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
- Priority Areas for BMP Implementation
  - Riparian Pastureland Buffer Zone
  - Septic Susceptibility Ranking
- All-Forested Background Loads
- Technical and Financial Assistance
- Information and Education

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

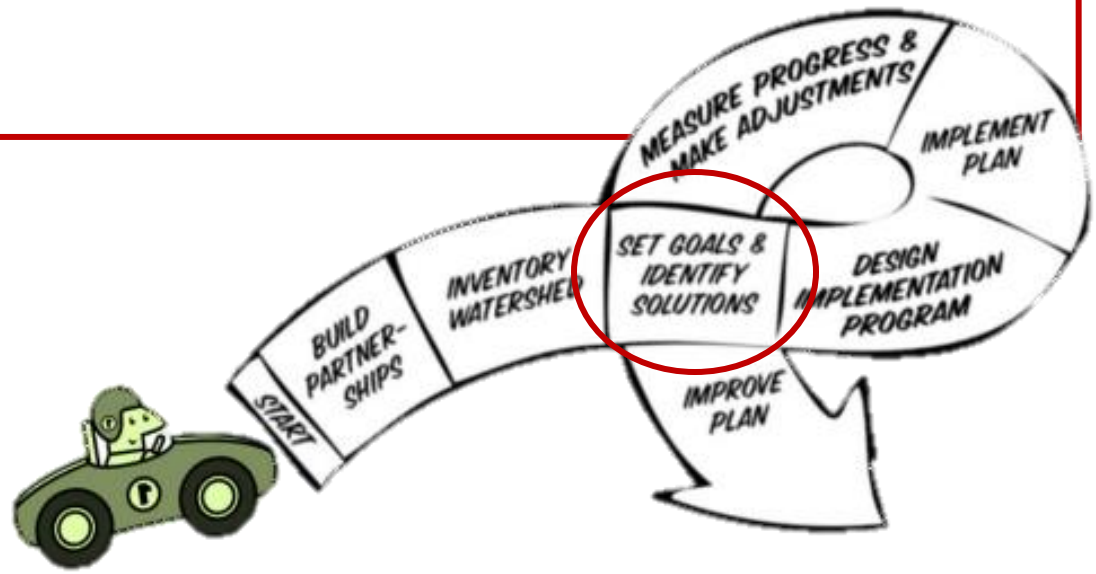
5. Develop an Information/Education Component

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

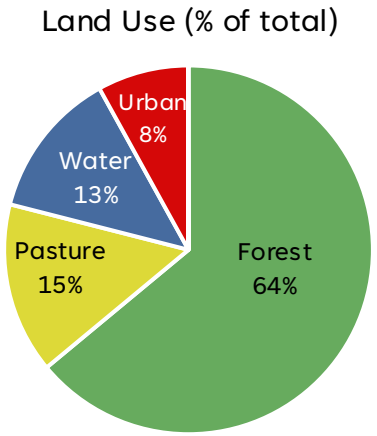
POLLUTANT SOURCE REVIEW

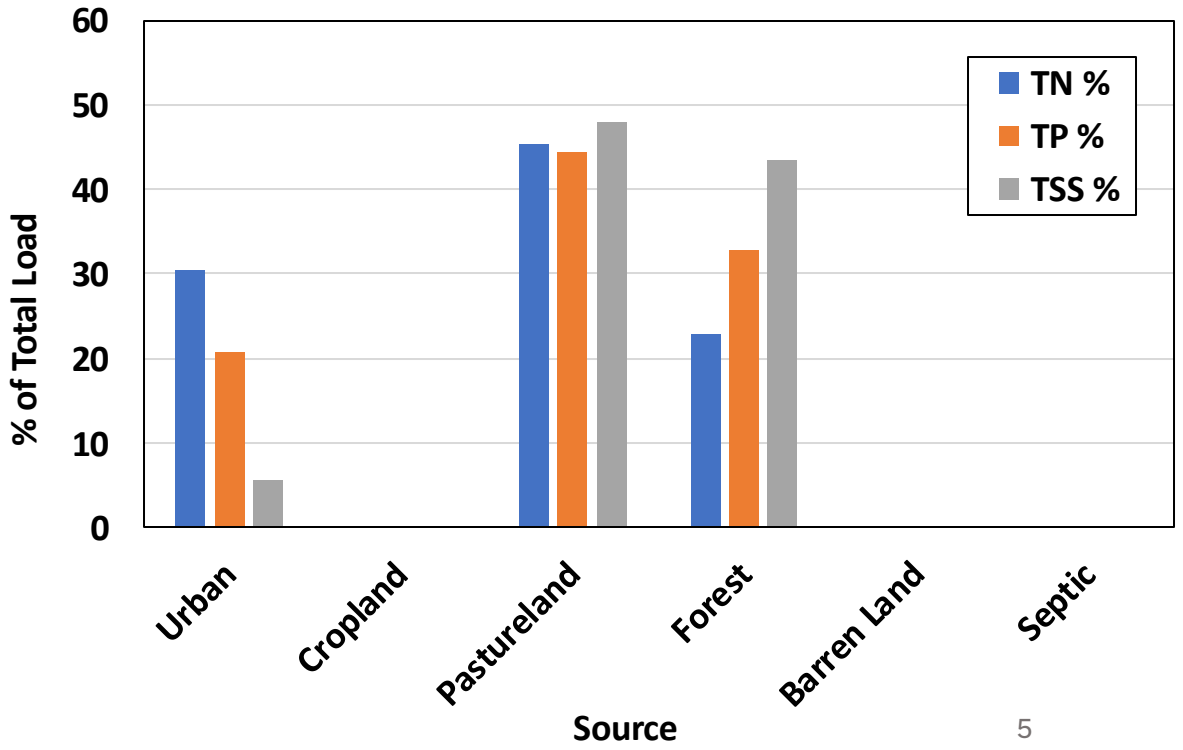
POLLUTANT SOURCE IDENTIFICATION

1. **Pastureland is estimated to contribute the highest nitrogen, phosphorus, and sediment loads within the TRLW (44-48%)**

2. Forested areas contribute the 2nd highest phosphorus (33%) and sediment loads (43%)

3. Urban areas contribute the 2nd highest nitrogen loads (30%)

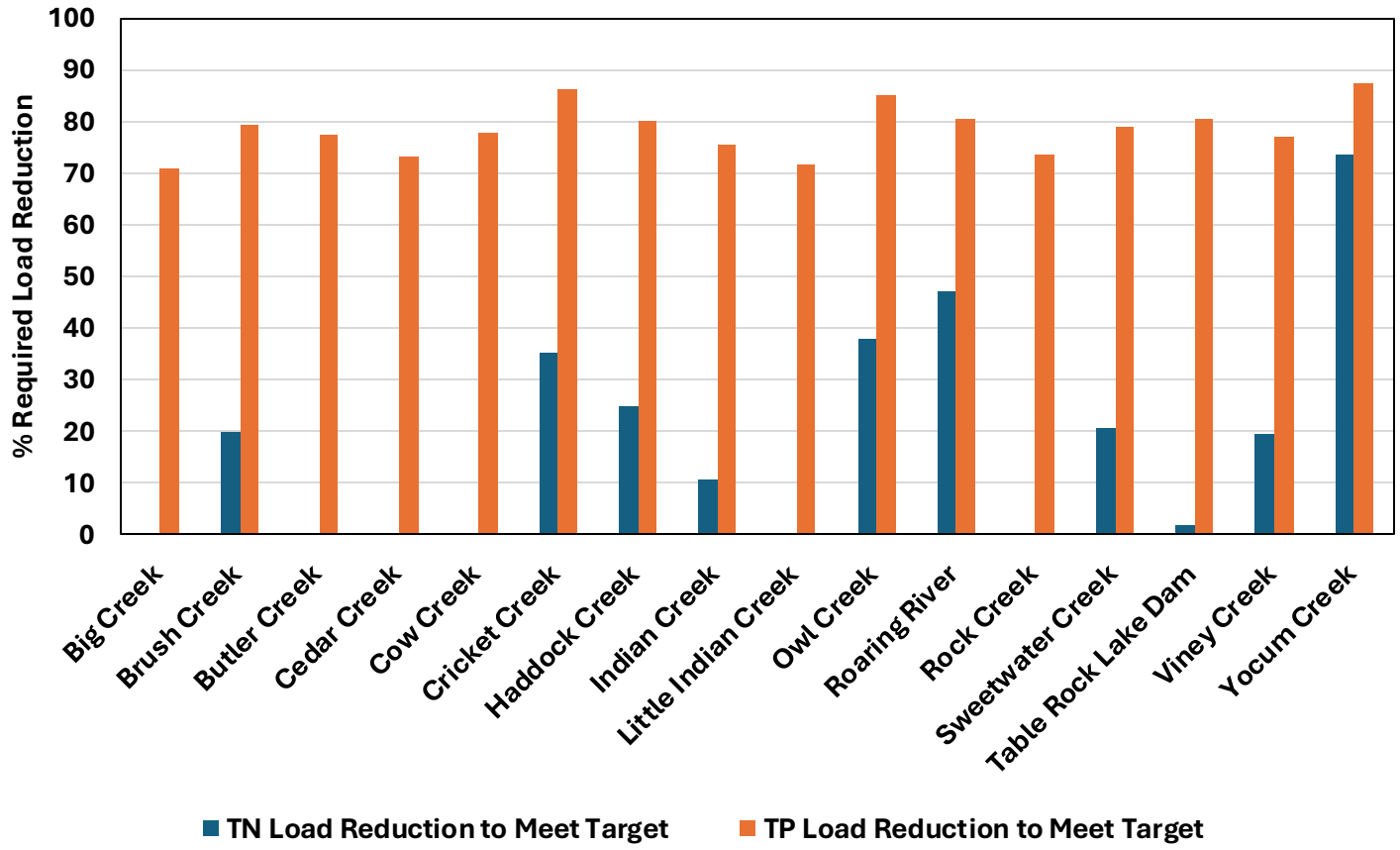




REQUIRED LOAD REDUCTIONS

- **To meet EPA Eutrophic Threshold of:**
  - 1.5 mg/L TN
  - 0.075 mg/L TP

- Total Reductions required:
  - N = 77,179 lb
  - P = 110,517 lb



(USEPA, 2000) Nutrient Criteria Technical Guidance Manual Rivers and Streams. EPA-822-B-00-002.

CRITICAL SOURCE AREAS

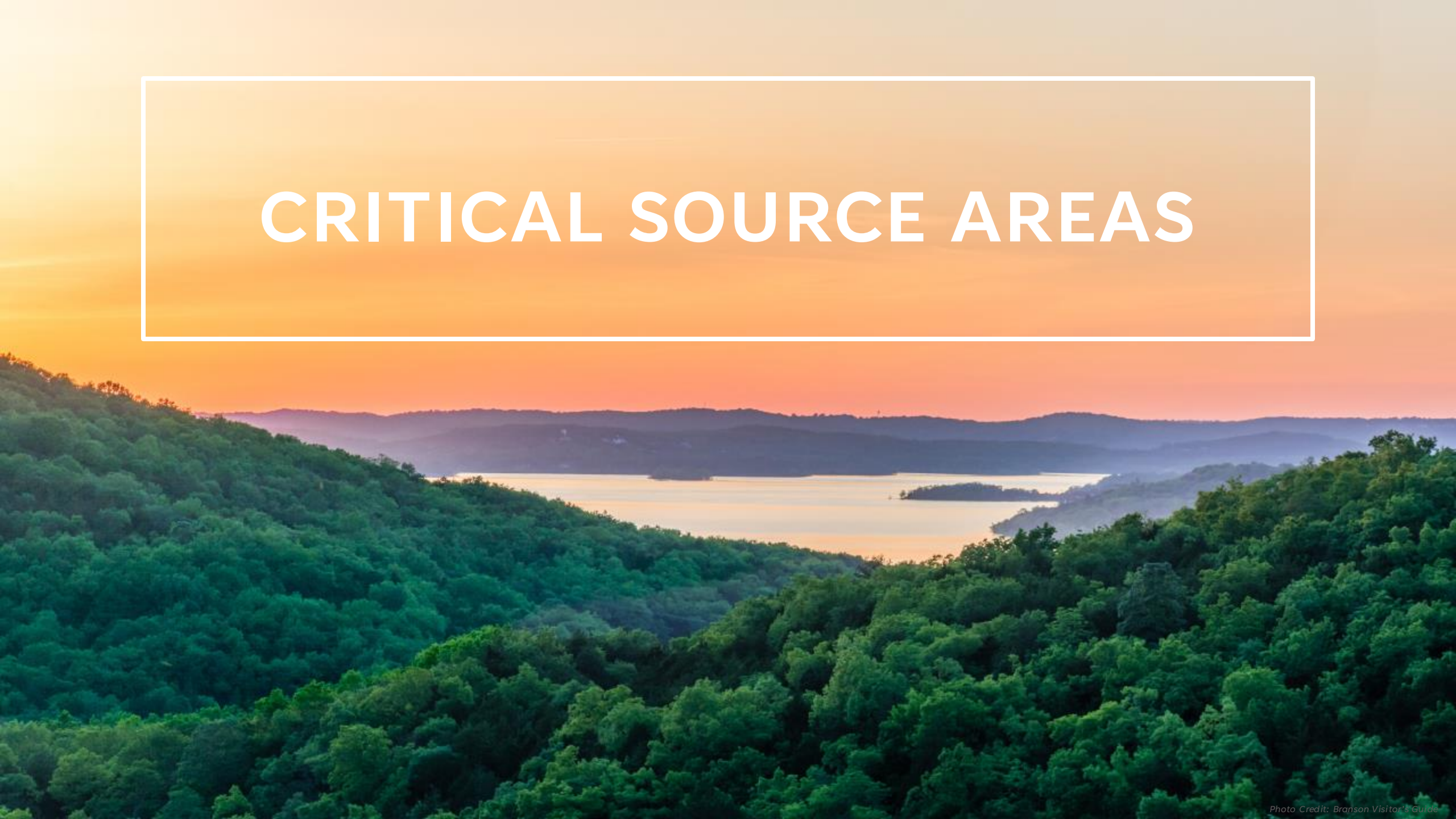
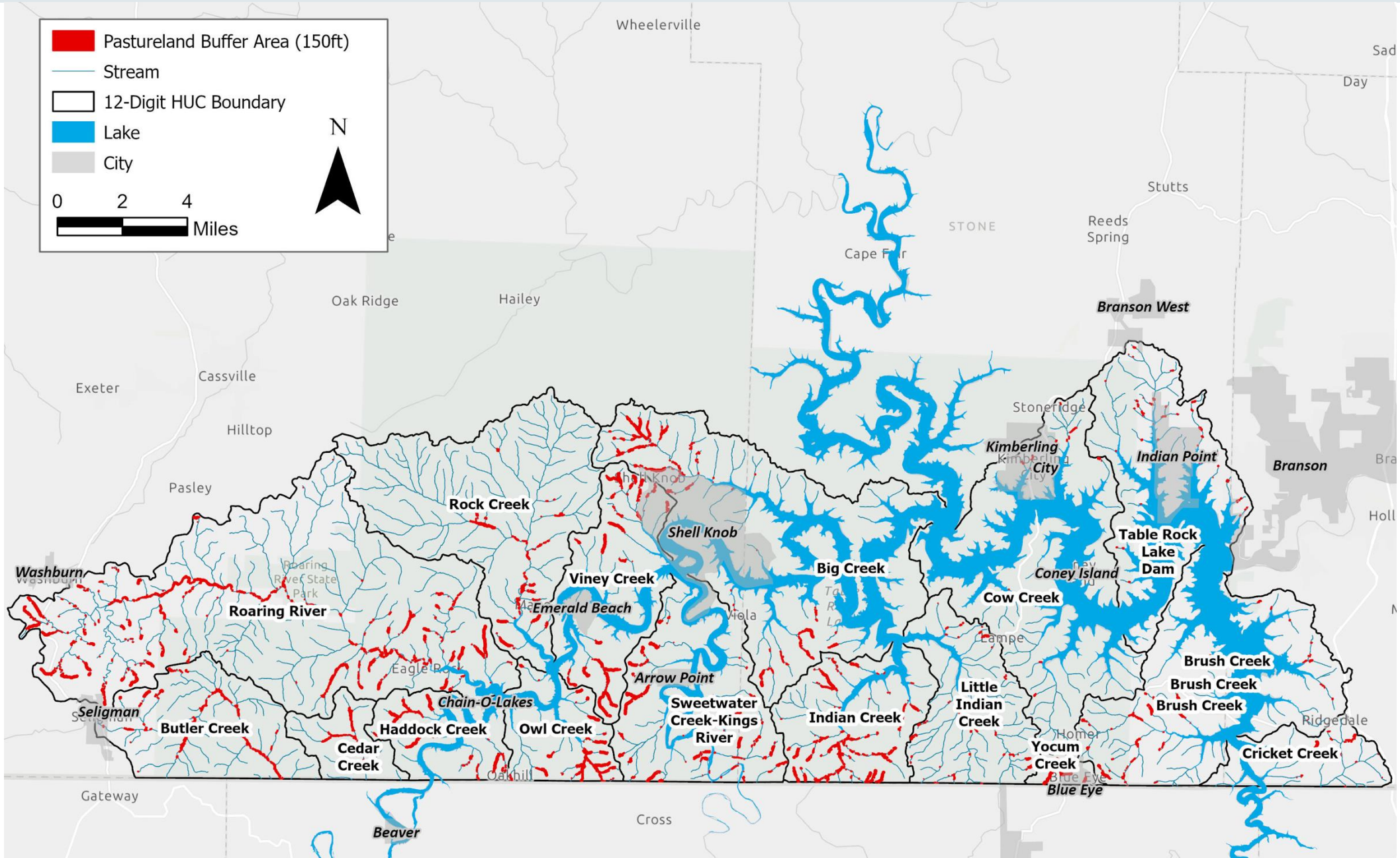


Photo Credit: Branson Visitor's Guide

PASTURELAND BUFFER ZONE



CRITICAL AREA: PASTURELAND BUFFER ZONE

150 ft buffer around streams =

~5,000 acres of Pastureland

- **Example: Streambank Stabilization and Fencing on 5,000 acres =**
  - 29,500 lb/yr TN Reduction
  - 6,500 lb/yr TP Reduction
  - 4,000 T/yr S Reduction

Total Reductions required:

- *N = 77,179 lb*
- *P = 110,517 lb*

	TN Reduction Yield (lb/ac/yr)	TP Reduction Yield (lb/ac/yr)	S Reduction Yield (T/ac/yr)
Streambank Stabilization and Fencing	5.9	1.3	0.8
Grass Buffer	6.1	1.2	0.7
Access Control / Livestock Exclusion	3.0	0.9	0.7
Use Exclusion	3.8	0.8	0.6
Access Control + Forage and Biomass Planting + Prescribed Grazing	3.9	0.8	0.5
Critical Area Planting	2.2	0.6	0.4
Prescribed Grazing	3.0	0.5	0.3
Access Control + Forage and Biomass Planting	2.2	0.5	0.3
Heavy Use Protection	2.0	0.5	0.3
Alternative Water	1.2	0.3	0.2
Forage and Biomass Planting (including Annual Forages for Grazing)	0.8	0.1	0.0
Litter Storage and Management	0.6	0.1	0.0

ALL-FORESTED MODEL "BACKGROUND" LOADS

- **Representative of pre-settlement conditions prior to land use change**
- **Key Results**
  - **Nitrogen**
    - Background N loads *below* eutrophic threshold (1.5 mg/L)
    - Indicates that N is likely responsive to land cover changes
  - **Phosphorus**
    - Background P Loads *above* eutrophic threshold (0.075 mg/L)
    - Indicates that P is driven by both natural and anthropogenic sources
    - P is typically sediment bound; likely transported by eroding steep slopes
- STEPL models runoff, eutrophic threshold represents in-stream conditions (baseflow + runoff)
  - May explain background loads exceeding target

Current:Background Load		
HUC12	**N Ratio**	**P Ratio**
Big Creek	4	3
Brush Creek	5	3
Butler Creek	2	1
Cedar Creek	1	1
Cow Creek	4	3
Cricket Creek	4	3
Haddock Creek	4	3
Indian Creek	6	4
Little Indian Creek	3	2
Owl Creek	6	4
Roaring River	2	2
Rock Creek	1	1
Sweetwater Creek	5	3
Table Rock Lake Dam	5	3
Viney Creek	5	3
Yocum Creek	12	8

Ratio of 4 means current loads are 4x higher than Background load


SEPTIC POLLUTION
SUSCEPTIBILITY RANK
Photo Credit: Branson Visitor's Guide

SEPTIC DENSITY ESTIMATION – USGS

- Septic system density estimated at 3 scales for the conterminous US
- Developed using predictive modeling
- Based on 2020 census, 2019 land cover, and building footprint data
- Ranked as High, Medium, or Low density (# of systems / square km)
- Used to identify areas with higher potential for septic-related water quality risks

SOIL HYDROLOGIC GROUP SCORING

Low Infiltration (Group D) = Highest Septic Pollution Susceptibility
High Infiltration (Group A) = High Susceptibility
Moderate / Low Infiltration = Moderate / Low Susceptibility

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

High

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Low

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Moderate

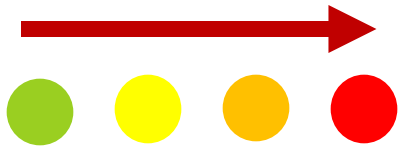
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Highest

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Septic Pollution Susceptibility



COMBINED SCORING: SEPTIC POLLUTION SUSCEPTIBILITY

Score	Septic Density
1	Low
2	Moderate
3	High

+

Score	Hydrologic Soil Group
6	D
5	C/D
2	C
4	B/D
1	B
3	A

=

≤3 = Low

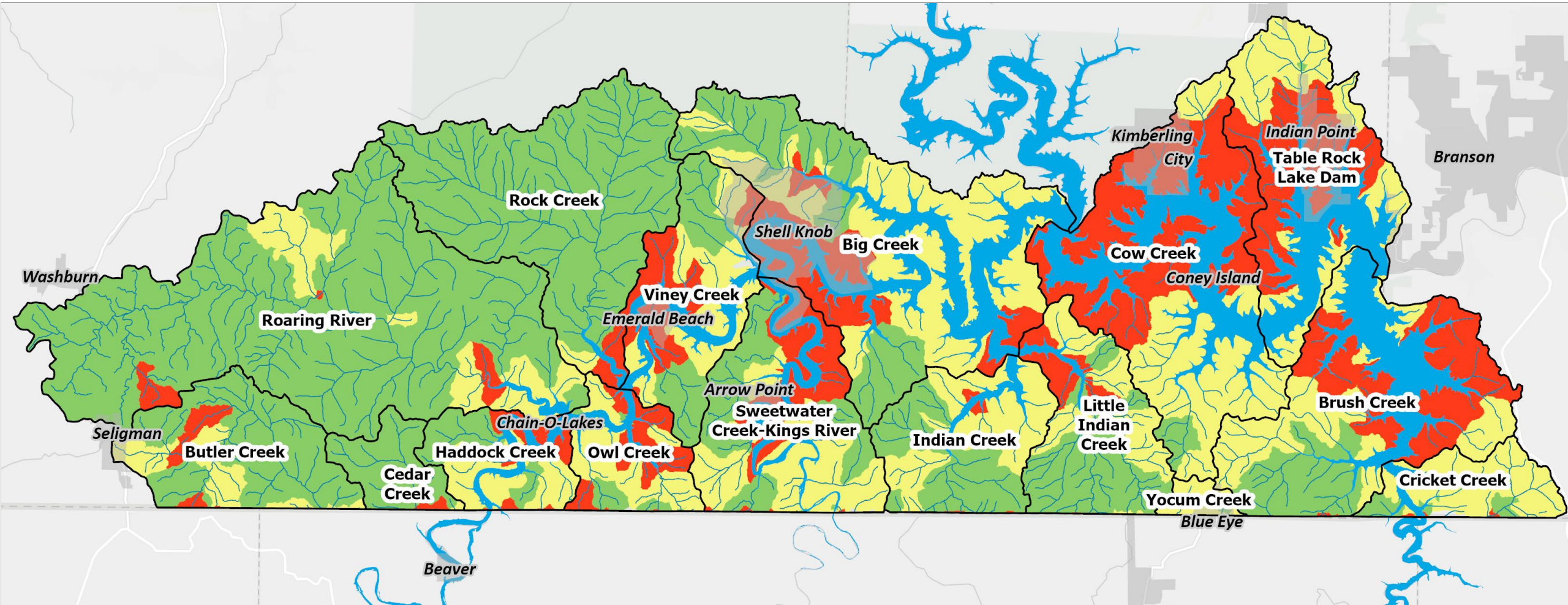
>3 - 4 = Moderate

>4 - 9 = High

Potential Septic Pollution Susceptibility

SEPTIC POLLUTION SUSCEPTIBILITY RANKING

- **Data Sources**
  - **Septic Density Estimations (USGS)**
  - **Hydrologic Soil Group (USDA)**



SOURCES OF ASSISTANCE, INFORMATION, & EDUCATION

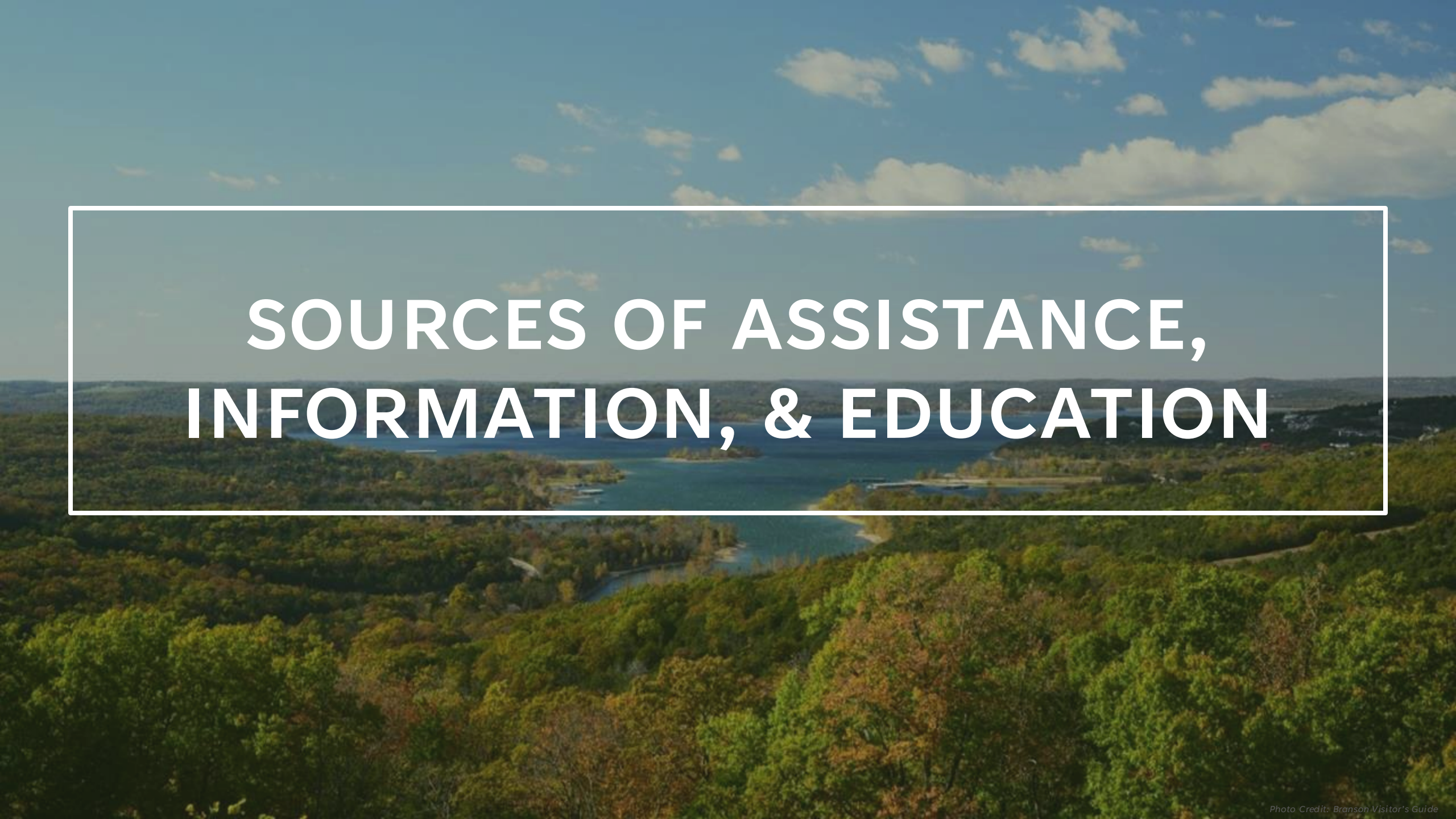


Photo Credit: Branson Visitor's Guide

TECHNICAL & FINANCIAL ASSISTANCE

MO DEPT. OF NATURAL RESOURCES

- 319 Nonpoint Source Project Grants
- 604(b) Water Quality Management Planning Grants
- Soil And Water Conservation Cost-share Program
- Abandoned Well Plugging Grants

US ENVIRONMENTAL PROTECTION AGENCY

- Clean Water State Revolving Funds
- Water Finance Clearinghouse
- Wetland Program Development Grants
- Healthy Watersheds Consortium Grants
- Environmental Justice Small Grants Program
- Urban Waters Small Grants

MO DEPT. OF CONSERVATION

- Community Conservation Cost-Share

US DEPT. OF AGRICULTURE

- Conservation Reserve Program
- Agricultural Conservation Easement Program
- Environmental Quality Incentives Program (EQIP)
- Conservation Stewardship Program (CSP)

NATIONAL FISH AND WILDLIFE FOUNDATION

- Five Star and Urban Waters Restoration Grant Program

MO DEPT. OF TRANSPORTATION

- Governor's Rural Routes Program

SOIL AND WATER CONSERVATION DISTRICTS

- Ag Related Project Funding

LOCAL HOUSING AUTHORITIES

- Potential funding for home (septic) repairs

INFORMATION AND EDUCATION

Urban & Residential Areas

- Implement Pollution Prevention Plans (signage, stenciling, etc.)
- Green Stormwater Infrastructure involving native plantings (MDC & Grow Native!)
- Grow Native Workshop + Lawn Nutrient Education
- EPA Stormwater Smart Outreach Tools & Materials
- Humane Society Adoption Day + Dog Waste Education Presentation

Pastureland & Agriculture

- Develop & implement nutrient management plans for pastureland
- Promote sustainable practices via Understanding Ag programs

Septic & Rural

- MO Smallflows Septic Workshop

Recreation & Water Use

- US Coast Guard Best Boating Practices

Policy & Decision-Makers

- Involve County Commissioners in NPS pollution workshops

THANK YOU

Stay Connected:

Next Meeting October 17th

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