North Central Texas Water Quality Project

Richland-Chambers Reservoir Watershed Protection Plan
Stakeholder Meeting
Ennis Chamber of Commerce Conference Room, Ennis, Texas

AGENDA

Monday, September 11, 2017

6:00 Sign-in

6:15 Welcome and Introductions, Recap of WPP Activities
Clint Wolfe, Texas A&M AgriLife Research

6:25 Project Goals and the Integrated Report
Tina Hendon, Tarrant Regional Water District

6:35 Water Quality Modeling Update
Tina Hendon, Tarrant Regional Water District

6:45 BMPs and Economic Analysis update
Clint Wolfe, Texas A&M AgriLife Research

7:15 Stream Channel and Restoration Projects
Stephanie Coffman, Sr. Geomorphologist, STANTEC

7:45 Discussion
- Timeline and Next Steps in WPP Development
- Time and Objectives for Next Meeting

8:00 ADJOURN

Richland-Chambers Watershed Partnership

Stakeholder Meeting
September 11, 2017

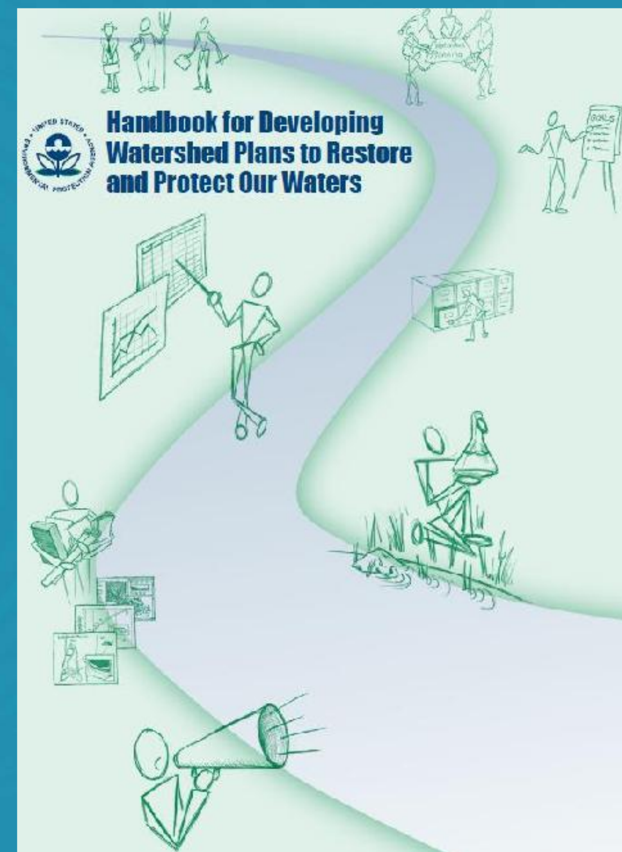
Welcome and Introductions

Status of Watershed Planning Activities

Watershed Protection Plans

Nine Elements of a Successful Watershed Plan

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



Project Goals and TCEQ's Integrated Report

TCEQ's Integrated Report

Biennial Assessment of Water Quality in Texas

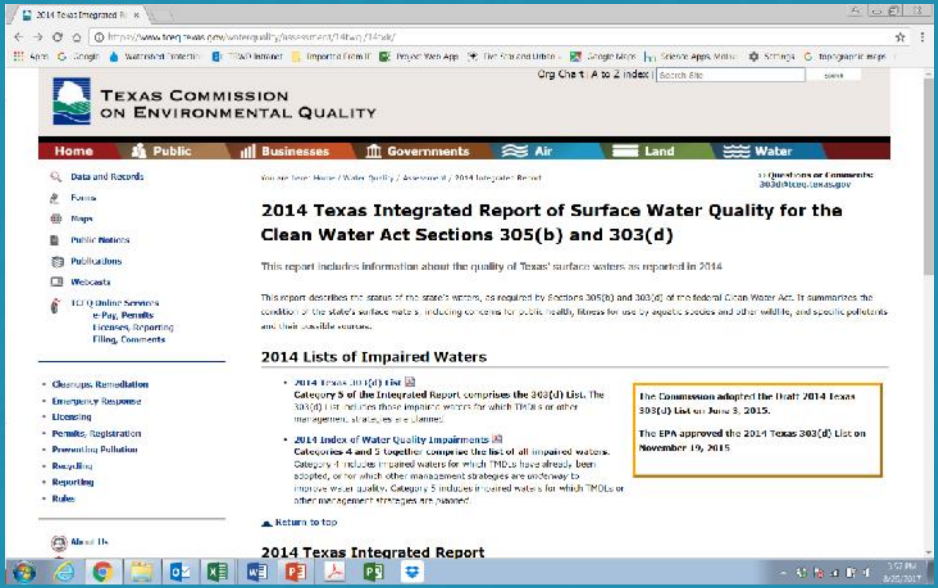
Required under the Clean Water Act

Public comment, EPA approval.

Data from TCEQ and other monitoring programs.

Based on criteria in state Water Quality Standards

Assessment period =7-10 yrs)



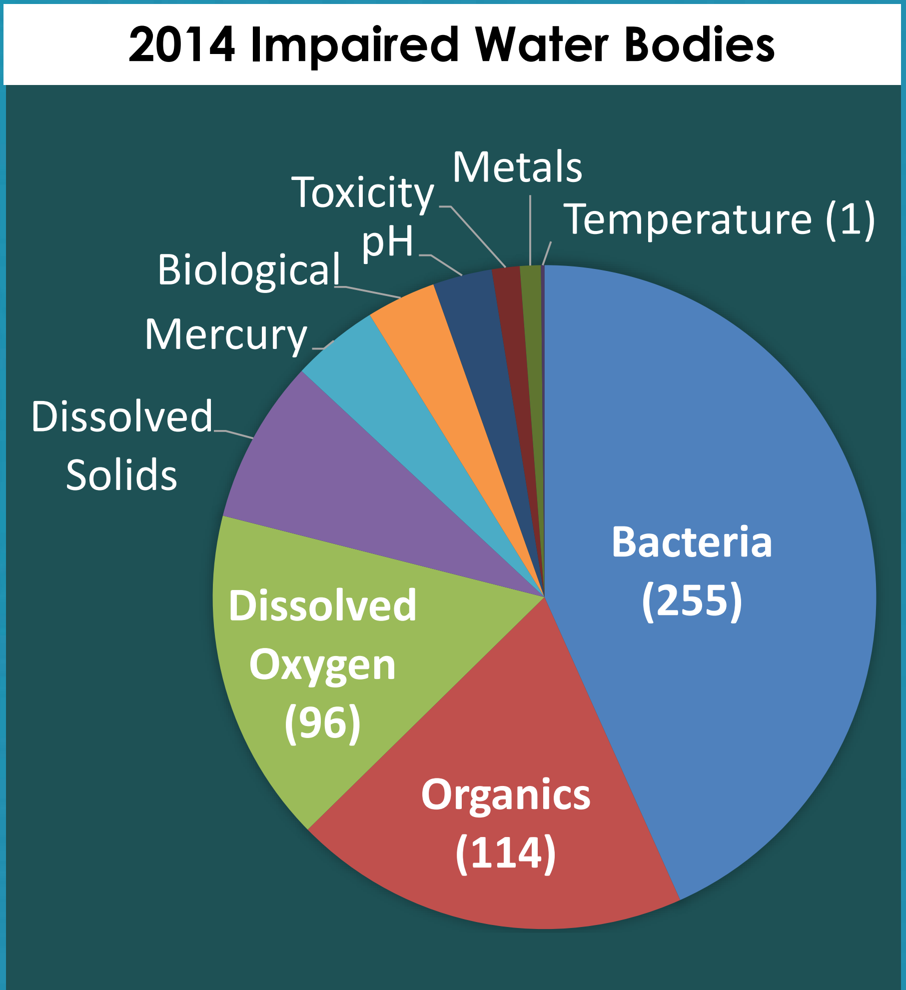
TCEQ's Integrated Report

Biennial Assessment of Water Quality in Texas

Impairment if data exceeds an EPA-approved criterion.

Concerns if data nearing EPA-approved criteria

Concerns if exceeds screening level (no approved criteria)



Water Quality Goals for the Richland-Chambers Watershed

- **Goal Statement** (Protection)

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

- **Goal Statement** (Restoration)

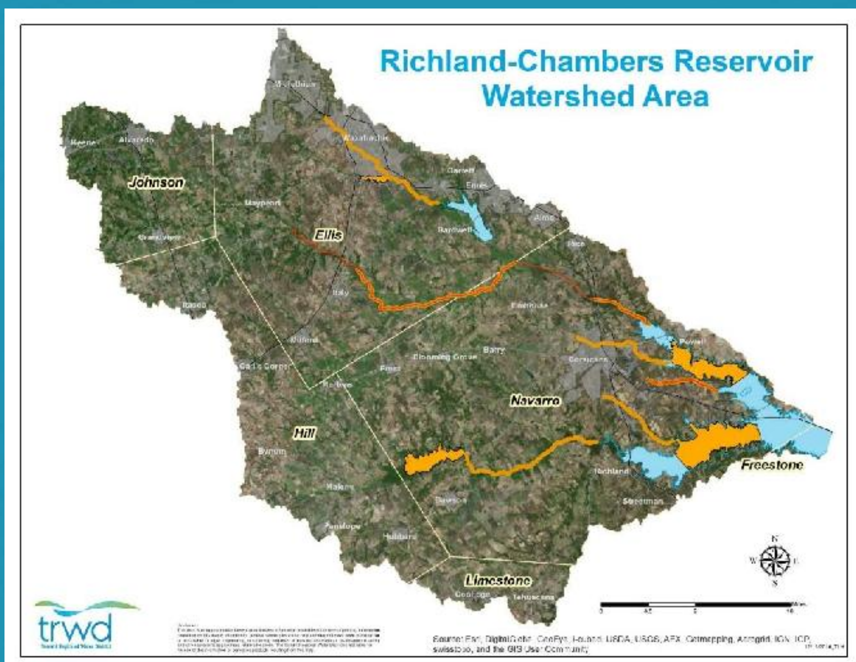
  … streams and reservoirs in the Richland-Chambers reservoir meet appropriate water quality standards.

  - **Water Quality Target**

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

Water Quality Goals

Ensure that investments are put where they're needed.



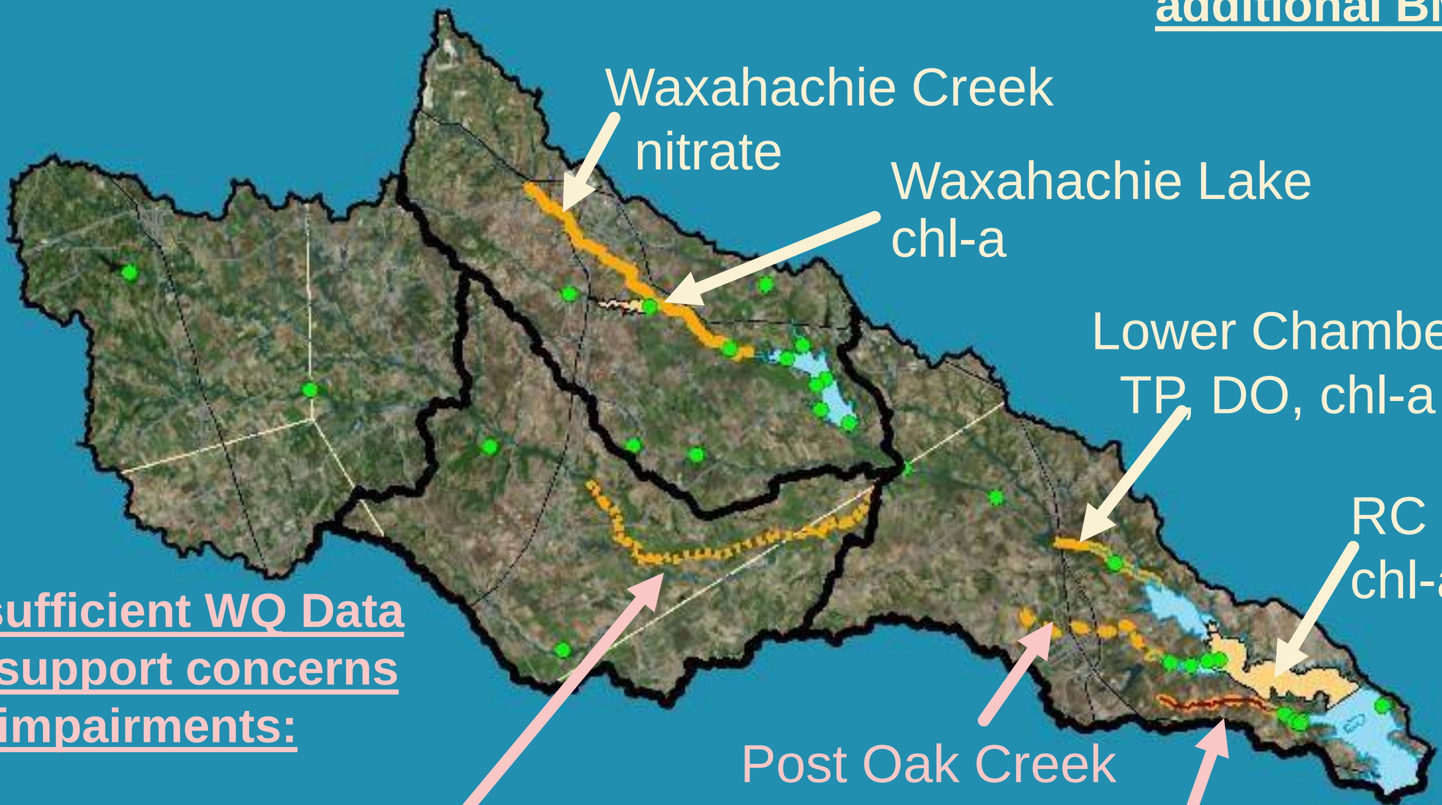
Determine which waters need improvement.

Identify segments

- with sufficient data
- assessed using correct criteria
- with properly assigned regulatory standards

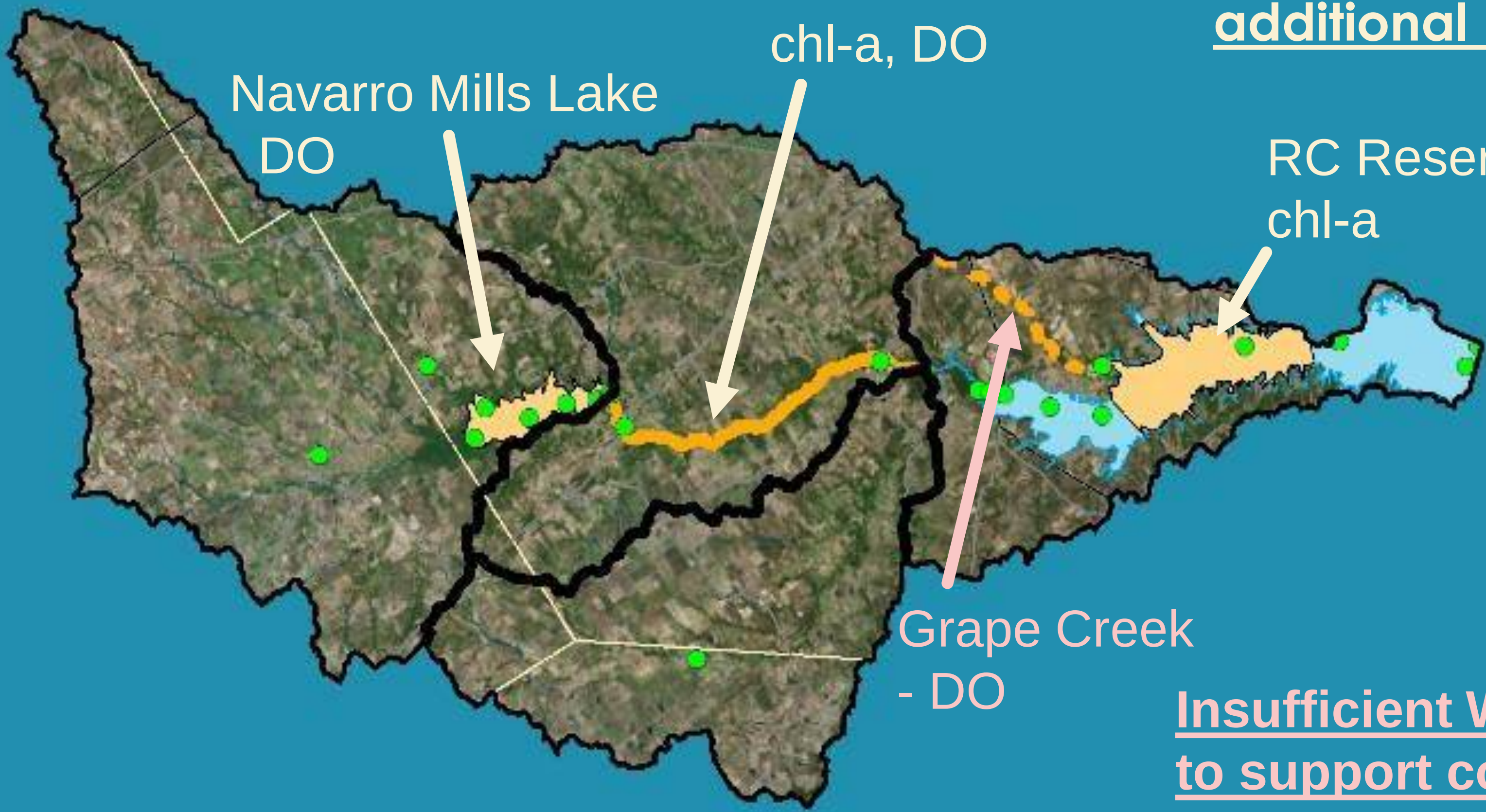
Water Quality Status

Chambers Creek Subwatershed



Water Quality Status

Richland Creek Subwatershed



Segments where concerns may be addressed through additional BMPs

Insufficient WQ Data to support concerns:

Next Steps

- Finalize calibration of models.
- Identify cost-effective land management practices with water quality benefits.
- Estimate load reductions and potential water quality improvements of future land management practices.
- Prioritize sub-basins and waterbodies with greatest need and potential for improvement.

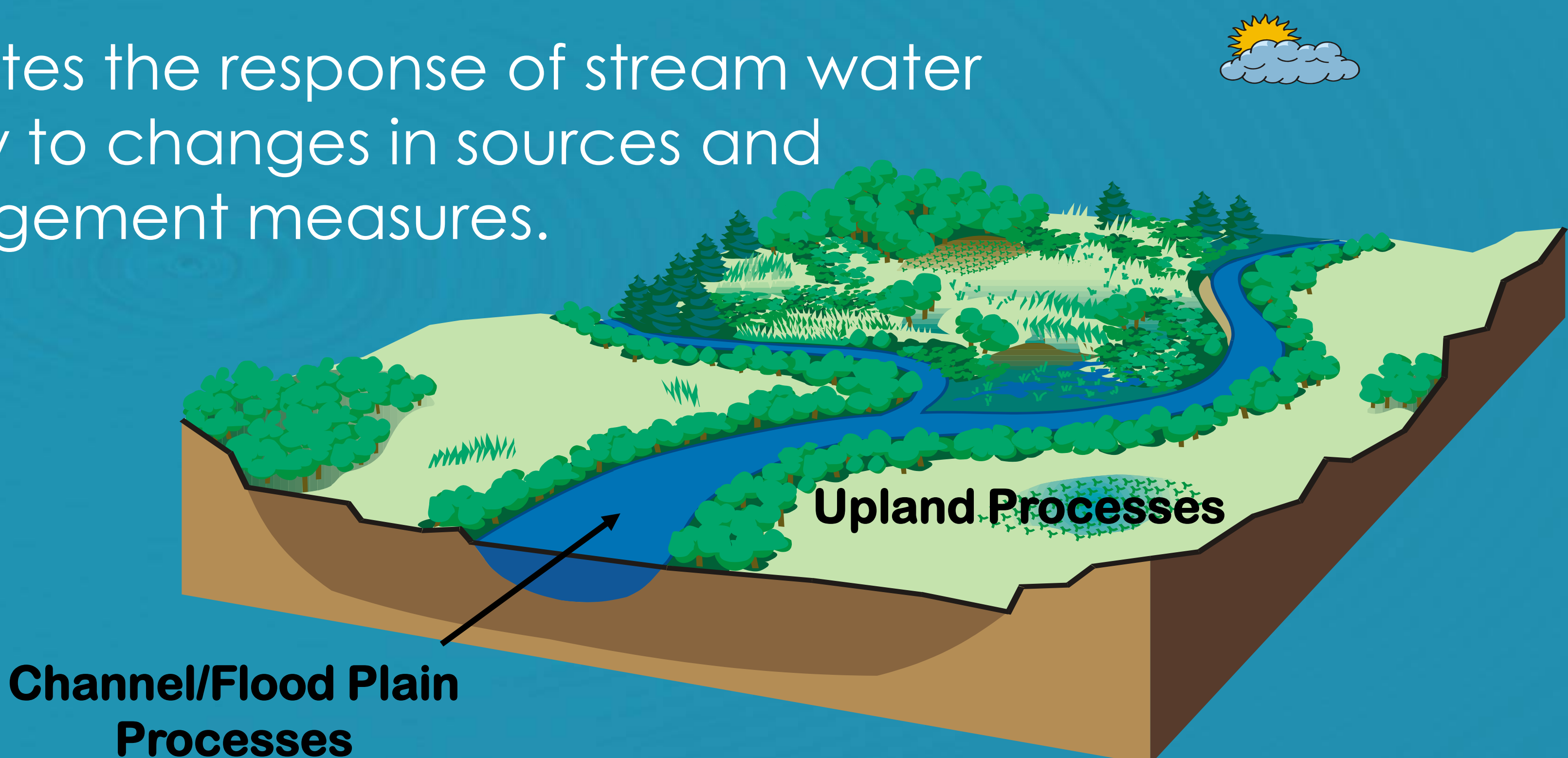
Status of Modeling Activities

Water Quality Modeling

SWAT Watershed Contributions

Estimates contributions of nutrients and sediment from various watershed sources.

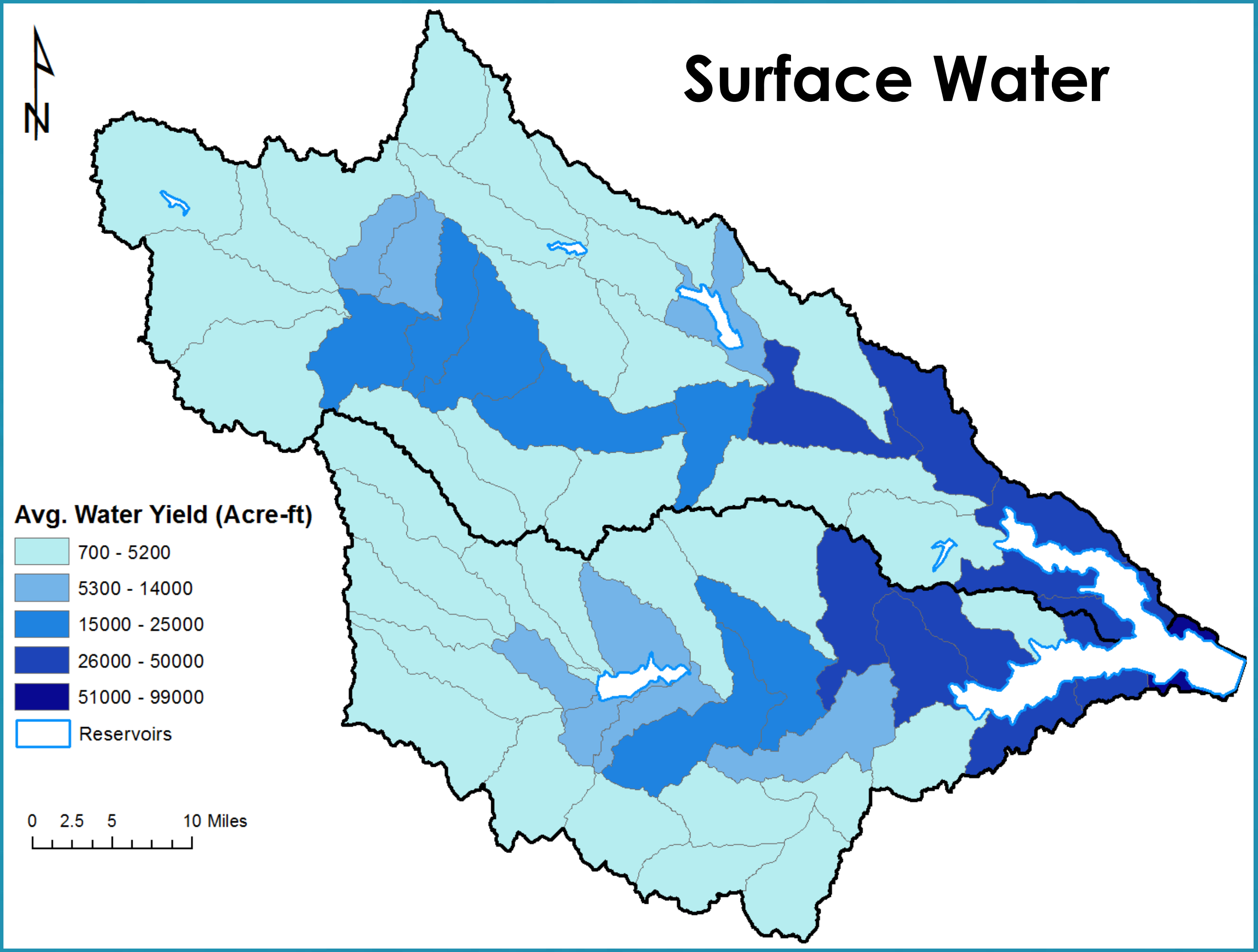
Estimates the response of stream water quality to changes in sources and management measures.



Water Quality Modeling

SWAT Estimates (1987 – 2015)

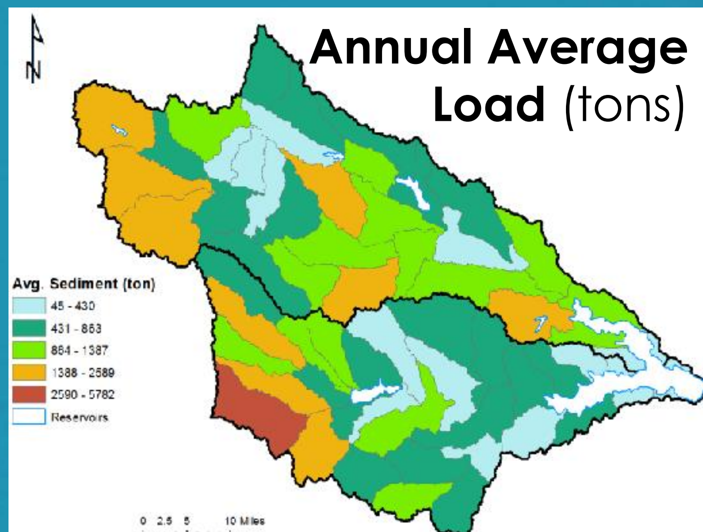
Average Annual Yield (ac-ft)

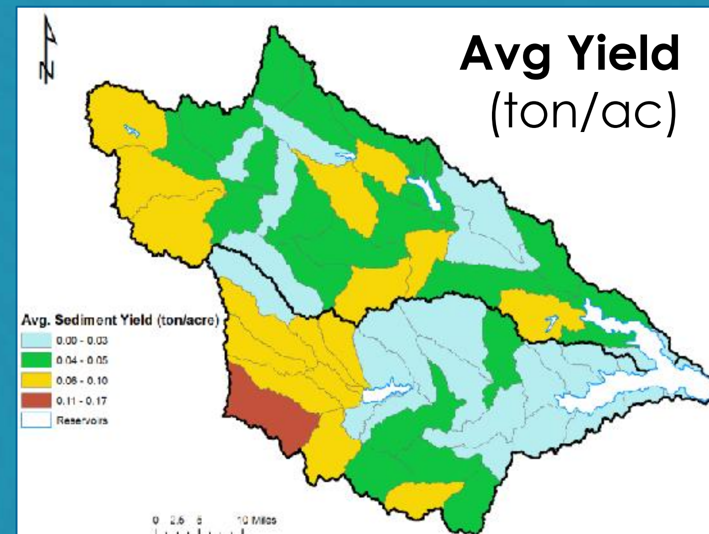


Water Quality Modeling

SWAT Estimates Sediment 1987 – 2015

Amount Generated in Sub-basins





Amount Reaching Reservoir

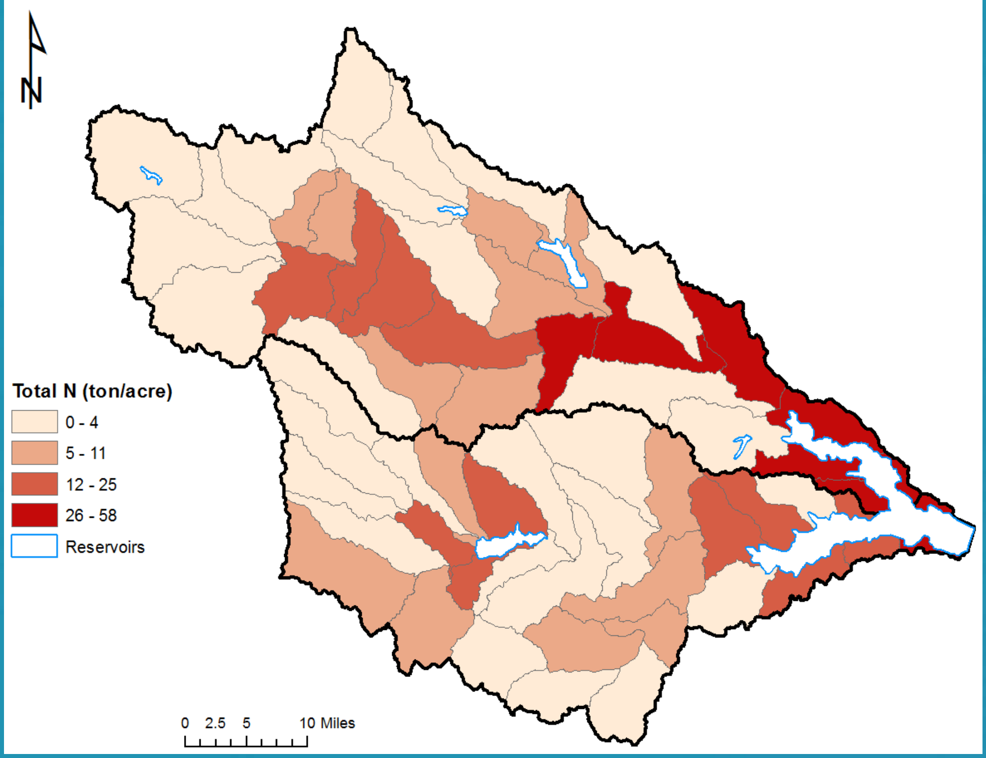
	28 Yr Total *(tons)*	**Annual Avg** *(tons)*
Chambers	37,615,985	1,297,103
Richland	24,229,057	835,485
Total	**61,845,042**	**2,132,588**

	Annual Avg Yield *(ton/ac)*
Chambers	2.1
Richland	1.5
Aggregated	**1.9**

Water Quality Modeling

SWAT Estimates – Total Nitrogen (1987 – 2015)

Amount Generated in Sub-basins



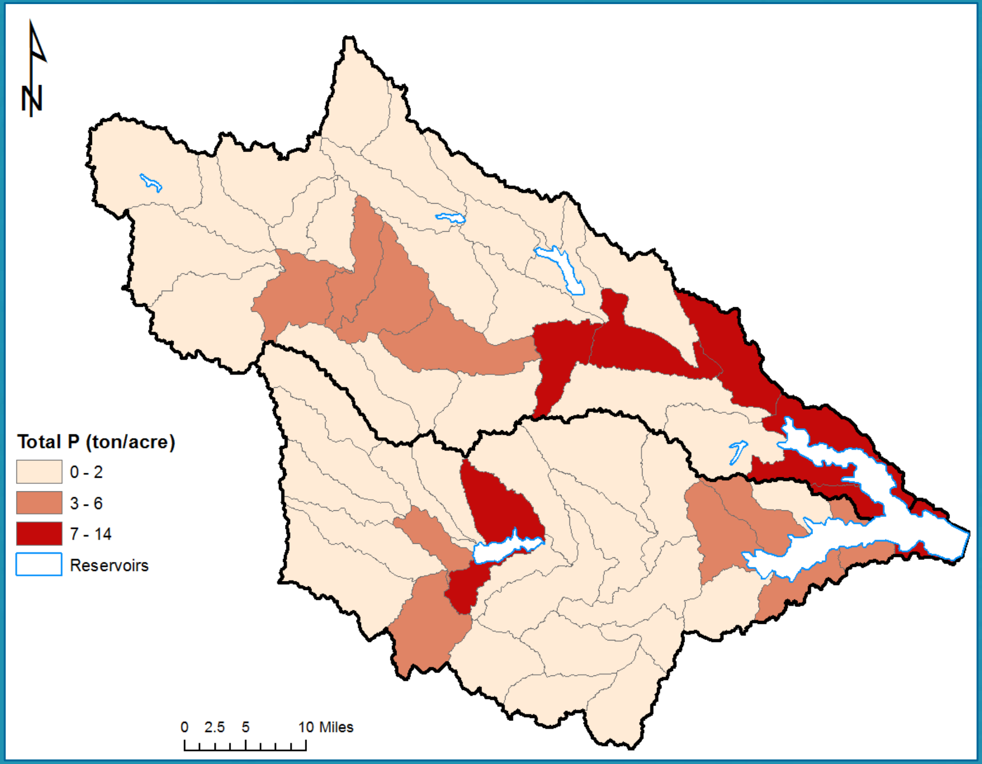
Amount Reaching Reservoir

	28 yr Total *(tons)*	Annual Average *(tons)*	Annual Avg Yield *(tons/ac)*
Chambers	77,769	2,682	.004
Richland	51,620	1,780	.003
Total	**129,390**	**4,461**	**.004**

Water Quality Modeling

SWAT Estimates – Total Phosphorus (1987 – 2015)

Amount Generated in Sub-basins



Amount Reaching Reservoir

	28 yr Total *(tons)*	**Annual Average** *(tons)*	**Annual Avg Yield** *(tons/ac)*
Chambers	30,274	1,044	.002
Richland	28,659	988	.002
Total	**58,933**	**2,032**	**.002**

Water Quality Modeling

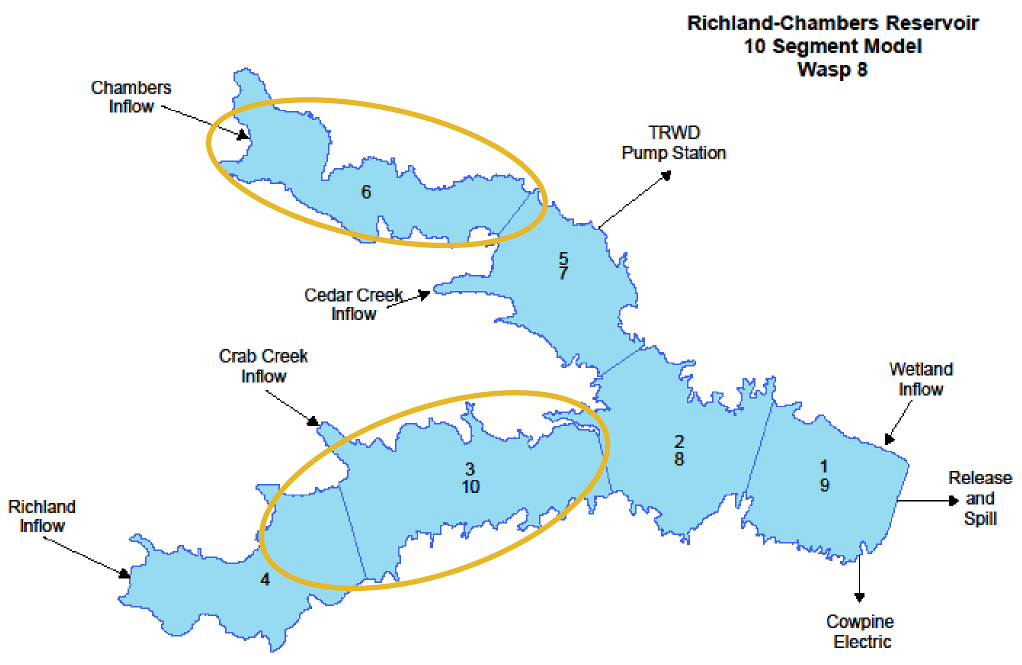
WASP –Reservoir Response

Simulates the processing and cycling of nutrients in a lake.

Estimates water quality response to nutrient inputs from the watershed.

Built using 12 years of tributary, inflow, and outflow data (2004-2015)

Calibrate using physical, then chemical, then biological parameters.

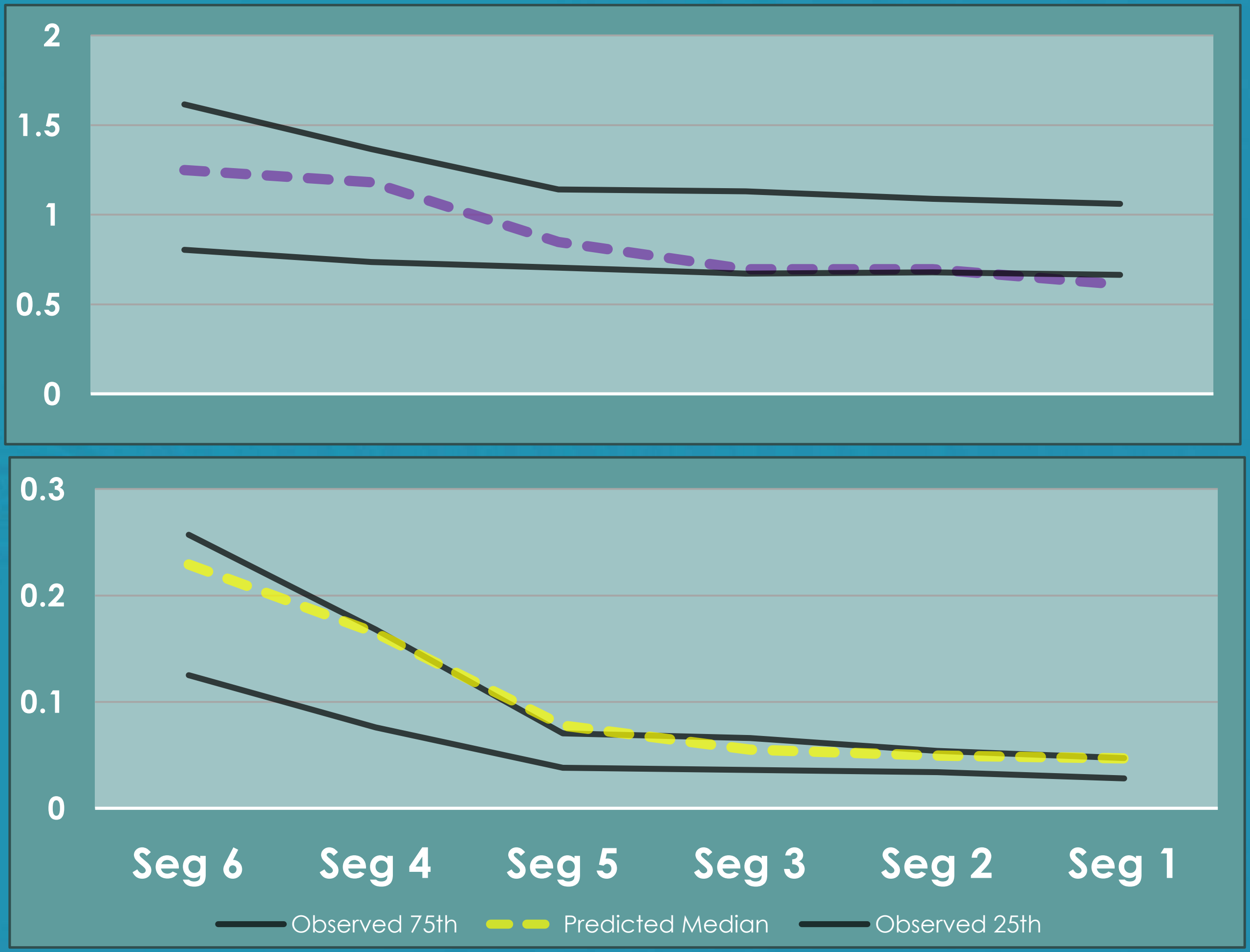


Water Quality Modeling

WASP – Calibration

Total Nitrogen
mg/L

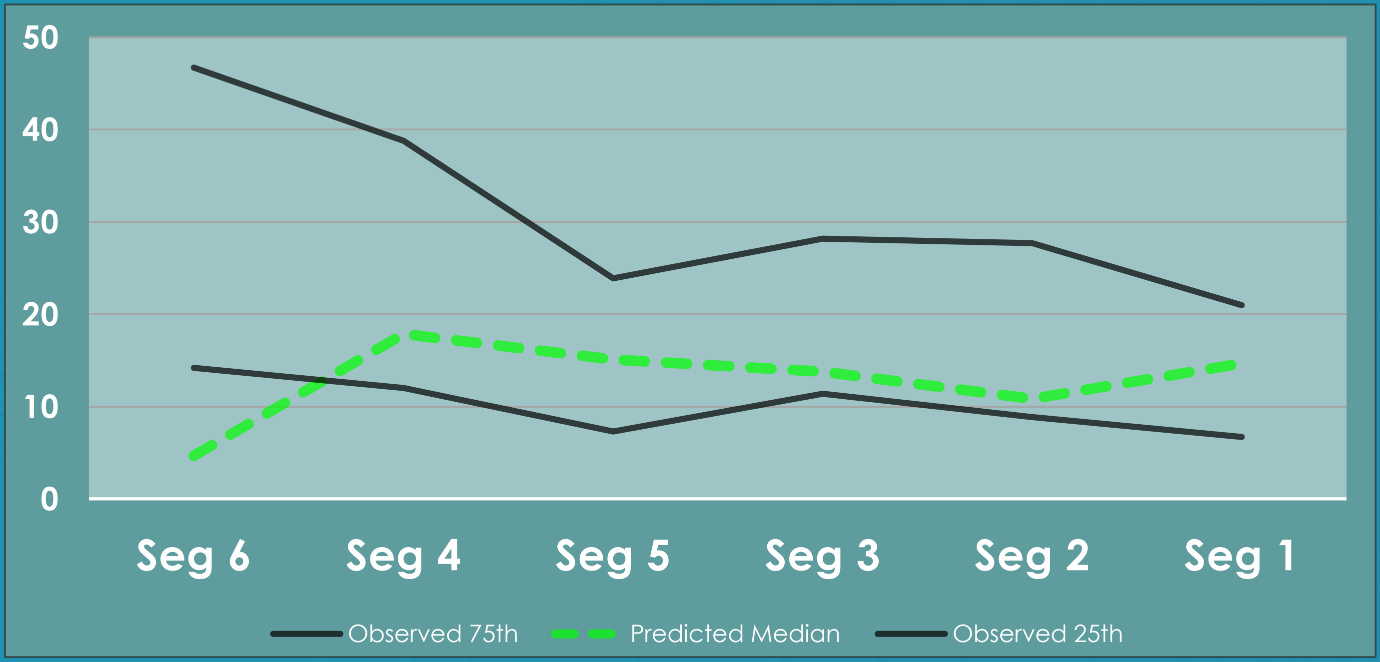
Total Phosphorus
mg/L



Water Quality Modeling

WASP – Calibration

Chlorophyl-a
μg/L



Water Quality Modeling

Next Steps

Integrate watershed and reservoir models.

Determine the amount of reduction needed to see a statistical and/or measurable improvement in water quality.

Apply recommended BMPs into the model to determine the nutrient reductions that would be achieved if implemented.

Economic Analysis and BMPs

Economic Study of BMPs

Identification of Relevant Solutions

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

Evaluation Process

List of practices was generated and evaluated to determine

- practices that are currently being implemented,
- practices that would likely be implemented with appropriate education or incentives.

Using input from:

- Stakeholder work groups
- Interviews & surveys of stakeholders
- Industry expert panel
- Other regional watershed plans
- Agency databases

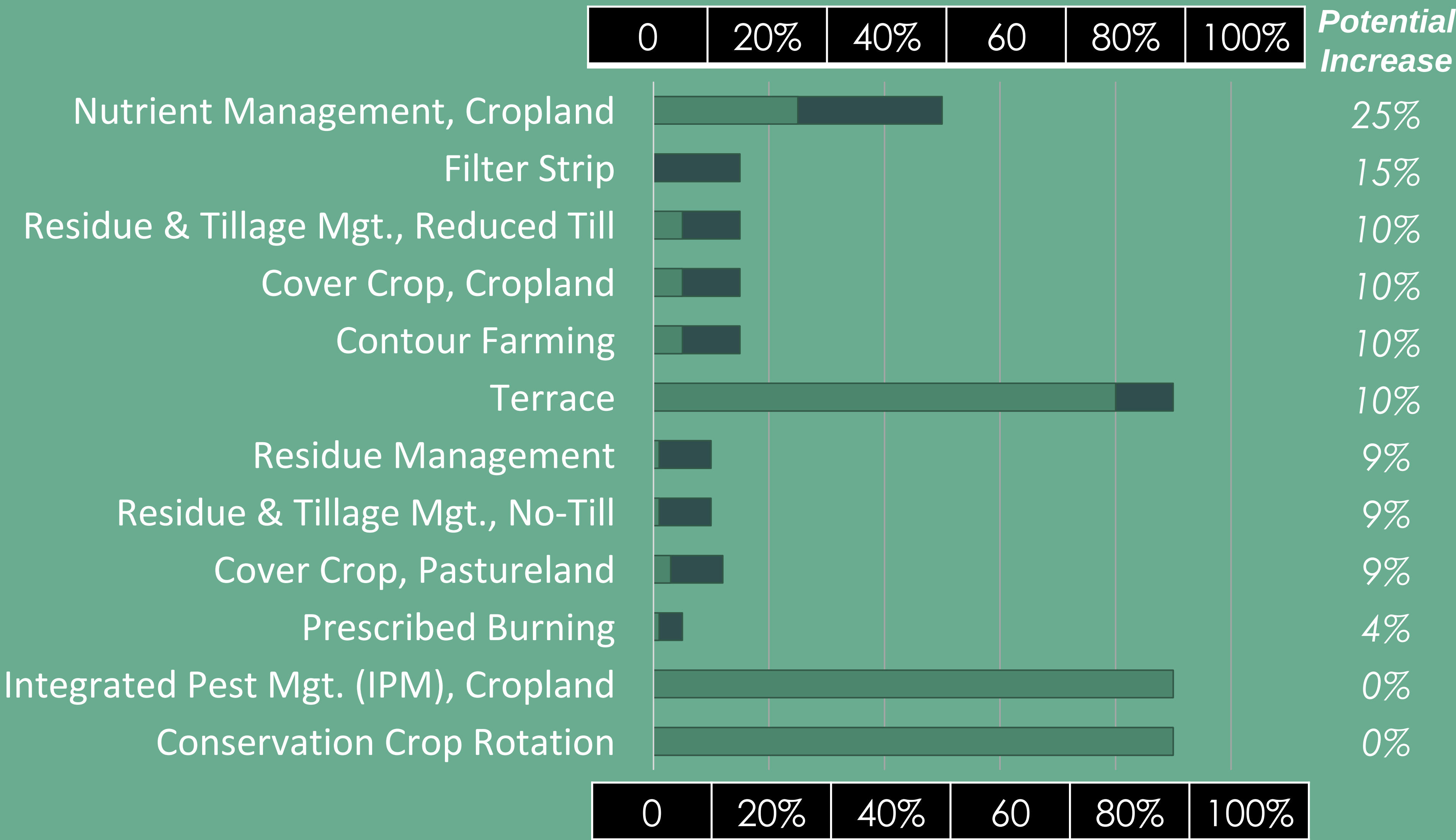
Total Eligible Acreage for an Individual BMP

10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

% of Acreage Currently Implemented	% of Acreage Likely to Implement	% of Acreage Unlikely to Implement

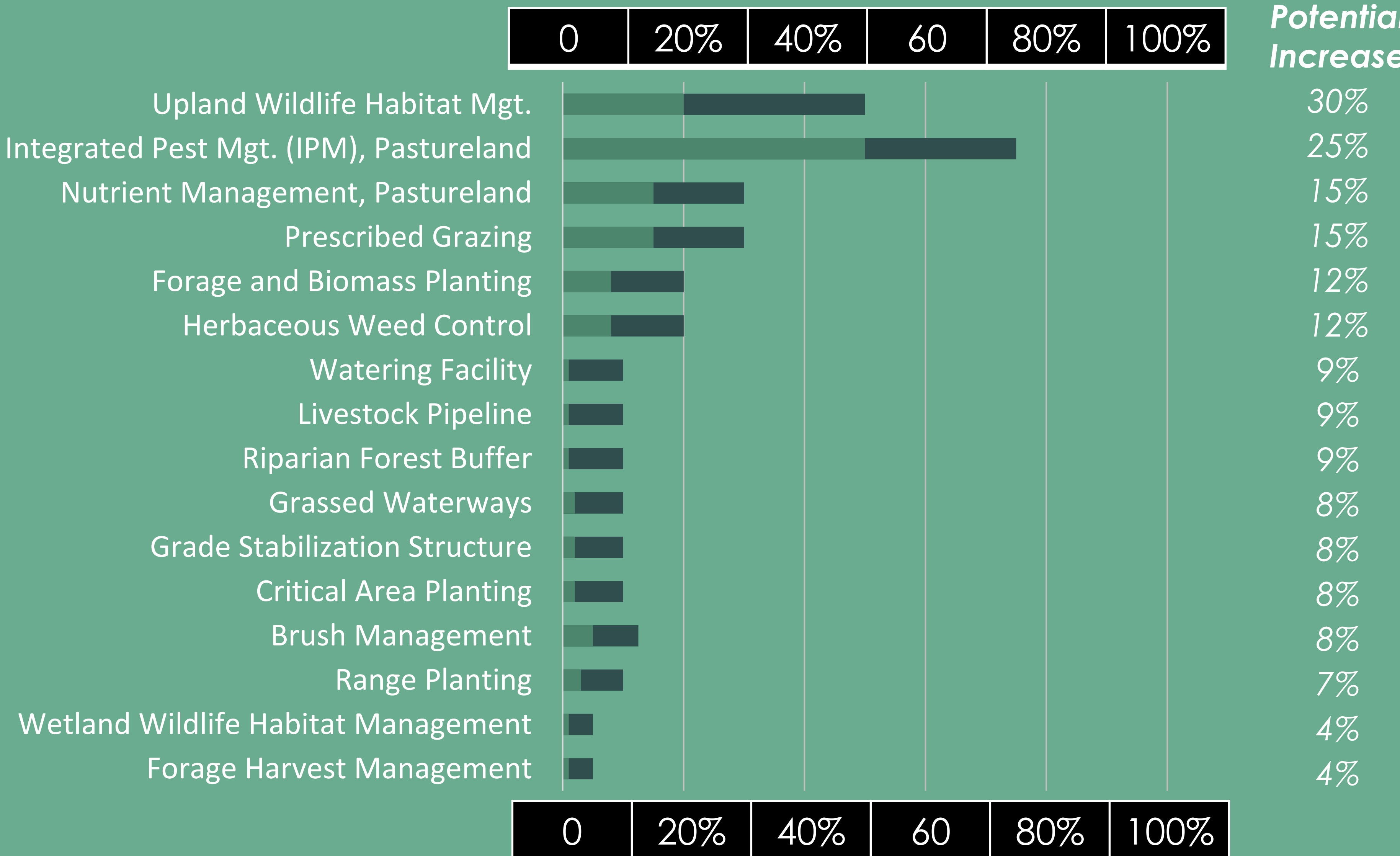
Ag/Rural Practices

Cropland Practices



Ag/Rural Practices

Pasture/Range Practices



Ag/Rural Practices

Supporting Practice or Not Selected

- Conservation Cover
- Contour Buffer Strips
- Sedimentation Basins/Ponds
- Pond
- Fencing
- Field Border
- Stripcropping
- Water & Sediment Control Basin
- Early Successional Habitat Development/Mgt.
- Stream Habitat Improvement & Mgt.
- Streambank & Shoreline Protection
- Channel Stabilization
- Wetland Restoration
- Wetland Creation
- Wetland Enhancements

Urban Practices

Ordinances

- Larger urban centers have existing water quality and/or quantity protection under state TPDES, MS4 requirements, zoning, and/or floodplain rules
- Growing need for floodplain and riparian vegetation protection through ordinances, as development pressures increase.
- Additional effective ordinances could be implemented if challenges such as cost and education (taxpayers and officials) were overcome.

Urban Practices

Construction & Post-Construction BMPs

Already widely used – required under State stormwater regulations (Stormwater Pollution Prevention Plans), MS4 Stormwater Plans, or local ordinances.

Use is expected to increase with anticipated rate of new development.

Urban Practices

General & Post-Construction BMPs

Also widely implemented – some required under State stormwater regulations but most implemented under local ordinances governing new development.

Challenges are cost and education of developers, decision-makers, and tax-payers.

Higher adoption rates than what is needed to keep up with growth are possible, but not likely.



Urban Practices

Low Impact Practices

- Not widely implemented
- Lack of knowledge about construction, function, & cost
- Wider implementation is **likely**, could be increased significantly if challenges are overcome.

Urban Practices

Low Impact Practices

More space-intensive practices are **<u>less likely</u>** to be implemented on larger scales, as land prices rise in developing areas.

Lack of knowledge about function & cost

Implementation may be possible if challenges are overcome, especially on smaller projects.

Urban Practices

Stream channel protection & restoration

- Channel protection measures are widely applied in urban areas where infrastructure is threatened.
- Natural channel design and channel restoration are only sparsely applied to urban streams.
- Challenges include lack of knowledge about benefits relative to grey solutions and perceived cost.
- Increased implementation is **highly likely** if challenges are overcome.

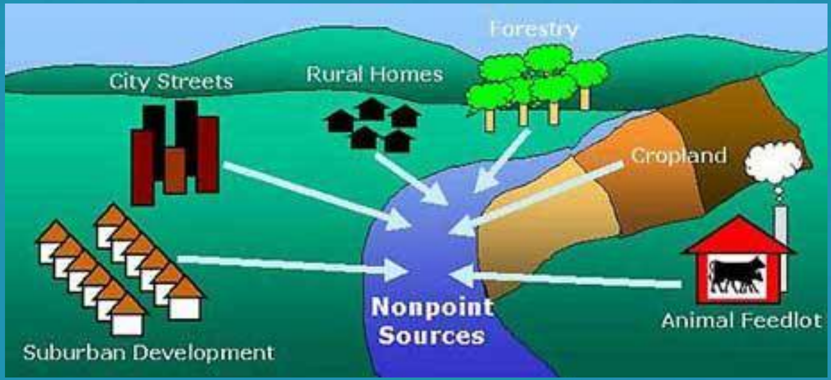
Urban Practices

Education & Outreach

Various levels and types of NPS education are being implemented in all jurisdictions.

Cost and manpower are the major challenges to expanding programs.

Increased implementation is **<u>highly likely</u>** if challenges are overcome.



Questions?