

***2011 American Water Resources Association  
Washington State Conference  
A Perspective on Water Quality Issues  
across Washington State***

**Strategies and Implementation for Reducing  
Phosphorus Loading with a Focus on the Spokane River**

***Managing Watershed Nutrients with a  
Nonpoint Source Reduction Plan***

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**October 4, 2011**



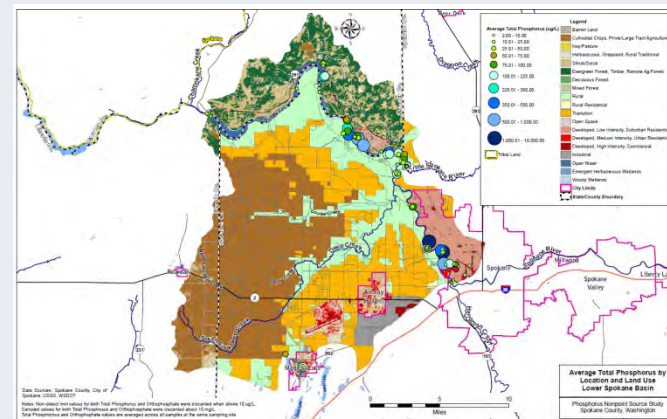
# Nonpoint Source Pollution

- Any unconfined diffuse sources
  - Atmospheric deposition
  - Surface water runoff from land uses
    - Urban/suburban
    - Agriculture
    - Forestry
  - Subsurface and groundwater
    - Septic systems
    - Gaining river reaches



# Point versus Nonpoint Sources

- Point Sources
  - Single location
  - Single entity
  - NPDES permits
  - Typical discharge patterns
- Nonpoint Point Sources
  - Watershed
  - Multiple entities
  - Voluntary
  - Variable



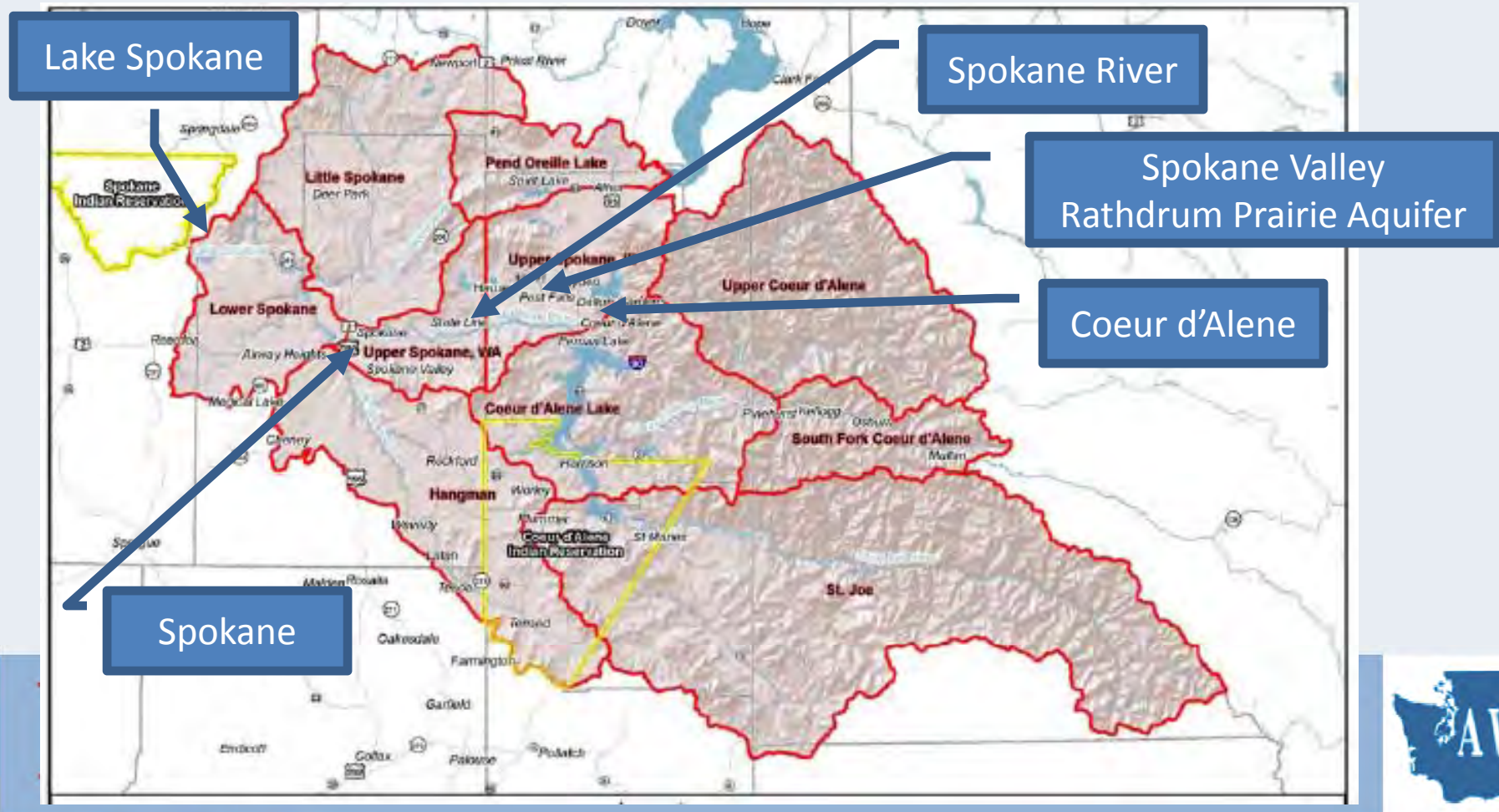
# Managing Nonpoint Sources

- Necessary to meet water quality standards
- Necessary as point sources are reduced to near zero
- More cost effective than reducing point sources
- Reduced by using best management practices



# Spokane River Watershed

- 6,600 square miles



# Bi-State Nonpoint Source Phosphorus Study and Reduction Plan

- Nonpoint source (NPS) loading analysis
- NPS Reduction Plan includes 100+ recommended actions in eight categories
- Target nonpoint sources with best management practices (BMPs)
- Sources throughout the basin contribute to the reductions



# History

- Overview of NPS Study and NPS Reduction Plan
  - Identified as needed during dissolved oxygen TMDL development
  - Began in 2007
    - NPS Study Evaluation: Completed Spring 2011
    - NPS Reduction Plan: To be finalized December 2011
  - Provide framework for NPS phosphorus reductions
- Nonpoint Advisory Committee (NPAC) meetings
  - Held eleven meetings
  - Reviewed and discussed NPS Study
  - Discussed NPS Reduction Plan content



# Nonpoint Source Study Outcomes

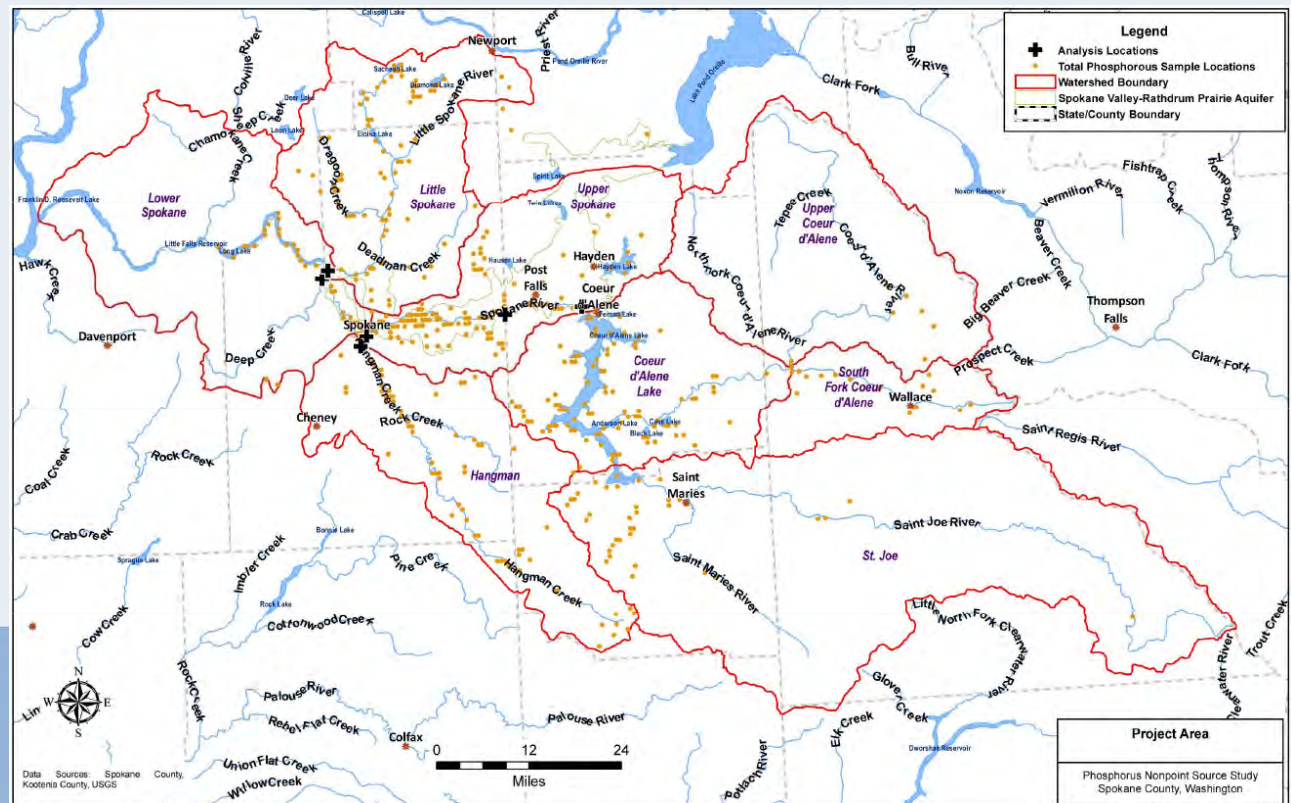
- Watershed-scale database
  - Credible data review
  - Phosphorus species
  - Total suspended solids
  - Flow
- Septic tank distribution evaluation
- Watershed-scale data gap identification and prioritization
- Deep Creek and Eaglewood field data collection
- Evaluation of analytical methods
- Data analysis and modeling for both surface water and groundwater
- Local and global BMP review and evaluation
- NPS Reduction Plan





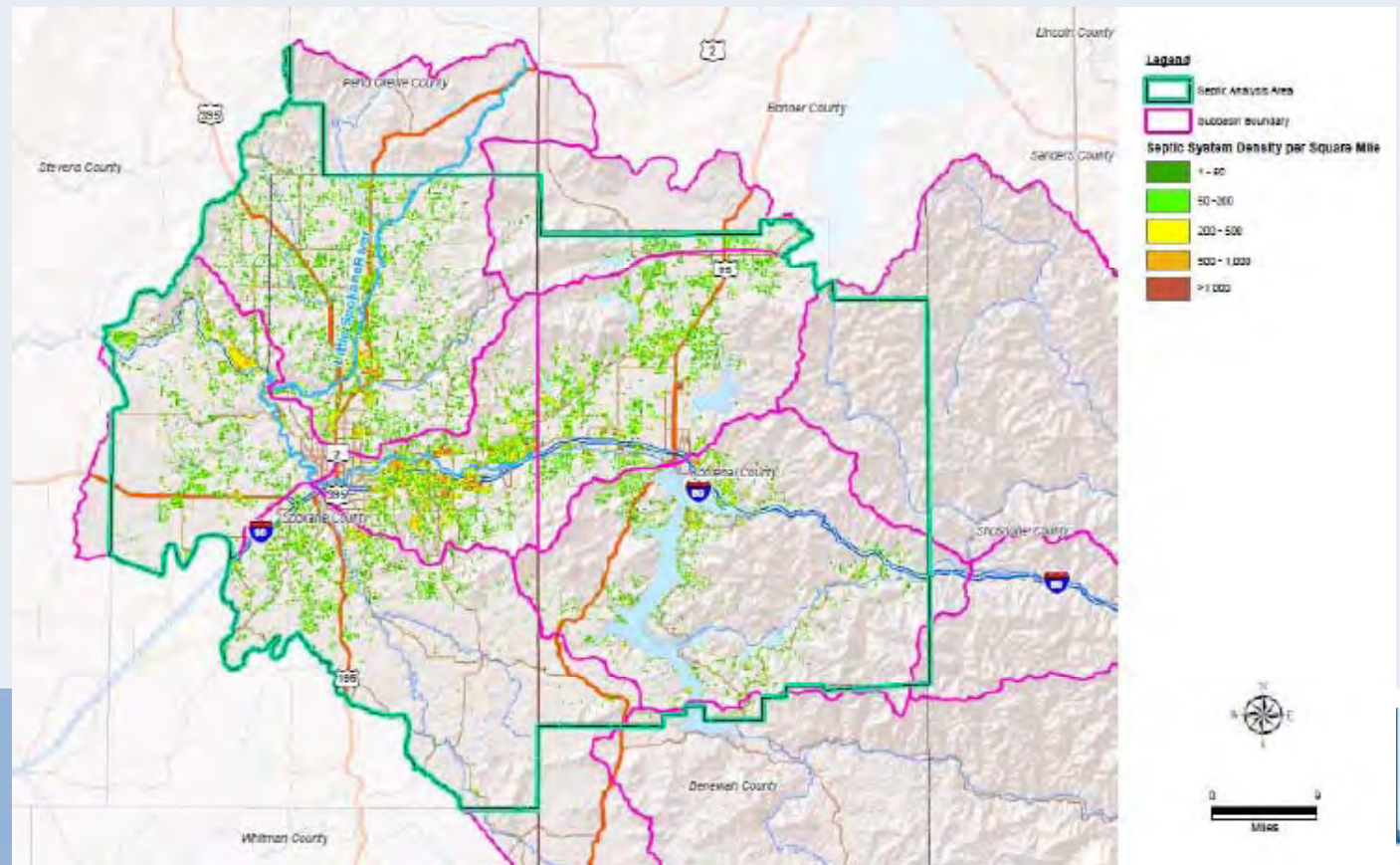
# Watershed Database

- Approximately 15,000 data post-1990 deemed relevant and credible from 100+ reports
- Inconsistent distributions
  - Spatial
  - Temporal
  - Detection Limits



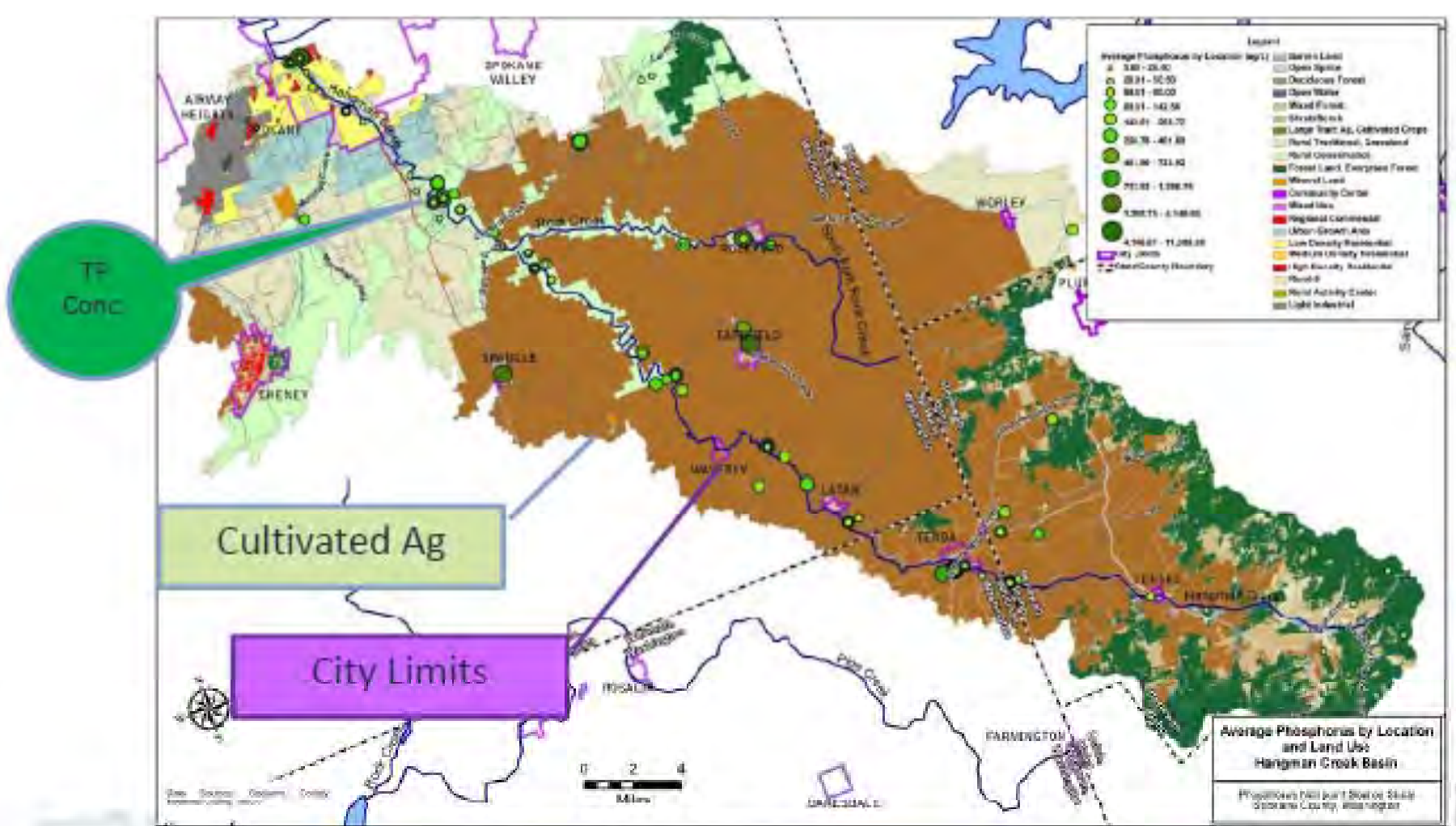
# Septic Systems in Spokane River Watershed

- Large number of septic systems remain in the watershed for future management consideration



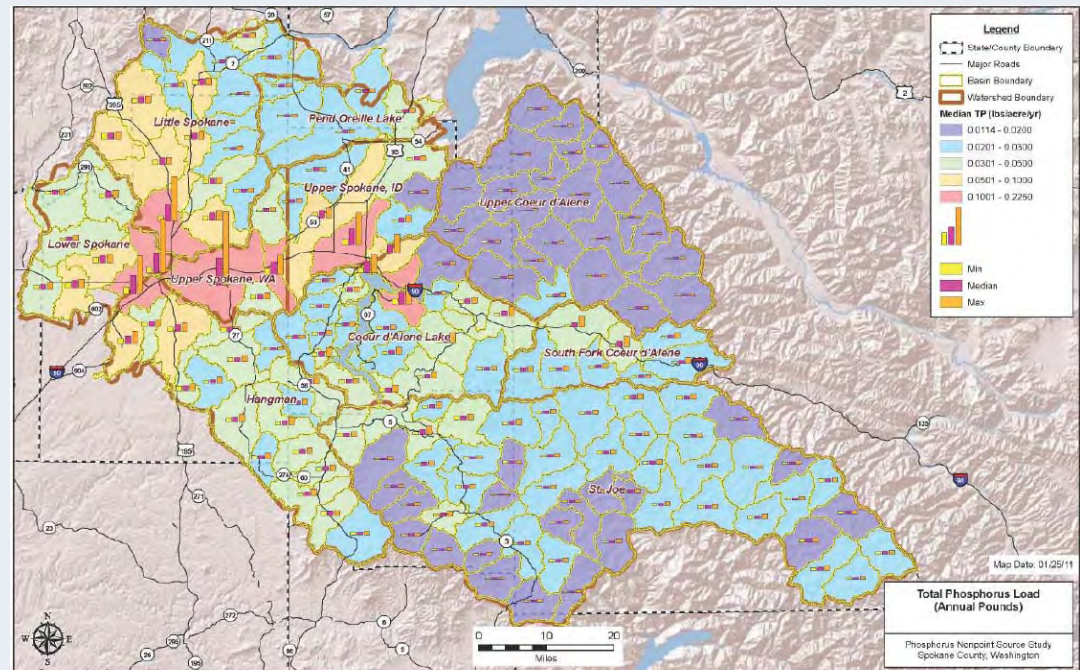
# Example - Hangman Creek Subbasin

- Total phosphorus data correlate with



# Watershed Scale Loading Analysis

- Objectives
  - Estimate nonpoint source loads
  - Not fate and transport modeling
- Model Selection Process
  - Available data
  - Limited schedule and budget
- Selected PLOAD model
  - Nonpoint source load from land uses
  - Annual aerial loading factor
- Customized optimization routine



# Best Management Practices Review

## Review and Evaluate

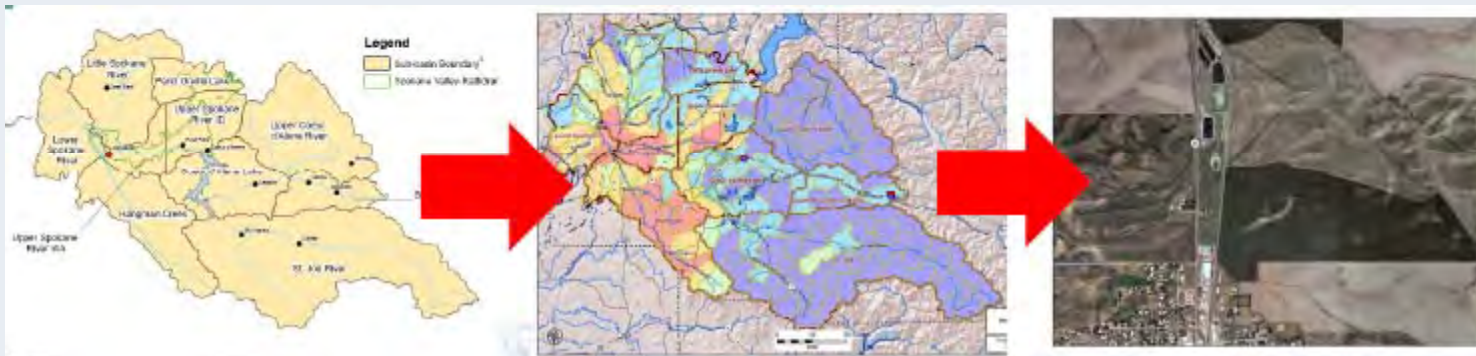
- Objectives
  - Identify BMPs appropriate for Spokane River watershed
  - Identify BMPs for different land uses and sources
- Gather information
  - Literature review
  - Survey of local and national experts
- Linkage to PLOAD results

## Prioritization Considerations

- Applicability
- Source reduction
- Proximity to waterbody
- Proximity to Lake Spokane
- Construction and maintenance costs
- Monitoring requirements and feasibility
- Estimated cost per unit phosphorus reduction
- Regulatory feasibility
- Level/likelihood of citizen/landowner cooperation
- Implementation schedule
- Duration of performance

# Application of Study Findings

- Combine the Analysis, PLOAD modeling, BMPs, and source identification
  - Into watershed and basin activities
  - Intermediate step to selecting local BMPs
- Local Stakeholders and Land Managers
  - Select activities for detailed, site specific BMPs
  - Implement



# Bi-State Study to Nonpoint Source Reduction Plan

- NPS Reduction Plan
  - Capture and summarize the Bi-State Study
  - Capture and acknowledge ongoing subbasin efforts
  - Support continuation of reduction activities
  - Provide recommendations for future efforts
  - Supply justification for agency leaders to do projects
  - Provide foundation for obtaining funding

# Outline of Nonpoint Source Reduction Plan

- Executive Summary
- How to Use this Plan
- Chapter 1 – Background and Issues
- Chapter 2 – TMDL and Nonpoint Sources
- Chapter 3 – Subbasins and Land Uses
- Chapter 4 – Watershed Data
- Chapter 5 – Field Data
- Chapter 6 – Groundwater Analysis
- Chapter 7 – Surface Water Analysis
- Chapter 8 – BMPs
- Chapter 9 – Watershed
- Chapter 10 – Lower Spokane River
- Chapter 11 – Upper Spokane River WA
- Chapter 12 – Little Spokane River
- Chapter 13 – Hangman Creek
- Chapter 14 – Upper Spokane River ID
- Chapter 15 – Coeur d’Alene Lake
- Chapter 16 – Upper Coeur d’Alene River
- Chapter 17 – South Fork Coeur d’Alene R.
- Chapter 18 – St. Joe River
- Chapter 19 – Pend Oreille Lake
- Chapter 20 – Implementation Considerations
- Chapter 21 - Conclusions



# Reduction Activities

- Chapter 9
  - Actions – steps from planning through achievements of NPS phosphorus reduction.
  - BMPs – core of the action.
- Actions are either land use or support related:
  - Agriculture Related Activities
  - Forestry Related Activities
  - Range Related Activities
  - Urban/Suburban Related Activities
  - Support Existing and Planned Activities
  - Supporting Phosphorus Reduction Activities
  - Regional Phosphorus Management
  - Additional Activities



# Watershed Actions

- Public Education and Outreach Programs
- Spokane River Watershed Phosphorus Trading
- Bi-State Coordination Workgroup
- Evaluate Long-term Trends
- Ongoing Monitoring
- Adaptive Management
- Evaluate and Restore Stream Functions and Stream banks
- Determine Baseline Conditions
- Review Forest Management Actions

# Basin Actions

- Fertilizer Application Location and Timing
- Fertilizer Application Rates
- Runoff Management and Treatment
- Crop and Animal Management
- Evaluate Forestry Practices
- Quantify Sediment-Phosphorus Relationships in Forested Areas
- Road Planning and Rehabilitation
- Commercial Forest Management
- Fire Rehabilitation Areas
- Evaluate Rangeland Practices
- Urban Waters Initiative to Reduce Stormwater Pollution
- Evaluate and Revise Stormwater Policies
- Strengthen Requirements in Critical Areas
- Evaluate Septic Loadings
- Septic Tank Elimination Programs
- Coordination and Support of Existing Plans, TMDLs and WRIA activities
- Enforcement of Existing Regulations, Ordinances, Plans

# Taking the Nonpoint Source Reduction Plan Forward

- Vision: Subbasin actions are implemented and nonpoint source phosphorus is reduced

