USGS Water Availability and Use Science Program

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Mindi Dalton is the Deputy Program Coordinator for the USGS Water Availability and Use Science Program (WAUSP). Her role in WAUSP focuses on promoting successful research related to components of the water budget as well as stakeholder engagement. In addition, she coordinates the USGS Water Use Data and Research program, a financial assistance program focused on the improvement of water use data and methodology development at the State level. Prior to WAUSP, she helped coordinate the USGS National Water Census, part of the Department of the Interior's WaterSMART initiative and has worked with the Department of the Interior's Climate Science Centers. Her USGS career began as a hydrologist at the Georgia Water Science Center and she still resides in Atlanta, GA with her husband Brendan, son Patrick, and dog Charlie.

ABSTRACT

A key part of achieving the US Department of the Interior's sustainability goals is informing the public and decision makers about the status and trends of the nation's water resources. To achieve these goals the USGS has implemented a National Water Census (NWC) to provide a more accurate picture of the quantity of the nation's water resources and improve forecasting of water availability for current and future economic, energy production, and environmental uses. In 2016, to streamline water sustainability activities, the USGS realigned all water availability and use oriented research, including the NWC, within a new Program - the Water Availability and Use Science Program (WAUSP).

WAUSP supports producing a current, comprehensive scientific assessment of the factors that influence water availability through development of nationally consistent datasets on the status and trends of water budget components (precipitation, streamflow, groundwater, and evapotranspiration), as well as human water use; improving the current understanding of flow requirements for ecological purposes; and evaluating water-resource conditions in selected river basins, or Focus Area Studies, where competition for water is a local concern.

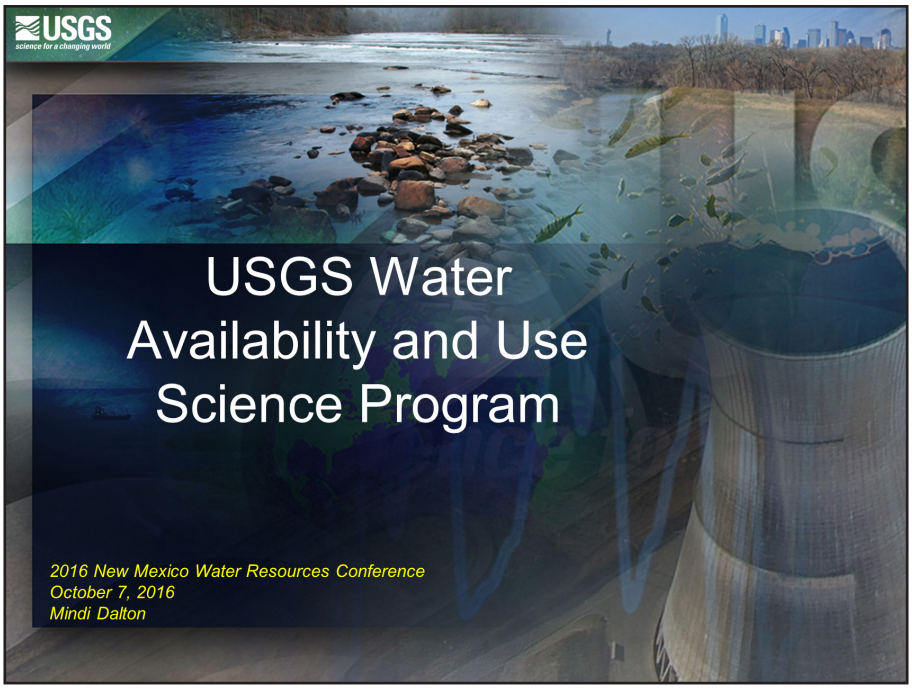

Figure 1. Introduction.

Figure 2. The World Economic Forum (WEF) identified water crises as one of the most likely and impactful world economic risks, intrinsically linked to the other two top rated risks that are directly influenced by water availability.

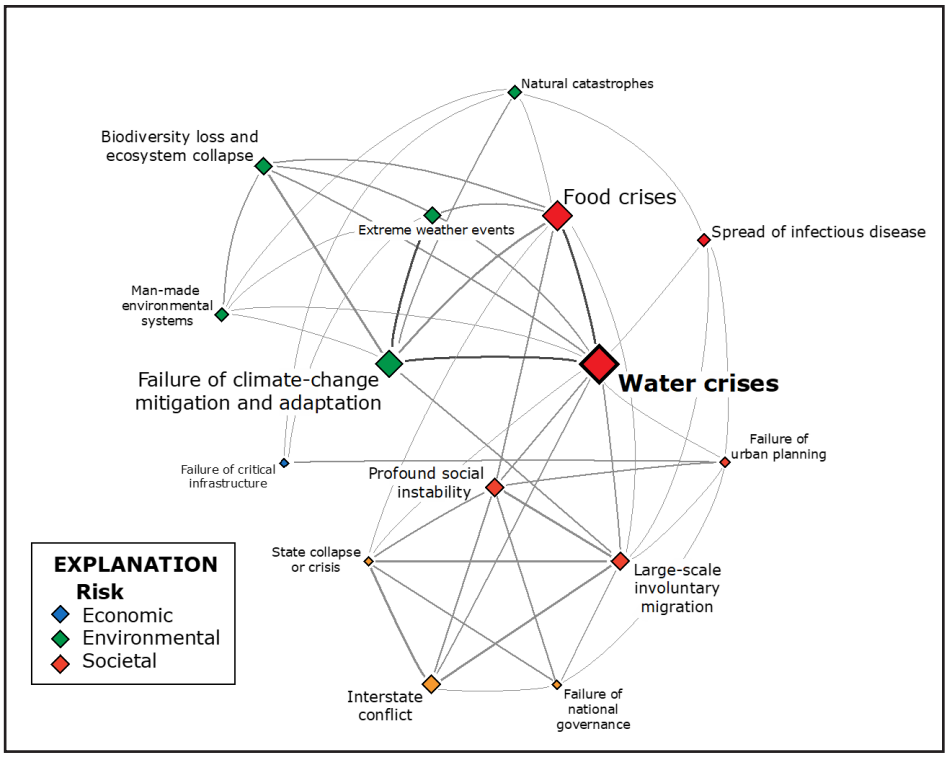

Figure 3. Water functions as the nexus of environmental and societal/economic concerns.

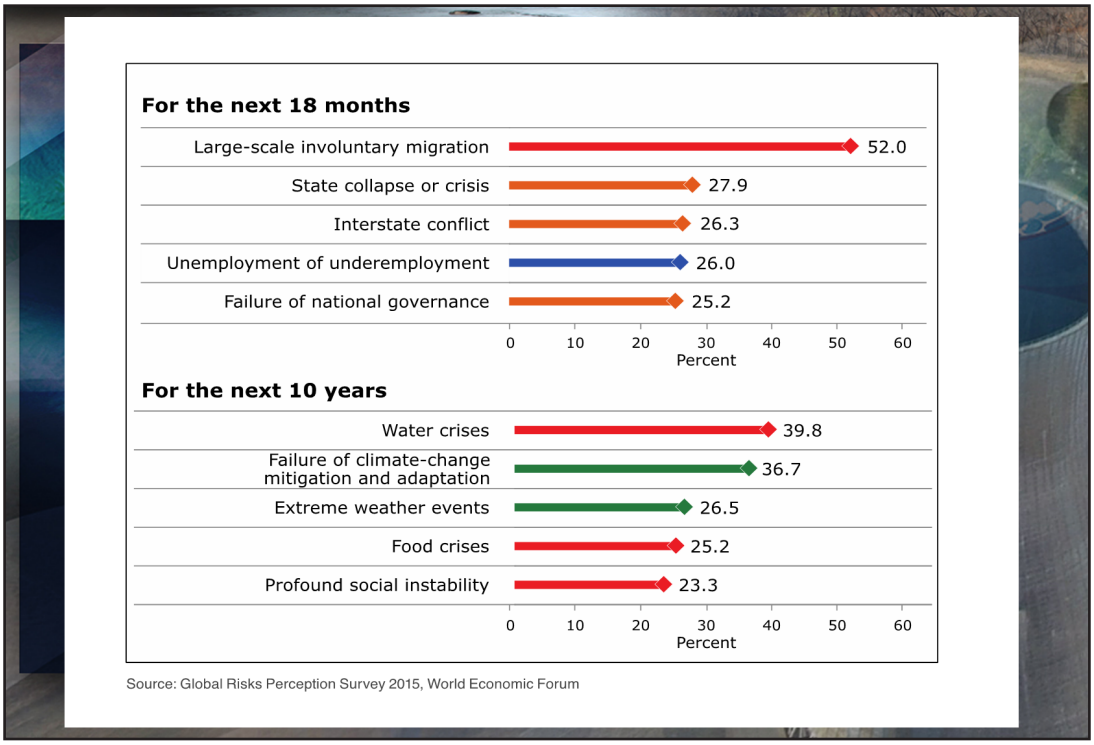

Figure 4. While over the next 18 months the WEF is mostly concerned about societal/governmental crises due to political unrest and terrorism, WEF identified water crises as one of the most likely and impactful world economic risks over the next 10 years.

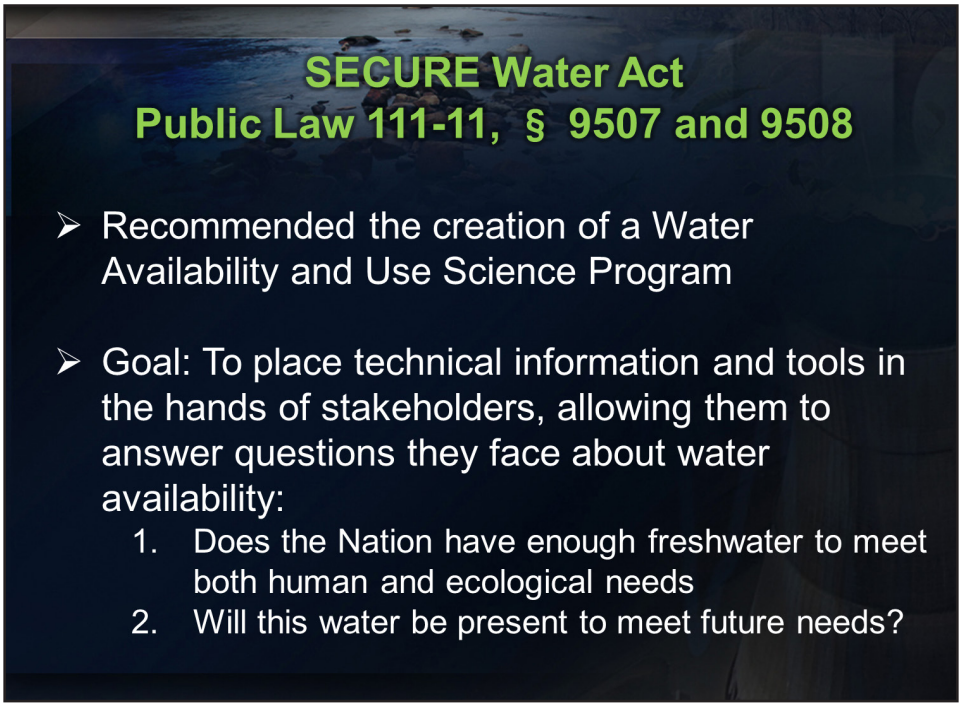

Figure 5. SECURE Water Act passed in 2009.

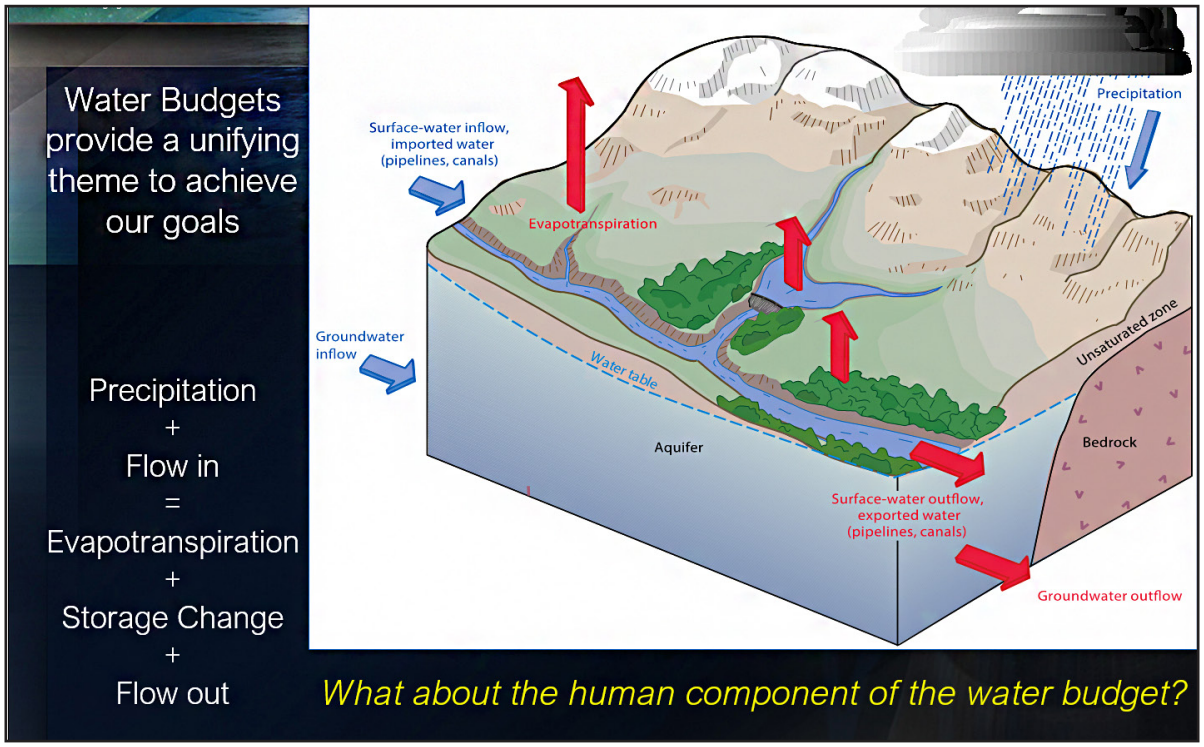

Figure 6. The Water Availability and Use Science Program (WAUSP) approach.

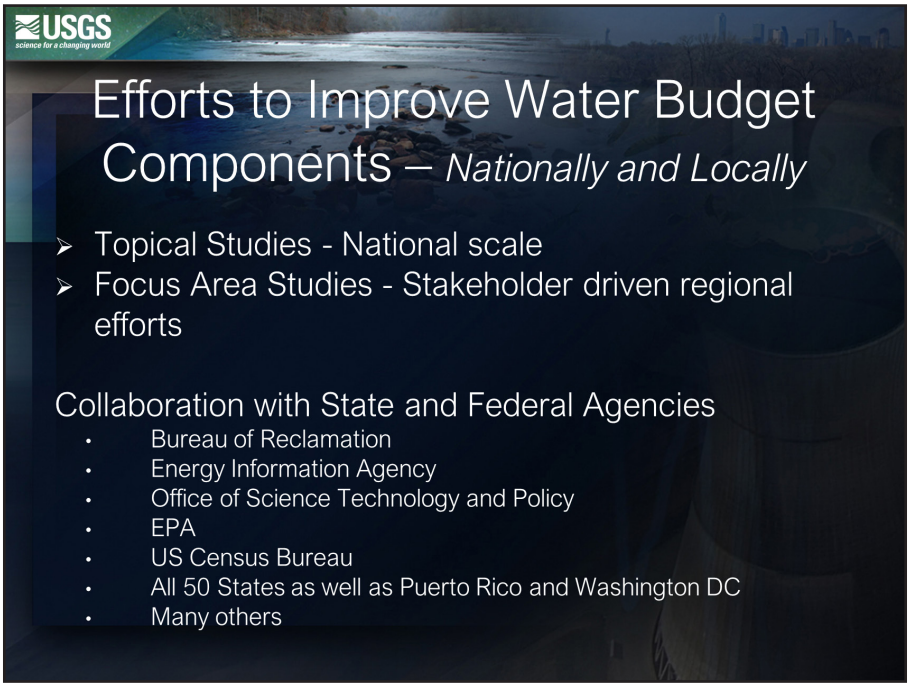

Figure 7. In WAUSP, we look to improve water budget components through topical studies and Focus Area Studies (FASs) in additional to collaborating with other USGS Mission Areas and other State and Federal Agencies.

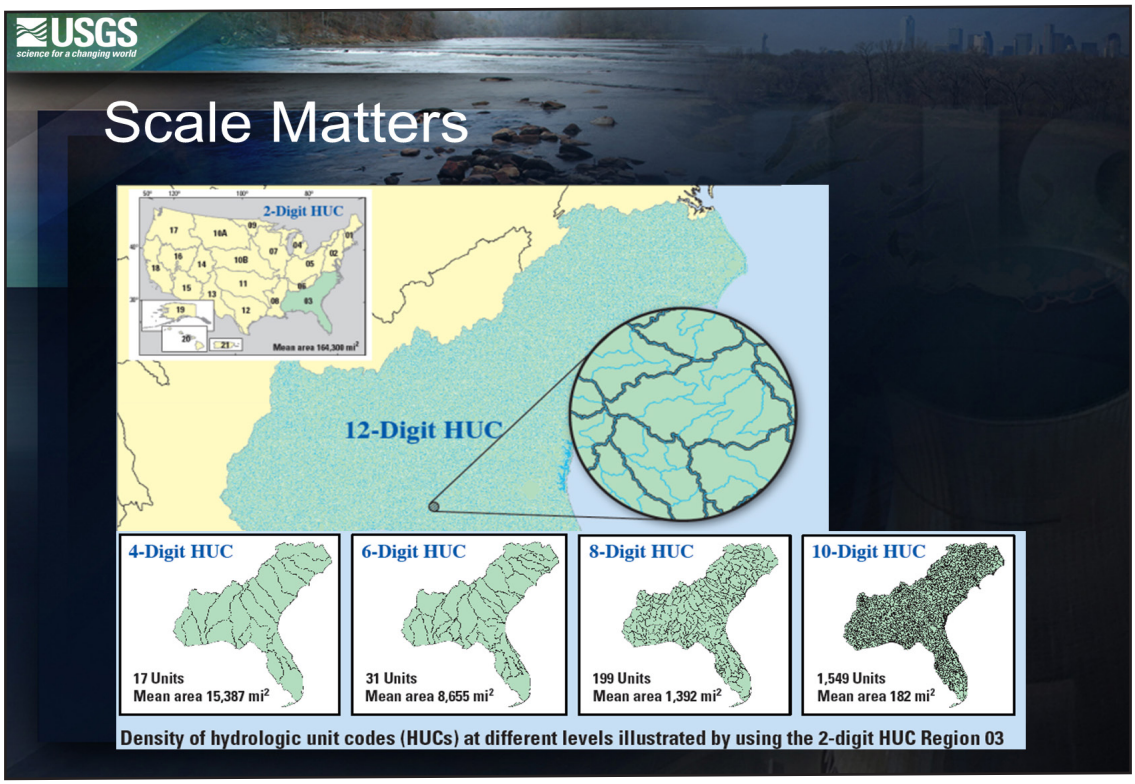

Figure 8. Scale matters. The Water Census will be working at the HUC-12 scale, which is demonstrated on this figure. There are 103,400 HUC-12s in the US. On temporal scale, we will work on a daily time-step for components like streamflow, ET, precipitation, etc.

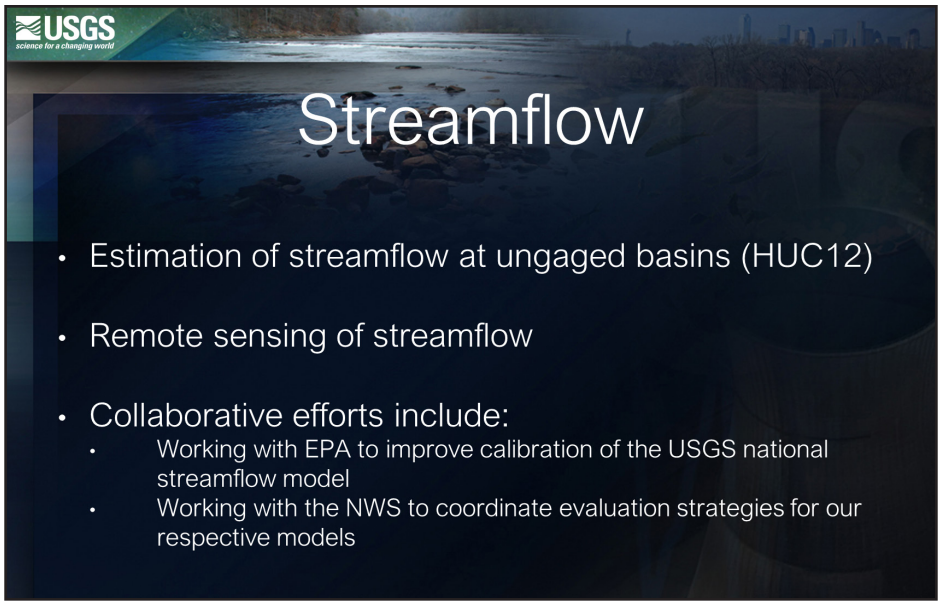

Figure 9. In addition to the national network of streamgages, the USGS is working to develop models that provide estimates of streamflow when we don't have record or when we don't have monitoring capabilities. In remote areas, like Alaska, we are working on developing methods to use remote sensing to provide estimates of streamflow and using that data to develop watershed models. Several talks during the conference will be focused on these techniques specific to Alaska.

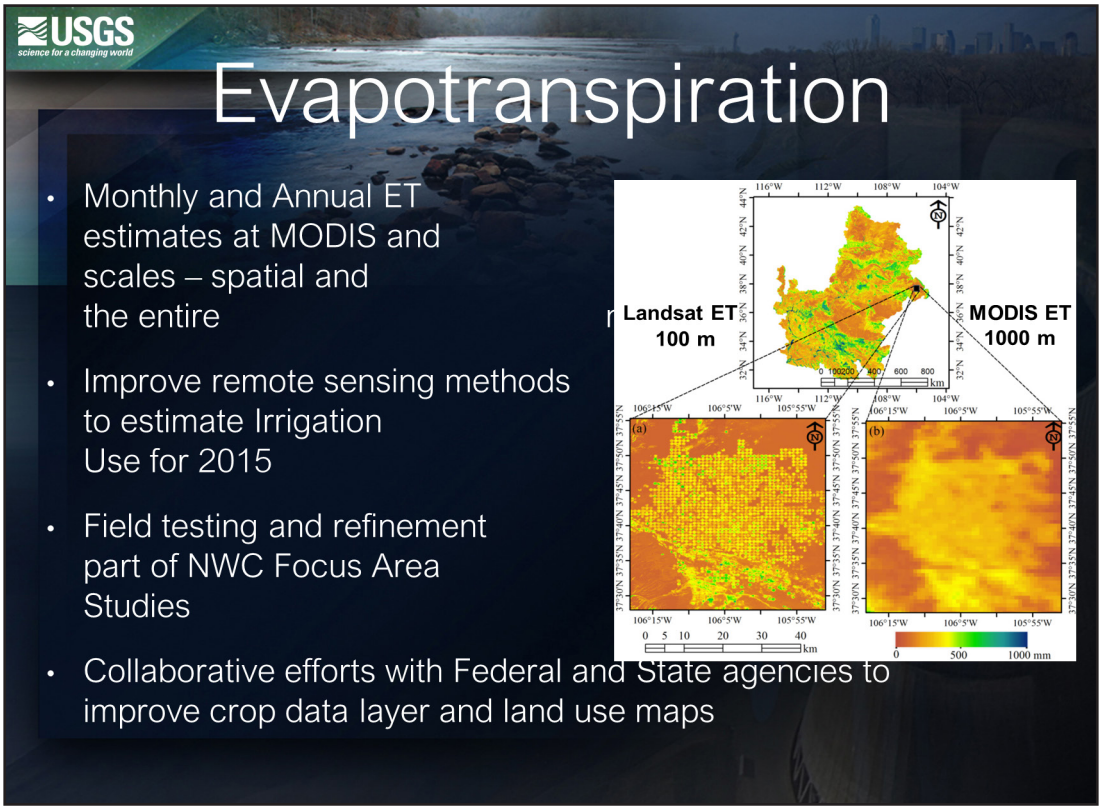

Figure 10. Evapotranspiration.

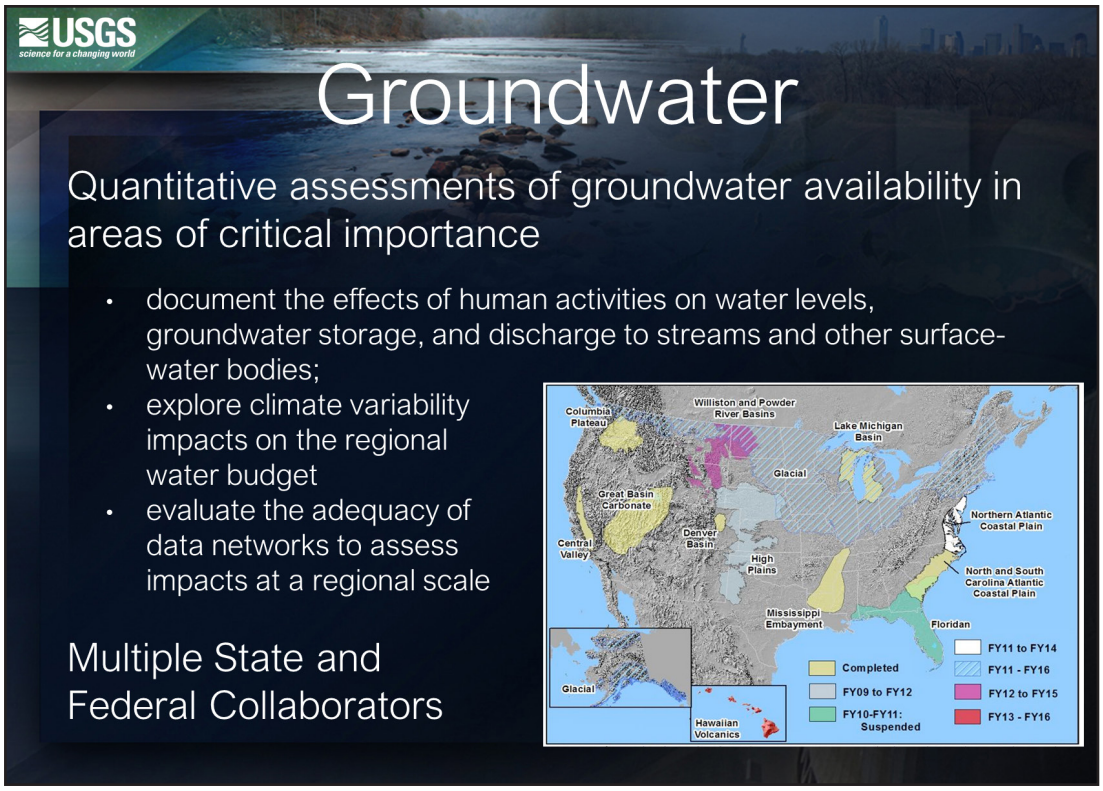

Figure 11. Groundwater.

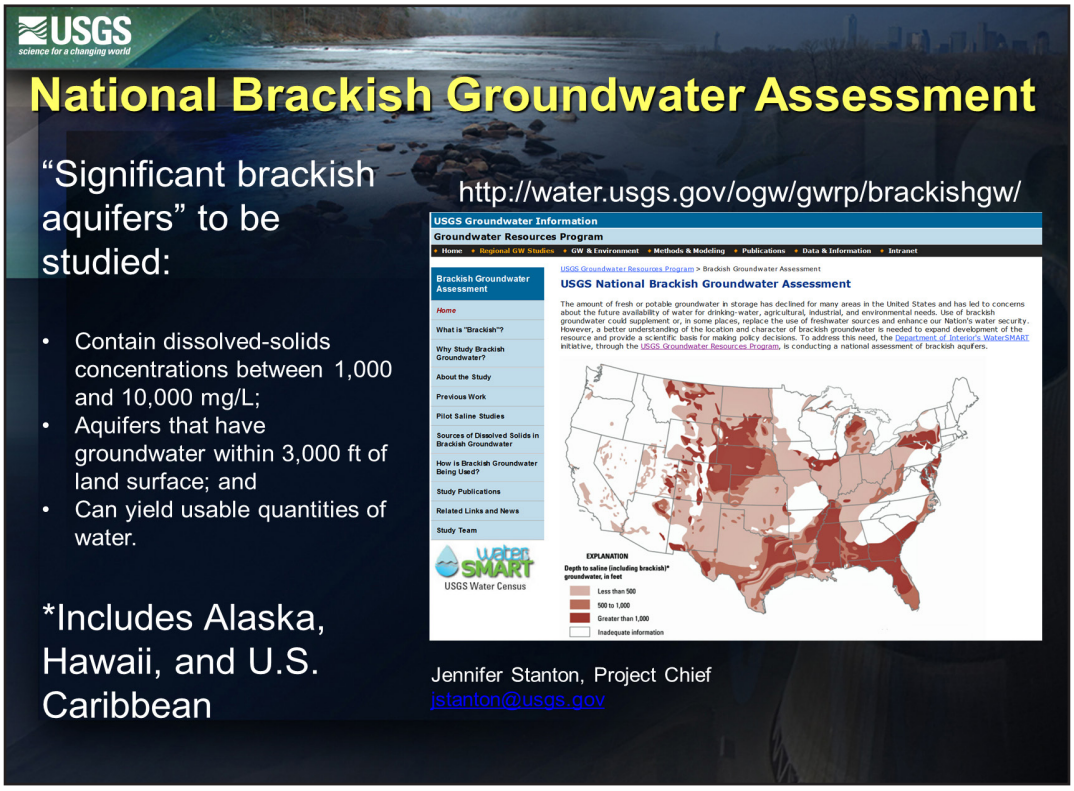

Figure 12. National Brackish Groundwater Assessment.

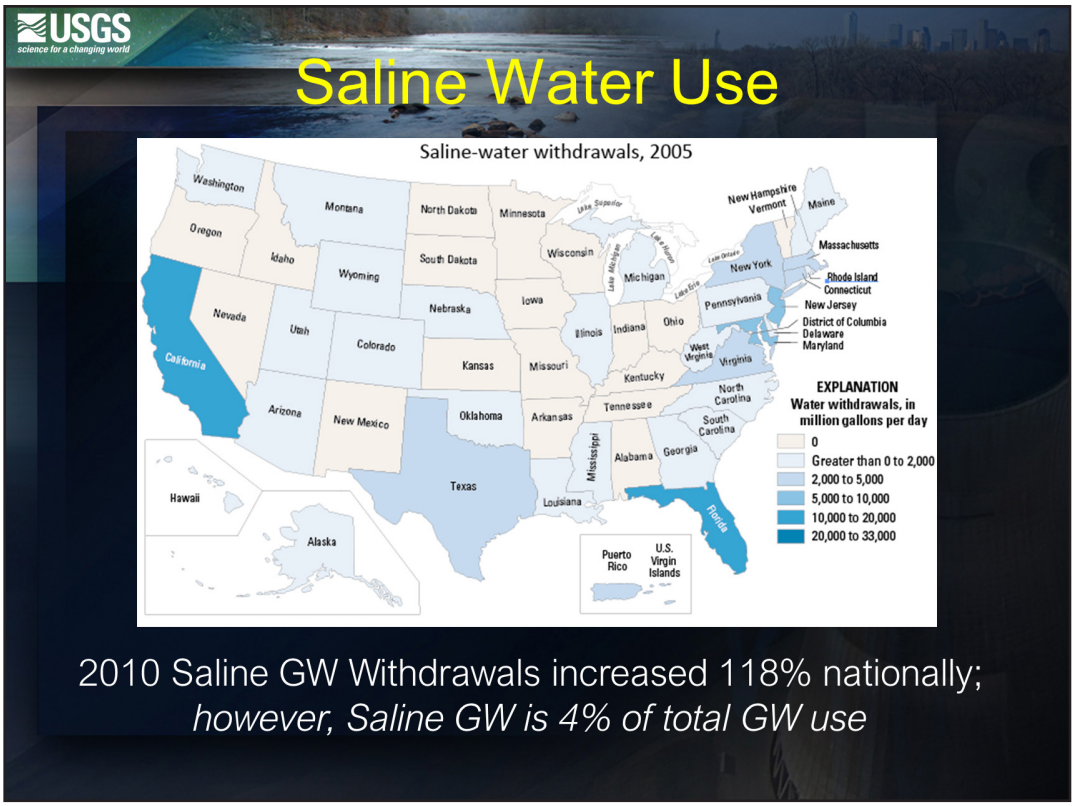

Figure 13. Saline water use.

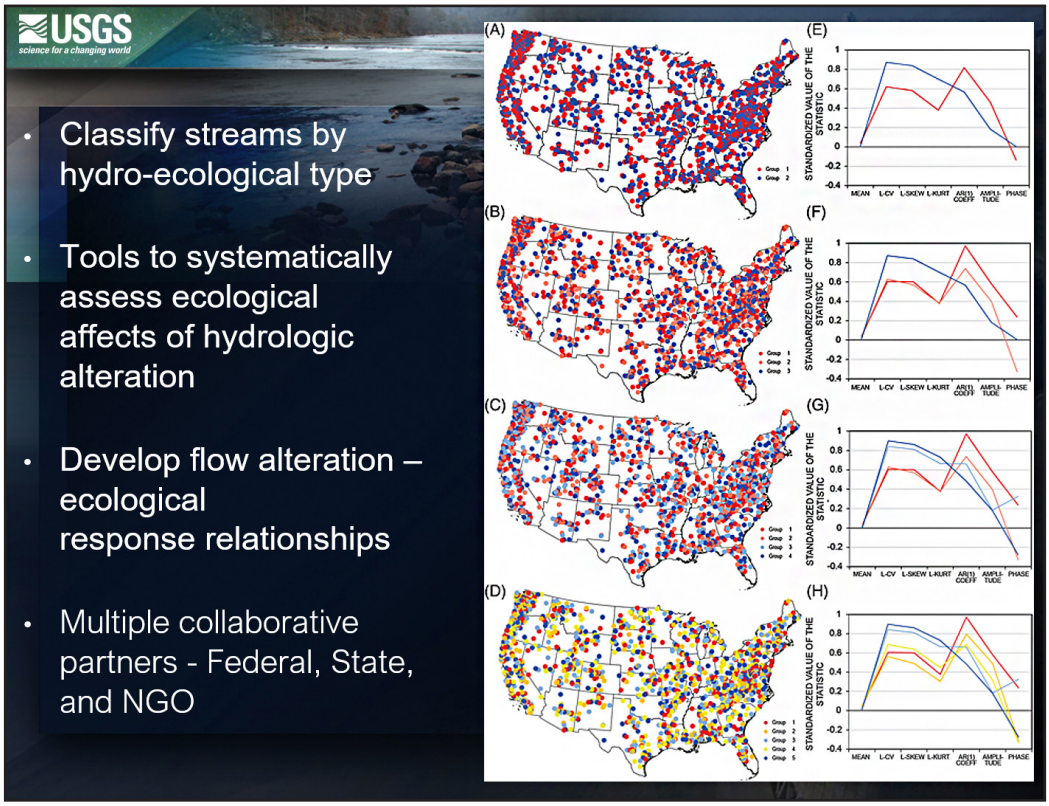

Figure 14. Ecoflows.

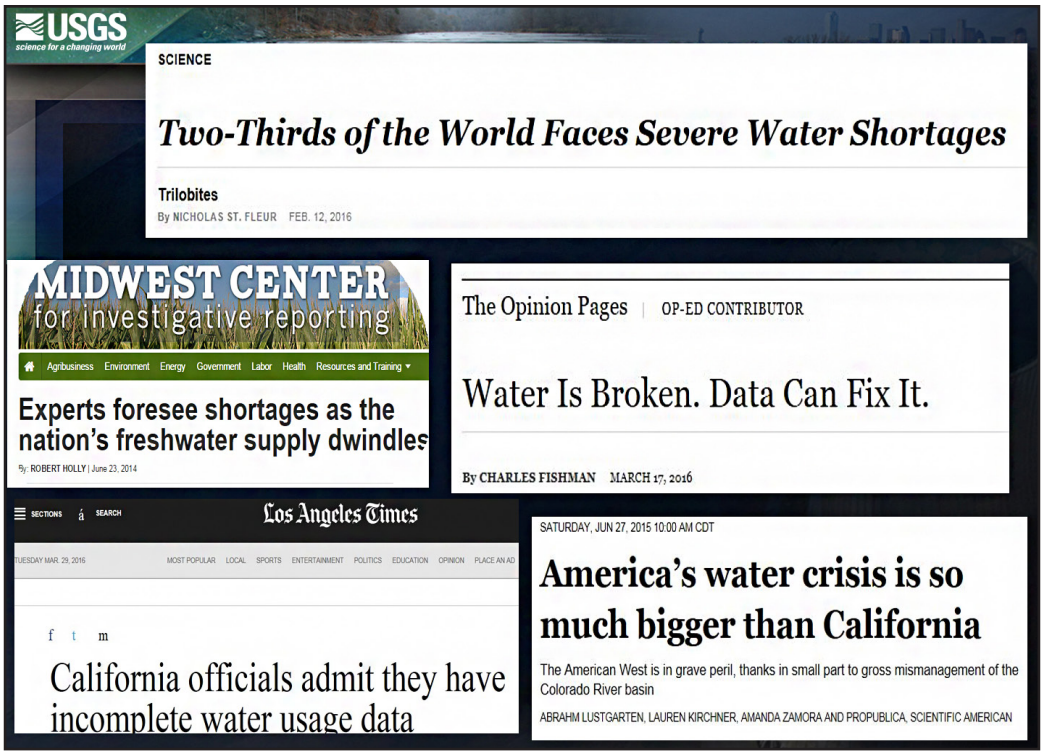

Figure 15. Why water use?

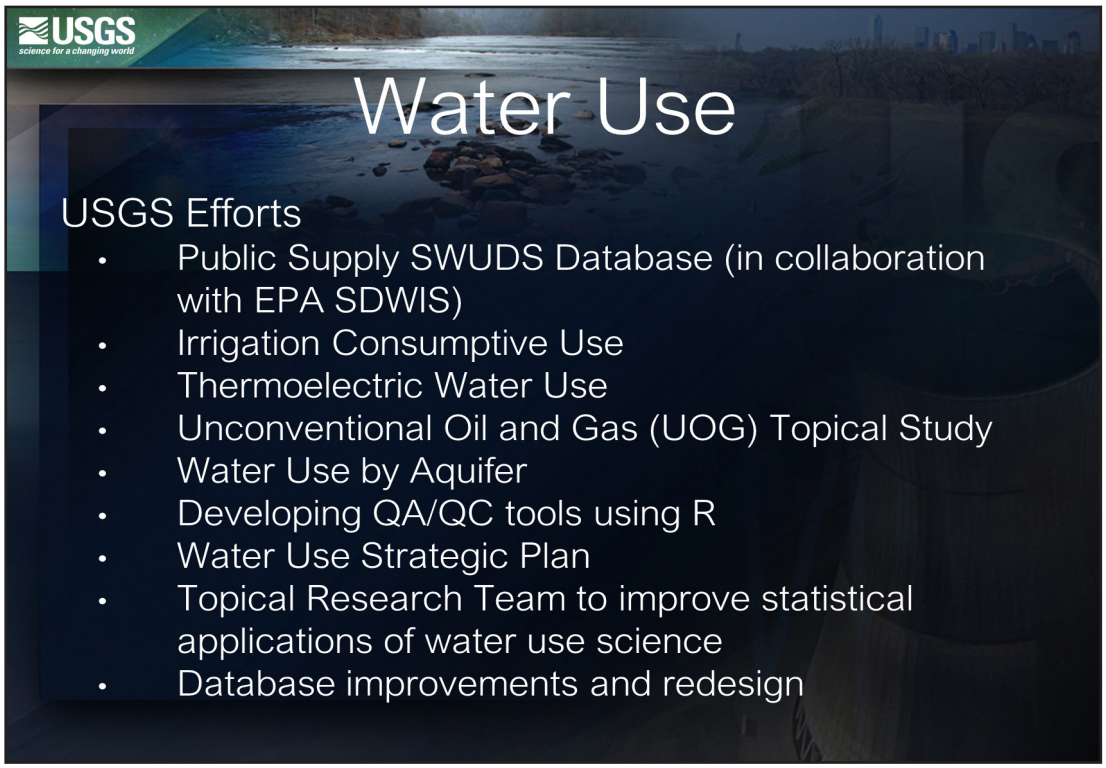

Figure 16. USGS efforts on water use.

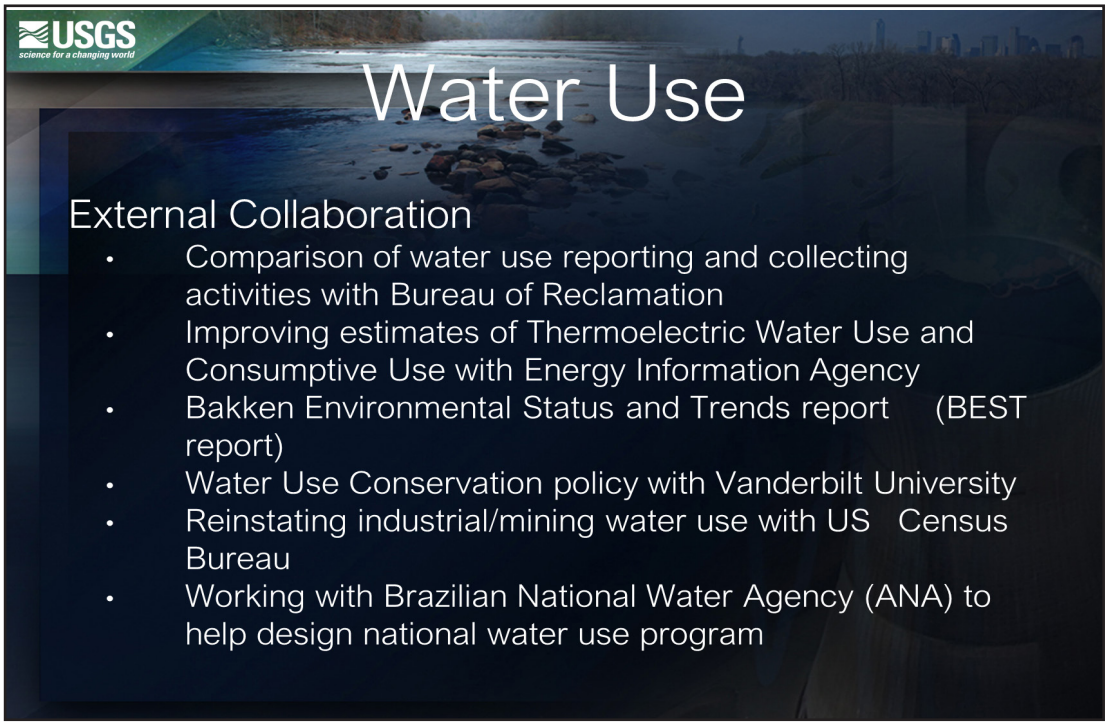

Figure 17. External collaboration on water use.

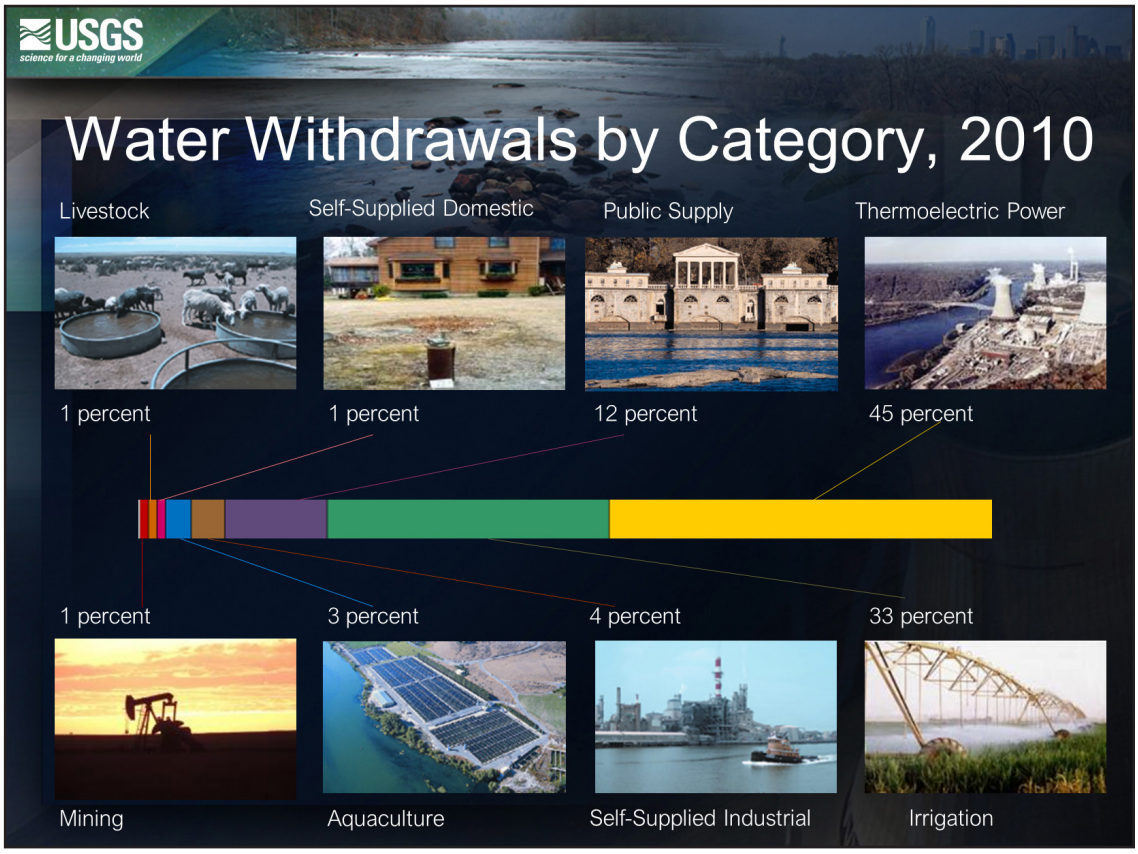

Figure 18. Water withdrawals by category, 2010.

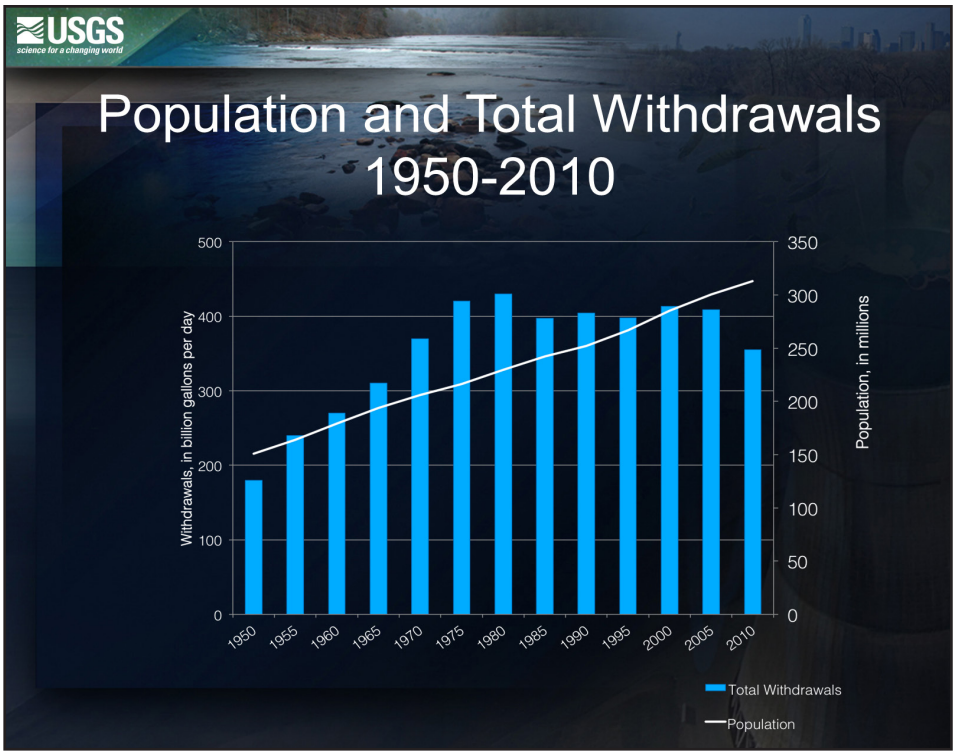

Figure 19. Population and total withdrawals: 1950-2010.

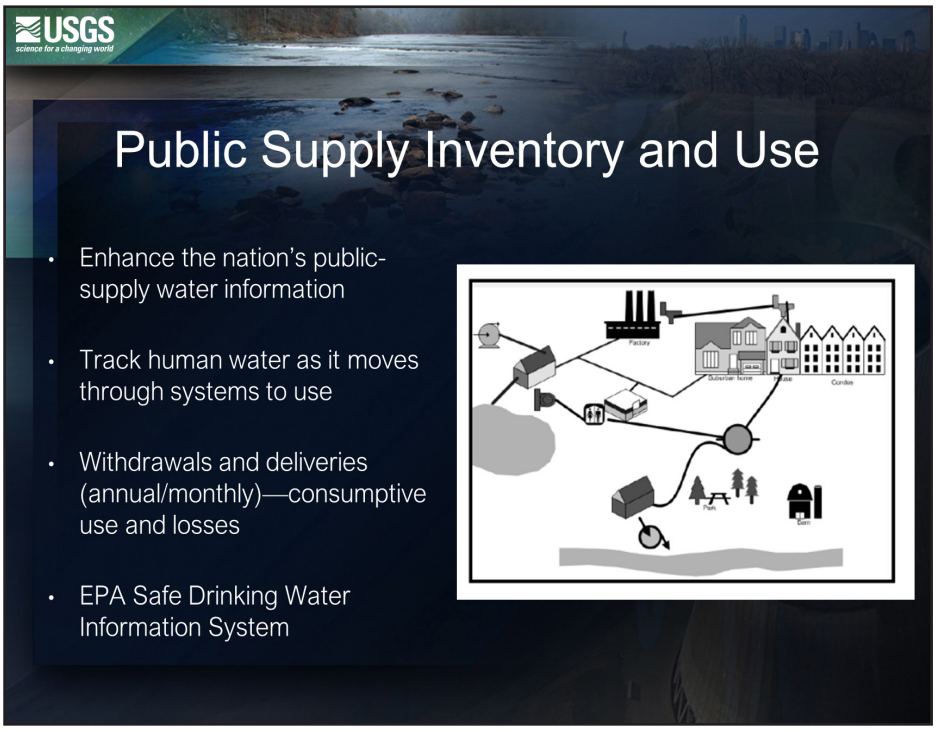

Figure 20. Public supply inventory and use.

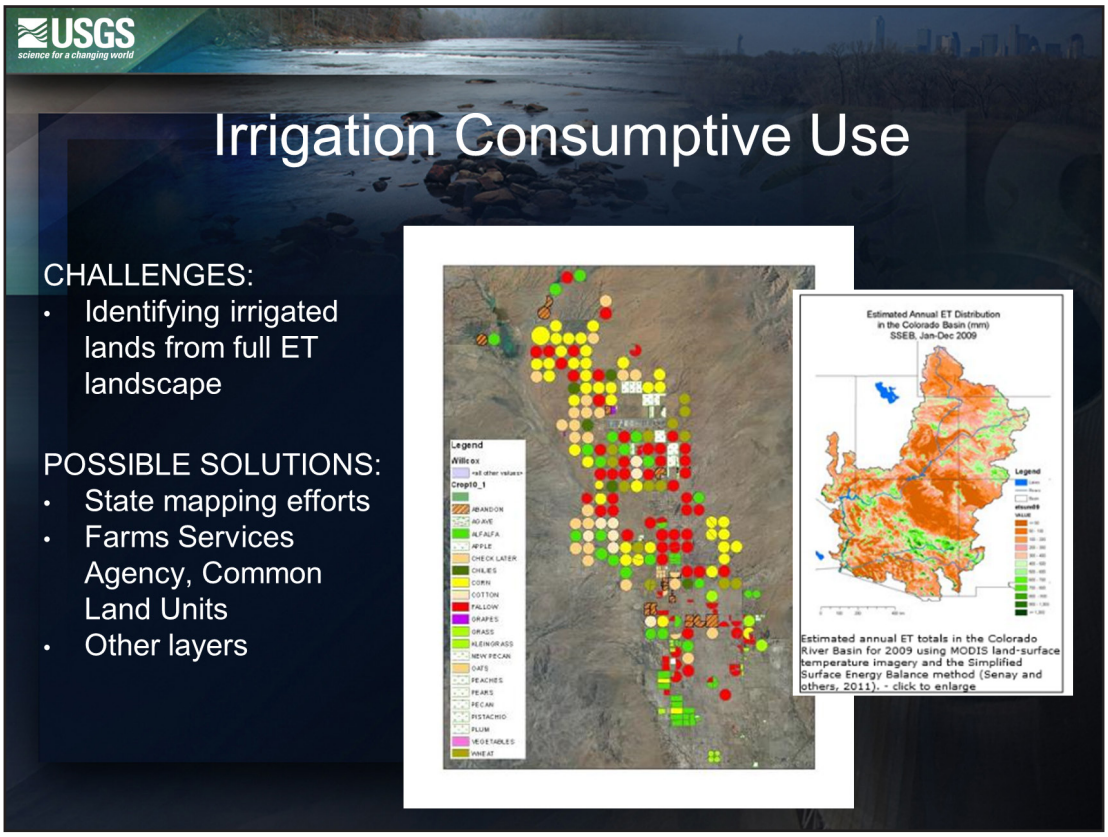

Figure 21. Irrigation consumptive use.

Figure 22. Unconventional oil and gas.

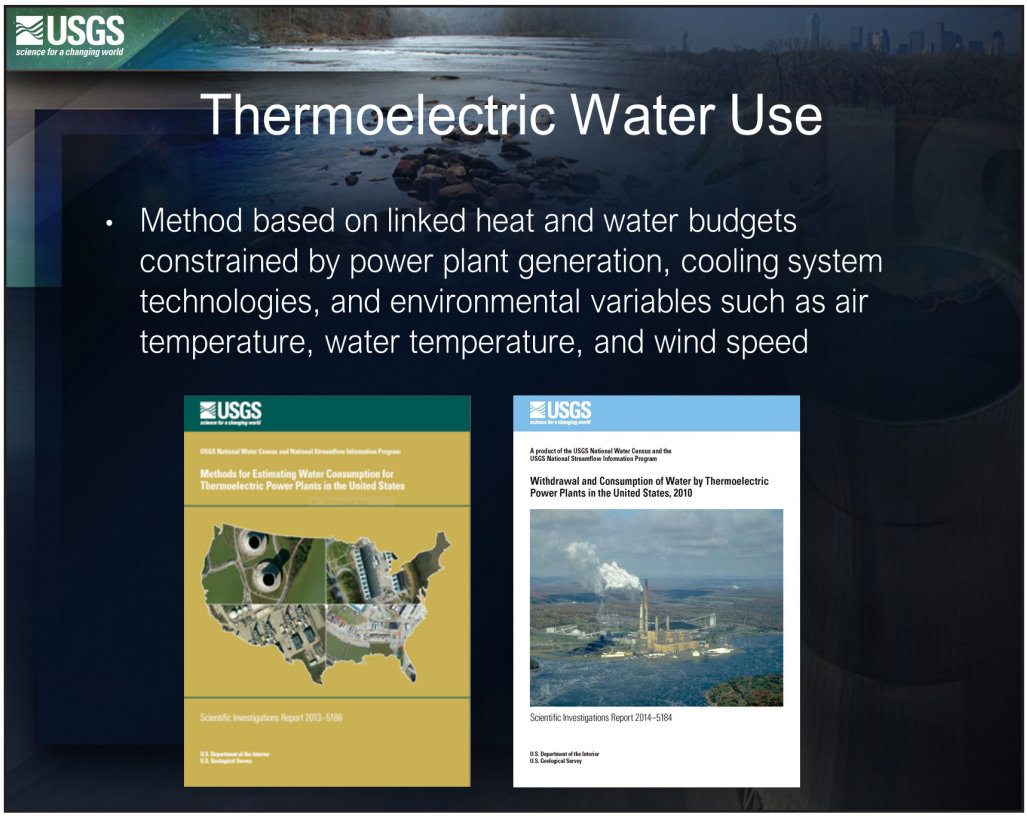

Figure 23. Thermoelectric water use.

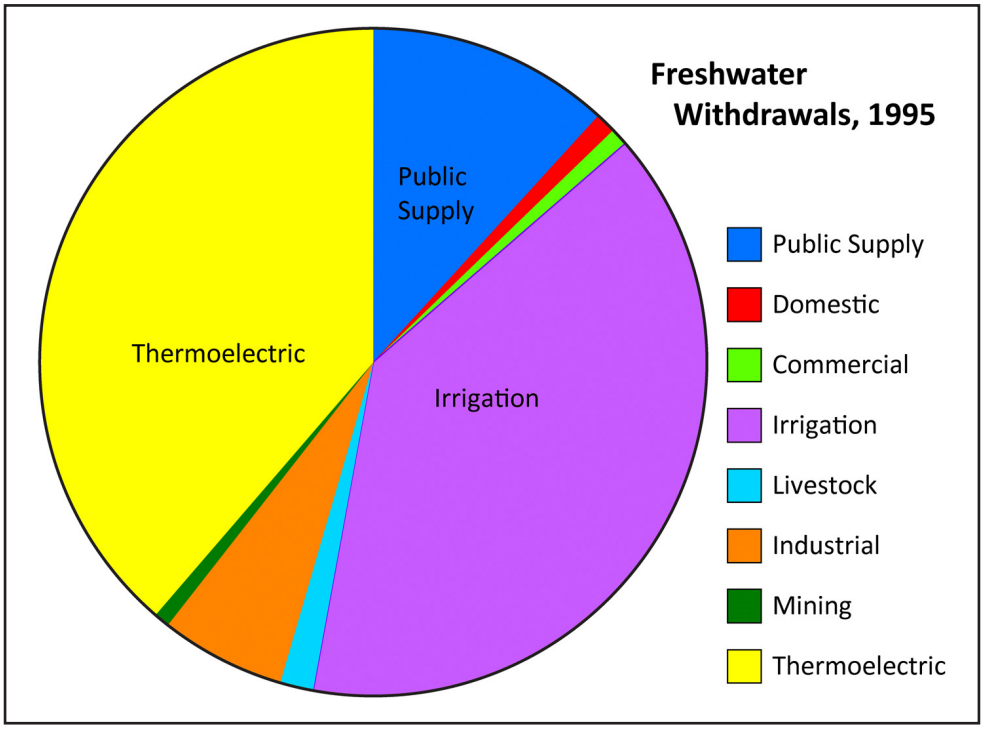

Figure 24. Freshwater withdrawals, 1995.

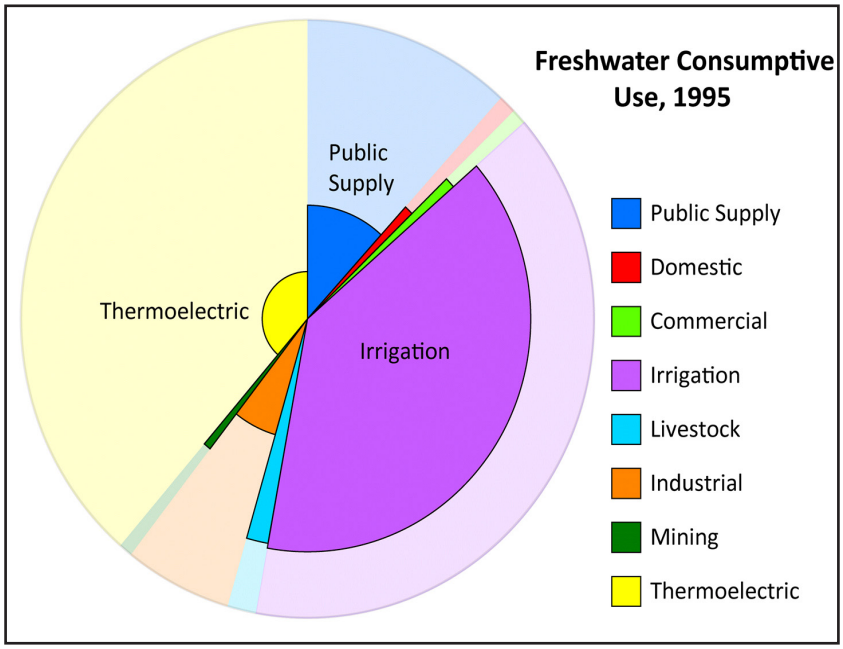

Figure 25. Freshwater consumptive use, 1995.

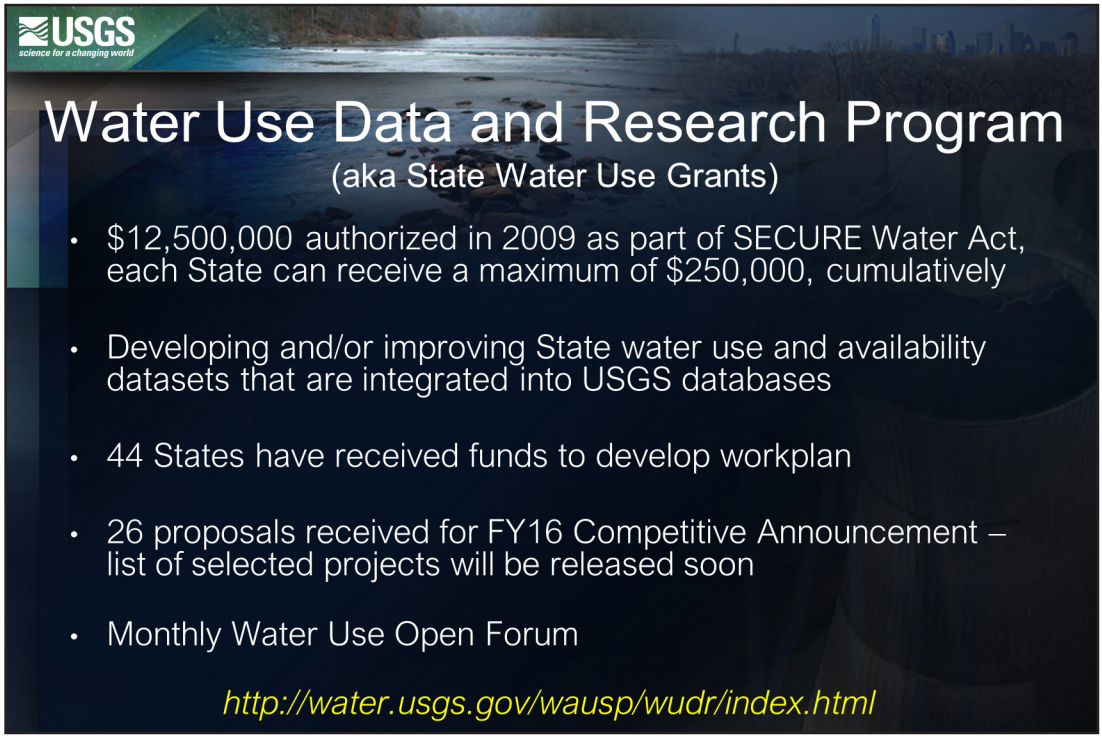

Figure 26. Water Use Data and Research Program.

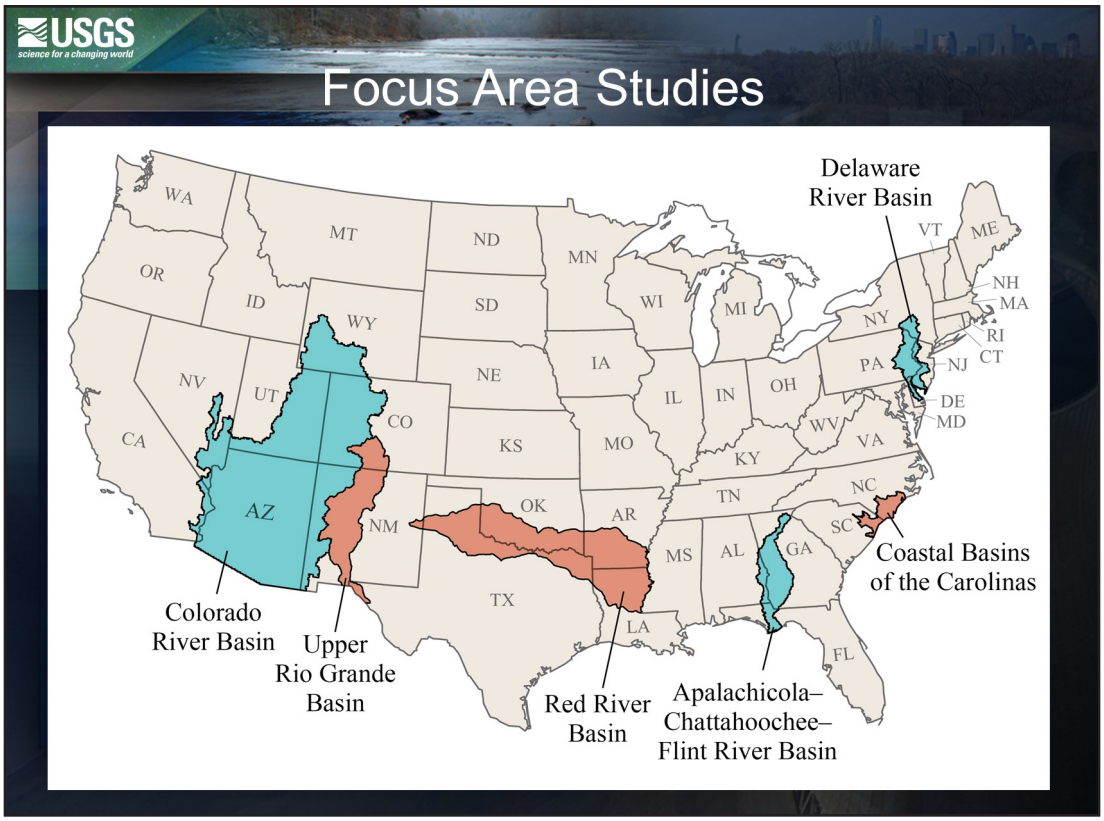

Figure 27. Focus area studies.

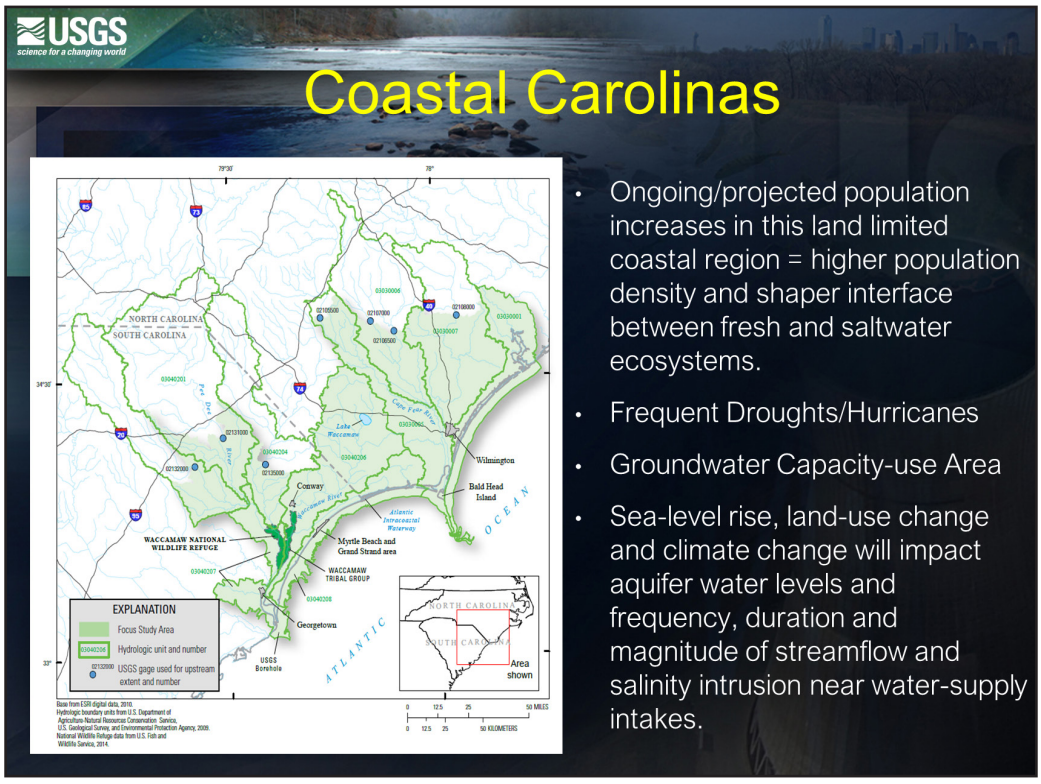

Figure 28. Coastal Carolinas.

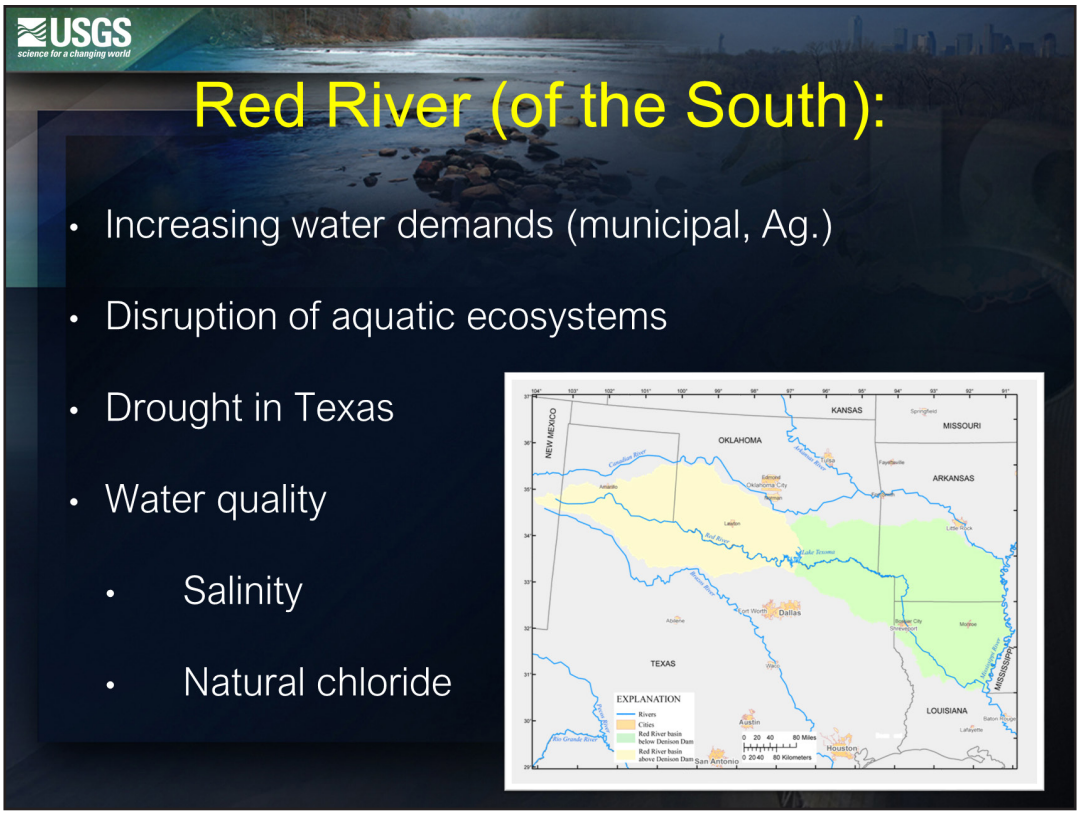

Figure 29. Red River of the South.

Figure 30. Upper Rio Grande Basin Focus Area Study.

Figure 31. TAAP: Transboundary Aquifer Assessment Project.

Figure 32. Rio Grande Transboundary Integrated Hydrologic Model: modeling conjuctive use to support resource management.

Figure 33. Assessment of hydrologic resources and the potential effects from oil and gas development in the U.S. Bureau of Land Management Tri-County Planning Area, Sierra, Doña Ana, and Otero Counties, New Mexico.

Figure 34. Water resource assessment of the Rio San Jose Basin, West-Central New Mexico.

Figure 35. Mesilla Basin monitoring network.

Figure 36. Simulation of pre- and post-fire streamflow in the Upper Rio Hondo Basin, NM.

Figure 37. Hydrologic studies in the East Mountain Area of Bernalillo County, NM.

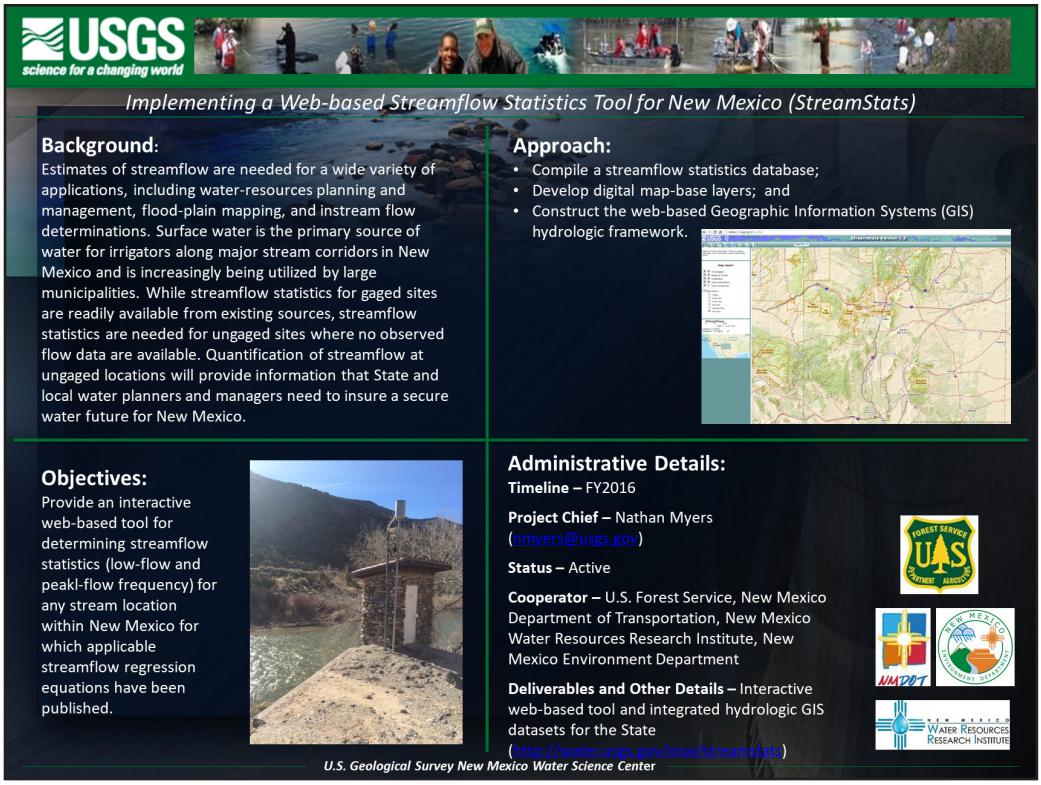

Figure 38. Implementing a web-based streamflow statistics tool for New Mexico (StreamStats).