

Texas Land Trends Web Data Explorer

USER GUIDE

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Texas Land Trends Web Data Explorer User Guide

Foreword

As part of our *Texas Land Trends* series, this report serves as an introductory tutorial or “User Guide” to the web-based data explorer on the project website: txlandtrends.org. The new *Texas Land Trends* visualizer allows users to manipulate and explore geospatial data related to changes in private lands in Texas. Special thanks to Ross Anderson, who spent countless hours in programming the database tool as part of the website, and Alison Lund, who compiled this user guide as part of the series. We hope you find the report and database tool of *Texas Land Trends* to be useful!

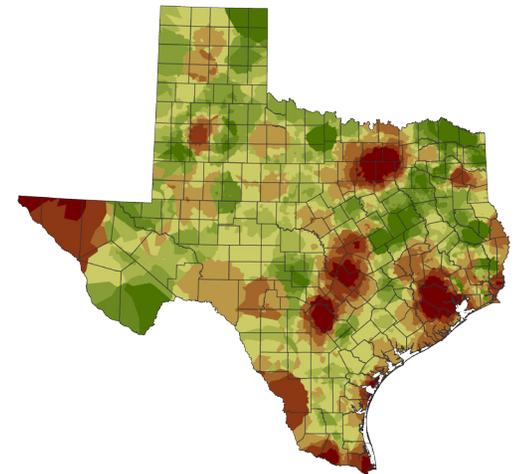
Roel Lopez
Director

Introduction

The *Texas Land Trends* report was initially developed for paper-based distribution every five years, following the availability of the United States Department of Agriculture, National Agricultural Statistics Service (USDA, NASS) Census of Agriculture data. For more than two decades, this valuable information has provided guidance and insight in conservation efforts, development trends, natural resource policy decisions, and forecasting of natural resources-related issues across Texas.

Since its inception, this report has evolved into an interactive website and database, which users can explore land trend data, dating as far back as 1997, by using a “data visualizer” tool.

Users can query specific areas of interest, such as counties, river basins, or ecoregions, to generate maps and data for land use, land market values, and other useful metrics. Both the content in this report and the website’s online help features illustrate the functions and use of the web-based tool for further exploration of the *Texas Land Trends*.



Data Explorer

The *Data Explorer* allows users to curate land trend data based on their area or areas of interest. Custom data queries by users generate an output of summary statistics, which demonstrate land demographic data in three primary categories: land use, land values, and ownership. These data are displayed through interactive mapping, tables, graphs, and general text to allow unique visualization of occurring changes on the selected *areas of interest*. Users should regard data in the generated output as indicators of general conditions of Texas' working lands. The outcome data should not be interpreted to represent exact and current conditions. However, the summary statistics do provide a general guide to land changes over the specified time period.

Software requirements

The *Data Explorer* has been tested and works in the following browsers:

- Mozilla Firefox: Version 47.0 and above
- Google Chrome: Version 51.0.2704.84 m and above

Please update your web browsers if some tools in the Data Explorer do not work well for you.

The Texas A&M Institute of Renewable Natural Resources Data Analysis and Geographic Information Systems Team created and maintains this application.



Getting Started

The *Data Explorer* will open to the main query page. Here, you can select either *Trends*, to view one set of data for a geographic region at a time, or *Compare*, to view datasets of multiple geographic regions at a time. Once selected, users will be redirected to the appropriate query input page, where they can select area(s) of interest to explore. The following tools will remain stationary throughout users' exploration of the website.

1. **TX Land Trends:** Navigates back to main *Texas Land Trends* website.
2. **Trends:** Navigates to trends query page.
3. **Statewide:** Shortcuts to statewide data.
4. **Compare:** Navigates to compare query page.
5. **About the data:** Cites source data and terminology.
6. **Reference Maps:** Reference Maps of Ecoregions, River Basins, and Regions of Interest.
7. **Toggle Menu:** Changes visibility of the left menu, expanding main screen.
8. **Comparison Menu:** Stores *areas of interest* for later comparison and allows quick removal of already selected areas.
9. **Help:** Shows tips about different features unique to each page.
10. **Home:** Navigates back to main query page.

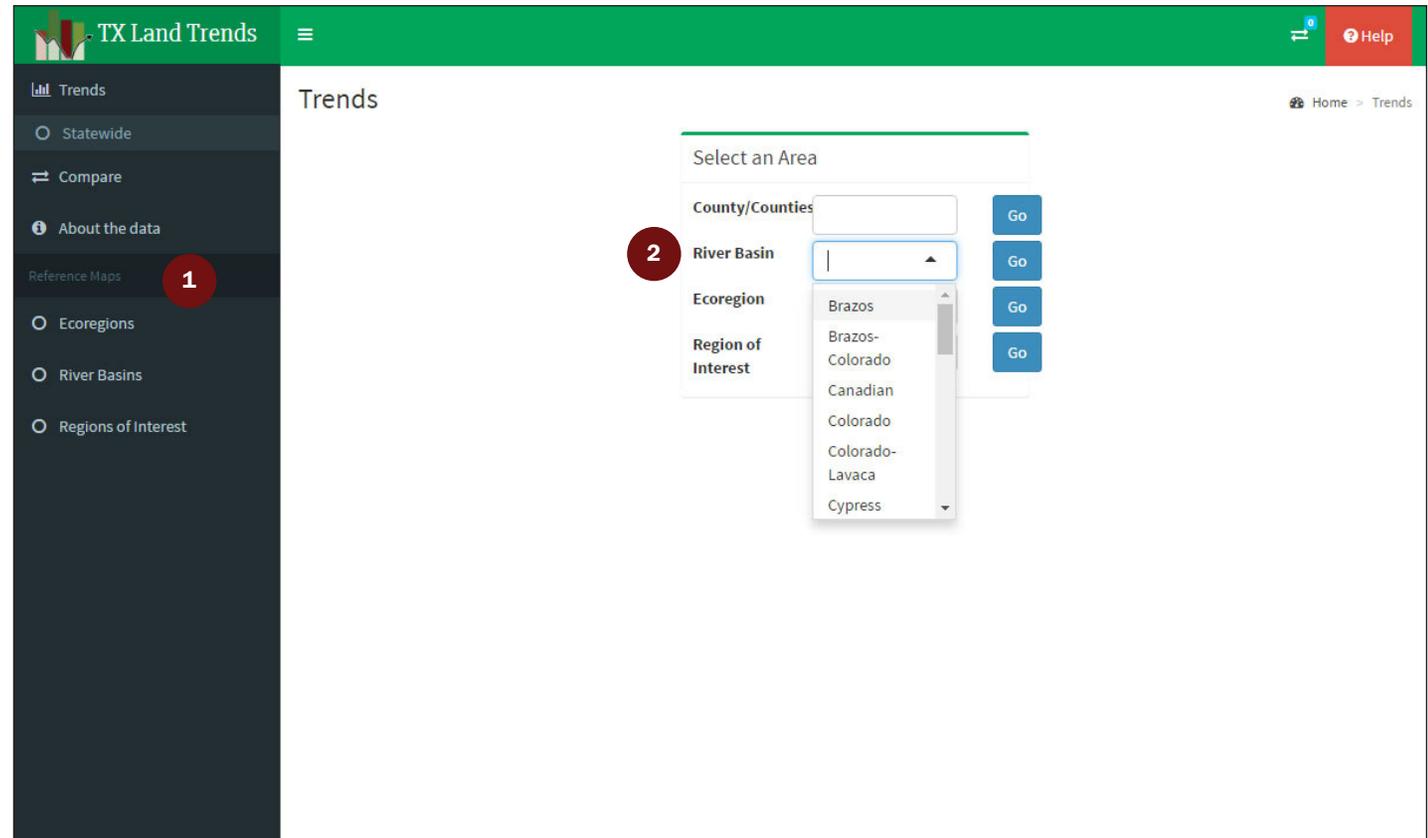
The screenshot shows the TX Land Trends website interface. The top navigation bar is green and contains the TX Land Trends logo (1), a toggle menu icon (7), a user profile icon (8), and a Help icon (9). The left sidebar is dark grey and contains the following menu items: Trends (2), Statewide (3), Compare (4), About the data (5), Reference Maps (6), Ecoregions, River Basins, and Regions of Interest. The main content area is white and features a 'Home' heading (10) and a paragraph of text: 'Texas' working lands are undergoing fundamental changes due to fragmentation and conversion. Use the 'Go To Trends' tool to explore trends for a county, multiple counties, river basins, ecoregions or various regions of interest. Use the 'Compare' tool to explore comparisons between these areas.' Below this text are two sections: 'Trends' with a 'Go to trends' button and 'Compare' with a 'Compare' button. On the right side of the main content area is a map of Texas showing land conversion rates, with a legend indicating 'High' (red) and 'Low' (green) conversion rates. The map is labeled 'Texas Land Trends' and 'TRNR'.



Trends

Users can quickly generate trend data for an area of interest by selecting a specific area listed under one for the four listed categories. Multiple counties can be selected at a time by simply typing in the names of each county desired before selecting *Go*; this will generate combined totals for trends in those counties. Reference maps of Ecoregions, River Basins, and Regions of Interests remain available for users on the stationary, left column of the website.

1. **Reference Maps:** Displays maps of Ecoregions, River Basins, and Regions of Interests.
2. **Select an Area:** Allows users to pick an Area of interest from one of the four listed categories. Smart fields display Area options for each category.
*Multiple counties can be selected at a time. Results will be of all selected counties combined.



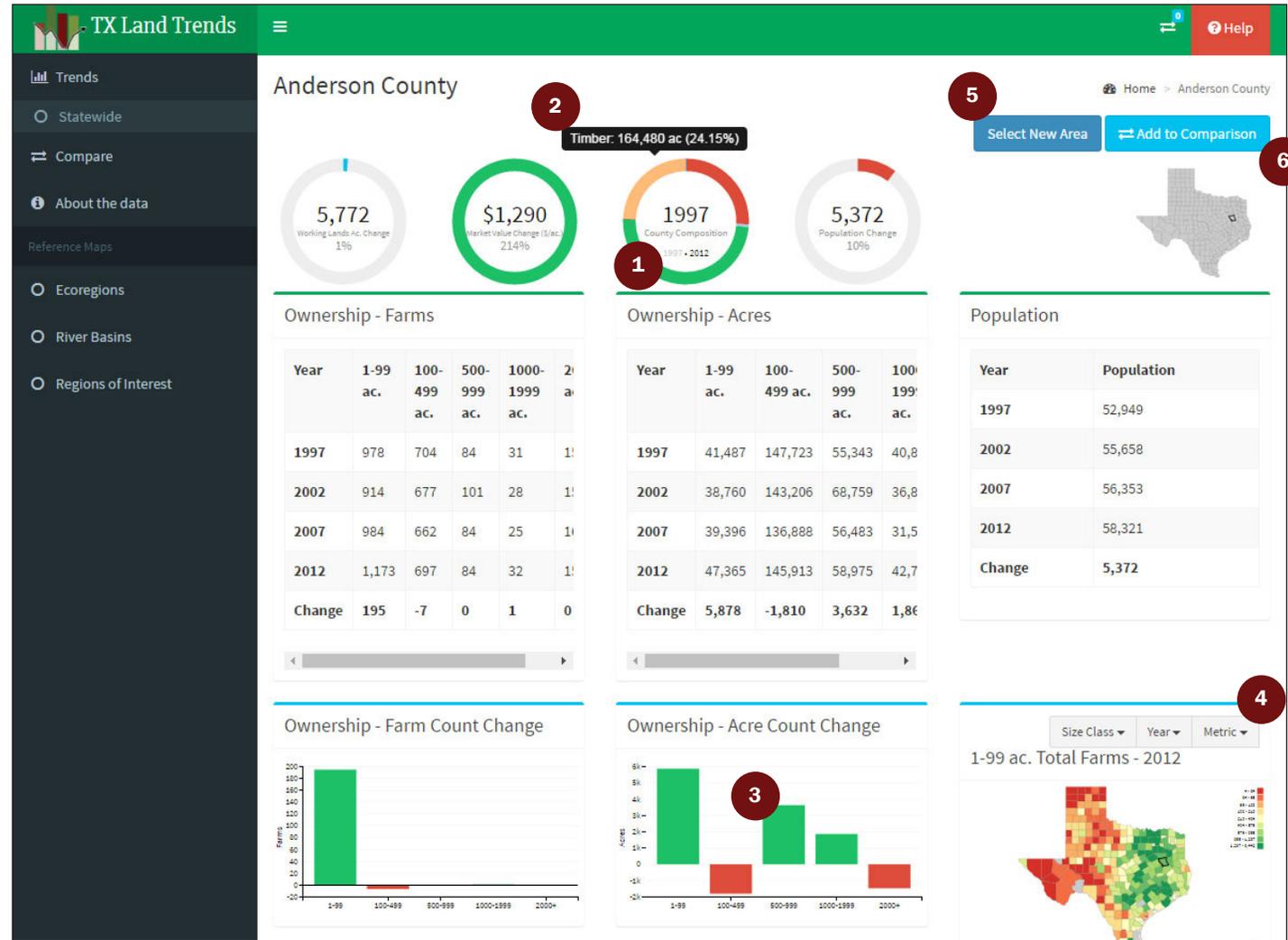
The screenshot displays the TX Land Trends website interface. On the left is a dark sidebar with navigation options: Trends, Statewide, Compare, About the data, Reference Maps (highlighted with a red circle '1'), Ecoregions, River Basins, and Regions of Interest. The main content area is titled 'Trends' and features a 'Select an Area' form. This form includes four input fields: 'County/Countries', 'River Basin' (highlighted with a red circle '2'), 'Ecoregion', and 'Region of Interest'. The 'Region of Interest' dropdown menu is open, showing a list of options: Brazos, Brazos-Colorado, Canadian, Colorado, Colorado-Lavaca, and Cypress. To the right of each input field is a blue 'Go' button. The top navigation bar is green with the TX Land Trends logo and a 'Help' button. The bottom right corner of the page shows the breadcrumb 'Home > Trends'.



Trends (cont.)

Results for a user's query will be displayed in multiple forms (text, table, graph, image, and map), some of which include interactive features to further examine the data. The following describes the different options available when viewing trend query results.

- 1. Toggle Option:** Switch between 1997 and 2012 data by clicking on the darkened year number in the *Composition* ring.
- 2. Hover Descriptions:** Rest the mouse over the color bars of the composition ring to expand a text description (actual acres and percent out of all lands) of the composition of working lands and non-working lands for your area of interest.
- 3. Hover Descriptions:** Rest the mouse over the color bars of the graphs to expand a text description of change (from 1997-2012) in number of farms and farm acres by size class.
- 4. Interactive Maps:** Alter data displayed by selecting from dropdown options or clicking Aggregate.
- 5. Select New Area:** Click to select new area of interest to explore.
- 6. Add to Comparison:** Click to save current area of interest for later comparison.



Compare

Users can quickly generate trend data for an area of interest by selecting a specific area listed under one for the four listed categories. Multiple counties can be selected at a time by simply typing in the names of each county desired before selecting *Add*; this will generate combined totals for trends in those counties. Reference maps of Ecoregions, River Basins, and Regions of Interest remain available for users on the stationary, left column of the website.

1. **Remove:** Allows users to remove an unwanted, selected Area.
2. **Reference Maps:** Displays maps of ecoregions, river basins, and regions of interests.
3. **Select an Area:** Select an Area: Allows users to pick an Area of interest from one of the four listed categories. Smart fields display Area options for each category.
*Multiple counties can be selected at a time. Results will be of all selected counties combined.

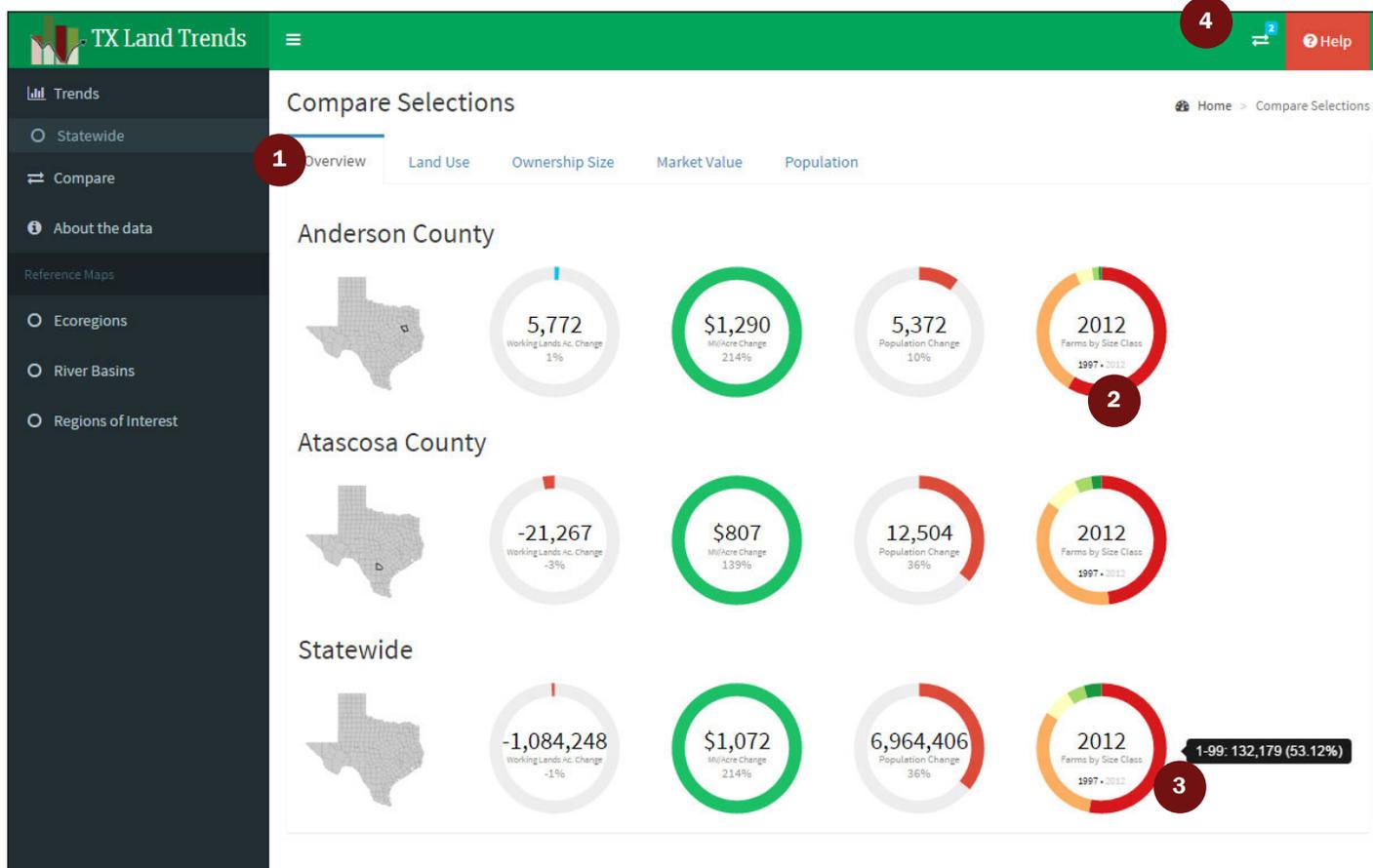


Compare (cont.)

Results for a user's query will be displayed in multiple forms (text, table, and image), some of which include interactive features to further examine the data. Along with the selected areas of interest, statewide data will also appear at the bottom of the output page. Five tabs will be generated at the top of the page.

The following describes the different options available when viewing compare query results.

- 1. Tab Option:** Click tabs to review overview statistic data for each metric (land use, ownership size, market value, and population).
- 2. Toggle Option:** Switch between 1997 and 2012 data by clicking on the darkened year number in the *Farms by Size Class* ring.
- 3. Hover Descriptions:** Rest the mouse over the color bars of the *Farms by Size Class* ring to expand a text description (actual number and percentage out of all farm size classes) of the composition of farms by size class for your area of interest.
- 4. Comparison Menu:** Remove areas from query results by clicking the X next to unwanted areas or *Remove All*.



About the Data

Data Definitions

Aggregate – Averages data across your area of interest (e.g., county) for visual purposes.

Consolidation – The combining of smaller farms, ranches, and forests to create larger ownerships.

Cropland, Land Use Group – Includes irrigated cropland and dry cropland as reported in acres by the Texas Comptroller at the Independent School District (ISD) level.

Ecoregion – Gould's ecoregions for the state of Texas, denoted by areas of general similarity in ecosystems and type, quality, and quantity of environmental conditions and resources. Includes the Blackland Prairies, Coastal Sand Plains, Edwards Plateau, Gulf Coast Prairies, High Plains, Llano Uplift, Oak Woods and Prairies, Piney Woods, Rolling Plains, South Texas Brush Country, and Trans Pecos ecoregions.

Fragmentation - The break-up of large farms, ranches, and forests into smaller ownership sizes.

Land Use – Annual compilation of land use and land value data from the Texas Comptroller of Public Accounts. Includes property use, tax, and value data for private lands designated as 1-d and 1-d-1 appraisal status for all Texas ISDs. Land use categories include cropland, grazing land, wildlife management, timber, and other.

Grazing Land, Land Use Group – Includes native rangeland, non-native pasture, and barren lands as reported in acres by the land use data from the Texas Comptroller at the ISD level.

Land Use, Acres – The number of acres that fall into each specified land use category as reported by the Texas Comptroller.

Land Use, County Composition – Land use structure at the county level (e.g., Anderson County contains 40% grazing lands)

Land Use, State Composition – Land use structure at the state level (e.g., Texas contains 61% grazing lands)

Land Use, Market Value Per Acre - The average appraised value of land, calculated as \$ per acre, as reported by the Property Tax Assistance Division of the Texas Comptroller.

Land Use, Market Value Change (\$/ac.) – Change in market value per acre, from 1997 to 2012. Also includes percent change from the same time period.

Ownership, Acres – Number of acres of farms by ownership size class (e.g., There are 4,003,617 acres of farms that are 1 to 99 acres in size in the state of Texas). Derived from county level ownership size data as reported by the USDA, NASS.

Ownership, Farm – Number of farms by ownership size class (e.g., There are 106,389 farms that are 1 to 99 acres in size in the state of Texas). Derived from county level ownership size data as reported by the USDA, NASS.



About the Data, cont.

Ownership, Acre Count Change – Change in the number of acres of farms by ownership size class from 1997 to 2012.

Ownership, Farm Count Change – Change in the number of farms by ownership size class from 1997 to 2012.

Other, Land Use Group – Includes orchards and other agricultural lands as reported in acres by the Texas Comptroller at the ISD level.

Population – County level population data (individuals per county) compiled by the Texas Department of State Health Services using Census Population and Intercensal Estimates Data.

Population Change – Change in population by county from 1997 to 2012. Also includes percent change from the same time period.

Region of Interest – Includes selected counties for particular regions of interest across the state including:

- I-35 Corridor – Counties surrounding Interstate 35 from San Antonio to Austin
- Coastal – All counties with Gulf of Mexico coastline
- Hill Country – Counties designated as part of the Hill Country by the Hill Country Alliance
- D/FW Metroplex – Tarrant/Dallas counties and adjacent counties making up the Dallas/Fort Worth metropolitan area
- Greater Houston – Harris County and adjacent counties making up the greater Houston metropolitan area
- Rio Grande Valley – Hidalgo and Cameron counties

River Basin – Derived from the United States Geological Survey by the Texas Water Development Board. This dataset represents the boundaries for Texas river basins, including the Brazos, Brazos-Colorado, Canadian, Colorado, Colorado-Lavaca, Cypress, Guadalupe, Lavaca, Lavaca-Guadalupe, Neches, Neches-Trinity, Nueces, Nueces-Rio Grande, Red, Rio Grande, Sabine, San Antonio, San Antonio-Nueces, San Jacinto, San Jacinto-Brazos, Sulphur, Trinity, and Trinity-San Jacinto rivers.

Timber, Land Use Group – Includes timber, timber '78, timber in transition, and restricted timber lands as reported in acres by the Texas Comptroller at the ISD level.

Wildlife Management, Land Use Group – Includes wildlife management lands as reported in acres by the Texas Comptroller at the ISD level.

Working Lands – Privately owned farms, ranches, and forests that produce food and fiber, support rural economies, and provide wildlife habitat, clean air and water, and recreational opportunities. Includes all cropland (irrigated and dry), grazing land (native rangeland, non-native pasture, and barren), timber land (timber, timber '78, timber in transition, and restricted timber), and other (orchards and other) agricultural lands collected and compiled from the Texas Comptroller of Public Accounts.

Working Lands Change – Change in total acres of Working Lands (as reported by the Texas Comptroller) from 1997 to 2012. Also includes percent change from the same time period.



Ownership Size Data—USDA NASS Ag Census (at County level)

The United States Department of Agriculture's National Agricultural Statistics Service (USDA, NASS) Census of Agriculture is conducted every five years (1997, 2002, 2007, 2012) and provides uniform, comprehensive agricultural data for every county in the United States. This dataset provides valuable information on U.S. farms and ranches and their operators. Census data is used to make decisions about not only issues that impact farmers and ranchers but also those that impact our wildlife, water, and natural resources. Texas Land Trends utilizes the ownership size dataset to measure number of farms and number of acres of farms in various size classes.

The census definition of a farm is any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. This data is reported by size classes (1 to 9 acres, 10 to 49 acres, 50 to 179 acres, 180 to 499 acres, 500 to 999 acres, 1,000 to 1,999 acres, 2,000+ acres), according to the total land area in the farm as well as by total number of farms. The land area of a farm is an operating unit concept and includes land owned and operated as well as land rented from others.

Working Lands, Land Use Data—Comptroller's Office Property Appraisal Data (at ISD level)

The Texas Comptroller of Public Accounts (Texas Property Tax Assistance Division) produces an annual compilation of land use and land value data from all independent school districts (ISDs). General property classes and property appraisal classifications are provided below.

Property Classes

- Real Property
 - Single-family residential
 - Multi-family residential
 - Vacant platted lots
 - Agricultural open-space land
 - Commercial/industrial-real
 - Pipelines
 - Minerals
 - Farm Improvements
- Tangible personal property
 - Inventory
 - Furniture, fixtures, and equipment
- Intangible personal property
 - Goodwill
 - Patents
 - Bonds
 - Copyrights
 - Contracts
 - Brand names



Property Classification Guide

- A: Real Property: Single-family residential
- B: Real Property: Multifamily residential
- C1: Real Property: Vacant Lots and Tracts
- C2: Real Property: Colonia Lots and Tracts
- **D1: Real Property: Qualified Open-space Land**
- D2: Real Property: Farm and Ranch Improvements on Qualified Open-Space Land
- E: Real Property: Rural Land, not Qualified for Open-Space Appraisal, and Residential Improvements
- F1: Real Property: Commercial
- F2: Real Property: Industrial
- G: Real Property: Oil and Gas, Minerals and Other Subsurface Interests
- O: Real Property: Residential Inventory

D1: Real Property: Qualified Open-space Land

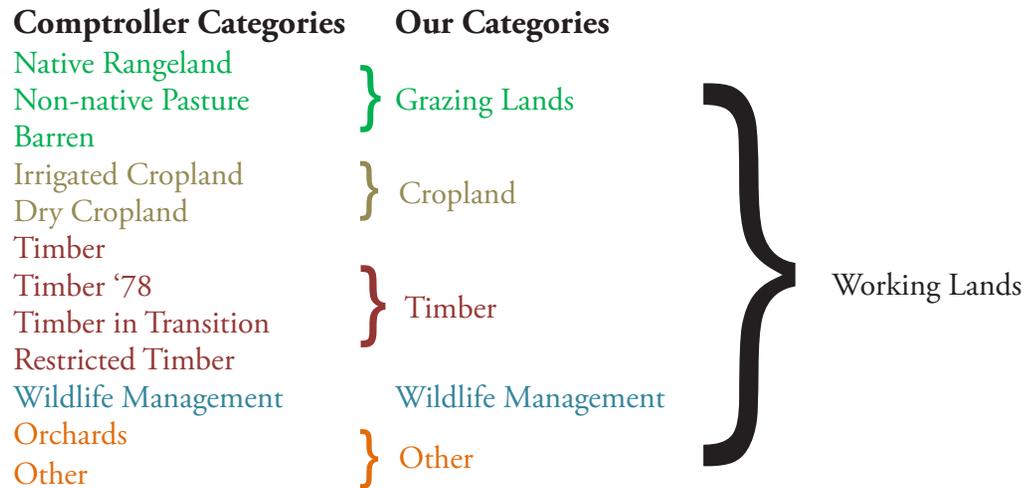
This dataset represents all private lands designated as 1-d and 1-d-1 appraisal status for all Texas ISDs. 1-d agricultural use status refers to lands devoted to full time agricultural operations where the owner's primary occupation and source of income is derived from agricultural enterprises. 1-d-1 open space status designates lands based solely on the primary use of the land with no consideration for the landowner's income/occupation. The original land use categories and metrics obtained from the Comptroller include:

- D1 (qualified) irrigated cropland (# of acres)
- D1 (qualified) dry cropland (# of acres)
- D1 (qualified) barren / wasteland (# of acres)
- D1 (qualified) orchards (# of acres)
- D1 (qualified) improved pasture (# of acres)
- D1 (qualified) native pasture (# of acres)
- D1 (qualified) timber @ productivity (# of acres)
- D1 (qualified) other ag land (# of acres)
- D1 (qualified) wildlife management (# of acres)
- D1 (qualified) restricted-use timber (# of acres)
- D1 (qualified) timber-in-transition (# of acres)
- D1 (qualified) timber @ 78 market (# of acres)



Data Sources (cont.)

The original data was statistically adjusted to remove outliers and aggregated to form five major land use classes: cropland, grazing land, timber, wildlife management, and other. These land uses collectively form the *Texas Land Trends* working lands dataset. Working lands are privately owned farms, ranches, and forests that produce food and fiber, support rural economies, and provide wildlife habitat, clean air and water, and recreational opportunities. The aggregated major land use classes and the original Comptroller categories are shown below.



Market and Productivity Value Data—Comptroller’s Office Property Appraisal Data (at ISD level)

In addition to providing extensive land use data, the Texas Comptroller also reports land market and productivity value data for all private lands designated as 1-d and 1-d-1 appraisal status for all Texas ISDs. Land market value is defined as the average appraised value of the land, reported in \$ per acre. Land productivity value is defined as the value of agricultural commodities produced by the land, reported in \$ per acre.

Population Data—Texas Department of State Health Services (at County level)

The Texas Department of State Health Services produces an annual compilation of county level population data (total of all individuals per county) for the state of Texas. Population values for census years (every 10 years) are taken from the United States Census Bureau census counts and estimates are used for years in between. County population data from 1997, 2002, 2007, and 2012 are used from this dataset.



Procedures to Note

- The original Comptroller data were statistically adjusted to remove outliers, and land use categories were grouped to reduce fluctuation between Comptroller-defined classifications.
- Values for ISDs that no longer exist due to school district consolidations were retroactively assigned to the new ISD. County level land use data is made up of an aggregation of all ISDs whose centroid fell within the county boundary. The centroid was the true centroid of the polygon, meaning it wasn't forced within the boundary of the school district polygon but placed at its true center. Because of this, it is likely that the total land use area in a given county can exceed the actual area of the county itself.
- Counties were similarly assigned to ecoregions, river basins, and regions of interest based on the county's centroid. A true centroid, placed at the polygon's true center, was used. All centroids falling within the boundary of the selected area of interest were included and aggregated.



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