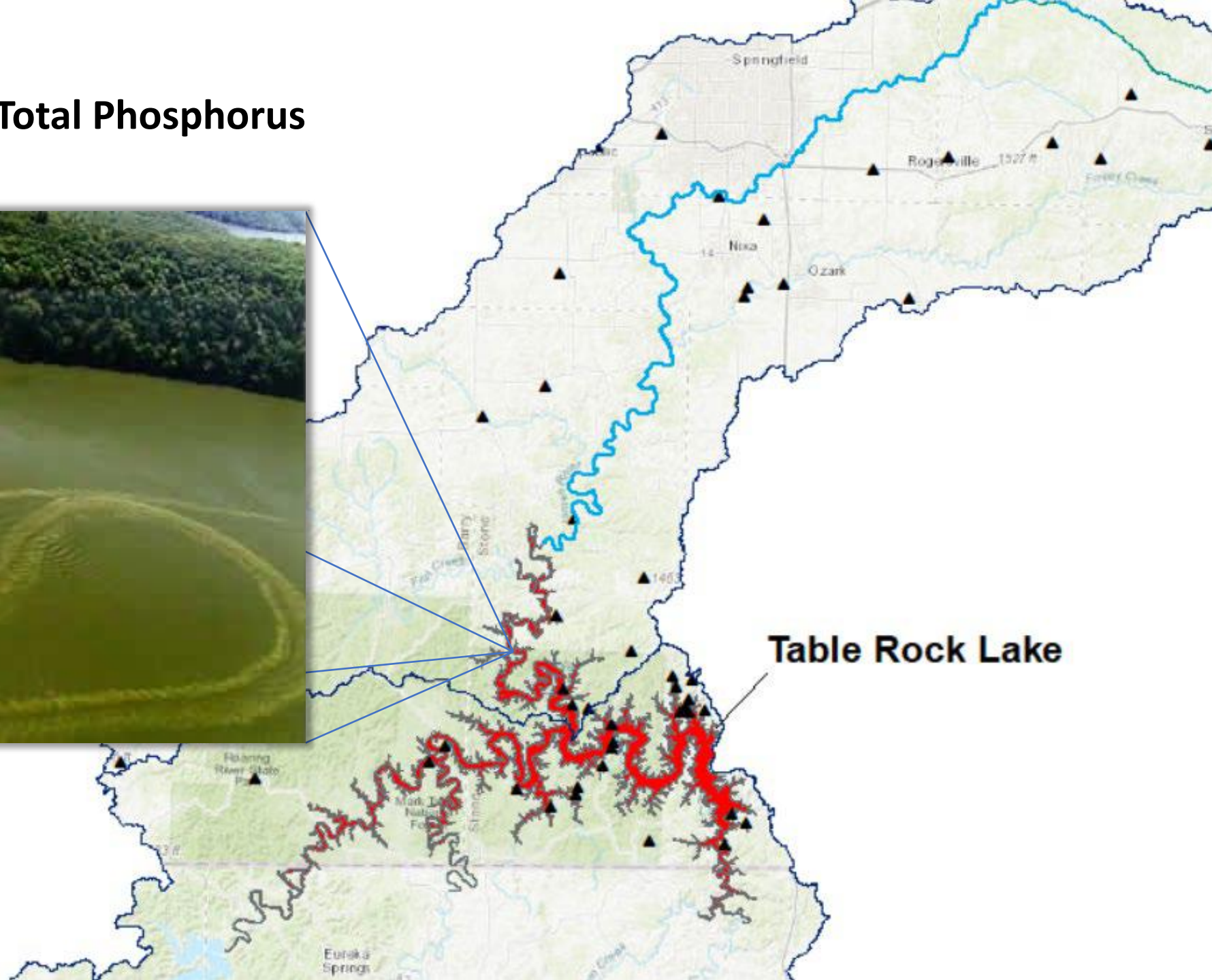
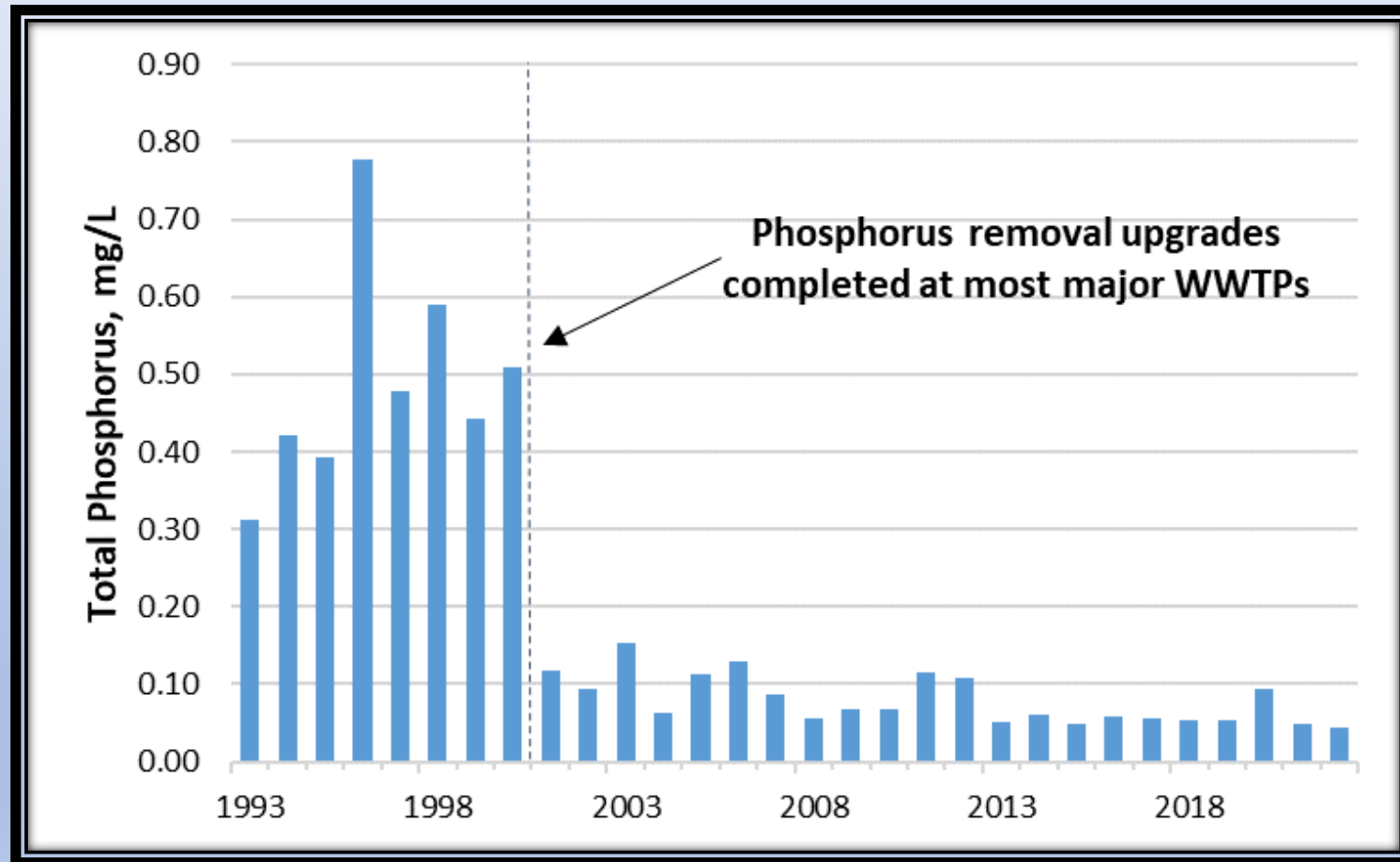


**Nutrient Trading in the
James River Basin**

TMDL 2001: Phase One Total Phosphorus



Watershed Focus on Early Adoption:





Phase 2 Solution: Reduce nutrient loading from Nonpoint Sources

Voluntary BMPs
MS4 Urban Stormwater Permits
On-going

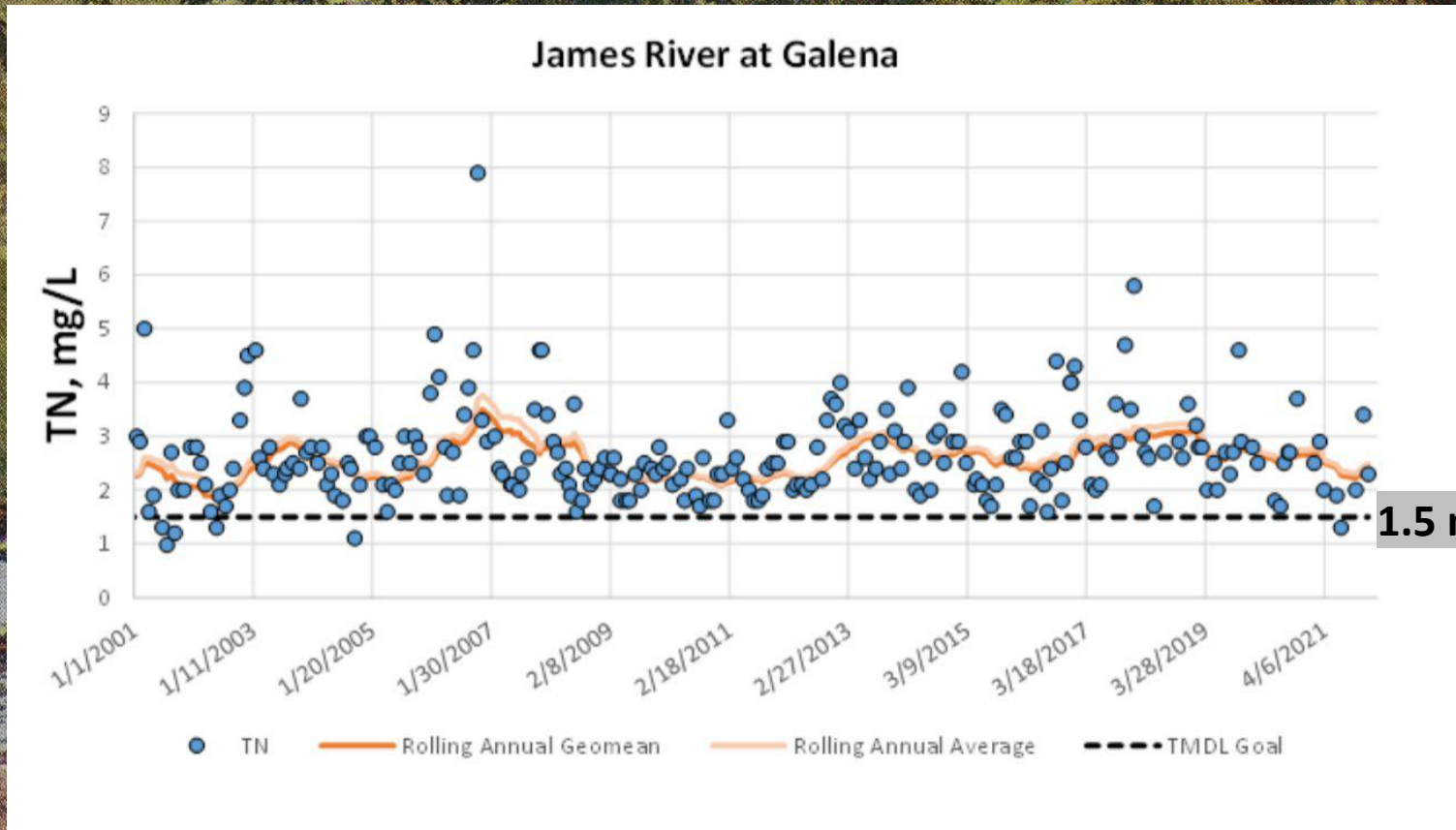


James River TMDL: Phase 3

Achieve TMDL target of
1.5 mg/l TN at Galena from all
point & nonpoint Sources



TN exceeds TMDL target of 1.5 mg/l
TN has slightly increased since the 1990s



James River TN Permitting Approach

- Watershed-based permitting framework
 - Stakeholder meeting 10/24/22
 - Public notice Spring 2023
- Potential nutrient trading
- Framework establishes:
 - Applicable facilities
 - TN limitations and monitoring
 - TN allocations
 - TN trading
 - Reporting

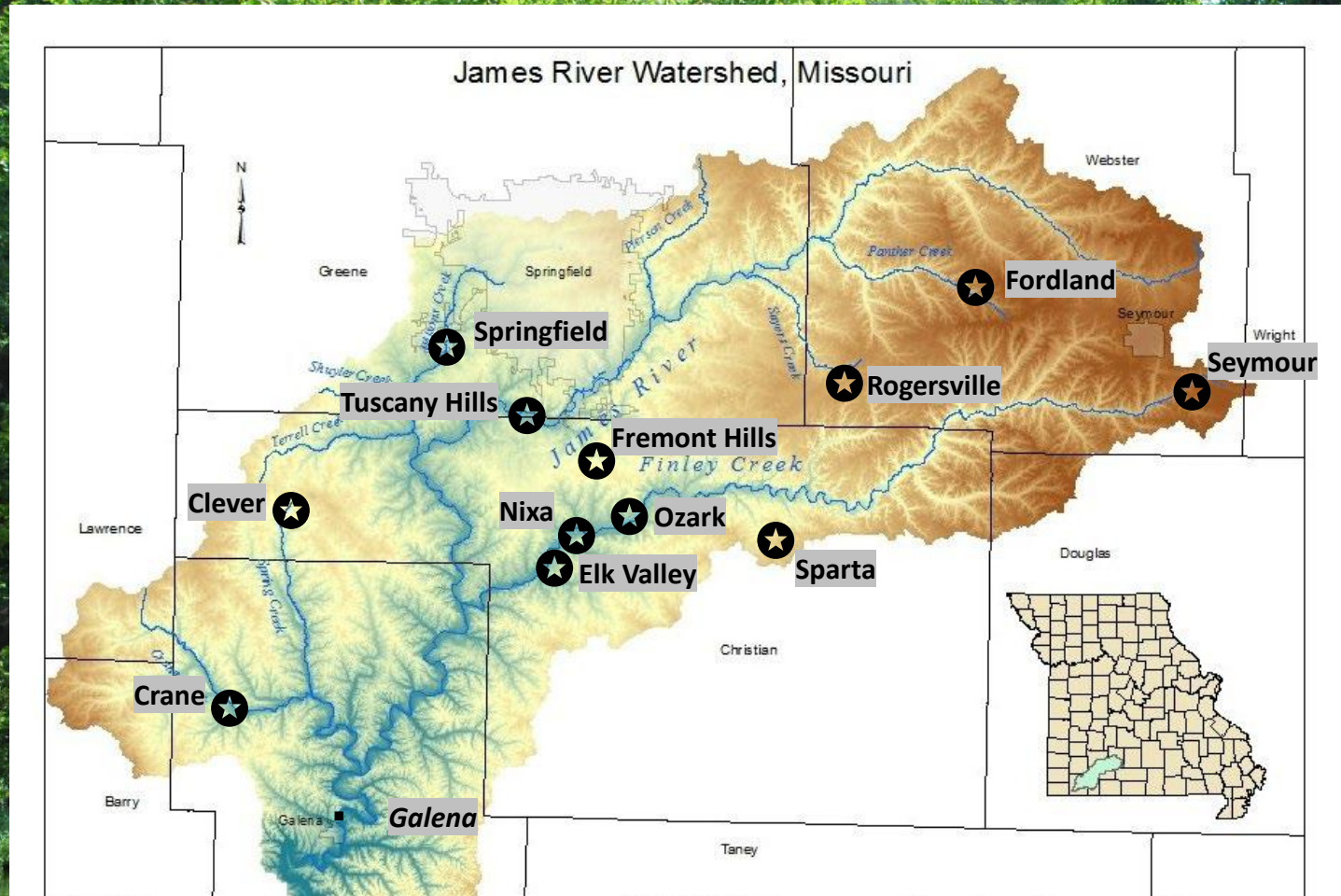
James River Watershed Total Nitrogen Permitting Framework October 2022

Missouri Department of Natural Resources developed a total maximum daily load (TMDL) to address excess nutrients in three segments of the James River as identified on Missouri's 1998 303(d) List of Impaired Waters. To address the nutrient impairment of the James River, the TMDL specifies concentration-based nutrient targets expected to result in attainment of water quality standards. The ultimate goal of the TMDL is achievement of 0.075 milligrams per liter (mg/L) total phosphorus and 1.5 mg/L total nitrogen at the in-stream United States Geological Survey monitoring location at Galena, MO.

The TMDL, approved by the U.S. Environmental Protection Agency (EPA) on May 7, 2001, is being implemented in phases. Phase 1 places an emphasis on achieving total phosphorus reductions from regulated point sources through effluent limitations administered through the Missouri State Operating Permit (MSOP) Program, implementing Missouri's effluent regulations limiting phosphorus discharges in the Table Rock Lake watershed to 0.5 mg/L as specified at 10 CSR 20-7.015(3)(F). Phase 1 of the TMDL implementation also included development and issuance of a municipal separate storm sewer system (MS4) permit to the City of Springfield, located in the James River watershed. The implementation of urban Best Management Practices (BMPs) implemented to meet MS4 permit conditions is expected to result in reductions in nutrient loading to the James River.

Phase 2 places an emphasis on reducing nutrient loading from nonpoint sources. Water quality improvements are often dependent upon actions and support from local communities and landowners residing within the watershed. Nonpoint sources are not regulated through permits and nutrient loading reductions from these sources rely on the voluntary implementation of BMPs in the watershed. This second phase of implementation was not defined by specific completion dates or activities like Phase 1 and essentially continues to this day.

From the time of the TMDL development in 2001, and since then to the present, a substantial decline in total phosphorus is apparent after Phase 1 implementation to reduce loading total phosphorus from point source discharges. However, the annual average total nitrogen concentrations have exceeded the TMDL target of 1.5 mg/L in all years of available data and average concentrations appear to have slightly increased since the late 1990s. Total nitrogen values remain much higher than the TMDL restoration target and indicate that greater reduction efforts are needed; an additional phase is implemented.



Twelve POTWs with $\geq 100,000$ gpd design flow account for 99.4% of TN point source load
Enforcement based on annual mass loading



FACILITIES \geq 0.1 MGD

Limits

- Mass-based (lbs/yr)
 - $(10 \text{ mg/L}) * (\text{Design flow, MGD}) * 8.34$
- Weekly sampling
- Monthly Total = (Monthly Avg, mg/L) * (monthly flow, MGD) * 8.34
- Annual Total = Sum of the 12 calendar months

James River TN Permitting Approach



Goals for Facilities $< 100,000$

- Concentration = 15 mg/L
- Weekly Sampling



| Facility | Design Flow (MGD) | % Total | TN Limit (mg/l) | 12-mo. Mass Loading (lbs/year) |
|--------------------|-------------------|---------------|-----------------|--------------------------------|
| Clever | 0.210 | 0.3% | 10.0 | 6,392.61 |
| Crane | 0.300 | 0.4% | 10.0 | 9,132.30 |
| Fordland | 0.100 | 0.1% | 10.0 | 3,044.10 |
| Fremont Hills | 0.176 | 0.2% | 10.0 | 5,357.62 |
| Nixa | 4.000 | 5.4% | 10.0 | 121,764.00 |
| Ozark | 2.100 | 2.9% | 10.0 | 63,926.10 |
| Ozark - Elk Valley | 1.000 | 1.4% | 10.0 | 30,441.00 |
| Rogersville | 0.960 | 1.3% | 10.0 | 29,223.36 |
| Seymour | 0.378 | 0.5% | 10.0 | 11,506.70 |
| Sparta | 0.200 | 0.3% | 10.0 | 6,088.20 |
| Springfield | 64.000 | 87.0% | 10.0 | 1,948,224.00 |
| Tuscany Hills | 0.120 | 0.2% | 10.0 | 3,652.92 |
| TOTAL | 73.544 | 100.0% | 10.0 | 2,238,752.90 |

Example:

Nixa: $4.0 \times 10.0 \times 8.34 \times 365 = 121,764 \text{ lb/year}$

TMDL goal to be attained collectively by the facilities in the trading zone





Schedule of Compliance

- Schedule of Compliance
 - Within 6 months, report progress
 - Annual interim progress reports
 - **Compliance within 12 years**

| Year | Suggested Milestone(s) |
|------|---|
| 1 | Hire engineer and conduct rate survey, submit application for Engineering Report Grant for I&I evaluations |
| 2 | Implement rate survey recommendations, optimization, I&I work |
| 3 | Optimization, I&I work |
| 4 | Optimization, I&I work |
| 5 | Submit renewal application, hold bond election, I&I work |
| 6 | Submit funding application, submit facility plan/Antidegradation, develop construction permit application, I&I work |
| 7 | Submit construction permit application, operating permit modification application, technical plans and specifications and summary of design |
| 8 | Construction permit application review, start construction |
| 9 | Construction |
| 10 | Construction, submit renewal application |
| 11 | Construction |
| 12 | Construction complete, submit Statement of Work Complete, meet limits |

With Total Nitrogen Permitting Framework:

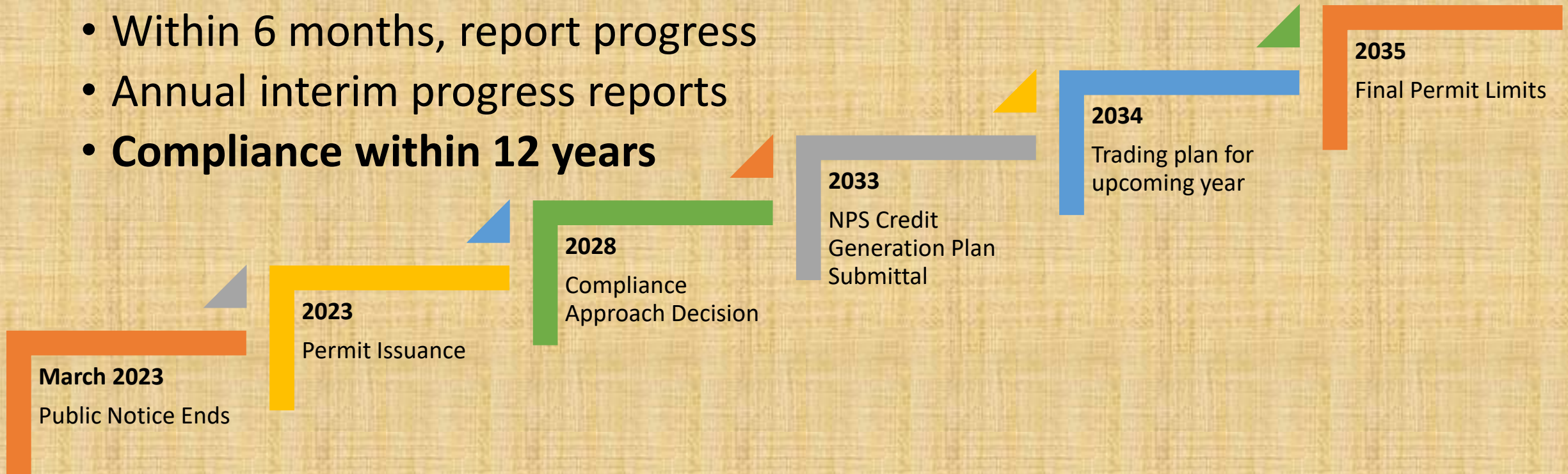
COMPLIANCE OPTIONS

- Installation of technology (treatment process improvements)
- Purchase of TN credits
- Hybrid: Installation of technology AND purchase of TN credits



Schedule of Compliance

- Within 6 months, report progress
- Annual interim progress reports
- **Compliance within 12 years**



| EXAMPLE | |
|--|-----------------|
| POTW "A" | Pounds per year |
| Allowable annual TN mass loading | 30,000 |
| Actual annual TN mass loading | 32,000 |
| Credits purchased | (2,000) |
| After credit adjustment (ACA) | 30,000 |
| * The ACA is used for permit compliance | |
| * ACA must be less than or equal to allowable annual mass loading. | |
| POTW "B" | Pounds per year |
| Allowable annual TN mass loading | 100,000 |
| Mass loading based upon actual annual flow | 98,000 |
| Credits available based on actual mass loading | 2,000 |
| Eligible credits from NPS projects | 2,000 |
| Adjusted TN Mass Loading | 96,000 |
| Credits available for sale | 4,000 |
| After credit adjustment (ACA) | 100,000 |

One credit = one pound of nitrogen

For NPS projects, the number of credits allowed per pound of TN reduction will be determined on a case-by-case basis.

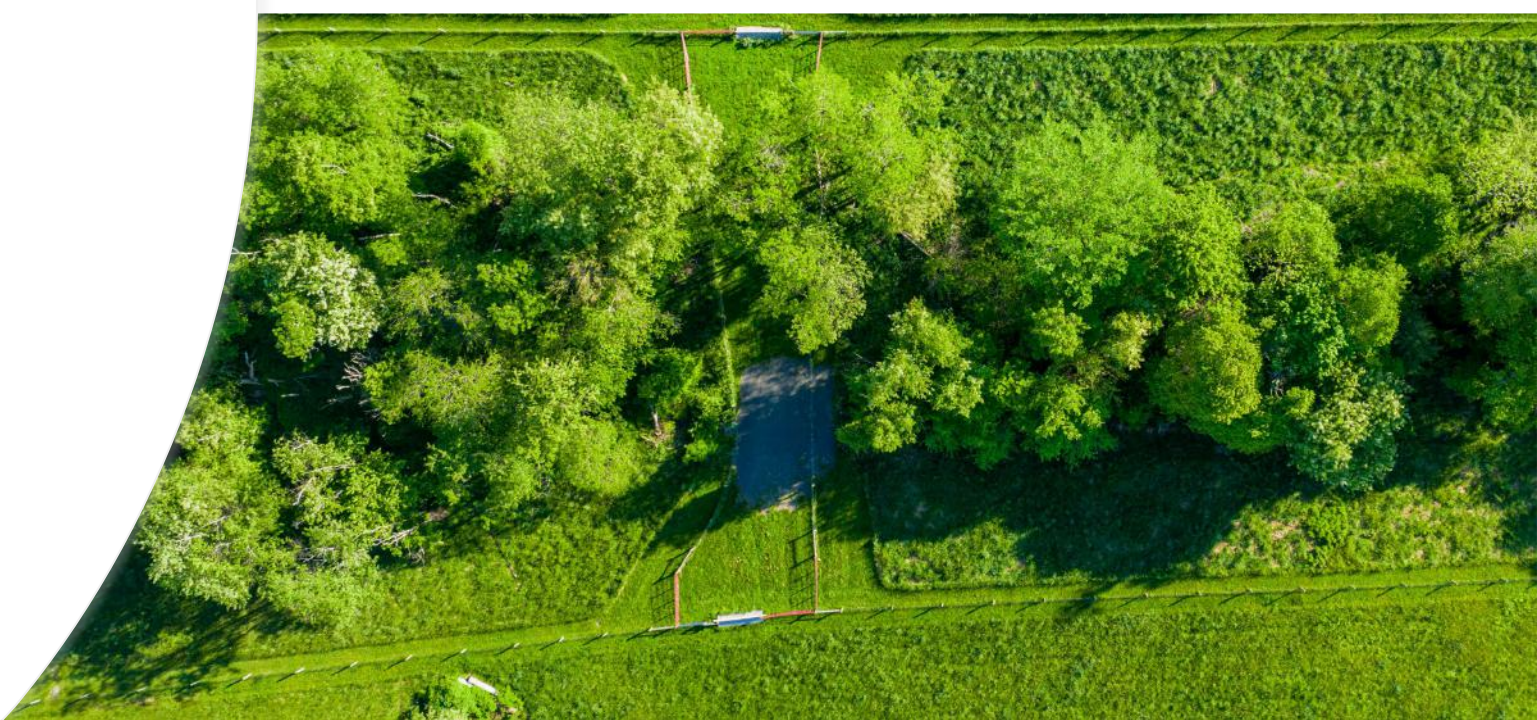
Nonpoint Sources of Nitrogen in the James River Basin

- Cattle and livestock
- Streambank erosion
- Failing septic tanks
- Urban runoff



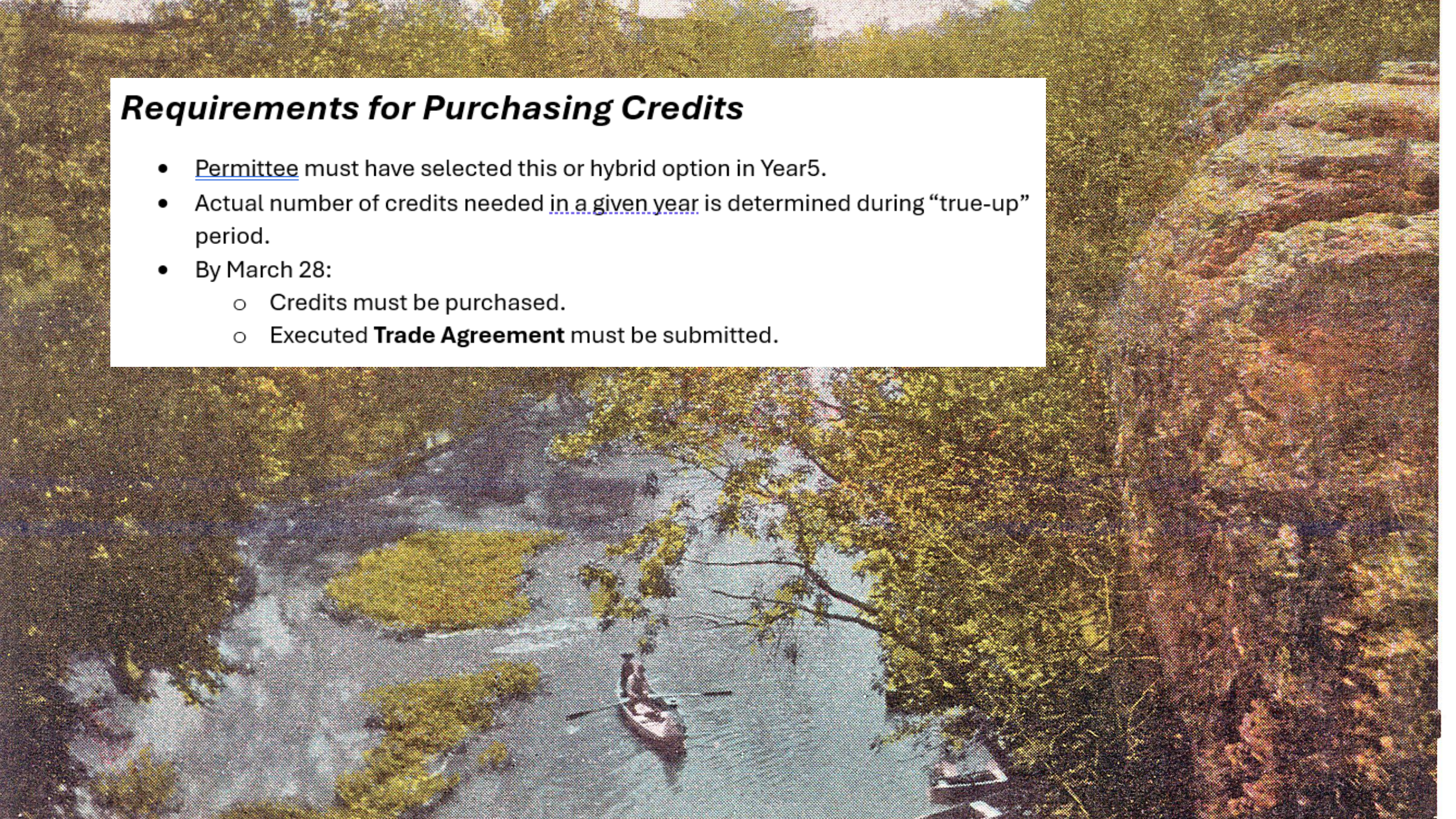
Potential BMPs for generating TN credits

- Riparian Restoration and Enhancement
- Streambank stabilization
- Cattle Exclusion
- Septic Tank Elimination
- Other BMPs



Requirements for Purchasing Credits

- Permittee must have selected this or hybrid option in Year 5.
- Actual number of credits needed in a given year is determined during “true-up” period.
- By March 28:
 - Credits must be purchased.
 - Executed **Trade Agreement** must be submitted.



Requirements for generating and selling credits

Seller

- Identify potential project (s)
- Evaluate feasibility of project
 - Estimate cost
 - Estimate TN reduction
 - Availability of project site
- Prepare **NPS Credit Generation Plan**
- Submit for DNR review and approval
- Obtain agreements/easements for project site
- Contract for construction (or in-house)

[Construction of project]



A scenic view of a river flowing through a forest. The river is in the foreground, with large rocks on the left bank. The water is clear and reflects the surrounding greenery. The background is filled with tall trees and dense foliage, creating a lush, natural setting.

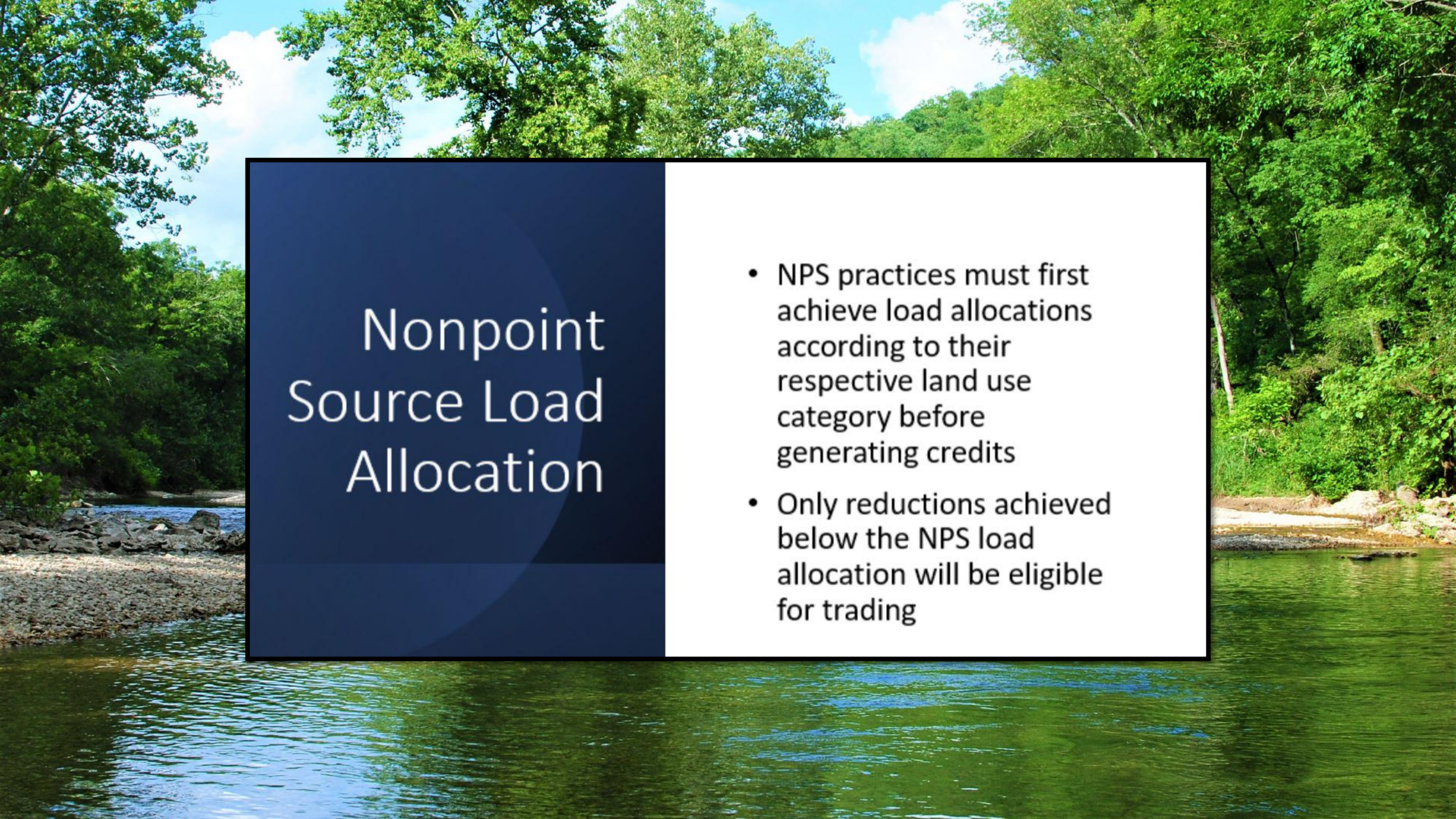
POST-CONSTRUCTION

- Permittee submits information to verify load reduction.
- Credits may be sold after one year of achieving proposed reduction.
- DNR approves trading ratio.
- **Permittee:**
 - Decides sale price for credits.
 - Identifies potential purchasers.
 - Negotiates and executes Trade Agreement.

Nonpoint Source Credit Generation Plans

NPS implementation plans must include the following:

- Overview of the project
- Projected TN credits generated
- Proposed trading ratio(s) calculations
- Implementation and credit tracking plans
- Relevant financial information
- Project schedule
- Inspection and on-going maintenance



Nonpoint Source Load Allocation

- NPS practices must first achieve load allocations according to their respective land use category before generating credits
- Only reductions achieved below the NPS load allocation will be eligible for trading

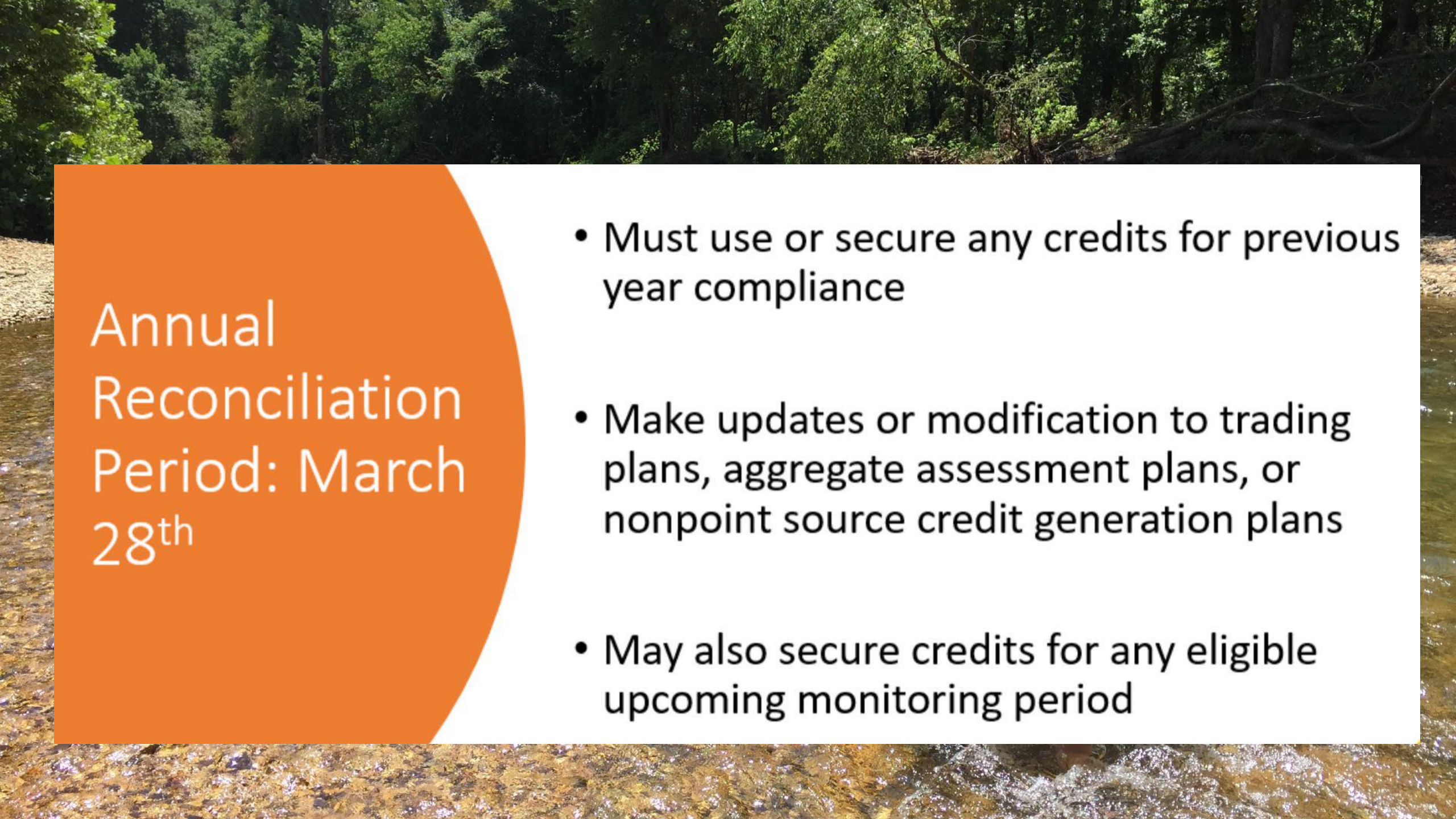
NPS Nitrogen Load Allocation by Proportion of Existing Loading

| Type of land use | Total acres in James River watershed | Loading Proportion | LA Estimated TN load (pounds per year) | LA estimated TN load (pounds per acre per year) |
|-------------------|--------------------------------------|--------------------|--|---|
| Developed (urban) | 94,839 | 14.30% | 238,945 | 2.5 |
| Hay/pasture | 333,531 | 78.31% | 1,308,288 | 3.9 |
| Forest | 210,033 | 6.60% | 110,251 | 0.5 |
| Cropland | 1,959 | 0.79% | 13,137 | 6.7 |
| TOTAL | 640,362 | 100.00% | 1,670,682 | |

Time Terms for Credit Use

- A credit may only be applied towards the load of a single year (single use). Unused credits expire after 2 years.





Annual
Reconciliation
Period: March
28th

- Must use or secure any credits for previous year compliance
- Make updates or modification to trading plans, aggregate assessment plans, or nonpoint source credit generation plans
- May also secure credits for any eligible upcoming monitoring period



Trade Negotiations & Costs of Credits

No Third-party Trade Group

- Permittee responsible to negotiate trades and obtain legal trade agreements
- Trade negotiations and agreements shall take place without the involvement of the department
- The final price of a credit is entirely determined by the credit seller

Third-party Trade Group

- Third-party assists with trades and obtaining legal trade agreements
- Third-party assists with determining price of credits and maintaining records of trades.
- Trade negotiations and agreements shall take place without the involvement of the department

Next Steps

- Determine level of interest in nutrient trading.
- Meet with Technical Committee to determine details of process for managing trades and determining cost of credits.
- Present recommendations to the Stakeholder Committee.
- A report will be prepared with:
 - recommendations for establishment of a trading framework
 - the role of a 3rd party to assist with trades, and
 - any additional study or information needed prior to finalizing the framework.
- Give presentations to elected leadership of each community as requested.

A scenic photograph of a river flowing through a lush green forest. In the foreground, a bright blue canoe is beached on a rocky shore. The river has a light brownish-green hue and shows some rapids further downstream. The background is filled with tall, leafy trees under a cloudy sky. The text 'Questions? / Discussion' is overlaid in white, italicized font on the right side of the image.

*Questions? /
Discussion*