Healthy Creeks and Waterways: Vegetation and the Flow of Healthy Waterways

March 31, 2021

Microsoft Teams

North Central Texas Council of Governments
Environment & Development

Agenda

- **Welcome, Introductions** – Crysta Guzman, NCTCOG
- **Riparian Buffers in Watersheds** – Aaron Hoff, Tarrant Regional Water District
- **Denton County Greenbelt Plan** – Blake Alldredge, Upper Trinity Regional Water District
- **How to Start a Grow Zone Program** – John Clement, City of Austin
- **NCTCOG Resources** – Carolyn Horner, NCTCOG

Welcome & Housekeeping

- Please keep your line on mute until the end of all the presentations.
- We will have an open Q&A session at the end of the presentations. Please type your question in the chat box or raise your hand to ask a question.
- We will be using Poll Everywhere throughout the presentation. Please visit **PollEV.com/nctcogenv444** to participate in the polls.

Speaker Bios

Aaron Hoff

- Aaron is an environmental scientist working with the Tarrant Regional Water District, specializing in source water protection and watershed education. He has assisted with the development of five watershed protection plans (WPPs) in the Dallas/Fort Worth area.
- Born and raised in rural north Texas, his childhood adventures fostered a healthy appreciation for the natural world. He proceeded to earn both his bachelor's and master's degrees from Texas A&M, where his studies focused on water quality and natural resource management. He is currently seeking his PhD from UT–Arlington, where he is researching microbial impacts in Texas waterways.
- Connect with Aaron at: Aaron.Hoff@trwd.com

Blake Alldredge

- Blake is a Water Education Coordinator with the Upper Trinity Regional Water District since 2014. He coordinates the District's Water Conservation and Watershed Protection planning and outreach programs and assists customer cities and utilities in their efforts. Blake also assists in the daily activities of the Upper Trinity Conservation Trust, which was established by the District in 2010 as a non-profit land trust that can accept and hold conservation easements from landowners, developers and municipalities.
- Prior to joining UTRWD in 2014, he worked for the Texas A&M AgriLife Extension Service in the Wildlife and Fisheries department. Blake received a Bachelor's of Wildlife Science in 2008 and a Master's of Water Management in 2010, both from Texas A&M University.
- Connect with Blake at: balldredge@utrwd.com

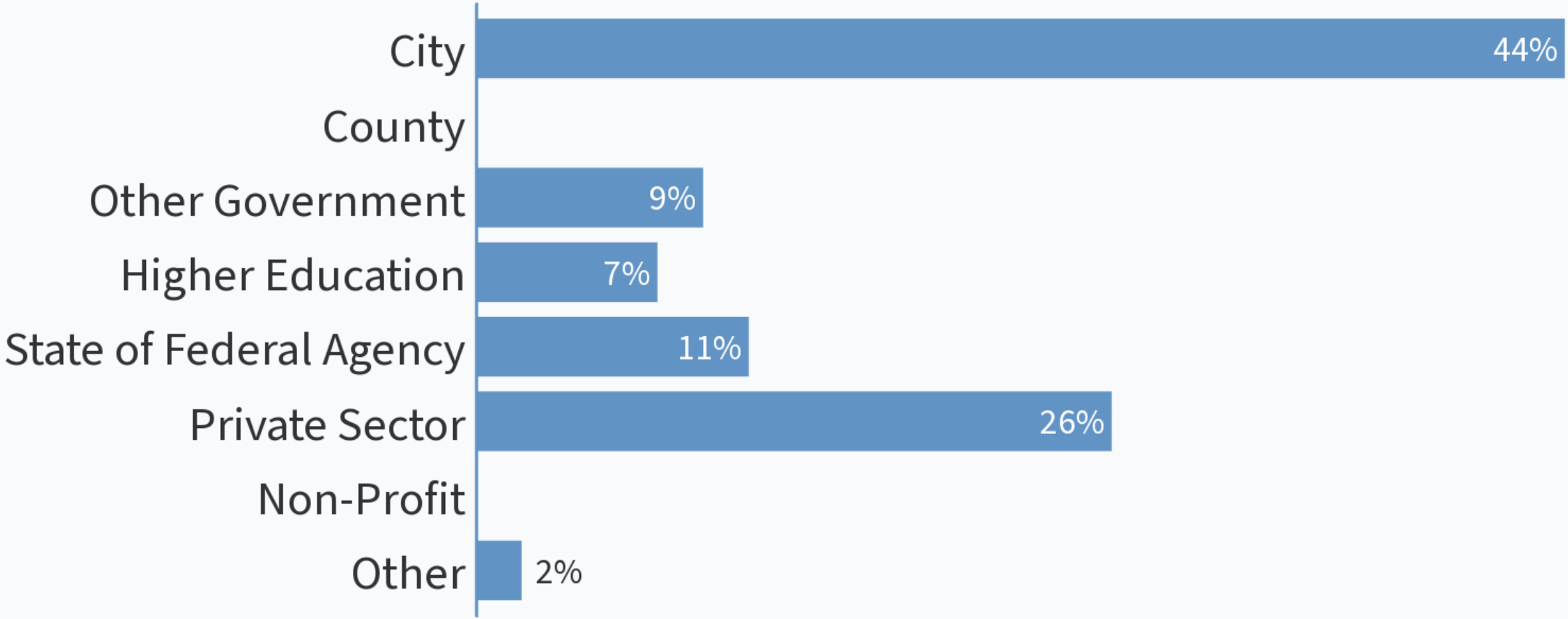
John Clement

- John is an Environmental Program Coordinator with the City of Austin's Watershed Protection Department. He manages Austin's Grow Zone program and related initiatives that improve floodplain health and community access to waterways, as well as engage the community in active stewardship of creekside areas.
- John has a PhD in Botany from the University of Texas at Austin and 20 years of experience in water resource protection in Central Texas.
- Connect with John at: John.Clement@austintexas.gov

When poll is active, respond at **pollev.com/nctcogenv444**

Text **NCTCOGENV444** to **22333** once to join

What type of organization do you represent?



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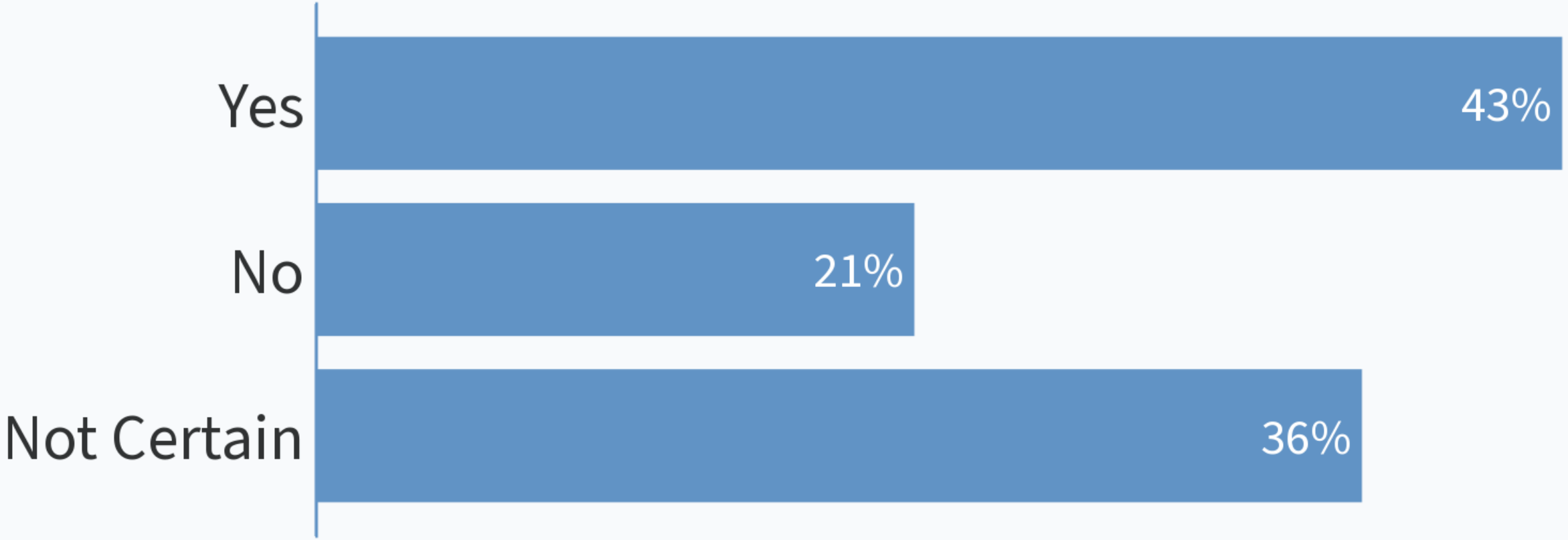
Does your organization have a plan in place to establish and/or protect riparian buffers?



Aaron Hoff

Tarrant Regional Water District

trwd Tarrant Regional Water District

Riparian Buffers in Watersheds

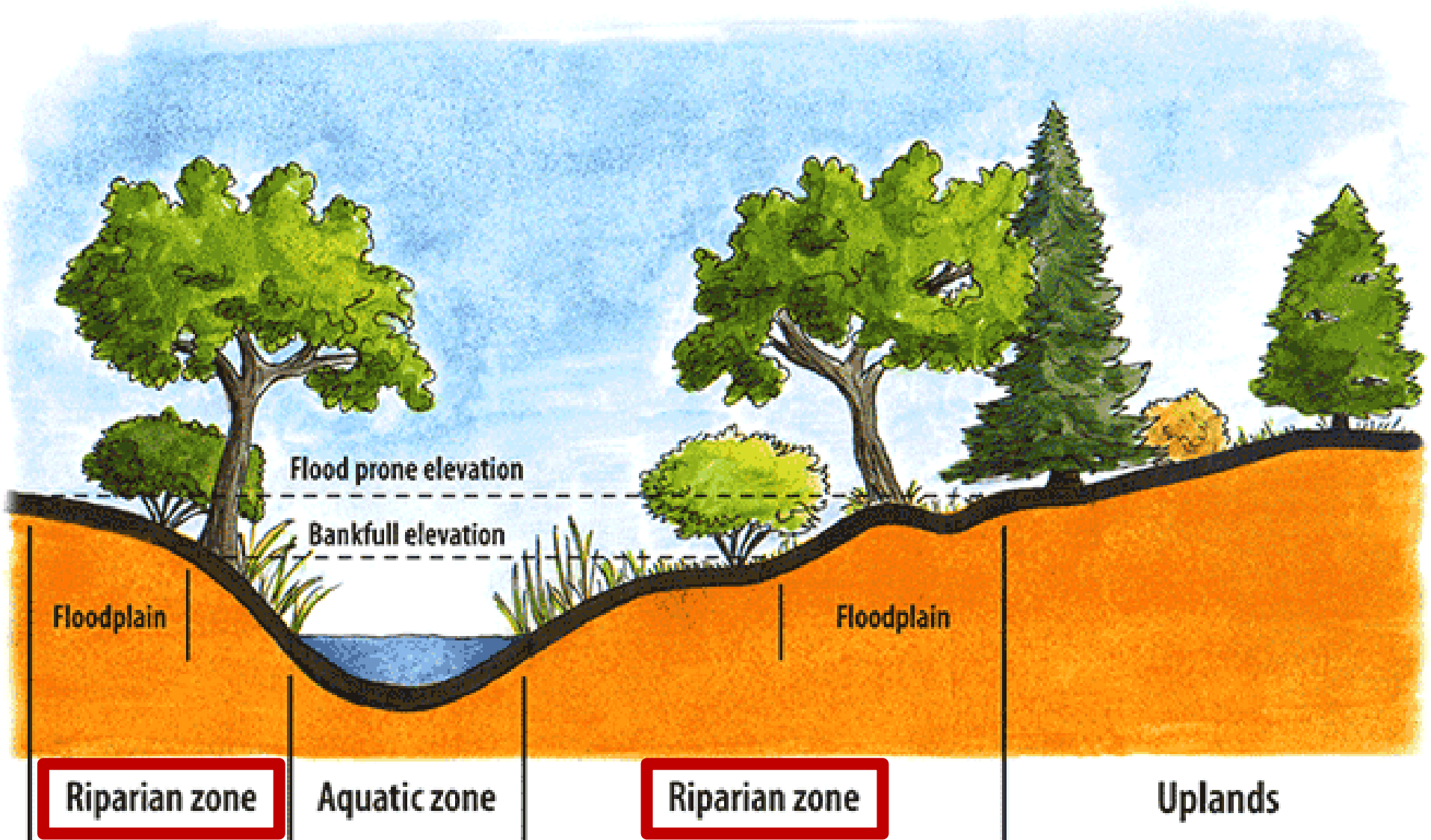
Healthy Creeks and Waterways

Aaron Hoff

Tarrant Regional Water District

What is a watershed?

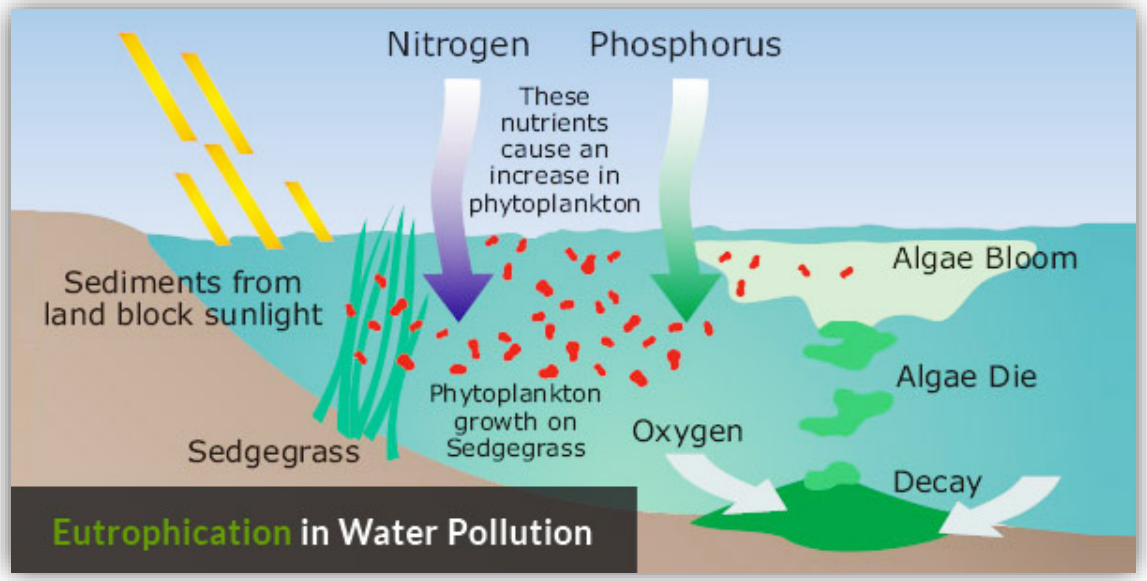
Zooming in: Riparian Zones



What makes riparian zones so great?

Role in Watershed Planning

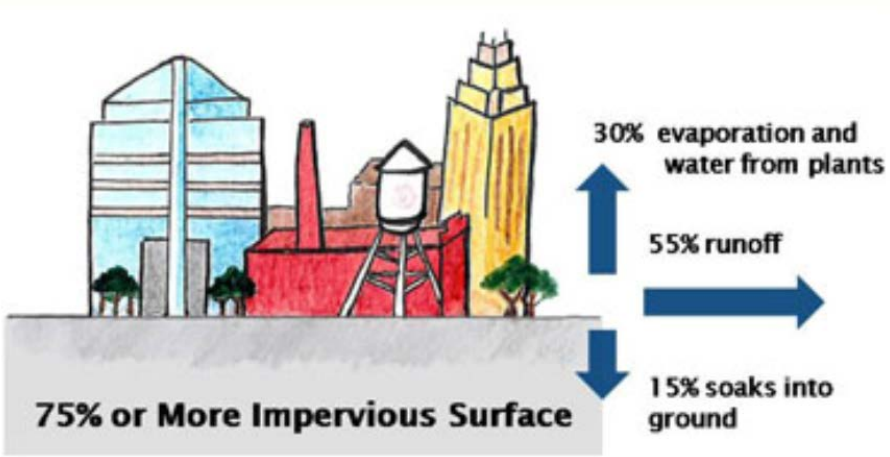
- Problem – excessive eutrophication in local lakes

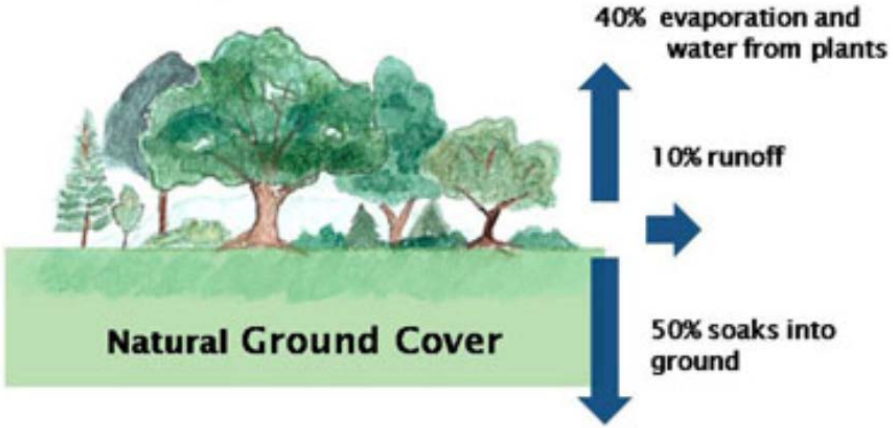


PLOT TWIST: Must obtain goal while:

- Maintaining current uses
- Keeping the majority of stakeholders happy

- Goal – decrease algal growth in lake
  - Reduce incoming contaminant loads

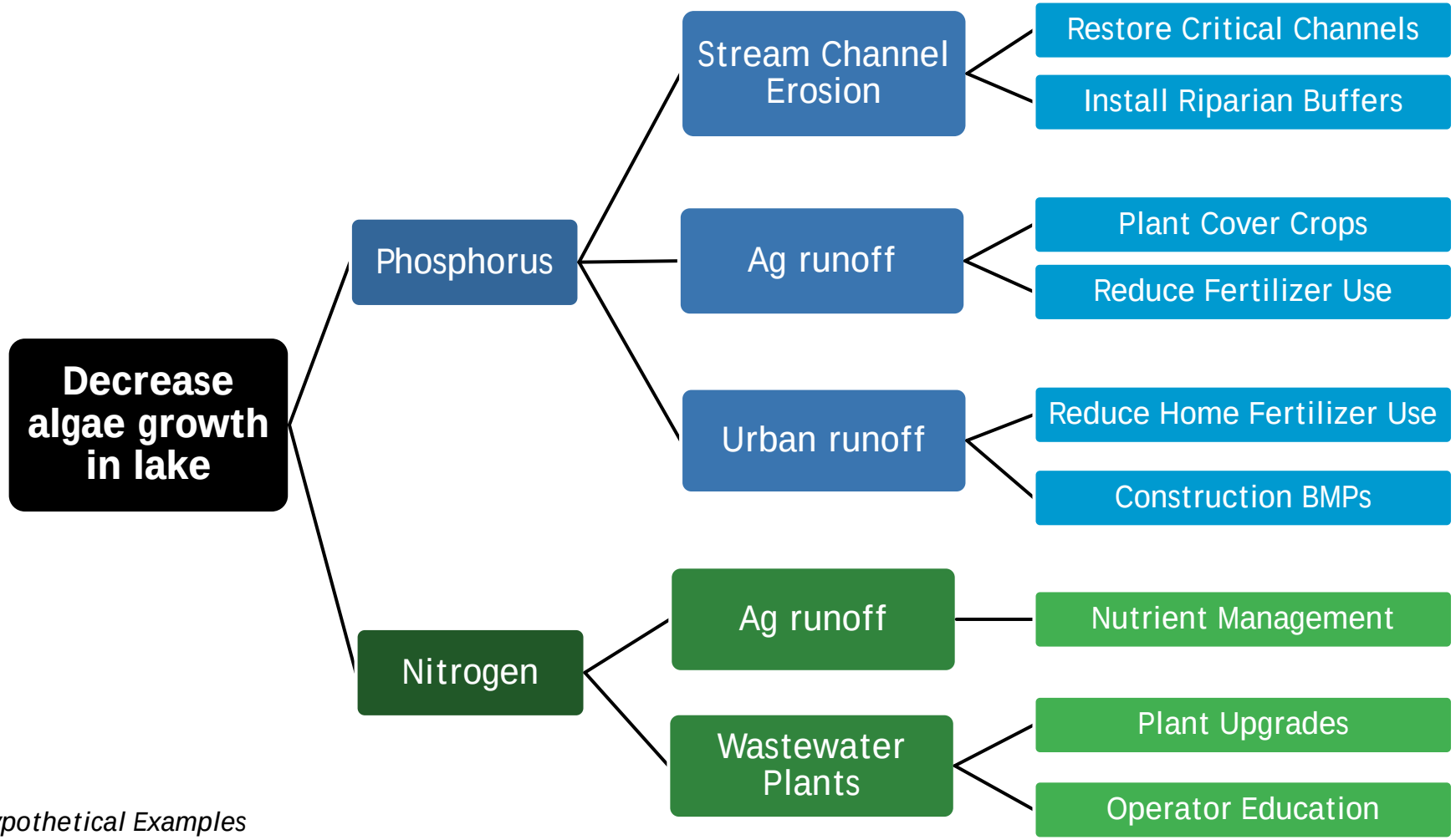




Watershed Planning

- **Translating Goals into Management Measures**

Goal → Indicator → Source → Mgmt Measure



Hypothetical Examples

Watershed applications – Agricultural

- Croplands

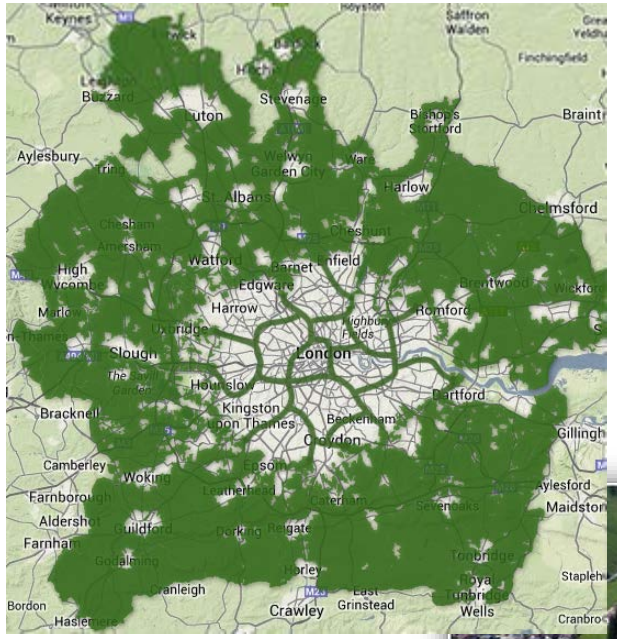
- Range/livestock

Watershed applications - urban

The Itachi River before (1981, left) and after (1993, right) restoration.

Credit: Shin-ichi Yoshimura, *https://www.researchgate.net/publication/253859779_River_restoration_efforts_in_Japan_overview_and_perspectives*

Watershed applications - Urban



Lessons from Seoul: How to Revive a River and Manage a Landfill

Seoul can teach Delhi a few things on how to revive the Yamuna, clean the Mughal-era nullahs and convert dump yards into eco-friendly zones.

The Cheonggyecheon stream. Credit: stari4ek/ Wikimedia Commons

https://thewire.in/environment/lessons-from-seoul-how-to-revive-a-river-and-manage-a-landfill

What constitutes a functional riparian buffer?

Table 1. Minimum filter strip widths to reduce sediment, particulate organics, and sediment adsorbed contaminants

	Length of Flow (ft)			
Land slope of contributing area	Hydrologic Group A	Hydrologic Group B	Hydrologic Group C	Hydrologic Group D
0–1 %	20	20	22	24
>1–3 %	20	25	28	30
>3–5 %	24	30	33	36
>5–8 %	28	35	40	42
>8–10 %	32	40	44	48

Hydrologic soil groups:
A: Well-drained sand and gravel; high permeability
B: Moderate to well-drained; moderately fine to moderately coarse texture; moderate permeability
C: Poor to moderately well-drained; moderately fine to fine texture; slow permeability
D: Poorly drained, clay soils with high swelling potential, permanent high water table, claypan, or shallow soils over nearly impervious layers

Source: NRCS, USDA

Table 2. Minimum filter strip flow widths to reduce dissolved contaminants in runoff

	Length of Flow (ft)			
Land slope of contributing area	Hydrologic Group A	Hydrologic Group B	Hydrologic Group C	Hydrologic Group D
0–1 %	30	30	33	36
>1–3 %	40	50	55	60
>3–5 %	56	70	77	84
>5–8 %	72	90	100	108
>8–10%	96	120	132	144

Source: NRCS, USDA

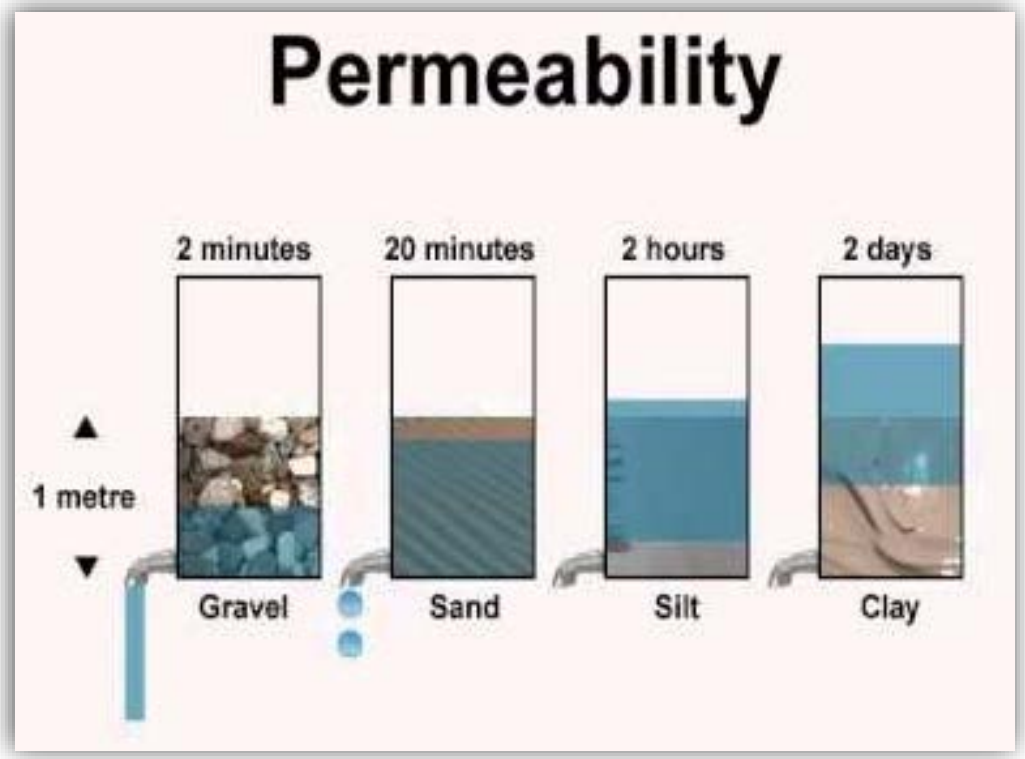
Table 3. Minimum filter strip flow widths to reduce pathogens in runoff

	Length of Flow (ft)			
Land slope of contributing area	Hydrologic Group A	Hydrologic Group B	Hydrologic Group C	Hydrologic Group D
0–1 %	20	25	28	30
>1–3 %	24	30	33	36
>3–5 %	32	40	44	48
>5–8 %	48	60	66	72
> 8–10%	100	125	137	150

Source: NRCS, USDA

What constitutes a functional riparian buffer?

- Soil texture



- Plant selection

A CAUTIONARY TALE

Data shows urban stream restorations fall short of water quality goals

By Jeff Gillies on November 21, 2013

4 SHARES | SHARE | TWEET | SHARE | SHARE | 0 COMMENTS

A restoration on Boone Creek at Durham Park maintains manicured vegetation that provides no shade to the over-warm stream (Photo courtesy of Kristan Cockerill)

FOLLOW THE DATA

- Don't try to fix a problem you don't have
- Work with technical experts and stakeholders to maintain focus
- Failed projects > wasted money > bad optics

Source: https://www.fondriest.com/news/data-shows-urban-stream-restorations-fall-short-water-quality-goals.htm

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What do you see as the greatest benefit to properly managing riparian areas?

Blake Alldredge

Upper Trinity Regional Water District

DENTON COUNTY GREENBELT PLAN

Blake Alldredge
Upper Trinity Regional Water District

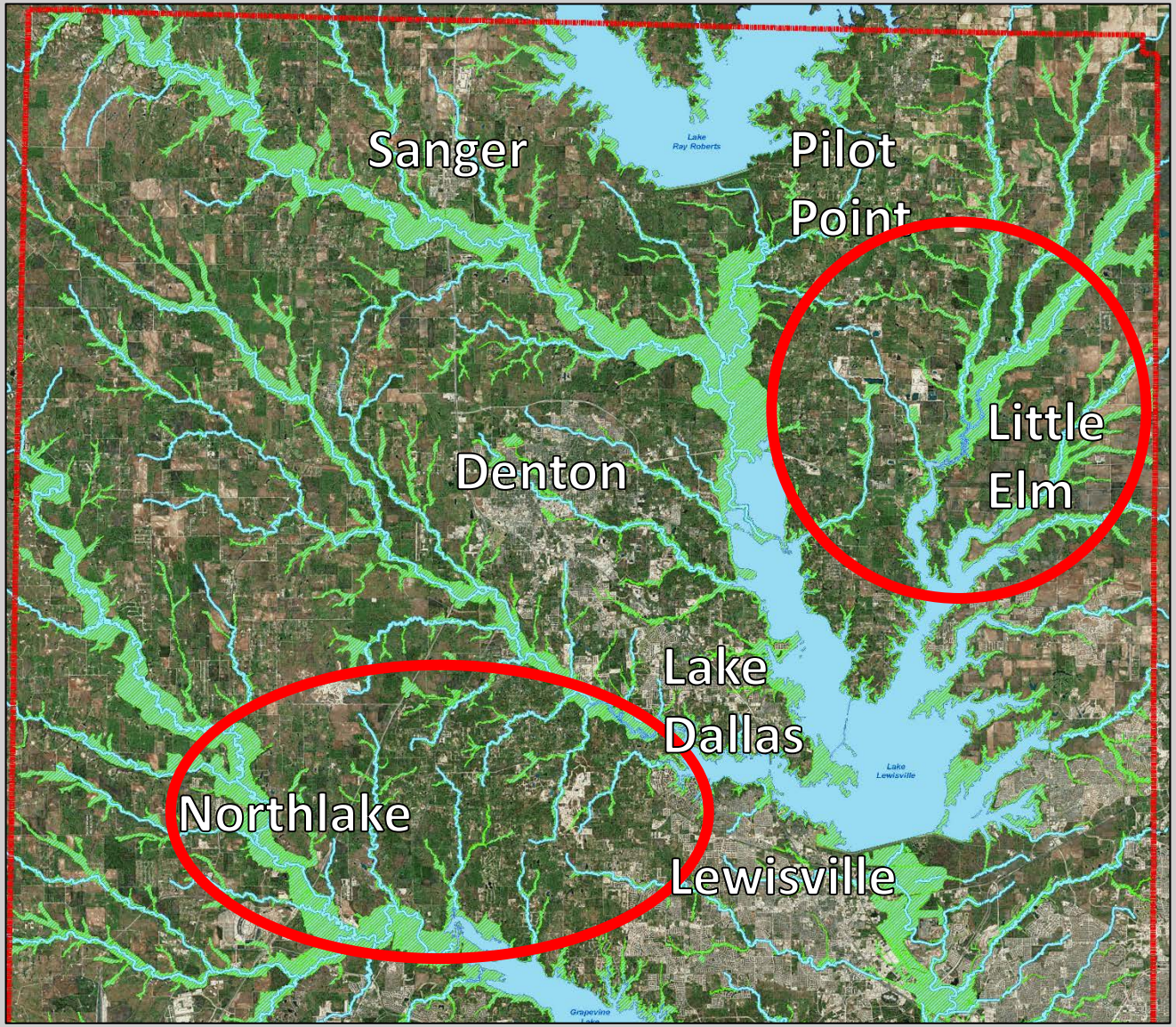
Upper Trinity Regional Water District

- Created in 1989
- Provides regional water & wastewater services for 25 communities
- Serves Denton & portions of Collin Counties

UPPER TRINITY
REGIONAL WATER DISTRICT

Looking to the Future

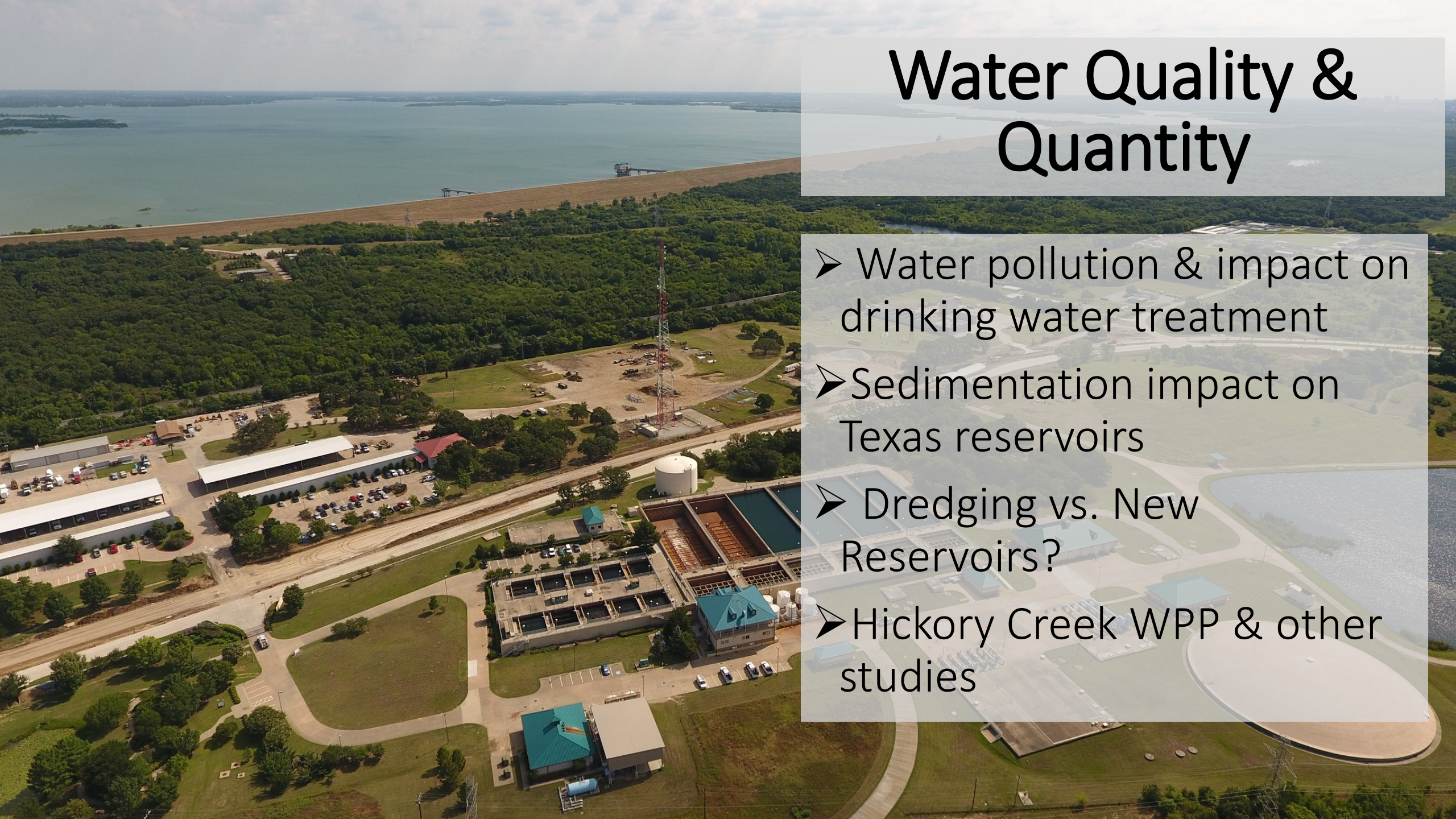
- Over 1 million expected in Denton County by 2030
- Protection of natural assets important for future economic growth and quality of life



Our Waterways

- Thousands of miles of streams and creeks
- Three major water supply reservoirs
- Hundreds of miles of hike/bike trails

Denton County Greenbelt Plan
For the Future



Water Quality & Quantity

- Water pollution & impact on drinking water treatment
- Sedimentation impact on Texas reservoirs
- Dredging vs. New Reservoirs?
- Hickory Creek WPP & other studies

Greenbelts…

- ✓ Protect water quality
- ✓ Lessen flooding impacts
- ✓ Recreational opportunities
- ✓ Provide nature-based educational experiences
- ✓ Preserve wildlife and aquatic habitat

Enhance the Quality of Life


Little Elm Creek

Denton County Greenbelt Plan
For the Future

Social Benefits

- ✓ Recreation/Exercise → Lower Chronic Disease
- ✓ Connection to Nature → Greater Well-Being
- ✓ Improve Mental Health → Lower Stress & Anxiety

Physical, Psychological and Social Health

"Healthy Trees, Healthy Lives" (*Texas A&M Forest Service*)

Denton County Greenbelt Plan
For the Future

Economic Benefits

<u>Lewisville Lake in 2016</u>:

✓ 2.7 million visits

✓ $65 million in visitor spending within 30 miles

✓Supports 601 jobs

*USACE Lewisville Lake 2020 Master Plan

- *Stormwater Management Benefits?*
- *Water Treatment Benefits?*

Denton County Greenbelt Plan
For the Future





Greenbelt Plan:

- ✓ Guide preservation of greenbelts and related natural areas
- ✓ Identify strategic areas for establishing greenbelt corridors
- ✓ Advocate a common vision for multi-use greenbelts
- ✓ Provide a toolbox of implementation strategies

Entities who have Adopted

City of Aubrey

City of Corinth

City of Denton

Town of Double Oak

Town of Flower Mound

Town of Hickory Creek

City of Justin

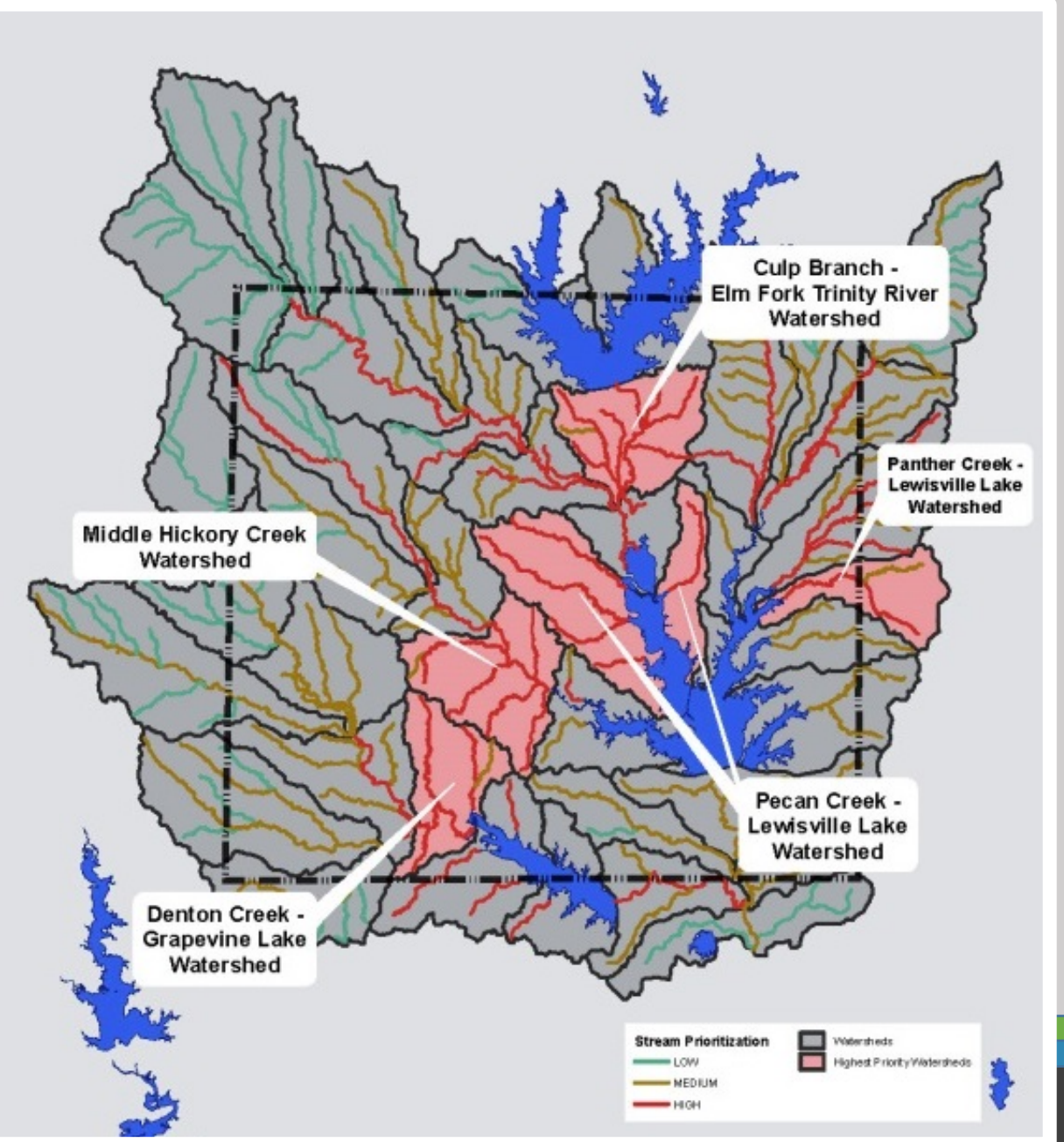
Lake Cities MUA

Lantana

City of Lewisville

City of Pilot Point

City of Sanger



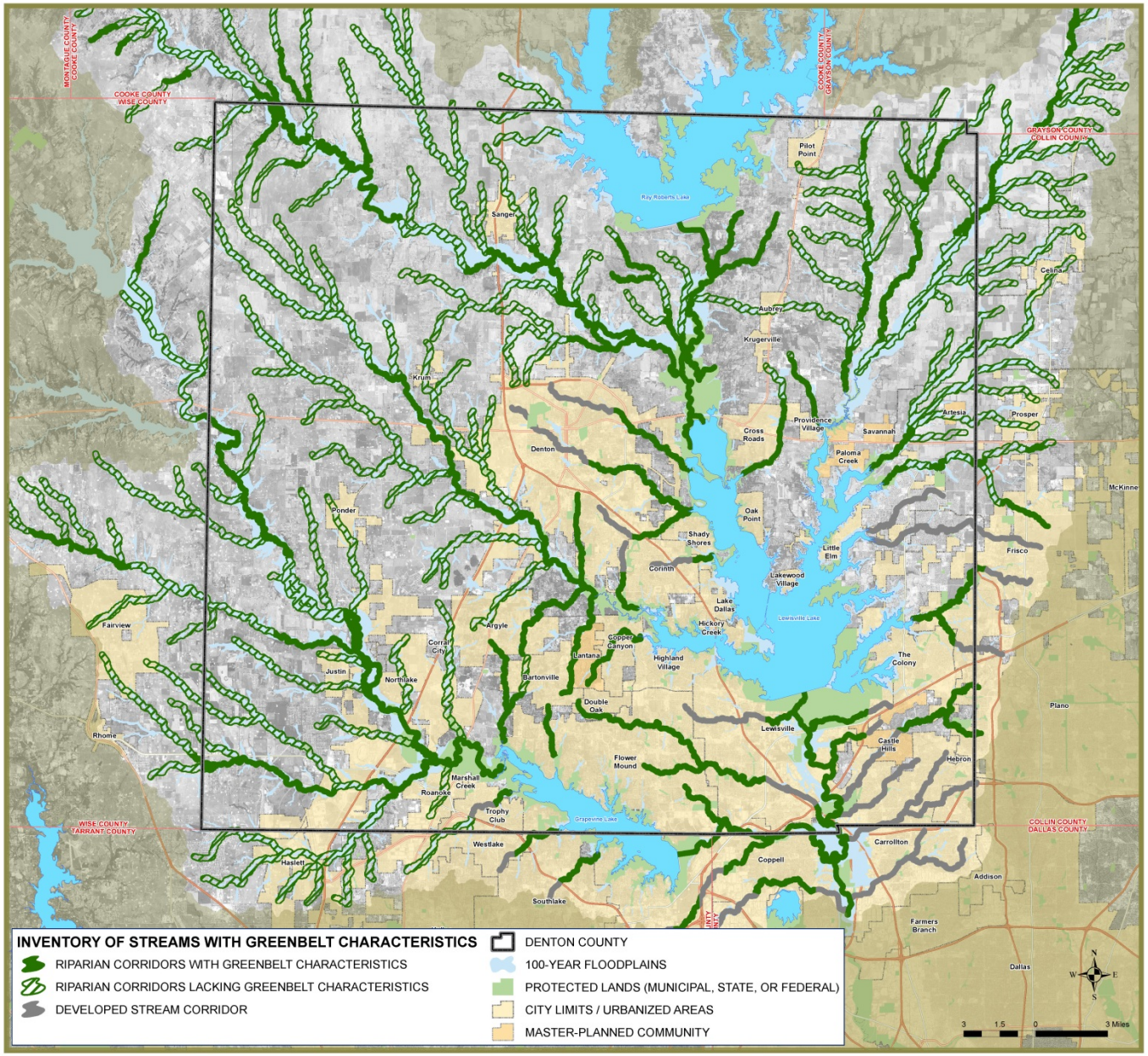
Priority Streams and Watersheds

Factors Based On:

- Hydrology
- Ecology
- Land Use
- Cultural/Historical

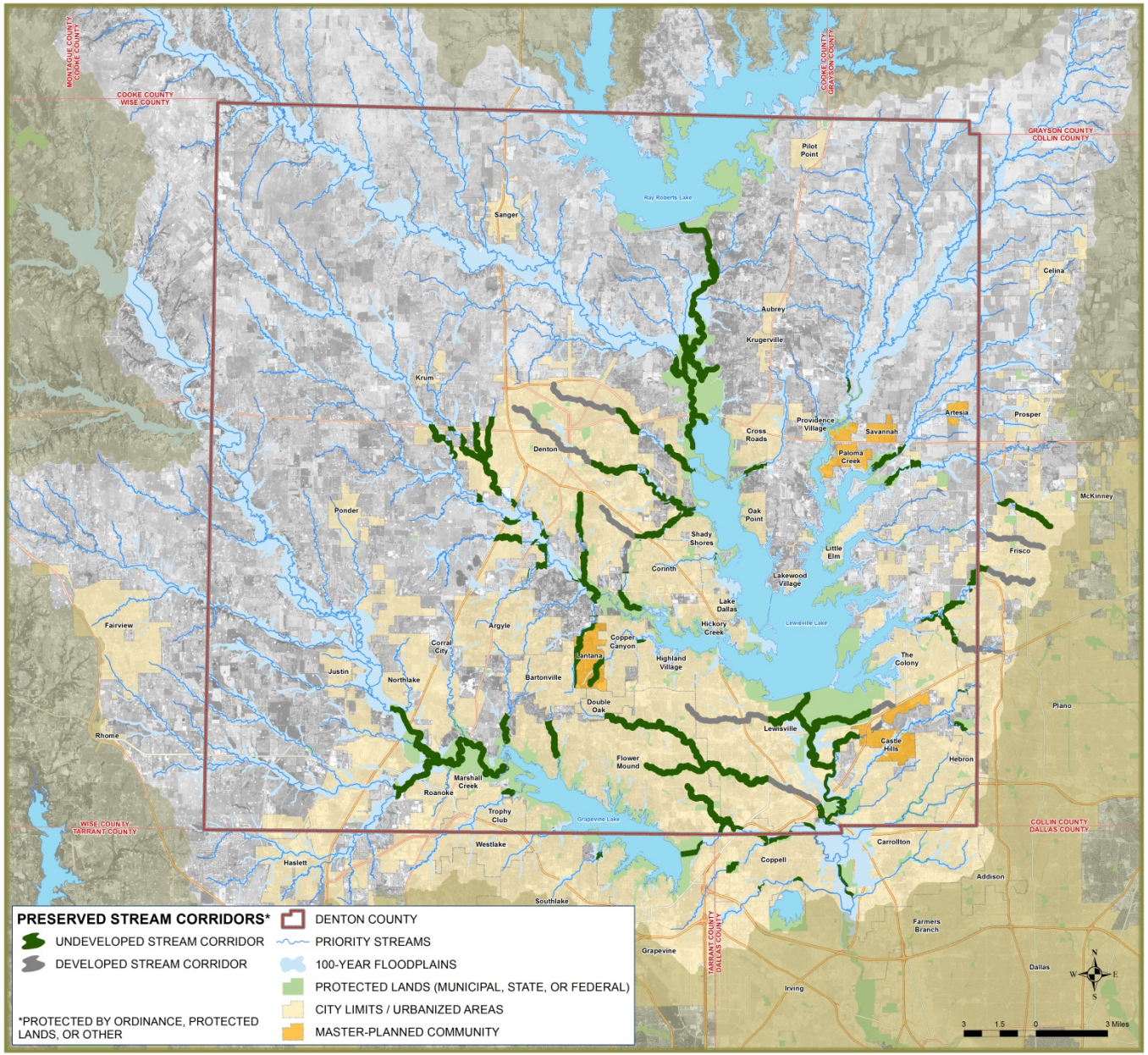
Denton County Greenbelt Plan
For the Future

Greenbelt Inventory



- Riparian areas with sufficient tree canopy.

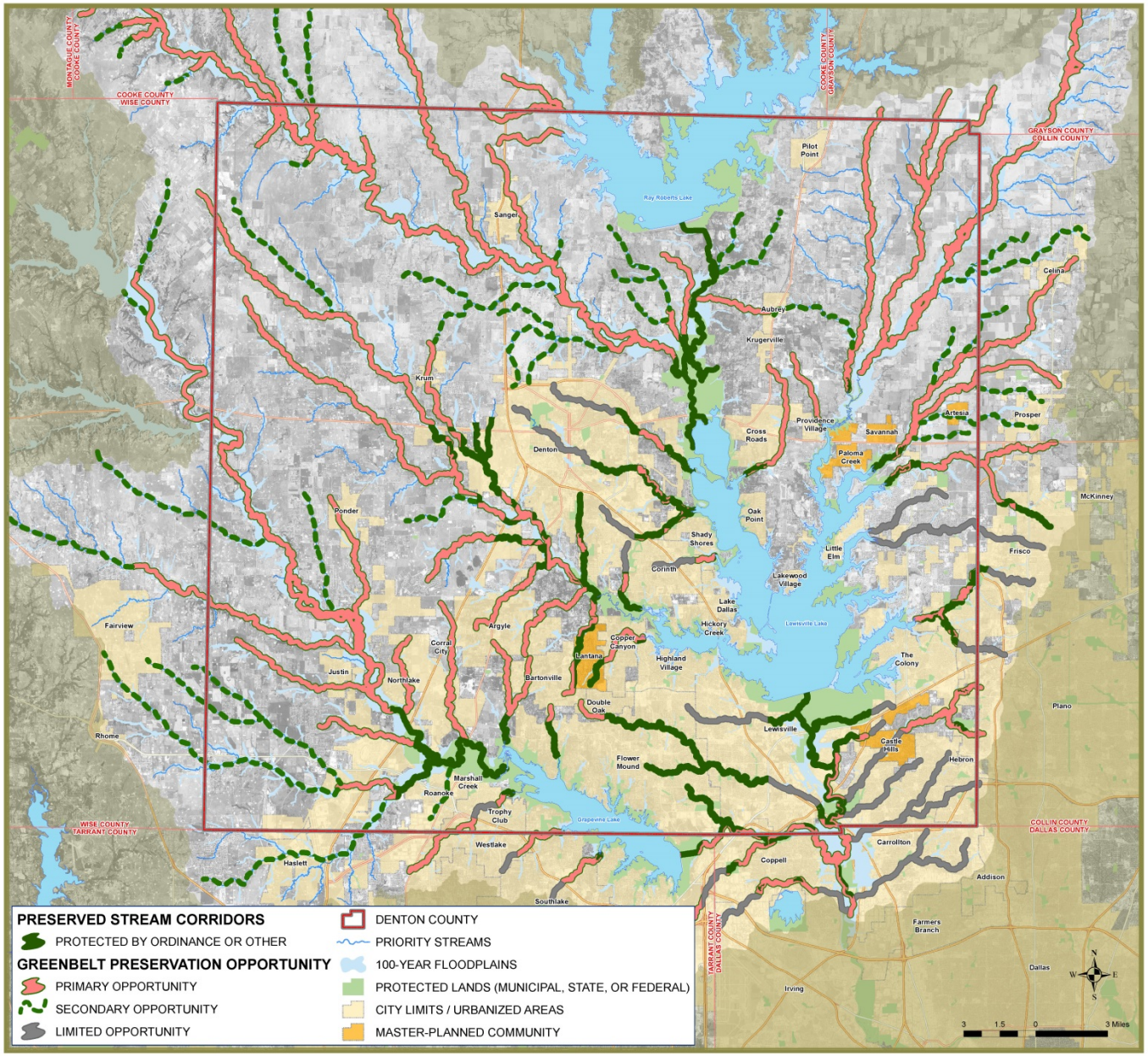
Denton County Greenbelt Plan
For the Future



Protected Stream Corridors

- Ordinance
- Protected Land
- Setback
- Other

Denton County Greenbelt Plan
For the Future

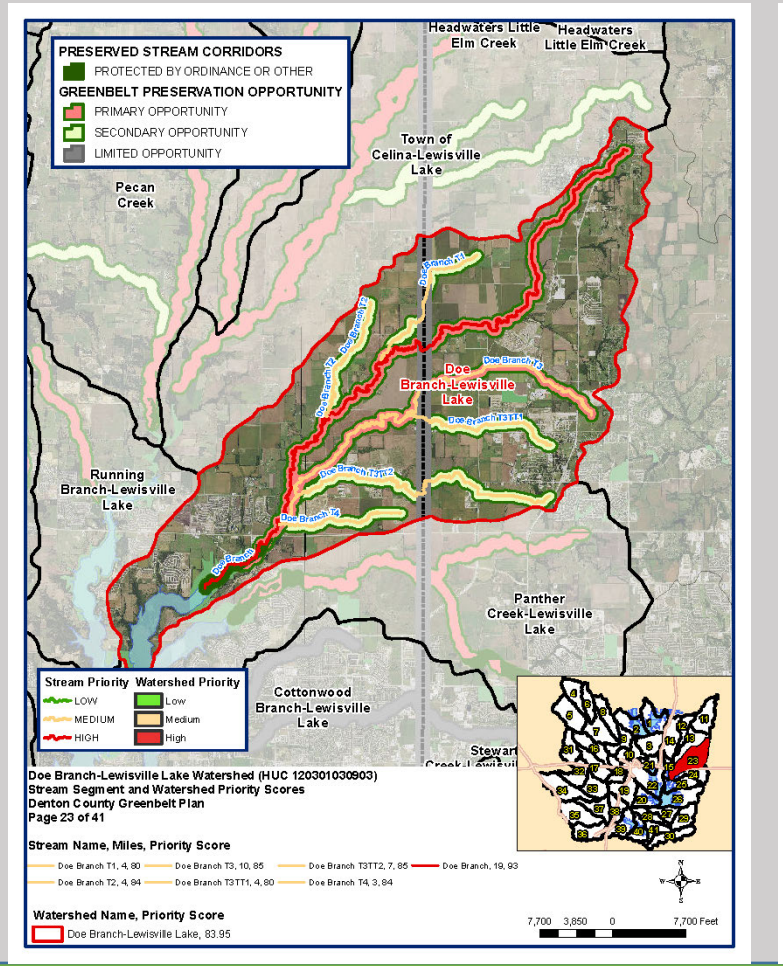


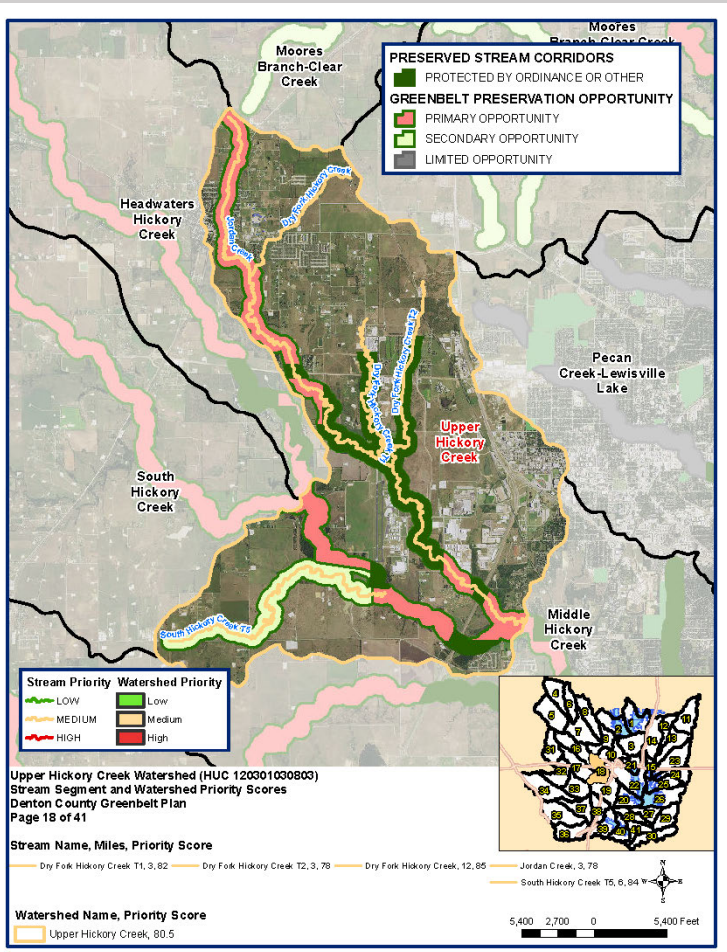
Greenbelt Opportunities

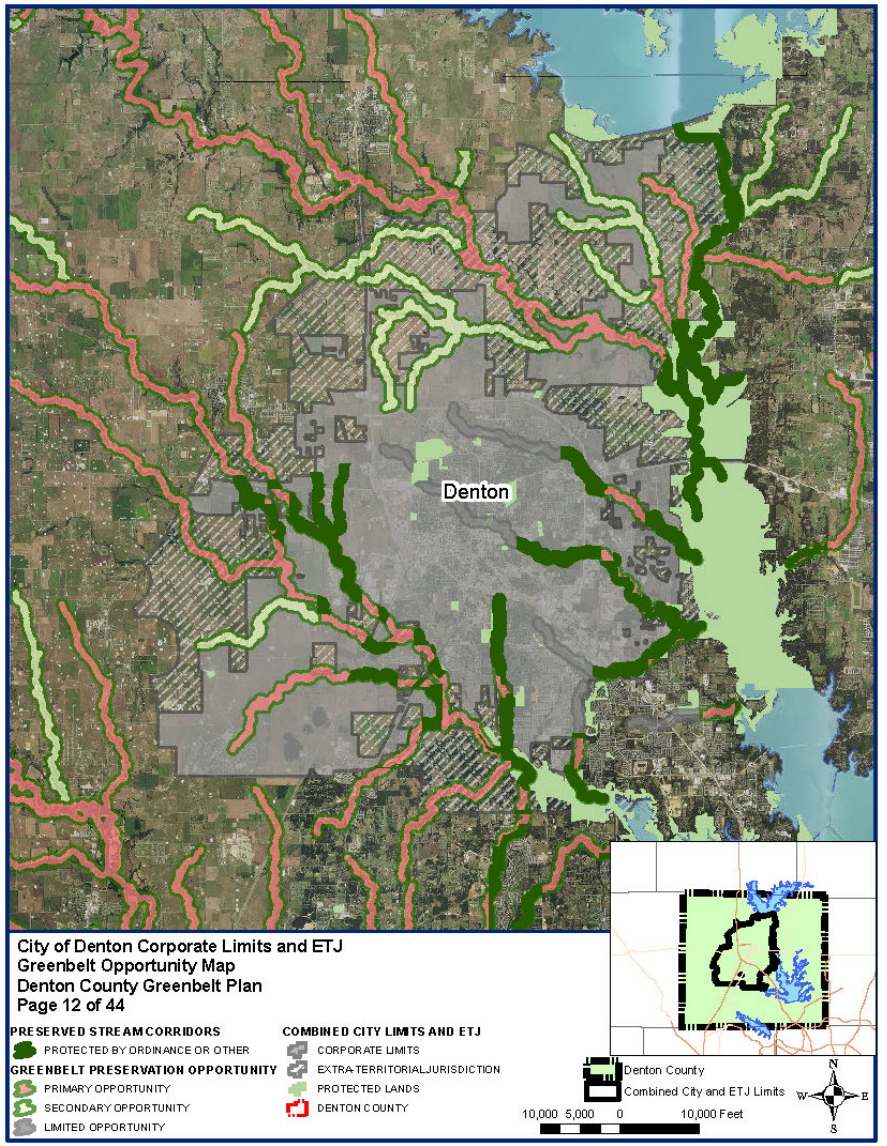
- Primary
- Secondary
- Limited

Denton County Greenbelt Plan
For the Future

Maps in Detail







DENTON COUNTY GREENBELT PLAN

Denton County Greenbelt Plan
For the Future

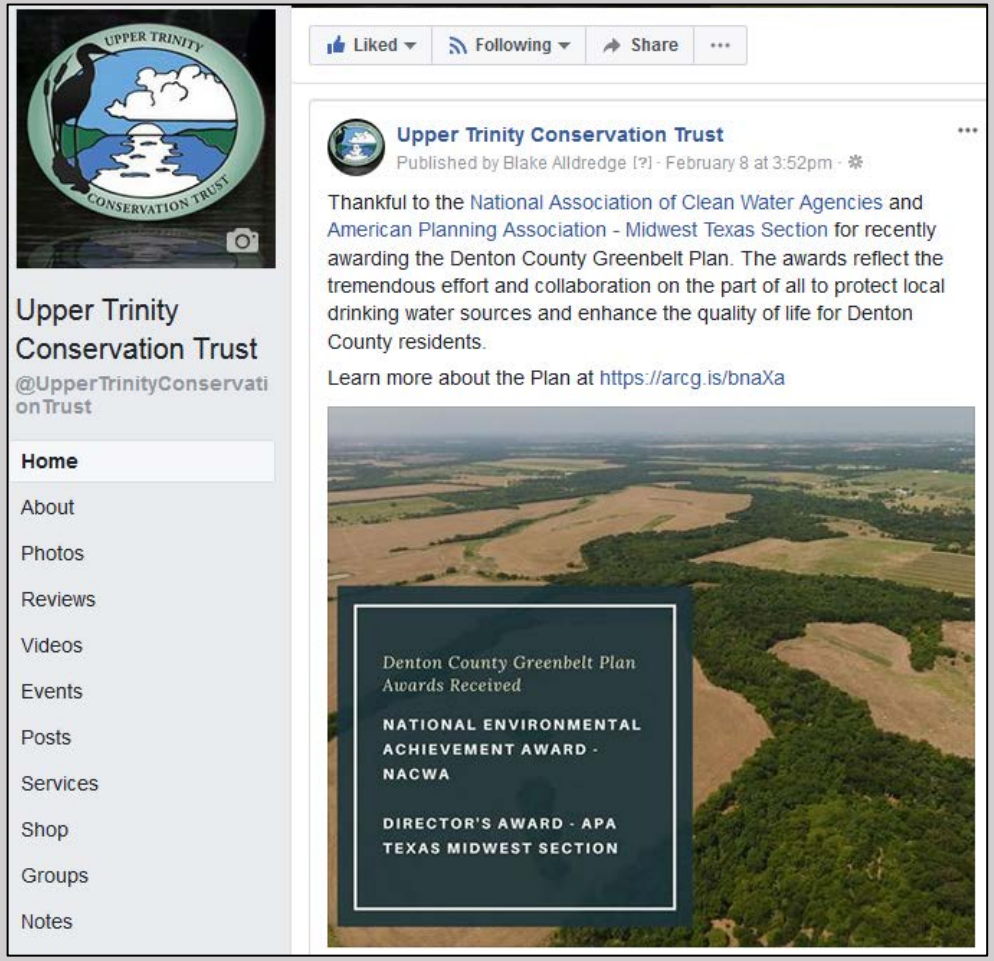
Implementation Strategies


Lantana

- ❑ Completely Voluntary - - No Less Important
- ❑ For Municipal/County Leaders, Citizens, Developers, Landowners and others
- ❑ Implementation tools
- ❑ Education – Protection – Funding

Education and Outreach

- ❑ Brochures
- ❑ Public Awareness Campaigns
- ❑ Ambassadors for Greenbelts
- ❑ Recognition Programs
- ❑ Others



Denton County Greenbelt Plan
For the Future

WHICH CREEK WOULD YOU RATHER HAVE IN YOUR COMMUNITY?

Preservation/Protection Tools

- ❑ Development Standards
- ❑ Conservation Easements
- ❑ Alternative Development Ideas
- ❑ Green Infrastructure
- ❑ Trail Design Standards
- ❑ Mowing Regimes
- ❑ Private Landowner Resources

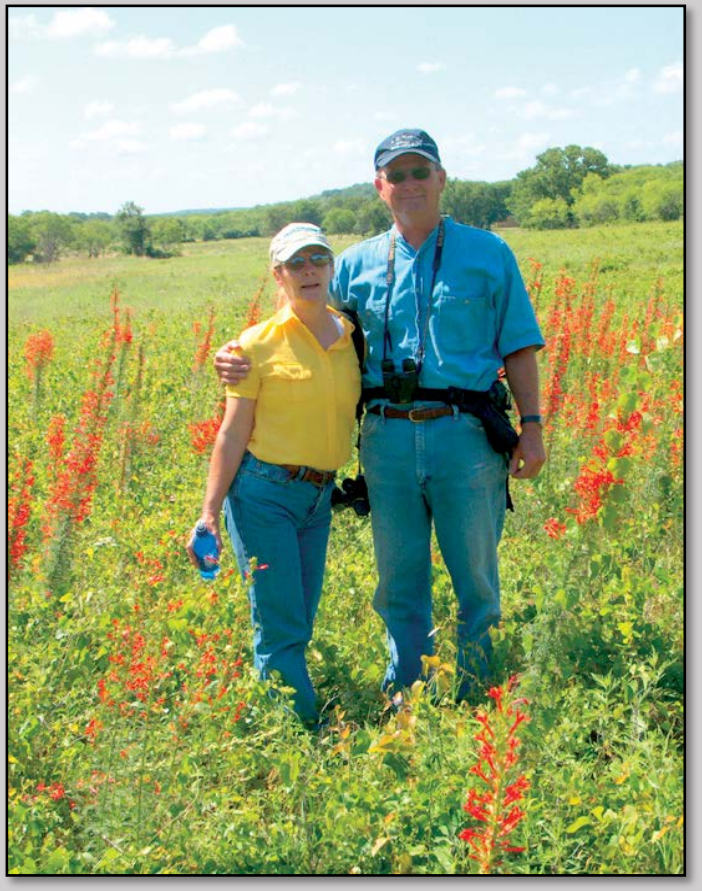
North Central Texas Council of Governments

iSWM – iswm.nctcog.org

DENTON COUNTY GREENBELT PLAN

Denton County Greenbelt Plan
For the Future

Upper Trinity Conservation Trust

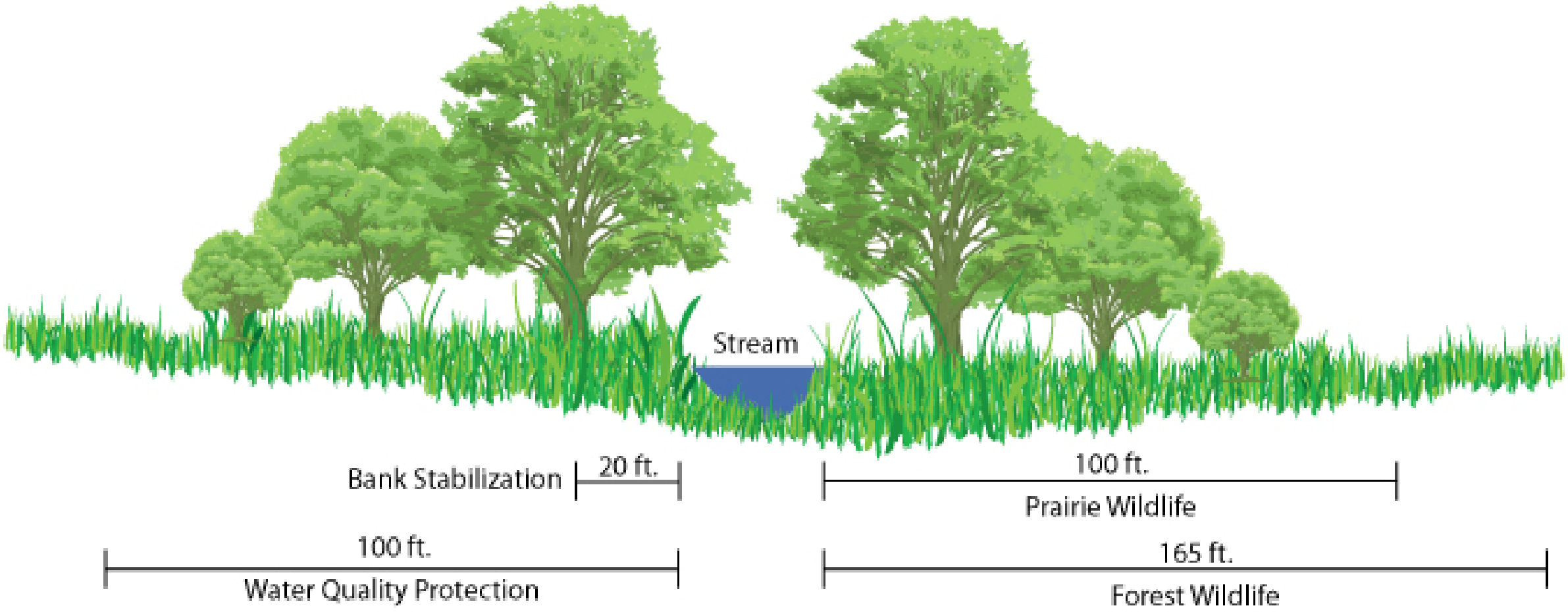


- Conservation easements protect natural, riparian areas on the land
- Allows a property owner to continue to own & use the land
- Limits development rights to extent specified
- Runs with the land in perpetuity

Funding and Acquisition Tools

- ❑ General Obligation Bonds
- ❑ Development Dedications
- ❑ State and Federal Grants
- ❑ Conservation Programs
- ❑ Public/Private Partnerships
- ❑ Donations

Vegetation Recommendations



Denton County Greenbelt Plan
For the Future

Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows

Five General Types of Riparian Plants:

- ❑Sedges & Rushes
- ❑Grasses
- ❑Forbs
- ❑Shrubs
- ❑Trees
- ❑Dual Purpose:
  --Above ground slows water
  --Below ground holds the soil (riparian sponge)

Denton County Greenbelt Plan
For the Future

Five Wetland Indicator Categories

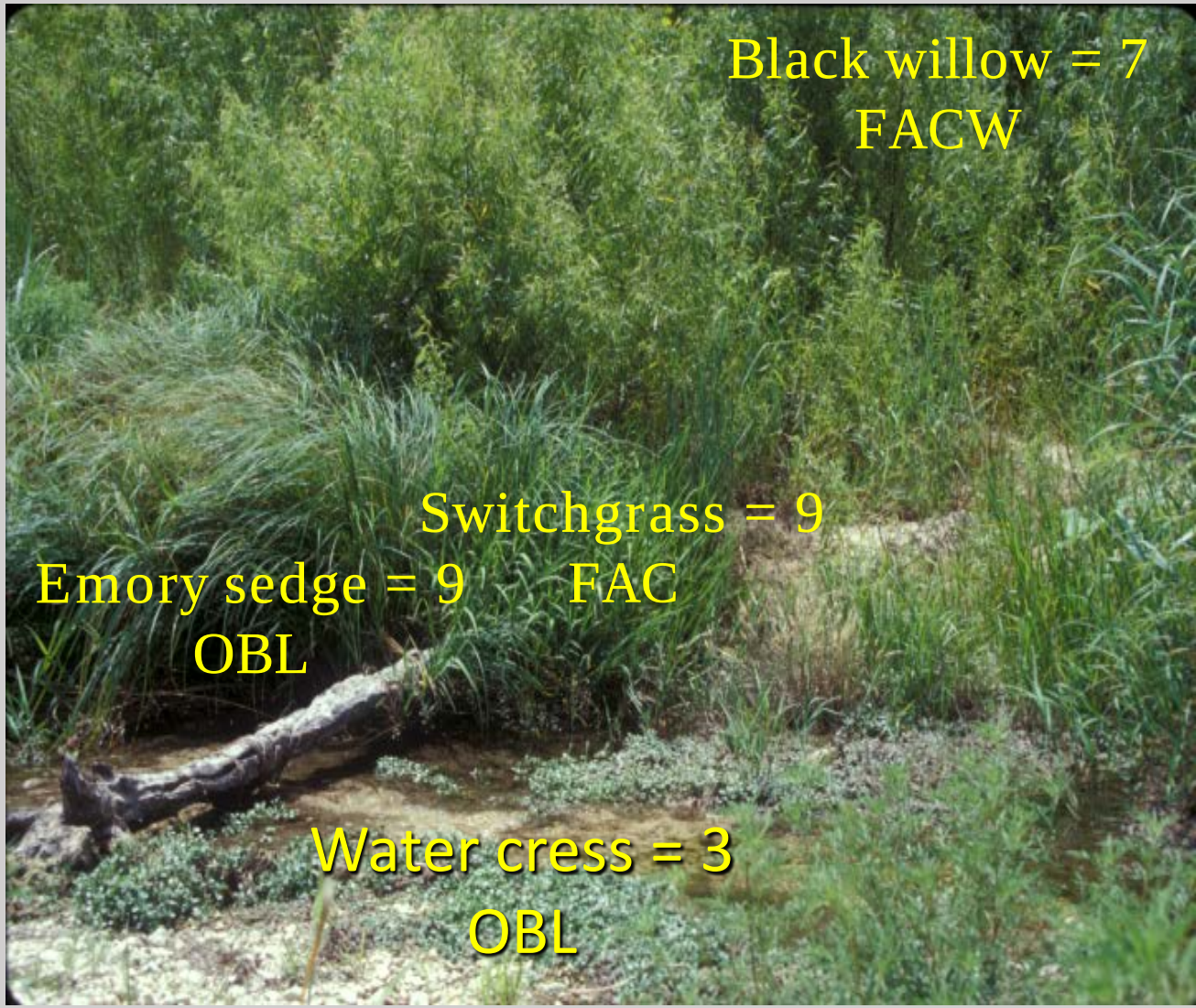
Indicator Status	Occurrence in Wetlands
Obligate (OBL)	Almost always occurs in wetlands (99%)
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands (67 – 99%)
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands (34 – 66%)
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands (1 – 33%)
Upland (UPL)	Almost never occur in wetlands (<1%)

Stability Ratings of Riparian Plants

Scale of 1 to 10

- 1 = The stability of bare ground
- 10 = The stability of anchored rock or large anchored logs
- 7 = Acceptable riparian stability for high gradient (>0.3% slope) streams
- 6 = Acceptable riparian stability for low gradient (<0.3% slope) streams

See Common Plants of Riparian Areas-North Central Texas (NRCS)



Active vs. Passive Restoration

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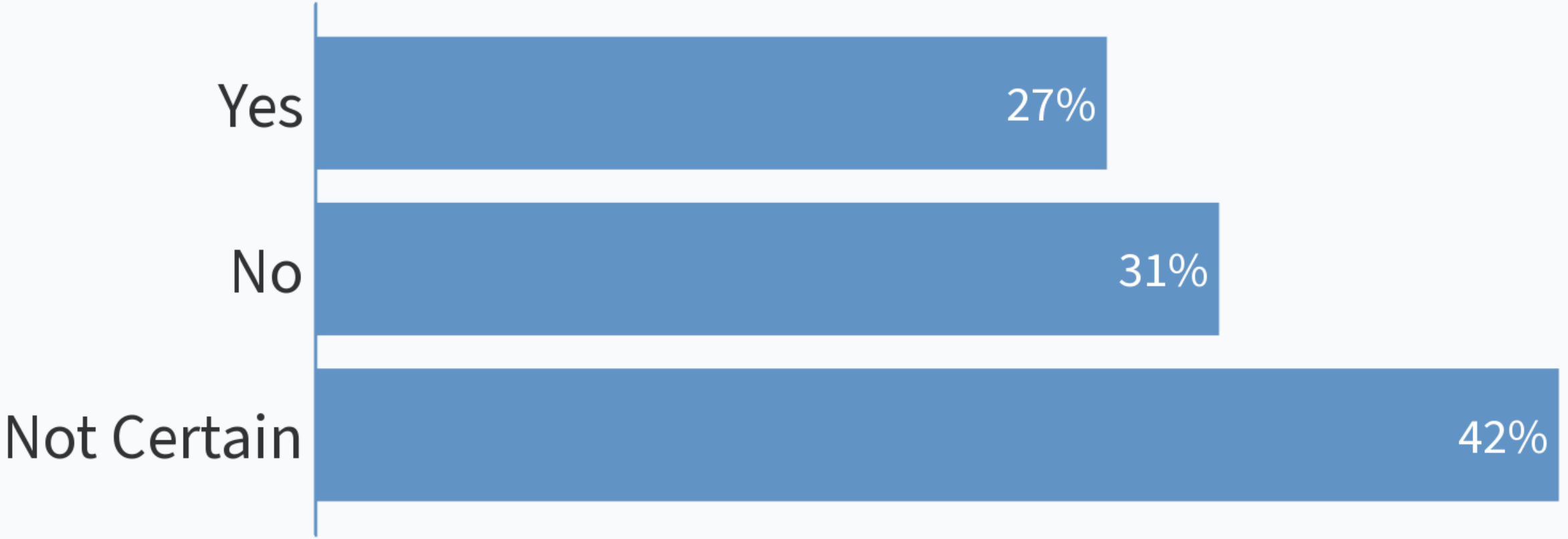
Does your municipality/organization have ordinances or standards for riparian buffers?



John Clement

City of Austin

HOW TO START A GROW ZONE PROGRAM

JOHN CLEMENT, CITY OF AUSTIN

HOW ~~NOT~~ TO START A GROW ZONE PROGRAM

JOHN CLEMENT, CITY OF AUSTIN

THINGS TO CONSIDER

VALUE OF RIPARIAN AREAS

SOCIAL CONTEXT

OTHER CONSTRAINTS

- Staff resources
- Flooding/conveyance
- Mowing ordinances

WHAT STAFF AND PARTNER RESOURCES DO YOU HAVE?

- Do you have staff with the time and resources to respond constructively to complex situations?
- Do you have resources for outreach and education?
- Do you have partner organizations that can help?

WILL THERE BE FLOODING IMPACTS?

- Vegetation slows floodwaters – is there room to store it?
- Grow Zone management choices can lead to accumulation of woody debris – can this impact downstream culverts?
- Also, is there a potential wildfire fuels issue with woody debris?

DOES YOUR CITY HAVE A MOWING ORDINANCE?

- Ordinances may prohibit “grass or weeds” taller than 12” or even 6”
- Ordinances can be modified. They can include exceptions for:
  - Areas “associated with a waterway”
  - Areas “associated with a stormwater control facility”
  - Areas that are certified wildlife habitat
  - Areas that are outside of a setback from developed property

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§ 10-5-21 - DUTY TO MAINTAIN PROPERTY IN SANITARY CONDITION

SOCIAL CONTEXT

WHAT ARE YOU TAKING AWAY?

- Does the change have a significant aesthetic impact?
- Does it affect the perceived safety of park users?
- Does it impact active park uses?
- Need to consider impacts to neighbors
- Need to consider equity and the perspectives of other community members

SOCIAL CONTEXT

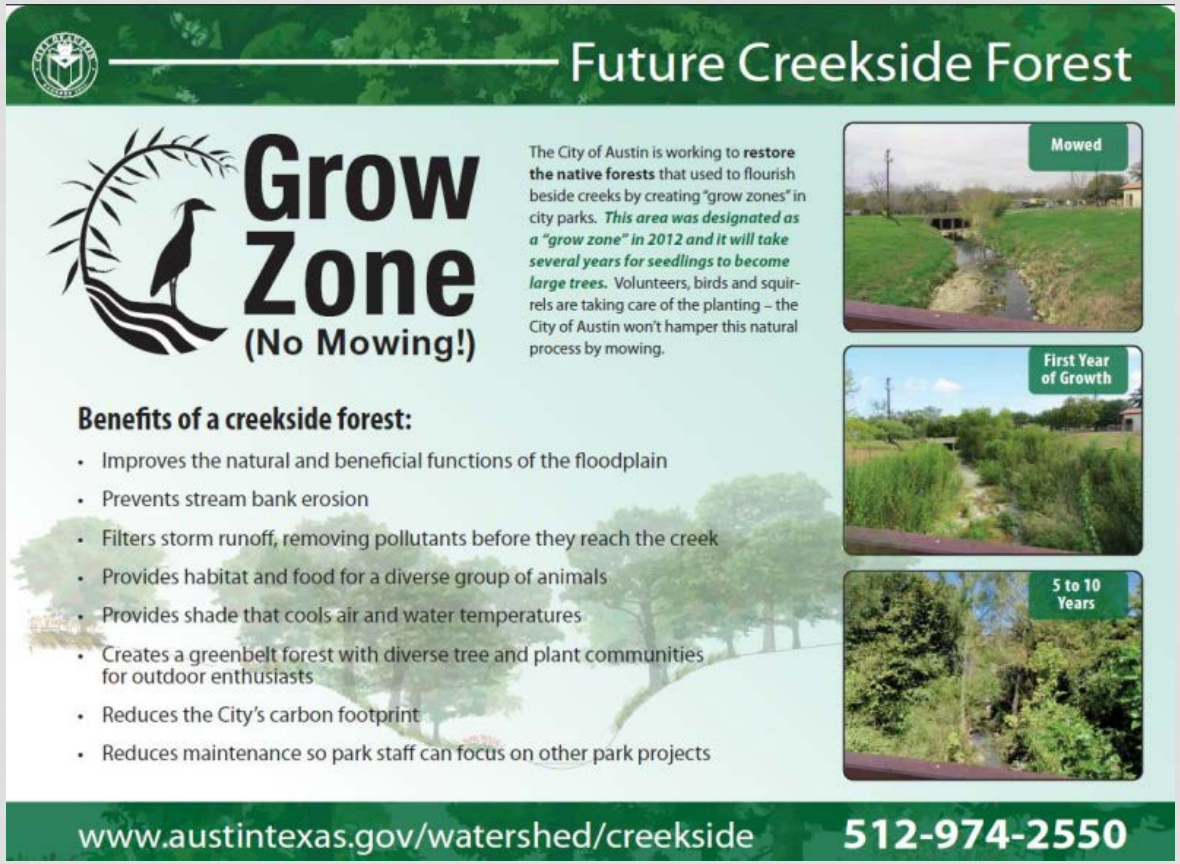
WHAT ARE YOU BRINGING? - RESILIENCE

- Erosion, water quality, flood storage
- Urban heat island mitigation
- Reduce fuel consumption and carbon footprint
- Access to nature
- Opportunities for stewardship
- Pollinator/wildlife support

THINK STRATEGICALLY

How are you going to gain acceptance for the project?

- Messaging/communication
- Intentionality – signs of care
- Signage
- Include expanded natural areas in the park planning process



THINK STRATEGICALLY

How can you best make use of staff resources?

- Try a pilot project
- Make use of CIP projects
- Experiment with wildflower meadows (not just near creeks)
- Enlist partner organizations

IN SUMMARY

Don’t take on too much at once

Consider location, extent and likely acceptability

Small efforts can indicate signs of care

Involve partners

And finally -

Be prepared to respond adaptively (change mow line, more signage, add split rail fence, provide creek access)

AUSTIN'S GROW ZONE PROGRAM

235 acres, 15 miles, more than 40 parks and other properties

PARTNERS

Keep Austin Beautiful – Adopt-a-Creek program
Austin Parks Foundation – Adopt-a-Park program
TreeFolks – Ready, Set, Plant!
American YouthWorks/Texas Conservation Corps
Many smaller orgs

TECHNICAL GUIDANCE

Staff provides technical support to volunteer organizations

Creekside Stewardship Guide

- austintexas.gov/restorationguide
- ArcGIS StoryMap format

City of Austin Creekside Restor

https://austin.maps.arcgis.com/apps/MapSeries/index.html?appid=128a8990833144e4b364dcd43afbca26

City of Austin Creekside Restoration Guide

Watershed Protection Department

City of Austin WATERSHED PROTECTION

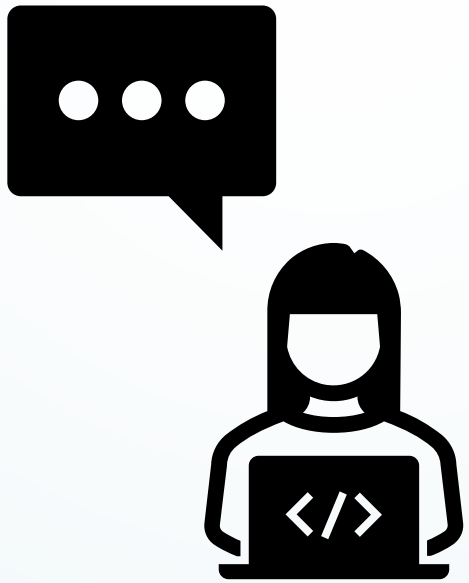
Welcome to Creekside Restoration!

We love our creeks and lakes in Austin. Thank you for your commitment to caring for these valuable community features and for helping to protect and restore them. This guide focuses on stewardship of riparian areas - the transition space between our creeks and the drier uplands that surround them. As creeks rise during a storm, water eventually leaves the banks of the creeks and spreads out over the riparian areas, which can help to store and slow the flood, reducing erosion and flooding risks downstream.

Healthy riparian areas support dense vegetation and have loose, rich soils. This allows them to contribute many benefits besides storing floodwaters. These "ecosystem services" include filtering and removing pollutants in stormwater, shading the creek to reduce water temperatures and support aquatic life, reducing the "urban heat island" effect in cities and providing accessible natural areas for community recreation.

Q&A

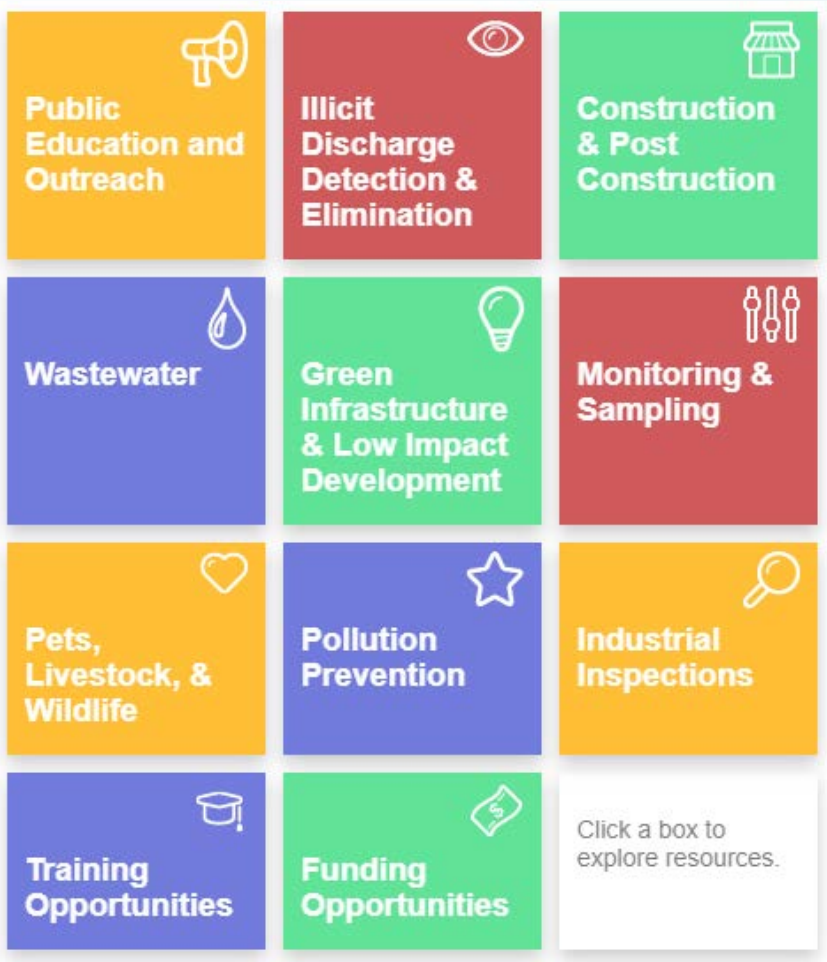
- Have a question? Please unmute your line or place your question in the chat.



NCTCOG Resources

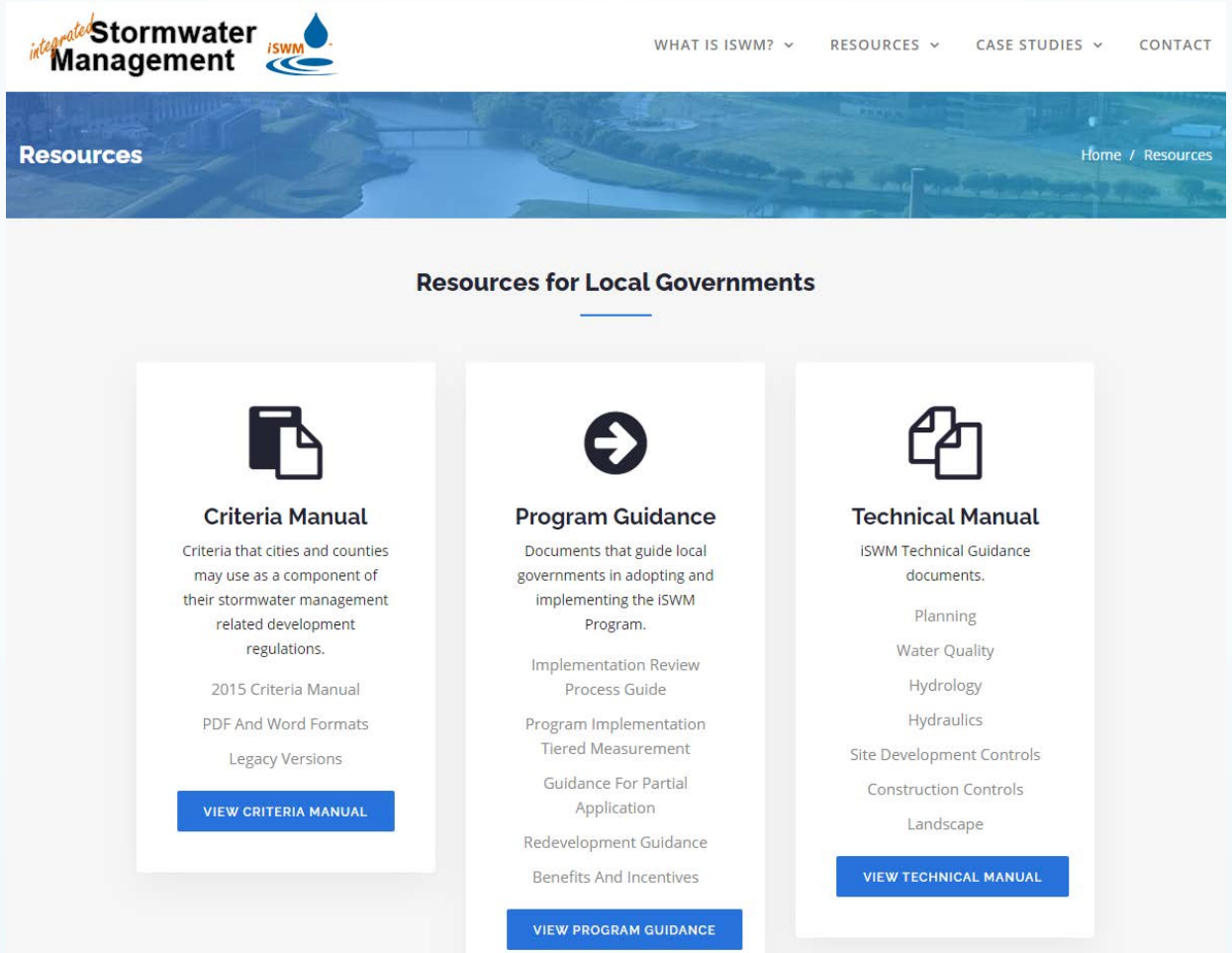
[Stormwater BMP Library]

- Organized by general topics
- Easy to search for specific items for your individual situation



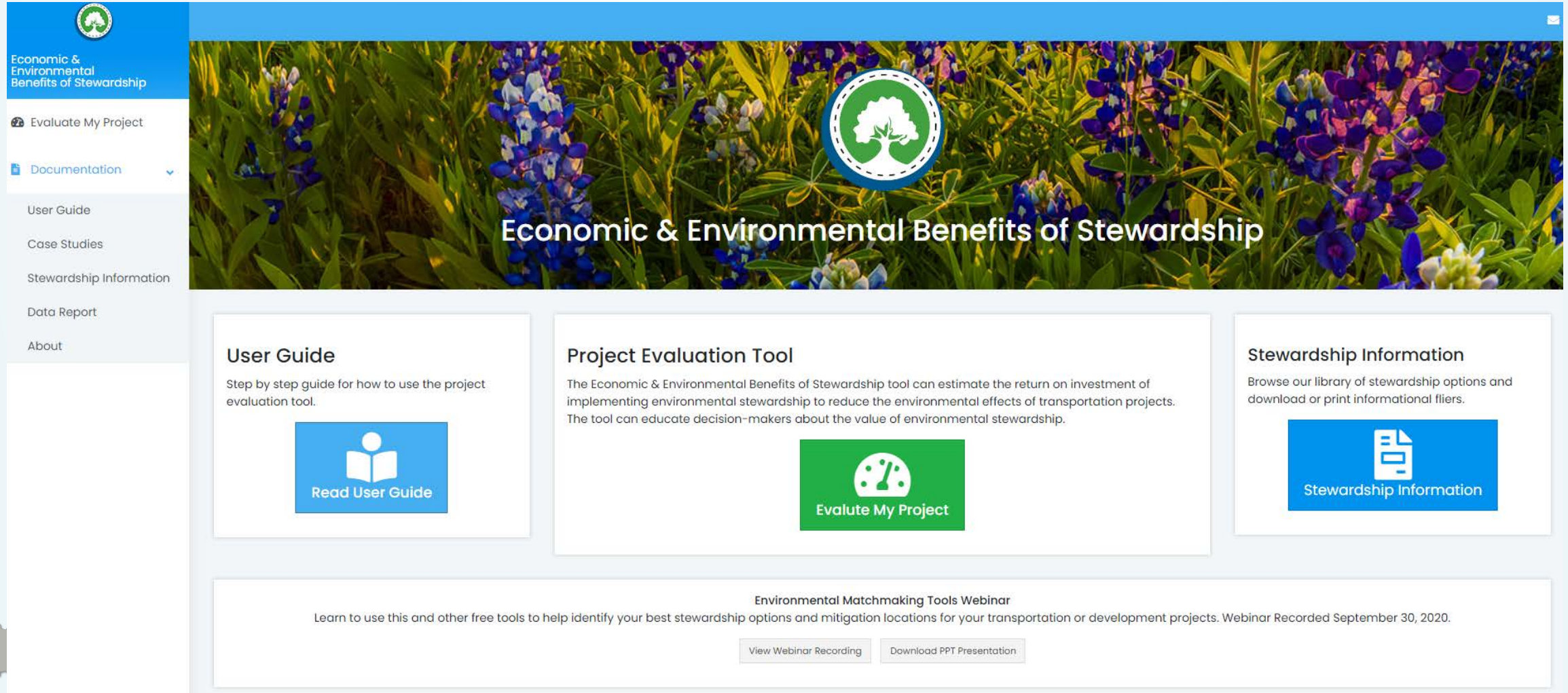
NCTCOG Resources

Integrated Stormwater Management (iSWM) Resources



NCTCOG Resources

Economic & Environmental Benefits of Stewardship (EEBS) tool



NCTCOG Resources

Water for North Texas Online Library

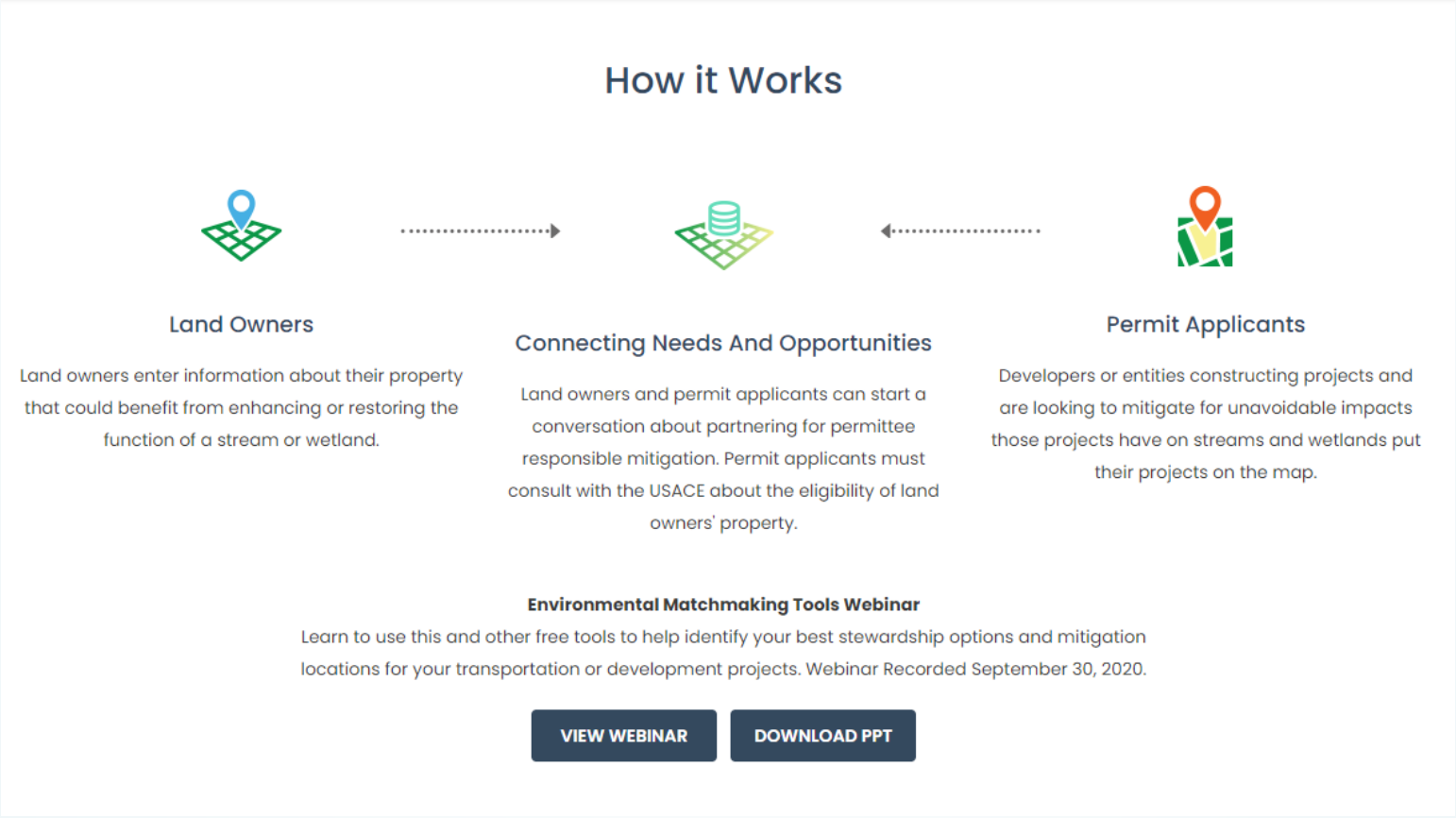
- Topics:
  - Water Supply/Conservation
  - Water Management
  - Water Quality
  - Seasonal
    - Freeze, flushing pipes and hydrants, etc.
  - Other
    - Case studies, regional campaigns, teacher resources

NCTCOG Resources

Total Maximum Daily Load (TMDL) Avian Feeding Signage and Avian Feeding Social Media Toolkit

NCTCOG Resources

Permittee Responsible Mitigation (PRM) Database



THANK YOU!

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