OKLAHOMA PARTNERSHIP FOR PUBLIC DELIBERATION

The OPPD is a nonprofit, nonpartisan partnership of statewide and regional organizations and groups working together to foster citizen engagement in public issues through public deliberation. Through a broad spectrum of collaborative efforts – all aimed at increasing the public's capacity to work together on common problems that affect Oklahoma and the nation – the OPPD helps citizens learn to moderate deliberative forums, build balanced frameworks for examining public issues, and network with others to convene public discussions. For more information, visit the OPPD at www.okdeliberates.org or call 405-744-9928.

National Issues Forums Institute

This issue guide and the deliberative forums where it will be used are modeled after the National Issues Forums Institute. NIFI promotes the use of public deliberation in a variety of community settings in the United States, such as schools, colleges, businesses, civic organizations, neighborhoods, agencies and libraries. The institute serves as a partner with public affairs television stations and other organizations that want to reach a wider audience. For almost two decades, the institute has collaborated with others to produce *A Public Voice*, a public television program examining what citizens think of issues affecting the nation. In addition, the institute develops some of the issue guides used in National Issues Forums. The institute's directors are volunteers drawn from leaders in government, colleges and universities, libraries, civic organizations, the media and medicine. For more information, visit www.nifi.org.

OKLAHOMA STATE UNIVERSITY EXTENSION

Oklahoma Cooperative Extension Service

Division of Agricultural Sciences and Natural Resources

Oklahoma State University

Drawing Straws:

Working Together to Manage Oklahoma's Growing Demand for Water

A deliberative forum issue guide

Our understanding of an issue is not complete until we understand why other people feel the way they do.

Welcome to the Forum

A public deliberative forum is a way to help people talk about complex public issues in a safe way. Forum participants have the opportunity to reconsider the views of others, as well as their own opinions and judgments, and develop a greater understanding of an issue.

Purposes for holding a deliberative forum.

- To have a larger public voice.
  Multiple deliberative forums on an issue gather the perspectives of hundreds, perhaps thousands, of Oklahomans who have weighed the alternative approaches and identified trade-offs and common ground. These forums can occur in a community or organization or throughout the state. A report on the forums' outcomes communicates the public's understanding of the issue.

- To build community capacity--to help forum participants develop a habit of using the deliberative approach to address difficult issues. A regular schedule of forums on various issues can be used to keep the people engaged in deliberative forums depending on their interest in a particular issue.

- To help forum participants find avenues and resources to take action and address an issue in their community or state.

- To help communities/states/nations address "hot button" issues.

  When a community, state, or nation has developed a habit of public deliberation it is better able to respond to polarizing issues when they occur and prevent or mitigate their effect.

The purpose of this forum is to work together to:

- Better understand the issue and its implications;
- Consider the benefits and drawback of different approaches to the issue;
- Identify actions that are likely to make a positive difference and are doable in terms of time, resources and public will;
- Examine the roles of government, schools, businesses and industries, neighborhoods, civic and religious groups, as well as our responsibility as individuals in addressing this issue; and
- Explore potential next steps.

How forum participants' input will be used.

Forum participants' input will be used to prepare a report to the OSU Cooperative Extension Service. The input will come from forum moderators who will submit a short report after each forum to Reneé Daugherty/Oklahoma Partnership for Public Deliberation (OPPD). Forum participants will remain anonymous. Moderators will report on what elements of the issue seemed most difficult to the participants, the common concerns that were most apparent, trade-offs that participants were willing to accept and any shared direction for action.

How this guide was developed.

Deliberative forum issue guides like this one are developed over several months. They begin with two kinds of research:

- A review of popular and scientific media as well as interviews with experts to describe the public issue and what can be done
- Interviews with the general public asking these basic questions:
  - When you think about the issue what concerns you? How are you and your family being affected? *(These questions call to mind the things that people consider most valuable.)*
  - What actions would you take or want to see taken to address your concerns? *(The actions should have a direct and logical connection to the concern.)*
  - What consequences might follow from the actions you favor that could adversely affect something else you consider valuable? *(This question should expose tensions between what people consider valuable).*

Acknowledgements

We would like to thank our colleagues who helped to gather public input, construct and review this issue guide, or test this guide in community forums around Oklahoma: Frank Acker; Damien Adams; Claude Bess; Jeri Fleming; Bill Jacobs; Jim Key; Leland McDaniel; Aaron Mittelstet; Kathy Moore; Marla Peek; Noel Osborn; Bob Sandbo; Doug Sander; Larry Sanders; Dick Scalf; Mike Smolen; Dave Taylor; and Terry Wyatt.

The reviewers of this issue guide brought their valuable knowledge, expertise, and experiences with Oklahoma water in the following areas: agriculture, environment, municipal government, rural water districts, water conservation, water economics, water law/policy/regulation, water quality, water rights ownership, and water sales and transfer.

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June, 2009

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of $525.00 for 300 copies. 0709 GH/TE.

Reflections on the forum

In this forum, we have explored three different approaches for meeting Oklahoma's growing demand for water. Though the approaches overlap in some respects, they suggest different priorities for action that would bring different benefits and trade-offs. Please take a few minutes to reflect on your experience in the forum.

Individually…

What new information or insights did you gain?

How did your own thinking about the issue change?

How did your thinking about other people's views change?

As a group…

What actions are we most willing to support, and why?

What actions are we least willing to support, and why?

What trade-offs are we most willing to accept?

What tough choices do we still need to grapple with?

Moving to action…

Most people who participate in forums want to do more than talk about the problem; they also want to consider actions that will improve the situation. What are the opportunities for action that emerged from this forum?

What are the possibilities?

What can we each do personally to meet Oklahoma's growing demand for water?

What can our communities do about the issue?

What policies – local, state or national – should be changed to meet Oklahoma's growing demand for water?

How else can we use what we learned today?

Where should we start?

What actions are most likely to have the greatest impact?

What actions are the most doable in terms of time, resources, and public will?

Who needs to be involved?

What will be our next steps?

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Some say Oklahomans don't do enough to protect this precious resource and maintain quantities that meet our current and future needs. We need to take a more aggressive approach to conserving water.

Approach 3: Allow government—with public guidance—to treat water as a common good. 12
Some say that Oklahomans don't recognize water as a basic necessity and cannot be owned. We need to allow state government along with public input to determine how our water supply can be used to benefit all Oklahomans.

Learn More Online...

- **Oklahoma Cooperative Extension Service Water Quality Programs:** http://waterquality.okstate.edu. This site includes presentations and publications by the OCES Water Quality Team. Enter a zip code to find a collection of information on a community's watershed.
- **Oklahoma Water Science Center:** (U.S. Geological Survey) http://ok.water.usgs.gov/. The website provides maps and information on the surface and groundwater resources of Oklahoma.
- **Oklahoma Water Resources Research Institute:** http://environ.okstate.edu/owrri/. OWRRI provides research support, educates and trains water specialists, and facilitates the exchange of information within the Oklahoma water resource community.
- **Oklahoma Water Resources Board:** http://www.owrb.ok.gov/. The OWRB site includes maps, data and information on water use permitting well drilling, water quality standards, and grants and loans to fund water resource projects.
  - **Conservation:** http://www.owrb.ok.gov/news/publications/pdf_pub/consweb.pdf. This pdf describes many ways water can be conserved in our communities and homes, and in agriculture and industry. (Must have Adobe Acrobat to view.)
  - **Law:** http://www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/waterlawseminar/Kershen.pdf. University of Oklahoma Law Prof. Drew Kershen's pdf introduces water law in Oklahoma. (Must have Adobe Acrobat to view.)
- **U.S. Environmental Protection Agency:** http://www.epa.gov/watersense/pubs/outdoor.htm. This website is designed to help Americans save water and protect the environment.
- **University of Oklahoma's WaTER Center:** (Water Technologies for Emerging Regions) http://water.ou.edu. The Center's mission is to help solve drinking water and sanitation challenges for impoverished regions in developing countries through innovative teaching and research initiatives.

Most of the factual information in this issue book came from the online sources listed above.

Introduction: Water, water everywhere...

In photographs of Earth taken from space, it's easy to see how plentiful water is. Three-fourths of the planet's surface is water. That's an area of more than 139 million square miles.

But very little is usable fresh water. Almost 97 percent is salt water. Of the remaining three percent, two-thirds is frozen in the polar ice caps, leaving only about one percent as fresh water. Of this small amount, almost all is in the ground and only 1 percent is in lakes, streams and wetlands.

During the last 50 years, worldwide demand for fresh water has tripled. As water use climbs, it is hard to keep up with growing demand. Climate change, periods of drought and population growth all come together, producing a water crunch.

In Oklahoma, water is commonly categorized separately as surface water or groundwater. **Surface water** includes stream water and diffused surface water, such as rain that runs over the surface of land before it flows into a definite stream. **Groundwater** refers to any water below the surface of the earth. Groundwater is retrievable from aquifers, which are underground water-bearing formations made up of layers of porous rock, gravel or sand. Water in aquifers discharges naturally to streams and can be extracted by pumping. The process that replenishes water in aquifers is called "groundwater recharge."

Definite Stream—a watercourse in a natural channel with defined beds and banks, originating from a specific source or sources of supply. This includes water in rivers, creeks, lakes, and ponds. A stream doesn't have to flow year-round, if that's normal in an area.

The relationship between groundwater and surface water is complex, but they are not really separate waters. Surface water seeps into aquifers, and groundwater discharges to surface waters through springs and seeps. Groundwater keeps streams flowing when it is not raining. Aquifer recharge rates vary greatly with time and space, and cannot be directly measured. Accurate long-term measurements of streamflow, groundwater levels and climate are needed to estimate recharge rates.

Aquifer—a water-bearing formation of sand or gravel that can produce water in useable quantities.

Oklahoma enjoys an abundance of fresh water in most years. In large quantities, water is measured in acre-feet. Oklahoma receives about 92 percent of its water – 50 to 100 million acre-feet annually – through precipitation. The remaining 8 percent of the state's water is surface water inflow from other states. The state has 34 major reservoirs that store 13

Whether the goal is to use water more efficiently, to conserve as much as possible or to preserve Oklahoma's agriculture heritage, it is necessary to set priorities that everyone can live with or go along with. This approach gives ordinary citizens a chance to deliberate and reach a shared judgment. The other approaches leave this crucial task to an impersonal market, technocrats, or lobbyists and politicians.

What can be done?

- Recognize, through legislation, that the Public Trust Doctrine applies to all water in the state. This doctrine holds the state responsible to its people and accordingly has title to all stream and groundwater in trust for public purposes. Compensate existing right-holders for losses resulting from the transfer of water they otherwise would have used.
- Strengthen state government's role, on behalf of the public, to decide which uses of water should take precedence over others and where in the state water is most needed, authorizing its transfer as needed and requiring conservation to the extent necessary.
- Create criteria and a procedure for balancing the interests of areas within the state that import water and the interests of those areas that export water.
- Create a permanent public advisory panel, with members selected from residents throughout the state. The panel members will to serve for a period of time to recommend priorities on behalf of the public and to provide direction to state government.
- Retain local control of water supplies through water districts or other entities. They reflect local concerns and interests to assure waters are valued and protected or sold for the interest of the local economy.

What appeals to me about this approach?

What some might say in opposition to Approach 3:

- The existing system of laws, rules and rights has stood the test of time and can be modified to ensure better protection and wiser allocation of water resources. Adopting any alternative to the existing water law system will favor the urban centers to the detriment of rural areas and the agricultural sector.
- Permitting people to buy and sell access to water through a market is the fairest, least "political" way to make decisions about how to allocate it. It's also the best way to find out exactly what the public's priorities are because people value water in direct proportion to what they're willing to pay for it.
- Decision-making by citizens is unrealistic. They don't have the time, interest or expertise needed to make sound policy decisions. Nor do they always succeed in resolving their differences and reaching agreement. Legislators and water agencies have more experience and more success in clarifying the issues, evaluating the resources and negotiating workable compromises.

Possible trade-offs:

- We support allowing Oklahomans to set priorities for water even if their decisions might have the effect of limiting population growth or development.
- We are willing to preserve everyone's right to water even if it means we might have to cut back on water used for other important purposes such as watering lawns or creating opportunities for communities and businesses to grow.
- We support allowing Oklahomans to set priorities for water even if it reduces agricultural production in the state.

What concerns me about this approach?

Approach 3: Allow government—with public guidance—to treat water as a "common good."

Water is like air, not oil.

Approaches 1 and 2 share an important characteristic: both assume water is a commodity and the right to use it is a private right. Maybe it's time to think of the access to water as a public right. Although water is divisible—like oil or natural gas—it more closely resembles air, which people also cannot live without. Just as all are affected by the supply of breathable air, all are affected by the supply of drinkable water.

John Locke, the 17th century English philosopher whose writings greatly influenced the thinking of America's founders, is credited with providing the foundation for the idea of private property. But Locke also noted that God gave the world to all humanity in common. He argued that an individual can claim to own one part of the world only "where there is enough, and as good, left in common for others."

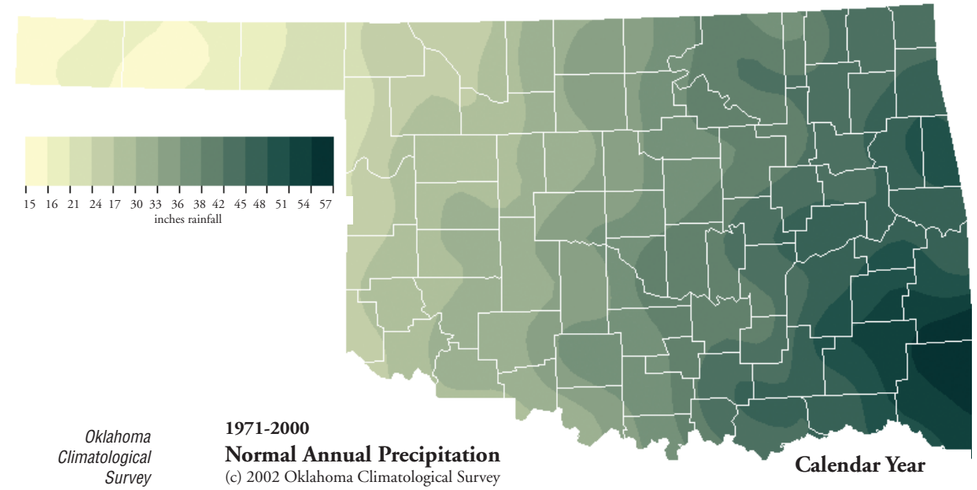
We can't exercise our right if doing so would harm others who also have rights; their rights restrict what we can do with our rights. (We can't take their property, for example.) We can't own water, which is indispensable for everyone's life, anymore than we can own air, which is equally indispensable. That's one reason there are public rights as well as private rights.

Today, a public right usually refers to the right of government to establish and control land or airwaves for the common good. People who want to make money by drilling on public land or broadcasting on a given frequency will argue that anybody has a right to do so. But most legislatures and courts have recognized governments have the authority to regulate the use of airwave frequencies or water because of scarcity or national security. In the case of the airwaves, governments have a responsibility to protect the public from military threats and natural disasters. That's also why they should have the authority to regulate the use of water—indispensable resource that could be used in a way that harms the public, if not regulated.

Oklahoma law already treats stream water as a public good. Why not treat groundwater as a public

good as well? Tying groundwater rights to land rights made sense in the past, but does it today? Back then the population was much smaller and the chief problem was disputes among neighboring landowners who wanted the water for their crops, which is not the case today. Also, it was once assumed surface water and groundwater were distinctly different resources. Research now shows that one affects the other. It doesn't make sense today to tie groundwater rights to land rights, especially when so many people have a pressing need for sufficient water for many different and important purposes.

Control and distribution of water raises ethical questions, not just political ones. The basic rule of democracy is, "When all are affected, all should decide." Approach 3 treats the availability of water as an issue that should be resolved by all Oklahomans. For example, it's imperative that Oklahoma cooperate with its Indian tribes to resolve water rights issues because resorting to litigation is too costly and time-consuming for everyone. Treating water as a public good to be allocated fairly and democratically would help foster a constructive working relationship with tribal peoples and a resolution of allocation issues.



million acre-feet of water. A majority of Oklahoma's water, 79 percent, returns to the atmosphere through evapotranspiration; 20 percent flows through rivers and streams into neighboring states, and less than one percent percolates to deep groundwater.

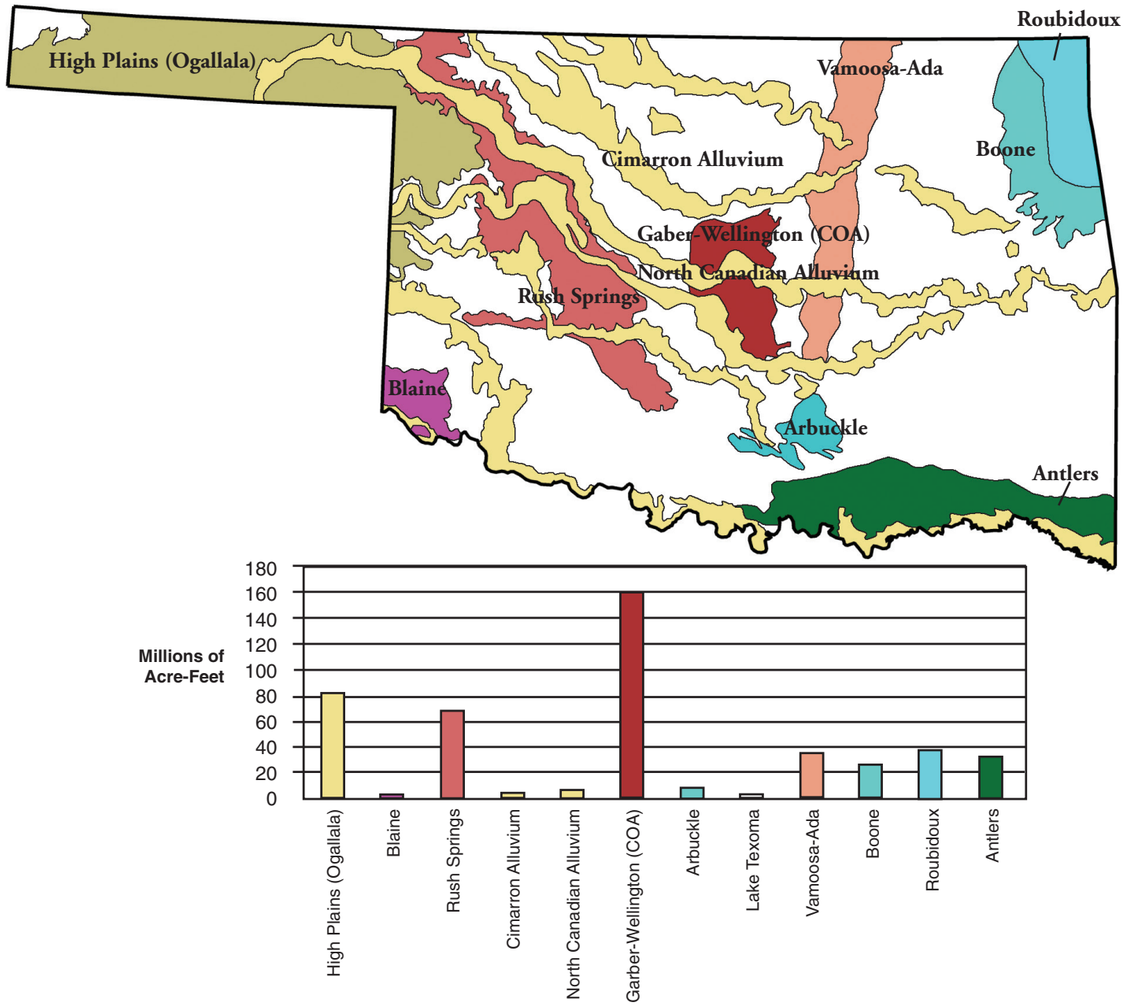
Acre-feet— the amount of water that would cover one acre to a depth of one foot, or about 326,000 gallons.

Evapotranspiration— the evaporative process by which water returns to the atmosphere. It combines the term **evaporation**, or movement of water from the surfaces of land and water and the term **transpiration**, which describes the plant-mediated process that takes water from deeper in the soil.

Water isn't evenly distributed around the state. The annual rainfall gradient varies from 55 to 60 inches in the southeast to 15 inches or less in the northwest part of the state. This results in more surface water in the eastern half of the state. The primary source of water in the western part of the state is groundwater. It is economical to develop groundwater wells for small water systems and private residences, if the source is protected and treatment costs are minimal. Typically, larger cities use surface water and have secured water supplies up to 100 miles away. But generally, water stays within the same basin.

There is an estimated 320 million acre-feet of water in Oklahoma's aquifers, half of which may be economically recoverable at this time. Most of our agriculture and about one-in-five Oklahomans depend on groundwater, especially in the western part of the state. Almost 90 percent of all water used for irrigation comes from deep in the ground. For example, the High Plains Aquifer (commonly known as the Ogallala) contains about 87 million acre-feet of water and underlies about 7,100 sq. mi. in northwestern Oklahoma. However the High Plains Aquifer is a limited resource and has very little recharge. Recharge

Groundwater in Storage in Oklahoma's Largest Aquifers



is primarily from infiltration of precipitation over the aquifer surface, and this aquifer is in a part of the state with limited precipitation. Consequently, the water level dropped as much as two feet per year when irrigation demand was at its peak. Improvements in irrigation efficiency and increasing energy costs have reduced this rate, but water is still being drawn at a rate 20 times greater than it is being recharged.

The quality of fresh water is equally as important as quantity. Pollution and erosion or sediment runoff are threats to both surface water and groundwater. Domestic and agricultural use of fertilizers and pesticides, human and animal wastes, and industrial pollution reduce the amount of water available for beneficial use. Sources include construction sites, urban runoff, and runoff and leaching from agricultural and oil and gas production areas.

What Can Be Done?

- **At home.** Turn off water when it's not being used, reduce lawn watering to minimal amount, install low-flow showerheads, put water-saving devices in toilet tanks, attach low-flow aerators to faucets, and replace or repair leaking fixtures.
- **In the community.** Local governments or utilities can offer rebates to residents to replace older toilets and appliances with models that use less water. They can adopt building codes requiring developers to install water-saving plumbing fixtures in homes and commercial buildings. State government could prohibit urban areas from adding to their water supply in order to grow. These programs have high benefit-cost ratios.
- **In business.** Give businesses incentives to reduce their water use, incorporate recycled materials into their products, recycle water within their facilities, and use treated wastewater (gray water) wherever possible. For example, according to the OWRB, producing one ton of recycled paper consumes 60,000 fewer gallons of water than producing one ton of new paper.
- **In agriculture.** Give growers incentives to conserve water. Efforts could include the following: plant crops that use less water, capture and re-use runoff, use recycled water from other sources, use drip irrigation in place of overhead sprinklers, reduce leakage from water storage and conveyance systems, employ conservation tillage (leaving crop stubble on the soil) to reduce erosion, place buffer strips between crops and waterways to reduce pollution, and employ integrated pest management and fertility management to reduce the use of excess pesticides and fertilizers. Promote research and education of technology and practices to save water such as infrared moisture sensoring.
- **State compliance.** Require meters on all pumps where the OWRB issues a permit to ensure an accurate measurement of water use across the state and enforce compliance.

What appeals to me about this approach?

What some might say in opposition to Approach 2:

- Conservation depends on the ability and willingness of people to act selflessly. The temptation will always be great for some water users to take a "free ride" on the self-restraint of others and use more than their fair share. Water rights and market-set prices or regulations are a better guarantor of virtuous behavior.
- Relying heavily on conservation will simply lead to political battles in which well-funded special interests will succeed in shaping public policies that favor them and work to the detriment of most Oklahomans. Price is the best indicator of people's priorities. A market in water is the only way to set its true value and to ensure that people get the maximum benefit from the state's water resources at the minimum cost.
- Actual water use must be closely monitored to ensure water is not used excessively. That will result in higher taxes or fees. Enforcing conservation has its costs, too.
- Adopting any alternative to the existing water law system will shrink or change the agricultural sector, impact the rural economy, and reduce farm families' incomes and the agricultural base of the state.

Possible trade-offs:

- We support requiring businesses (commercial, industrial, agricultural) to accept limitations on the use of water for economic purposes even if doing so raises their costs in the short-term.
- We are willing to cut back on our use of water even if doing so will require compromise and sacrifice from everyone—and may even fall more heavily on some people, areas or sectors than others.
- We support restricting population growth in urban areas even if doing so slows economic growth.

What concerns me about this approach?

Approach 2: Promote conservation to balance water demands with water supply.

The world has changed. So must we.

Clean water is limited and expensive. To maintain current standards of living in the future, it is necessary to conserve water—that means reducing demand and using it more efficiently.

Conservation is fair. It asks all Oklahomans—not just some communities or areas, or some types of economic activity—to protect an indispensable good in which everyone has a stake. Through conservation, Oklahomans could reduce the need to build new reservoirs and reduce the impact on its water infrastructure such as pipelines and treatment plants.

Each day, the indoor water use for a typical person in Oklahoma is about 60 gallons for personal needs. A family of four uses about 240 gallons. Of that, almost 50 gallons is used for laundry; almost 45 gallons is consumed by bathing and showering; and around 40 gallons goes down the toilet, literally. A single leaky faucet can waste between 10 and 30 gallons per day—as much as 10,000 gallons each year.

Outdoor household water use is calculated in addition to the 240 gallons a day mentioned above for indoor use. The amount used can vary by season and can include lawn and garden irrigation, washing automobiles, maintaining swimming pools, and cleaning sidewalks and driveways. The EPA approximates household outdoor water use at 120 gallons per day.

People can change their habits to conserve water. The *40-hour Drought* project is a simple community activity to reduce water usage in the home by challenging a person to use a small amount of water, about 11 gallons, for a 40-hour period. Georgia Cooperative Extension Service's *40 Gallon Challenge* addresses soil and water conservation habits. Some Oklahoma towns have a tiered price structure to encourage water customers to conserve water – the more water used, the higher the rate.

Purple pipe water is a re-use conservation option for cities. Purple pipe is actually purple—color coded so it's obvious that it carries non-potable water. The water is treated reclaimed waste water that is not drinkable. It

is suitable for irrigation and other outdoor uses, as well as fighting fires and some industry use.

Despite continuing improvements to efficiency, irrigating farm crops still consumes roughly 40 percent of the total volume of water used daily by everyone in Oklahoma. More importantly, irrigation accounts for 90 percent of all groundwater used in the state. As with other uses, demand for water in agriculture is expected to rise. Almost all of the increase will go to irrigating crops, and is expected to come from groundwater sources.

The need to pump more groundwater will be badly timed. State and federal governments are under pressure to reduce or eliminate agricultural subsidies and reduce access to surface water. There is also pressure to enact more stringent environmental regulations to preserve in-stream flows, protect wetlands, prevent soil erosion, and reduce contamination from pesticides and fertilizers used in both residential and agricultural applications.

According to an article published in the December 2008 issue of the Journal of the American Water Resources Association, global warming will increase the duration and severity of droughts. Temperatures will increase and precipitation will decrease. Because the water tables of aquifers drop about five times faster in dry periods than they rise during wet periods, farmers and ranchers in the west face a growing threat to their ability to continue irrigating.

Water and the Law

In the United States, there are two basic systems of water allocation: 1) the riparian doctrine in the East and 2) the doctrine of prior appropriation in the West. The riparian system, which governs both surface and groundwater, links water rights to ownership of the land. A riparian landowner is one who owns land adjacent to the water. The doctrine of prior appropriation allocates water based on "first in time, first in right." This means whoever put the water to beneficial use first has the right to the water. This legal principle has been recognized by state court decisions, constitutions and statutes. Like other states in the middle of the country, Oklahoma's water rights law is a blend of riparian and appropriation doctrine.

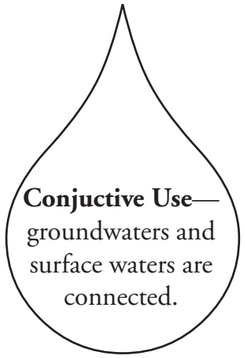
The Oklahoma Water Resources Board (ORWB) relies on people with permits to submit an annual water use report. Meters are not required on pumps for groundwater or surface water sources, but water utilities use meters to know how much to charge.

A water right is a right to use the water. A right is acquired by appropriation—by taking water from its source and applying it elsewhere is called a beneficial use, sometimes at a distance from the source. Domestic use does not require a right.

Oklahoma water policy concerns two types of use: 1) beneficial use and 2) domestic use. Beneficial use of water includes water supply (both drinking and domestic use), agriculture, irrigation, hydroelectric power generation, municipal and industrial, navigation, recreation, and fish and wildlife.

Domestic use of water supply is for household purposes, farm and domestic animals up to the normal grazing capacity of the land, and irrigation not exceeding three acres of land for growing of gardens, orchards, and lawns. Fire protection is also considered domestic use. This classification even applies to non-household entities that require drinking water, restrooms and grounds maintenance as long as the use does not exceed 5 acre-feet/year.

Current Oklahoma water law treats surface and groundwater as separate and distinct resources that have no physical links or interactions. The scientific view suggests these resources should be managed together, conjuntive use. This relationship has become a central issue in state water politics.



Surface Water

Under prior appropriation doctrine, stream water is owned by the public. The state has the authority to decide how it will be used, particularly if there isn't enough water to satisfy everyone's claims. Riparian landowners do not need a permit for domestic water use. During a water shortage, domestic riparian users are given top priority, followed by the older water rights.

To obtain a permit to use surface water, an applicant must convince the OWRB the following four conditions are met:

(1) The requested amount of water is available.
(2) There's a present or future need for the water and the intended use is beneficial.
(3) The intended use doesn't interfere with domestic or existing uses.
(4) If the use includes transportation of water outside a stream system, the use doesn't interfere with current or proposed beneficial uses, or the needs of water users in the area.

Oklahoma law doesn't give priority to one use over another, except that stream water allocations cannot interfere with domestic uses. In practice, water needed for public supply and vital economic activities generally take precedence during drought and related local water emergencies.

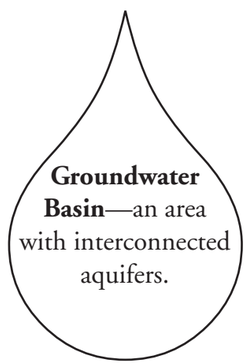
Groundwater

Unlike surface water, allocations of groundwater are made on the basis of who owns the land above the groundwater. Groundwater is considered private property like oil, gas, coal, and other minerals. Unlike minerals–which are static–groundwater moves from

higher to lower areas, and interchange occurs between surface and groundwater.

The OWRB regulates the use of groundwater to ensure the minimum life of state groundwater supplies and that all landowners receive their designated share. Even landowners with groundwater beneath their land are required to obtain permits before pumping water in an amount beyond domestic use.

When the OWRB completes a study of the amount of water in an aquifer, it sets limits for groundwater pumping permits to assure the aquifer will maintain its life for a minimum of 20 years. Then the ORWB allocates water to the owners of overlying land on a per-acre basis. If the maximum annual yield has not been approved, each landowner is entitled to 2 acre-feet/acre/year. To issue a permit, the OWRB must determine that:



(1) the party requesting the permit owns or leases the land;
(2) the land lies atop a fresh groundwater basin or sub-basin;
(3) the use will be beneficial; and
(4) waste, by either depletion or pollution, will not occur.

If these conditions are met, a landowner is entitled to a permit that recognizes an ownership share of the particular aquifer underlying his or her land. The OWRB has the authority to increase the amount of water an applicant has been granted but not decrease. Landowners who intend to use groundwater beneath their land for domestic purposes do not have to obtain a permit, but they are prohibited from wasting it.

What can be done?

- Create a water market using one of the following methods: Yield Stock Rights, Unitization or Proportional Rights.
- Reduce government control on out-of-state water sales.
- Allow severance of water rights from adjoining land and unrestricted buying and selling of existing water rights.

What some might say in opposition to Approach 1:

- Even when markets operate properly, they can give a big advantage to those who have greater economic power than others. Less-prosperous communities and economic sectors may fare badly in a free market.
- Agriculture would suffer in competition with the higher value of public water supply. The result could be loss of the agricultural production base of the state and depletion of waters that would allow future agricultural production.
- A market for water won't necessarily give adequate consideration to matters such as sustainability of water over time, environmental uses for water or recreation. Markets seldom take full account of future needs and contingencies such as prolonged or severe droughts, for which publicly accountable government planners are expected to prepare.
- If past experience with other commodities is anything to go by, Oklahomans should be wary of assigning rights that can be bought and sold, particularly for a commodity that is necessary to sustain life.
- The impact of inter-basin water transfer is unknown.

Possible trade-offs:

- We are willing to give priority to efficiency even if that means private individuals or groups will control how and how much water is used.
- We support letting people buy water for whatever purposes they want even if more water is used for commercial, industrial or residential purposes.
- We are willing to take much of the regulatory authority over the allocation of water away from water management agencies, even if this means we won't be able to plan as a state for future needs.

What appeals to me about this approach?

What concerns me about this approach?

Approach 1: Allow water to be bought and sold in a free market like any commodity.

A free market for allocating water is better than the out-dated water law system and assures that water is not undervalued and wasted.

As population increases and economies grow, so does the demand for water. The more prosperous a country becomes, the higher its population lives on the water food chain. For instance, the U.S. is the world leader in water consumption per capita, with high quality drinking water available at low cost in all parts of the country. Drinking-quality water is used for activities like laundry, washing cars and even watering lawns. If the cost of water rises to its actual value, low-value uses would decline, and waste could be eliminated.

Oklahoma is one of several states taking important steps toward adopting a free-market approach to water management by recognizing transferable surface and

groundwater rights. The state legislature enacted the current law governing water use in 1954 with the intent to preserve the claims people have acquired over the years and the added aim of restricting water use so resources aren't exhausted.

The only way for surface right-holders to make sure they have access to water is to use it before other users do. This creates a wasteful use-it or lose-it mentality. A market based on rights that have been clearly established enables right-holders to generate income from their rights by selling water to others instead of using it themselves.

There are three common types of water markets:

- **Yield-Stock Rights.** Landowners and right-holders are assigned property rights for a share of their water source. They get a percentage of the new water that enters the source each year, plus a percentage of the source's storage or stock.
- **Unitization.** This allocation system treats a source of water as if it were owned by a single right-holder, rather than many. Owners of land overlying the groundwater source and right holders for surface water in the same basin develop the resource together and share the costs and profits. Right-holders drill the optimal number of wells in optimal locations, thus increasing productivity by minimizing pumping costs and setting the best rates of extraction in response to demand.
- **Proportional Rights.** These rights are based on a proportion of the source's annual safe yield. After determining who has rights for various uses and assigning them according to a priority date system, each right-holder may use a given percentage of each year's safe yield.

Oklahomans deserve a water allocation system that maximizes the benefits of the state's water supply to everyone who uses it, but minimizes cost. Protecting historical water rights and government regulation of water supplies are not the only ways to ensure this. The new system should remove the limits on transferability of water rights, allowing water to flow to uses the public prioritizes by their willingness to pay the prices set by a free market. A market shows how much water is available and how much is needed for a specific use. Because it requires an initial clarification of water rights, it will minimize conflict among users and ensure the water is used as efficiently as possible.

Will There Be Enough?

The amount of fresh water being withdrawn from the state's resources for all purposes is currently estimated to be more than 1.75 billion gallons per day (about 5,400 acre-feet). Of that, irrigating farm crops uses about 40 percent (about 90 percent of all groundwater use); public water supply accounts for 38 percent (83 percent of the surface water use); and the remaining 20 percent of water use is devoted to purposes such as watering livestock, generating electrical power, and domestic and commercial uses.

There are several major factors that affect the estimates of Oklahoma's future water needs:

- **Population and economic growth.** In 50 years, the population is expected to grow by more than 30 percent—more than 1 million additional residents. Most of that growth will occur in the metropolitan areas of Oklahoma City and Tulsa.
- **Competing uses for water.** Agriculture uses a lot of water, even with conservation. Urban use and drinking water are high value. Generally, conversion of a water source from agricultural use to urban or drinking water use results in taking land out of agricultural production.
- **Minimum in-stream flow requirements.** A permit for wildlife and ecological services has been proposed to assure minimum streamflows even when there is not enough water for other permit holders. Such minimum streamflow requirements are currently in effect only where there are endangered species. A minimum streamflow may also result from commitments to downstream states, in particular Arkansas and Louisiana, through the Arkansas River and Red River compacts.
- **Pollution.** Contamination and pollution can reduce available water. Oklahoma has made great strides in improving water quality, but there are still factors that can degrade the water in Oklahoma.
- **Energy production.** To the extent that electrical power continues to be generated from fossil fuels (oil, natural gas, coal) or from nuclear materials, water will be needed. Water would also be required for coal-liquefaction. Because of the long-term rise in the prices of these fuels, there will be a growing emphasis on alternative sources of energy. For example, more water may be needed for irrigating crops to be used as biofuels or for fermentation to ethanol. If more hydropower is planned, more dams will have to be built, further reducing in-stream flows.
- **Repair, replacement and expansion of infrastructure.** Federal funding for dams, aqueducts, and pipelines has been declining since the 1960s and could continue to do so. Many of the state's 34 major reservoirs were built in the mid-1900s and need major work. The same is true for hundreds of the Natural Resources Conservation Service (NRCS) flood control structures and water and sewer systems in the state.
- **Indian water rights claims.** The uncertainty associated with unresolved treaty rights, riparian rights, and other rights of Native American tribes and nations, may impede any large change in water use or water sales. Indian claims could have a very substantial impact on both existing state water law, as well as on the current system of administering water rights. In any event, the impact of these issues will not be known until Indian water rights claims are resolved.
- **Impact of climate change.** Climate change is expected to raise the average temperature and increase the frequency and severity of both droughts and flooding in the future. Fewer (but

more intense) precipitation events will lead to crop damage and increasing erosion. There may be less water available even if yearly totals increase.

- **Non-consumptive use.** Uses such as recreation and ecosystem protection are growing and increasing in value. This increases the criteria for water quality and aesthetics. While these uses are nonconsumptive, they compete with and put constraints on other uses.
- **Relationship between surface water and groundwater.** Science indicates there is a link between surface and groundwater. This will have major implications for right-holders and landowners, and further suggests the need for compensation if their rights are diminished.

In summary, Oklahomans face the possibility of serious water crises resulting from increasing pressure on quality and quantity of existing supplies, deteriorating water infrastructure and uncertainty in water rights. Both the severity of crises and the costs of coping may be reduced by establishing priorities to help ensure there will always be resources in the quantity and the quality necessary to meet the state's multiple uses for fresh water.

Consumptive Use—refers to uses that lose water through evaporation such as irrigation or evaporative cooling. Many uses are **nonconsumptive** such as hydroelectric generation. Many uses consume some water and return water to the ground and surface water system. Examples are return flow from irrigation or septic drainfields that disperse water into the soil.

What Should We Do?

Here are three possible approaches to managing Oklahoma's growing demand for water:

Approach 1: Allow water to be bought and sold in a free market like any commodity.
Approach 2: Promote conservation to balance water demands with water supply.
Approach 3: Allow government—with public guidance—to treat water as a common good.

Many of us will see at least some value in each of these approaches, as well as offsetting disadvantages or costs such as money, time, convenience, and individual rights. The challenge lies in coming to agreement on priorities and acting on them. To do so, we need to grapple with questions like these:

- If each approach has advantages and disadvantages, costs and benefits, etc., which approach do we think would be the best one to take?
- All things considered, which approach seems likely to produce the most benefits, the fewest costs, and the least infringement of individual rights?
- If we can't do everything at once, where should we start?
- What steps are the most doable in terms of time, resources and public commitment?
- Which actions are most likely to have the greatest positive impact?
- What should we expect from government, communities and schools, businesses and industries, and from ourselves?

A public deliberative forum is just one part of the important conversation on which Oklahomans have embarked. We hope it leads to further discussions involving wider circles of people who care about the issue and are willing to work toward sound, widely-supported policies and actions addressing Oklahoma's water future.

Most of the factual information in this issue book came from the online sources listed on page 1.