

Category: Water Quantity

Indicator: Reservoir Storage

Methodology

Reservoir Storage is an indicator of the buffering capacity for surface water supply in Texas during dry periods. This indicator is measured as the volume of reservoir conservation capacity as a percent of mean annual flow in each river basin.

We calculated Reservoir Storage from information on reservoir capacity from the Texas Water Development Board (TWDB) and water budget outputs from the Texas Commission on Environmental Quality (TCEQ) Water Availability Models (WAMs) for each Texas river basin. The volume (conservation capacity) of each reservoir in TWDB's GIS layer of Existing Reservoirs was used to derive reservoir storage. We summed the conservation capacity of all reservoirs in each river basin to calculate total reservoir storage for each basin. One reservoir was removed from the analysis (Retamal Channel Dam) because it was listed as "Proposed". The mean annual flow in each river basin was derived from WAM water budget outputs for each river basin. To estimate mean annual flow for the basin, we took the average of the annual naturalized flow estimates for each year of the WAM's period for the most downstream control point in each river basins. For some river basins, such as minor coastal basins, we summed these averages for multiple control points that together represent the majority of flow for the river basin. To derive the indicator value, we then divided the conservation capacity by the mean annual flow for each basin.

To map this indicator, we joined this data to the TWDB's river basin shapefile and include two resulting maps: 1) total reservoir (conservation capacity) by river basin, and 2) total reservoir (conservation capacity) as a percent of mean annual flow for each river basin.

Data Sources

Texas Water Development Board. Existing Reservoirs Conservation Capacity: By reservoir, from TWDB shapefile of existing reservoirs.

<https://www.twdb.texas.gov/mapping/gisdata.asp>

Texas Commission on Environmental Quality Water Availability Models (WAM) covering all 23 Texas river basins.

http://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/wam.html

WAM monthly and annual water budget outputs, as post-processed by Richard Hoffpauir and The Nature Conservancy to calculate mean annual flow for each river basin.

Texas Water Development Board. Major River Basins shapefile.

<http://www.twdb.texas.gov/mapping/gisdata.asp>