Oklahoma Comprehensive Water Plan & Water’s Role in Agriculture

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AGRICULTURE’S ROLE IN THE COMPREHENSIVE STATE WATER PLAN

- Sustainable agricultural industry essential to Oklahoma
- Water access essential to the success of agriculture and to the future of the state’s economy
- The current state of knowledge limits scientific ability to evaluate future access to water and water supply
Water’s Role in Agriculture

- Water accounts for 100% of the agricultural economy
- Direct impact for Oklahoma agriculture sector in 2008, including production and processing-- $20.3 billion
  - Total impact of agriculture sector on Oklahoma economy was estimated at over $28 billion
- Average streamflow and groundwater recharge would likely be lower were it not for the existence of crop production agriculture and the stewardship of agricultural land managers
- Farms cover 35 of Oklahoma's 44 million acres, they are the first recipients, first users, and first managers of around 75-80% of Oklahoma's precipitation
Water Supply Issues in OK

Plenty of water...

- 23 major groundwater basins w/ 320 mil. acre-feet
- 1120 square miles of water area in lakes & ponds & over 78,000 miles of rivers & streams
- Oklahoma Water supply
- 34 mil. ac-ft/yr flows out of state via Ark. & Red River basins
- Allocated stream water use is 2.6 mil. ac-ft/yr

Problem is Allocation – getting it where, when, how much and at a price we want
Oklahoma water resources under pressure

More weather volatility
Lack of Investment
Growing population
Invasive species
Water uptake
Economic development
Water quality diminishes
Ethanol production
Unknown/ unexpected event(s)
Tribal rights
Changes in water law/ rights
Texas rule of capture
Thirsty neighbors

20 years ago, how many of these were unexpected events?
Oklahoma water under pressure, but changes in demand and supply

- Re-use petro pumping water
- Wetland use
- Assigning Property rights
- Conservation
- Investment in water infrastructure
- Development of new structures
- Drought/flood management
- Unknown/Unexpected Events?
- Increase the price of water
- OK Water Resources
- Red cedar eradication
- Desalinate water
- Re-use water
- More efficient Irrigation systems
- Drought tolerant plants
Research/Education Recommendations

- What is the annual water balance for watersheds?
- What is the influence of farmland management practices on rainfall partitioning and water production?
- How are trends in land use and land cover impacting the hydrology of watersheds?
- How will climate change influence the water balance?
- How can Oklahoma’s world leadership in remote sensing research & Mesonet capabilities be used to develop decision support systems to forecast changes to water use & availability due to climate variability, conservation practices, public policy, & land-use change?
- How can Coop Extension programs be developed & delivered to assist ranchers, farmers, other landowners, & rural communities to adopt management to increase resilience & reduce vulnerability to climate variability?
• What horticultural practices could be phased in over time to lower water consumption (Xeriscape, low-input irrigation, rain barrels, bioretention ponds, rain gardens, etc.)?

• How could gray water be better recycled?

• What water conservation/reuse-recycling options best fit Oklahoma & what are the most expedient and efficient options for managing water use conflicts?

• To what extent will exurban development influence ground water use, especially riparian water use through demand created by large, irrigated gardens & other domestic-use demands for water as allowed in the current statute?

• How will livestock water requirements change with changing production/market environments?
Fish pee in there you know.
Water’s Role in Agriculture

Livestock production and aquaculture account for about 12% of water use in the state.

Irrigation is the number one use of Oklahoma water (35-40%).

Forests and rangelands are important to Oklahoma because of economic impact and ecosystem services.

Horticulture and urban landscaping are also important.

Other potential benefits—renewable fuel, pharmaceutical assets, carbon offsets and other environmental assets; feeding a hungry world.

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Hypothetical Correlation between Land in Farms and Level of Ecosystem Services

- **Initial Development:**
  - Farms increase at cost to Ecosystem

- **Maturation phase:**
  - Landowners recognize value in Ecosystem

- **Mature phase:**
  - Landowners maintain/enhance Ecosystem; Public supports private sector investment in Ecosystem

**Acres; Benefits**

**Land in Farms**

**Ecosystem Services**

**Time**
Oklahoma Water profile

- Irrigation: 30-40%
  - Groundwater: 75-87% of irrigation water supply
- Residential/Commercial: 30-40%
- Livestock: 12%
- Thermoelectric: 8%

But, some “consumptive use” returned to watershed.

- Groundwater: 75-87% of irrigation water supply
Ecosystem Services

- Benefits that people and other living species gain from environmental assets and natural capital stocks
  - wildlife habitat
  - clean water and air
  - productive soil
  - stable plant and animal communities
  - Environmental assets that are the basis for outdoor recreation opportunities