North Central Texas Water Quality Project

Richland-Chambers Reservoir Watershed Protection Plan
Stakeholder Meeting
Cowboy Church of Ennis, Ennis, Texas

AGENDA

Wednesday, May 24, 2017

8:00 – 12:00 Texas Watershed Steward Workshop

12:00 LUNCH and Erosion Demonstrations (12:00 & 12:30)

1:00 – 3:15 Richland-Chambers Watershed Protection Plan Stakeholder Meeting

1:00 Welcome and Introductions
Clint Wolfe, Program Manager Texas A&M AgriLife Research

1:10 Recap Last Meeting and Watershed Protection Plan Development Activities
Clint Wolfe, Program Manager Texas A&M AgriLife Research

1:20 Water Quality Goals
Tina Hendon, Watershed Program Manager, Tarrant Regional Water District

1:35 Overview of Example Practices
Clint Wolfe, Program Manager Texas A&M AgriLife Research

1:45 Selection & Prioritization of Recommended Practices
- Agricultural and Rural
- Urban and Wastewater Treatment
- Education & Outreach

2:30 Break

2:40 Reports from Breakout Groups

3:00 Discussion
- Timeline and Next Steps in WPP Development
- Time and Objectives for Next Meeting

3:15 ADJOURN

Richland-Chambers Watershed Partnership

Stakeholder Meeting
May 24, 2017

Welcome and Introductions

CLINT WOLFE, TEXAS A&M AGRILIFE RESEARCH

Recap of Previous Meeting

CLINT WOLFE, TEXAS A&M AGRILIFE RESEARCH

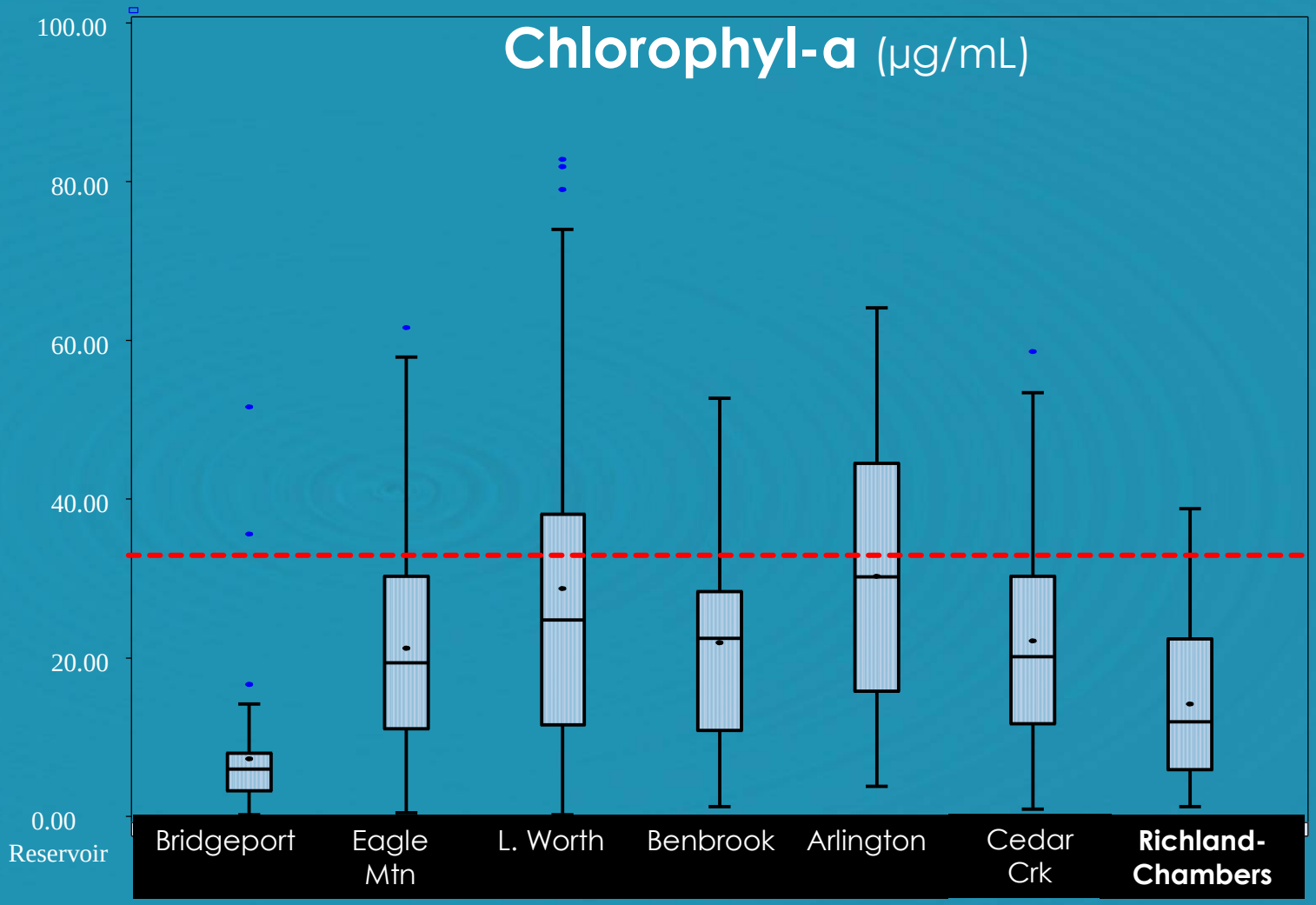
Reservoir Water Quality

Summary

- Water quality of Richland-Chambers Reservoir is good, compared to others in the region.
- Reservoir is Phosphorus-limited near the dam.
- Definite differences in water quality from the arms to the dam.
- Chambers Creek carries more water, sediment, salts and nutrients.

Reservoir Water Quality

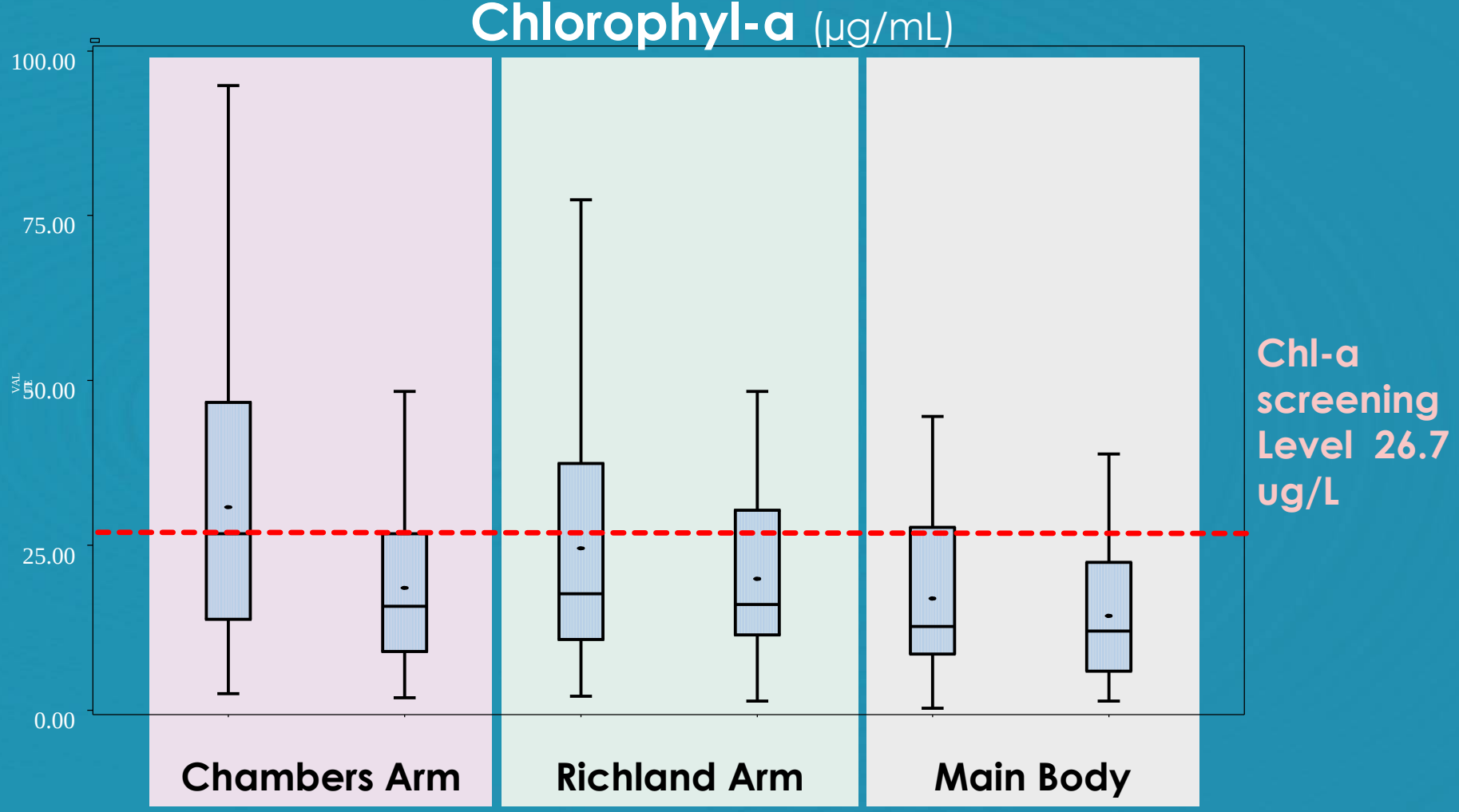
Comparison to other Reservoirs



Chl-a Screening Level 26.7 ug/L

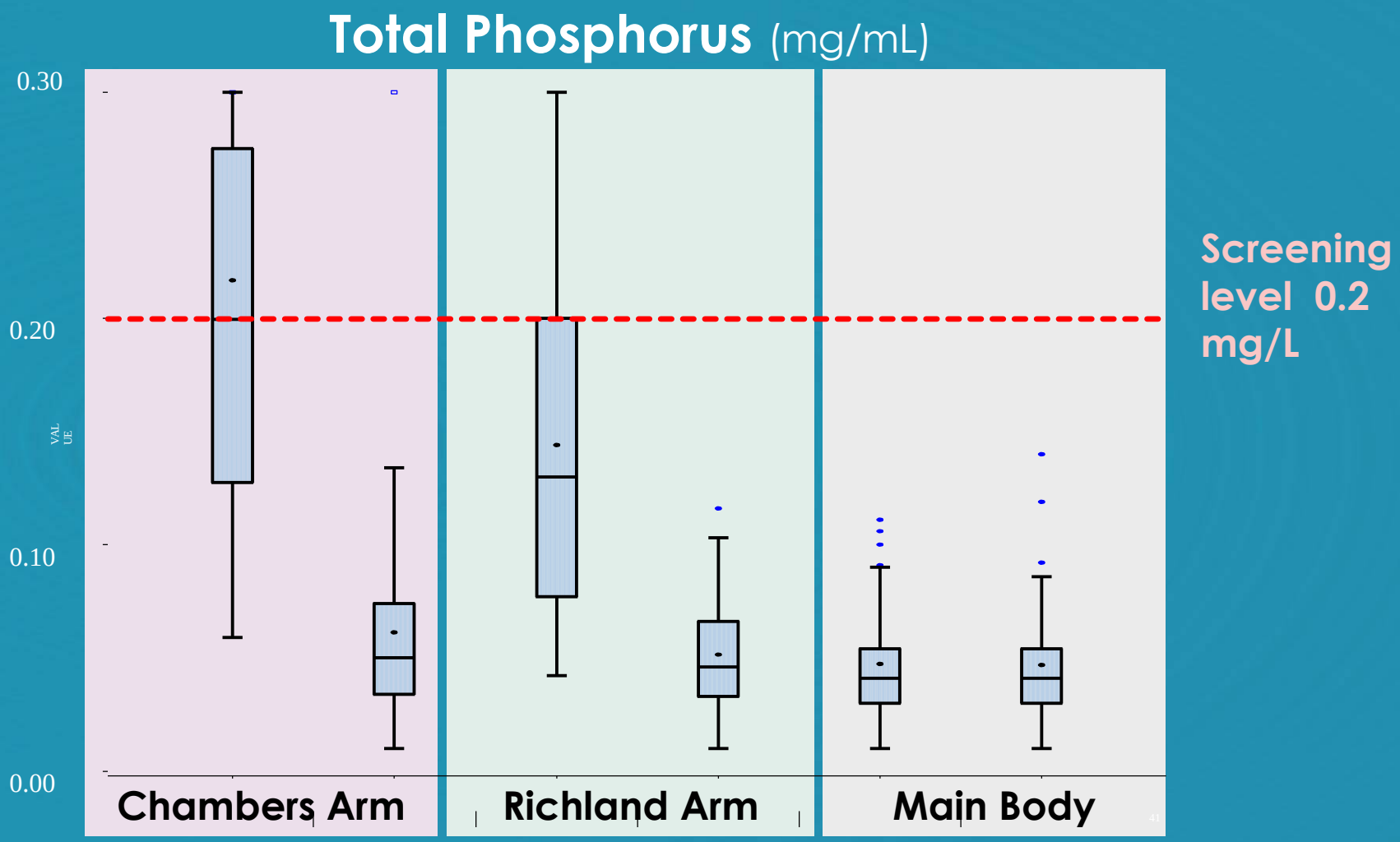
Reservoir Water Quality

Comparison within Reservoir



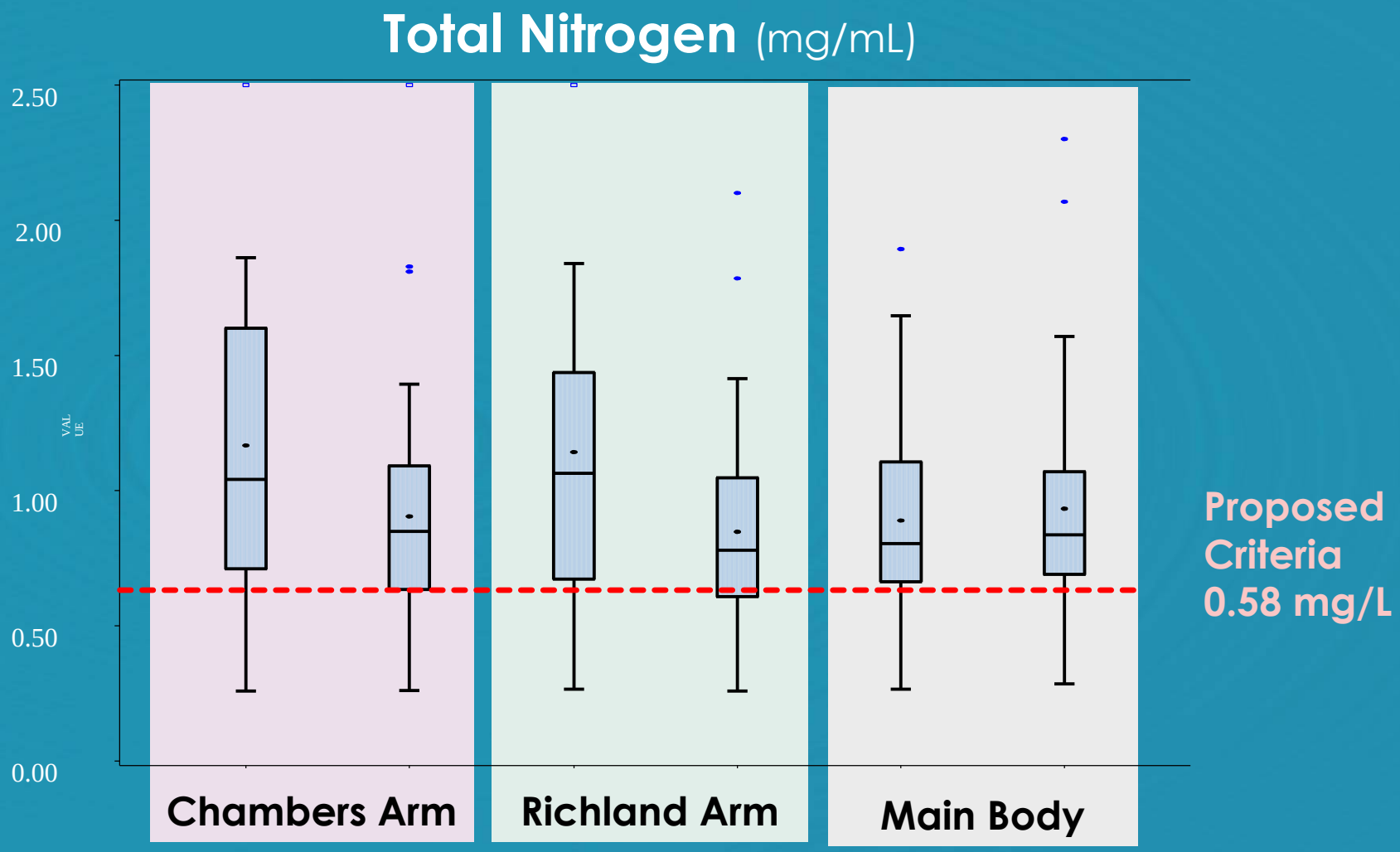
Reservoir Water Quality

Comparison within Reservoir



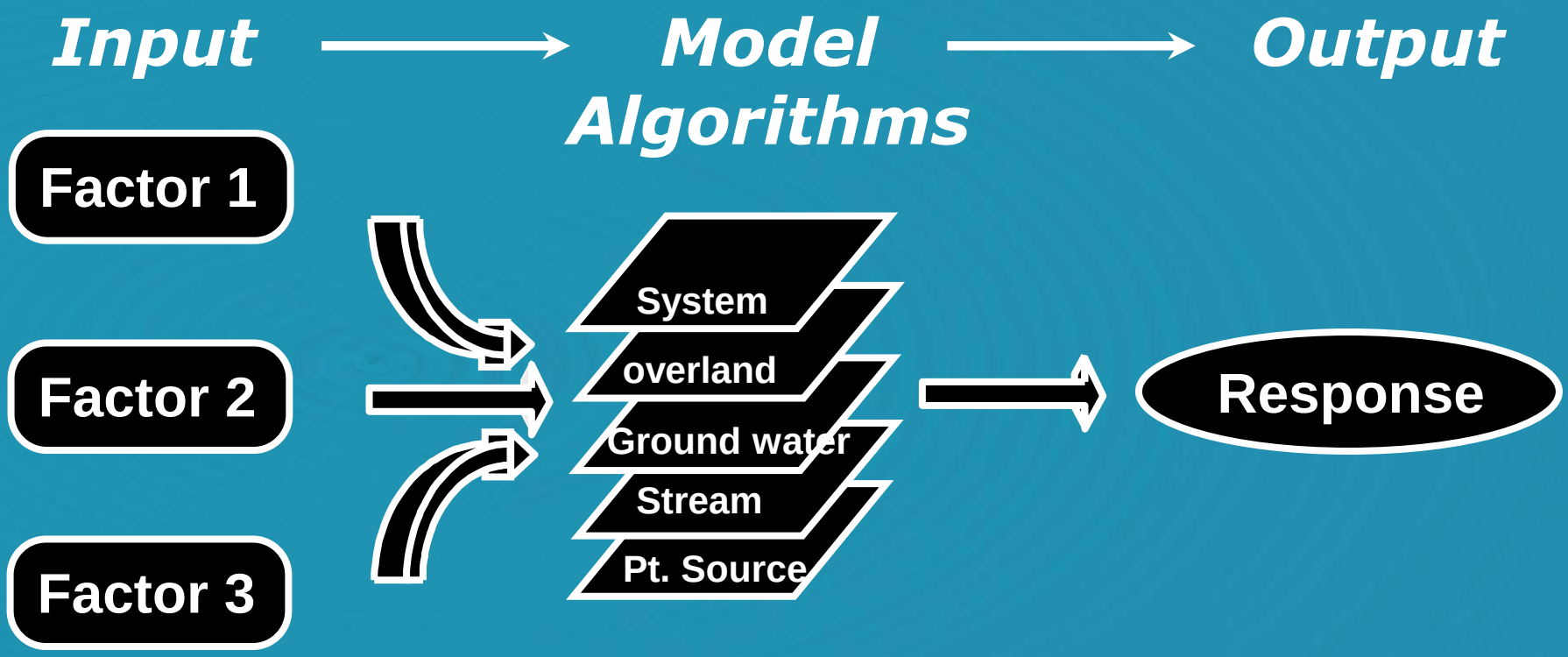
Reservoir Water Quality

Comparison within Reservoir



Modeling Approach

Overview

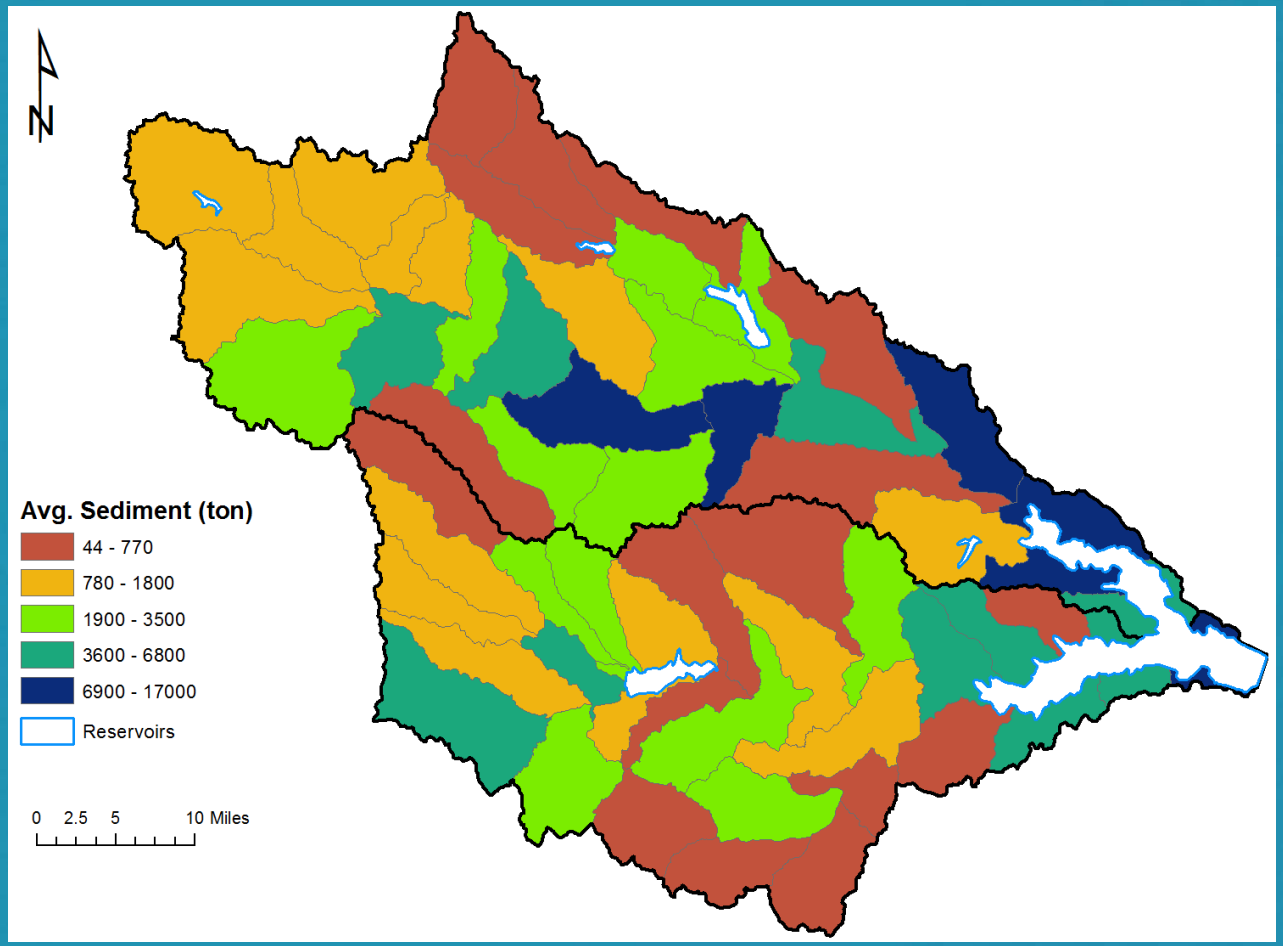


Estimated Sediment Loads

Summary 1989 - 2015

	Sediment (metric tons)	Total N (Kg)	Total P (kg)
Total Chambers	**37,615,985**	**70,551,410**	**27,464,142**
Annual rate	1,297,103	2,432,808	947,040
Yield tons/ha	**0.14**	**0.26**	**0.10**
Total Richland	**24,229,057**	**46,829,282**	**25,999,163**
Annual rate	835,485	1,614,803	896,523
Yield tons/ha	**0.08**	**0.15**	**0.09**
Grand Total	**61,845,042**	**117,380,692**	**53,463,305**
Annual rate	2,132,588	4,047,610	1,843,562
Yield tons/ha	**0.11**	**0.21**	**0.09**

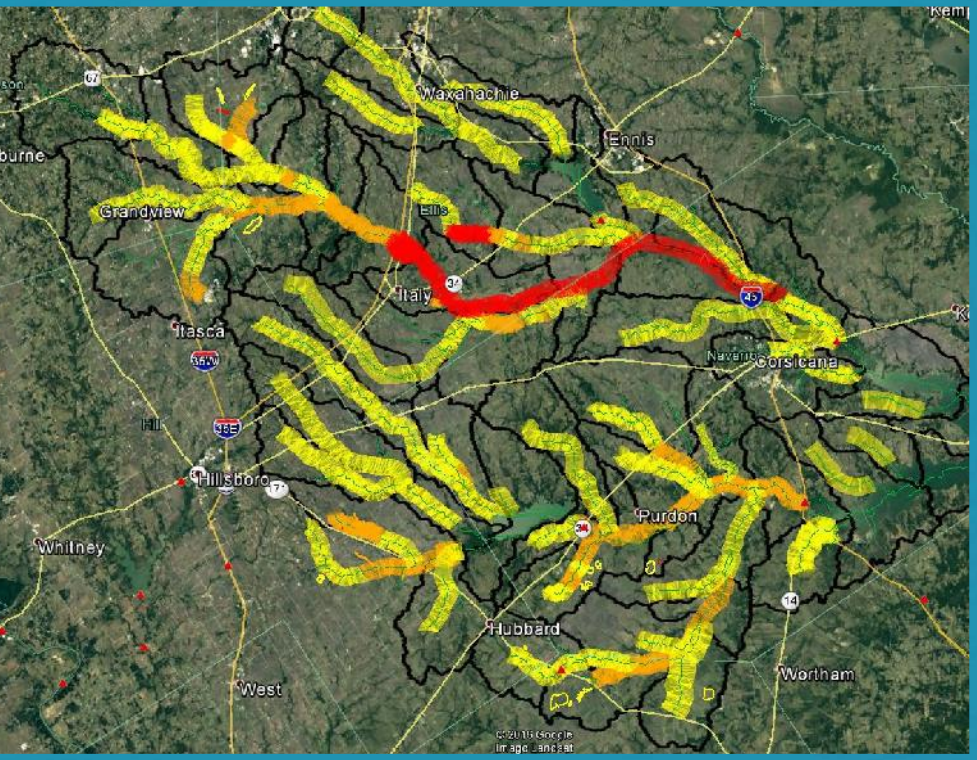
Estimated Sediment Loads



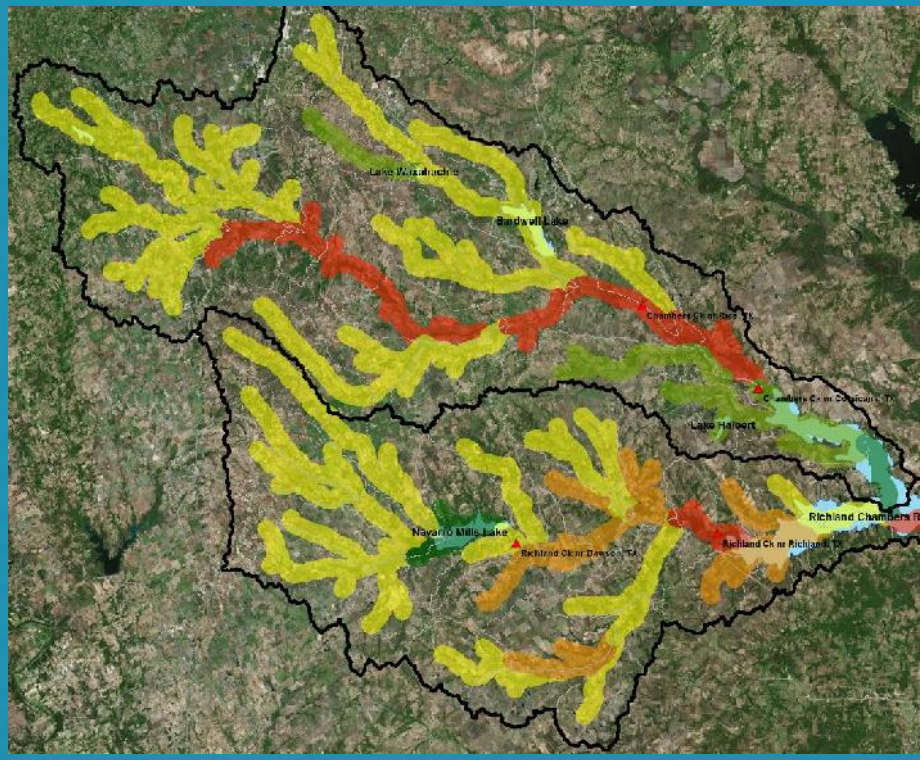
Identification of subwatersheds by sediment contributions.

Channel Erosion

Studies indicate more severe channel erosion in Chambers Creek subwatershed.



Baylor University study

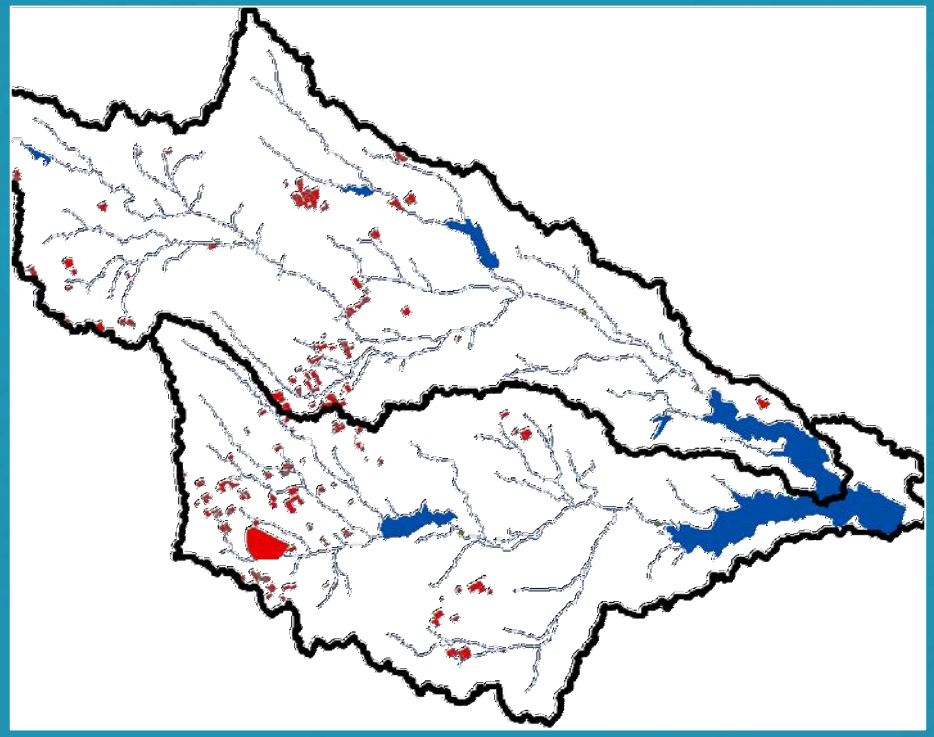


SWAT Estimates

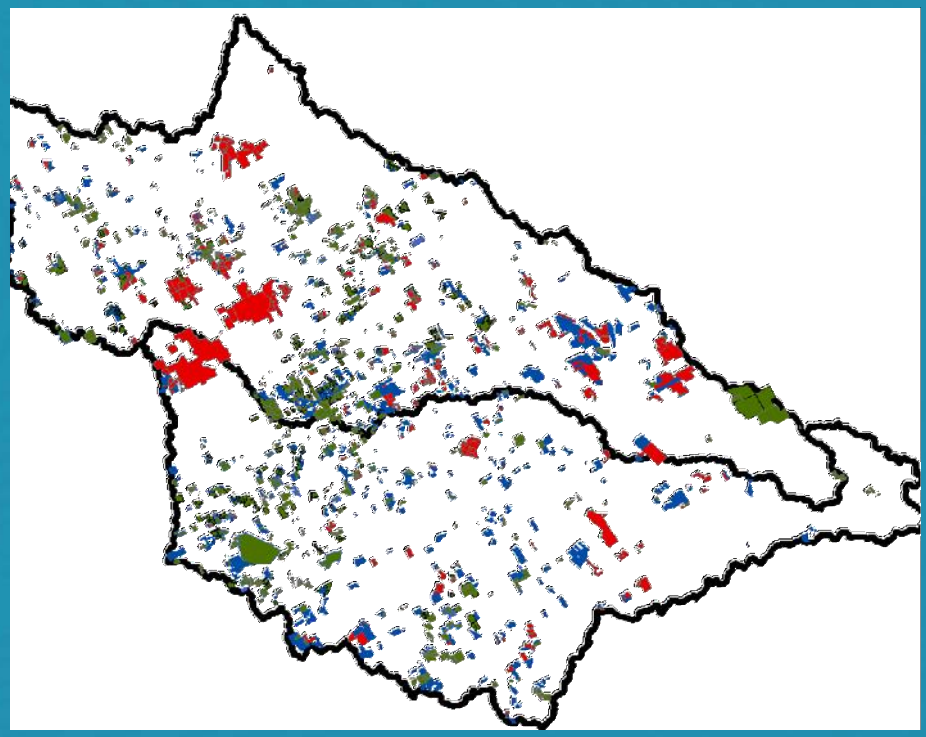
Existing Conservation Practices

Practices applied on 20% of watershed since 2003

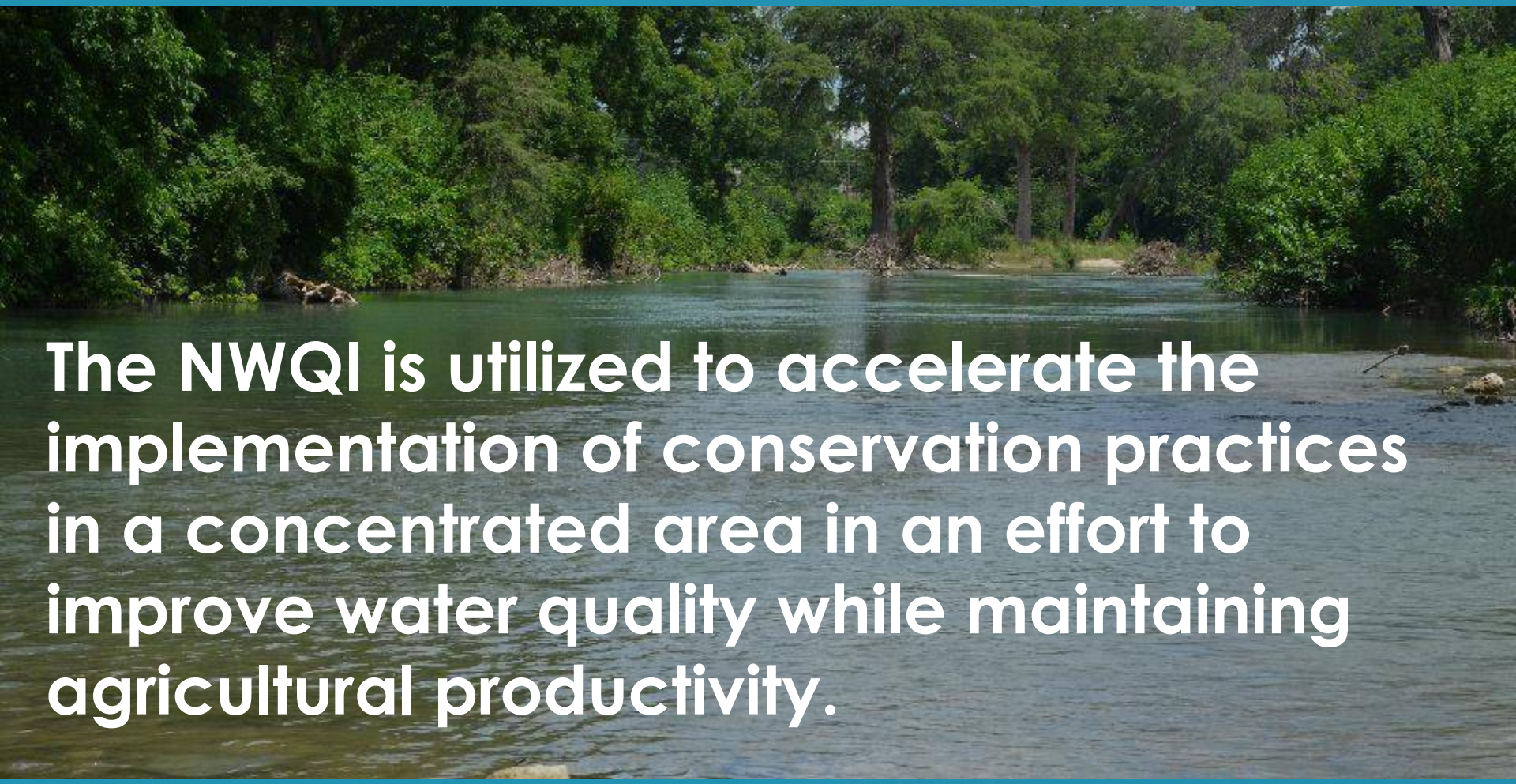
Structural Practices on 1% of watershed



Non Structural Practices on 19% of watershed



National Water Quality Initiative (NWQI) Chambers Creek



The NWQI is utilized to accelerate the implementation of conservation practices in a concentrated area in an effort to improve water quality while maintaining agricultural productivity.

Chambers Creek NWQI Highlights 2012 -2016

- NRCS funded over 120 contracts with over 100 individual landowners and land managers.
- Over 75 practices were applied.

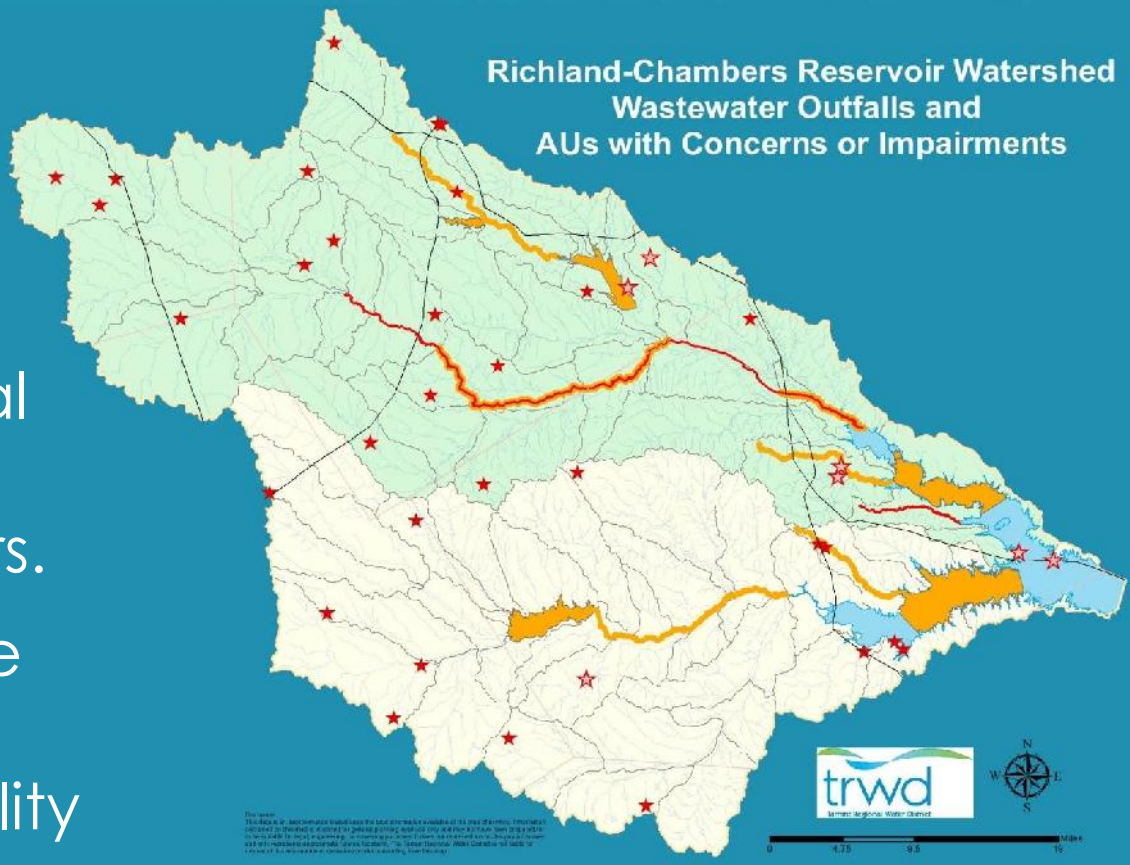
Water quality-related conservation practices enhance agricultural profitability through reduced input and enhanced soil health, which results in

- **Higher soil organic matter**
- **Increased infiltration**
- **Increased water-holding capacity**
- **Improved nutrient cycling.**

Point Source Evaluation

Overview

- Assess
  - current load,
  - permit limits,
  - annual variability.
- Used to estimate total nutrient loads to streams and reservoirs.
- Assess BMPs available for maintaining and improving water quality
- Cost considerations



Economic Study of BMPs

Overview

- Historic Use of BMPs in Watershed
- Estimation of Adoption Rates
  - Current,
  - Potential
  - Most Likely
- Ranking of BMPs
  - least cost for load reduction
- Identify suite of BMPs to reach project goal
- Establish Cost Estimates for Least Cost Solution

Richland-Chambers Watershed Partnership

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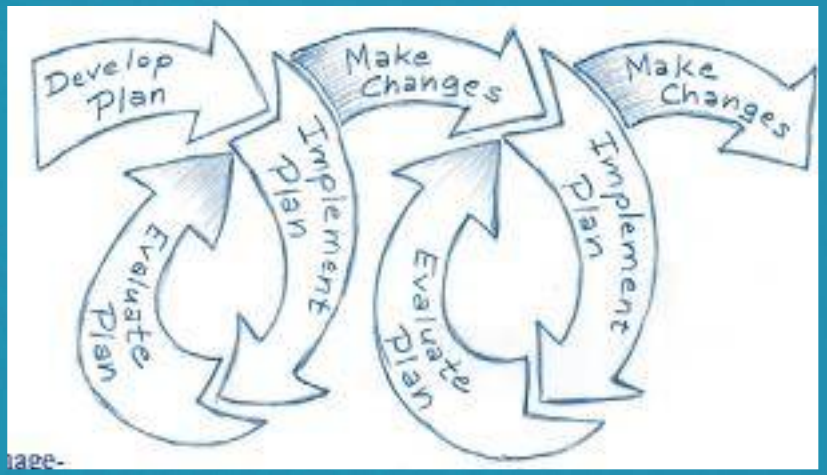
Developing Water Quality Goals

TINA HENDON, TRWD

Watershed Protection Planning

Steps to Effective Watershed Management

1. Build partnerships
2. Characterize your watershed
3. Establish goals & identify solutions
4. Develop an implementation program
5. Implement your plan
6. Measure progress & make adjustments



The outcomes of this process are documented or referenced in a watershed plan.

Developing Goals

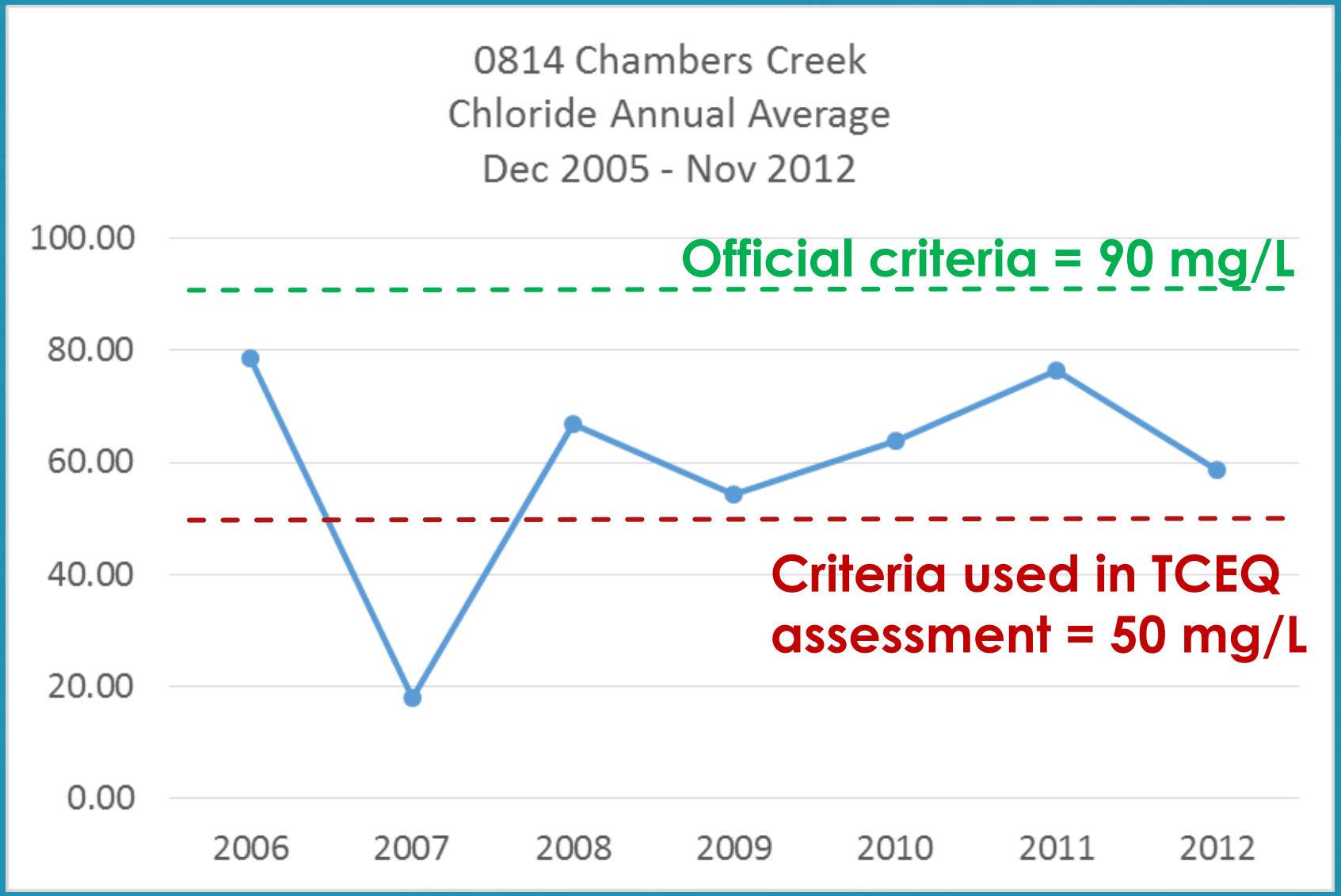
Prioritize Efforts

1. Evaluate TCEQ assessment methods.
2. Evaluate underlying data.
3. Evaluate appropriateness of criteria assigned to the waterbody.
4. Recommend other actions for those with uncertainty, e.g. more data or change of standards.
5. Develop WPP goals around waterbodies with certainty.

Developing Goals

Name	Status	Parameter	Are Data Adequate?
STREAMS			
Chambers Creek	Impaired/5c	chloride	Yes
	Concern	chlorophyll-a	Yes
	Concern	chlorophyll-a	No
	Concern	dissolved oxygen	No
	Concern	total phosphorus	No
	Concern	nitrate	Yes
Richland Creek	Concern	chlorophyll-a	Yes
	Concern	dissolved oxygen	Yes
Grape Creek	Concern	dissolved oxygen	No
Post Oak Crk	Concern	dissolved oxygen	No
Cedar Creek	Impaired/5b	dissolved oxygen -avg	No
	Concern	dissolved oxygen -grab	No
LAKES			
Navarro Mills	Concern	dissolved oxygen	Yes
Lake Waxahachie	Concern	chlorophyll-a	Yes
Richland-Chambers	Concern	chlorophyll-a	Yes

Developing Goals



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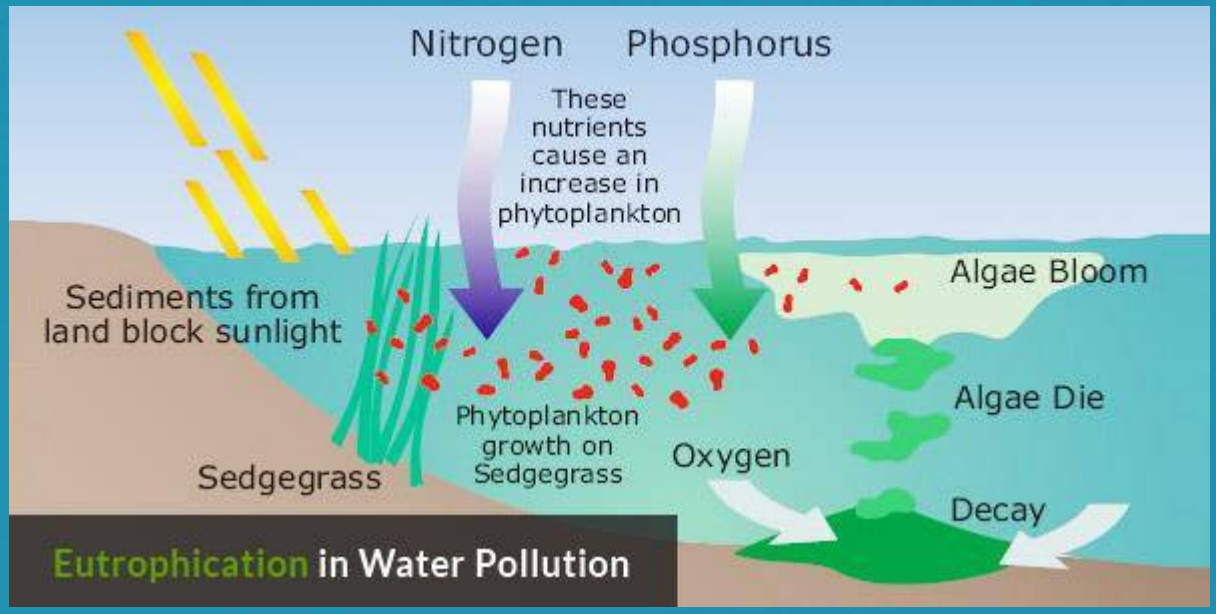
Developing Goals

Refine Parameters

↑ Nutrients =	↑ Chlorophyll-a =	↓ Oxygen
Chambers Creek	Chambers Creek Richland Creek Lake Waxahachie Richland-Chambers	Richland Creek Navarro Mills Lake



Developing Goals

Selecting an Approach

Protection – Actions designed to prevent new or continued degradation of water quality, typically when no regulatory issues exist.

Restoration = Actions designed to change water quality to meet a pre-determined level or threshold, typically state water quality standards.

Developing Goals

Goal Statement(s) indicate whether the approach is restoration and/or protection.

> Lower Nueces River WPP: "Partnership stakeholders developed a primary goal for the WPP that included (at a minimum) meeting the appropriate water quality standards established for bacteria to ensure safe contact recreation."

Water Quality Target(s) translate the goal into measurable outcomes.

> Lower Nueces River WPP: The goal over the next ten years is to reduce the E. coli geometric mean by 14.5%.

Developing Goals

- **Goal Statement** (Protection)

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

- **Goal Statement** (Restoration)

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

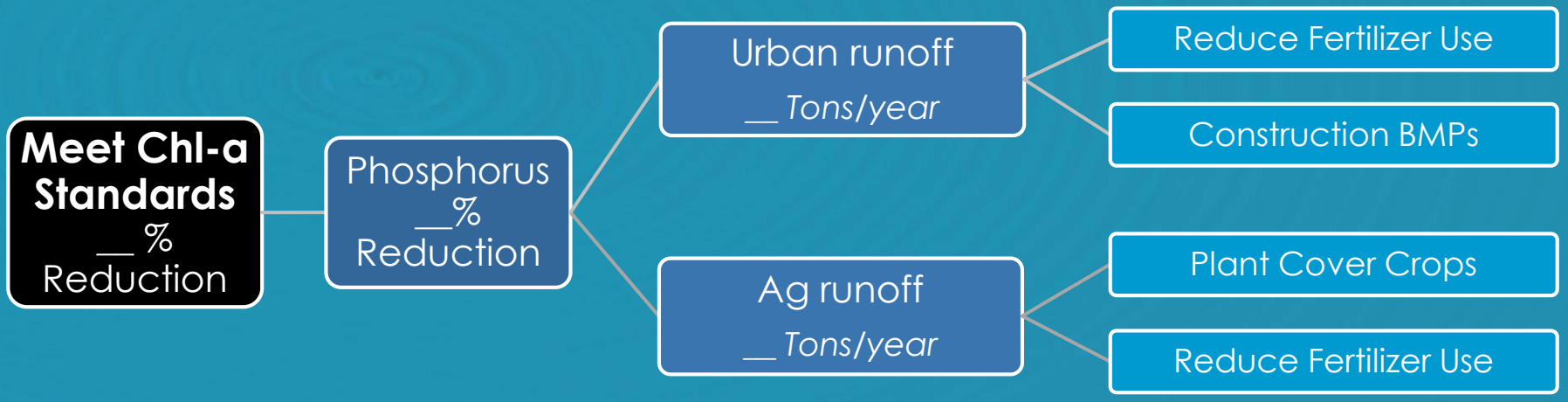
  - **Water Quality Target** *(specific to each water body)*

  … reduce the effects of eutrophication in the watershed by reducing [***parameter***] by ***X%*** over the next ***XX*** years.

Hypothetical

Next Steps…
Translating Goals into Practices

Goals & WQ Targets → **Pollutant Load Reductions** → **Management Objectives** → **Management Practices**



Hypothetical

Richland-Chambers Watershed Partnership

Stakeholder Meeting
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Richland-Chambers Watershed

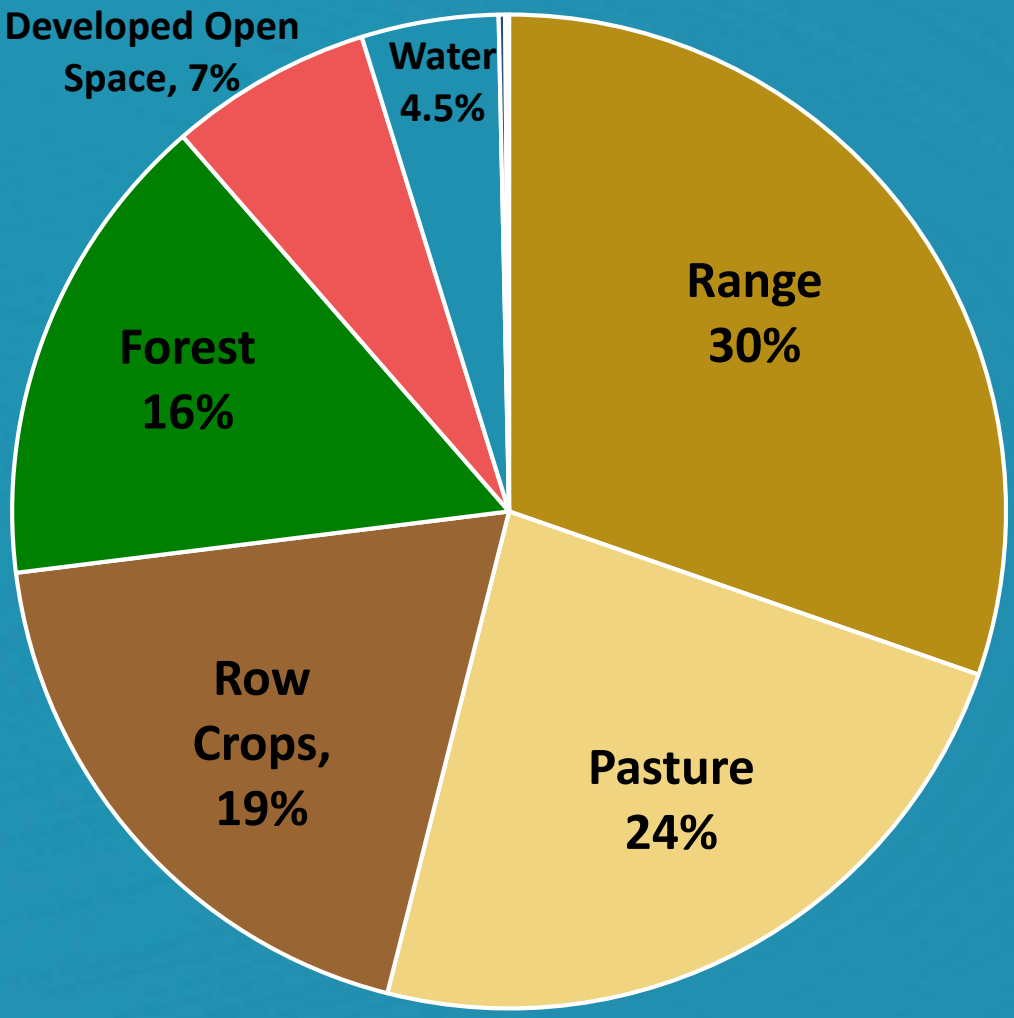
Issues of Concern

- Excess Nutrients
  - Phosphorus
  - Nitrogen
- Sedimentation
- Run-off

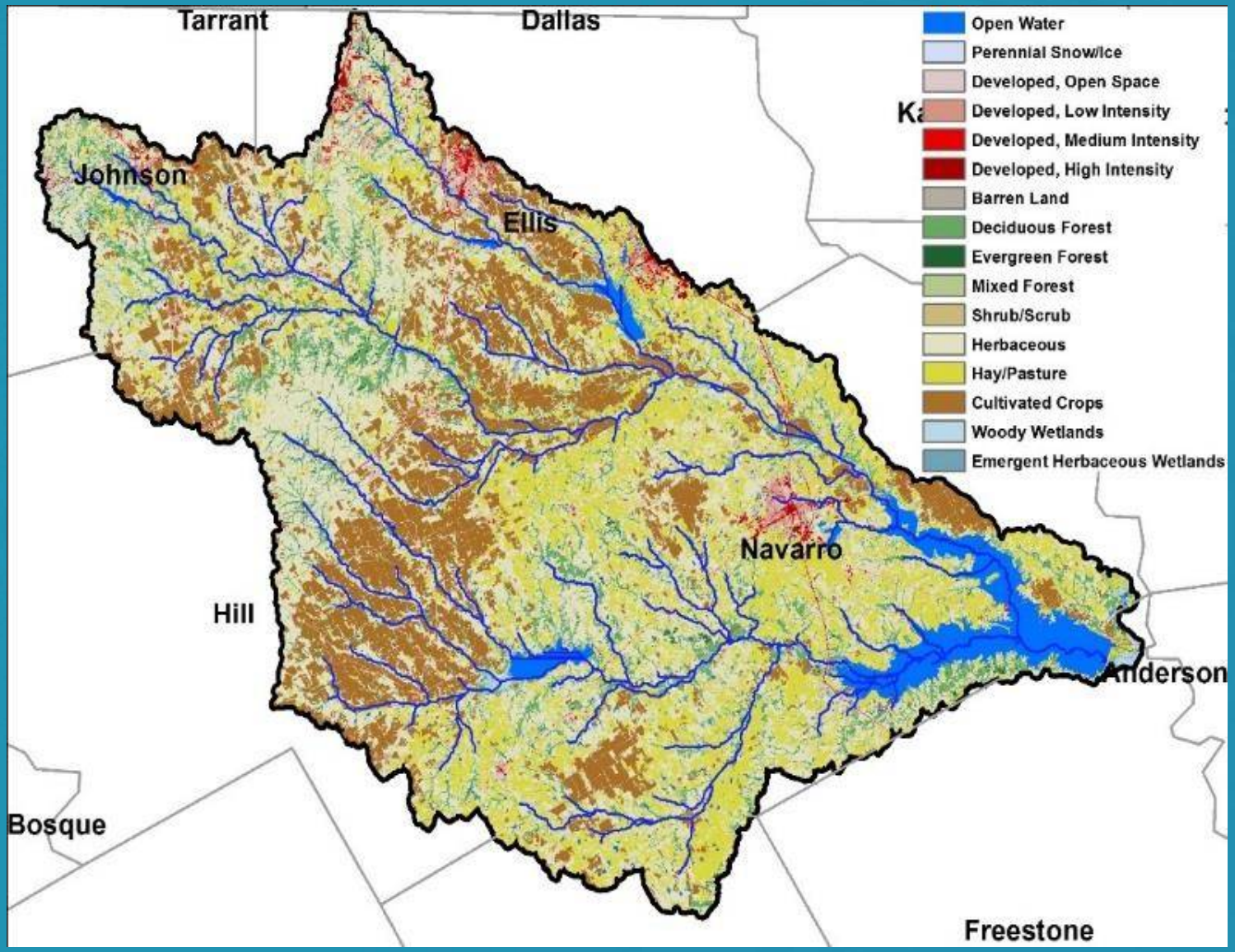
Richland-Chambers Watershed

Source Categories

- Agricultural/Rural
- Urban
- Wastewater



Richland-Chambers Watershed



Agricultural and Rural Best Management Practices

Agricultural Best Management Practices

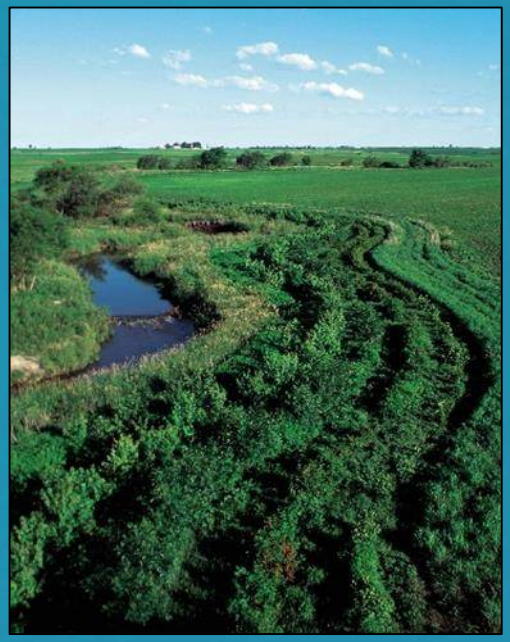
- Implementation of structural or behavioral practices to reduce loadings of sediment or nutrients into watersheds
  - Cropland
  - Pasture and Rangeland

Cropland BMP's

- Filter Strips
- Contour Farming
- Terracing
- Grassed Waterways
- Crop Residue Management
- Cropland Conversion to Pasture
- Fertilizer/ Nutrient Management

Filter Strips

- Vegetation filter strips work to prevent erosion and absorb nutrients



Contour Farming

- Uses the natural landscape as a method of retaining nutrients and sediment

Terracing

- Allows crops to grow with the natural landscape with minimal soil disruption

Grassed Waterway

- Allow for the retention of sediment and nutrients within the crop area

Crop Residue Management

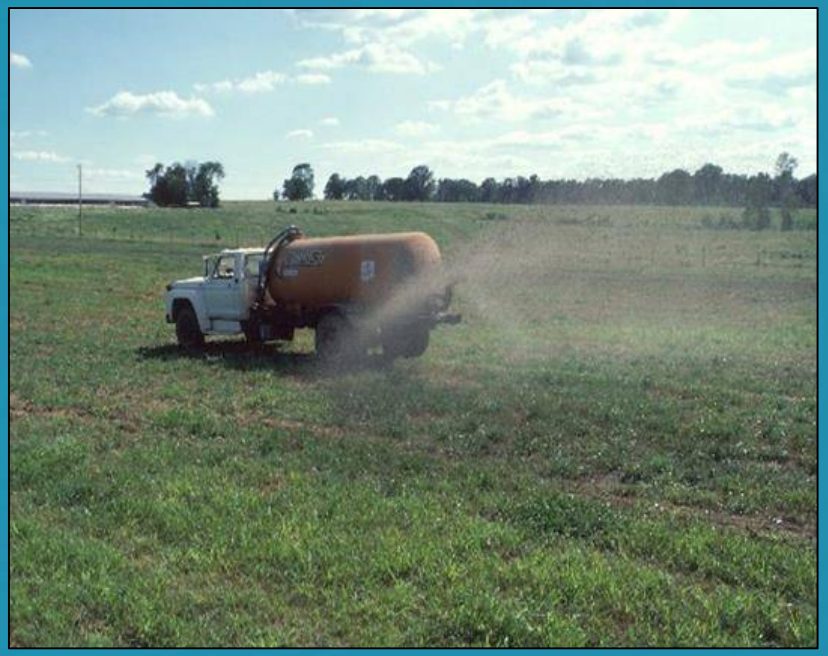
- Tillage is minimized to allow for retention of nutrients in soil

Cropland Conversion to Pasture

- Conversion of cropland to pasture decreases the need for nutrients and stabilizes top soil and ground cover

Nutrient Management

- Precision application of fertilizers prevent excess nutrients from entering the watershed



Pasture and Rangeland BMP's

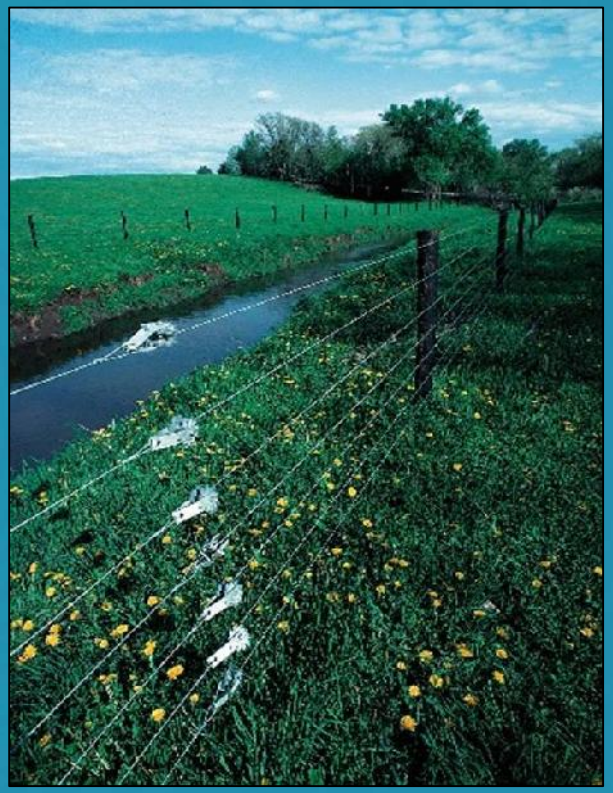
- Prescribed Grazing
- Fencing
- Water Facility
- Fertilizer/ Nutrient Management
- Pasture Planting
- Range Planting
- Grassed Waterway
- Riparian Buffer strips

Prescribed Grazing

- Grazing rotation allows for retention of ground cover, nutrients, and soils

Fencing

- Prevents livestock from entering sensitive riparian areas



Water Facility

- A water tank centered at the confluence of four pastures allows for rotation grazing

Pasture Planting

- Utilization of native grasses allow for a more hearty ground cover reducing run-off of sediment and nutrients

Range Planting

- Supplementing range cover prevents degradation of lands and soils

Grassed Waterway

- Allow for the retention of sediment and nutrients within the crop area

Riparian Buffer Strips

- Maintain vegetative cover near stream beds and drainages to reduce erosion and nutrient runoff into the watershed

Other Rural Best Management Practices

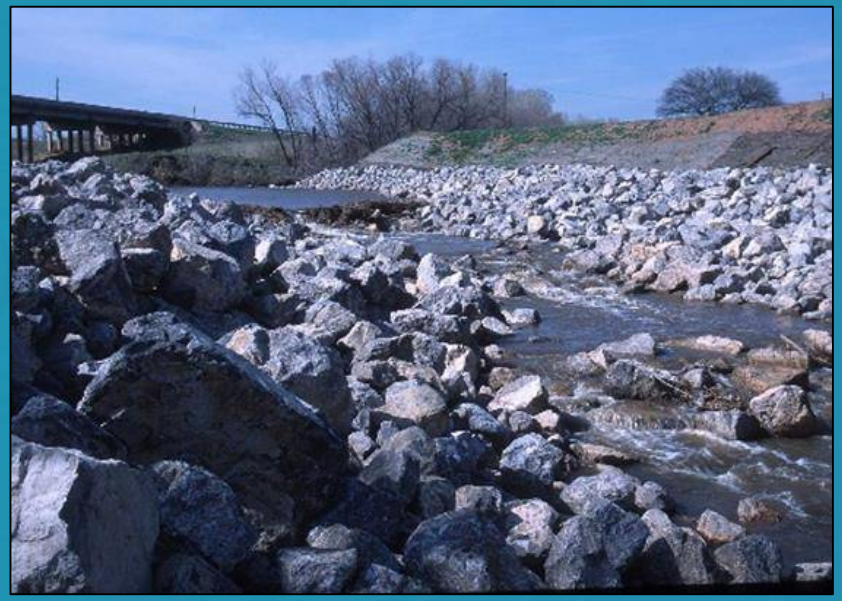
- Structural or behavioral practices to reduce loadings of sediment or nutrients within the watershed
  - Sediment Basins
  - Channel Stabilization
  - Streambank Protection
  - Grade Stabilization
  - Wetlands

Sediment Basins

- Sediment basins allow for the collection of sediments and prevent further flow into the watershed

Channel Stabilization

- Stabilization structures reduce erosion and sedimentation of streams and channels



Streambank Protection

- Vegetation or constructed mechanism to prevent streambanks from degradation

Wetland Creation/Protection

- Wetlands within the watershed serve as natural filters of sediment and nutrients

Grade Stabilization Structures

- Maintain structure of reservoir by preventing erosion of grades

Urban Best Management Practices

Urban Best Management Practices

- Municipal and County Ordinances
- Construction Site Management
- Sand Filter
- Detention Ponds
- Illegal Dumping Prevention
- Septic System Maintenance
- Residential Fertilizer Management
- Rainwater Harvesting
- Bioswales/Rain Gardens
- Porous Pavement
- Pet Waste Management
- Soil Testing
- Constructed Wetlands

Municipal and County Ordinances

- Ordinances that work to require public and private entities to reduce or eliminate the discharge of pollutant substances into watersheds, limit sedimentation from development projects, or mandate licensing or education for those who handle nutrients or pesticides.

Construction Site Management

- Seed Roadways and Dirt Piles
- Construction Sediment Control
- Permeable Paving Surfaces
- Storm Drain Blockage

Sand Filters

- Sand filters trap sediment keeping it out of storm drains

Detention Ponds

- Detention ponds trap excess run off to prevent flooding excess stormwater from entering watershed

Illegal Dumping Prevention/Clean up

- Enforcement of anti dumping laws and clean up programs assist in keeping watersheds clean

Septic System Maintenance

- Maintaining septic systems prevents the entry of bacteria and nutrients into stormwater run-off

Residential Fertilizer Management

- Controlling amounts of lawn fertilizer and lawn clippings
- Prevents the runoff of nutrients and vegetation into storm drains

Rainwater Harvesting

- Can prevent flooding and erosion
- Additional water supply
- Slows run-off and allows water to infiltrate into the ground

Bioswales/Rain Gardens

- Swales constructed in low-lying areas slow runoff and encourage groundwater infiltration. Rain gardens detain run-off and allow for infiltration.

Porous Pavement

- Porous pavement is a permeable surface that allows infiltration of stormwater.

Pet Waste

- Picking up yards and parks prevents stormwater from passing over pet waste and picking up bacteria and nutrients

Soil Testing

- Determines soil type, texture, pH and nutrient content of urban soils to determine what actions are needed

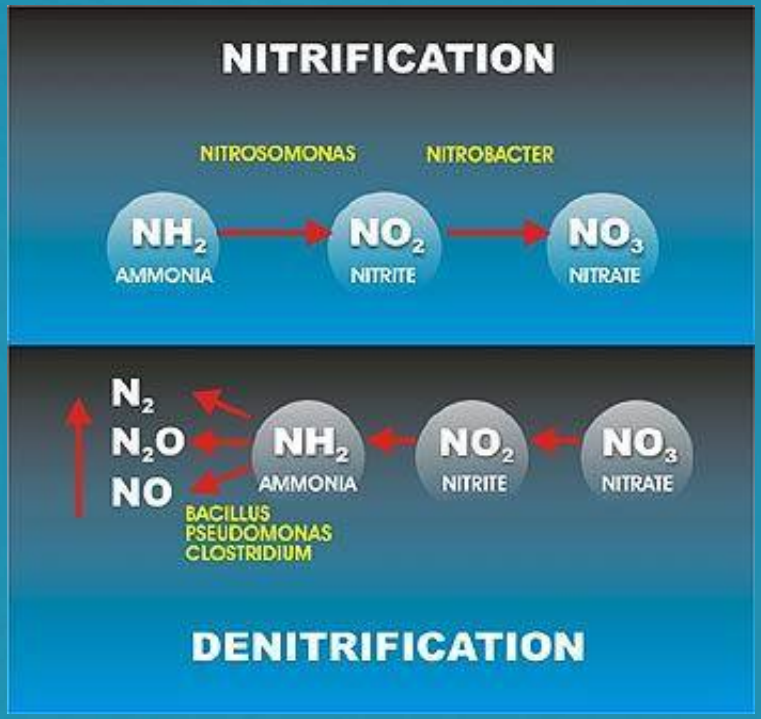
Constructed Wetlands

- Constructed wetlands retain stormwater and provide a natural filter and wildlife habitat

Wastewater Treatment Practices

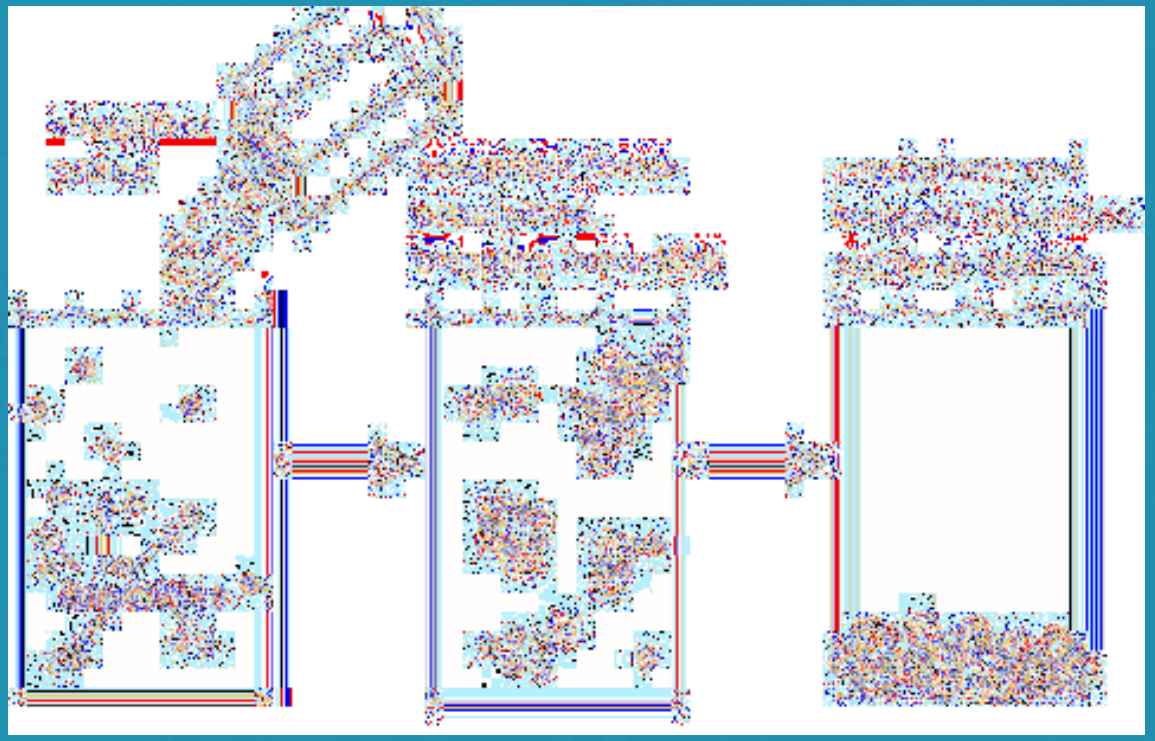
Nitrogen Removal

- Nitrification: Conversion of ammonia to nitrite and ultimately nitrate
- Denitrification: Conversion of nitrate to nitrogen gas. The process reduces total nitrogen as well as removes suspended solids from the effluent.



Phosphorous Removal

- Chemical precipitation with alum
- Filtration for particulate phosphorus



Richland-Chambers Reservoir Watershed Protection Plan
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EDUCATION AND OUTREACH WORKGROUP

OBJECTIVE: Develop draft, prioritized list of practices and actions to be considered for further analysis and potential inclusion in the watershed protection plan. Practices and actions should focus on reducing sediment, nutrients, and associated pollutant loads to streams and reservoirs in the Richland-Chambers watershed.

DISCUSSION QUESTIONS

1. What are the biggest challenges to an education and outreach campaign to protect or restore water quality in the Richland-Chambers watershed?

_____

_____

2. What outreach or education efforts are already being conducted in the watershed? What are the target audiences, and who is doing this work?

_____

_____

3. How should the demographics of the Richland-Chambers Watershed population affect our education and outreach strategy?

_____

_____

4. How would you define a successful campaign around water quality?

_____

_____

6. What education and outreach activities or programs would you recommend for various target audiences to protect or restore water quality in the Richland-Chambers watershed? *Rank your list.*

_____

_____

5. For each activity or program listed above, what approach do you believe will be most effective? Examples could be workshops, demonstrations, media campaigns, printed flyers, etc.

_____

_____

Richland-Chambers Reservoir Watershed Protection Plan
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Target Audience	Message or Program	Priority	Approach
Example: *All Watershed Stakeholders*	*What is a watershed?*	*1*	*Fact sheets & printed materials*
Example: *Homeowners Associations*	*Lawn fertilization and landscape management.*	*2*	*Clinics and workshops.*

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RURAL AND AGRICULTURAL WORK GROUP

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DISCUSSION QUESTIONS

1. What do you believe are the biggest physical challenges to managing rainfall runoff from rural areas in the Richland-Chambers watershed? Why?

   _____

   _____

2. Which conservation or best management practices are more likely to be well received and most likely to be adopted by owner-producers in the Richland-Chambers Watershed? By tenant-producers? *Rank your list of practices*.

   _____

   _____

3. What conservation or best management practices are more likely to be rejected by owner-producers? By tenant-producers?

   _____

   _____

4. What can be done to steer landowners and agricultural producers toward adopting practices that help to improve water quality? (Education/Outreach)

   _____

   _____

Richland-Chambers Reservoir Watershed Protection Plan
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Practice	Priority (rank)	Notes
Example: Prescribed grazing	*1*	*Education on proper use of this practice is key to success.*
Example: Riparian restoration	*2*	*More incentive is needed.*

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   _____

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Richland-Chambers Reservoir Watershed Protection Plan
Stakeholder Meeting
May 24, 2017

Practice	Priority (rank)	Notes
Example: Prescribed grazing	*1*	*Education on proper use of this practice is key to success.*
Example: Riparian restoration	*2*	*More incentive is needed.*