board. The Division has also produced a model water conservation plan and a model time-of-day watering and rate ordinance for use by interested entities.

The institutional framework driving Utah's conservation efforts and main programs are listed below.

3C.3.3.1 Water Conservation Plan Act (Utah Code §73-10-32)

With the initial passage of Utah's Water Conservation Plan Act in 1998 and later revisions, (as codified in Utah Code §73-10-32), water conservation planning became law for municipal providers with more than 500 connections. This act requires Utah water suppliers to submit a water conservation plan to the DWRe every 5 years outlining the efforts they will use to conserve water within their systems. The methods used to achieve each system's goals are left up to the individual

[2] HB05-1254; SB07-008 Expansion of the Water Efficiency Grant Program

public water system and they choose the methods most suitable to their community and budgetary constraints. This requirement covered systems that provide water to about 93 percent of Utah's population. As of June 2001, 99 out of 150 water retailers and conservancy districts which were to submit plans have done so. State water funding boards have further stipulated that a plan must be in place prior to any funds being awarded. The legislation also directs the Board of Water Resources to study ways to implement the plans, develop recommendations on implementation, and report to the legislature (DWRe, 2001).

The Act was revised in 1999 and 2004 to include provisions that provided for publishing a report that identified entities that do not have a current water conservation plan; required that water conservation plans contain existing and proposed water conservation measures; required that water conservation plans describe the extent to which a retail provider will use certain measures to achieve its conservation goals; required that water conservation plans contain a clearly stated water use reduction goal and implementation plan for each conservation measure, including a timeline for action and an evaluation process to measure progress; and required that the Board of Water Resources report be presented to the Natural Resources, Agriculture, and Environment Interim Committee at its November 2004 meeting.

3C.3.3.2 2003 Utah's Water Conservation Plan

Utah completed its second Water Conservation Plan in 2001 (DWRe, 2001) and prepared an M&I Water Conservation Plan in 2003 (DWRe, 2003). The M&I Water Conservation Plan includes eight steps to meet Utah's water conservation goal to reduce the 1995 per capita water demand from public community systems by at least 25 percent before 2050; this would be a total decrease in demand of about 400,000 AF per year by 2050. Included in the 8 steps are the following 13 recommended BMPs for implementation by state water providers.

- Comprehensive water conservation plans
- Universal metering
- Incentive water conservation pricing
- Water conservation ordinances
- Water conservation coordinator
- Public information programs
- System water audits and leak detection and repair
- Large landscape conservation program and incentives
- Water survey programs for residential customers
- Plumbing standards
- School education programs
- Conservation programs for commercial, industrial, and institutional customers
- Reclaimed water use

3C.3.3.3 State Water Education Program

The DWRe manages the state water education program. The program helps teachers and students realize their places in the water cycle and enables them to make informed decisions about water and how they use it. By developing awareness and knowledge of water resources, the state is equipping the leaders of the future with the skills they will need to make sound water management decisions. The focus areas are teacher education, student outreach, the young artists' water education posters contest, and a banquet.

For additional information:
- www.watereducation.utah.gov

3C.3.3.4 Governor's Water Conservation Team

This program is designed to inform the public by providing water conservation information. Created in 2000, this team is composed of key water officials from the state's five largest water conservancy and metropolitan water districts, the DWRe Director, a representative from the Governor's Office of Planning and Budget, Rural Water Association of Utah, Utah Water Users Association, and the landscape industry. Thus far, the top priority of the Governor's Water Conservation Team has been the joint funding and production of a statewide media campaign, which includes radio and television ads, printed materials, and presentations.

For additional information:
- www.slowtheflow.org/index.php/governor-s-water-conservation-team

3C.3.3.5 Other Programs

Other state water conservation resources are the Center for Water Efficient Landscaping, Water Wise Utah, and the Utah Water Conservation Forum. The Center for Water Efficient Landscaping is a research and outreach center designed to improve efficient use of water for landscape irrigation. The Water Wise Utah partnership is a unique collaborative project where public broadcasting, museums, and libraries work together for greater impact and to leverage the skills of each partner. The Utah Water Conservation Forum supports federal, state, and local water agencies and professionals in sustaining a statewide water conservation movement. They organize a water efficiency conference in the state and have demonstration gardens and a scholarship program for post-secondary students in Utah pursuing research or educational training related to water conservation or a water management related field.

For additional information:
- Center for Water Efficient Landscaping cwel.usu.edu
- Water Wise Utah waterwiseutah.org
- Water Conservation Forum utahwaterconservationforum.org

3C.3.4 New Mexico

The New Mexico Office of the State Engineer (OSE) is charged with administering the state's water resources. The State Engineer has power over the supervision, measurement, appropriation, and distribution of all surface and groundwater in New Mexico, including streams and rivers that cross state boundaries. The State Engineer is also Secretary of the Interstate Stream Commission, which is charged with protecting New Mexico's right to water under eight interstate stream compacts, ensuring the state complies with each of those compacts, and ensuring that the state complies with water planning efforts.

New Mexico has a well-defined ongoing program involving periodic updates of state and regional plans. The New Mexico Statutes 72-14-3.1 (C) (5) instructs the Interstate Stream Commission in collaboration with the OSE and in consultation with other government agencies as appropriate, to develop water conservation strategies and policies to maximize beneficial use. This use includes the reuse and recycling by conjunctive management of water resources and, by doing so, promoting non-forfeiture of water rights in a comprehensive and coordinated state water plan.

3C.3.4.1 Office of State Engineer Water Conservation Program

The Water Conservation Program coordinates water conservation activities for New Mexico. Program goals are to increase awareness about the value of water resources; provide assistance to entities initiating water conservation plans and programs; and to assist in the development of state government policies that will encourage the implementation of water conservation measures in various water use sectors.

The OSE has been working with municipalities to conduct water system audits and develop daily per capita use protocols. The OSE has developed a standardized methodology for GPCD calculations in New Mexico. This standardized tool is used for water use reporting. The GPCD methodology will be required for applications when requesting to hold water unused (40-Year Plans), for water conservation plans, and for mandated water use reporting. It may also be required as a permit condition for sensitive hydrologic basins, for emergency permits, and for large or excessive users. This type of data is also requested as part of the Uniform Funding Application that is used to evaluate water and wastewater loan fund requests.

The OSE also provides technical support and promotes conservation programs such as the Fix a Leak Program and WaterWise Building. The OSE published a complete planning guide (the New Mexico Water Conservation Planning Guide for Public Water Suppliers), which provides tools and step-by-step instructions for developing a measureable and effective water conservation plan for public water suppliers. Another technical resource is the food service water audit program, which is designed for restaurants and cafeterias within the public water supplier's water supply systems. It provides instructions, questionnaires, evaluations, reporting information, and supplemental resources about how to conduct a food service industry water audit program within a utility.

For additional information:
- www.ose.state.nm.us/WUC

3C.3.4.2 Other Programs

The New Mexico Environment Department provides assistance for communities through its Community

Service Group of the Drinking Water Bureau to secure funding for water and wastewater infrastructure projects. The Department's Division of Water and Waste Water Infrastructure Development works with the Governor's Water Cabinet to align state water policy and create consistency in funding through the Water Trust Fund.

The Water Trust Fund became a permanent fund by constitutional amendment in 2006 and receives continuing funding. A water project's inclusion in a regional water plan is a consideration for funding. Also, in the New Mexico Finance Authority's Water Project Fund, projects are recommended by the Water Trust Board to the Legislature. Projects fall under five categories: (1) water conservation or reuse; (2) flood prevention; (3) Endangered Species Act collaborative efforts; (4) water storage, conveyance, and delivery infrastructure improvements; and (5) watershed restoration and management initiatives.

Other nonprofit organizations statewide significantly support water conservation efforts. The New Mexico Water Conservation Alliance is a nonprofit dedicated to water conservation issues. Individuals from municipal, industrial, institutional, and commercial sectors have joined together in an effort to exchange information, provide education, and work collaboratively to help ensure a positive water future for the state. Another organization is the Xeriscape Council of New Mexico formed in 1986 by green-industry professionals interested in water conservation to offer educational programs, training sessions, and conferences on resource-efficient landscaping and related subjects. The Xeriscape Council of New Mexico's primary project is an annual conference that focuses on water, people, and landscape.

For additional information:

- New Mexico Finance Authority, Water Project Fund www.nmfa.net/financing/water-programs/water-project-fund
- New Mexico Water Conservation Alliance www.nmwca.org
- Xeriscape Council of New Mexico www.xeriscapenm.com

3C.3.5 Nevada

Local and regional planning in Nevada has been done by major suppliers (such as the Southern Nevada Water Authority) in key urban areas. Water conservation statutes, programs and the institutional framework as presented in the Nevada State Water Plan (NDWR, 1999) are described below.

3C.3.5.1 Conservation Plans

In Nevada, each "supplier of water" for municipal, industrial or domestic purposes must submit conservation plans to the State of Nevada Division of Water Resources for review and approval. The State Engineer's authority for review of the plans is derived in Nevada Revised Statutes (NRS) 540, with NRS 540.121 through NRS 540.151 covering conservation specifically. The statutes require the following.

- Public education about water conservation.
- Encouraging reduction in sizes of lawns and use of desert adapted plants.
- Leak identification and reduction.
- Reuse of effluent.
- Contingency plans for assuring potable supplies.
- Conservation-oriented rate structures and analyses of how rate structures will maximize water consumption.
- Fines for violation of water conservation related ordinances.
- Metrics for evaluating of success of elements of the plans, including requirements for stating estimated GPCD yield for each conservation measure in the plans.
- A schedule for carrying out plans and requirements for update every 5 years.
- Transparency of plans and online publication of plans

3C.3.5.2 Service Connection Metering Ordinances

A majority of the public water system withdrawals (in terms of volume) are metered; however, not all deliveries to each service connection are metered. Water meters were initially prohibited in Reno and Sparks by a 1919 statute (NRS 704.230). Since that time, gradual changes have occurred that (1) require meters on all businesses (1977) and on all new homes built after 1988 and (2) allow meters on residences upon owner request and under certain conditions tied to the Negotiated Settlement (1990) (NDWR, 1999).

3C.3.5.3 Low-Flow Plumbing Standards: Assembly Bill 359

The Nevada Legislature passed AB359 in 1991 thereby imposing certain minimum standards for plumbing fixtures (toilets, showers, faucets, and urinals) in new construction and expansions in residential, industrial, commercial, and public buildings. Each county and city was required to include these requirements in its building code or to adopt these requirements by ordinance, and to prohibit by ordinance the sale and installation of any plumbing fixture that does not meet the minimum standards (NDWR, 1999).

3C.3.5.4 Other Programs

The Nevada Division of Environmental Protection, Office of Financial Assistance Water Grants Program to provide grants to purveyors of water to assist with the costs of capital improvements to publicly owned community water systems and publicly owned nontransient water systems as required, or made necessary by, the state health board or made necessary by the Federal Safe Drinking Water Act. The program is commonly referred to as the AB 198 Grant Program, after Assembly Bill 198 which established the program. Grants may also be made to eligible recipients to pay for the cost of improvements to conserve water such as in the case of irrigation districts.

Another example of state financial support administered by the Division of Water Resources Planning is the Channel Clearance Program. The program provides funding for channel clearance maintenance, restoration, surveying and monumenting. Local communities, including counties, cities, irrigation districts, and flood control districts can apply for matching funds to maintain channels of navigable rivers within their jurisdictional boundaries (NDWR, 1999).

For additional information:

- www.ndep.nv.gov/bffwp/grants01.htm

3C.3.6 Arizona

In 1980, the ADWR was established with the passage of the Groundwater Management Act. The ADWR administers state laws governing the use of surface water and groundwater (except those related to water quality), underground storage of water, and dam safety. It explores methods of augmenting water supplies to meet future demands, and works to develop public policies and regulations that promote conservation and reuse of water. The ADWR is authorized, for and on behalf of the state of Arizona to consult with and advise the Secretary of the Interior on matters affecting Arizona's entitlement to Colorado River water, and to prosecute and defend Arizona's rights to Colorado River water.

Considerable investment in water resource development and planning has occurred in many parts of Arizona. The State Water Plan developed from 1975 to 1978 by the Arizona Water Commission (predecessor to the ADWR) was the first statewide water planning effort in the state (AWC, 1978). The Arizona Water Resources Assessment (ADWR, 1994) was built upon this document and The Final Report of the Governor's Blue Ribbon Panel on Water Sustainability (ADWR/ADEQ/ACC, 2010) identified obstacles to increased water sustainability and recommendations on the technical, legal, and policy aspects of promoting increased water conservation and recycling of reclaimed water, gray water, industrial process water, and storm water.

Also in 2010, the Arizona State Legislature passed House Bill 2661 that established the Water Resources Development Commission (WRDC). The WRDC was tasked with assessing Arizona's demand for water and the supplies available to meet those demands for the next 25, 50, and 100 years. The WRDC comprised 17 commission members with knowledge regarding a variety of water resource and water management issues in the state. Five committees were formed to meet the statutory obligations of the WRDC, each generating a detailed written report. The WRDC Final Report was released in 2011 (WRDC, 2011). The WRDC continued discussions through August of 2012 to develop recommendations aimed at providing local communities with the tools necessary to reduce or prevent future water supply and demand imbalances.

The WRDC Supplemental Report (WRDC, 2012) is a result of these discussions. The Arizona Water Atlas, a separate endeavor from the 1994 assessment, provides a broad overview of water supply and demand conditions as well as an analysis of water resource management issues. The Atlas divides Arizona into seven planning areas composed of groundwater basins and is an organizational concept that provides for a regional perspective on water supply, demand, and resource issues (ADWR, 2010).

In January 2014, the ADWR released Arizona's Strategic Vision for Water Supply Sustainability (ADWR, 2014). The Strategic Vision assessed current and projected demands and water supplies that have been identified in recent reports, and organized the state into twenty-two solution-oriented Planning Areas to facilitate the process of identifying potential strategies that will help Arizona meet its future needs. According to this document, one of the strategies for meeting future demand is the continuation of water conservation programs. The mandatory conservation programs implemented through the Management Plans under the Groundwater Code and complementary voluntary water conservation efforts have resulted in significant increases in water use efficiency throughout the planning area. Continuation and expansion of these efforts to further and continuously increase water use efficiency will be an important element of leveraging existing available supplies and increasing the relative yield of water augmentation alternatives (ADWR, 2015b).

The sections below describe the regulatory framework and relevant programs managed by the ADWR Water Planning Division. Programs and efforts from other institutions are also included.

3C.3.6.1 Arizona Groundwater Management Code

In Arizona, efforts to protect non-renewable groundwater resources led to the passing of a hallmark legislation in 1980 known as the Arizona Groundwater Management Code. The goal of the Code is to control severe groundwater depletion and to provide the means for allocating Arizona's limited groundwater resources to most effectively meet the state's changing water needs.

In 1986, the Ford Foundation selected Arizona's Groundwater Management Code as one of the 10 most innovative programs in state and local government. For nearly 35 years, the 1980 Groundwater Management Act has shaped Arizona's approach to water management. Enacted in response to decades of depletion of the state's limited groundwater supplies, the Act aims to halt groundwater mining in the state's most heavily populated areas, known as AMAs. The Act established the ADWR and gave it extensive authority to regulate water uses and consumption. Within AMAs, the Act prohibits the expansion of agricultural irrigation, requires a permit to drill a new well, mandates that ADWR quantify all rights to withdraw groundwater, requires groundwater users to measure their withdrawals and file annual reports with ADWR, and prohibits new residential growth without a proven 100-year assured water supply.

The Code established three levels of water management to respond to different groundwater conditions. The lowest level of management includes general provisions that apply statewide. The next level of management applies to irrigation non-expansion areas. The highest level of management, with the most extensive provisions, is applied to AMAs where groundwater overdraft is most severe.

To meet the statutory requirements of the Code, management goals were established for each AMA. In the Phoenix, Prescott, Tucson, and Santa Cruz AMAs, the management goal is to achieve safe-yield by 2025. Safe-yield is accomplished when, on average no more groundwater is being withdrawn than is being replaced annually. In the Pinal AMA, where the economy is primarily agricultural, the management goal is to preserve that economy for as long as feasible, while considering the need to preserve groundwater for future non-irrigation uses. In addition to maintaining its safe-yield status, the Santa Cruz AMA goal is to prevent local water tables from experiencing long-term decline. Each AMA carries out its programs in a manner consistent with these goals while considering and incorporating the unique character of each AMA and its water users.

For additional information:

- www.azwater.gov/AzDWR/WaterManagement/documents/Groundwater_Code.pdf

3C.3.6.2 Third Management Plan

Management plans reflect the evolution of regulation under the Groundwater Code, assisting in moving each AMA toward its long-term water management goals. Through the management plans, ADWR establishes conservation goals for each water use sector: agriculture, municipal (includes cities, towns, and

private water companies by statute), and industrial (mining, golf course, electric power generation, dairies, and feedlots). Each AMA implements management plans corresponding to five management periods, every 10 years from 1980 through 2025.

The AMAs are currently in the Third Management Plan (2000-2010) and are in the initial stages of formulating the Fourth Management Plan (2010-2020)[3], delayed due to decreased funding in recent years. Once ADWR formally proposes a plan, it must hold a public hearing on the plan prior to final adoption. ADWR's findings after the hearing and its order adopting a plan are subject to judicial review.

A brief description of conservation programs currently implemented as part of the Third Management Plan follows. Conservation requirements in the Third Management Plans have been met. The management plans must include increasing conservation requirements for all water users designed to reach the management goal of each AMA. For municipal uses, the conservation requirements are based on reductions in per capita use and other appropriate measures. Large municipal providers are required to meter all connections and limit system losses to no more than 10 percent. Landscaping in public medians and rights-of-way is restricted to low-water-use plants identified in Regulatory Plant Lists. Many jurisdictions within the AMAs have officially adopted the local regulatory list and incorporated it into ordinances and design guidelines for development. More than 90 percent of the population of this region is served by municipal providers implementing a wide range of BMPs in the categories of public awareness, education and training, outreach service, system evaluation and improvement, ordinances/conditions of service/tariffs, rebates and incentives, and research and innovation. Most large providers have conservation rate structures. Conservation requirements have also been established for persons or entities receiving water from a municipal provider for a non-agriculture use. These uses include turf-related facilities, large-scale cooling facilities, and publicly owned rights-of-way.

[3] Available documentation of the process is at: http://www.azwater.gov/AzDWR/WaterManagement/AMAs/FourthManagementPlan.htm.

For additional information:

- Third Management Planwww.azwater.gov/AzDWR/WaterManagement/AMAs/ThirdManagementPlan3.htm
- Conservation Planning Support to water planners and providers www.azwater.gov/azdwr/StatewidePlanning/Conservation2/Planners/WaterPlanners_Providers_Planning.htm

GPCD: Per-Capita Requirements for Large Municipal Providers

This base program established in the Groundwater Code was first implemented 1987 as part of the First Management Plan. Large municipal providers are those that serve more than 250 AF of water per year for non-irrigation use. Providers are assigned an annual total GPCD allotment that is calculated using the component method (including single-family, multi-family, non-residential, and lost-and-unaccounted-for water).

Non-Per Capita Conservation Program

Established in 1992, the Non-Per Capita Conservation Program (NPCCP) requires implementation of "reasonable conservation measures" from the Third Management Plan and a reduction in groundwater use. Providers must have a designation of assured water supply or be a member of a groundwater replenishment district. In 1992, the Legislature enacted legislation requiring the Department to include in the management plans an NPCCP as an optional, alternative program to the Total GPCD Program requiring reasonable reductions in per capita use. Each provider regulated under the NPCCP is required to implement specific residential and non-residential conservation programs for interior and exterior water use, a public education program relating to water conservation, and a program to meter service area connections. Additionally, providers who are regulated under the NPCCP are required to either reduce their groundwater pumping consistent with the Assured and Adequate Water Supply (AAWS) Rules (Arizona Administrative Code R12-15-701, et seq.) or eliminate their use of mined groundwater by 2010. The NPCCP is a performance-based program with compliance determined by the effective implementation of stipulated conservation measures and required groundwater reductions. For the Third Management Plan, the statutory requirement for

the NPCCP are found in Arizona Revised Statues § 45-566.01. (From 2000-2010 Third Management Plan.)

Modified Non-Per Capita Conservation Program

Established in 2008 and first implemented in January 2010. The Modified Non-Per Capita Conservation Program (MNPCCP) came about as a result of the need to consider alternatives to the municipal regulatory program that would better meet the needs and capabilities of the regulated municipal water providers, as well as ADWR. Between 2006 and 2008, ADWR evaluated the regulatory programs for large municipal water providers in the Third Management Plan. This program is mandatory for all large municipal water providers in AMAs that do not have a Designation of Assured Water Supply; it is optional for those that do. The MNPCCP requires providers to implement the following measures:

- Public Education Program: Communicate to customers about water conservation and provide free written water conservation material.
- BMPs: Providers with up to 5,000 connections must implement 1 BMP, 5 BMPs for 5001-30,000 connections and 10 BMPs for > 30,000 connections. BMPs are selected based service area characteristics and/or water use patterns from a list of 53 BMPs.
- Provider Profile: Due within 6 months of notice date and resubmit every 3 years. If service connections increase to a higher tier, a new profile is due within 60 days.
- Conservations efforts report: Submit with the provider's Annual Water Withdrawal and Use Report on or before March 31st
- Rate Structure: Submit with the provider profile.

According to the program annual report (ADWR, 2011), the conservation effort reports by water providers indicated that the BMP related to outreach services and physical system improvements were selected most frequently. BMPs related to ordinances, conditions of service, and tariffs, were selected least frequently. The three most popular BMPs selected by the 55 providers are meter repair and replacement (49 percent), high water use inquiry resolution (33 percent), and high water use notification (25 percent).

For additional information:

- Modified Non-Per Capita Conservation Program www.azwater.gov/azdwr/WaterManagement/AMAs/ModifiedNon-PerCapita.htm
- Suggestions for matching service area characteristics with best management practices www.azwater.gov/azdwr/WaterManagement/AMAs/documents/BMPMatrix.pdf

Alternative Conservation Program

The Alternative Conservation Program, first established in the Second Management Plan, continued into the Third Management Plan. This program is a blend of the GPCD and the NPCCP.

Institutional Provider Program

This program is for large institutional facilities such as prisons, military installations, schools, and airparks that use more than 90 percent of their water deliveries for non-residential purposes. The Institutional Provider Program assigns a GPCD requirement for residential use and conservation measures for the specific institutional water uses in the provider's service area.

Large Untreated Provider Program

This program is for cities, towns, and irrigation districts that deliver non-potable water for landscape irrigation to at least 500 people or at least 100 AF of water. Providers must limit the amount of water delivered in a year. (Note: A provider could be regulated under this program in addition to one of the others above.)

Conservation Requirements for Distribution System

Each large municipal water provider must maintain its distribution system and properly meter and account for all deliveries. Water losses may not exceed 10 percent. Small providers must maintain their systems such that losses do not exceed 15 percent.

3C.3.6.3 Water Management Assistance Program

Beginning in 1990, the Management Plans have required the provision of funding and technical support for programs that help water users in AMAs to achieve the efficient use of water supplies and meet the AMA's water management goal. Funding is primarily from groundwater withdrawal fees collected from each entity withdrawing groundwater in an AMA from a non-

exempt well, and is used for purposes that benefit that AMA. To date, hundreds of funded projects have assisted water users in the development and implementation of conservation programs, augmentation, renewable water supply utilization and the acquisition of information on hydrologic conditions and water availability in the AMAs.

ADWR's conservation assistance helps water users plan and undertake conservation programs and lessens the number of enforcement actions related to conservation requirements. It is used for information and education services, including services that increase public awareness about of the importance of water conservation and the AMA's groundwater supplies. It also provides technical support designed to increase water use efficiency across the AMAs. Conservation assistance supports ADWR's role as a central source for information on water conservation, augmentation, and recharge. These efforts have included a variety of projects, such as educational programs for adults and children, evaluation of conservation measures and residential water use, horticulture and irrigation research, and technical workshops and incentive programs for the industrial/commercial sector. Examples include the Patch the Pipe program, which assists water providers in reducing their distribution system losses, and the RinseSmart program, implemented in partnership with providers to save both water and energy in the food service industry.

3C.3.6.4 Assured and Adequate Water Supply Programs

Other ADWR major statutory programs are the Assured and Adequate Water Supply Programs. The Assured Water Supply Program protects consumers inside AMAs by ensuring that people buying or leasing subdivided land in AMAs have sufficient water. A new subdivision will not be approved and homes may not be sold or leased in an AMA unless the applicant can demonstrate that there is sufficient water of adequate quality for at least 100 years. The applicant must apply for and receive a Certificate of Assured Water Supply from the Department.

The Adequate Water Supply Program ensures that people buying or leasing subdivided land outside of AMAs are notified of whether their water supply is adequate or inadequate for at least 100 years. However, subdivisions may be approved and homes may be sold outside of an AMA even if an inadequate water supply determination is made. New subdivisions apply to ADWR for a Water Report (Letter of Adequate Water Supply) prior to lot sales and must share the findings with the public. The Water Report indicates whether water supplies are adequate or inadequate.

The Assured and Adequate Water Supply Programs apply when a subdivision is being developed and thus are driven by the definition of a subdivision from the Arizona Department of Real Estate. A subdivision is six or more parcels with at least one parcel having an area less than 36 acres. This includes residential or commercial subdivisions, stock cooperatives, condominiums, and all lands subdivided as part of a common promotional plan (including golf courses, parks, schools, and other amenities). Short-term leases (12 months or less) and subdivisions where all parcels are greater than 36 acres do not fall under this definition. Both the Assured and Adequate Water Supply Programs are based on demonstration of a 100-year water supply considering current and committed demand as well as growth projections.

For additional information:

- www.azwater.gov/AzDWR/WaterManagement/AAWS

3C.3.6.5 Recharge and Recovery Program

The purpose of this program is to encourage the delivery, storage, and use of renewable water supplies (surface water and treated wastewater). The program includes water supplies that are stored underground, water supplies that are released into natural stream channels to recharge the aquifer, and farms or irrigation districts that use a renewable water supply instead of groundwater that would have otherwise been pumped.

For additional information:

- www.azwater.gov/azdwr/WaterManagement/Recharge

3C.3.6.6 Compliance and Enforcement Program

ADWR has statutory authority to enforce the provisions of the Groundwater Management Act, including the conservation requirements of the Management Plans. A.R.S. Title 45, Chapter 3, Article 12. ADWR developed a compliance and enforcement program to ensure that conservation requirements are met. Annual water withdrawal and use reports are one part of this program. Audits are conducted to determine whether

water users are in compliance with conservation requirements. If a water user is found to be out of compliance, ADWR sends out a notice of non-compliance, conducts post audit meetings with the water user, and attempts to negotiate a settlement for the excess water used.

For additional information:
- www.azwater.gov/AzDWR/WaterManagement/AMAs/PhoenixAMA/Compliance.htm

3C.3.6.7 Arizona Water Awareness Portal

The ADWR and the Arizona Municipal Water Users Association, working with other water conservation partners throughout the state that have a role in educating the public about water efficiency and conservation, developed the Arizona Water Awareness web portal as a central source of information on Arizona water resources and water conservation and stewardship. The Central Arizona Project and the Salt River Project have provided funding assistance to the project. The site includes ideas, tips, resources and events about water conservation. The portal sprang from the Water Awareness Month campaign, a result of a 2008 Executive Order that designates April as Water Awareness Month and the Water Awareness Month website that was first launched in 2011.

For additional information:
- Arizona Water Awarenesswww.arizonawaterawareness.com
- Water Awareness Month www.waterawarenessmonth.com

3C.3.6.8 Regional Conservation Programs

Listed below are well-established examples of regional and statewide collaboration and information sharing among water providers, agencies, universities, and others in Arizona.

- The Arizona Statewide Conservation Information Sharing Group (InfoShare) was established circa 2000 to facilitate the exchange of information, research, resources, and funding opportunities. Staff from public and private utilities; federal, state, and local agencies and organizations; universities; and the private sector meet twice a year or more to discuss water conservation, efficiency, and reuse programs, technologies, and strategies. Between meetings, information and updates are disseminated via a volunteer coordinator who maintains a master email list of participants.

  For additional information:
  - Contact Community Water Resource Manager, Liberty Water.

- The Arizona Municipal Water Users Association (AMWUA) Regional Conservation Program is a collaborative effort of the conservation staffs of the ten AMWUA member municipalities—Avondale, Chandler, Gilbert, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, and Tempe—working with local, state and federal agencies, trade associations, universities and AMWUA staff, to advance water use efficiency and conservation across the Phoenix metropolitan area. Established in 1982, the Regional Program complements, expands, and supports individual member programs that serve more than 3.2 million residents. By pooling funding and the diverse expertise of its membership and partners, AMWUA has assembled an expansive toolbox of educational materials and websites, training, outreach, messaging, and research that its members, partners, and many others use to inform, educate, and assist their customers and constituents to manage water resources efficiently.

  For additional information:
  - www.amwua.org

- The Water Conservation Alliance of Southern Arizona (Water CASA) has provided since 1997 a means for member water providers to augment their individual conservation programs and to improve the region's overall water conservation efforts. Members include Community Water Company of Green Valley, Flowing Wells Irrigation District, Town of Marana Water Department, Metropolitan Water Domestic Improvement District, Town of Oro Valley Water Department, Voyager Water, and Farmers Investment Co. Water CASA uses economies of scale to provide services to its members and their customers, engages in research to increase effectiveness of water conservation programs, and provides a voice on regional and state water resource management issues.

  For additional information:
  - www.watercasa.org

- The Cochise Water Project (TCWP) is non-governmental 501c3 established in 2012 and dedicated to the reduction of groundwater use in the Sierra Vista sub-watershed by decreasing water use in both residential and commercial sectors. Overseen by a board made up of prominent community leaders, the organization has acquired funding and introduced a wide range of programs and initiatives since its inception. In particular, a major push has been made through rebates and grants to encourage more people to install rainwater harvesting tanks to capitalize on the mountainous region's annual monsoon season which can result in an additional 12 inches of rainfall.

  For additional information:
  - www.thecochisewaterproject.com

3C.3.6.9 Other Programs

Through its Community Investment Program, the Central Arizona Project offers funding and programs in support of water education and the environment in central and southern Arizona. The Salt River Project provides funding for educational projects and programs and provides conservation resources and programs to students, teachers, and residents in the SRP service area.

3C.3.7 California

California has a well-defined ongoing water management program involving periodic updates of state and regional plans. Every 5 years, the Department of Water Resources (DWR) issues the California Water Plan (DWR, 2013), a policy document that includes an analysis of the current status of water supply and demand, examines future water availability scenarios, and identifies strategies that guide state investments in technological innovation, infrastructure, and integrated water management. The DWR is also responsible for administering the Urban Water Management Planning Act of 1983, which requires urban suppliers to prepare and update their Urban Water Management Plans every 5 years.

The California Water Plan provides a collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future. The plan presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The California Water Plan also evaluates different combinations of regional and statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship. The evaluations and assessments performed for the plan help identify effective actions and policies to meet California's resource management objectives in the near term and for several decades to come.

The goal for each California Water Plan update is to receive broad input and support from Californians in producing a strategic water plan that meets California Water Code requirements, guides state investments in innovation and infrastructure, and advances integrated water management and sustainable outcomes.

3C.3.7.1 20x2020 Water Conservation Plan

The 20x2020 Water Conservation Plan (DWR, 2010) sets forth a statewide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020 and beyond. It aims to set in motion a range of activities designed to achieve the 20 percent per capita reduction in urban water demand by 2020. The potential conservation savings analysis of current actions and additional selected measures indicates that California can reduce its per capita use 20 percent, from the current 192 GPCD to 154 GPCD; this amounts to an annual savings of about 1.59 million AF based on the savings achieved by California's 2005 population of 37 million. In November 2009, California placed the 20x2020 goal into statute (California Water Code Section 10608.16) with the enactment of SBX7-7.

As part of the 2009 state legislation, regional and local water districts were required to provide incentives to enact conservation and other measures to develop "diverse regional water supply portfolios that will increase water supply reliability and reduce dependence on the Delta" (California Water Code Section 10608(c)). Thus, this legislation, in addition to setting conservation targets, also urges water agencies to develop their own sources of water supply. SB X7-7 also required urban water suppliers to report in their Urban Water Management Plans beginning with their

2010 plans, baseline daily per capita water use, their urban water use target, and compliance with daily per capita water use, including technical bases and supporting data for these calculations. The preparation of an Urban Water Management Plan now requires greater analyses of management tools and options that will maximize resources and minimize the need to import water from other regions (Blanco et al, 2012). The current conservation actions include codes related to plumbing and appliance efficiency, regulatory activities, BMPs, and new technologies already having an impact.

3C.3.7.2 Updated Model Water-Efficient Landscape Ordinance

In 1990, California enacted the Water Conservation in Landscaping Act (amended in 2004 and 2006), directing the state's DWR to develop and adopt a Model Water-Efficient Landscape Ordinance (MWELO) (California Code of Regulations, Title 23, Division 2, Chapter 2.7 § 490-494) and requiring all cities and counties to adopt a water-efficient landscape ordinance (DWR, 2009). The ordinance calls for the development of landscape water budgets and performance standards, among other provisions. Landscapes planted under the ordinance are allowed a water budget with an evapotranspiration adjustment factor that decreased in 2010 from 0.8 to 0.7.

By regulation, California Government Code Section 65595 required DWR to update the MWELO in accordance with specified requirements, reflecting many of the recommendations of the Landscape Task Force as documented in the report Water Smart Landscapes for California. Local agencies, not later than January 1, 2010, were required to adopt the updated MWELO or, a local landscape ordinance that was at least as effective in conserving water as the updated model ordinance. If the local agency had not adopted the updated MWELO, or a local ordinance, the MWELO would be applicable within the jurisdiction of the local agency, including charter cities and charter counties. The law required each local agency to notify DWR by January 31, 2010, of their intent of adopting DWR's MWELO, or if not, submit a copy of their adopted water efficient landscape ordinance and include findings and evidence in the record that the local ordinance is at least as effective as the state MWELO. This law directed DWR to submit a report to the Legislature relating to the status of water-efficient landscape ordinances adopted by local agencies. DWR has kept a comprehensive and an ongoing record of responses from local agencies.

Table 3C-3 shows the cities, counties, and water purveyors that responded to the model water-efficient landscape ordinance.

TABLE 3C-3
Number of Cities, Counties, and Water Purveyors that Responded to the Model Water-Efficient Landscape Ordinance

Type	Number of Notices Sent	Number Responded	% of Response
City[1]	456	298	65
County[1]	58	34	59
Water Districts[2]		5	
Other Land Use Authority (Joint Powers Authority)	1	1	100

[1] Cities and counties may have dual responsibility of planning function and water purveyor.
[2] Water purveyors were not required by statute to adopt a water-efficient landscape ordinance; some agencies did so voluntarily.

3C.3.7.3 California Urban Water Conservation Council's Memorandum of Understanding Regarding Urban Water Conservation

The California Urban Water Conservation Council (CUWCC) was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities (CUWCC, 2011). The Council's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources.

In 1991, many urban water suppliers initiated water conservation programs identified as BMPs after adopting the Council's MOU Regarding Urban Water Conservation.

By 2006 more than 190 urban water suppliers—representing two-thirds of all Californians— had signed the MOU and annual water savings tied to implementation of urban BMPs have increased by 15 percent to 20 percent annually since 1991. The CUWCC's 14 BMPs are organized into five categories. Two categories, Utility Operations Programs and Education, are "Foundational BMPs", because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. Utility Operations Programs subcategories are Operations Practices, Water Loss Control, and Metering with Commodity Rates for All New Connections, and Retrofit of Existing Connections, and Retail Conservation Pricing. Education Programs subcategories are Public Information Programs and School Education Programs.

3C.3.7.4 Water Efficiency Standards: California Energy Commission

In 2002, the California Legislature ordered the California Energy Commission (CEC) to establish water-efficiency standards for residential clothes washers. Accounting for a reported 22 percent of an average household's water usage (WaterRF, 1999), washing machines are prime candidates for increased water-efficiency regulation. The 2014 Appliance Efficiency Regulations Section 1605.1(p) (CEC, 2014), provides standards for residential clothes washers manufactured on or after January 1, 2007, and manufactured before March 7, 2015, for a certain maximum water factor. This section also provides a standard for residential clothes washers manufactured on or after March 7, 2015, to meet a maximum integrated water factor by March 7, 2015 and another for January 1, 2018. Similarly, for commercial clothes washers, the section provides standards to comply with a maximum water factor, effective January 1, 2007, and January 8, 2013. Although the federal Energy Policy and Conservation Act expressly pre-empts states from regulating "energy efficiency, energy use, or water use of any product covered by federal energy efficiency standards," the CEC requested a waiver from the U.S. Department of Energy that would allow California to regulate water-efficiency standards for residential washing machines. The CEC won its request for a waiver in 2009 (Proctor, 2010).

3C.3.7.5 High-Efficiency Toilets and Urinals (Assembly Bill 715)

Assembly Bill (AB) 715, signed in 2007, requires that, on or after January 1, 2014, all low-flush toilets and urinals sold or installed in California must be high-efficiency, as codified in California Health and Safety Code Section 17921.3,) requires that, on or after January 1, 2014, all low-flush toilets and urinals sold or installed in California must be high-efficiency. The maximum gallons per flush for high-efficiency toilets and high-efficiency urinals are not to exceed 1.28 gallons and 0.5 gallon, respectively. The bill also requires manufacturers selling toilets or urinals in California to offer high-efficiency models for sale in a specified percentage of all models offered.

By virtue of the 100 percent requirement relating to sales after January 1, 2014, all commercial and residential renovations involving toilet and/or urinal replacement would be subject to the high-efficiency toilet and high-efficiency urinal requirements. As such, the expectation is for natural turnover/replacement to ultimately lead to the replacement of all toilets and urinals throughout the state over time.

3C.3.7.6 2013 California Green Buildings Standards Code: Title 24, Part 11

The California Green Buildings Standards Code is the 11th of 12 parts of the official compilation and publication of the adoptions, amendments, and repeal of regulations to the California Code of Regulations, Title 24. This component is known as the California Green Building Standards Code (CALGreen). The CALGreen Code is published in its entirety every 3 years by order of the California Legislature. The California Legislature delegated authority to various state agencies, boards, commissions, and departments to create building regulations to implement state statutes. These building regulations or standards have the same force of law, and take effect 180 days after their publication unless otherwise stipulated.

The residential mandatory measures related to water efficiency and conservation are included under Division 4.3. CALGreen prescriptive provisions to establish the means of conserving water used indoor are summarized in Table 3C-4. Plumbing fixtures and fittings shall be

TABLE 3C-4
2013 California Green Building Standards Code (CALGreen) Prescriptive Provisions for Maximum Indoor Water Use: Section 4.303

Fixture/Fitting	High-Efficiency Consumption (Tables 4.303.2 and 5.303.2.3)
Fixture/Fitting	High-Efficiency Consumption (Tables 4.303.2 and 5.303.2.3)
Water closet (toilet)	1.28 gallons per flush
Urinal	0.5 gallon per flush
Residential lavatory faucet	Maximum 1.5 gallons per minute at 60 pounds per square inch (psi) Minimum: 0.8 gallon per minute at 20 psi
Common and public lavatory faucet	0.5 gallon per minute at 60 psi
Metering faucet	0.25 gallon per cycle
Kitchen faucet	1.8 gallons per minute (may temporarily increase the flow above maximum rate, but not to exceed 2.2 gallons per minute at 60 psi)
Non-residential lavatory faucet	0.4 gallon per minute

installed in accordance with the California Plumbing Code and shall meet the applicable standards referenced in Table 1401.1 of the California Plumbing Code.

The outdoor water use (Section 4.304) provides the standards for the automatic irrigation system controllers for landscaping providers by the builder and installed at the time of final inspection. It is indicated that these shall be weather- or soil moisture-based controllers that adjust irrigation amounts. The weather-based controllers shall account for local rainfall.

This code covers new construction and renovations, and does not cover property resales, seller disclosures, or product sales. Indoor provisions of CALGreen include commercial sub-metering, excess consumption sub-metering, efficient fixtures, faucet aerators, toilets, urinals, lavatory and metering faucets, multiple showerheads, and nonpotable water use systems. Outdoor considerations include water budgets, landscape sub-metering, and irrigation design (including rain sensors and evapotranspiration controllers).

For additional information:
- www.bsc.ca.gov/Home/CALGreen.aspx

3C.3.7.7 Other Programs

DWR has also partnered with nonprofit organizations such as the Association of California Water Agencies to support conservation efforts. In 2009, the Save Our Water program was created with the alliance of the agency to raise public awareness about the ongoing drought. Today, the Save Our Water program aims to help Californians adopt permanent water conservation behaviors.

For additional information:
- Association of California Water Agencies
  www.acwa.com
- Save Our Water
  www.saveourwater.com

3C.4 Programs Outside of the Basin States

International and national water conservation and reuse program examples are presented in this section. These programs, while not intended to be comprehensive, represent a good reference for successful water conservation efforts that have been implemented outside the Basin States and could serve as additional resources for planning water conservation within the Basin States.

3C.4.1 International Examples

3C.4.1.1 Australia: South East Queensland

In the South East Queensland region, with a population of about 3 million, a severe drought in the middle of the last decade prompted an intensive campaign to reduce

water demand. In response, residential water consumption dropped from about 85 GPCD in 2005 to less than 35 GPCD in 2008 during the most severe drought restrictions. Total urban demand, including losses and non-residential consumption, fell from about 130 GPCD in 2005 to about 80 GPCD in 2010.

The drought restriction campaign included many programs. In one notable program, the water utility found that 6.4 percent of residential water users consumed 15.9 percent of the total residential water used, and that 0.4 percent of households was responsible for 5.6 percent of total residential water use. In response, the utility instituted the Residential Excessive Water Users Compliance Program, targeting these high water users with audits and increased scrutiny. Despite the end of the drought, public relations efforts maintain the message to Target 200, which encourages consumers to limit water consumption to 200 liters (about 50 gallons) per day, well above the Target 140 (less than 40 GPCD) campaign implemented during the height of the drought. New homes and most new commercial and industrial building must now capture and store stormwater via rainwater tanks and related infrastructure.

For additional information:
- www.qld.gov.au/environment/water/restrictions

3C.4.1.2 Israel

Israel, home to about 8 million people, faces intense water scarcity. Water management and decision making in Israel occurs at the national level. The government owns the water and sells it to water providers offering retail services.

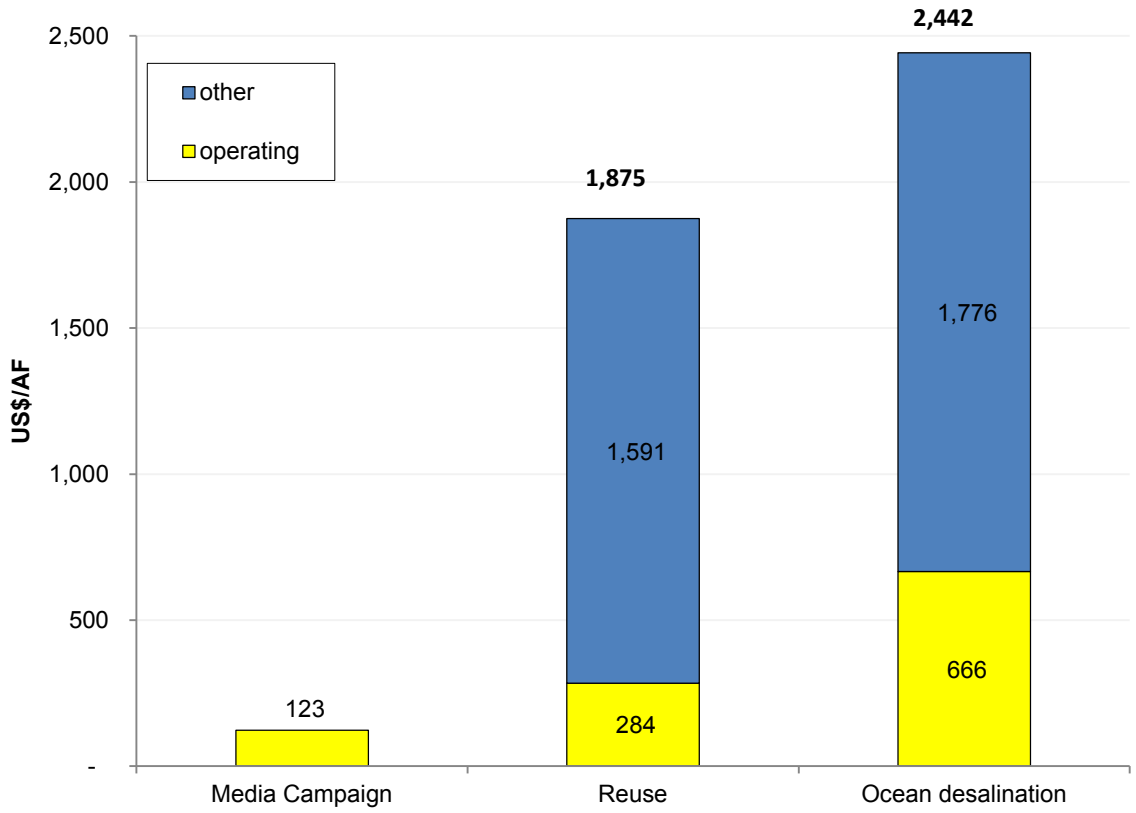
Household water use in Israel is different from that in the Colorado River Basin states, as roughly 35 percent of total household use is consumed by toilet flushing and only about 5 percent by outdoor irrigation; total household use in 2005-2007 averaged about 44 GPCD (total urban use those years, including commercial uses and system losses, was about 72 GPCD). Approximately 84 percent of Israel's domestic wastewater is reclaimed for irrigation in the agricultural sector, supplying about 38 percent of irrigation requirements.

To account for system losses, the state does not charge for 8 percent of the water sold, providing a price signal and incentives to reduce system losses at the provider level. Metering for all water provision in the country is required, enabling detection of system losses; the country is in the process of installing automated meter reading technology. The state also allows providers to reduce water pressure in the pipes to further reduce system losses; such reductions in water pressure are projected to reduce total water use by as much as 5 percent. A multimedia campaign that began in mid-2008, repeating the slogan "Israel is drying up," combined with a roughly 350 percent price increase (a "drought tax") imposed on third-tier water use, decreased M&I water consumption by 18.5 percent and reportedly reduced total urban per capita water consumption by 10 percent just in 2009, to about 65 GPCD. In 2010, the country increased M&I water rates by 40 percent in 1 year because of concerns about rapidly decreasing water storage due to an ongoing drought, promoting water conservation but prompting a public outcry.

The country also implemented a new policy requiring separate meters for each of three classes of vegetation in public gardens and parks and required that the surface area of each vegetation class be reported. One related water conservation program opportunity identified by a local organization is to replace water-intensive plants in municipal parks and gardens with other varieties that have low water needs, potentially saving 20,000 to 50,000 AF per year. Figure C3-1 compares the unit costs of three ongoing water supply and efficiency initiatives in Israel, as reported by the national authority.

For additional information:
- http://www.water.gov.il/Hebrew/Pages/Water-Authority-Info.aspx

FIGURE 3C-1
Total Unit Costs of a Sample of Three Water Supply/Efficiency Initiatives in Israel



Notes:
1. Costs converted from US$/$m^3$ to US$/AF. The cost of effluent conveyance from wastewater treatment facilities to the agricultural sector and nature ("reuse") ($284/AF) is distinguished from the remaining wastewater treatment costs and the costs of conveyance to the treatment facilities from the domestic sector ($1,591/AF).
2. Desalination operating costs ($666/AF) are distinguished from all other costs of desalination (construction and conveyance; $1,776/AF).
3. "Media Campaign," labeled "Demand Management" (FoEME, 2010). reflects total 18-month campaign costs divided by volume of reported savings in 2009 only, though water savings continued at a similar rate in 2010; therefore, these costs were actually lower when amortized over total water savings.
4. Data from FoEME, 2010.

3C.4.2 National Examples

3C.4.2.1 San Antonio Water System: Drought Restrictions and Conservation Programs

The San Antonio Water System (SAWS) is a public utility owned by the City of San Antonio that serves about 1.6 million people in Texas. It was created in May 1992 through the consolidation of its three predecessor agencies: City Water Board; City Wastewater Department; Alamo Water Conservation and Reuse District. Since the formation of SAWS, San Antonio has been recognized nationally for its novel conservation efforts and proactive water management planning. SAWS claims to have the nation's largest direct-use recycled water system, saving energy and conserving up to 75 KAF per year.

Per capita use in the SAWS service area was 143 GPCD in 2011, a historically dry year, down from a high of 225 GPCD in the mid-1980s. The SAWS 2012 water management plan sets a target of 135 GPCD, which would result in a savings of 16.5 thousand acre-feet (KAF) per year by 2020.

SAWS distinguishes between its short-term drought restrictions and its medium- and long-term water conservation programs. In response to the multi-year drought plaguing Texas, the City's Conservation

Ordinance was updated in 2014 to help better align conservation goals with population growth and long-term water supply strategies. In May 2015, SAWS is enforcing Stage II drought restrictions, limiting sprinkler or soaker-hose irrigation to limited hours and only once per week and imposing limitations on washing cars and on filling private pools, among other restrictions. SAWS issues 200 water citations per week for over-watering and other violations of its drought restrictions; it estimates that a citation reduces the consumer's water use by 24 percent. SAWS estimates that its drought restrictions have saved from 3 KAF to 11 KAF, at a cost of $22 per AF to $73 per AF SAWS runs residential and commercial water conservation programs featuring water audits, outreach and training, coupons, and rebates. In 2015, SAWS is offering a turf replacement program: SAWS will provide a $100 or $200 coupon (depending on irrigation) to homeowners for the conversion of 200 square feet of grass per coupon to "patioscapes," or a water saving garden bed. SAWS offers rebates for water-efficient fixtures such as toilets, pool filters, and residential irrigation conversions. SAWS's commercial rebates include compensation for installing water-saving equipment, and irrigation design.

For additional information:
- www.saws.org/conservation

3C.4.2.2 Seattle Public Utilities: Saving Water Partnership Program

The Seattle area has a regional water conservation program known as the Saving Water Partnership that includes 19 water utilities with a total service area population of about 1.17 million. Actual retail water use in the Saving Water Partnership service area fell from a high of 117.8 million gallons per day in 1994 to 92.5 million gallons per day in 2012, a 21 percent decline in total retail water use despite a population increase of more than 15 percent over that period. Per capita use fell from 116 GPCD in 1994 to 79 GPCD in 2012.

Seattle Public Utilities reports that about half of the reduction in water demand in its service area came from changes in rates and codes, about a third from water conservation programs, and the remainder from system operation improvements. The current water conservation program includes the following programs and measures: distribution of efficient showerheads; toilet rebates; educational programs; online weather data, watering index, water budgeting, and irrigation scheduling tools; trainings and classes; and benchmarking. The Saving Water Partnership has worked with larger institutional users such as the University of Washington to reduce water demand by implementing a suite of water conservation projects, as described in the online video at their Website.

For additional information:
- www.savingwater.org

3C.4.2.3 Tampa Bay Water: Reclaimed Water Use

Tampa Bay Water is a wholesale distributor providing water to several member agencies that in turn serve about 2.4 million people in three counties and three cities in the region.

Potable water demand in its service area has fallen by more than 30 KAF per year since the development of the utility's master water plan conservation goals in 1995, primarily due to savings from reclaimed water use. Pasco County Utilities, one of Tampa Bay Water's member agencies, has retrofitted all 11,000+ reclaimed water meters in its service area with automated meter reading technology. The utility is in the process of retrofitting roughly 96,000 potable water meters with automated meter reading, with the goal of increasing water efficiency by improving water usage data collection, enabling the rapid detection of leaks.

Other programs in the Tampa Bay Water service area include sprinkler system evaluations, high-efficiency clothes washer and toilet rebates, distribution of free rain sensors and pre-rinse commercial spray valves, restrictions limiting sprinkler use to twice a week, prohibiting irrigation between 8:00 a.m. and 6:00 p.m., and adding a fifth (punitive) water charge tier with a volumetric rate double that of the fourth tier.

For additional information:
- www.tampabaywater.org

3C.4.2.4 DeKalb County, Georgia: Retrofit on Reconnect

As of June 1, 2008, any residential properties built prior to 1993 in unincorporated DeKalb County, Georgia must have lowflow toilet and plumbing fixtures installed upon resale before the new homeowner can obtain water service from the County.

All low-flow plumbing fixtures must meet the appropriate American National Standards Institute (ANSI) guidelines and new homeowners must submit a certificate of compliance signed by a licensed home

inspector or licensed plumber. Penalties for violating the laws include a warning for the first offense, $250 for the second offense, and $500 for the third offense.

This law went into effect on January 1, 2009 for commercial properties upon resale.

For additional information:

- http://www.dekalbwatershed.com/PDF/low_flow_info.pdf

3C.4.2.5 Florida Moisture Sensors

In 2009, Florida Statutes 373.62(1) was revised to require that soil moisture sensors, evapotranspiration-based controllers or rain sensors be installed on automatic irrigation systems to prevent irrigation during periods of sufficient moisture.

3C.5 References

American Water Works Association Research Foundation (WaterRF), 1999. *Residential End Uses of Water.*

Arizona Department of Water Resources (ADWR), 1994. *Arizona Water Resources Assessment*.

_____, 2010. *Arizona Water Atlas.* September.

_____, 2011. *Annual Progress Report, Modified Non-Per Capita Conservation Program.* October.

Arizona Department of Water Resources (ADWR), 2014 *Arizona's Next Century: A Strategic Vision for Water Supply Sustainability.* January.

_____, 2015. Community Water Systems, System Water Plans, retrieved on May 7, 2015, from www.azwater.gov/AzDWR/StatewidePlanning/drought/CWS.htm.

_____, 2015a. Active Management Area Assessment, retrieved on May 7, 2015, from www.azwater.gov/azdwr/WaterManagement/Assessments.

_____, 2015b. Water Management Plans, retrieved on May 7, 2015 from: http://www.azwater.gov/AzDWR/WaterManagement/AMAs/ManagementPlans.htm.

Arizona Department of Water Resources, Arizona Department of Environmental Compliance and Arizona Corporation Commission (ADWR/ADEP/ACC), 2010. *Blue Ribbon Panel on Water Sustainability, Final Report*. November.

Arizona Water Resources Development Commission (WRDC), 2011. *Final Report.* October.

_____, 2012. *Supplemental Report.* September.

Arizona Water Commission (AWC), 1978. *State Water Plan.*

Blanco, H., Newell, J., Stott, L., Alberti, M., 2012. *Water Supply Scarcity in Southern California: Assessing Water District Level Strategies.* November.

California Department of Water Resources (DWR), 2009. *The Updated Model Water Efficient Landscape Ordinance*. October.

_____, 2010. *20x2020 Water Conservation Plan*. February.

_____, 2013. *California Water Plan Update 2013.*

California Energy Commission (CEC), 2014. *2014 Appliance Efficiency Regulations*. May.

California Urban Water Conservation Council (CUWCC), 2011. *Memorandum of Understanding Regarding Urban Water Conservation in California, as amended.* September.

Colorado Water Conservation Board (CWCB), 2011. Colorado's Water Supply Future, Statewide Water Supply Initiative 2010. January.

_____, 2013. *Draft No and Low Regrets Plan*. August.

_____, 2014. *Colorado Water Plan News and Updates*, Number 2. June.

_____, 2014a. *Draft Colorado Water Plan*. December.

Colorado WaterWise, 2010. *Guidebook of Best Practices for Municipal and Water Conservation in Colorado, Technical Guide.* August.

Eco/Peace/Friends of the Earth Middle East (FoEME), 2010. *An Economic Analysis of Policy Options for Water Conservation in Israel*. July.

Metro Mayors Caucus, 2005. *Memorandum of Understanding*. January.

Metro Mayors Caucus and Colorado WaterWise Council, 2005. *Best Management Practices for Water Conservation and Stewardship.* April.

Nevada Division of Water Planning (NDWR), 1999. *Nevada State Water Plan*. March.

New Mexico Office of the State Engineer (OSE), 2003. *New Mexico State Water Plan*. December.

_____, 2009. *Overview of Water Planning in Western States*. February.

_____, 2013. *Working Toward Solutions: Integrating Our Water and Our Economy, State Water Plan 2013 Review*.

Proctor, J., 2010. *California's Water Efficiency Standards: Ninth Circuit Orders Further Review*.

Southern Nevada Water Authority (SNWA), 2014. *Water Conservation Plan 2014-2018*. May.

Utah Division of Water Resources (DWRe), 2001. *Utah's Water Resources, Planning for the Future*. May.

_____, 2003. *Utah's M&I Water Conservation Plan, Investing in the Future.* July.

Wyoming Water Development Commission (WWDC), 2007. *The Wyoming Framework Water Plan*. October.

_____, 2009. *Technical Memorandum, Green River Basin Plan II, Water Conservation Opportunities*. October.

_____, 2009a. *Water Management and Conservation Assistance Programs Directory*. Fourth edition.

_____, 2014. *Water Management and Conservation Assistance Programs Directory*. Fifth edition.