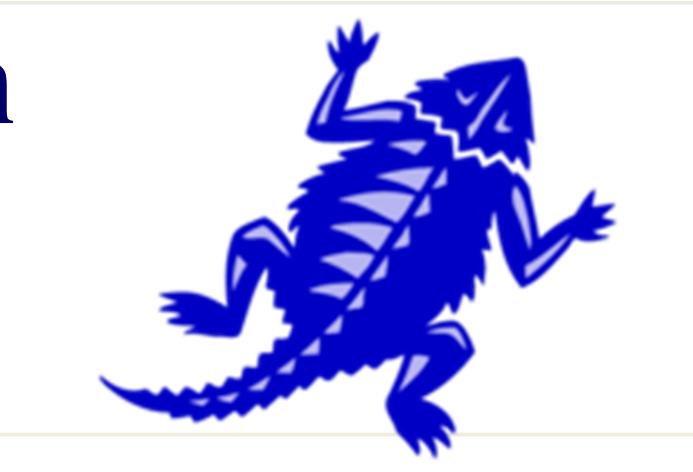


## Geospatial analysis of drinking water for bats in the Lower West Trinity watershed of Fort Worth

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### **Abstract**

Although bats are extremely important ecosystem service providers, they face challenges accessing suitable drinking resources in urban environments where water access can be severely hindered. The objective was to conduct a comprehensive geospatial analysis to assess water sources within Tarrant County and specifically, around Texas Christian University. Factors such as tree cover, water surface, connectivity, and proximity to roadways, and shelter were all evaluated and mapped. Overall, six sites within the watershed exhibit ideal, yet diverse, conditions for bat drinking and, therefore, population presence. The results can be applied to research projects in the Department of Environmental Sciences Bat Lab, including projects where said water sources will be surveyed for changes in bat activity over time. Additionally, this suitability data will contribute valuable insights into the spatial distribution of drinking resources for local bat populations, aiding in conservation efforts and habitat management in the region.

## Background

- · Access to water is essential for all wildlife to thrive in an area, including bats
- Bats are crucial ecosystem service providers (Sugiyana et al. 2018, Tuneu-Corral et al. 2023).
- In urban environments, while water sources are often present for bats to drink from, they may avoid them due to other environmental factors.
- Bats require connectivity to resources provided by tree corridors (Harms et al. 2020).
- Proximity to roadways can negatively affect bat activity (Russo-Petrick and Root 2023).
- · Results will convey ideal research sites for bat presence and observation in subsequent studies.

## **Objective**

To provide future research in the Environmental Sciences Bat Lab with a diverse range of study sites to observe bat activity across Fort Worth for effective research and conservation

## Study Area

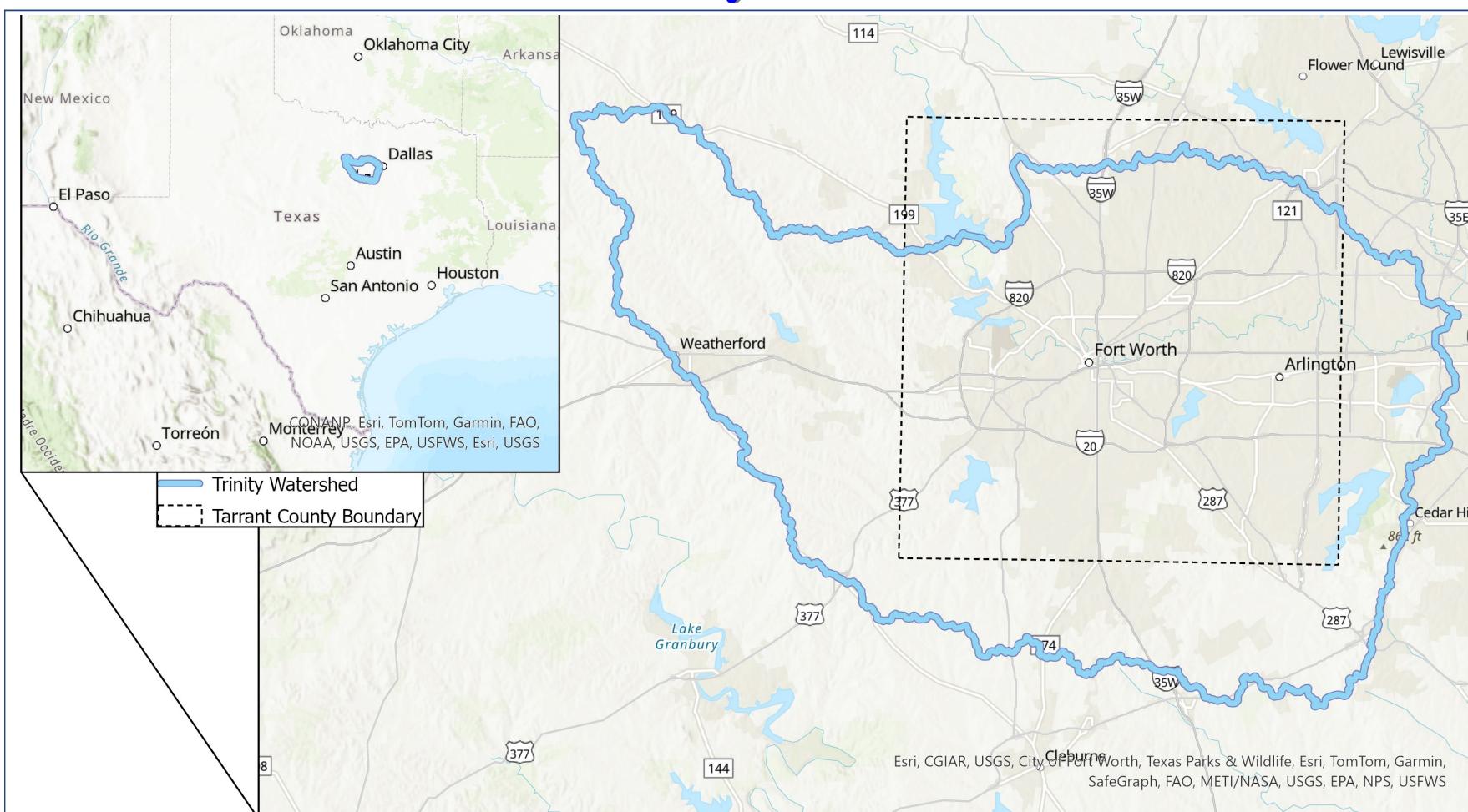


Figure 1: The study was conducted in Tarrant County and the Lower Trinity Watershed.

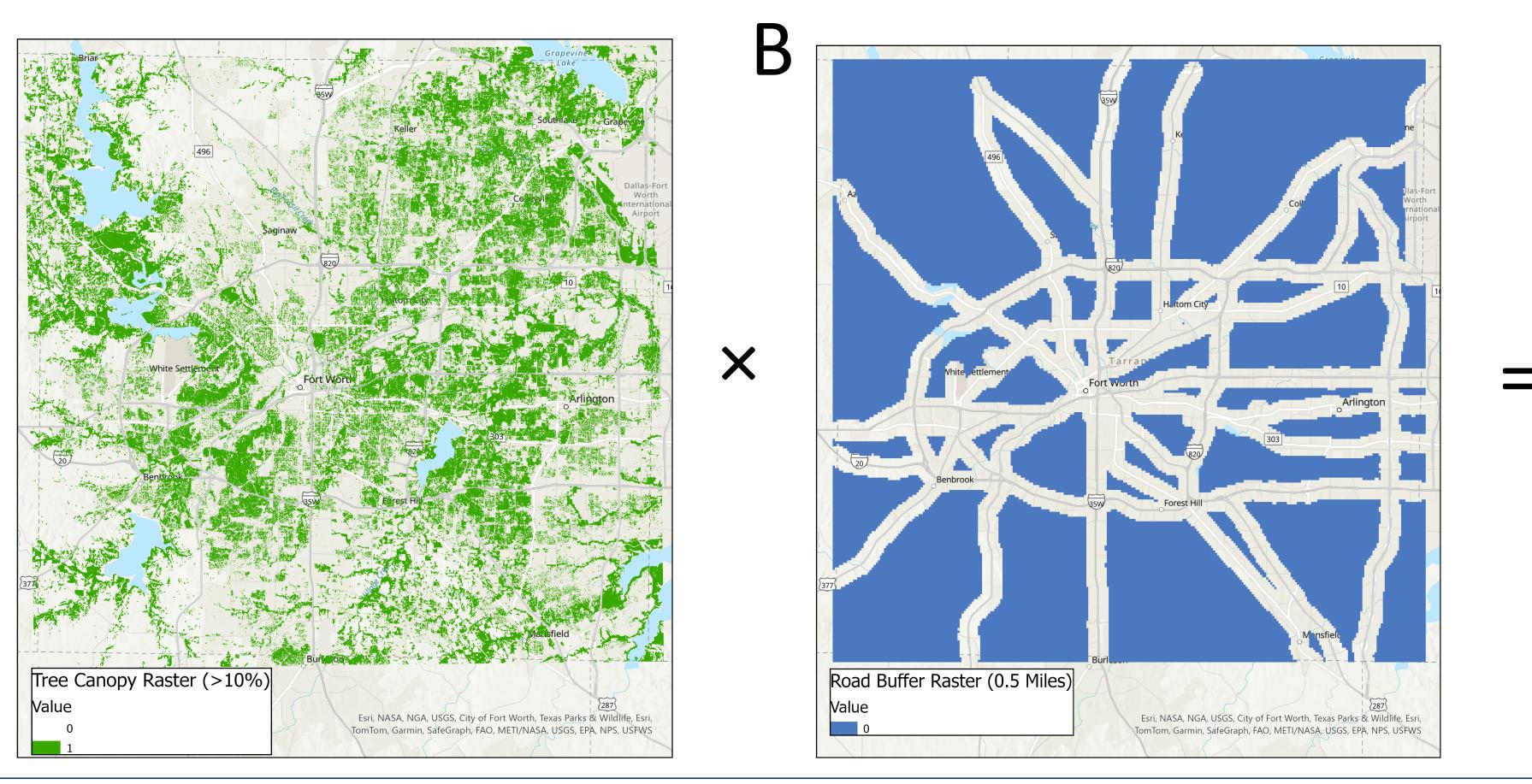
## Data Sets

- 2021 USFS Tree Canopy Cover (CONUS) From NLCD—a 30 m raster geospatial dataset for the United States
- 20222 MAF/TIGER roadways census—a dataset of roadways across the United States
- River, watershed, and other water source data provided by Dr. Victoria Bennett.

# Areas within the Lower West Trinity Watershed Areas within subwatersheds and/ or connected to rivers No less than 10% tree canopy coverage Exclude areas within 0.5 mile of ≥2-lane roads Diverse study sites that still exhibit bat activity

# After reclassification and multiplication of raster data of both tree canopy cover and multilane roads in Tarrant County together, a final raster displayed areas in Tarrant County with desired characteristics (Fig. 2).

Results



**Figure 2**: Rasters of areas with >10% Tree Canopy Coverage (A) and areas out of 0.5-mile buffer from multi-laned roads (B) were multiplied to produce the final site source (C) in ArcGIS Pro.

# **Conclusion** Dallas CONANP, Esri, TomTom Garmin, FAO, NOAA, USGS EPA, USFWS, Esri, USGS Dallas Pond Locations — Multi-lane roads Subwatershed Benbrook Reservoir watershed

# Figure 3: The final proposed map displaying water sources, roadways, and the 6 chosen sites determined as suitable for bat population presence (based on Figure 2: C). Six total sites were selected due to their centrality in the watershed, high tree coverage and connectivity, and

- distance from busy roadways.

  Although one study site (Site F) is notably not indicated for bat presence by raster analysis, it has been cho-
- sen for proximity to TCU as a low-level control.

  Sites include the Benbrook Reservoir, the Clear Fork Trinity River, Rocky Creek, and other terminating rivers-
- concurrent for observing bat behavior as water source availability is essential.

  Their ability to support bat populations confirmed by past studies (Nystrom and Bennett 2019) and can be

## Acknowledgements

utilized further by the TCU Bat Lab.

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