# Summary: Non-Surveyed Annual Livestock Inventory and Water Use Estimates

Annual water use estimates are a vital portion of the data needed to develop water use projections for the State Water Plan as mandated by Texas Water Code Sec. 16.053 and Texas Administrative Code Sec. 357.31. The following is a high-level summary of the methods used by the TWDB for estimating the annual volume and regional distribution of water used for livestock in Texas.

Inventory for dairy cattle, non-dairy cattle, equine, goats, hogs, sheep, broiler chickens, non-broiler chickens, and turkeys are estimated and multiplied by the corresponding water use coefficient for each livestock category. These coefficients include water used for consumption as well as cooling and washing facilities. The coefficients were updated in 2021 based on new research. Water use for wildlife is not included in the estimate.

The United States Department of Agriculture (USDA)- National Agriculture Statistics Service[1] (NASS) conducts an agricultural census once every five years, in which the inventory of livestock animals are estimated by category down to the county level. For years between the agricultural census, the USDA conducts a survey where-in inventory estimates are updated at the county level for cattle, at the state level for goats, hogs, sheep and non-broiler chickens, and allowed to roll over from the last census for equine, turkeys and broiler chickens. USDA-NASS annual estimates are the primary source of data for the annual livestock estimates. During survey years, TWDB staff may use supplemental data from the Texas Soil Science and Water Conservation Board (TSSWCB)[2], permitted capacity for confined animal feeding operations (CAFOs) from the Texas Commission on Environmental Quality[3], and feedback from regional consultants to estimate final livestock totals.

Inventory estimations for each livestock category begin with the most recent NASS census or survey totals. Then the final estimates are developed based on the smallest geographic unit available.

**Cattle** – county-level data from the NASS census/survey, in conjunction with regional consultant feedback, is used to estimate county inventory totals for NASS classifications of all cattle and dairy cattle. The non-dairy (fed and range) cattle inventory is calculated as the difference between the two.

**Equine** – baseline county estimates are determined every five years using data from the NASS census. During non-census years, the NASS census estimates are carried over unless new information becomes available.

**Goats, Hogs, and Sheep** – the NASS provides county-level estimates during census years, and state level estimates during survey years. County-level inventory estimates are determined each census year and multiplied by the proportional state change during survey years.

**Poultry** – baseline county-level estimates for broiler chickens, non-broiler chickens (layers, pullets, and roosters), and turkeys are calculated once every five years using data from both the NASS census and the TSSWCB. County totals are updated proportionally where NASS survey state totals are available and using any updated inventory estimates from the TSSWCB.

Once county-level inventory estimates are calculated for each livestock category, they are multiplied by the respective water use coefficients (water use/head/day) to calculate total county water use. Table 1 summarizes the water use coefficients used for each livestock category.

*Table 1 - TWDB Livestock Categories, Corresponding NASS Data Type, and Daily Water Use Parameters*

| TWDB Category | NASS Data Type | Previous Water Use (gallons/head/day) | New Water Use Coefficients (gallons/head/day) |
|---|---|---|---|
| Cattle | Dairy Cattle | 75 | 55 |
| | All Other Cattle | 15 | 15 |
| Chickens | Non-Broilers | 0.086 | 0.09 |
| | Broilers | 0.077 | 0.09 |
| Turkeys | Turkeys | 0.2 | 0.2 |
| Equine | Horses, Ponies, Mules, Burros, & Donkeys | 12 | 12 |
| Hogs | Hogs | 11 | 5 |
| Sheep | Sheep & Lambs | 2 | 2 |
| Goats | Milk, Meat, & Angora | 0.5 | 2 |

The county-level livestock water use estimates are further refined by apportioning them to a smaller geographic unit including planning region and major river basin. Geographic splits are periodically updated based on the location and capacity of CAFOs and habitable plant cover for range livestock based upon data from the National Land Cover Database[4]. Historically based estimates of the split between groundwater and surface water sources are then applied for each combination of livestock category and region-county-basin location.

The final livestock water use totals presented as part of the historical water use estimates published on the TWDB website[5,6] include the values calculated as described above as well as water use reported as part of the annual TWDB annual Water Use Survey[7]. Those values include fish hatchery water use and other non-standard species water use.

**References**

[1] USDA National Agriculture Statistics Service: https://www.nass.usda.gov/Statistics_by_State/Texas/index.php

[2] Texas Soil Science and Water Conservation Board:  https://www.tsswcb.texas.gov/

[3] Texas Commission on Environmental Quality CAFO homepage: https://www.tceq.texas.gov/permitting/wastewater/cafo

[4] 2016 National Land Cover Database: https://www.mrlc.gov/

[5] Historical Water Use Estimates: https://www3.twdb.texas.gov/apps/reports/WU_REP/SumFinal_BasinReportWithReuse

[6] TWDB Water Planning Dashboard: http://www.twdb.texas.gov/waterplanning/data/dashboard/index.asp

[7] Annual Water Use Survey: https://www.twdb.texas.gov/waterplanning/waterusesurvey/index.asp

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