

# Promoting Nature-Based Solutions and Natural Infrastructure for Flood Resilience

Trinity River COMMON VISION Flood Management Task Force



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# Outline

1. Nature-Based Solutions (NBS) and Natural Infrastructure for flood resilience
2. Planning for and funding NBS
3. An introduction to Trinity Floodplain Planning and Prioritization Tool

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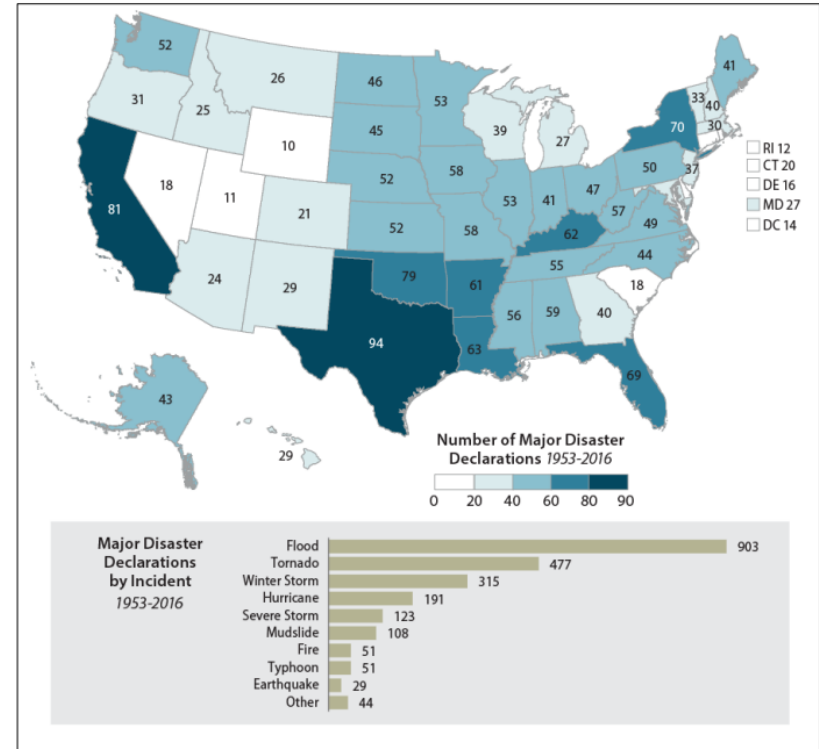
*Nature-Based Solutions (NBS) and Natural  
Infrastructure for flood resilience*

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# Challenges for Texas

Texas leads the country in federally declared natural disasters.<sup>1</sup>

**Figure 6. Major Disaster Declarations by State and Type**  
1953-2016



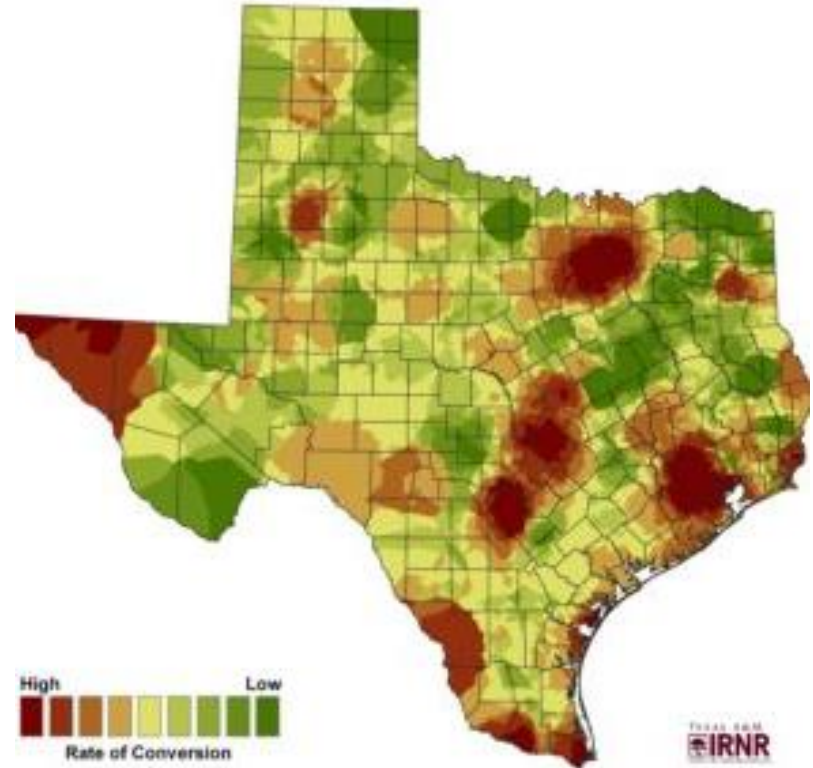
<sup>1</sup> Congressional Research Services, 2017

**Source:** CRS analysis based on data from U.S. Department of Homeland Security, Federal Emergency Management Agency, *Disaster Declarations*, available at <https://www.fema.gov/disasters>.

# Challenges for Texas

Texas leads the country in federally declared natural disasters.<sup>1</sup>

Texas is losing its natural buffers: an estimated 240,000 acres per year are converted to development.<sup>2</sup>



<sup>1</sup> Congressional Research Services, 2017

<sup>2</sup> Texas Land Trends



# Challenges for Texas

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Texas is losing its natural buffers: an estimated 240,000 acres per year are converted to development.<sup>2</sup>

Population centers are outgrowing stormwater drainage systems.

According to the State Climatologist, by 2036, Texas communities will experience as much as 50 percent more flooding.<sup>3</sup>

Cost of gray solutions is very high

<sup>1</sup> [Congressional Research Services, 2017](#)

<sup>2</sup> [Texas Land Trends](#)

<sup>3</sup> Texas A&M University. Office of the Texas State Climatologist

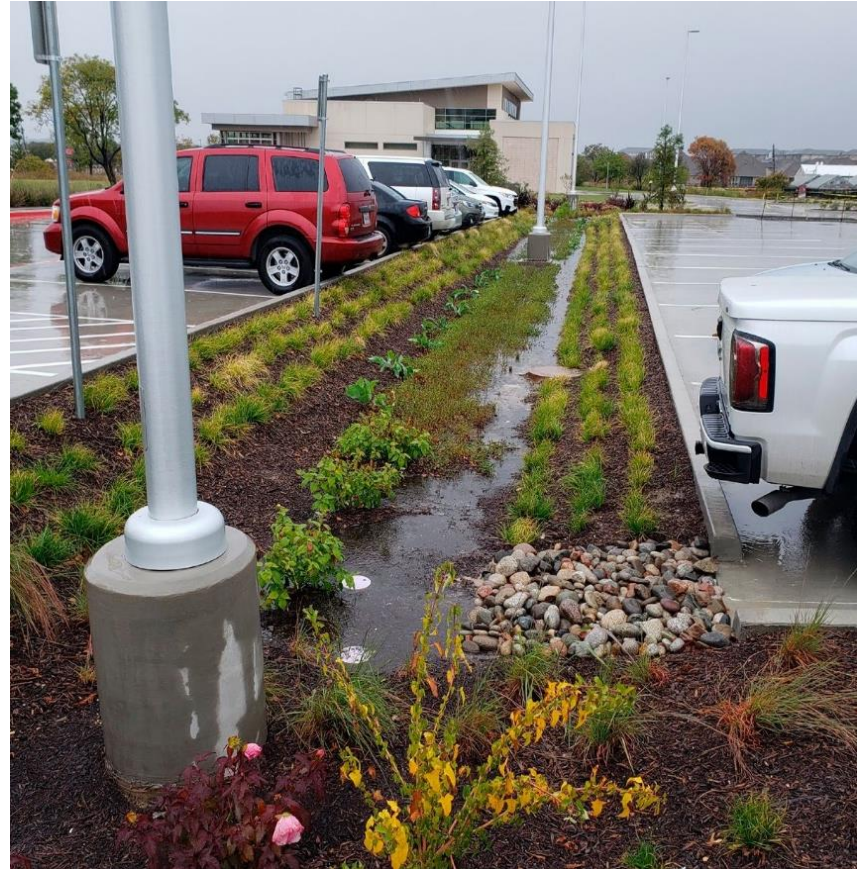


# Nature-based Solutions

Nature-based Solutions (NbS) use or imitate natural features and processes - increasing community resilience and providing multiple benefits to people and the environment

These solutions:

- Reduce flooding
- Protect water quality
- Combat urban heat island effect
- Improve air quality
- Impact public health outcomes
- Provide green space
- Increase quality of life for people & wildlife

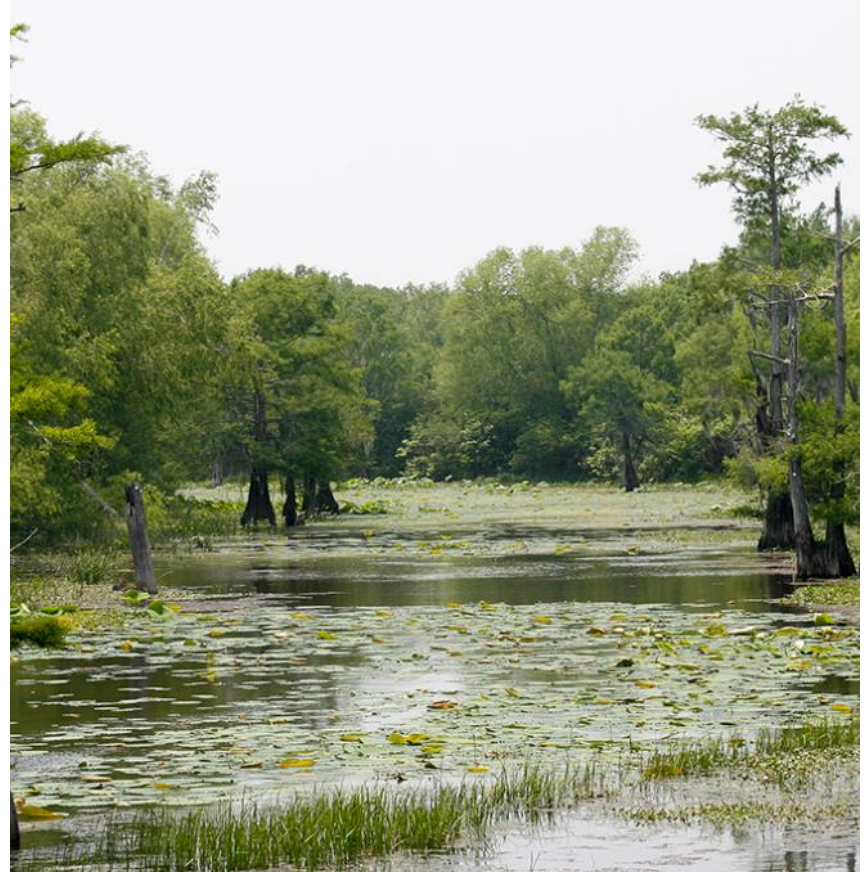


# NbS for Flood Mitigation

Nature-based Solutions absorb rainfall and slow and hold stormwater

Natural areas throughout a watershed improve flood storage capacity, infiltration, provide filtration, and delay flows

Natural shorelines are more adaptable to relative sea level rise and attenuate wave energy



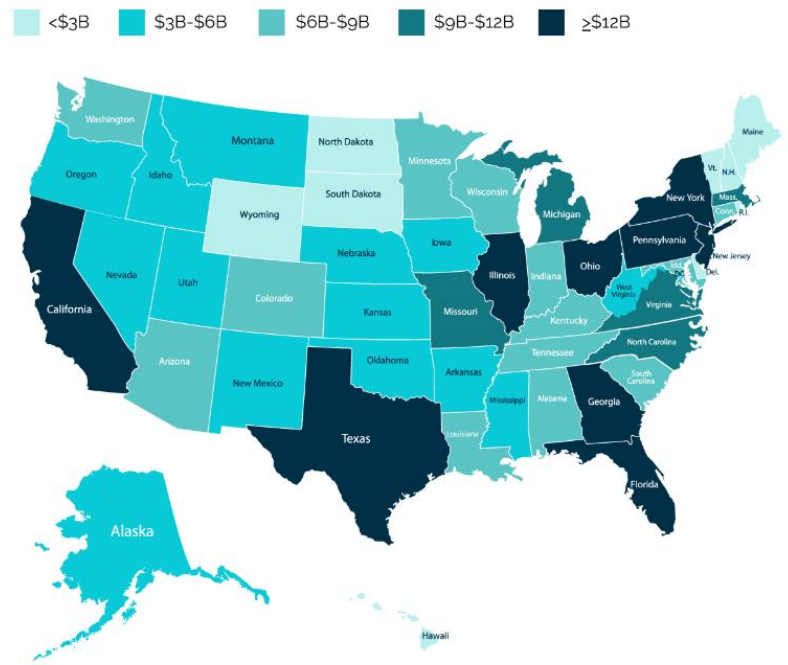


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*Planning for and Funding NBS*

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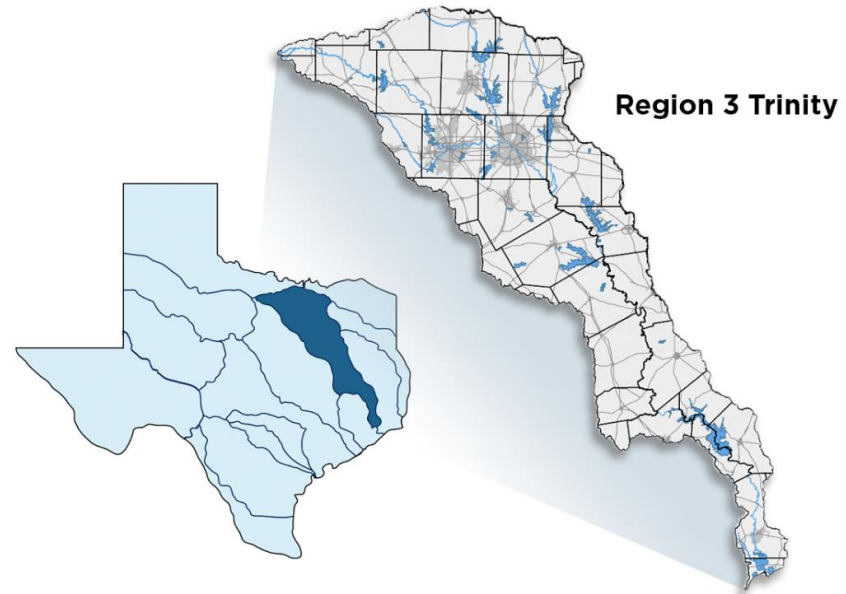
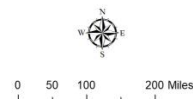
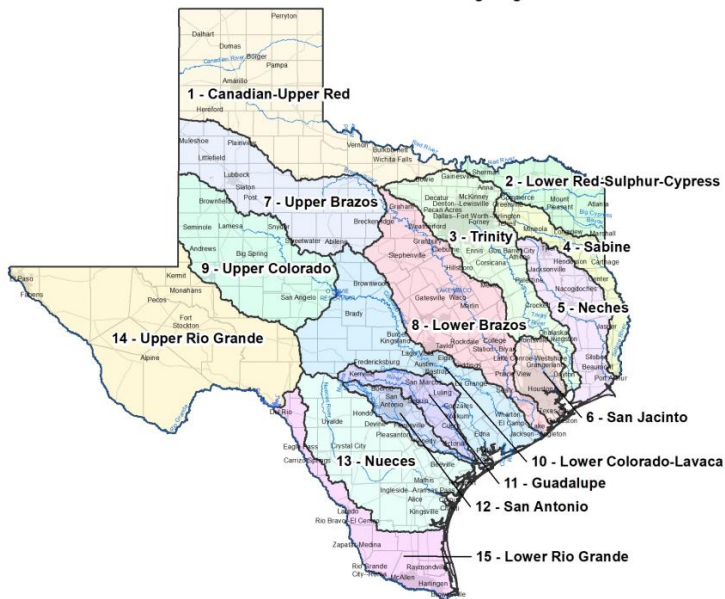
# Garnering Largescale Investment



TOTAL ESTIMATED INFRASTRUCTURE BILL (IIJA) ALLOCATIONS  
 POSTLETHWAITE & NETTERVILLE

# Texas Flood Planning- Garnering Largescale Investment

Flood Planning Region Boundaries



## Familiar theme: Lack of shovel ready projects in plans





## Barriers to NbS

- Viewing nature as an infrastructure solution is relatively “new”
- General lack of understanding and familiarity about NbS as a tool for flood management
- Difficulties with the paradigm of multi-benefit projects and strategies
  - Multidisciplinary
  - Quantifying benefits and costs
  - Life-cycle planning
  - Watershed planning
- Training in design and maintenance
- Need for consistent & clear information

# Nature-based Solutions for Climate Resilience

TNC is working with partners to advance natural infrastructure and NbS at multiple scales across rural-to-urban landscapes, for improved climate resilience and multiple benefits

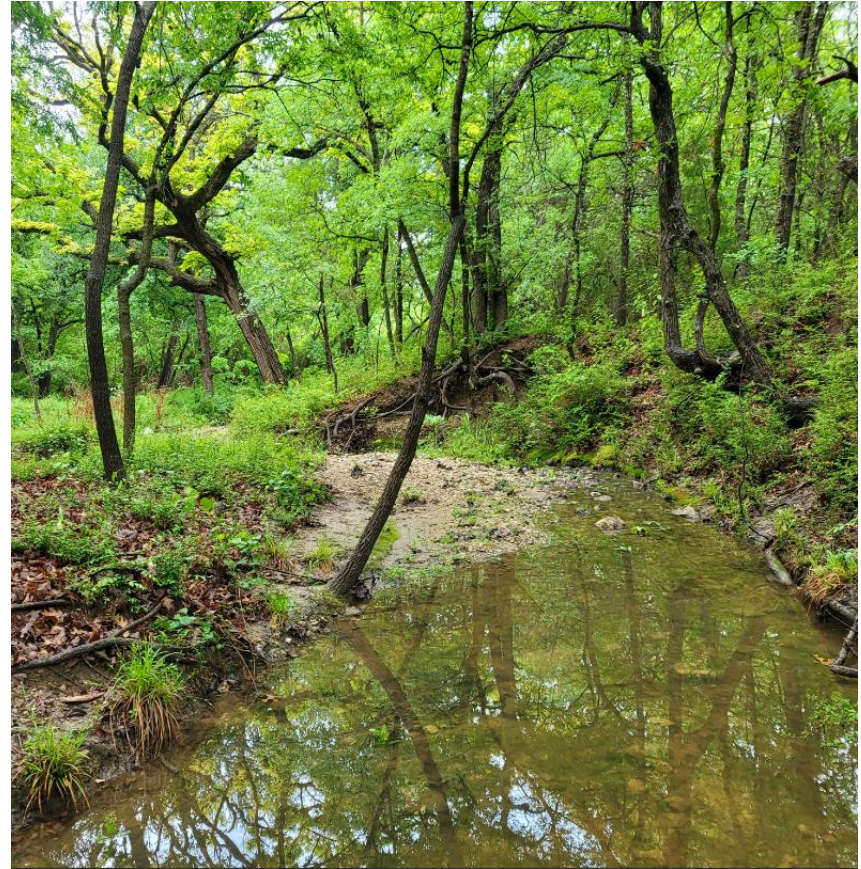
- Addressing barriers to and garnering large-scale investment in NbS
- Encouraging inclusion of NbS in regional and state flood plans
- Demonstrating the benefits of NbS
- Supporting stakeholders to prioritize and develop NbS projects



CLEAR CREEK NATURAL HERITAGE CENTER [INSTAGRAM](#)

# NBS in Flood Planning

- Nature-based Solutions for Flood Mitigation in Texas guidance manual
  - TNC is on the project team with Freese and Nichols, Inc. to develop a single, statewide manual for Texas communities on the use of nature-based flood mitigation solutions
  - <https://www.twdb.texas.gov/flood/research/Nature-based-Solutions-2022/index.asp>
- Trinity Floodplain Planning & Prioritization Tool



BOTTOMLAND HARDWOOD FOREST STRATFORD NATURE AREA © CITY OF FORT WORTH

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*Trinity Floodplain Planning and  
Prioritization Tool*

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Since 2020, TNC and the USACE Silver Jackets partner Fort Worth District (USACE-SFW) have collaborated with Trinity Basin stakeholders to support the protection and restoration of greenspace in the floodplain to reduce flood risk and improve biodiversity, water quality, and additional community benefits

- Includes adaptation of TNC's Floodplain Prioritization Tool (FPPT) to the Trinity Basin: [Trinity Floodplain Prioritization Tool](#)
- Inform Regional and State Flood Plan investment
- Stakeholder planning to prioritize, evaluate, and prepare a portfolio of NBS for implementation



# SILVER JACKETS

## Many Partners, One Team

Silver Jackets are Interagency Teams that Facilitate Collaborative Solutions to State Flood Risk Priorities.

State-led Silver Jackets teams exist in all states and several territories, bringing together multiple state, federal, and sometimes local agencies and Tribes to learn from one another and work together to reduce risk from floods and sometimes other natural hazards. Silver Jackets teams conduct diverse collaborative efforts.

[Silver Jackets Website](#)

[Texas Silver Jackets](#)

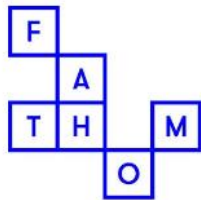




# FLOODPLAIN PRIORITIZATION TOOL

The Nature Conservancy developed the new Floodplain Prioritization Tool (FP Tool) to identify critical opportunities for floodplain conservation and restoration in the Mississippi River Basin. Working with data developed by the Conservancy and provided by several partners, the FP Tool is designed to help identify places where these actions would have the greatest impact on the overall health of this iconic river system. This first-of-its-kind tool is interactive, web-based and designed to help decision-makers—like federal, state and local governments, county planners, land trusts, and businesses—optimize their conservation and restoration investments and minimize the impacts of development. For the portfolio of priority sites identified throughout the basin, the Floodplain Prioritization Tool allows stakeholders to identify priorities and assess tradeoffs related to nutrient removal, wildlife habitat, flooding and other goals.

The applicability of this new tool is important because floodplains are incredibly [hard-working ecosystems](#) that can improve water quality, reduce flood impacts, provide critical wildlife habitat and enhance recreational opportunities. But tens of millions of acres of floodplains across the Mississippi River Basin have been developed or converted to agriculture. These changes in land use have degraded water quality, increased flood impacts, and diminished habitat for fish and wildlife, all of which takes a toll on the economy and the quality of life for people.



## About the Floodplain Prioritization Tool

### Mississippi River Basin Floodplain Tool

Who is it for?

Launch the FP Tool (IE not supported)

Fact Sheet

Feature Story

Coverage Map

The Value of Floodplains

User Training Video

Technical Specifications & Data Layers

Email TNC's Kris Johnson

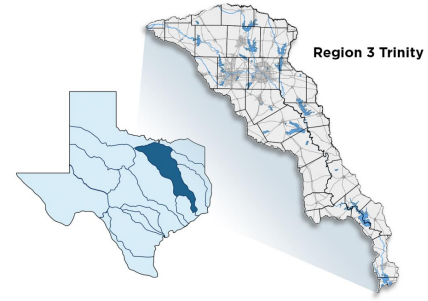
Media Info

### Lower Meramec River Floodplain Tool

Launch the FP Tool (IE not supported)

Western Tennessee Floodplain Tool

# PHASE 1- TOOL BUILDOUT & REGIONAL FLOOD PLANNING (Fall 2021- Summer 2023)



Trinity Floodplain Prioritization Tool



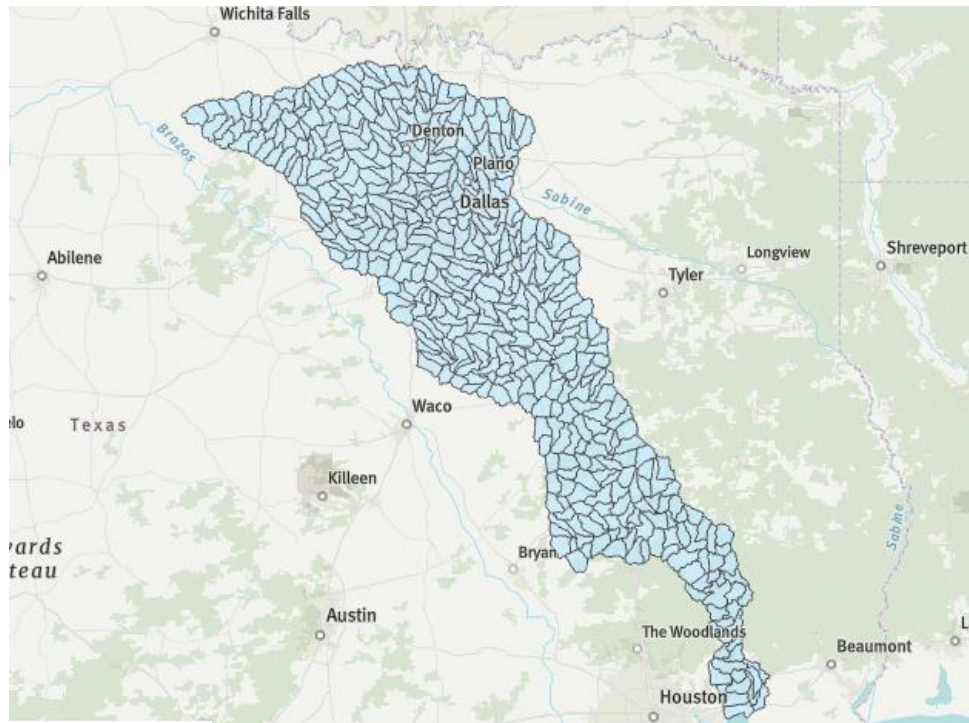


# Use Case– Section 1135 Environmental Restoration

**Section 1135 – Environmental Restoration** - What areas may be available protect/restore to improve aquatic habitat that could be funded by cost-share in Upper Trinity River Basin?

## Criteria:

- Available unprotected floodplain within watershed near protected land (possible USACE adjacent) in 5-year flood frequency that potentially contributes to sediment loading to USACE project (reservoir).
  - ✓ 1-in-5 yr.
  - ✓ HUC-12
  - ✓ Available unprotected floodplain area **>100 acres**
  - ✓ Suspended sediment yield **>20**
  - ✓ Connectivity **> 1 acre**
- Possesses community flood risk reduction potential
  - ✓ Population exposure (current and 2050) **>10; >18**
  - ✓ Expected to experience increased developmental pressure **Index >1**
- Supporting Layers
  - ✓ 5-yr
  - ✓ 100-yr
  - ✓ Protected areas



## PHASE 2: STAKEHOLDER PLANNING & PROJECT DEVELOPMENT (Current)

Share tool with stakeholders to encourage on the ground investment

Pursue a stakeholder planning process to prioritize, evaluate, and prepare a portfolio of NBS for implementation.



<https://nature.org/suns>

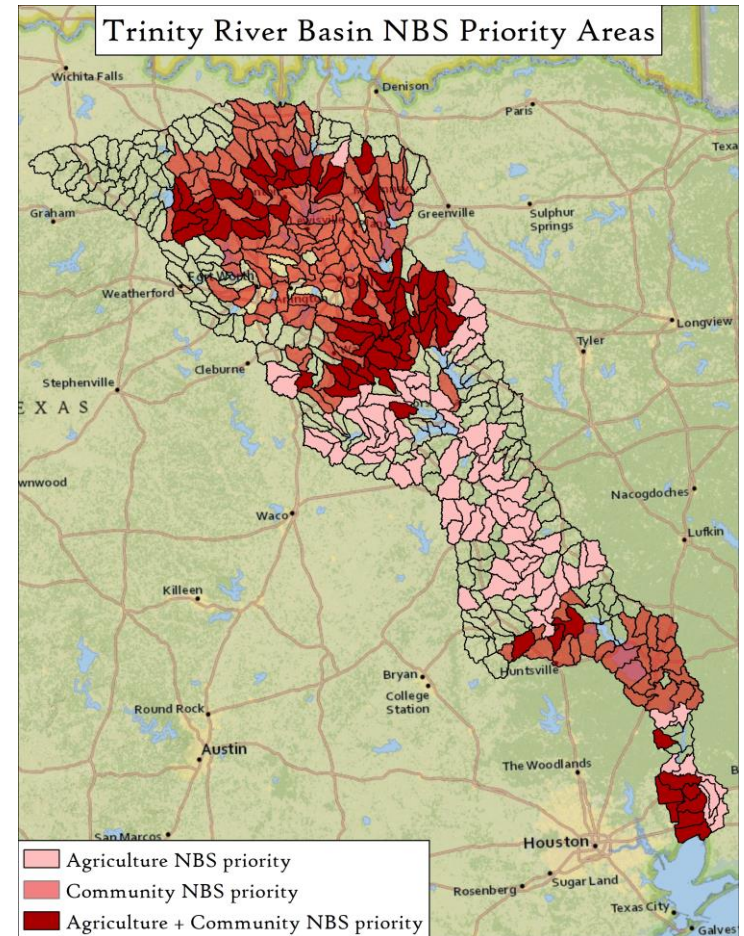


# Region 3 Trinity Flood Plan

TNC developed a Flood Mitigation Strategy and a Flood Mitigation Evaluation that are included in the [2023 AMENDED Region 3 Trinity Regional Flood Plan](#).

- [Trinity Basin Stakeholder Nature-Based Solutions Project Planning and Analysis \(FMS\)](#): Phased multi-jurisdictional stakeholder engagement, NBS project planning and analyses will be performed in targeted areas to identify a portfolio of priority NBS flood mitigation projects and strategies
- [Trinity Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions \(FME\)](#): Basin-wide analysis on the flood mitigation value of select nature-based solutions (NBS) at a variety of scales and land use types;

Qualifying entities can apply for [Flood Infrastructure Funding](#) by April 15<sup>th</sup> for these or other Flood Mitigation Projects in the Plan



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*Thank You*

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