Richland-Chambers Watershed Protection Plan

TINA HENDON. SARAH GRELLA. MICHELLE WOOD-RAMIREZ.

TRWD Watersheds

4 Major Reservoirs

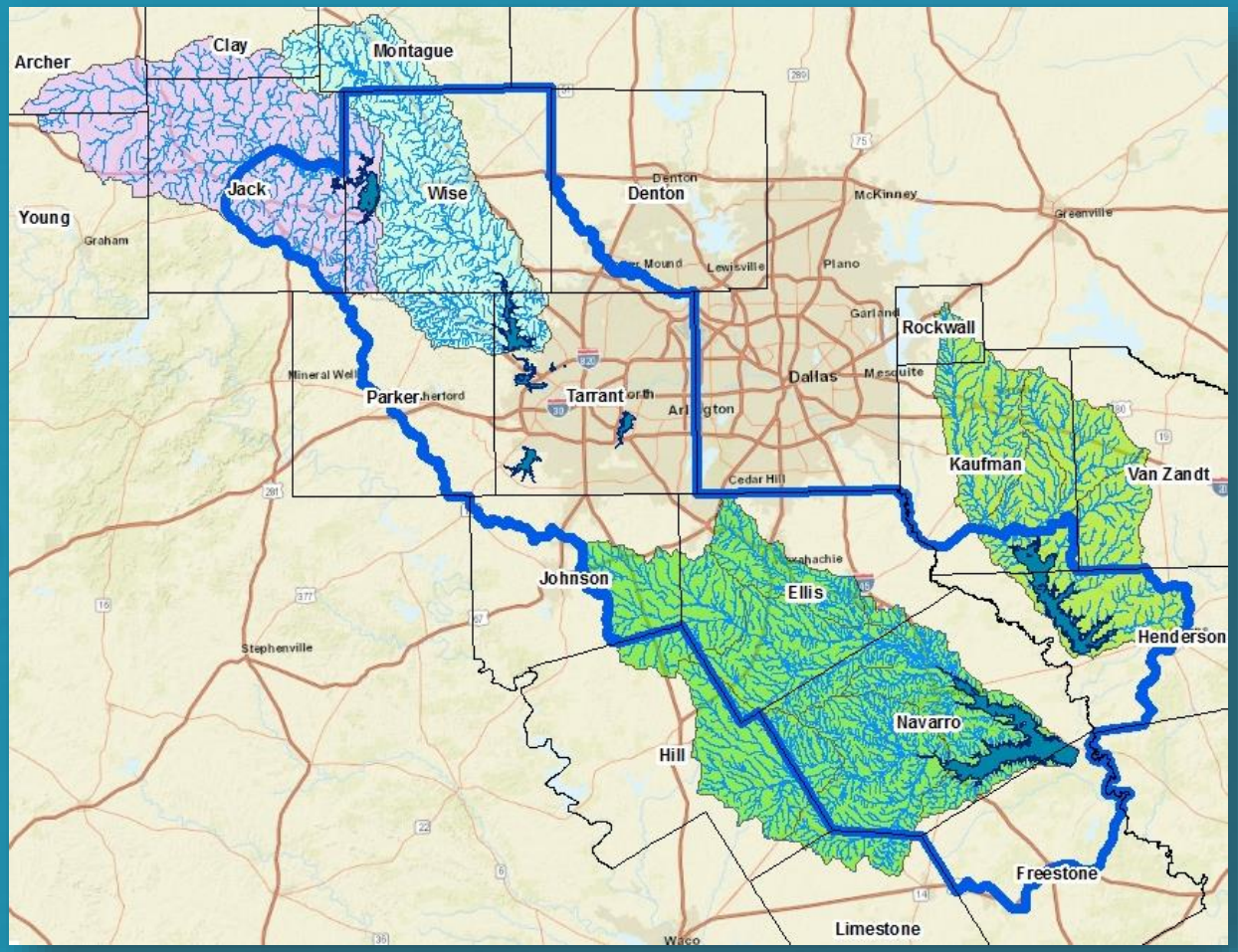
> 97,000 Surface Acres

> 760 Miles of Shoreline

Watersheds

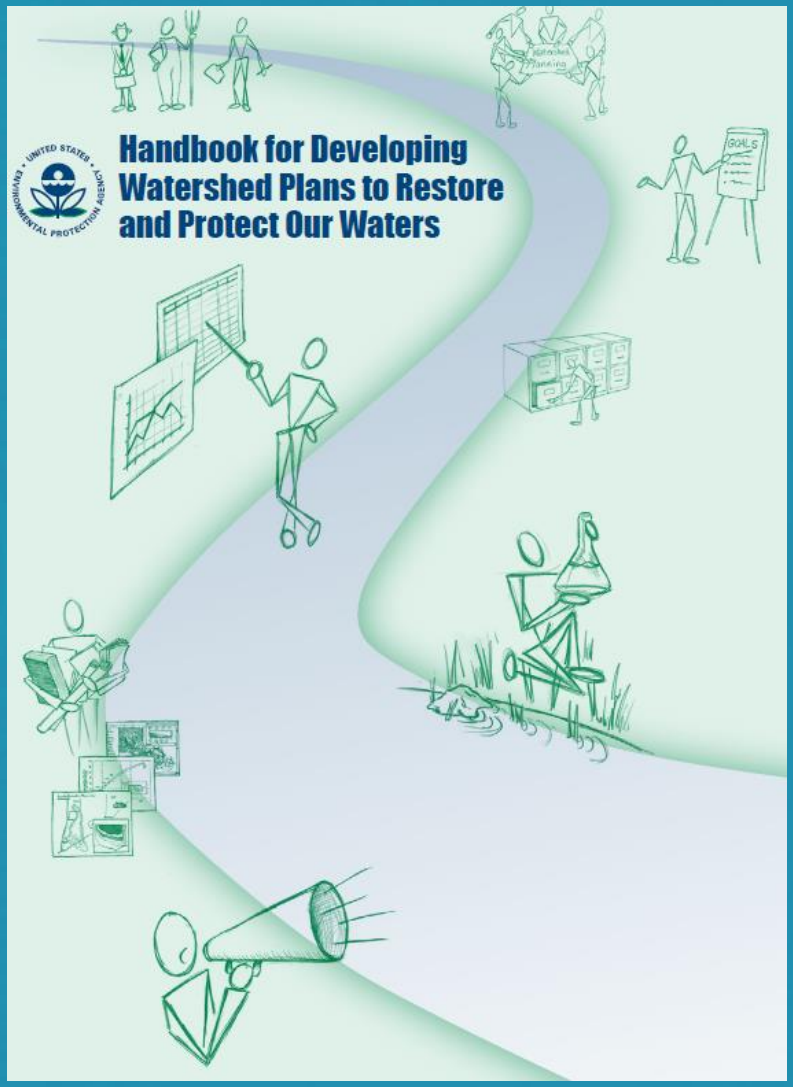
> 5,000 Square Miles

> 5,500 Stream Miles



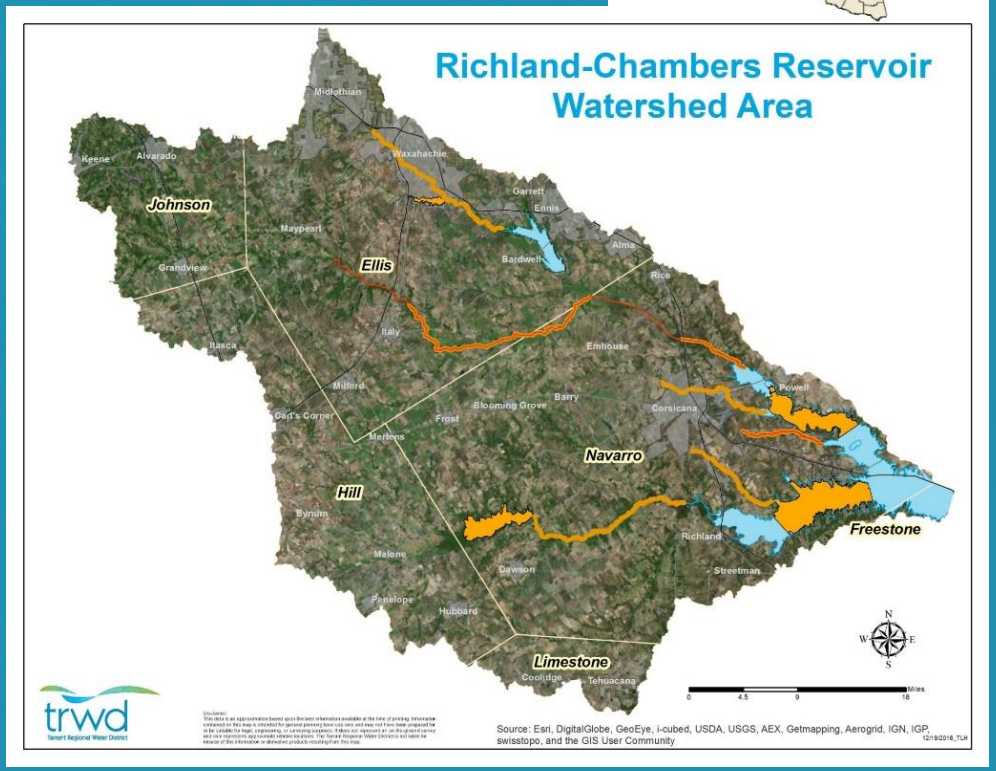
Watershed Protection Plans

A. Identify problem & sources
B. Reductions needed to reach goals
C. Identify measures needed to achieve reductions
D. Assistance needed
E. Education & outreach plan
F. Schedule
G. Milestones
H. Criteria for measuring progress
I. Monitoring Plan



Why We're Here

- TCEQ identified issues in streams & lakes
  - Nitrogen,
  - phosphorus,
  - dissolved oxygen
  - Chlorophyl-α

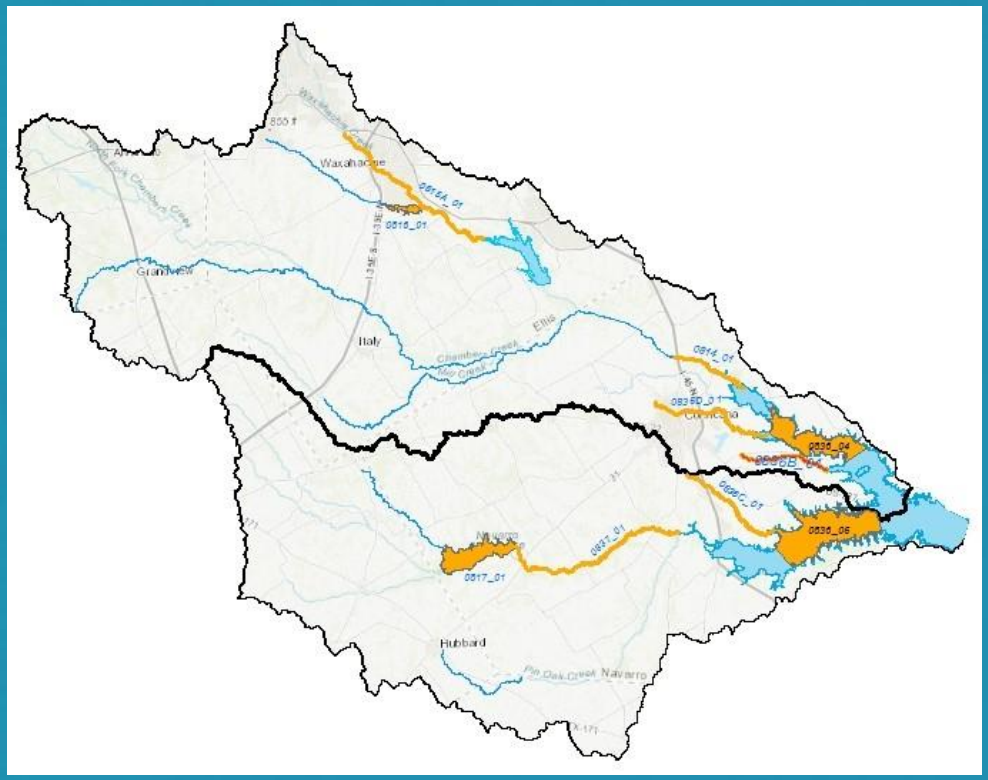


Richland-Chambers WPP

Element A: Watershed Characterization and Pollutant Sources

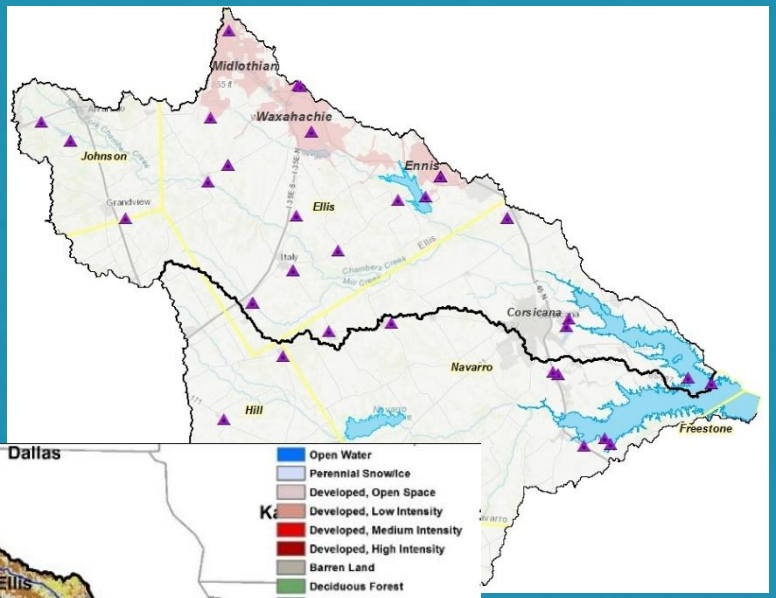
What are the Issues?

- Degraded quality of lakes and streams
  Nitrogen, phosphorus, dissolved oxygen, chlorophyll-α
- Drinking water capacity
  Sediment in lakes



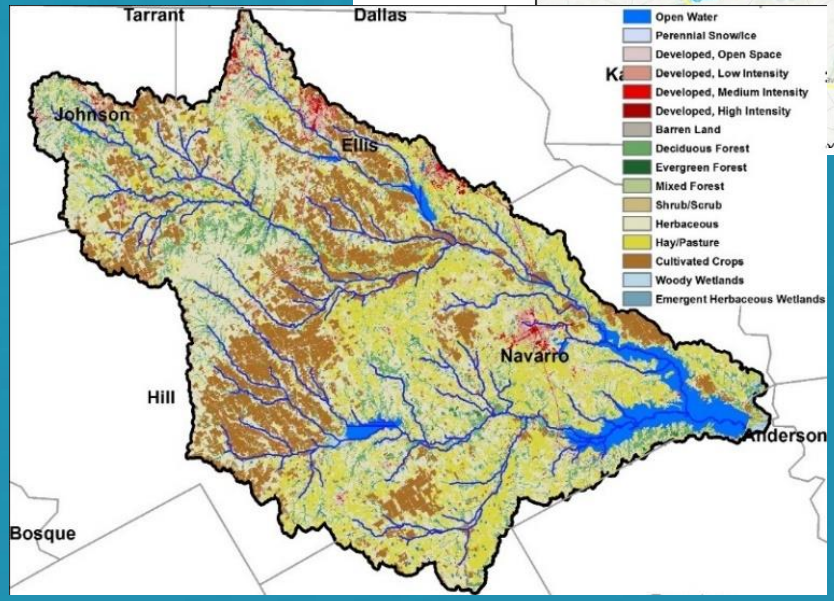
Richland-Chambers WPP

Element A: Watershed Characterization and Pollutant Sources



What are the Causes?

- Point Sources
  WWTPs, sewer overflows
- Nonpoint Sources
  Erosion and rainfall runoff from rural lands, agricultural operations, urban runoff, channel erosion



Richland-Chambers WPP

Element B: Goals and Pollutant Reductions

- **Goal Statement** (Restoration)

  … streams and reservoirs in the Richland-Chambers reservoir meet appropriate water quality standards.

- **Goal Statement** (Protection)

  … capacity of water supply reservoirs be protected by reducing erosion in the Richland-Chambers watershed.

Richland-Chambers WPP

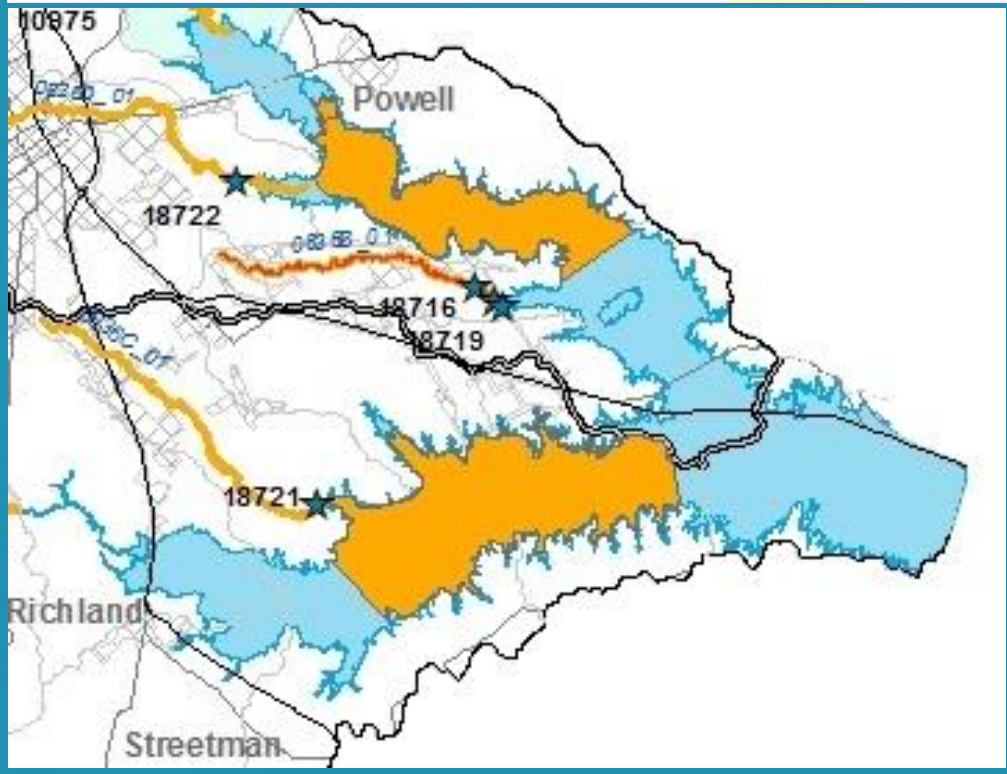
Element B: Goals and Pollutant Reductions

Richland-Chambers Lake

Total Phosphorus reduction

- 10% Chambers arm
- 40% Richland arm

Arm	10%	20%	30%	40%	50%
Chambers	24	22	19	16	12
Richland	34	32	27	24	21



Richland-Chambers WPP

Element B: Goals and Pollutant Reductions

Other Waterbodies

- Richland and Chambers Creeks
  - Load Duration Curves to determine reductions
- Waxahachie Creek (inadequate data)
  - Trinity River Authority will resume sampling this site (site#?)
- Cedar Creek, Post Oak Creek, Grape Creek, DO (inadequate data)
  - Intensive studies will be initiated by Trinity River Authority to confirm concerns and impairments.

Richland-Chambers WPP

Element C: Management Measures

- Urban & Developed Areas
  - Nutrient management
  - Sediment trapping using green and conventional BMPs
- Agricultural & Rural Areas
  - State and Federal Conservation Plans and priority practices for farms and ranches
- Stream Channel Erosion
  - Stabilization and restoration projects in priority areas.
- Targeted in priority areas

Richland-Chambers WPP

Element C: Management Measures

Priority Ag & Rural Management Measures

- Filter Strips
- Terraces, contour farming
- Residue management
- Crop rotation
- Prescribed grazing
- Brush management
- Nutrient Management
- Cover crops
- Critical area planting
- Herbaceous weed control
- Range planting
- Riparian forest buffer
- Upland wildlife habitat management

Richland-Chambers WPP

Element D: Assistance Needed

Technical assistance from agencies, extension agents, private sector, landowners, and others for

- Planning, engineering, design, and education.

Financial assistance from agencies, nonprofit organizations, and corporations and industries to support planning and implementation of projects for

- natural resource conservation;
- wastewater and infrastructure design,
- construction, and management;
- riparian and channel management; and education.

Richland-Chambers WPP

Element E: Education & Outreach

- Stakeholder involvement and participation in plan
- Educational component associated with each management measure
- General natural resource & watershed/water quality awareness for the public

TOOLS

Demonstration sites

Meetings and workshops

Onsite technical assistance

Citizen monitoring programs

Training and certification programs

Social media

Richland-Chambers WPP

Element F: Schedule

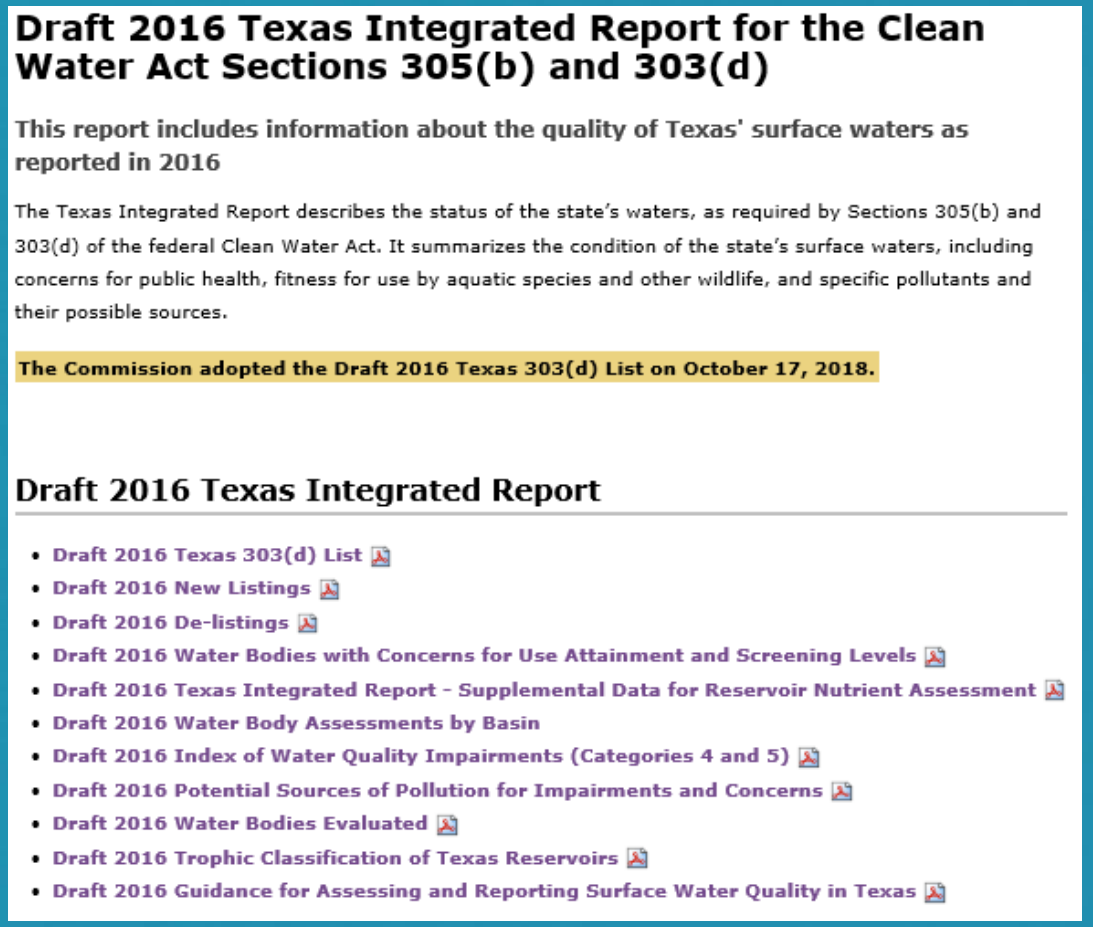
Element G: Interim Milestones

- Implementation over15 year timeframe
- Milestones planned & tracked in 3 year increments
- Annual report on implementation of management measures and other activities
- Review of WPP document every 5 years

Richland-Chambers WPP

Element H: Criteria for Load Reductions

- Assess progress toward water quality goals using TCEQ's biennial Integrated Report
- Concerns *and* Impairments



Draft 2016 Texas Integrated Report for the Clean Water Act Sections 305(b) and 303(d)

This report includes information about the quality of Texas' surface waters as reported in 2016

The Texas Integrated Report describes the status of the state's waters, as required by Sections 305(b) and 303(d) of the federal Clean Water Act. It summarizes the condition of the state's surface waters, including concerns for public health, fitness for use by aquatic species and other wildlife, and specific pollutants and their possible sources.

The Commission adopted the Draft 2016 Texas 303(d) List on October 17, 2018.

Draft 2016 Texas Integrated Report

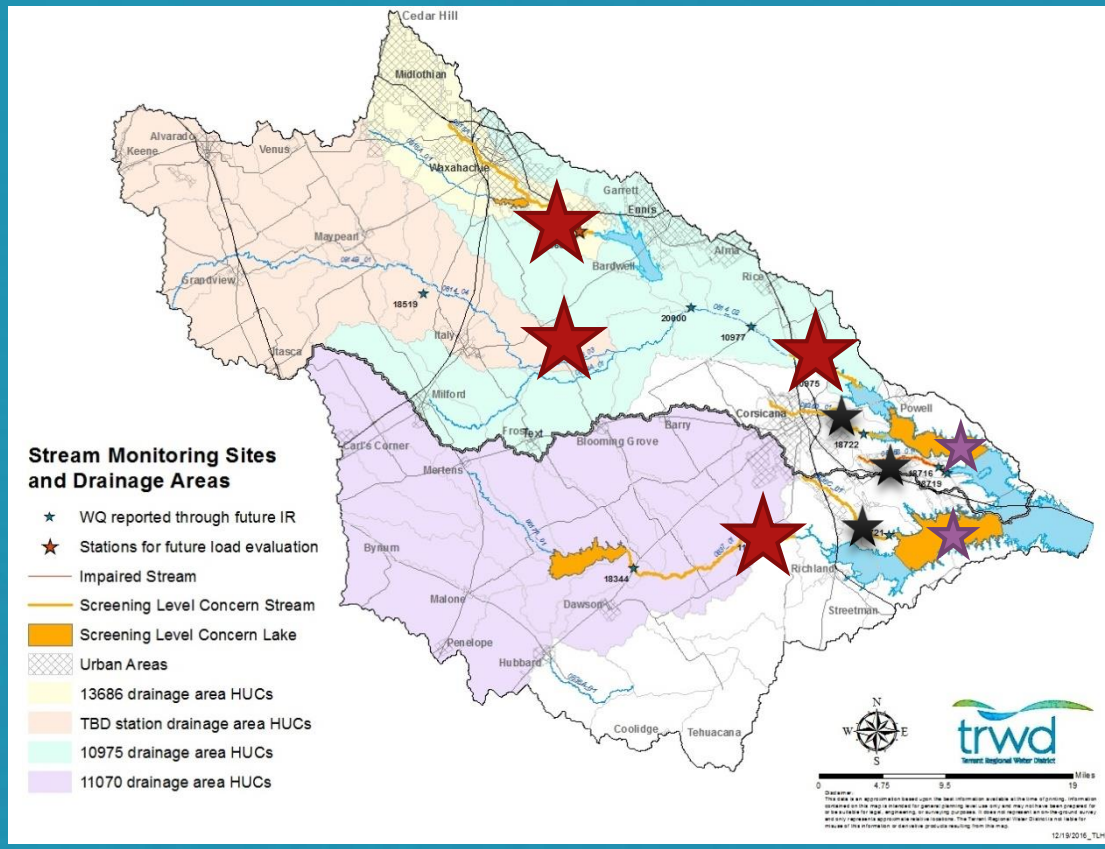
- Draft 2016 Texas 303(d) List
- Draft 2016 New Listings
- Draft 2016 De-listings
- Draft 2016 Water Bodies with Concerns for Use Attainment and Screening Levels
- Draft 2016 Texas Integrated Report - Supplemental Data for Reservoir Nutrient Assessment
- Draft 2016 Water Body Assessments by Basin
- Draft 2016 Index of Water Quality Impairments (Categories 4 and 5)
- Draft 2016 Potential Sources of Pollution for Impairments and Concerns
- Draft 2016 Water Bodies Evaluated
- Draft 2016 Trophic Classification of Texas Reservoirs
- Draft 2016 Guidance for Assessing and Reporting Surface Water Quality in Texas

Richland-Chambers WPP

Element I: Monitoring

Measure progress in water quality improvements

- Waxahachie Creek
- Chambers Creek upper and lower
- Richland Creek
- Richland-Chambers Lake



Confirm status of Post Oak, Grape, & Cedar Creeks

Update on TCEQ's 2016 Water Quality Report

Water Quality

TCEQ Water Quality Reports

Period of Data Collected for
TCEQ Integrated Report Cycles

Report	2005	'06	'07	'08	'09	'10	'11	'12	'13	'14	'16	'17	'18	'19
2014	Dec	>>	>>	>>	>>	>>	>>	Nov						
2016			Dec	>>	>>	>>	>>	>>	>>	Nov				
2018					Dec	>>	>>	>>	>>	>>	>>	Nov		

Water Quality

2014 Integrated Report: *Dec 2005 – Nov 2012*

Water Body	N	P	DO	Chl-a	Chloride
Chambers Creek Subwatershed					
Chambers Creek (lower)		C	C	C	Imp
Waxahachie Creek	C				
Lake Waxahachie				C	
Cedar Creek			Imp		
Post Oak Creek			C		
Richland Creek Subwatershed					
Richland Creek			C	C	
Navarro Mills Lake			C		
Grape Creek			C		
Richland-Chambers Lake				C	

TCEQ 305(b) Report;
Imp = Impairment
C = Concern

Water Quality

DRAFT 2016 ***Report:*** *Dec 2007 – Nov 2014*

Water Body (2016 report)	N	P	DO	Chl-a	Algae	Sulfate	E. coli
Chambers Creek Subwatershed							
Chambers Creek (lower)		C	~~C~~	C			C
Waxahachie Creek	C						
Lake Waxahachie				~~C~~			
Bardwell Reservoir					C	Imp	
Cedar Creek			Imp				
Post Oak Creek			C				C
Richland Creek Subwatershed							
Richland Creek			C	C			C
Navarro Mills Lake			C		C		
Grape Creek			C				
Richland-Chambers Lake				~~C~~	C		

Potential Sources of Bacteria

Element A:
Pollutant Sources

- Wastewater Plants
- Septic Systems
- Pets - Dogs
- Livestock
  Cattle, horses, goats, sheep
- Wildlife - Deer
- Non-natives - Feral Hogs

Analysis of Potential Sources

SELECT Model

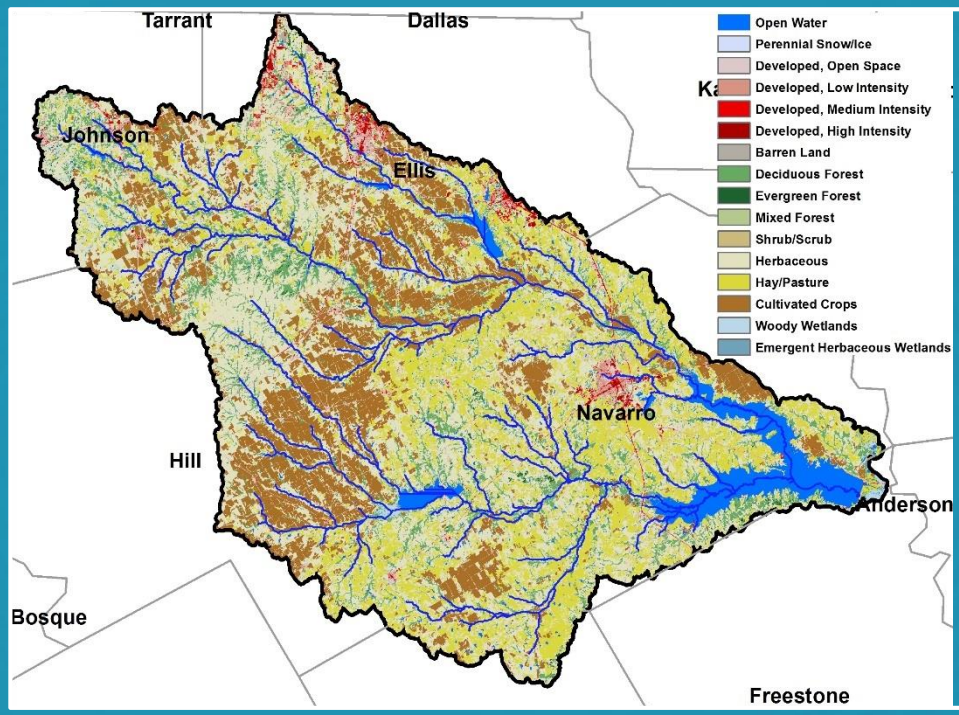
- Combines population, natural resource and land use data into mapping software.
- Estimates total potential loads from identified sources.
- Provides maps of relative bacteria loads across the watershed.
- Used statewide in many watershed plans

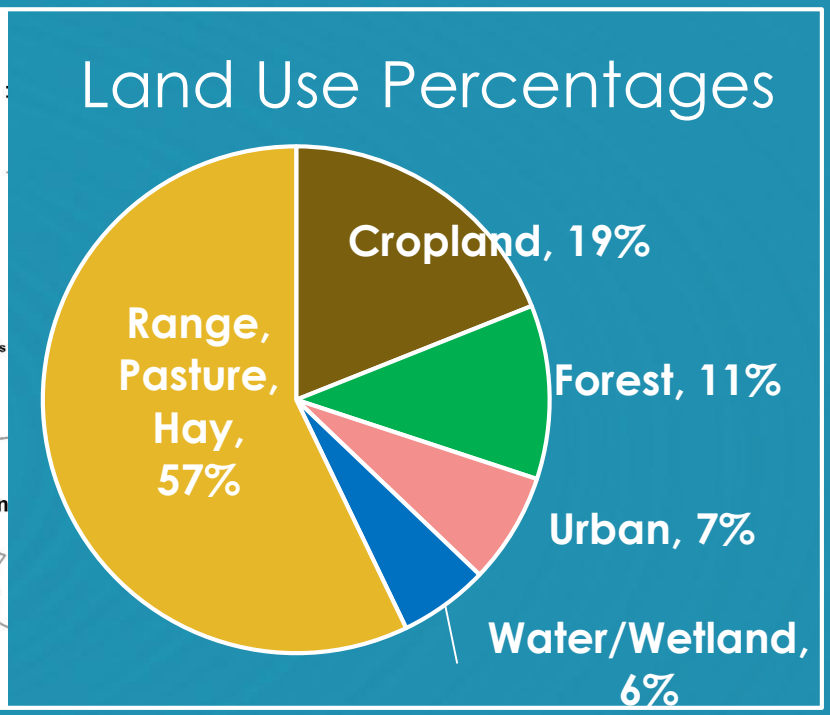
S patially
E xplicit
L oad
E nrichment
C alculation
T ool

Does not provide exact loadings or locations

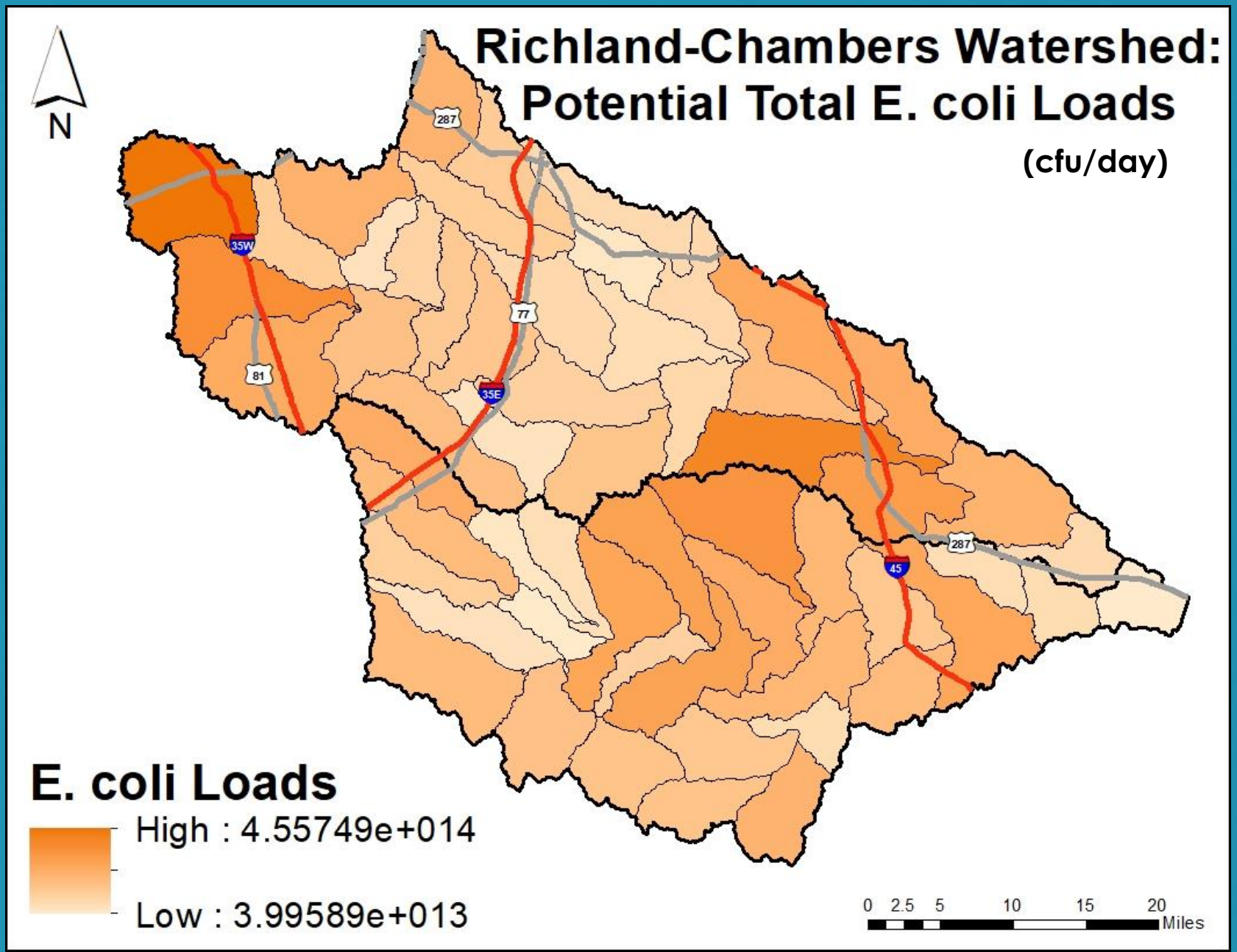
Analysis of Potential Sources

Land Uses and Coverage



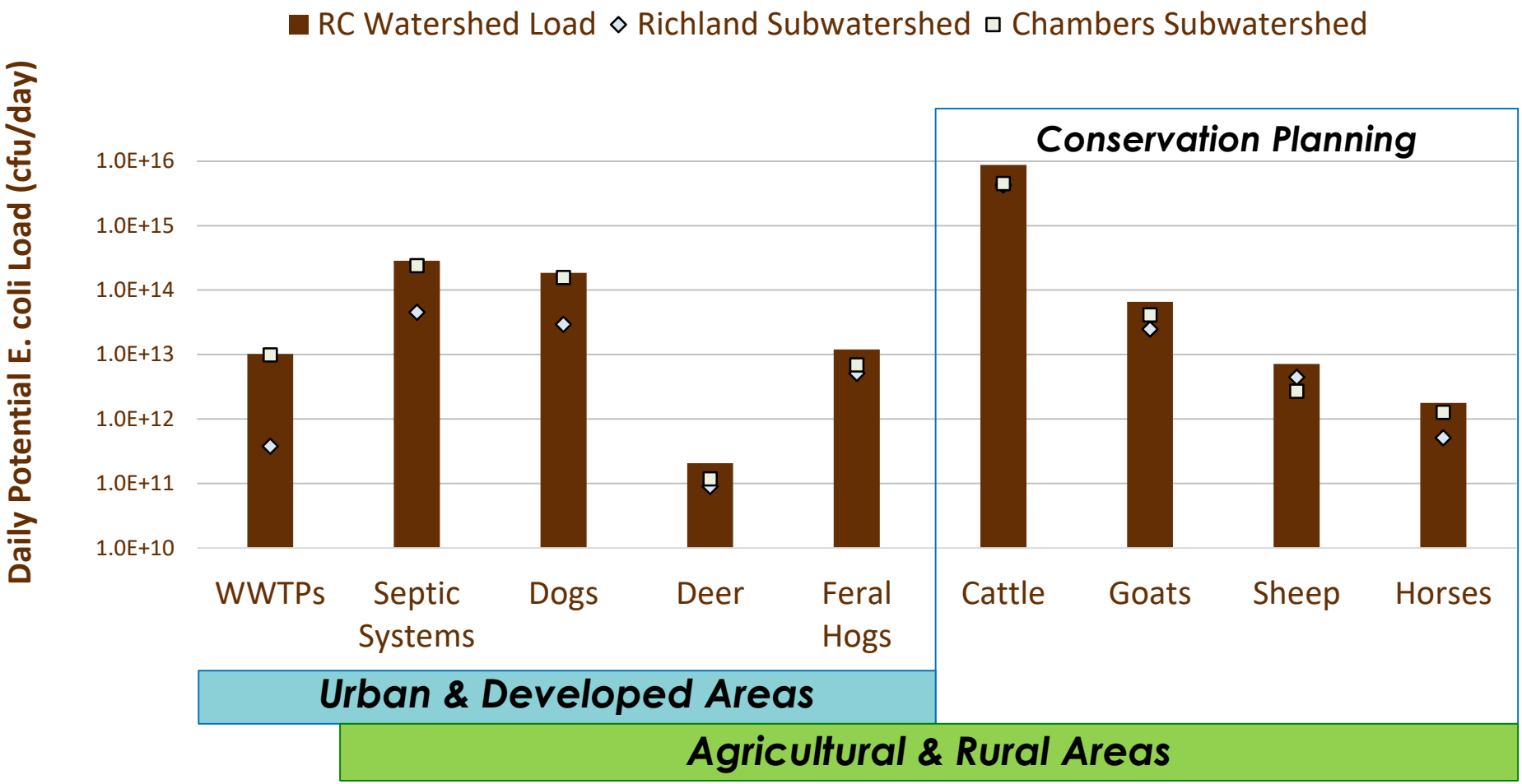


Analysis of Potential Sources



Relating Sources to Management

Total Potential Load from Identified Sources by Management Measure



Path Forward

- Incorporate TCEQ 2016 Report into the WPP through maps, tables, and text
  - Pollutants added and removed
  - Investigate/confirm additions
  - Research potential sources of sulfate in Lake Bardwell
- Add bacteria-related sources, management measures, and education programs
- Add bacteria-related technical/financial assistance opportunities


Questions?

ROWLETT CREEK WATERSHED CHARACTERIZATION *319 Grant*

- Purpose is to develop a watershed protection plan to improve water quality in Rowlett Creek Watershed.
- Proactively applied for the grant with SMU and TAMU AgriLife.
- While the characterization and modeling is being conducted, a 2nd grant will be applied for.
- The 2nd grant will be used to develop a Watershed Protection Plan for Rowlett Creek Watershed as a whole.
- Once submitted to the TCEQ and hopefully approved, the WPP allows any entity within Rowlett Creek Watershed to apply for funding for green infrastructure.
- For more information visit: https://www.tceq.texas.gov/waterquality/nonpoint-source/grants

ROWLETT CREEK WATERSHED CHARACTERIZATION *319 Grant*

- Texas A&M AgriLife Extension: Dr. Fouad Jaber
  - Works with project partners to collect water quality data to characterize the Rowlett Creek Watershed with regard to bacteria and nutrient impairment.
  - Data will also be used to model the watershed to determine best management practices that will restore the creek.
  - A stakeholder group will be developed and invited to attend meetings with plans to develop a Watershed Based Plan in subsequent years.
- Southern Methodist University: Dr. Wenjie Sun
  - Oversee the entire design, implementation and administration of the project with focus on the sample collection and water quality analysis with regard to bacterial and nutrient impairment.
- City of Plano provides support to AgriLife and SMU by the following actions:
  - Assistance with sample collection and water quality analysis
  - Establishment of a watershed group and facilitation of stakeholders
  - Development of outreach and educational materials

TEXAS A&M AGRILIFE EXTENSION

SMU | LYLE SCHOOL OF ENGINEERING

ROWLETT C
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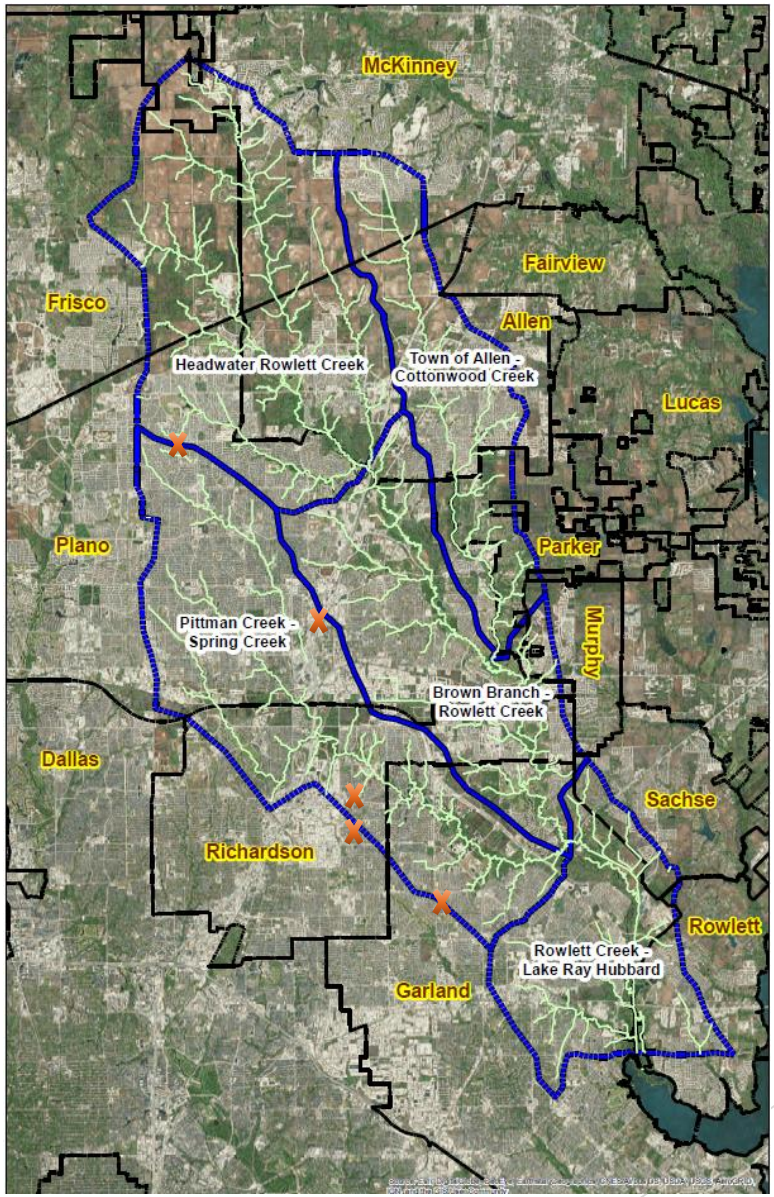
TEXAS A&M AGRILIFE EXTENSION

MU | LYLE SCHOOL OF ENGINEERING

- 5 sites at confluence points
- ISCO units will be installed
- Routine and Stormwater Sampling
- Routine: Grab Samples Quarterly
- Stormwater: at least 9 storms a year for 2 years



TEXAS STREAM TEAM

at The Meadows Center for Water and the Environment

Dedicated to understanding and protecting the 191,000 miles of Texas waterways.

THE MEADOWS CENTER
FOR WATER AND THE ENVIRONMENT

TEXAS STREAM TEAM






MISSION:

To facilitate environmental stewardship by empowering a statewide network of concerned citizen scientists, partners, and institutions in a collaborative effort to promote a healthy and safe environment though environmental education, data collection, and community action.

WHAT WE DO

- Environmental Education
- Data Collection
- Data Use
- Community Action
- Watershed Services

OUR PROGRAMS

TEXAS STREAM TEAM
PADDLERS

TEXAS STREAM TEAM
ANGLERS

TEXAS STREAM TEAM
MONOFILAMENT FINDERS

TEXAS STREAM TEAM
BIOMONITORS

CERTIFICATION TRAINING COURSES

- Standard Core Water Quality Monitoring
- Paddler Core Water Quality Monitoring
- Advanced NPS Water Quality Monitoring
- *E. coli* Monitoring and Analysis
- Riparian Bull's Eye Evaluation - NEW
- Macroinvertebrate Rapid Bioassessment - NEW

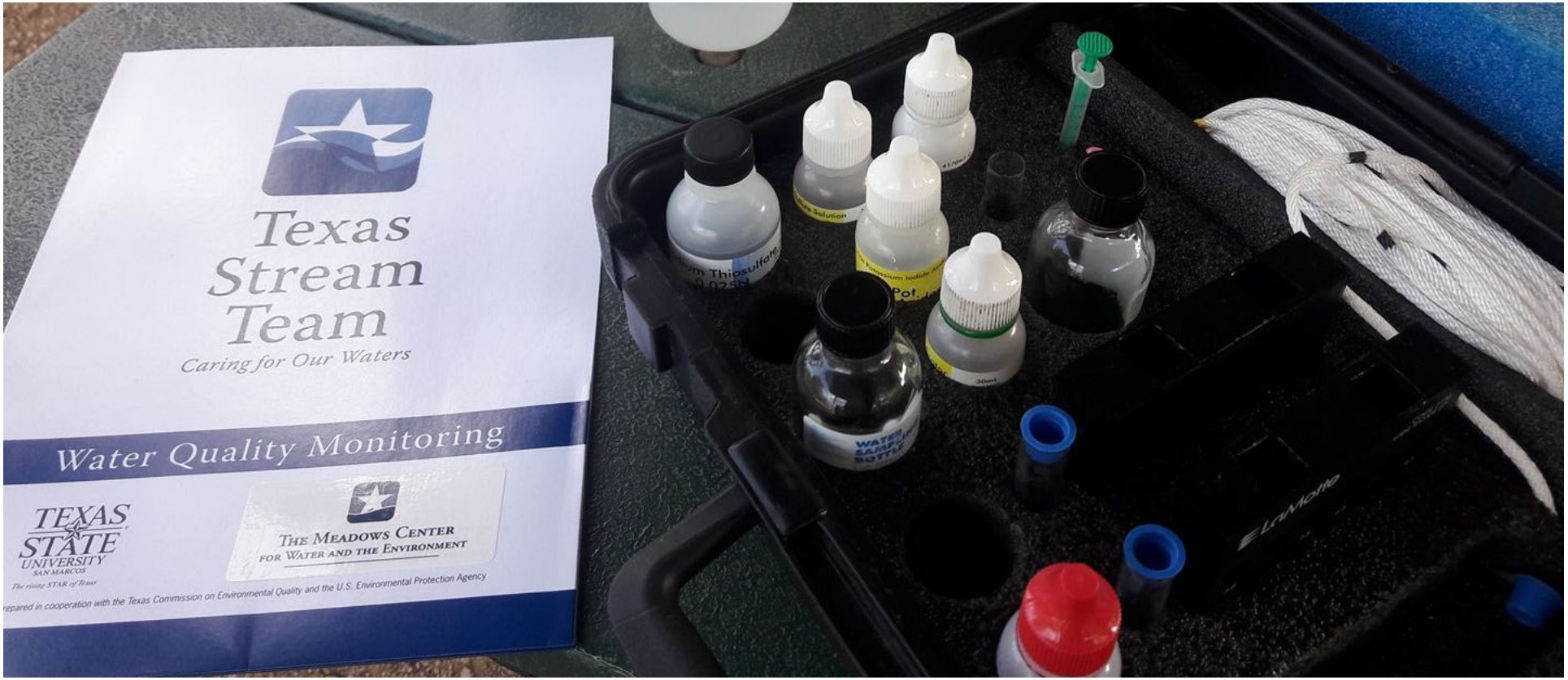
DATA COLLECTION AND PARAMETERS

Core Water Quality Parameters

- Temperature
- pH
- Dissolved Oxygen
- Specific Conductivity
- Total Dissolved Solids
- Salinity
- Secchi Disk and Total Depth
- Field Observations

Advanced Water Quality Parameters

- *E. coli*
- Nitrate-Nitrogen
- Orthophosphate
- Turbidity
- Streamflow



DATA USE

- Inform communities about local water quality
- Municipalities outreach messages
- Data Summary Reports
- Submitted to EPA's water quality database
- WPP and TMDLs
- TST Partners
- Interpretive displays, education and outreach event
- Research projects
- Presented on Waterways Dataviewer

WATERWAYS DATAVIEWER DATA ENTRY SYSTEM

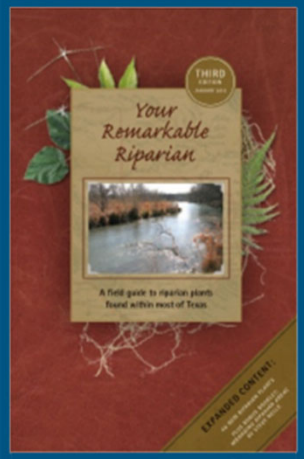
Action	Site ID	Sample Date...	Air Temperature (° C)	Water Temperature (° C)
Edit | Del	81349	7/17/2018	32.10	27.70
Edit | Del	81229	7/16/2018	34.00	27.00
Edit | Del	80336	7/16/2018	32.00	24.00
Edit | Del	81074	7/15/2018	27.00	27.10
Edit | Del	80347	7/15/2018	32.00	31.20
Edit | Del	10743	7/14/2018	30.00	28.00
Edit | Del	10749	7/14/2018	28.00	27.00

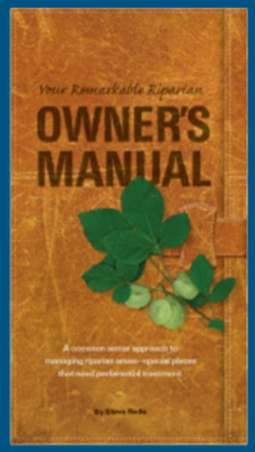
Upon submission and verification, data is uploaded directly to the TST Database.

RIPARIAN EVALUATION & MACROINVERTEBRATE BIOASSESSMENT PROGRAM

Assess the health of waterways based on the riparian habitat and the aquatic insects that are present there.

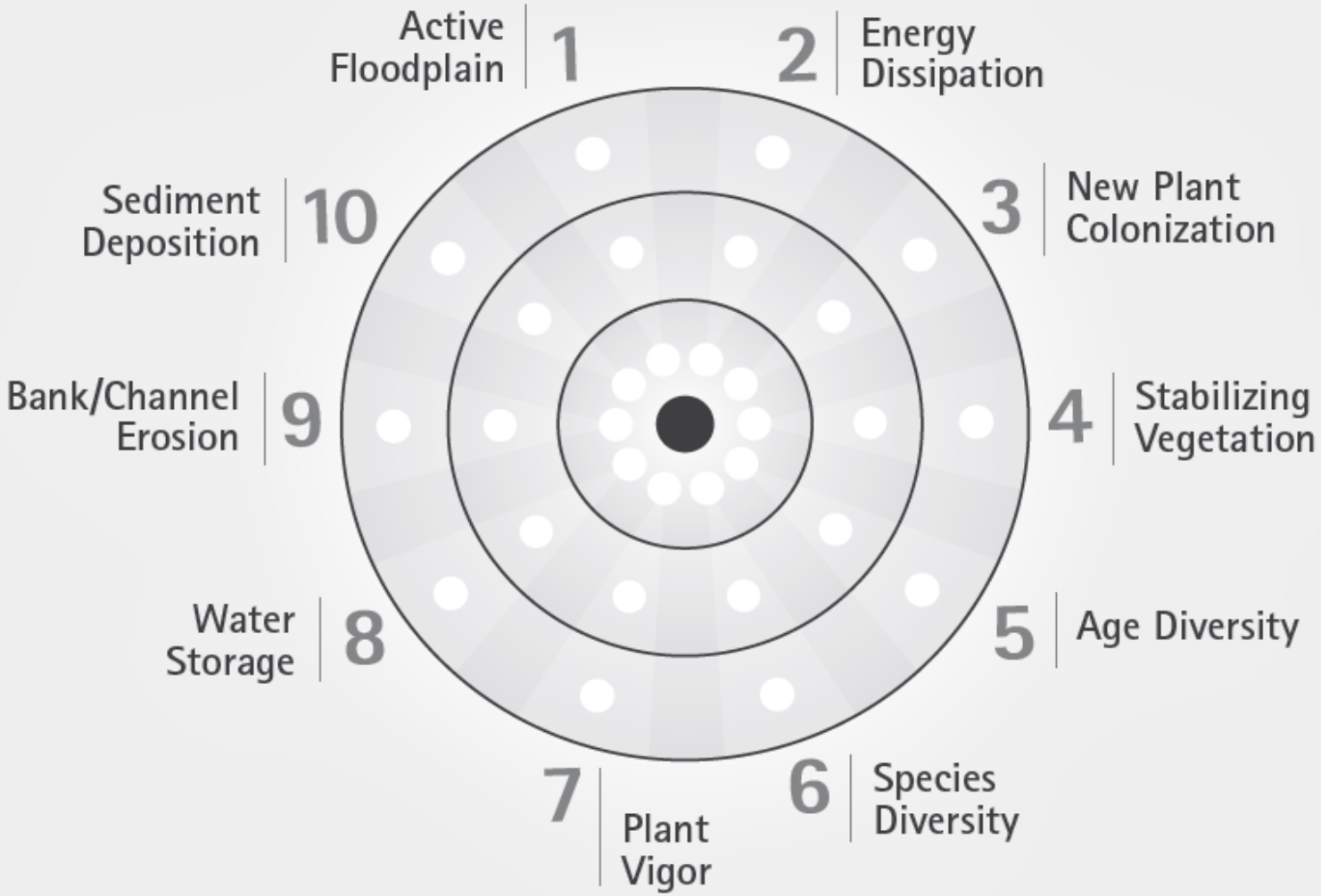
YOUR REMARKABLE RIPARIAN





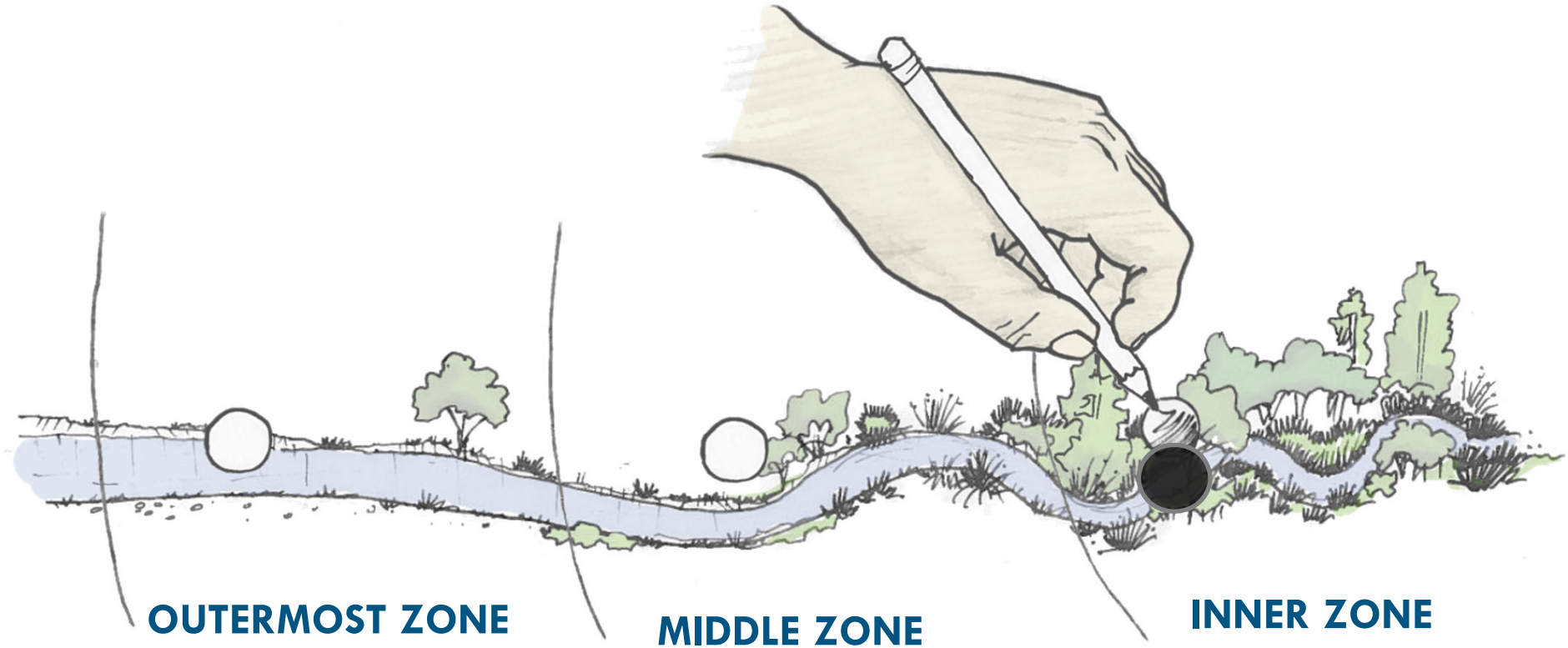
- Field Guide to riparian plants found within most of Texas
- Cultivates awareness and appreciation for riparian plants and the role they play in the production of abundant, clean water
- Used as a companion to complete and submit forms with one to four photos to report observations to Texas Stream Team

RIPARIAN BULL'S-EYE EVALUATION TOOL



Ten riparian indicators to guide your eye in assessing riparian landscapes for their function and identifying activities that may be hindering the natural riparian recovery process

THE BULL'S-EYE ZONES



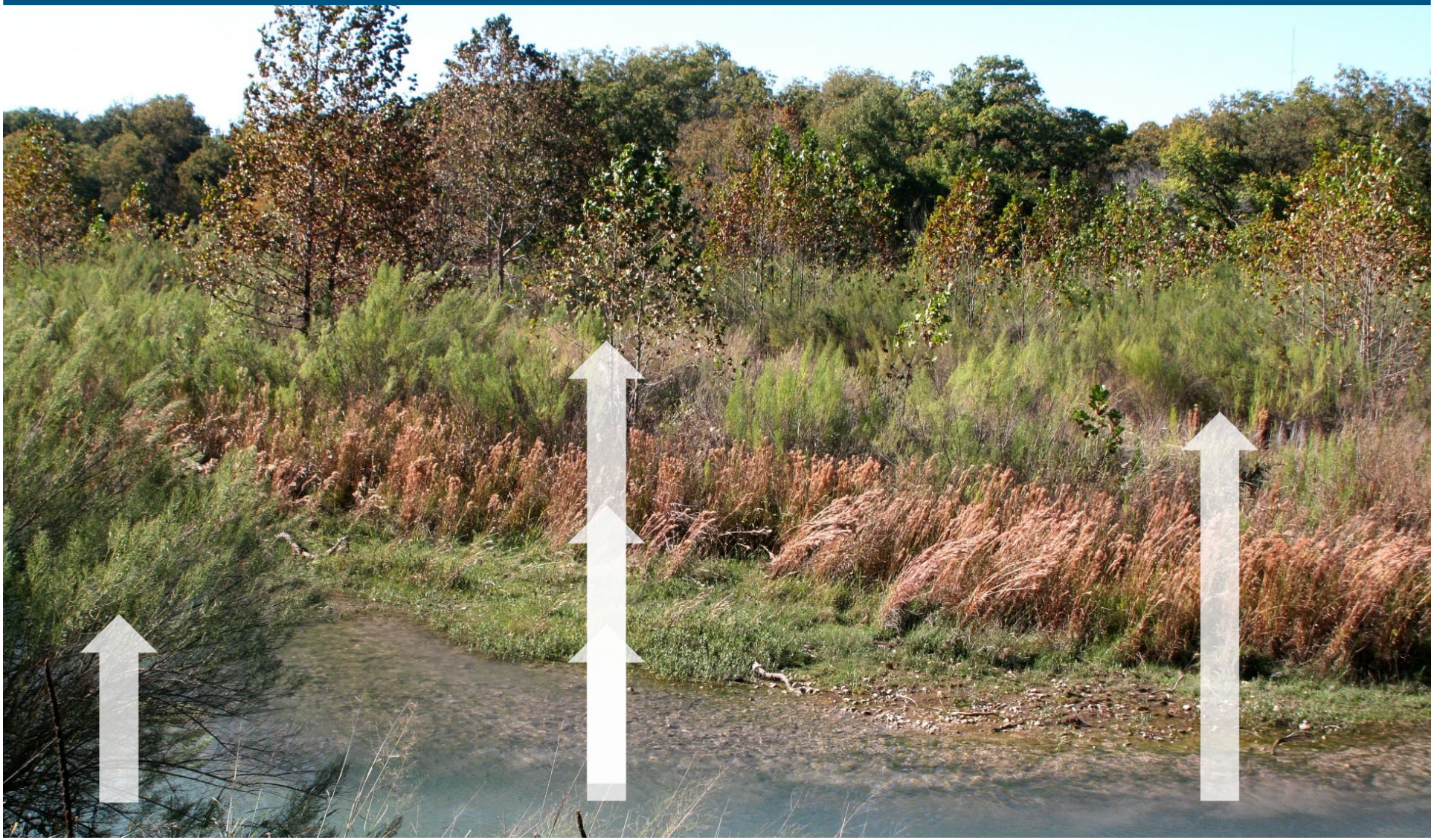
OUTERMOST ZONE
Totally Dysfunctional
Riparian Condition

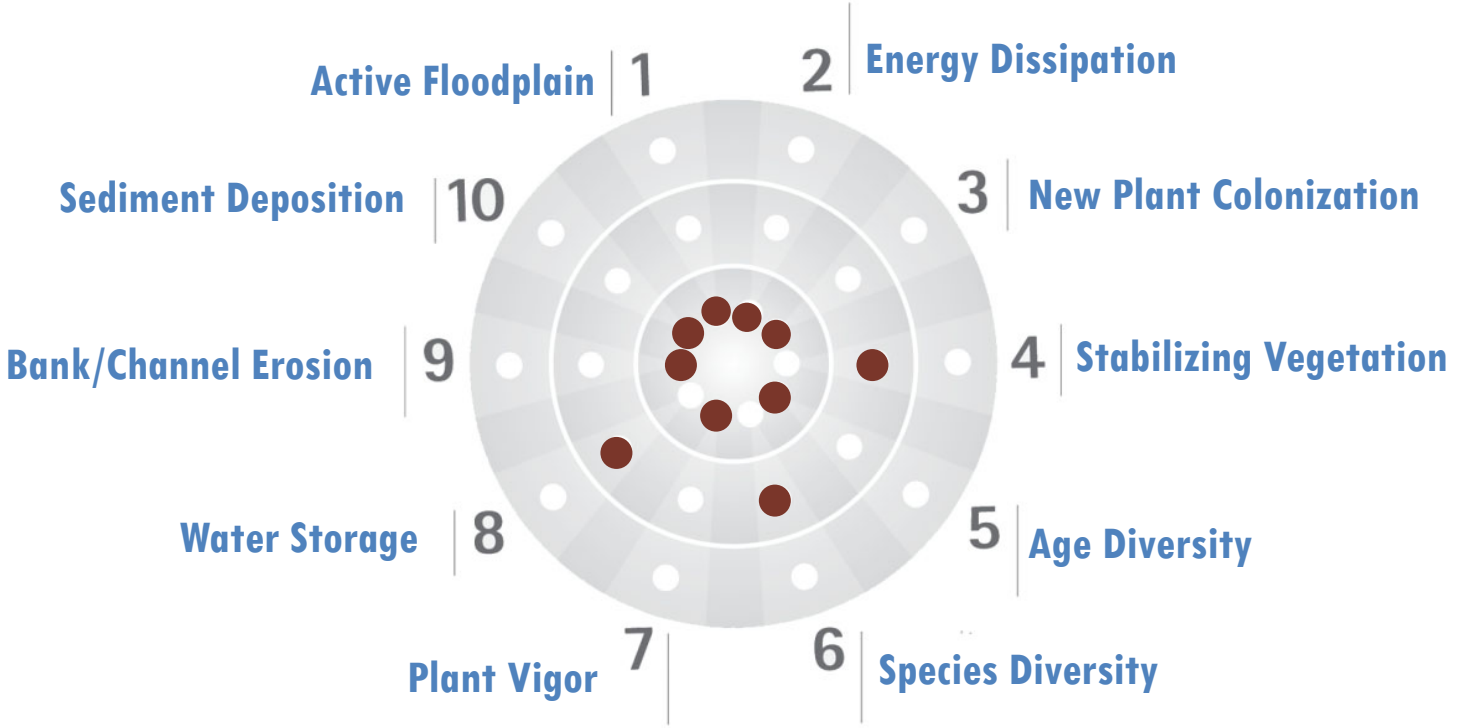
MIDDLE ZONE
At-Risk Condition,
Riparian Danger Zone

INNER ZONE
Optimal Function,

PUTTING IT ALL TOGETHER

OBSERVATION IS A POWERFUL TOOL





Filling in the bulls eye evaluation

REQUEST A RIPARIAN EVALUATION TRAINING EVENT


Leakey Springs – June 21, 2018

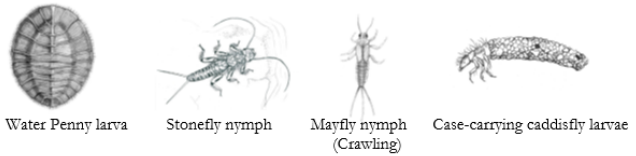

Oso Creek – October 26, 2017


Resaca De La Palma State Park – July 11, 2018

MACROINVERTEBRATE RAPID BIOASSESSMENT TRAINING

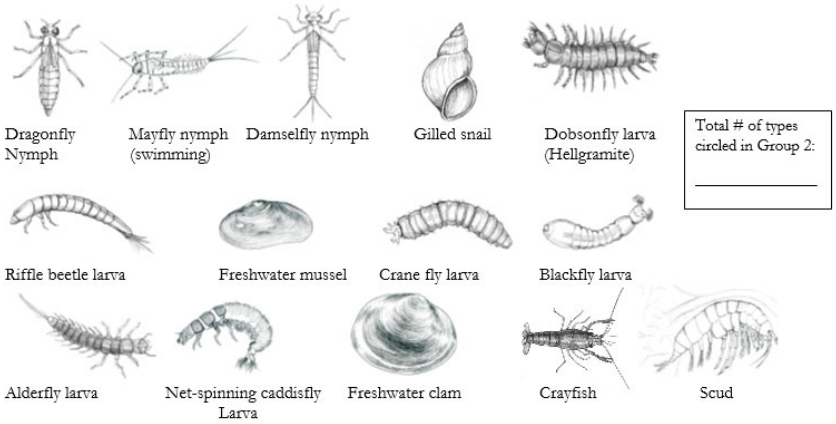
MACROINVERTEBRATE RAPID BIOASSESSMENT

Group 1: These animals are mostly intolerant to pollution. Their dominance generally signifies Good to Excellent water quality



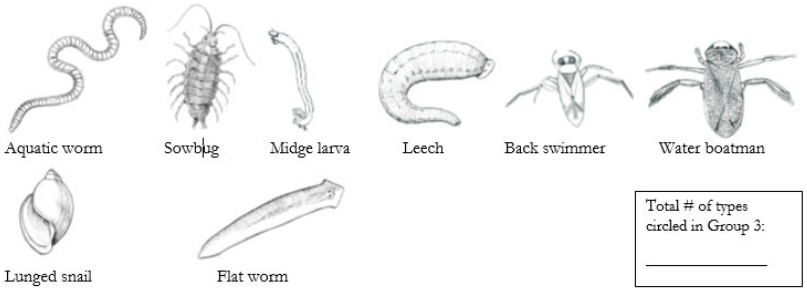
Total # of types circled in Group 1: _____

Group 2: These animals live in a wide range of water quality conditions

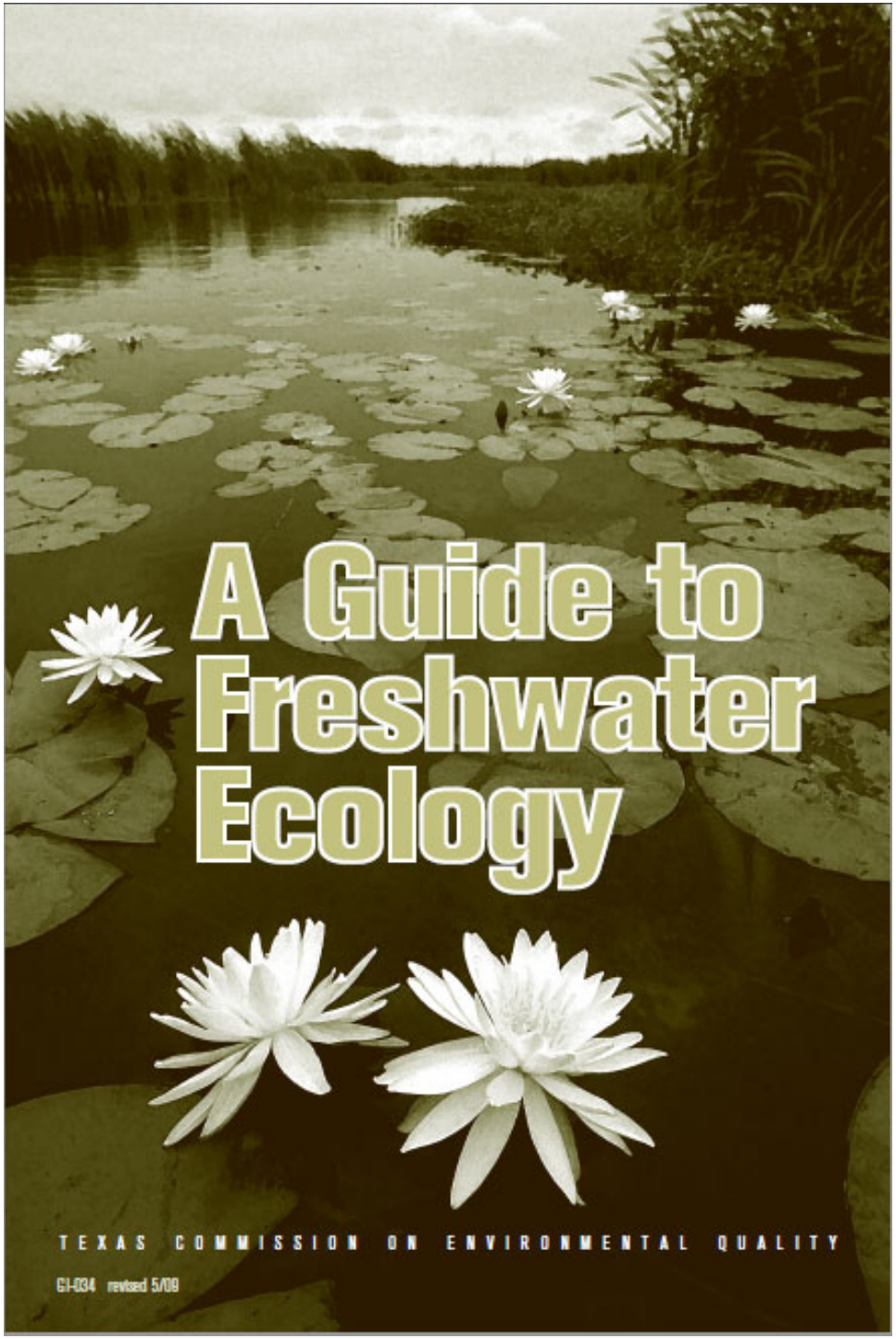


Total # of types circled in Group 2: _____

Group 3: These animals are mostly tolerant of pollution. Their dominance generally signifies poor water quality.



Total # of types circled in Group 3: _____



MACROINVERTEBRATE IDENTIFICATION RESOURCES

For identifying aquatic macroinvertebrates and group according to pollution tolerance and water quality conditions refer to:

- *General Key for Macroinvertebrates*
- *A Guide to Freshwater Ecology*
- *Key to Macroinvertebrate Life in the River*


Thank you!
512-245-1346
txstreamteam@txstate.edu
The Meadows Center
for Water and the Environment
Texas Stream Team