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
  ➢ Chlorophyll-α
What are the Issues?

➢ Degraded quality of lakes and streams
   *Nitrogen, phosphorus, dissolved oxygen, chlorophyll-α*

➢ Drinking water capacity
   *Sediment in lakes*
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
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

<table>
<thead>
<tr>
<th>Arm</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
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<tr>
<td>Richland</td>
<td>34</td>
<td>32</td>
<td>27</td>
<td>24</td>
<td>21</td>
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</table>
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**

<table>
<thead>
<tr>
<th>Priority Ag &amp; Rural Management Measures</th>
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</thead>
<tbody>
<tr>
<td>Filter Strips</td>
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<tr>
<td>Terraces, contour farming</td>
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<tr>
<td>Residue management</td>
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<tr>
<td>Crop rotation</td>
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<tr>
<td>Prescribed grazing</td>
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<tr>
<td>Brush management</td>
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<tr>
<td>Nutrient Management</td>
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<tr>
<td>Cover crops</td>
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<tr>
<td>Critical area planting</td>
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<tr>
<td>Herbaceous weed control</td>
</tr>
<tr>
<td>Range planting</td>
</tr>
<tr>
<td>Riparian forest buffer</td>
</tr>
<tr>
<td>Upland wildlife habitat management</td>
</tr>
</tbody>
</table>
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 over 15 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
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**

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<thead>
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## Water Quality


<table>
<thead>
<tr>
<th>Water Body</th>
<th>N</th>
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<th>Chl-a</th>
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<tr>
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<td><strong>Richland Creek Subwatershed</strong></td>
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TCEQ 305(b) Report; Imp = Impairment; C = Concern
# Water Quality

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

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</tbody>
</table>

Water Body: Chambers Creek Subwatershed, Richland Creek Subwatershed, Richland-Chambers Lake.
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

Does not provide exact loadings or locations
Analysis of Potential Sources

Land Uses and Coverage

- Cropland, 19%
- Forest, 11%
- Urban, 7%
- Water/Wetland, 6%
- Range, Pasture, Hay, 57%
Analysis of Potential Sources

Richland-Chambers Watershed: Potential Total E. coli Loads (cfu/day)

E. coli Loads
- High: $4.55749 	imes 10^{14}$
- Low: $3.99589 	imes 10^{13}$
Relating Sources to Management

Total Potential Load from Identified Sources by Management Measure

- RC Watershed Load
- Richland Subwatershed
- Chambers Subwatershed

Daily Potential E. coli Load (cfu/day)

Conservation Planning

Urban & Developed Areas

Agricultural & Rural Areas
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?
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 2\textsuperscript{nd} grant will be applied for.

The 2\textsuperscript{nd} 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
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
ROWLETT CREEK WATERSHED CHARACTERIZATION

- 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
  - Oversees 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:
  - Assists with sample collection and water quality analysis
  - Establishes a watershed group and facilitates stakeholders
  - Develops outreach and educational materials
• 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.
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 through 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
Upon submission and verification, data is uploaded directly to the TST Database.
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
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
**Group 1:** These animals are mostly intolerant to pollution. Their dominance generally signifies Good to Excellent water quality.

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

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