WATERSHED MANAGEMENT PLANNING FOR THE TABLE ROCK LAKE WATERSHED

THE ENVIRONMENTAL PROTECTION AGENCY REGION 7 THROUGH THE MISSOURI DEPARTMENT OF NATURAL RESOURCES HAS PROVIDED PARTIAL FUNDING FOR THIS PROJECT UNDER SECTION 319 OF THE CLEAN WATER ACT. G22-NPS-03

Image Credit: wanderthemap.com

MISSOURI STATE UNIVERSITY
OEWRI
Ozarks Environmental and Water Resources Institute

H2Ozarks
Cleaner Water Together!

MISSOURI DEPARTMENT OF NATURAL RESOURCES

EPA
United States Environmental Protection Agency

Photo Credit: Breakfastinamerica.me

- Introductions
- Load Reduction Goals & Plan
- BMP Implementation Schedule
- WQ Monitoring Plan

9-ELEMENT WATERSHED MANAGEMENT PLAN (WMP)

United States Environmental Protection Agency

1. Identify Causes and Sources Of Pollution

2. Estimate Watershed Pollutant Loads and Load Reductions Needed to Meet Water Quality Standards

3. Describe Management Measures That Will Achieve Load Reductions

4. Estimate Amounts of Technical & Financial Assistance and the Relevant Authorities Needed to Implement Plan

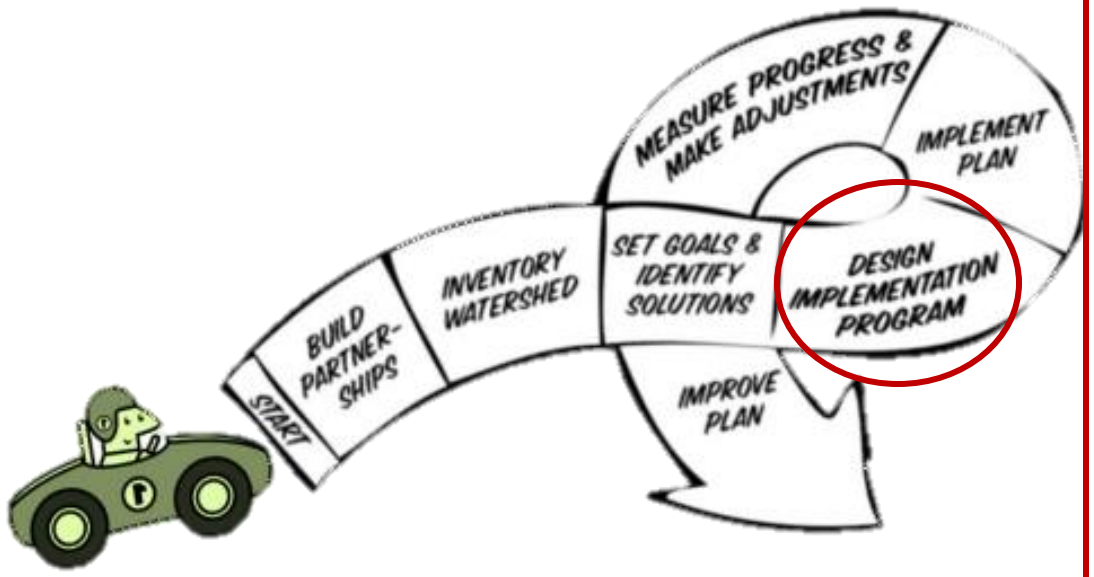
5. Develop an Information/Education Component

6. Develop a Project Implementation Schedule

7. Describe the Interim, Measurable Milestones

8. Identify Indicators to Measure Pollutant Reduction Progress

9. Develop a Monitoring Component



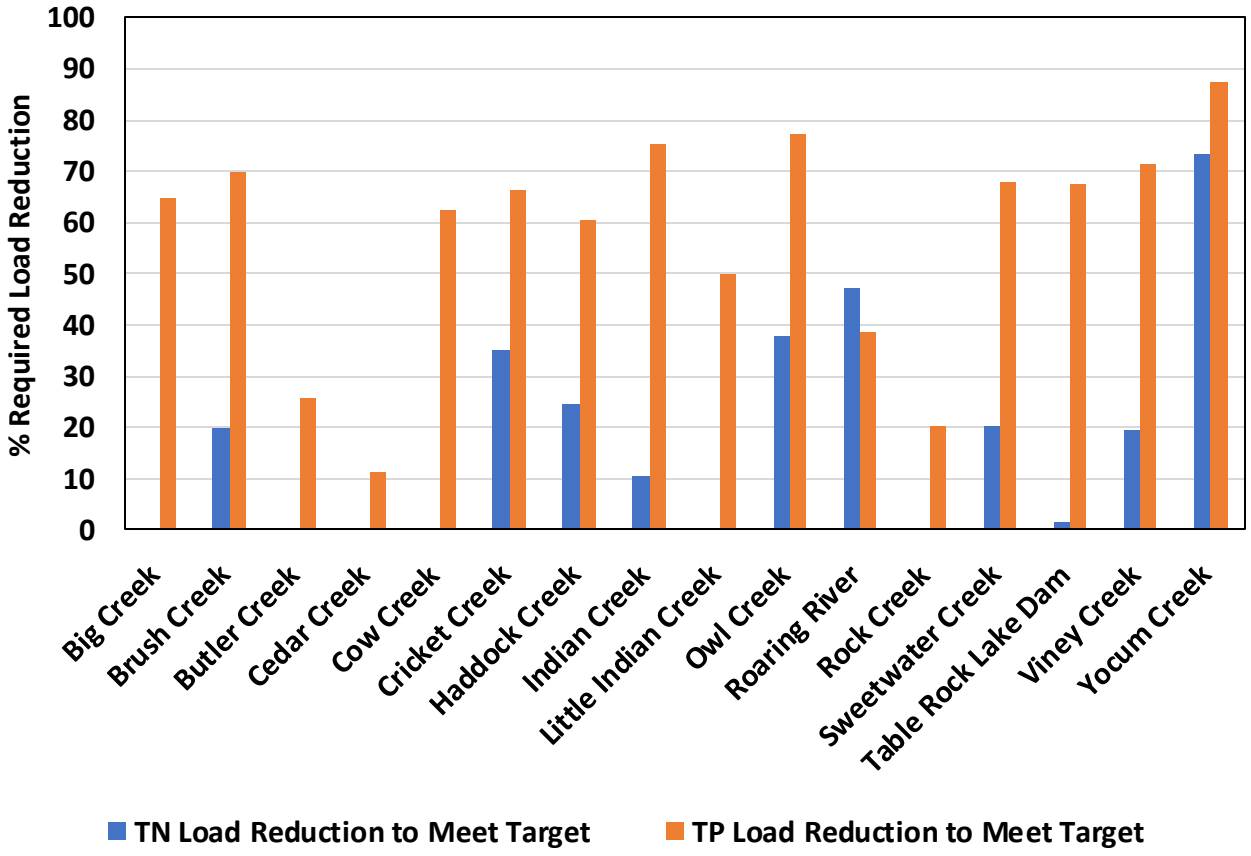
Project Purpose: Develop a 9-E WMP for the Table Rock Lake Watershed

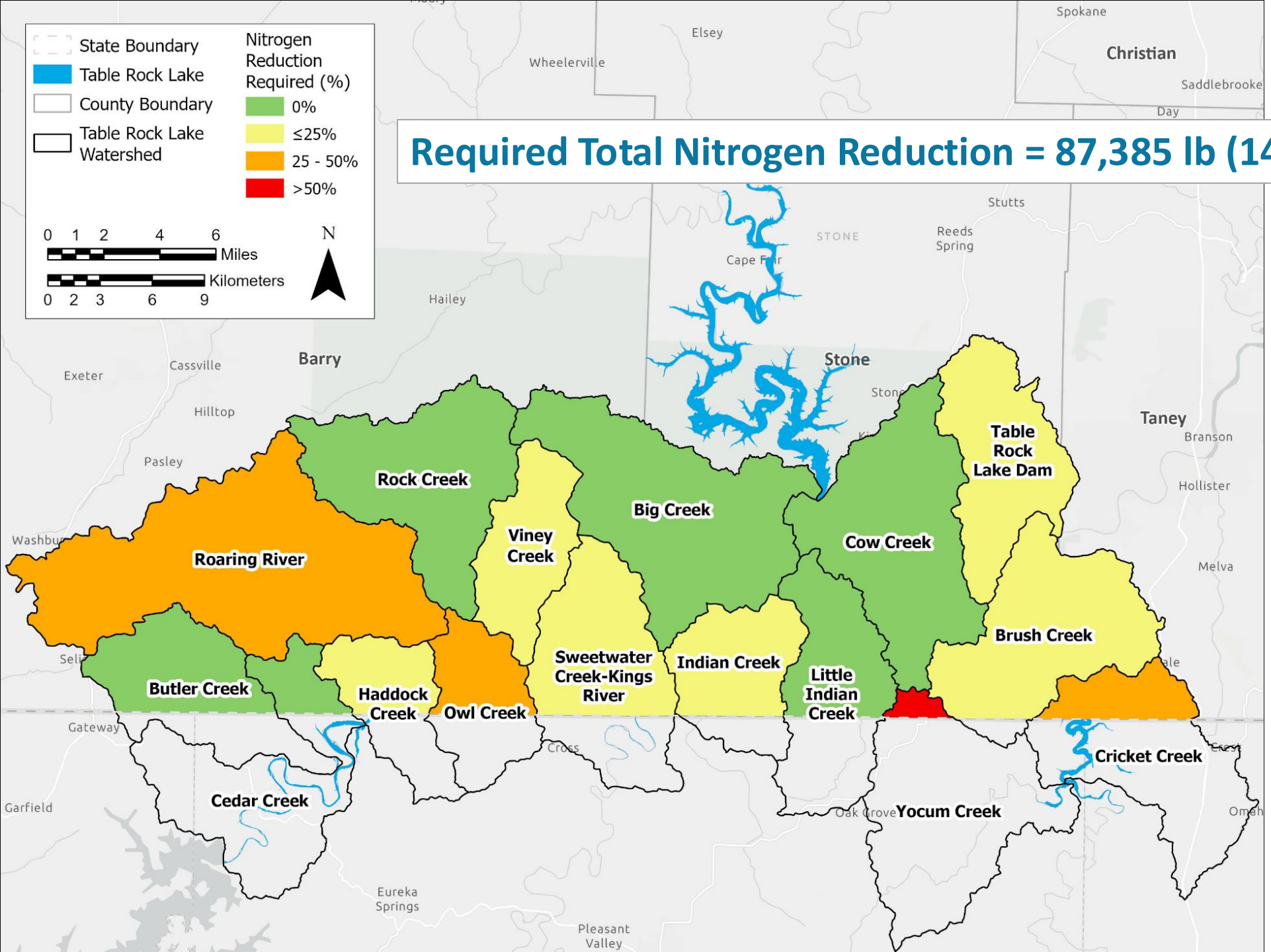
LOAD REDUCTION PLAN

Photo Credit: Branson Visitor's Guide

REQUIRED LOAD REDUCTIONS

- **Total load reductions required:**
  - Nitrogen = 87,385 lb (14%)
  - Phosphorus = 79,580 lb (56%)




State Boundary
Table Rock Lake
County Boundary
Table Rock Lake Watershed
Nitrogen Reduction Required (%)
0%
≤25%
25 - 50%
>50%
0 1 2 4 6
Miles
0 2 3 6 9
Kilometers
N
Required Total Nitrogen Reduction = 87,385 lb (14%)
Rock Creek
Big Creek
Viney Creek
Roaring River
Cow Creek
Table Rock Lake Dam
Brush Creek
Sweetwater Creek-Kings River
Indian Creek
Little Indian Creek
Haddock Creek
Owl Creek
Butler Creek
Cedar Creek
Cricket Creek
Yocum Creek
Barry
Stone
Taney
Christian
Spokane
Saddlebrooke
Day
Elsey
Wheelerville
Stutts
Reeds Spring
Cape Fair
Hailey
Exeter
Cassville
Hilltop
Pasley
Washburn
Branson
Hollister
Melva
Gateway
Garfield
Eureka Springs
Pleasant Valley
Oak Grove

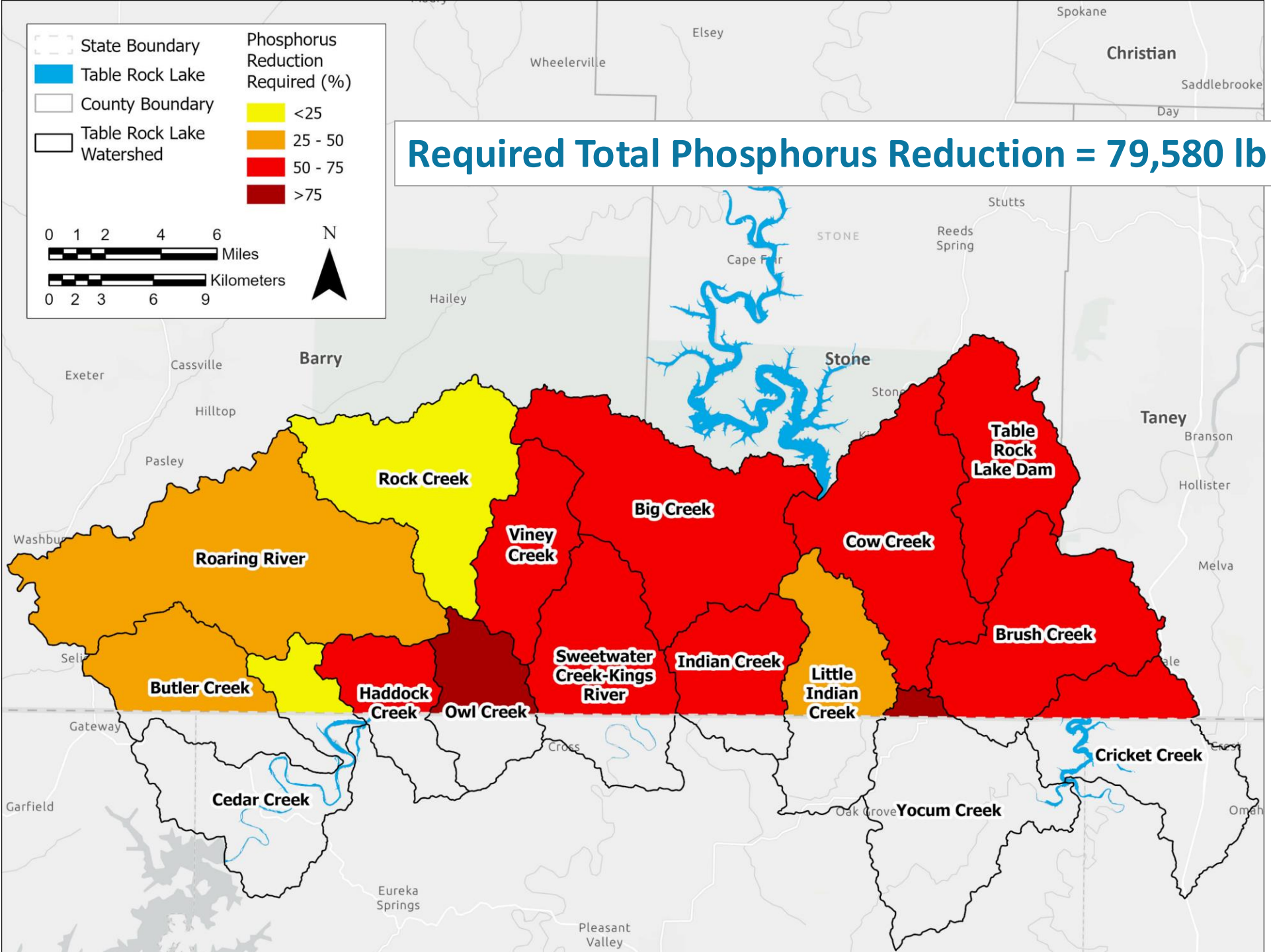

State Boundary
Table Rock Lake
County Boundary
Table Rock Lake Watershed
Phosphorus Reduction Required (%)
<25
25 - 50
50 - 75
>75
0 1 2 4 6
Miles
0 2 3 6 9
Kilometers
N
Required Total Phosphorus Reduction = 79,580 lb (56%)
Rock Creek
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Table Rock Lake Dam
Brush Creek
Sweetwater Creek-Kings River
Indian Creek
Little Indian Creek
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Haddock Creek
Owl Creek
Cedar Creek
Cricket Creek
Yocum Creek
Spokane
Christian
Saddlebrooke
Elsey
Wheelerville
Day
Stutts
Reeds Spring
STONE
Cape Fair
Hailey
Barry
Stone
Exeter
Cassville
Hilltop
Pasley
Taney
Branson
Hollister
Melva
Washburn
Gateway
Cross
Garfield
Oak Grove
Eureka Springs
Pleasant Valley

LOAD REDUCTION GOALS:

NEIGHBORING WATERSHEDS

Lake Taneycomo WMP

Within each HUC-12, treat:

- 25% of pastureland (8,820 acres)
- 25% of urban land (6,620 acres)
- Stabilize 2,500 ft. of eroding streambanks

Expected Reductions with Plan:

*-**10%** Nitrogen (30% reduction to target load)*

*-**8%** Phosphorus (85% reduction to target load)*

Phased approach; 20-year goals

James River WMP

1. Treat 25% of pastureland (18,750 acres)
2. Retrofit 132 Urban detention basins
3. Establish/protect 395 acres of riparian buffer in urban and pastureland areas
4. Restore/protect 5,000 ft of streambank

Expected Reductions with Plan:

-39% Nitrogen

-45% Phosphorus

Phased approach; 20-year goals

LOAD REDUCTION GOALS: TABLE ROCK LAKE WATERSHED

	Nitrogen	Phosphorus
Load Reduction Goal	Eutrophic Threshold Load	Background (All Forested) Load
Required Total Load Reduction	87,385 lb (14%)	79,580 lb (56%)
Required Reduction Per Year (with 20-year plan)	4,369 lb/yr	3,979 lb/yr

EXAMPLE GOAL SCENARIO

20-Year Treatment Goal	BMP	N Reduction	P Reduction	S Reduction
25% of Pastureland	Access control, Forage and Biomass Planting, Prescribed Grazing	5%	5%	6%
25% of Urban land	Vegetated Filter Strips, Sand Filter + Infiltration basins	4%	3%	1%
25% of 150-ft Stream Buffer	Establish / Protect 5,000 acres (25%) of Riparian Forest Buffer surrounding streams (>35 ft, <150 ft)	2%	2%	2%
	T o t a l	**11% 69,617 lb**	**10% 13,835 lb**	**9% 7,048 lb**

+ Additional Reductions from: *Wastewater Remediation, POS Inspection Ordinance Implementation, Detention basin retrofits, gravel road improvements, urban green infrastructure, etc.*

IMPLEMENTATION SCHEDULE

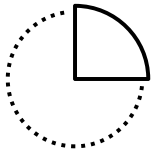
Lake Taneycomo, James River, and Spring River WMPs

- Short-Term (within 5 years)
- Medium-Term (5 – 10 years)
- Long-Term (10 – 20 years)

Proposed for Table Rock Lake Watershed

- **Short-Term (within 5 years)**
- **Medium-Term (5 – 10 years)**
- **Long-Term (10 – 20 years)**

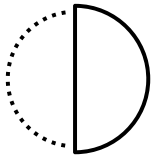
IMPLEMENTATION SCHEDULE



Short-Term (5 years)

Treat

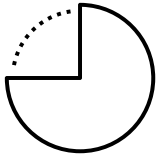
- **2,251 acres of pastureland (25%)**
- **1,288 acres of urban land (25%)**
- **Establish/protect 1,250 acres of riparian buffer**
- *Host X workshops, field days, events*
- *Establish WQ Monitoring*
- *Survey Detention basins for retrofits*



Med-Term (5 – 10 years)

Treat

- **2,251 acres of pastureland (25%)**
- **1,288 acres of urban land (25%)**
- *Complete **X** outreach events and/or workshops*
- *Complete X detention basin retrofits or wastewater remediation projects*



Long-Term (10 – 20 years)

Treat

- 4,502 acres of pastureland (50%)
- 2,576 acres of urban land (50%)
- *Complete **X** outreach events and/or workshops*

A phased approach provides *measurable milestones* to assess project progress

DEVELOPMENT OF LONG-TERM MONITORING PLAN

I. Establish baseflow & runoff sampling efforts across watershed

II. Proposed WQ Parameters: TN, TP, TSS, DO, Cl, E. coli, pH, temperature, specific conductance, Chlorophyll-a (lake)

III. Monitor BMP effectiveness (sample upstream & downstream)

IV. Volunteer Water Quality Monitoring Program (MODNR)

Table Rock Lake

- **State Lakes Assessment Program (SLAP)**
- **Lakes of Missouri Volunteer Program (LMVP)**
  - *12 sites monitored from April to October*

Tributary Streams (TRLW)

- **MO Stream Teams**
  - *7 Inactive Sites*
  - *1 Active - Roaring River*
- **USGS Streamflow Gaging**
  - *1 active - Roaring River @ Roaring River State Park*

Critical for measuring pollutant reduction progress

THANK YOU

Stay Connected:

Meeting documents and information available online at
www.h2ozarks.org/trlwmp