

## NATURE-BASED SOLUTIONS:

# THE ECONOMIC CASE FOR RIPARIAN & FLOODPLAIN PRESERVATION

**What are nature-based solutions?** Nature-based solutions (NBS) are strategies that manage stormwater and convey floodwaters by preserving or mimicking natural ecosystems rather than relying solely on engineered infrastructure. Strategies include riparian corridor conservation (protecting vegetated transition zones between land and water) and floodplain preservation, which involves acquiring land to maintain natural flood storage. Through mechanisms like conservation easements and voluntary buyouts, NBS's prevent future development in high-risk areas while enhancing environmental quality and community resilience.



## Flood Mitigation

- Riparian zones and floodplains act as natural sponges that slow, absorb, and divert floodwaters.
- By reducing the force, height, velocity, and volume of runoff, these features protect downstream infrastructure and developments from damage.
- Research indicates that upstream wetlands, particularly those within 500 to 750 meters of a water source, provide measurable flood mitigation benefits valued at over \$12,000 per acre per year by intercepting water before it reaches residential properties.

## Proactive Preservation vs. Reactive Buyouts

- Proactive preservation involves conserving natural floodplains before they are developed.
- This is generally a more cost-effective strategy because it can avert the need for expensive structural flood controls and disaster recovery later. Additionally, buyouts become more expensive as development occurs.
- Reactive solutions, such as voluntary home buyouts and managed retreat, address areas already impacted by flooding.
- Governments purchase damaged properties and restore the land to open space to reduce future emergency costs and restore natural flood storage.
- While often more expensive than proactive measures, reactive projects still yield high returns.



## Co-Benefits

- NBS's deliver robust co-benefits in improved water quality, habitat, and aesthetics, as well as heat island reduction and recreation opportunities.
- These values are reflected in increased property values for adjacent homes and businesses, which boosts tax revenues and offsets acquisition costs.

Property  
values  
increase

**5-35%**



## Return on Investment

- Investing in preservation yields high financial returns.
- FEMA flood mitigation projects generate between \$2 to \$7 in benefits for every \$1 invested due to avoided damages and insurance payouts.
- Acquiring natural lands in the Upper Trinity River area is expected to have a greater benefit-cost ratio than in other parts of the country.
- Reduced flood risk and co-benefits result in higher sale prices for nearby residential and commercial developments.

**Up to \$7 for every  
\$1 invested**



**North Central Texas  
Council of Governments**



## Costs



- Cost considerations include
  - acquisition vs. easement
  - restoration
  - buyout and relocation costs
  - long-term maintenance
  - fiscal impacts
- Low-intensity conservation easements have widely varying costs, but typically may amount to around \$1,800 per acre per year, plus a one-time restoration cost of \$1,700.
- Urban buyouts and restorations can reach \$1 million per acre.

### Study Area Land Costs

| County  | Cropland | Grazing Land | Orchards | Wildlife Management | Average  |
|---------|----------|--------------|----------|---------------------|----------|
| Dallas  | \$24,178 | \$17,871     | \$11,519 | \$8,976             | \$20,162 |
| Denton  | \$21,557 | \$26,365     | \$75,867 | \$34,953            | \$25,830 |
| Ellis   | \$9,163  | \$8,341      | \$11,083 | \$7,285             | \$8,534  |
| Johnson | \$8,190  | \$5,790      | \$17,427 | \$7,789             | \$6,251  |
| Parker  | \$14,544 | \$14,494     | \$20,267 | \$11,949            | \$14,546 |
| Tarrant | \$22,122 | \$15,227     | \$73,751 | \$17,420            | \$16,246 |
| Wise    | \$7,522  | \$10,035     | \$5,320  | \$8,510             | \$9,976  |

## Case Study

- The Woodland Park neighborhood in Arlington suffered from at least five major flood events, including Ermine in 2010.
- Residents were skeptical of returning to their homes, but there were no cost-effective structural solutions.
- The City of Arlington's Rush Creek project spent \$23 million to acquire and demolish 63 flood-prone structures, converting the area into part of an 82-acre park system.[1]

[1] Adjusted to 2025 dollars from \$17 million in 2014 USD using GDP Deflator Index.



## Site Prioritization



- Preserved natural areas in urban zones generate higher returns because they protect more built infrastructure from flooding and provide co-benefits to larger populations.
- Prioritizing contiguous, clustered land acquisitions rather than isolated lots improves wildlife movement, moderates stream temperatures, and enhances water retention.
- The Nature Conservancy's Trinity Floodplain Prioritization Tool (FPPT) allows users to apply multiple criteria and view geographies that meet the selected priorities.
- Texas AgriLife's TSI stacking model identifies flood-prone areas based on environmental, socio-economical, infrastructural, and institutional factors, and is available on the TSI website.

**Funding Partners:** Texas General Land Office, U.S. Department of Housing and Urban Development; Texas Water Development Board; Texas Department of Transportation, Federal Highway Administration; Federal Emergency Management Agency