

# Before the Taps Run Dry

How Should We Manage Oklahoma's Growing Demand for Water?

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Oklahoma State University

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## How Should We Manage Oklahoma's Growing Demand for Water?

### Learn More Online...

- **Oklahoma Water Science Center** (U.S. Geological Survey):  
<http://ok.water.usgs.gov/>  
Its mission is to collect uniform, current, and reliable information on water use. The OWSC cooperates with the OWRB to collect and publish water-use information for Oklahoma. The web page provides freshwater withdrawal estimates for Oklahoma by source (ground or surface) and category, including irrigation, water supply, livestock and aquaculture, thermoelectric-power generation, domestic and commercial, and industrial and mining. Withdrawal data are aggregated and tabulated by county, principal river basin, and major aquifer. Total withdrawals and three major categories of irrigation, water supply, and livestock are presented in ranked order for the top ten counties in Oklahoma.
- **Oklahoma Water Resources Research Institute:**  
<http://environ.okstate.edu/owrri/>  
The Oklahoma Water Resources Research Institute (OWRRI), located in the Environmental Institute at Oklahoma State University, provides research support on all topics related to Oklahoma water resources, 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/>  
This state agency provides the public with information concerning water quality and standards, water supply and availability, ground water, surface water, water-use permits, well-drilling, hazard mitigation, dam safety, floodplain management, and water and wastewater financing. The site includes technical studies and legislative reports, weather modification data and maps, and information about loan and grant programs.
- **Oklahoma Water Resources Board–Conservation:**  
<http://www.owrb.ok.gov/news/publications/pdf/pub/consweb.pdf>  
This PowerPoint describes many ways in which water can be conserved in our communities and homes, in agriculture, and in industry.
- **Oklahoma Water Resources Board – Law:**  
<http://www.owrb.ok.gov/supply/ocwp/pdf/ocwp/WaterPlanUpdate/waterlawseminar/Kershen.pdf>  
University of Oklahoma College of Law Prof. Drew Kershen's PowerPoint introduces water law in Oklahoma.
- **Physical Geography and Environmental Issues: Water Supply, Use, and Management:**  
[http://geog-www.sbs.ohio-state.edu/courses/G210/bmark/Lecture04\\_Water1.pdf](http://geog-www.sbs.ohio-state.edu/courses/G210/bmark/Lecture04_Water1.pdf)  
This PowerPoint slide presentation, created by two faculty members at the Ohio State University as part of a geography course, that provides a broad overview of water-related topics.
- **U.S. Water Demand, Supply, and Allocation: Trends and Outlook:**  
<http://www.csg.org/pubs/Documents/Ben%20Dziegielewski-with%20notes-Puerto%20Rico.pdf>  
This PowerPoint presentation, by a professor at Southern Illinois University, offers information on water demand, supply, and allocation from a national perspective.
- **U.S. Environmental Protection Agency:**  
<http://www.epa.gov/watersense/pubs/outdoor.htm>  
WaterSense is a partnership program, sponsored by the U.S. Environmental Protection Agency, to help Americans save water and protect the environment. Information is provided on conserving household outdoor water use and water-efficient products.

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## Introduction: Water, water everywhere...

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

But how much of that massive quantity of water is usable? Very little. 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 for human use. Of this small amount of available fresh water almost all is in the ground and only 1 percent is in lakes, streams, and wetlands.

To make matters worse, over 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 from time to time producing a water "crunch" that is seldom anticipated.

In Oklahoma, water is commonly categorized separately as surface water or groundwater. **Surface water** includes stream water and diffused surface water, such as rain water that runs over the surface of land before it flows into a "definite stream". A definite stream is a watercourse in a definite, natural channel with defined beds and banks, originating from a definite 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 that area. **Groundwater** refers to water that has percolated downward from the surface outside the banks of a definite stream or lake. Groundwater is retrievable from aquifers, which are underground water-bearing layers of porous rock, gravel, or sand. Water in aquifers can be extracted by drilling wells. The process that replenishes the water in aquifers is called "recharge."

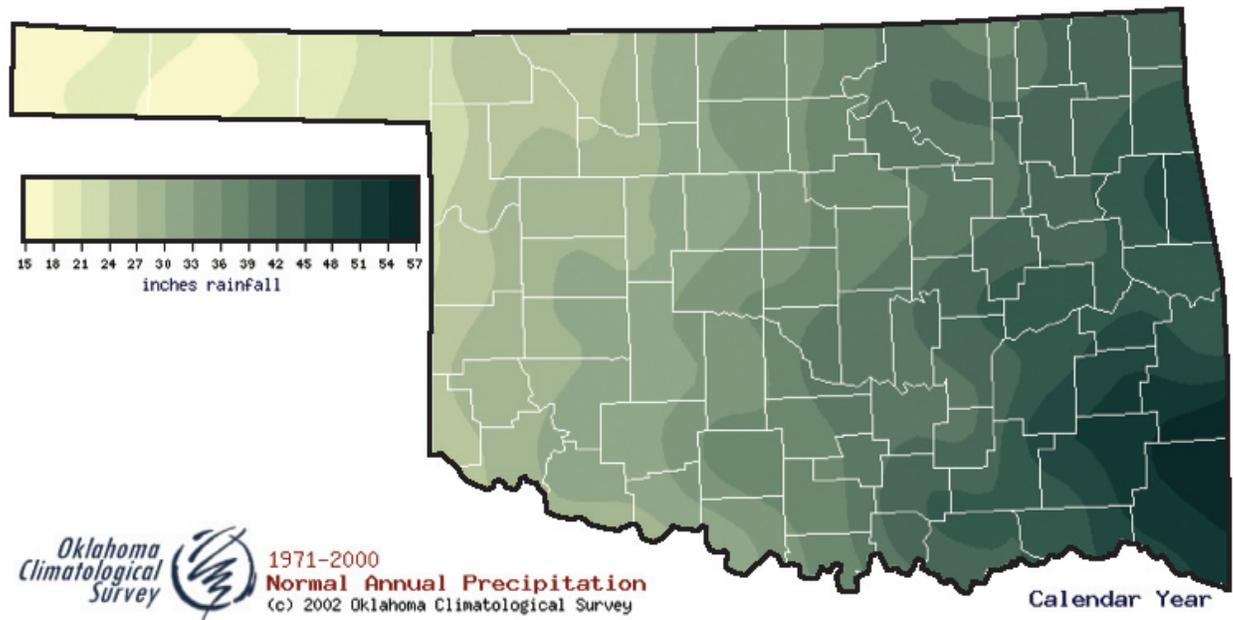
The relationship between groundwater and surface water is complex, but they are not really separate waters. Surface water, even stream water, does seep into aquifers, and groundwater does discharge to surface waters through springs and seeps. In fact it is groundwater that keeps streams flowing when it is not raining. Although the rate

of recharge is difficult to measure at any given point on the land, it can be estimated for a basin or an aquifer by measuring rainfall and streamflow (understanding that water comes in through rain and snow and leaves through streamflow and evaporation - the difference between what comes in and what goes out is groundwater recharge).

Oklahoma enjoys an abundance of fresh water in most years. Water in large quantities is measured in acre feet. An acre foot is the amount of water that would cover one acre to a depth of one foot. Generally more than 10 million acre-feet of water flows into Oklahoma from elsewhere. In addition, annual rainfall totals are between 50 and 100 million acre feet. Runoff is that part of the precipitation, snow melt, or irrigation water that appears in uncontrolled surface streams, rivers, drains or sewers. It supplies 6-12 million acre feet of water a year. Regarding surface water, the state has 34 major reservoirs. These reservoirs store 13 million acre-feet of water but about 80 percent (10 million acre feet) is "phantom" water that disappears through evaporation into the air and seepage into the ground over the course of a year.

Water isn't evenly distributed around the state. The annual rainfall gradient varies from 54 inches in the southeast to 15 inches 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 cheaper to develop surface water than groundwater. So larger cities have secured water supplies sometimes 50 to 100 miles away. Generally though, water stays within the same basin.

About one in five Oklahomans depend on well water for their needs, and agriculture generally relies on ground water, 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) lies beneath the Panhandle and extreme northwestern Oklahoma and was created by melting ice at the end of the last ice age. It contains about 87 million acre-feet of water. That sounds like a lot, but the High Plains Aquifer is a limited resource and



has very little recharge. During peak irrigation times, Texas County in the Panhandle alone uses as much water as New York City. It is estimated that water in this aquifer is being drawn down at a rate 20 times greater than it is being recharged. Consequently the water level has 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 somewhat, but pumping is still much greater than recharge.

There is an estimated 320 million acre-feet of water in Oklahoma’s aquifers, half of which may be economically recoverable at this time. In many locations, groundwater is being drained faster than it’s being replenished by recharge. When the Oklahoma Water Resources Board completes a study of the amount of water in an aquifer, it sets limits for groundwater pumping permits to assure the aquifer will not be depleted in less than 20 years. These permits are based on ownership of the land. Where no study has been completed, a temporary limit allows each permit holder to pump as much as 2 acre-feet of water for each acre of land owned or leased. When an aquifer study is completed, the Water Board may allow more or less pumping depending on the amount of water in the aquifer.

Finally the quality of fresh water is equally as important as quantity. Pollution is a threat to both surface water and ground water. 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.

## Water and the Law

In the United States there have been two basic systems of water allocation: the riparian doctrine in the East and the doctrine of prior appropriation in the West. The riparian system, which governs both surface and ground water, links water rights to ownership of the land. 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. Unlike most Western states which use the doctrine of prior appropriation, Oklahoma’s water rights law is a blend of riparian and appropriation law.

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 to what is called a “beneficial use,” sometimes at a distance from the source.

Because a water right is a right to use water, a permit system for regulating water use has developed. Right-holders must obtain a permit from the Oklahoma Water Resources Board, which is responsible for allocating water based on who has priority, how much they’re entitled to, and how they intend to use it. Policies prevent a right holder from obtaining a permit just to keep others from getting the water. If permit-holders do not use the water to which they have a right at least once during any consecutive seven-year period, they lose their right to the unused amount.

Meters are not required on pumps for groundwater or surface water sources. Groups that sell water such as municipalities will use meters in order to know how much to charge. Lack of meters results in an inaccurate account of how much water is being pumped from a source. The Oklahoma Water Resources Board relies on people with permits to turn in an annual water use report estimate. Metering would help the OWRB do a better job of managing the state’s water resources.

Oklahoma water policy describes two types of use: “beneficial use” and “domestic use.” **Beneficial** use of water includes water supply (both drinking and domestic use), agriculture, irrigation, hydroelectric power generation, municipal uses, industrial uses, navigation, recreation, and fish and wildlife.

**Domestic** use of a water supply is considered to be the use of water for household purposes, for farm and domestic animals up to the normal grazing capacity of the land, and the irrigation of land not exceeding three acres for the growing of gardens, orchards, and lawns. Domestic can also include water use for such things as fire protection, as well as non-household entities that need drinking water, restrooms, and grounds maintenance.

In current Oklahoma water law, surface

and groundwater are treated as separate and distinct resources that have no physical links or interactions. As mentioned earlier however, there is a relationship between the two and they are not separate waters. This has become a central issue in state water politics.

## Surface Water

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. All right-holders have to obtain a permit; however, riparian landowners do not need a permit for domestic water use. During a water shortage, domestic use and municipalities are given top priority followed by the older water rights. Following the traditional rule of “first in time, first in right,” the date that a request for a permit was first filed determines who gets the water.

In order to obtain a permit to use surface water, an applicant has to convince the Oklahoma Water Resources Board (OWRB) that 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 either ‘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.

## Ground water

Unlike surface water, allocations of groundwater are made on the basis of who owns the land that sits above the ground water, and how many acres of land are owned. In other words, groundwater is considered private property, like oil, gas, coal, and other minerals.

The OWRB regulates the use of groundwater because the Oklahoma Legislature has decided that reasonable regulation is required to preserve at least the minimum life of state groundwater supplies and to ensure that all landowners receive their designated share of water. So even though landowners own the groundwater beneath their land, they're required to obtain permits before pumping.

The OWRB must determine the maximum annual yield for groundwater "basins and sub-basins" underlying specified parcels of land. Then it has to allocate the water to the owners of overlying land on a per-acre basis (for example: one acre-foot of water per acre of land at the surface). In order to issue a permit, the OWRB is required to 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,\*
- (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 to decrease it. 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" water pumped from a well. Groundwater is considered wasted if it's not used for a beneficial purpose.

## 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 amount, irrigating farm crops uses about 40 percent (about 90 percent of all groundwater use). Withdrawals for public water supply account for 38 percent of the total (83 percent of the surface

water use). The remaining 20 percent of water use is devoted to purposes such as watering livestock (9 percent), generating electrical power (8 percent), and domestic and commercial uses (general household non-drinking requirements; irrigating gardens, orchards, and lawns; fire protection; and use by schools, businesses, and governments for restrooms and grounds maintenance).

There are several major factors that affect the estimates of whether there will be enough water in Oklahoma's future:

- **Population and economic growth.** Between now and 2030, Oklahoma's population is expected to grow by about 8 percent—roughly an additional 285,000 people. Most of that growth will occur in the metropolitan areas of Oklahoma City and Tulsa. By 2060, the population is expected to grow by more than 30 percent—more than 1 million additional residents.
- **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.

- **In-stream requirements.** Ecological needs for water are being recognized in order to maintain quality environment. Foremost in protecting plant and animal life is maintaining a minimum streamflow. This may require recognizing a permitted use for wildlife, making it necessary to withdraw less water from surface sources in order to preserve wildlife and sustain wetlands. In the past this has only been a concern where there are endangered species. In-stream requirements may also be necessary to comply with Oklahoma's various interstate stream compacts. The compacts are based on river basins that Oklahoma shares with neighboring states.
- **Pollution.** If contamination of both ground and surface water continues or grows, the quantity of usable water may decline.
- **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 for cooling. 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. If more hydropower is needed to cut carbon dioxide emissions, more dams will have to be built, thereby 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 in the state. Existing infrastructure will have to be repaired or replaced. New infrastructure may have to be added.
- **Indian water right claims.** The extent of water demand resulting from recognition of rights associated with Native American lands is unknown at present. The uncertainty associated with unresolved treaty rights, riparian rights, and other rights of Native American tribes and nations, will be an impediment to any large change in water use or water sales. Indian claims to water rights 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, whether through negotiation or through determination by the courts.
- **Rate, direction, and severity of climate change.** There are two main concerns: less surface water resulting from shallower snow-packs in the Rocky Mountains (especially the southern ranges that feed the Arkansas and Red rivers), and a significant increase in the frequency and severity of droughts. and floods.
- **Nonconsumptive use.** Uses such as recreation use ecosystem protection are growing and increasing in value. As population in Oklahoma and the surrounding region grows, demand for recreation use (already competitive with other uses) is expected to increase. As pressure on water quality increases, it will put at risk the recreation and ecosystem value of water resources. While these uses are nonconsumptive, they do compete with other uses that affect flow, levels and quality."
- **Relationship between surface and ground water.** Science indicates that, in fact, there is a link between surface and ground water. If so, it raises the legal and political question of changing the basis for water law to what is termed "conjunctive use". This will have major implications for rights-holders, and further suggests the need for consideration of compensation if existing rights-holders' rights are diminished.

In summary, Oklahomans face the possibility of serious water crises resulting from static

or diminished supply, deteriorating water infrastructure, and uncertainty in water rights combined with growing demand that is not matched to the amounts and distribution of water that is available. Both the severity of crises and the costs of coping with them can be reduced through wise and careful planning. Oklahoma needs to establish public priorities that will help ensure that there will always be resources in the quantity and of the quality necessary to meet the state's multiple uses for fresh water.

## 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 the 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 protections that most Oklahomans will be able to “live with” or “go along with” and be willing to act on. 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, business and industry, and from ourselves?

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

## **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 as 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 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 that have already taken 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 that 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.

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 between users and ensure the water is used as efficiently as possible.

### **What can be done?**

- Create a water market using one of the following methods:
  - Yield-Stock Rights. In this form of water market, 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 will drill the optimal number of wells in optimal locations on their land, thus increasing productivity by minimizing pumping costs and setting the best rates of extraction in response to demand.



- Proportional Rights. In this type of water market, 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.
- 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 other participants. Less-prosperous communities and economic sectors may fare badly in a free market. There are numerous examples of communities being denied drinking water after it was privatized.
  - Agriculture would suffer in competition to 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, that publicly accountable government planners are expected to prepare for.

- 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. Adopting this policy with regard to oil has left a lot of the state's land either ruined or worth much more than its initial price.
- The impact of inter-basin water transfer is unknown

Some possible trade-offs:

- We are willing to give priority to efficiency even if that means private individuals or groups will control how water is used, and how much is used.
- We support letting people buy water for whatever purposes they want even if more water ends up being 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.

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

The world has changed. So must we.

Clean water is neither unlimited nor inexpensive. Demand for clean fresh water is projected to exceed the state's limited supply. In order to have enough to maintain current standards of living in coming decades, it is necessary to conserve water. That means reducing demand and using it more efficiently.

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 amount almost 50 gallons is used for laundry. Almost 45 gallons is consumed by bathing and showering. Around 40 gallons goes, literally, down the toilet. 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.

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 the groundwater used in the state. As with other uses, demand for water in agriculture is expected to rise. Almost all the increase will go to irrigating crops, and almost all of the additional water 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.

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 (see Appendix). Temperatures will increase and precipitation will decrease. Because the water tables of aquifers drop about 5 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. Even the enormous High Plains (Ogallala) Aquifer could eventually be depleted if farmers, ranchers, and other large water users keep pumping water without regard to the impact on the aquifer's sustainability.

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. Conservation requires us to face up to the necessity of making hard choices and agreeing on statewide priorities.

### 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

bottles in toilet tanks, attach low-flow aerators to faucets, and replace or repair leaking fixtures. These and other steps can reduce residential water use by over 50%.

- 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. And they can create a tier-structure for water-use rates that rewards low-volume users with lower prices and penalizes high-volume-users with higher prices. 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 Oklahoma Water Resources Board, producing one ton of recycled paper consumes 60,000 fewer gallons less 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 run-off; 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 sensing.
- 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 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, and a market in water is the only way to set its true value. A market is also the only way 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 that 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.

### Some possible trade-offs:

- We should require 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 on others.
- We support restricting population growth in urban areas even if doing so slows economic growth.

### **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 that the right to use it is a private right. Maybe it's time to think of the access to water as a public right rather than as a private one. 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 17<sup>th</sup> 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 ones.

Today, a “public right” usually refers to the right of government to establish and control land or the airwaves for the common good. Of course, 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 that 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; an 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, even though it allocates use of such water through a permitting procedure that recognizes the rule of “first in time, first in right”. 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 between neighboring landowners who wanted the water for their crops, which is not the case today. Also it was once assumed that 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 right, especially when so many people have a pressing need for sufficient water for many different and important purposes.

Control and distribution of water, necessarily 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 democratically, 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 that satisfies everyone.

Whether the goal is more efficiency in the use of water, to conserve as much as possible, or to preserve a way of life like agriculture, it is necessary to set priorities that everyone can at least live with or go along with. This approach gives ordinary citizens a chance to deliberate together 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 that the state has a responsibility 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, to serve for a determinate period of time to recommend priorities on behalf of the public and to provide direction to state government with regard to them.
- Retain local control of water supplies through water districts or other entities. They reflect local concerns and interests to assure that

waters are valued and protected or sold for the interest of the local economy.

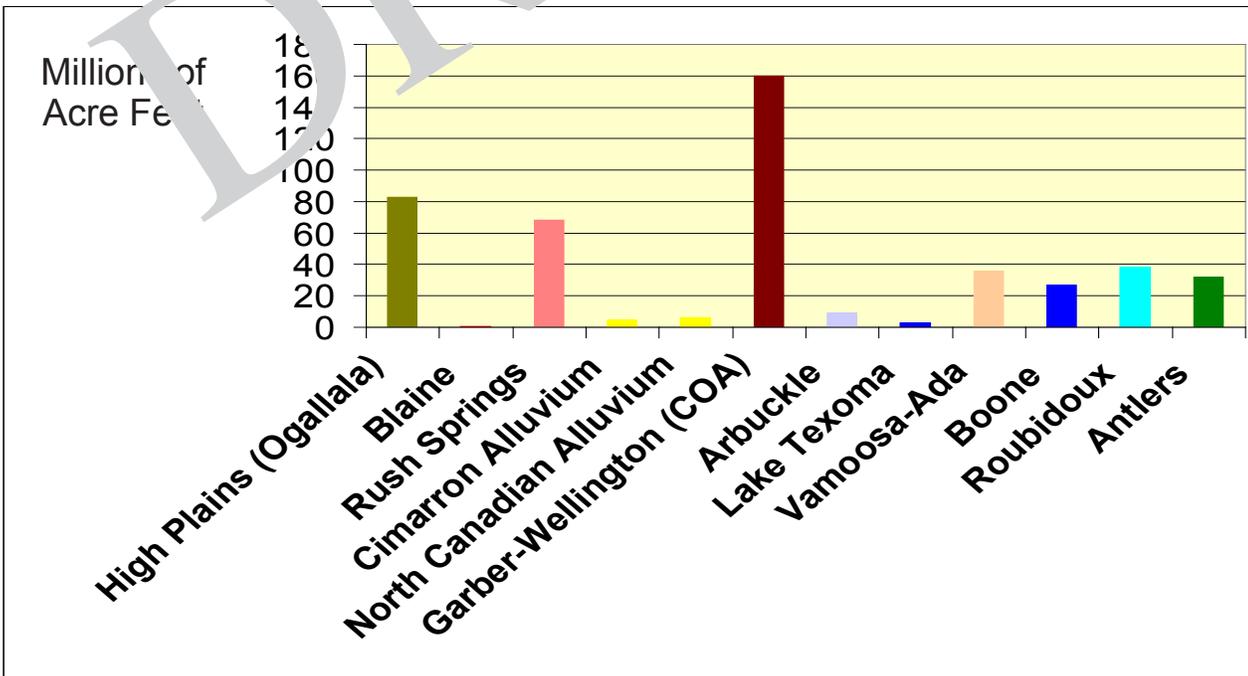
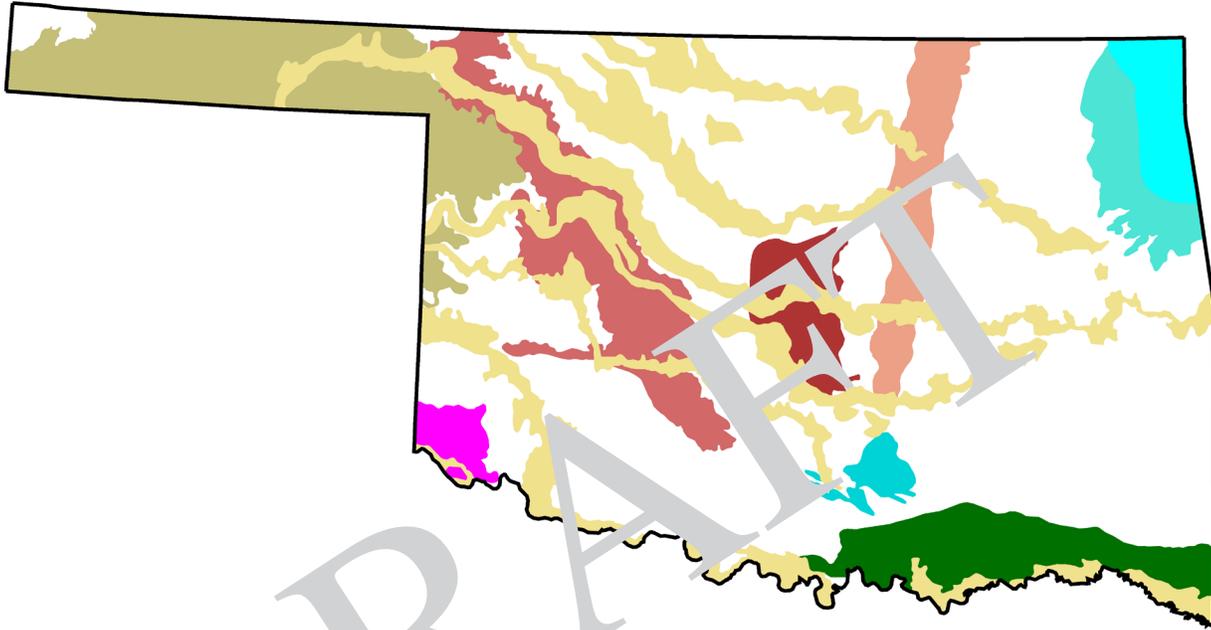
### What some might say in opposition to Approach 3:

- The existing system of laws, rules, and rights has stood the test of time and can be modified, if necessary, 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. This approach will shrink the agricultural sector requiring consumers to increase the amount of disposable income required to purchase food and other goods produced by Oklahoma agriculture.
- 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.

### Some possible trade-offs:

- 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 should allow Oklahomans to set priorities for water even if their decisions might have the effect of limiting population growth.
- We should allow Oklahomans to set priorities for water even if it reduces agricultural production in the state.

# Groundwater in Storage in Oklahoma's Largest Aquifers









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