Water use in New Mexico and Oklahoma in 2005

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For Tribal Water Plans, Ecological Flows, Drought, and Climate Change Class

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- Water-use data are vital for understanding hydrologic systems and planning for future population growth and development.
- USGS staff compiles water-use data by counties, and in some cases by aquifer or drainage basin, every 5 years.
- The National Water-Use Information Program of the USGS is responsible for compiling and disseminating the Nation's water-use data.

The goals of this program are to:

- Analyze the source, use, and disposition of water at different scales
- Document trends in water use in the United States
- Cooperate with other agencies on projects
- Develop water-use databases
- Publish local, state, and national water-use data reports
- Reply to water-use information requests from the public

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1950

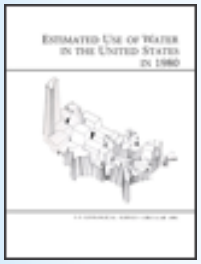
1955

1960

1965

1970

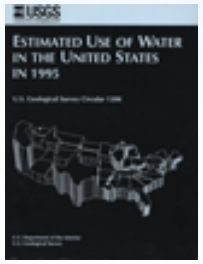
1975



1980

1985

1990



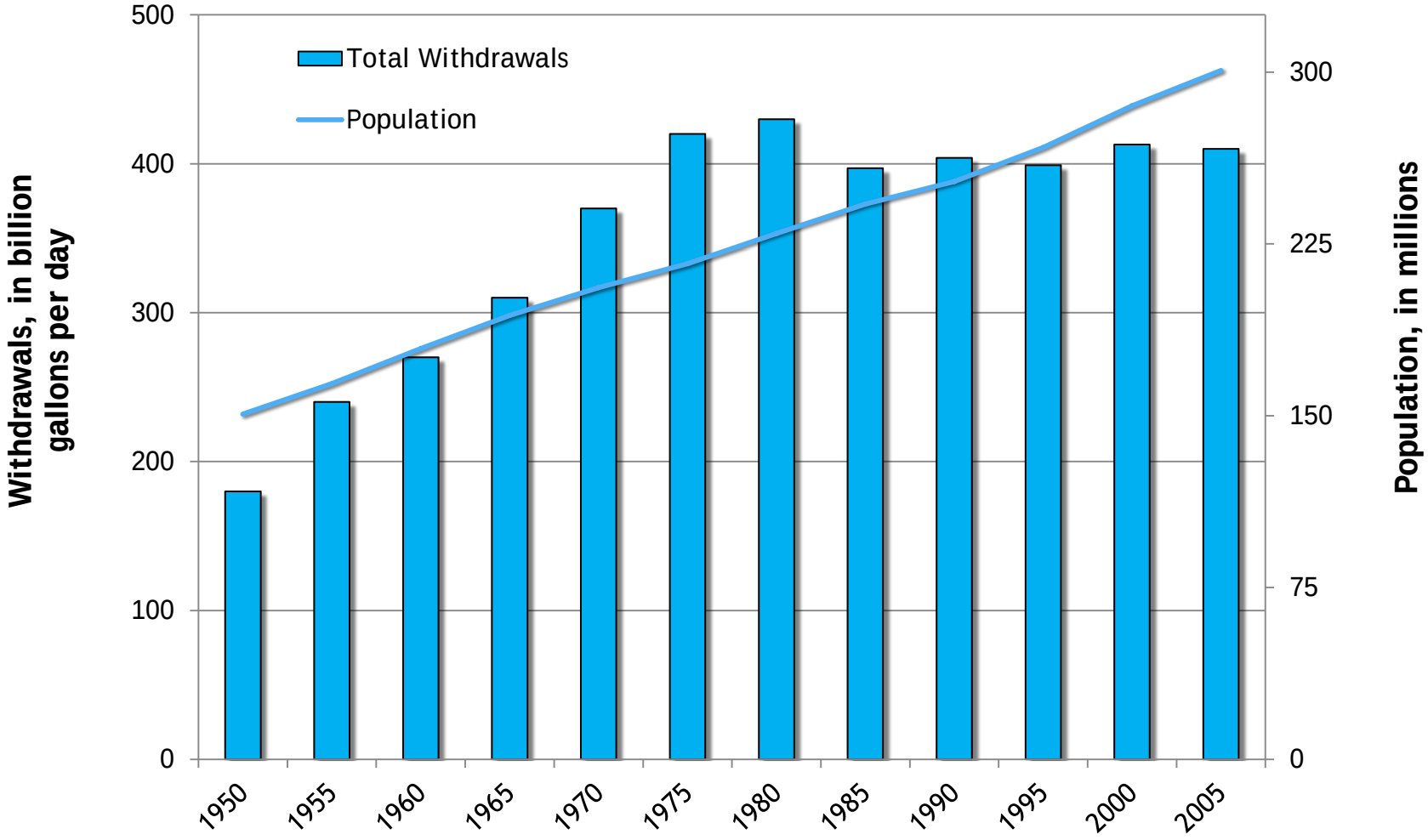
1995

2000

2005

- The reports, “Estimated Water Use in the United States,” have been published every 5 years since 1950 and are one of the most widely cited publications of the USGS.
- Water-use data are in great demand for planning purposes.
- Dozens of other reports have been published by State or other areas.
- Results from these compilations have been used in hundreds of other reports for local areas, such as the recently published USGS Scientific Investigations Report 2013-5010, which supplies information to be used for development of a Water Plan by the Citizen Potawatomi Nation.

Trends in U.S. population and total withdrawals, 1950-2005



Water withdrawals by category (all of U.S. in 2005)

Livestock

Less than 1 percent

Self-Supplied Domestic

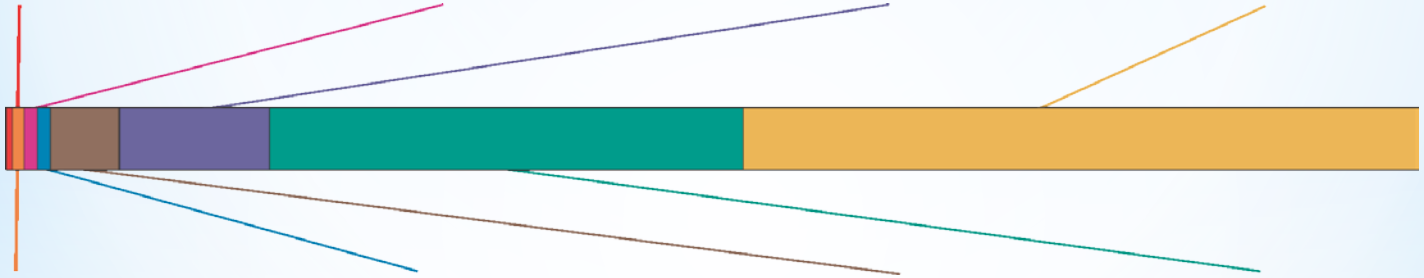
1 percent

Public Supply

11 percent

Thermoelectric Power

49 percent



1 percent

Mining

2 percent

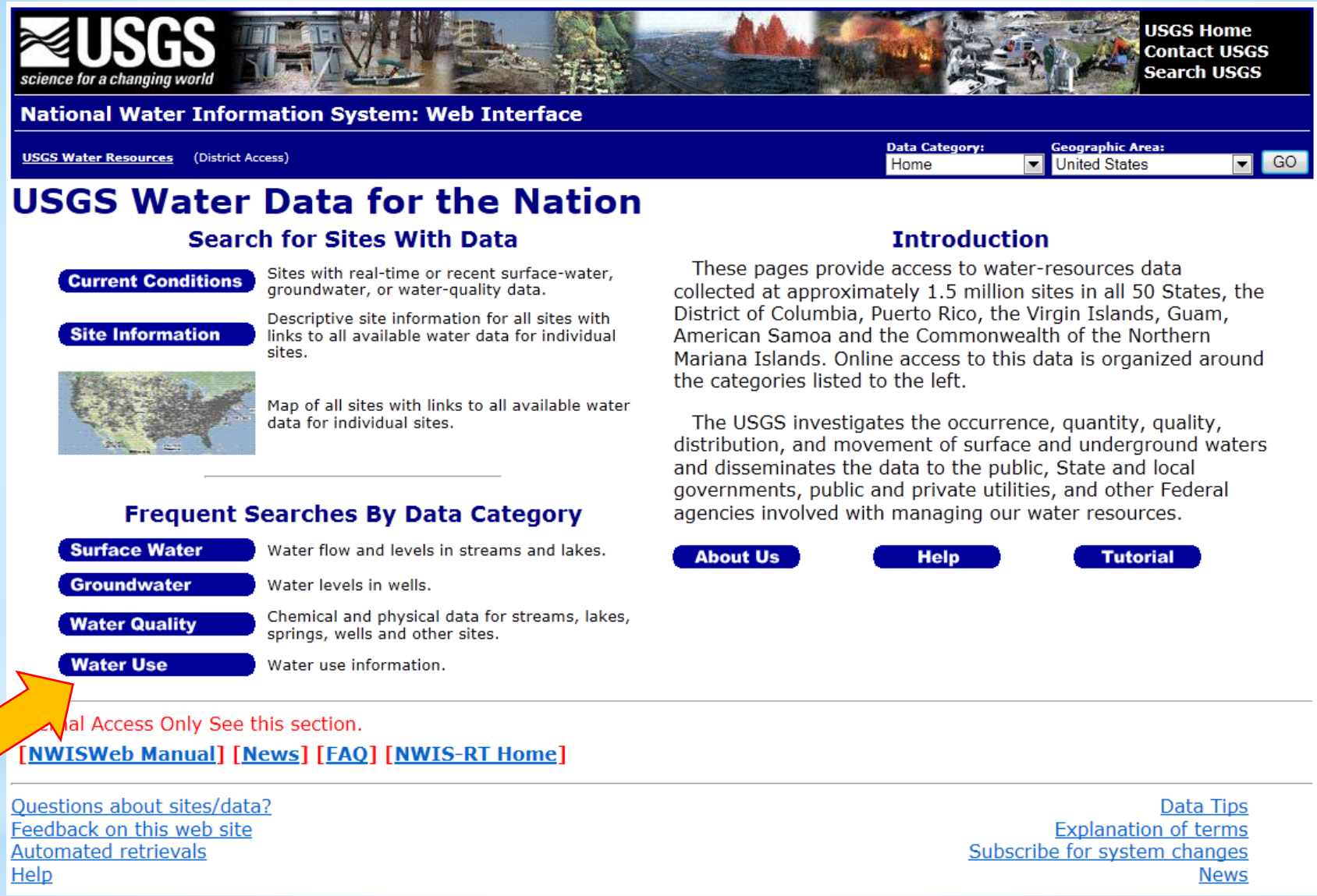
Aquaculture

4 percent

Self-Supplied Industrial

31 percent

Irrigation



Water-use data from 2005 compilations and before are available in reports and through the USGS NWIS-Web system, along with our other hydrologic data at http://waterdata.usgs.gov/nwis. Data from the 2010 compilation should be online late this year.

Mandatory reported water-use categories in 2010 included:

- Public supply
- Domestic
- Industrial
- Irrigation
- Livestock
- Aquaculture
- Mining (including oil & gas)
- Thermoelectric (cooling power plants)

Mandatory aggregation is by county only, though if funds are available, water-use data also can be aggregated by 8-digit hydrologic unit codes (watersheds) and by aquifer.

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Estimating water use

- In many cases, coefficients are used to estimate unmetered water use such as for domestic per capita use, livestock, crop irrigation, and consumption (water that is evaporated or incorporated in products).
- Multiple supplementary data sources are used, such as population numbers of humans and livestock, crop acreages, weather data, and comparisons to previous compilations, so considerable adjustments may be made to the raw, self-reported numbers.
- Because most water-use data are unmetered and self-reported, most of these data are **estimates**!

Let’s look at some water-use data from 2005

- In 2005, the population of New Mexico was 1.928 million, and the population of Oklahoma was 3.543 million.
- Total fresh groundwater use in New Mexico was 1677.03 million gallons per day (MGD) and in Oklahoma was 565.36 MGD.
- Total fresh surface water use in New Mexico was 1654.90 MGD and in Oklahoma was 972.55 MGD.
- No saline groundwater or surface-water use was estimated in New Mexico, whereas 189.97 MGD of saline groundwater use was estimated in Oklahoma, primarily for waterflooding of oil fields for residual extraction.
- Note that different sources of data with varying accuracy and different coefficients were used in these state compilations.
- The 2010 water-use compilation is being finalized and is not yet ready for release.

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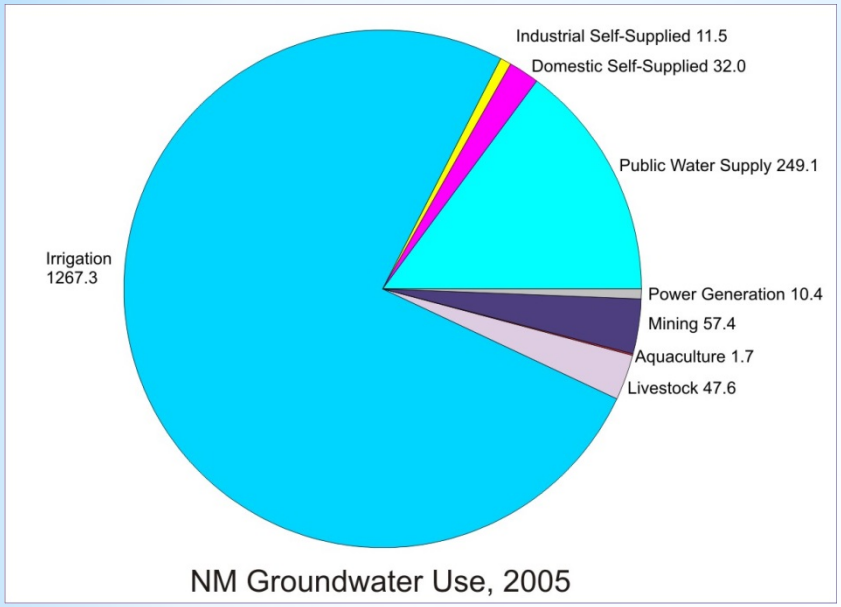
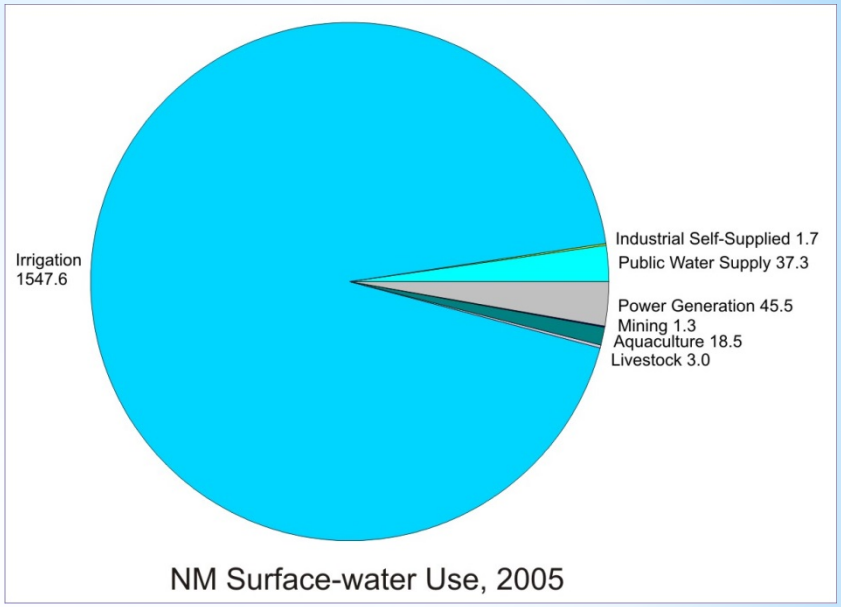
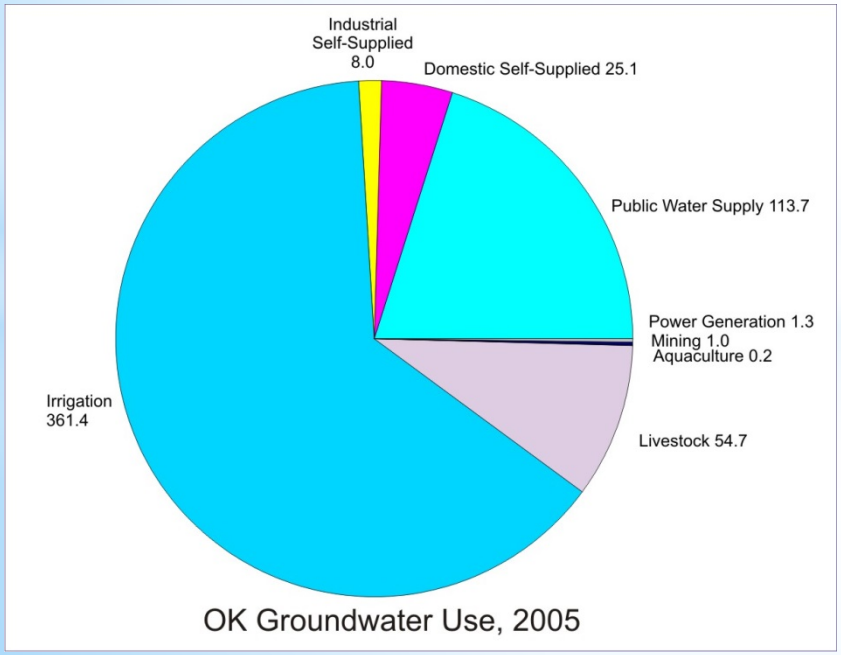
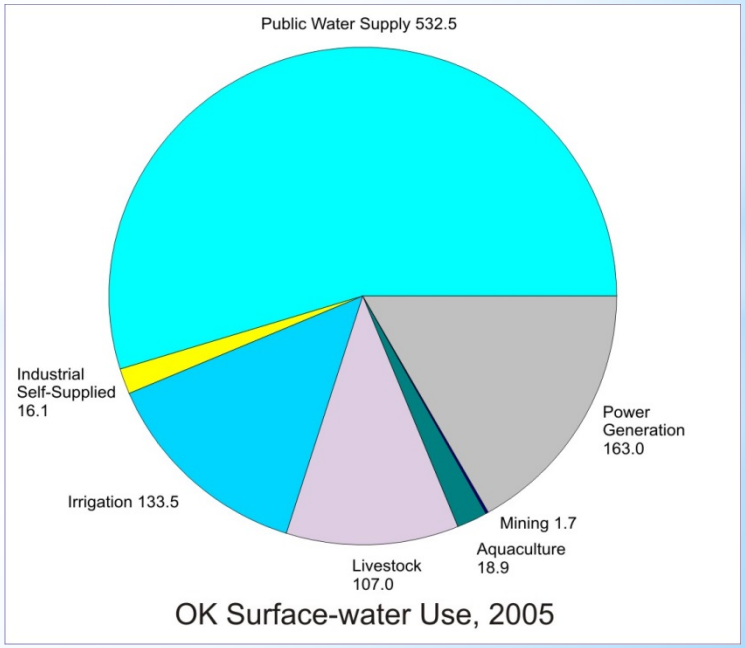
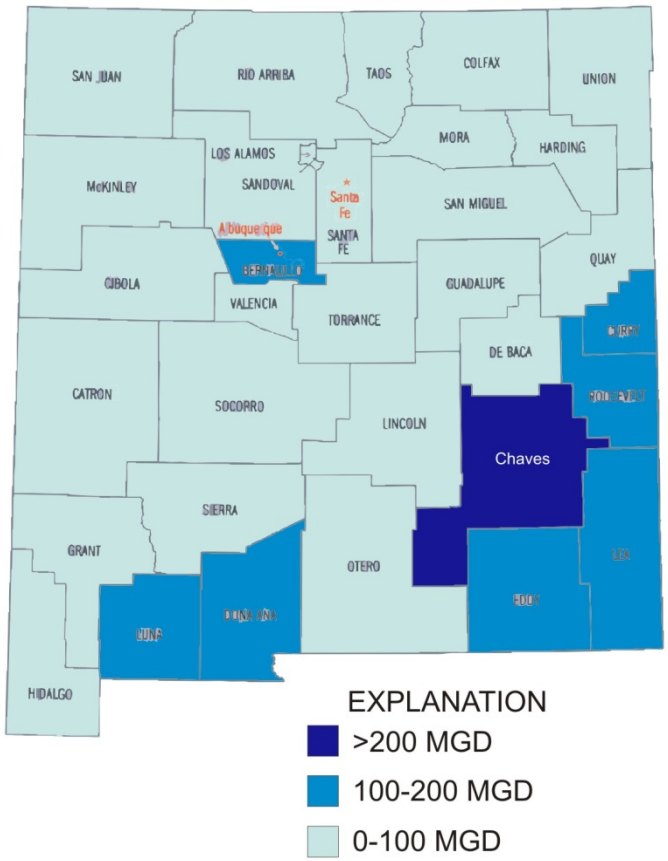
Water uses by category, NM and OK in 2005



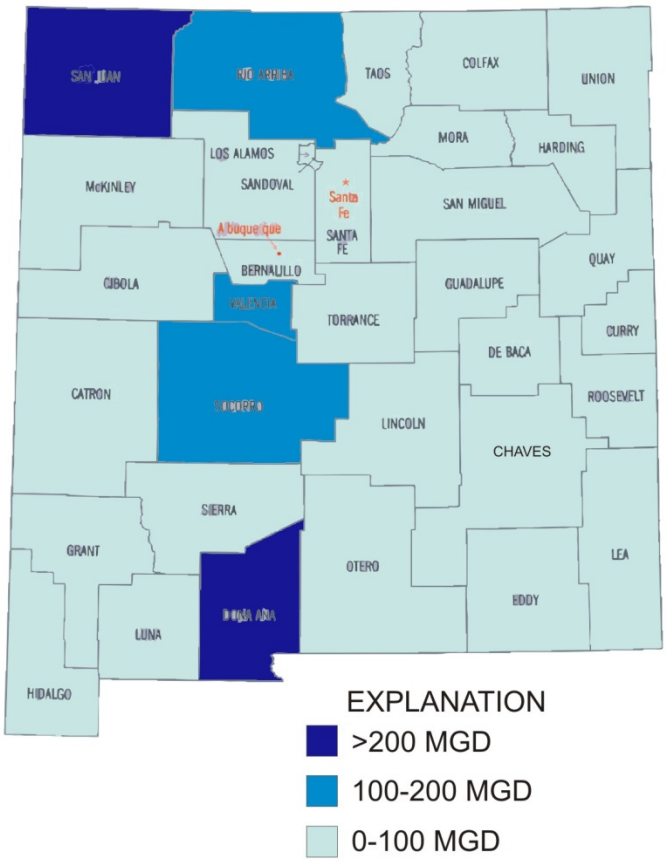








Groundwater use in New Mexico, 2005



Surface-water use in New Mexico, 2005

Largest freshwater withdrawals were associated with irrigation.

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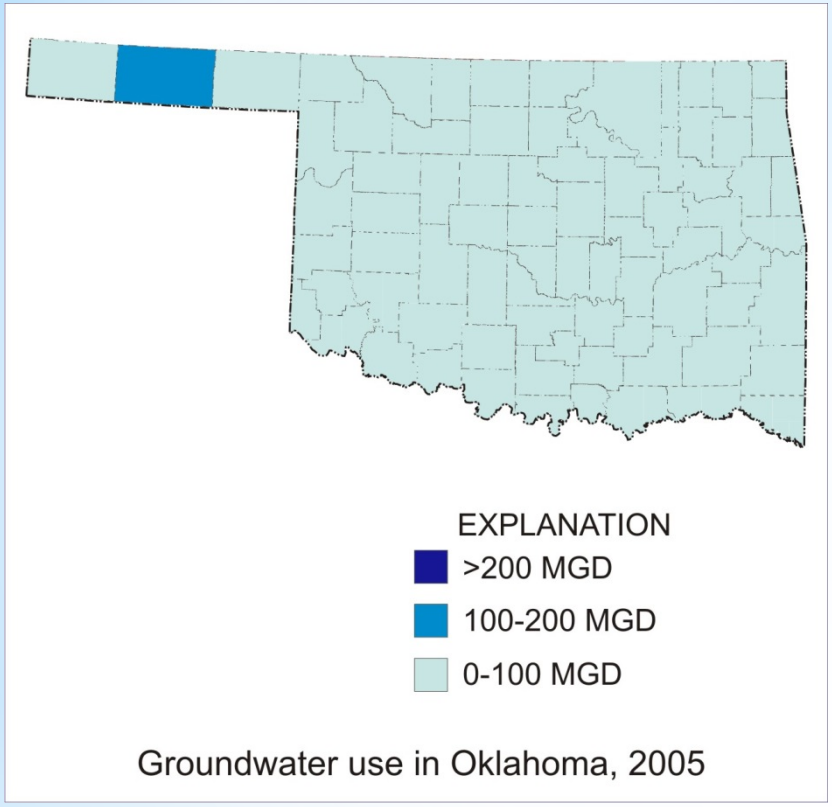

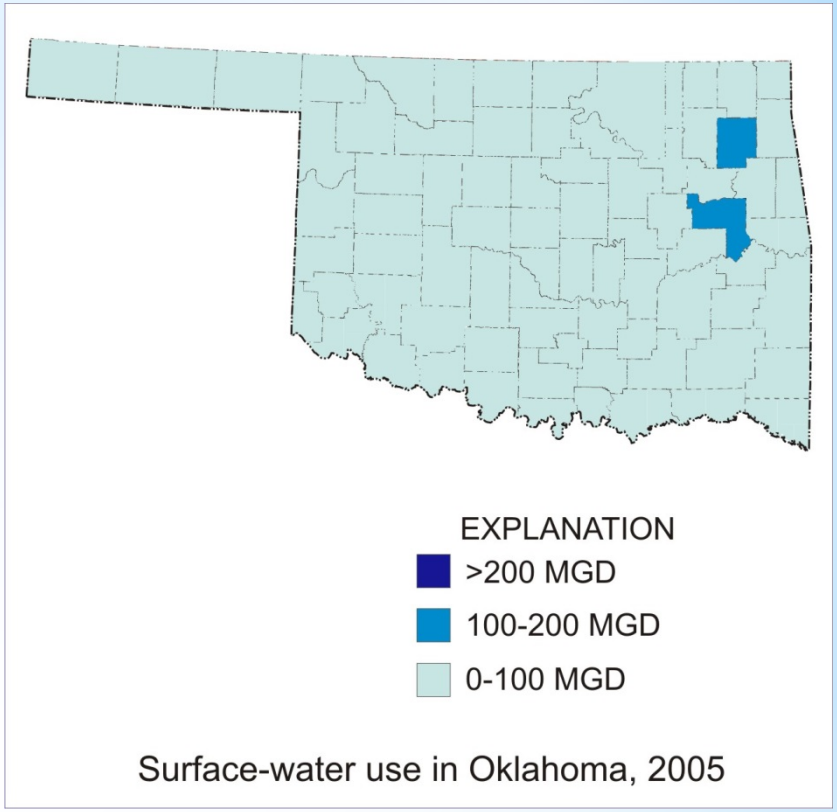

The large fresh groundwater withdrawal in Texas County is related to irrigation.

The large fresh surface-water withdrawals in Mayes and Muskogee Counties are related to public-supply and thermoelectric withdrawals, respectively.

Changes to Oklahoma water use in 2010 and additional thoughts

- Only data for the mandatory categories by county (not HUC or aquifer) were compiled in 2010.
- National coefficients for livestock water use were used to be more consistent for the National compilation. Dropping higher coefficients previously used will reduce livestock water use by ~30%.
- The Oklahoma Corporation Commission is collecting much more data about saline-water injection and OWRB temporary permit numbers for oil and gas were used for the first time, so fresh and saline water-use estimates for mining will increase substantially.
- Changes in estimation of water used for powerplant cooling will increase withdrawal estimates in the thermoelectric category.
- Water-use data can be used for a variety of planning purposes. In the context of tribal water plans, these withdrawals (and proportions of those withdrawals consumed, which range from several percent to 100%) should be compared to streamflow ranges and amounts of sustainable yields estimated for aquifers.

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Questions?