Texas Leadership Roundtable on Water

October 2014 Recommendations

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Developed by the Supporters of the Texas Leadership Roundtable on Water

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NOTE: This document does not necessarily represent the views of the organizations with which its authors are affiliated. Rather, it represents the best thinking among a very learned and diverse group of water stakeholders. It is the "making of a consensus."

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OVERVIEW – TEXAS LEADERSHIP ROUNDTABLE ON WATER

Texas is at a crossroads in how it manages its water resources. Texans have been engaged for decades in water planning in a variety of ways at the state, regional, and local levels. These efforts have been extensive and valuable in many respects, but basic questions about how we manage our water and to what ends still await answers. A statewide consensus about how to best manage our water resources has not yet been reached.

We are a state of contradictions with regard to water. As Texans, we show great pride in our heritage, our people, our bountiful natural resources, and our increasingly diverse economy, and we generally foresee a bright future for our great state. Water has been a key to our success as a state, and it is critical for our future.

Unfortunately, in many ways Texas is failing to meet the basic definition of sustainable water management: "Management that meets the needs of the present without compromising the ability of future generations to meet their own needs." Specifically:

- In a state where science, technology, and progress are so critical to our collective history and self-image, we are failing to manage our water in a manner that recognizes the most basic science of the water cycle: water is all part of the same system, whether it is found in the ground or on the surface.
- In a state with a heritage of abundant fish and wildlife resources, strong recreational and commercial fishing industries, and other businesses dependent upon these resources, we have failed to adequately provide for the in-stream flows in our rivers and the freshwater inflows to our coastal bays and estuaries that are essential to maintain the health and productivity of those resources.
- In a state where drought is a recurring factor (somewhere in Texas at almost any time), we have resisted, with certain exceptions, aggressive efforts to conserve this most precious resource and have often been slow to make reasonable reductions in non-essential water uses.
- In a state where many Texans prefer limited government, we must recognize that there is an appropriate role for government in addressing serious water challenges at the local, regional, and state levels. Actions by individual property rights holders are important in securing our water for the future but are not the total answer.

The goal of the Texas Leadership Roundtable on Water in convening over many months to examine our state's water issues was to move from a discussion of our water challenges to the development of recommendations and promotion of actions to meet those challenges. We have dared to take on tough water issues, because developing predictable, reliable, and comprehensive solutions to meet our state's water needs is not possible without action. The easy water issues have been addressed. It is time to tackle the tougher water challenges.

The vast majority of Texans supported the passage of Proposition 6 on the statewide ballot in November 2013 to establish a new funding source for projects in the state water plan. Many may now believe that we have "solved" our water problems. While creating a dedicated fund to aid water suppliers in implementing water management strategies in the state water plan is an important step forward, we have not completed our journey to reach a secure water future for Texas. Thorny issues remain about how we:

- manage our surface water and groundwater resources in a realistic and equitable manner;
- protect fish and wildlife habitat and the health and productivity of our streams, bays, and coastal estuaries in the face of demands for more water supplies;
- become more efficient in our water use;
- strike the proper balance between infrastructure and management in meeting water needs;
- price our water resources to reflect their true value;

- make wise choices in allocating water in a changing society; and
- continue to expand our knowledge of water and share that knowledge with all Texans, so that our decisions on water matters are better informed.

This policy paper on Texas water issues discusses some of the key challenges that remain and presents recommendations on how our state may meet those water challenges. This paper reflects a consensus among a number of Texans with expertise in water who come from a diverse cross-section of business, civic, education, political, and non-governmental organization interests. We have not tried in this one paper to address all the significant water issues facing Texas. We look forward to tackling some of those issues in future papers. We hope, however, that this initial policy paper serves as both a catalyst for the development of more effective and comprehensive water policies for Texas and a framework for implementing those policies.

CORE PRINCIPLES AND RECOMMENDATIONS

SURFACE WATER AND GROUNDWATER MANAGEMENT

- **Core Principle: Water planning and management structures should acknowledge interactions between surface water and groundwater.**

  Recommendation: The Texas Legislature should recognize, in law, the physical relationship between surface water and groundwater and develop planning and management approaches that reflect this relationship. Further, the Legislature should commit the state resources necessary to make these approaches effective.

DATA GAPS AND RESEARCH NEEDS

- **Core Principle: A comprehensive knowledge of Texas water resources is needed to ensure well-informed water policy decisions.**

  Recommendation: Public and private institutions in Texas, including the Texas Legislature, should make an ongoing commitment, with greatly enhanced funding levels, to conduct or support research that expands knowledge of the state's water resources and how to best manage those resources.

  Recommendation: Water researchers and research institutions in Texas should establish a state network to help coordinate the investigation and evaluation of critical water topics.

NEW TECHNOLOGIES

- **Core Principle: New water management technologies will be a key part of the comprehensive effort needed to meet the state's water supply challenges.**

  Recommendation: The Texas Legislature should explore using existing funding sources or establishing new funding mechanisms to assist in facilitating and advancing the development, demonstration, and deployment of innovative technologies and strategies for water management solutions.

OPTIMIZING THE TEXAS STATE WATER PLAN

Core Principles:

- **The state needs to plan for all its water needs.**
- **All the state's water resources should be used efficiently and effectively.**
- **Planning is best done with meaningful levels of local, regional, and state participation.**

  Recommendation: Regional water planners and the Texas Water Development Board (TWDB) must implement the prioritization process for water projects in a manner that truly supports and facilitates the most realistic projects, including conservation projects, by emphasizing factors such as viability, feasibility, sustainability, and cost-effectiveness of projects.

  Recommendation: TWDB should set clear expectations for the regional water planning groups to follow when considering the impacts of proposed water management strategies on agricultural and natural resources, actively evaluating and incorporating conservation as the first priority for meeting unmet water needs, and assessing and incorporating the implementation of drought contingency plans into the regional water plans. TWDB should rigorously evaluate the extent to which a regional plan truly addresses these overarching state concerns and make that assessment a significant factor in determining TWDB's approval of that regional plan.

  Recommendation: The Texas Legislature should authorize TWDB to suggest projects and strategies in the regional water plans and the state water plan to meet multi-regional needs more effectively, to address

multi-regional issues such as maintaining environmental flows, and/or to achieve other multi-regional or state goals. TWDB should be directed to work closely with regional planning groups throughout the regional planning process to pursue these possibilities and identify ways in which state financial assistance might be optimized to implement these projects and strategies.

Recommendation: The Texas Legislature should change the frequency of the regional and state water planning process from five years to 10 years and enhance opportunities to use the planning groups and TWDB staff and resources to address critical information needs that will lead to enhanced water plans and policies. The first five years of the planning cycle would be for developing updated plans, and the second five years would be devoted to targeted research designed to improve future plans and future water management.

Recommendation: Funds previously allocated to planning activities should be reallocated in the second half of the 10-year cycle to critical regional research topics.

Recommendation: The Texas Legislature should create a system of staggered terms for regional planning group members and should direct TWDB to set new requirements for publicizing opportunities for participation on the planning groups and for increasing diversity among planning group members. The Legislature should direct TWDB to evaluate the need for representation of additional water stakeholder interests on regional water planning groups and make recommendations to the Legislature accordingly.

ENVIRONMENTAL FLOWS

- **Core Principle: Environmental flows are a critical water need that must be met.**

  Recommendation: The Legislature should ensure that environmental flow needs are incorporated into water planning as a formal category of water use to be planned for and that a variety of proactive measures, consistent with private property rights, are implemented to meet those needs at locations where adequate flows are not otherwise assured.

CONSERVATION AND DROUGHT RESPONSE

- **Core Principle: Water conservation is an ongoing activity and is no longer optional.**

  Recommendation: The Texas Legislature should continue to require that public water utilities and certain surface water rights holders prepare and submit water conservation plans to the appropriate state agencies on a recurring five-year cycle and report on the implementation of those plans annually. The Legislature should provide additional authority and direction to the appropriate state agencies to take a more proactive role in assisting and, when necessary, requiring water utilities and water rights holders to take affirmative action to advance water conservation. The Legislature should also direct the regional water planning groups to ensure that water conservation is truly the first priority in meeting unmet water needs in their respective plans.

- **Core Principle: Reduction of water loss is an integral part of conservation.**

  Recommendation: Building upon action taken by the Texas Legislature in 2013 to enhance requirements for water loss audits and expand funding requirements and options to curb water loss by utilities, TWDB, regional water planning groups, water providers, and surface water rights holders should prioritize reducing water loss when implementing their respective responsibilities.

- **Core Principle: Water pricing mechanisms should promote conservation and be adjusted to produce sufficient revenue for water utilities while further reducing water use in drought years.**

  Recommendation: Retail and wholesale water providers should structure their respective water rates to promote water conservation, provide for long-term financial viability without undercutting conservation efforts, and reduce water use during drought situations.

- **Core Principle: Drought conditions require additional actions to reduce non-essential uses of water to sustain the economy and the environment.**

  Recommendation: The Texas Legislature should continue to require that public water utilities and certain surface water rights holders prepare and submit drought contingency plans to the appropriate state agencies on a recurring five-year cycle and report on the implementation of those plans annually. The Legislature should provide additional authority and direction to the appropriate state agencies to take a more proactive role in assisting and, where necessary, requiring water utilities and water rights holders to take affirmative action to enhance the effectiveness of drought contingency plans. The Legislature should also direct certain retail water suppliers to coordinate the development and implementation of their respective drought plans as appropriate within the same region.

- **Core Principle: The Texas Legislature and state water agencies — through direct funding, technical support, financial assistance, and/or regulatory action, as appropriate — must be proactive in helping retail and wholesale water suppliers and economic sectors achieve their conservation and drought management goals.**

  Recommendation: TWDB and the Texas Commission on Environmental Quality (TCEQ), with input from the state Water Conservation Advisory Council and other relevant entities, should undertake a well-funded, joint study to determine the potential for water conservation and water use efficiency in Texas and the economic impacts of an aggressive effort to achieve that potential, including possibilities for job creation.

  Recommendation: The Texas Legislature should make any necessary changes in state law that would assist the promotion and use of grey water and rainwater harvesting systems in new and existing residential, commercial, and institutional construction.

  Recommendation: TWDB should appropriately define "conservation projects" for state financial assistance that allows a broad range of water use reduction and efficiency measures to be eligible for support. However, such a definition of "conservation" should not be so expansive that it includes water supply activities, such as brackish groundwater desalination, which have merit but do not reduce water use.

  Recommendation: TWDB should assist retail and wholesale water utilities in acquiring and using software and other tools, such as smart meters, or services to better measure water use, the extent of real water losses, the effectiveness of implementing water conservation measures, and the impact of drought contingency measures on reducing water use.

LAND AND WATERSHED STEWARDSHIP

- **Core Principle: The protection of the vast watersheds and aquifer recharge areas in Texas is critical to maintaining the water resources and future well-being of the state.**

  Recommendation: More local governments in Texas should provide funding for purchasing the development rights of private landowners in critical watersheds in their areas in order to maintain the increasingly important hydrologic functions performed by those lands.

  Recommendation: The Texas Legislature should complement local efforts by identifying an ongoing source of funding for the Texas Farm and Ranch Lands Conservation Program to help farmers and ranchers continue their stewardship of those lands and the water sources they support.

EDUCATION AND PUBLIC OUTREACH

- **Core Principle:"The more Texans know about their water resources, the more likely they are to conserve."**

  Recommendation: The Texas Legislature should fully fund the implementation of Water IQ: Know your water, the state water education program, to help Texans understand the sources of their water as well as how and why to conserve and protect these sources. Water IQ should be used as a complement to other effective local and regional water education programs and as a resource for entities without education programs.

Recommendation: TWDB should revise the Water IQ program to incorporate components, such as an online tool, that help individuals and families calculate and understand the volume of water they use in-home and outdoors, how their water use compares to others, and how to reduce their water use based on that information.

Recommendation: State, regional, and local entities implementing Water IQ should use all forms of media, including television, radio, and print advertisements, and social media, to convey Water IQ messages to the public.

Recommendation: Wholesale and retail water suppliers should provide daily updates on local water supply conditions to the news media and through social media.

Recommendation: Where practical, retail water utilities should use new technology, such as automated metering systems, to provide direct feedback to consumers on water usage along with educational materials that are customized based on the lifestyle of the consumer.

Recommendation: TWDB, with the assistance of the Water Conservation Advisory Council, should evaluate water conservation education programs used in Texas to determine which programs appear to be the most cost-effective and the most effective in reducing water use. TWDB should also make that information available to water utilities and the public.

- **Core Principle: Water conservation education efforts could be greatly enhanced via collaborative regional programs and standardized resources.**

  Recommendation: The Texas Legislature and state water agencies should develop a clearinghouse of water conservation education resources for use by Texas communities.

  Recommendation: Each retail water utility in Texas should develop a utility-to-customer website to provide individualized information on customer water usage and cost, billing payment, and conservation programs provided by the utility. This would allow systems to deliver conservation materials and customer feedback in a way that is consistent with research without a substantial cost to the utility.

- **Core Principle: Agricultural water conservation is essential to meeting future water demands, and enhanced education and training is critical to maximizing the potential benefits of agricultural water conservation.**

  Recommendation: The Texas Legislature should provide financial resources that allow the Texas A&M AgriLife Extension Service, in cooperation with groundwater conservation districts and other partners, to enhance efforts that provide agricultural irrigation training programs and demonstration projects in major agricultural irrigation areas of Texas.

- **Core Principle: Responsible urban water management requires an understanding of the total value of water as a resource, the functions that outdoor landscaping serves beyond aesthetics, and the benefits of natural landscapes.**

  Recommendation: State water agencies, regional and local water utilities, and educational organizations should include information in their water education and training programs that helps urban water users understand water from a systems approach. This information would include an understanding of where tap water comes from, where water goes after it leaves the home as wastewater and the yard as runoff, and how landscape choices impact water and affect its functions. Such an initiative might include the establishment of a Texas Water Conservationist program similar to the existing Texas Master Gardeners program.

SURFACE WATER AND GROUNDWATER MANAGEMENT

Core Principle: Water planning and management structures should acknowledge interactions between surface water and groundwater.

Surface water and groundwater resources are often hydrologically connected. Surface water streams may originate from or receive significant contributions from springs, which are discharge points for groundwater aquifers. The impact of Comal and San Marcos Springs — discharge points for the southern portion of the Edwards Aquifer — on base flows in the Guadalupe River system is one example of that type of hydrologic connection. On the other hand, surface water runoff, and sometimes stream flows, may recharge underground aquifers. These hydrologic connections must be acknowledged, understood, and accounted for if water planning and management in Texas are to be truly comprehensive and effective in meeting all our water needs.

Developing and implementing a planning and management approach that adequately accounts for these hydrologic interconnections will be controversial because of, among other things, historically different legal principles governing surface water and groundwater in Texas and, consequently, potential implications for property rights and local control if a more comprehensive approach to dealing with water resources in Texas is pursued. Unquestionably, any approach chosen must acknowledge and carefully address those legal differences and implications. However, failure to confront the relationship between many surface water and groundwater resources in our state is a fatal flaw in our water planning and management approach that we cannot ignore if we are to meet our water challenges effectively in the long term.

We must first recognize, of course, the legal distinctions in how surface water and groundwater are governed in Texas. The State of Texas owns surface water and holds it in trust for all Texans. TCEQ regulates surface water and grants, amends and oversees all water rights permits for it. TCEQ issues water rights permits for various beneficial uses, including agricultural production, municipal supply, industrial use, and mining use. River authorities are also part of the management of surface water in that they contract with entities to allow those entities to use the water permitted by TCEQ to the river authorities in their respective basins. River authorities or municipalities who may hold water rights directly operate most surface water reservoirs in the state. Even federal surface water projects in Texas must obtain state water rights permits from TCEQ. TCEQ is also responsible for in-stream flows and freshwater inflows into coastal bays and estuaries. Texas law has not allowed the issuance of new surface water rights for environmental flows, although existing water rights may be amended to maintain such flows. All or part of a surface water right may be placed temporarily or permanently in the Texas Water Trust, which is currently administered by the TWDB, for maintaining environmental flows. By law, TCEQ has the authority to set aside certain volumes of currently unappropriated surface water for environmental flow purposes, but no such set-asides have been made yet.

In contrast to surface water, groundwater has been declared by state court decision and recognized by state statute to be a landowner's property right, known as ownership in place, although it is subject to reasonable regulation and management. State law has identified groundwater conservation districts (GCDs) as the state's preferred method of groundwater management (Ch. 36.0015). Although groundwater can be regulated by GCDs, a recent Texas Supreme Court ruling (*Day and McDaniel v. Edwards Aquifer Authority and State of Texas*) has cast uncertainty as to when such regulation might result in a property rights taking, requiring compensation to the landowner or reallocation of the right to produce groundwater. GCDs are as diverse and unique as Texas itself. Today there are 98 confirmed GCDs, three unconfirmed GCDs, and two subsidence districts. The confirmed GCDs and subsidence districts operate under varying rules and political objectives.

To complicate the issue, the hydrological boundaries of an aquifer might be regulated by multiple GCDs, which are established based on political jurisdictions, primarily county lines, including a large number of single-county GCDs. State law requires GCDs with jurisdiction over the same aquifer to jointly assess water availability and future groundwater conditions within 16 groundwater management areas and adjust GCD management to achieve desired future conditions for respective aquifers or portions of aquifers. This process is repeated every five years. Although the law establishing the process indicates the need to consider surface water and groundwater relation-

ships in this process, implementing that consideration has varied widely among the planning regions and the GCDs involved.

There is neither a means nor methodology for monitoring or supervising the actions taken by the respective GCDs to ensure either sound science-based decision making or consistency in determinations affecting an individual aquifer. State policy makers need to address and rectify this situation, which may require additional state financial resources, state-backed research, or other forms of assistance to and support for the GCDs.

> Recommendation: The Texas Legislature should recognize, in law, the physical relationship between surface water and groundwater and develop planning and management approaches that reflect this relationship. Further, the Legislature should commit the state resources necessary to make these approaches effective.

DATA GAPS AND RESEARCH NEEDS

Core Principle: A comprehensive knowledge of Texas water resources is needed to ensure well-informed water policy decisions.

Despite the vital importance of an adequate water supply to the future well-being of Texas and Texans, there is inadequate investment in Texas in scientific study and research to expand knowledge of water resources to help understand and address the state's water needs. That puts Texas in the untenable position of making critical decisions about one of the state's most pressing issues without the information needed to ensure well-informed decisions. A comprehensive approach to water management must include mechanisms to support, through some combination of direct financing, incentives, directives to public institutions, data collection, and/or research on the following:

- better quantification of the hydrological connection between specific groundwater and surface water sources;
- data to inform ongoing updates to groundwater and surface water models to ensure that planning and management decisions are based on the most current hydrological and climatic information;
- development and evaluation of new technologies;
- better quantification of interactions between adjacent aquifers, including brackish and fresh portions of aquifers;
- approaches for minimizing water use for landscapes;
- continued refinement of quantification of water needs for environmental flows;
- mechanisms for improved tracking of water use, behavioral factors in water use, and economics and pricing.

Funding for this research will be more efficiently spent and the benefits of the varying expertise of water researchers and research institutions will be optimized if efforts are made to enhance the coordination of the investigation and evaluation of these critical water topics.

Recommendation: Public and private institutions in Texas, including the Texas Legislature, should make an ongoing commitment, with greatly enhanced funding levels, to conduct or support research that expands knowledge of the state's water resources and how to best manage those resources.

Recommendation: Water researchers and research institutions in Texas should establish a state network to help coordinate the investigation and evaluation of critical water topics.

NEW TECHNOLOGIES

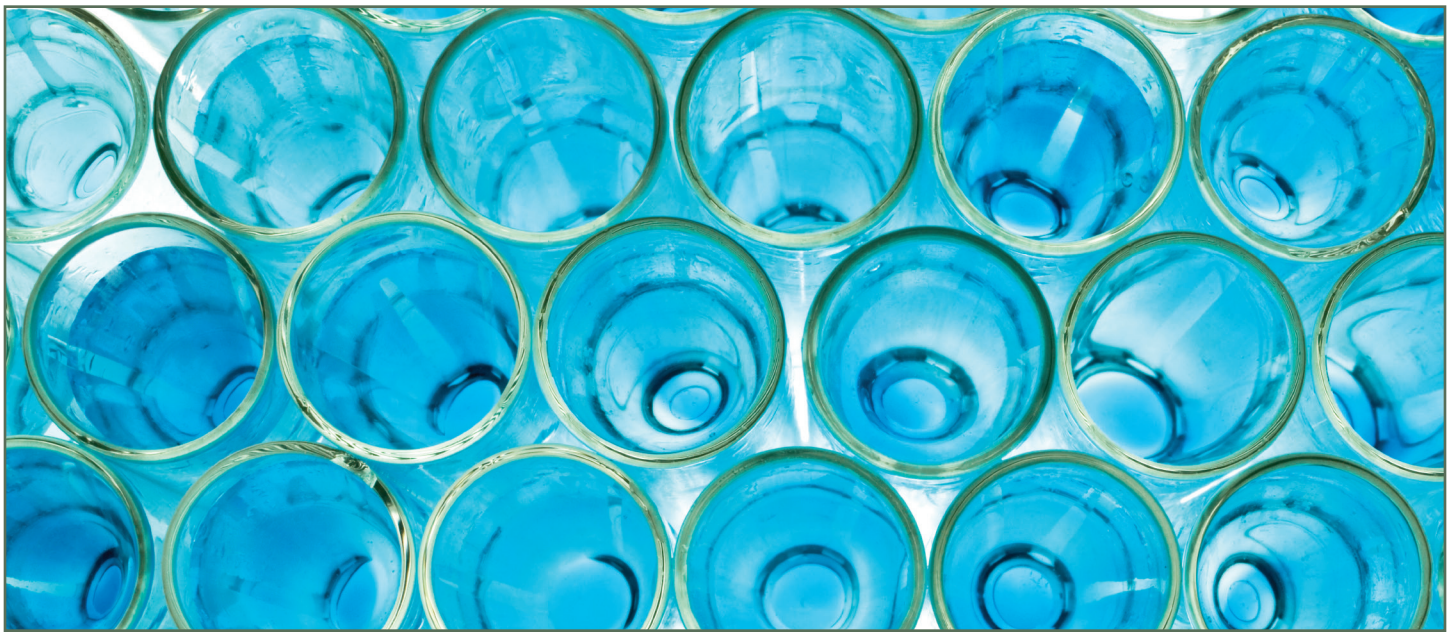
Core Principle: New water management technologies will be a key part of the comprehensive effort needed to meet the state's water supply challenges.

Water utilities in Texas have adopted or are pursuing a number of relatively new water management technologies, but the use of these technologies is not widespread. These technologies include brackish water desalination, seawater desalination, wastewater reuse, treatment and use of previously non-potable water supplies, enhanced storage techniques, such as Aquifer Storage and Recovery, or ASR, advancements in water system monitoring to detect leaks or ruptures, and a host of other techniques and strategies. Water utilities may be reluctant to pursue adoption of these new technologies if others do not extensively use these water management approaches and if initial implementation of the technologies appears prohibitively costly. They may also be concerned that gaining necessary state agency or other approvals for implementing these technologies will be more difficult than pursuing more common water projects.

The state should support the evaluation and initial implementation of new technologies that increase water efficiency or enhance supply. This support can include financial incentives, prioritization in the funding process, public education, and facilitation of regulatory decisions. New programmatic initiatives that reduce water losses or improve efficiency of use, or develop new supplies, such as brackish groundwater and the water produced from or used in oil and gas production, should also be considered. State-supported research activities should be increasingly directed to such innovation and coordinated with this goal in mind. Such funded programs or activities should communicate the results to water managers and policy makers as well as pursue outreach to national organizations that sponsor or communicate the opportunities for deployment of new technologies.

New technologies, such as desalination of seawater and brackish groundwater and recycling of produced water from oil and gas production, that actually increase the supply of available water, must be carefully considered and evaluated. Where appropriate, those technologies should be incorporated into water planning recommendations and implemented, even if initially on a pilot project basis.

> Recommendation**:** The Texas Legislature should explore using existing funding sources or establishing new funding mechanisms to assist in facilitating and advancing the development, demonstration, and deployment of innovative technologies and strategies for water management solutions.



OPTIMIZING THE TEXAS STATE WATER PLAN

Core Principles:

- **The state needs to plan for all its water needs.**
- **All the state's water resources should be used efficiently and effectively.**
- **Planning is best done with meaningful levels of local, regional, and state participation.**

For Texas to meet its long-term water needs and still maintain its high quality of life, it must use its water resources wisely and effectively. This requires sound planning, efficient use of all water supplies, full consideration of environmental health, and the management systems to achieve these goals. Environmental flows, management of surface water and groundwater, water conservation public education, innovative strategies and technologies, and other water management issues are addressed in their own sections elsewhere in this document. Planning and related management impacts are addressed in this section.

Texas has received accolades nationally for its long-term efforts to plan for its water future on a statewide basis, which is far from universal among the 50 states. Within our state, however, there are mixed views about the state water plan and about the regional and state water planning process. Because of current and recent drought conditions in Texas, the water plan and the planning process have gained more focused attention as witnessed in 2013 by state legislative action and a statewide vote on a funding source for projects in the plan. More history and background of the state water plan prior to 2013 is in the appendix.

As the state moves forward in the 21st century in coping with our water issues, it is an appropriate time to re-examine the purpose, scope, and value of the state water plan and the planning process and to assess how to develop a comprehensive and realistic state water plan that will lead to action to meet our water needs.

WATER PLAN ISSUES

Current Texas regional and state water planning has many positive aspects, including the following:

- The planning process has greatly expanded the information available about current water resources in Texas, projected future water demands, and possible strategies for meeting future water needs.
- The process has involved a large number of Texans in many regions and has helped developed a cadre of leaders who are better informed about water issues.
- Regional water planning groups are able to tailor water management strategies to meet the specific attributes of their respective regions.
- The process is iterative and able to incorporate updated information in each new planning cycle and adjust the plans accordingly.

However, different groups or individuals criticized the regional and state water plans and the process itself for a variety of reasons. Notwithstanding the improvements made with the passage of HB 4 and Prop 6 in 2013, many challenging issues remain. There is not necessarily a consensus about the validity of each of these criticisms, but they raise important issues to consider in determining how the plans and the planning process might be improved.

Among the criticisms leveled are the following:

- In the first planning cycles under the SB 1 process, there was no prioritization of water projects or water management strategies proposed in the various regional plans and the state water plan, except perhaps an indication of the decade in which a particular project was needed. In some instances, the plans were viewed as "wish lists" of projects that an interest group or other entity might like to see developed, regardless of whether there was a realistic expectation that such a project would be pursued or come to fruition.

- Without a dedicated funding source for projects or strategies proposed in the water plans, there was little likelihood that certain projects would be developed.
- Although state law required regional planning groups to consider water conservation first in meeting the "unmet" water needs of any water user group and although one-fourth of the water needs in the current state water plan are to be met through conservation, many of the regional water plans underestimated the ability of conservation to address water needs. The plans instead emphasized recommending new water infrastructure.
- Water demands in some of the plans have been over-projected, given trends such as decreasing per capita water use in Texas.
- Most regional plans did not identify environmental water needs — stream flows to meet fish and wildlife and other needs and freshwater inflows to maintain productivity of coastal bays and estuaries, and the plans did not recommend any strategies to meet those needs.
- Most plans gave inadequate attention to the impacts of proposed water management strategies on agricultural and natural resources.
- The plans are predicated on the assumption that all normal activities that historically demand water should be provided that water even during a drought as severe as the drought of record, even though different water user groups would be expected to implement drought contingency plans in such periods.
- The state water plan is essentially a compilation of all 16 regional plans and, as such, may not adequately incorporate and address statewide concerns and overarching water issues that require a state-level perspective.
- The five-year recurring planning cycle is not necessarily the most efficient and effective way of evaluating and addressing water needs and issues.
- Following TWDB's initial selection of the members of the regional water planning groups, the planning groups have been responsible for replacing vacancies and reappointing or filling the positions of members whose terms have expired. This approach may have the tendency to limit the prospects for fresh ideas and alternative approaches to be considered and incorporated into regional plans.

In 2013 the Texas Legislature took action and the voters of Texas gave overwhelming approval to address some of these criticisms. The cumulative effect of three pieces of legislation passed by large majorities in both houses of the Texas Legislature — HB 4, HB 1035, and SJR 1 (the SJR being the proposed state constitutional amendment approved by 73% of Texas voters as Proposition 6 on the November 2013 statewide ballot) — was to establish requirements for prioritizing projects in the regional and state water plans and to create a funding mechanism specifically for providing state financial assistance to projects in the state water plan. The Legislature identified certain criteria that regional water planning groups must use at a minimum in prioritizing projects at the regional level and that TWDB must use in prioritizing at the state level. In addition the Legislature set as a floor, not a ceiling, that at least 20% of the funds from the new funding mechanism should be used for conservation or reuse projects and at least 10% should be for rural projects, which could include agricultural water conservation.

If properly implemented, these recent legislative actions should enhance the prospects for the regional and state water plans to propose water projects and strategies that are realistic and are more likely to be pursued. However, implementation is key to making sure that projects and strategies in the regional and state water plans will be taken seriously by water utility decision-makers, elected officials, and the public and that those projects and strategies will be eligible for state financial assistance where needed and be a priority for such funding if appropriate. If regional water planners and TWDB truly prioritize projects in their water plans on the basis of the criteria set by the Legislature — factors such as the viability, feasibility, sustainability, and cost-effectiveness of a project, as examples — then there is a much better chance that the regional and state water plans will lead to action and implementation and not just take up space on a shelf or on some electronic storage device.

Recommendation: Regional water planners and TWDB must implement the prioritization process for water projects in a manner that truly supports and facilitates the most realistic projects, including conservation projects, by emphasizing factors such as viability, feasibility, sustainability, and cost-effectiveness of projects.

The current water planning process is exclusively regionally based. Although this regional focus has great value, there would also be value in complementing that regional focus with ways to consider and incorporate broader state interests that may transcend regional interests, potential alternative water solutions that benefit many parts of the state, or address multiple state water goals. At present, there is not an effective mechanism for ensuring that those broader public and statewide interests are adequately considered in the state water plan, or that larger-scale or more innovative water projects or strategies that might serve multiple regions and/or address multiple water needs are assessed.

In addition, as noted above, concerns have been raised about whether some regional plans have sufficiently assessed the impacts of proposed water management strategies on, for example, agricultural and natural resources, which is a statutory requirement, especially where a water project to meet one region's needs may be located in another region and the impacts of that project may occur primarily in the other region. These impacts could have implications for state policies and goals in such areas as agricultural production and natural resource protection, as well as affecting another region's interests. TWDB is in an important position to assist in balancing the interests of the regions and the state in this regard through its actions in the planning process.

Ways of ensuring that cross-regional issues are effectively aired and addressed, opportunities for water solutions are expanded, and broader state interests are factored into water decisions with implications beyond a single region should be pursued with close interaction with regional groups.

Recommendation: TWDB should set clear expectations for the regional water planning groups to follow when considering the impacts of proposed water management strategies on agricultural and natural resources, actively evaluating and incorporating conservation as the first priority for meeting unmet water needs, and assessing and incorporating the implementation of drought contingency plans into the regional water plans. TWDB should rigorously evaluate the extent to which a regional plan truly addresses these overarching state concerns and make that assessment a significant factor in determining TWDB's approval of that regional plan.

Recommendation: The Legislature should authorize TWDB to suggest projects and strategies in the regional water plans and the state water plan to meet multi-regional needs more effectively, to address multi-regional issues such as maintaining environmental flows, and/or to achieve other multi-regional or state goals. TWDB should be directed to work closely with regional planning groups throughout the regional planning process to pursue these possibilities and identify ways in which state financial assistance might be optimized to implement these projects and strategies.

The current planning model of repeating five-year cycles for the regional and state water plan may have exhausted its benefits. A 10-year planning cycle initiated upon the availability of the data from each decennial census and results in a completed state water plan within five years could then incorporate a subsequent five-year period of research and analysis of water topics. The opportunity to amend the regional and state water plans to reflect new information and strategies should be included throughout the 10-year cycle as under current law in the five-year planning cycles.

In the latter half of this 10-year planning cycle, the funds otherwise expended for yet another iteration of a five-year plan might instead be expended, under the planning group's direction, on targeted research and analysis on key water issues, such as the following:

- addressing critical knowledge gaps about groundwater resources through targeted monitoring;
- improving groundwater models to better reflect groundwater and surface water connections;
- assessing measures to help meet environmental flow needs;
- updating surface water hydrology data;
- evaluating water conservation potential; and
- determining any impediments to implementing water management strategies in the regional and state water plans.

The information gained from such targeted research and analysis would then be available to support both future planning and implementation efforts.

Recommendation: The Texas Legislature should change the frequency of the regional and state water planning process from five years to 10 years and enhance opportunities to use the planning groups and TWDB staff and resources to address critical information needs that will lead to enhanced water plans and policies. The first five years of the planning cycle would be for developing updated plans, and the second five years would be devoted to targeted research designed to improve future plans and future water management.

Recommendation: Funds previously allocated to planning activities should be reallocated to critical regional research topics in the second half of the 10-year cycle.

While revisiting the timing of the plan's revision process and the range of activities conducted during a planning cycle, it would also be an appropriate time to consider the composition and selection of regional water planning groups. Currently there is no mechanism under law to alter the membership of the planning groups unless the regions are re-drawn, a planning group member resigns, or the planning group itself decides to make changes. There are no term limits on planning group members. Although this system supports continuity in the process, which has many positive benefits, such as building expertise among planning group members, it tends to limit access to new perspectives, people, and ideas. In addition, it may be appropriate after 17 years of this planning process to consider whether certain interests who are clearly water stakeholders but not currently represented on the regional planning groups need to be added to the roster of represented interests.

Recommendation: The Texas Legislature should create a system of staggered terms for regional planning group members and should direct TWDB to set new requirements for publicizing opportunities for participation on the planning groups and for increasing diversity among planning group members. The Legislature should direct TWDB to evaluate the need for representation of additional water stakeholder interests on regional water planning groups and make recommendations to the Legislature accordingly.

ENVIRONMENTAL FLOWS

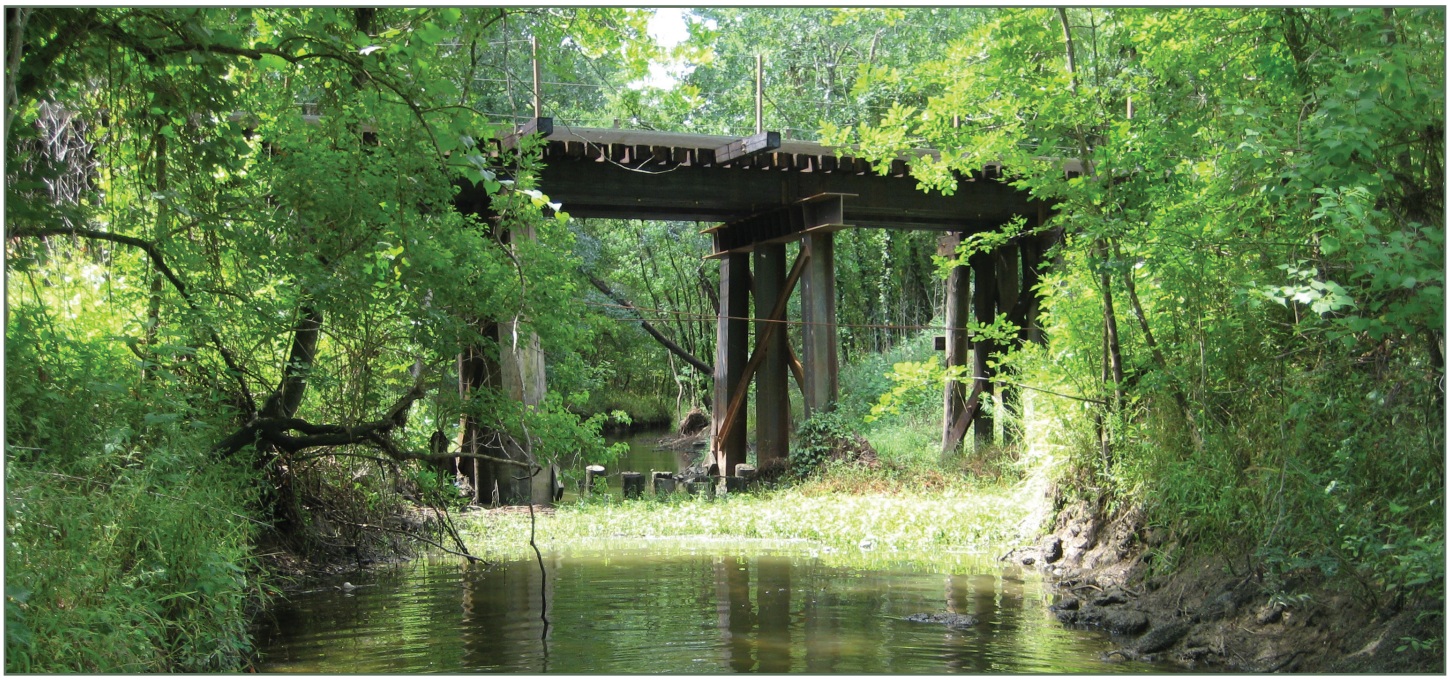
Core Principle: Environmental flows are a critical water need that must be met.

Healthy and productive rivers, bays, and coastal estuaries are a critical component of the natural heritage of all Texans and support billions of dollars of economic activity annually. Maintaining adequate flows in our rivers and into our bays and estuaries is essential to protecting that heritage and supporting the seafood industry, recreational hunting and fishing activities, and nature tourism activities important to rural and coastal economies. Environmental flow needs in Texas were not considered on a routine basis in water rights permitting until 1985. Because the vast majority of water rights were issued prior to that time, most existing water rights, and the ones with the highest priority for water use, are not subject to environmental flow conditions.

Given that legacy, simply placing environmental flow protections in new water rights, although an essential step, is not an adequate mechanism for meeting environmental flow needs in many locations. As a result, these important components of our natural heritage and economy are at serious risk without a concerted effort to address the challenge. In addition, the failure to address these issues proactively will only heighten significant uncertainties for new water projects that must obtain federal approvals or seek federal funding and, perhaps, even for existing projects.

Currently, environmental flow needs are not formally acknowledged as an actual category of water need to be planned for and met. That oversight must be remedied. To be sustainable and predictable, water planning and management processes must incorporate environmental flow needs — reasonable levels of flows to maintain healthy and productive rivers and bays and estuaries — as a formal category of water use. In many cases, especially for bays and estuary inflows, proactive measures are required to maintain or restore adequate environmental flows. Creative solutions must be evaluated and pursued, including some combination of the following: dedicating return flows, acquiring existing water rights through donation or purchase and conversion to flow protection, providing incentives for water conservation measures with a portion of conserved water dedicated to environmental flow protection, improving land stewardship practices that provide flow benefits, and altering reservoir operating plans. A combination of federal, state, local, and private funding and incentives are needed to help advance the implementation of identified solutions.

> Recommendation: The Legislature should ensure that environmental flow needs are incorporated into water planning as a formal category of water use to be planned for and that a variety of proactive measures, consistent with private property rights, are implemented to meet those needs at locations where adequate flows are not otherwise assured.



CONSERVATION AND DROUGHT RESPONSE

Core Principles:

- **Water conservation is an ongoing activity and is no longer optional.**
- **Reduction of water loss is an integral part of conservation.**
- **Water pricing mechanisms should promote conservation and be adjusted in drought periods to provide sufficient revenue for water utilities while further reducing water use.**
- **Drought conditions require additional actions to reduce non-essential uses of water to sustain the economy and the environment.**
- **The Texas Legislature and state water agencies — through direct funding, technical support, financial assistance, and/or regulatory action, as appropriate — must be proactive in helping retail and wholesale water suppliers and economic sectors achieve their conservation and drought management goals.**

There is good news and bad news regarding water conservation efforts in Texas. Ironically, in some respects the good news and the bad news are the same news. For example, Texas has been ranked by the National Alliance for Water Efficiency as one of the top two states in the country (California being the other) in terms of state-level laws and policies related to water efficiency and conservation. Unfortunately, in part, that may be a reflection of how little most other states have done in promoting efficient use of water. In fact, our state initiatives have not achieved the maximum potential for water conservation statewide.

With the exception of requirements for water-conserving fixtures, water loss audits, and submittal of water conservation and drought contingency plans as well as the annual reports of the implemented plans, efforts by the State of Texas to achieve more efficient use of water have traditionally relied upon the voluntary decisions and actions of water utilities and water rights holders. This voluntary approach has created highly variable water conservation efforts around the state. Certain entities, including the San Antonio Water System and El Paso Water Utilities, have been models for water conservation action and have dramatically reduced per capita water consumption in their service areas, and some water providers in North Texas have notably expanded their water conservation activities in recent years.

But other entities, including some of the largest wholesale and retail water providers in the state, have had, at best, minimal water conservation programs. Some suburban areas especially have extremely high per capita water use, particularly from water used for outdoor landscaping in the hottest months of the year. While it is true that overall per capita water use in Texas has been decreasing, it remains fairly high compared to what some water utilities in the state have achieved.

Given the challenging situation that Texas has found itself in as a result of drought and population expansion in recent years and given future projections, it would seem prudent for the Texas Legislature and state agencies to take a more proactive role in facilitating, supporting, and, where necessary, directing water utilities and certain water rights holders to take action to advance water conservation to meet our state's water needs. Our focus here is primarily on what is termed municipal water conservation, or water used by individuals, businesses, and industries that is provided by a retail or wholesale water provider rather than from their own wells, river diversions, or lakes, because to some extent it is the "low-hanging fruit." Other more specialized actions are needed in the area of agricultural water conservation, although there has been much progress in that arena in recent years, and industrial water conservation. Later policy papers may tackle those issues. Some of the following recommendations, however, might impact agricultural and industrial surface water rights holders of sufficient water volume to require them to submit water conservation and/or drought contingency plans to appropriate state agencies.

Core Principle: Water conservation is an ongoing activity and is no longer optional.

> Recommendation: The Texas Legislature should continue to require that public water utilities and certain surface water rights holders prepare and submit water conservation plans to the appropriate state agencies

on a recurring five-year cycle and report on the implementation of those plans annually. The Legislature should provide additional authority and direction to the appropriate state agencies to take a more proactive role in assisting and, when necessary, requiring water utilities and water rights holders to take affirmative action to advance water conservation. The Legislature should also direct the regional water planning groups to ensure that water conservation is truly the first priority in meeting unmet water needs in their respective plans.

- Each retail and wholesale provider of water in Texas and each surface water rights holder allocated a significant volume of water for municipal or agricultural purposes should prepare and implement a five-year water conservation plan and submit such a plan to the appropriate state agency for substantive review and feedback. Each water entity should incorporate in its water conservation plan, to the extent practicable and appropriate to its size and circumstances, the best management practices for water conservation prepared by the state Water Conservation Advisory Council in conjunction with TWDB.

- Each entity required to prepare and submit a water conservation plan should file an annual implementation report with the appropriate state agency, describing progress toward meeting its water savings and water loss reduction goals and identifying any issues or problems in meeting those goals. The respective state agency to which an implementation report is submitted should make recommendations for further conservation actions to those entities who are not meeting their goals.

- Each entity required to submit a water conservation plan should revise its plan and submit the revised plan to the appropriate state agency every five years. If an entity has not met its water savings and water loss reduction goals at the end of a five-year cycle, then that entity's revised conservation plan should be submitted to the appropriate state agency for approval, not just review and feedback. The respective state agency should recommend additional cost-effective conservation measures or other changes in the revised plan before the agency approves the plan.

- The Texas Legislature should establish a system of incentives to reward those water entities that consistently and significantly exceed their water savings and water loss reduction goals.

- The Texas Legislature should make changes to the Texas Water Code to deny new state financial assistance for water projects to a water entity that consistently and significantly fails to take action to meet its water savings and water loss reduction goals, unless such funding is necessary to help an entity achieve those goals and provisions are incorporated to assure that the entity will make a good faith effort to attain those goals.

- Regional and state water plans should include water conservation with quantifiable targets for water savings as at least one of the water management strategies — and the first such strategy to be implemented — for each of the water user groups with an identified water need.

Core Principle: Reduction of water loss is an integral part of conservation.

Recommendation: Building upon action taken by the Texas Legislature in 2013 to enhance requirements for water loss audits and expand funding requirements and options to curb water loss by utilities, TWDB, regional water planning groups, water providers, and surface water rights holders should prioritize reducing water loss when implementing their respective responsibilities.

- TWDB, in conjunction with the state Water Conservation Advisory Council, should set a target ceiling for "real water losses" by categories of retail and wholesale water providers and certain surface water rights holders, as appropriate to the size and circumstances of those entities.

- Water conservation plans required by water providers and surface water rights holders should include steps and milestones to achieve the target ceiling for real water losses set by TWDB for the relevant type of water entity.

- TWDB should establish a system for validation of water loss audits conducted by water providers and should be empowered to require an independent water loss audit of a water provider if TWDB has reason to question the validity of the audit conducted by that water provider.

- Regional water planning groups and TWDB should give high priority to infrastructure projects to reduce real water losses in the regional and state water plans and in decisions regarding provision of state financial assistance.

Core Principle: Water pricing mechanisms should promote conservation and be adjusted to produce sufficient revenue for water utilities while further reducing water use in drought years.

Recommendation: Retail and wholesale water providers should structure their respective water rates to promote water conservation, provide for long-term financial viability without undercutting conservation efforts, and reduce water use during drought situations.

- Retail and wholesale water providers should structure their respective water rates to provide incentives for minimizing water use, including establishment of a reasonable base rate for minimal water use and an inverted block rate with sufficient tiers and increased per unit charges at different tiers to affect consumer behavior.
- Retail and wholesale water providers should explore and adopt appropriate water rate structures that allow them to raise necessary revenues fairly, based on capacity and service level rather than water consumption alone, thus encouraging reductions in both peak demand and volume of water used.
- Retail and wholesale water suppliers should include in their water conservation plans a description of how their respective water rate structures promote conservation and efficiency and should include in their annual implementation reports information about the effectiveness of their rate structures in minimizing water use.
- Retail and wholesale water suppliers who are required to submit drought contingency plans to the state should be required to include in their water rate structures a drought period "surcharge" for water use by customers that would be graduated based on the respective drought contingency plan stage and on the volume of water used.

Core Principle: Drought conditions require additional actions to reduce non-essential uses of water to sustain the economy and the environment.

Recommendation: The Texas Legislature should continue to require that public water utilities and certain surface water rights holders prepare and submit drought contingency plans to the appropriate state agencies on a recurring five-year cycle and report on the implementation of those plans annually. The Legislature should provide additional authority and direction to the appropriate state agencies to take a more proactive role in assisting and, where necessary, requiring water utilities and water rights holders to take affirmative action to enhance the effectiveness of drought contingency plans. The Legislature should also direct certain retail water suppliers to coordinate the development and implementation of their respective drought contingency plans as appropriate within the same region.

- Each retail and wholesale provider of water in Texas and each surface water rights holder allocated a significant volume of water for municipal or agricultural purposes should prepare and implement a drought contingency plan and submit such a plan to the appropriate state agency for substantive review and feedback. Each entity should provide annual reports on the implementation of the drought contingency plan to the respective state agency, including information about any problems or issues in implementing stages of the plan during a drought period.
- TWDB should be directed to develop and provide guidance, periodically, to water suppliers on the components of effective drought contingency plans, including incorporating meteorological conditions or factors in determining drought stage triggers and requirements.
- Each entity required to submit a drought contingency plan to a state agency should revise its drought contingency plan every five years and submit its revised plan to the respective agency. Retail water suppliers who use the same water supply source and/or operate in the same geographic area should be required to coordinate the development and implementation of their respective drought contingency plans and include that information in their annual drought plan implementation reports.

Core Principle: The Texas Legislature and state water agencies — through direct funding, technical support, financial assistance, and/or regulatory action, as appropriate — must be proactive in helping retail and wholesale water suppliers and economic sectors achieve their conservation and drought management goals.

Recommendation: TWDB and TCEQ, with input from the state Water Conservation Advisory Council and other relevant entities, should undertake a well-funded, joint study to determine the potential for water conservation and water use efficiency in Texas and the economic impacts of an aggressive effort to achieve that potential, including possibilities for job creation.

Recommendation: The Texas Legislature should make any necessary changes in state law that would assist the promotion and use of grey water and rainwater harvesting systems in new and existing residential, commercial, and institutional construction.

Recommendation: TWDB should appropriately define "conservation projects" for state financial assistance that allows a broad range of water use reduction and efficiency measures to be eligible for support. However, such a definition of "conservation" should not be so expansive that it includes water supply activities, such as brackish groundwater desalination, which have merit but do not reduce water use.

Recommendation: TWDB should assist retail and wholesale water utilities in acquiring and using software and other tools, such as smart meters, or services to better measure water use, the extent of real water losses, the effectiveness of implementing water conservation measures, and the impact of drought contingency measures on reducing water use.

LAND AND WATERSHED STEWARDSHIP

Core Principle: The protection of the vast watersheds and aquifer recharge areas in Texas is critical to maintaining the water resources and future well-being of the state.

Rural land and natural landscapes are the areas where the first raindrops fall and replenish our rivers, streams, and underground water resources. In Texas the vast majority of these areas are on private property. Unlike most of the other Western states, more than 90% of Texas land area is held by private citizens. These landowners have traditionally been good stewards of their lands, and all Texans are the beneficiaries of their stewardship.

However, Texas is losing rural and agricultural land faster than any other state. Between the years 1997 and 2007 alone, the state lost more than 2 million acres of valuable open space, wildlife habitat, watersheds, and recharge areas to other uses. One of the biggest *terrestrial* environmental problems facing Texas is the fragmentation of land, which stems in large measure from the continued breakup of family lands across the state. As land passes from one generation to another generation, as property taxes increase, and as agricultural income declines, there is an ongoing exit from the countryside, which not only erodes the rich culture of private land stewardship in Texas but also the ability to manage those lands to provide sufficient water for future generations of Texans.

Proven methods exist to address this issue. An example is an initiative of the city of New York to protect its water supply by purchasing the development rights of landowners in key watersheds in the Catskills and Adirondacks. In Texas, citizens in Bexar, Hays, and Travis counties have issued hundreds of millions of dollars in bonds to do exactly the same thing. Purchasing development rights enables families to stay on their lands and continue to manage them wisely. At the same time, this practice assures that the lands will remain in a state capable of providing food, fiber, wildlife habitat, carbon sequestration, and, most of all, watershed protection for the rest of us.

Across the state, many landowners have begun donating their development rights through what are known as conservation easements in exchange for substantial Federal income tax benefits, but, unfortunately, most Texas farm and ranch families are simply not in the financial position to do so.

Regrettably, the State of Texas is currently doing relatively little to prevent the ongoing loss of both the state's heritage and valuable natural resources. One promising mechanism for addressing this issue is the Texas Farm and Ranch Lands Conservation Program at the General Land Office. The Texas Legislature authorized this program in 2005 to facilitate acquisition of development rights on agricultural lands. However, the potential of this program has been blunted by the lack of a specific, ongoing funding source.

> Recommendation: More local governments in Texas should provide funding for purchasing the development rights of private landowners in critical watersheds in their areas in order to maintain the increasingly important hydrologic functions performed by those lands.
>
> Recommendation: The Texas Legislature should complement local efforts by identifying an ongoing source of funding for the Texas Farm and Ranch Lands Conservation Program to help farmers and ranchers continue their stewardship of those lands and the water sources they support.

EDUCATION AND PUBLIC OUTREACH

Core Principle: "The more Texans know about their water resources, the more likely they are to conserve."

Research conducted by EnviroMedia Inc. in 2004 found that only 28% of Texans say they "definitely know" the natural source of their drinking water, but that 87% of Texans were more likely to conserve water after learning more about water conservation and hearing ideas about ways to save water. This study and others provide compelling evidence that Texans generally do not know the source of their drinking water but that if they did and were provided appropriate tools and tips, they would readily conserve water.

The challenge is how best to reach 26 million Texans and provide them with the information and tools needed to effectively change water usage and conserve water.

The state water education program, Water IQ: Know your water, was developed in 2004 in response to the market research by EnviroMedia. This program was designed to improve water knowledge and conservation. Unfortunately, this campaign has never been fully implemented due to lack of funding.

Water IQ and other outreach and education programs are needed to ensure needed water supplies for future generations of Texans.

Recommendation: The Texas Legislature should fully fund the implementation of Water IQ: Know your water, the state water education program, to help Texans understand the sources of their water as well as how and why to conserve and protect these sources. Water IQ should be used as a complement to other effective local and regional water education programs and as a resource for entities without education programs.

Recommendation: TWDB should revise the Water IQ program to incorporate components, such as an online tool, to help individuals and families calculate and understand the volume of water they use in-home and outdoors, how their water use compares to others, and how to reduce their water use based on that information.

Recommendation: State, regional, and local entities implementing Water IQ should use all forms of media, including television, radio, and print advertisements, and social media, to convey Water IQ messages to the public .

Recommendation: Wholesale and retail water suppliers should provide daily updates on local water supply conditions to the news media and through social media.

Recommendation: Where practical, retail water utilities should use new technology, such as automated metering systems, to provide direct feedback to consumers on water usage along with educational materials that are customized based on the lifestyle of the consumer.

Recommendation: TWDB, with the assistance of the Water Conservation Advisory Council, should evaluate water conservation education programs used in Texas to determine which programs appear to be the most cost-effective and the most effective in reducing water use. TWDB should also make that information available to water utilities and the public.

Core Principle: Water conservation education efforts could be greatly enhanced via collaborative regional programs and standardized resources.

Recommendation: The Texas Legislature and state water agencies should develop a clearinghouse of conservation education resources for use by communities throughout Texas.

Recommendation: Each retail water utility in Texas should develop a utility-to-customer website to provide individualized information on customer water usage and cost, billing payment, and conservation programs provided by the utility. This would allow systems to deliver conservation materials and customer feedback in a way that is consistent with research without a substantial cost to the utility.

Core Principle: Agricultural water conservation is essential to meeting future water demands, and enhanced education and training is critical to maximizing the potential benefits of agricultural water conservation.

Fifty-eight percent of water usage in the state currently is for agricultural irrigation. Further, agricultural irrigation water conservation is a significant component of the state water plan, expected to provide 1.5 million acre-feet of water annually by 2060. Only development of other new surface water resources is expected to provide more water. To meet conservation goals in the state, enhancement of agricultural irrigation conservation must be a top priority, and expanded education and training of agricultural producers on conservation is critical.

For example, an Agricultural Irrigation Training Program could develop and deliver region-specific resources to agricultural producers in major irrigation areas of Texas. Major program components would include economics, irrigation scheduling, irrigation technologies and best management practices, water quality issues, and crop specific guidelines in priority irrigation areas.

Enhanced demonstration projects would allow agricultural producers to observe the effectiveness of new technologies and promote the adoption of practices that best utilize existing moisture to reduce needed irrigation. Agricultural radio programs and Texas A&M AgriLife Extension Service newsletters could further promote water conservation.

> Recommendation: The Texas Legislature should provide financial resources to allow the Texas A&M AgriLife Extension Service, in cooperation with groundwater conservation districts and other partners, to enhance efforts that provide agricultural irrigation training programs and demonstration projects in major agricultural irrigation areas of the state.

Core Principle: Responsible urban water management requires an understanding of the total value of water as a resource, the functions that outdoor landscaping serves beyond aesthetics, and the benefits of natural landscapes.

Enhanced and expanded education and training of residential and other water users on the hydrologic cycle, appropriate water requirements for different types of lawns and other outdoor landscapes, irrigation system maintenance, agronomic requirements, water reuse, rain gardens, and rainwater harvesting would aid efforts to address a major component of urban water use in Texas. Such education and training would be would be beneficial for not only water users but also homeowners associations, land developers, city planners, and appropriate city staff. One possibility would be the development of a Texas Water Conservationist program that is similar to Texas Master Gardeners program to foster the use of volunteers by training the trainer.

> Recommendation: State water agencies, regional and local water utilities, and educational organizations should include information in their water education and training programs that helps urban water users understand water from a systems approach. This information would include an understanding of where tap water comes from, where water goes after it leaves the home as wastewater and the yard as runoff, and how landscape choices impact water and affect its functions. Such an initiative might include the establishment of a Texas Water Conservationist program similar to the existing Texas Master Gardeners program.

APPENDIX

A. History and Explanation of State Water Plan

B. Question for Western States Water Council states, November, 2013

C. Endorsers of the Recommendations

D. United States Geological Survey —*The Water Cycle*

APPENDIX A: HISTORY AND EXPLANATION OF STATE WATER PLAN

Although the development of state water plans for Texas began in the 1960s, the current process for regional and state water planning in Texas was established in 1997 with the passage of Senate Bill 1. At that time water planning in Texas became a bottom-up process, starting at the regional level with 16 regional water planning groups, one for each of the designated water planning regions in the state. Each planning group consists of about 20 or more members, who represent at least 12 interests, as required by Texas statute, including Agriculture, Industry, Public, Environment, Municipalities, Business, Water Districts, River Authorities, Water Utilities, Counties, Power Generation, and Groundwater Conservation Districts.

The planning cycle is every five years, and each regional plan assesses and makes recommendations to meet water needs over the next 50 years. Planning groups evaluate population projections, water demand projections, and existing water supplies that would be available during times of drought. Planning groups identify water user groups that are projected to have water demands in excess of available water supplies during the recurrence of a drought as severe as the Texas "drought of record" of the 1950s. For water user groups in that category, the planning groups recommend water management strategies that could be implemented to fill the gap between demands and supplies, and estimates of the costs of these strategies are provided. (In effect, the regional water plans are really compilations of hundreds of strategies designed to meet community needs across the state.) While carrying out these tasks, planning groups assess risks and uncertainties in the planning process and, to varying degrees, evaluate potential impacts of water management strategies on the state's water, agricultural, and natural resources.

Once the planning groups adopt their regional water plans, the plans are sent to the Texas Water Development Board (TWDB) — the state's water supply planning and financing agency — for approval. Approval is limited to consideration of whether a regional plan follows the requirements of the state Water Code and TWDB's rules, and whether that regional plan conflicts with any other regional plan. TWDB then compiles the state water plan, with information from the regional water plans and policy recommendations to the Texas Legislature. Each step of the process is open to the public and provides numerous opportunities for public input. Texas is now in the middle of the fourth five-year planning cycle under the process adopted in 1997.

APPENDIX B: QUESTION FOR WESTERN STATES WATER COUNCIL MEMBER STATES

Emailed to 16 States in November 2013

I am a member of a stakeholder group in Texas that is evaluating state water policy and attempting to make long-term recommendations to the State Legislature. One of the issues being discussed is how to implement the Texas State Water Plan. Currently, the State of Texas sponsors and has ownership in only a handful of projects. Almost all of water projects are sponsored, owned, funded, and operated by regional or local water authorities. Therefore, how does the state enforce implementation of a project if that project is sponsored and owned by a regional or local water authority? Does the state have to have ownership in a project to force implementation?

To help answer the above questions, I am trying to prepare for a list of projects that are sponsored and owned by your respective states. I can think of only one—the California State Water Project.

Please send me a list of projects in your state that fit the following categories:

State	100% Ownership
State/Federal	Joint Ownership
State/Regional or Local Water Authority	Joint Ownership

Thank you in advance for your help.

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RESPONSES FROM RESPECTIVE STATES (As of December 7, 2013)

Arizona

No response to date

California

Jeanine Jones, California Department of Water Resources, Jeanine.jones@water.ca.gov

We own a major water supply project—our State Water Project. We also own and operate the state's largest flood control project—the Sacramento River flood control project.

Colorado

Tom Browning, Colorado Division of Water Resources, tom.browning@state.co.us

There are plenty of projects in Colorado with State funding or involvement, but the question was about facility ownership so we focused on that. Projects in Colorado that fit within your three broad categories are:

1) **100% State-owned water projects**: Numerous agency-owned water projects to supply specific needs related to the agency (e.g. state wildlife areas, parks, etc). These would not fall into the category of State-owned water supply projects for traditional M&I and private agricultural uses.

2) **State and federal jointly owned water supply projects**: Technically none, but the Animas La Plata project (ALP) is an example where the facility is owned by the feds but there are state water contracts in the reservoir. Chatfield Reservoir could also be a similar example as future project.

3) **State and local/regional jointly owned water supply projects**: Technically none, but Elkhead Reservoir,

Terrace Reservoir, and potentially Chatfield Reservoir are examples where partnership exists, but ownership is really held by one entity. The reservoirs are not owned by the State.

Kansas

Margaret Fast, Kansas Water Office, Topeka, KS 66612, margaret.fast@kwo.ks.gov, 785-296-0865, www.kwo.org.

Tracy asked that I respond on behalf of the Kansas Water Office. The State of Kansas owns storage in 13 reservoirs developed by the Corps of Engineers. I have attached a table showing the reservoirs and the portions of storage dedicated to the two programs we use to contract with users for water (Water Marketing) and the storage dedicated to the Assurance program which is storage in which downstream municipal and industrial water right holders have ownership interest.

The way you phrased the question, I would consider the Water Supply Storage to be 100% state ownership. The state pays principle and interest and operation and maintenance. In most cases, you see there is also water quality storage in the conservation pool, under ownership and control of the COE. The Future Use storage is under contract with the state, but not currently being utilized, or paid for, so the COE retains the use.

There are a few other nuanced relationships in 3 other COE reservoirs; 2 developed prior to the 1958 water supply act from which the state can call for releases for water supply at no cost and 1 in which a municipality has water supply storage under contract directly with the COE. I have not gone into the Bureau of Reclamation projects, as the "ownership" interest is really a long term lease.

Please let me know if you need additional explanation of the table. I tried to describe in the footnotes the different columns. (Refer to hard copy of table.)

Idaho

No response to date

Montana

John Tubbs, Director, Montana Dept of Natural Resources and Conservation, jtubbs@mt.gov, 406-444-0505

Attached is a report on the Montana State Water Projects. The State owns 25 dams and hundreds of miles of canal. Water User Associations were created and are the marketer of the stored water under agreements with DNRC. This is one approach to greater state control, though because the Associations market the water the State is not benefiting from the increased value of the shares for State dams serving growing communities. The Associations receive the revenue. This has created an situation where repairs and replacement for dam safety may not be directly connected to the revenues earned by selling the states water. This could push costs towards the general tax payer rather than the users paying.

As for your basic question. State ownership is a direct approach to both the development of the storage and the use of the stored water. A regulatory approach where cities must secure a future water supply for compliance and making investment in a regional water storage project a key method for compliance may work. I believe New Mexico requires a 100 year supply for communities. Providing funding for regional authorities to construct the facilities may be another approach where ownership is kept at the local or regional level but the initial costs are born primarily by the State.

Nebraska

No response to date

Nevada

Jason King, Nevada State Engineer, Division of Water Resources, jking@water.nv.gov

I don't think I'm of much help. Like Texas, our water projects (and I'm assuming you're talking primarily of water delivery projects from one area to another) are sponsored, owned, funded and operated by regional and local governments or authorities, e.g. the Honey Lake Water Project is a project to take groundwater from a rural area

to the Reno metropolitan area via pipeline and is owned and operated by Washoe County. Our last statewide water plan was published in 1999. There was not a discussion similar to what you are asking in it. Nevada's water planning division was disbanded shortly after that water plan was published and the state's role has diminished to that of working/assisting the local governments with their planning efforts since land use planning and zoning is at their level.

New Mexico

No response to date

North Dakota

Michelle Klose, North Dakota State Water Commission, maklose@nd.gov

For North Dakota we have two state owned water projects and many that are locally owned and funded through state or federal grant and loan funding.

Most of our projects are driven on the local level. There is importance in keeping local interest and drive for the project on local level. This helps in costs of the project as well as with land or easement issues. The local commitment for water service contracts also assists in supporting funding and development of these projects.

The Southwest Pipeline Project was formed in 1983. This is a state owned project. This area lacked water supply, and had low population density and population was increasing with the oil activity in the area at that time. There were no regional water system in the area, and the water project started as a way to connect the communities onto a bulk water supply. This project evolved and would later provide the distribution system to rural customers as well. Later legislation was enacted to form a water authority with members form the counties served and they took over the operation and maintenance of the system through contracts with the state. The state still maintains ownership and construction is still ongoing. Last legislative session the state was directed to review if ownership of the water system could be turned from the state to the authority. The authority does have authority to issue a mill levy.

The Northwest Area Water Supply Project was formed in 1991. This is a state owned project as well. The water supply is lacking in quality and quantity in this region. Drought conditions in the late 1980s pushed this project toward state authorization. Options for this project include water diversion from the Missouri River. This raised international concerns with Canada, as earlier proposals (from the 1944 Flood Control Act) for water supply to this region were though open canal diversion and Canada had concerns with transfer of invasive species. The international issues likely drove this to be a state project.

We do not have any water supply projects that have joint state-federal ownership.

Our state funding of water projects do not require ownership interest by the state. We do have conditions that require local entity responsibility for future operation, maintenance, and working toward new policy that also expects the local entity responsibility for future replacement to ensure sustainable projects.

We would not suggest forcing implementation of water projects onto a region. We do have conditions that if projects are not proceeding, that previously approved state funding can be reallocated to other projects. In general water projects do take many years to work through all permitting and fund raising, and end up having some event used to push them toward completion.

Oklahoma

State 100%	Purpose	Lake
	Primarily Power	Hudson, Grand, W.R. Holway (Grand River Dam Authority—though COE operates flood control for Hudson and Grand Lakes)
	Recreation/F&WL	Murray, Clayton Lake, Crowder, Carlton, Wayne Wallace (State of OK/ OK Dept of Tourism),

		Lake Carl Etling, Lake Evans Chambers, Lake Vincent, Lake Watonga, Lake Elmer, American Horse Lake, Lake Vanderwork, Lake Hall, Lake Burtschi, Lake Dahlgren, Lake Jap Beaver, Lake Nanih Waiya, Lake Ozzie Cobb, Lake Schooler, Lake Raymond Gary (OK Department of Wildlife Conservation)
State/ Federal/Local	M&I	Sardis (ownership transferred from state to local- currently challenged in court)
Federal/State	Upstream Flood	Conservation District Lakes (Approx 2,100)
Regional/Local	Control & Several Multipurpose	

Julie Cunningham, Chief, Planning & Management Division, OK Water Resources Board, Julie.Cunningham@owrb.ok.gov, 405-530-8800, www.owrb.ok.gov

Oregon

Phil Ward, Director, Oregon Water Resources Board, phillip.c.ward@state.or.us

Oregon does not hold an interest in any water supply projects.

South Dakota

No response to date

Utah

No response to date

Washington

No response to date

Wyoming

Harry Labonde, Wyoming State Engineer's Office, harry.labonde@wyo.gov

Currently, Wyoming only has one project (High Savery Dam and Reservoir-22,500AF) that it owns and operates. It is located in south central Wyoming on Savery Creek which tribs to the Little Snake River which tribs to the Yampa which tribs to the Green River (Colorado River drainage.).

All other projects that are funded by the State are owned and operated by the local jurisdictions. Wyoming will fund municipal and irrigation districts with 67% grants and 33% loans.

How does the state enforce implementation of a project? Owners are required to enter into a project agreement which loosely describes the project scope. During design, the state assigns a project manager to work with the design engineer that is hired by the Owner. If the scope changes or deviates, the state may or may not participate in the scope change.

After completion of the project, Owners must establish a maintenance fund and maintain the system. Wyoming does not do very much follow-up in this regards. However, we as a rule will not fund a project that is less than 15 years old, i.e. you need to maintain projects to get at least 15 years of life out of them.

APPENDIX C: ENDORSERS OF THE RECOMMENDATIONS

Endorsers of the recommendations:

1. David Anderson, FORM Strategic Consulting
2. Carole Baker, Texas Water Foundation
3. Crockett Camp
4. Jon Comola, Wye River Group
5. David Eaton, Bess Harris Jones Centennial Professor of Natural Resource Policy Studies, UT Austin
6. Jon Fisher, President, Associated Builders and Contractors of Texas*
7. Kinnan Golemon, President, KG Strategies, LLC
8. Robert Hebert, County Judge, Fort Bend County
9. Myron Hess, National Wildlife Federation*
10. Jerry James, City of Victoria*
11. Robert King, SPEER, South-central Partnership for Energy Efficiency as a Resource
12. Wayne Klotz, Klotz Associates, Coastal Water Authority*
13. Ken Kramer, Sierra Club - Lone Star Chapter*
14. Weir Labatt, former member Texas Water Development Board
15. Wendy Lopez, URS*
16. Daene McKinney, Cockrell School of Engineering, UT Austin
17. Craig Pedersen, UT Austin and Enviro Water Minerals Company*
18. Andy Sansom, Meadows Center for Water and the Environment*
19. Mary Ellen Summerlin, 8-year board member of Headwaters Groundwater Conservation District
20. Melvin Swoboda
21. Ashok Varma
22. Kevin Wagner, Texas Water Resources Institute*
23. C.E. Williams, Panhandle Groundwater Conservation District*

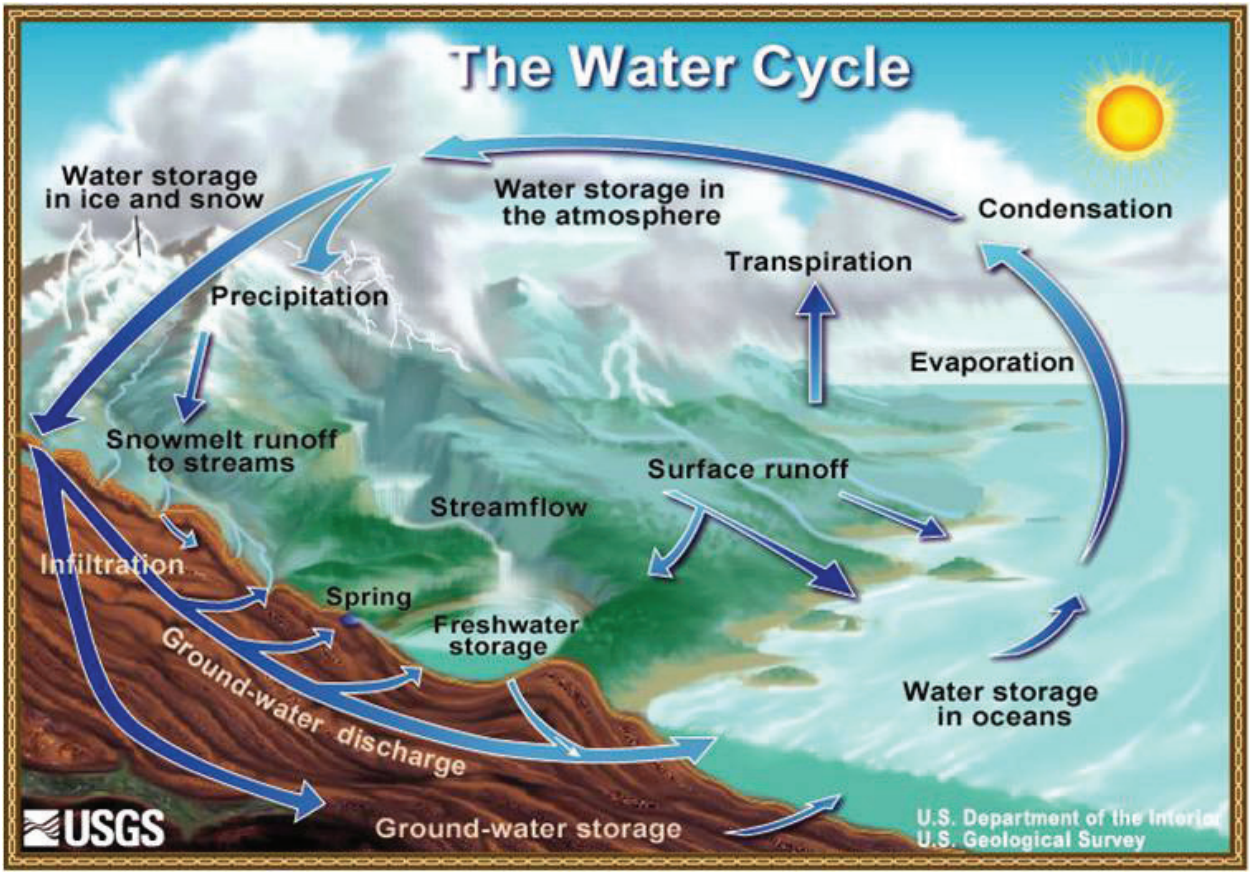
Legislative supporters of the process:

1. The Honorable Charles “Doc” Anderson
2. The Honorable Trent Ashby
3. The Honorable Bill Callegari
4. The Honorable Glenn Hegar
5. The Honorable Lyle Larson
6. The Honorable Eddie Lucio III
7. The Honorable Jerry Patterson
8. The Honorable Allan Ritter

Thank you to others who participated:

1. Bill Espey
2. Elizabeth Fazio, Texas House Committee on Natural Resources
3. Bill Howe, Texas Farm Bureau (Listed for informational purposes only and does not reflect any official position by that person or entity)
4. Robert Huston
5. Michael Lemonds, Texas General Land Office
6. Jeremy Mazur and Jonathan Mathews, Office of Rep. Callegari
7. Ronnie Mullinax, BG
8. Robert Potts, Dixon Water Foundation
9. Jon Schnautz, Office of the Texas Speaker of the House
10. Suzanne Schwartz, UT Center for Public Policy Dispute Resolution

*Institutional affiliation listed for informational purposes only and does not reflect any official position by that entity.


The Water Cycle
Water storage in ice and snow
Water storage in the atmosphere
Condensation
Transpiration
Precipitation
Evaporation
Snowmelt runoff to streams
Surface runoff
Streamflow
Infiltration
Spring
Freshwater storage
Ground-water discharge
Water storage in oceans
USGS
Ground-water storage
U.S. Department of the Interior
U.S. Geological Survey