

# Pack River Nutrient TMDL

Presented to Pend Oreille Tributary Working  
Group

July 19, 2007

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# Why do we care?

- Natural component of aquatic ecosystem.
- Nutrients in excess can cause a eutrophic (enriched) system.
- Nutrients in excess can cause increased algae, periphyton, and nuisance aquatic weed growth.



# Why do we care?

## Secondary Impacts of Excess Nutrients

- Lose of Fish and Macroinvertebrate habitat due to algal blooms and vegetative mats.
- Reduced dissolved oxygen levels as plants decompose, resulting in loss of aquatic organisms
- Sources of excess nutrients: fertilizers, sewage systems, sediment containing nutrients, and organic matter.

# Idaho's Nutrient Criteria

- *Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.*
  - IDAPA 58.01.02.200.06

# Developing Numeric Target

- Steps taken to translate a narrative criteria into a numeric target
  - Literature review
  - Reference watershed
  - EPA recommendations

Algae blooms on the Neuse River in North Carolina are caused by excess nutrients.



# Developing Numeric Target

## ➤ Literature review

- Pend Oreille Lake Nearshore TMDL
- Pack River Stream Channel Assessment “Golder Report”
- CWE assessments
- Other

Aerial photo of 1999 algae bloom in the James River arm of Table Rock Lake, Missouri.



# Developing Numeric Target

## ➤ Reference Watershed

- Nothing with similar characteristics and associated data

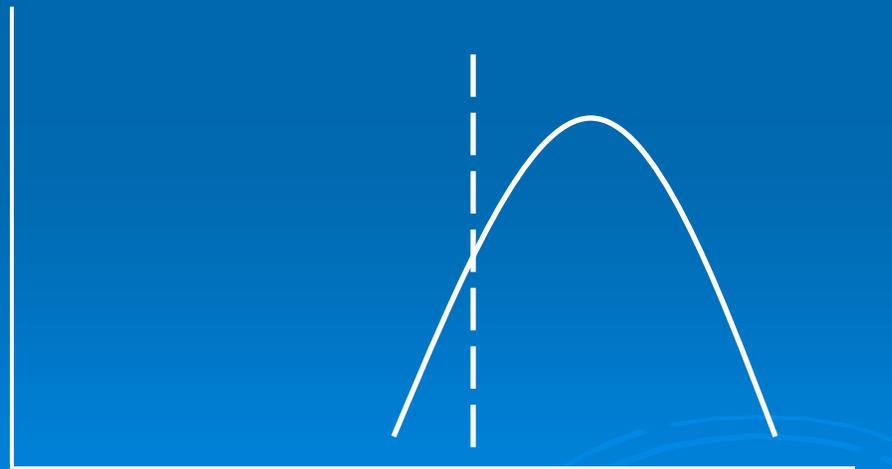


Northwest Florida

Merritts Mill Pond  
Photo by Jess Van Dyke  
Copyright 2003 Jess Van Dyke

# Developing Numeric Target

- EPA recommendations
  - 10  $\mu\text{g/L}$  based on upper 25<sup>th</sup> percentile of all sites



Higher Water  
Quality

Lower Water  
Quality

United States  
Environmental Protection  
Agency

Office of Water  
4304

EPA 822-B-00-015  
December 2000



## Ambient Water Quality Criteria Recommendations

Information Supporting the Development  
of State and Tribal Nutrient Criteria

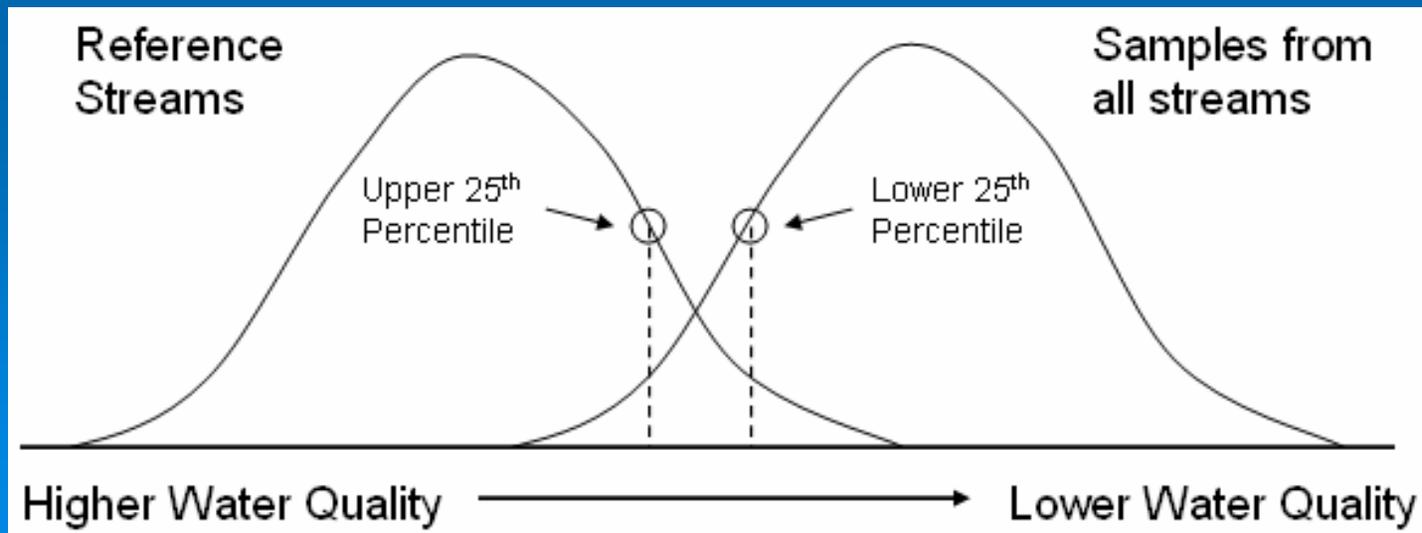
### Rivers and Streams in Nutrient Ecoregion II



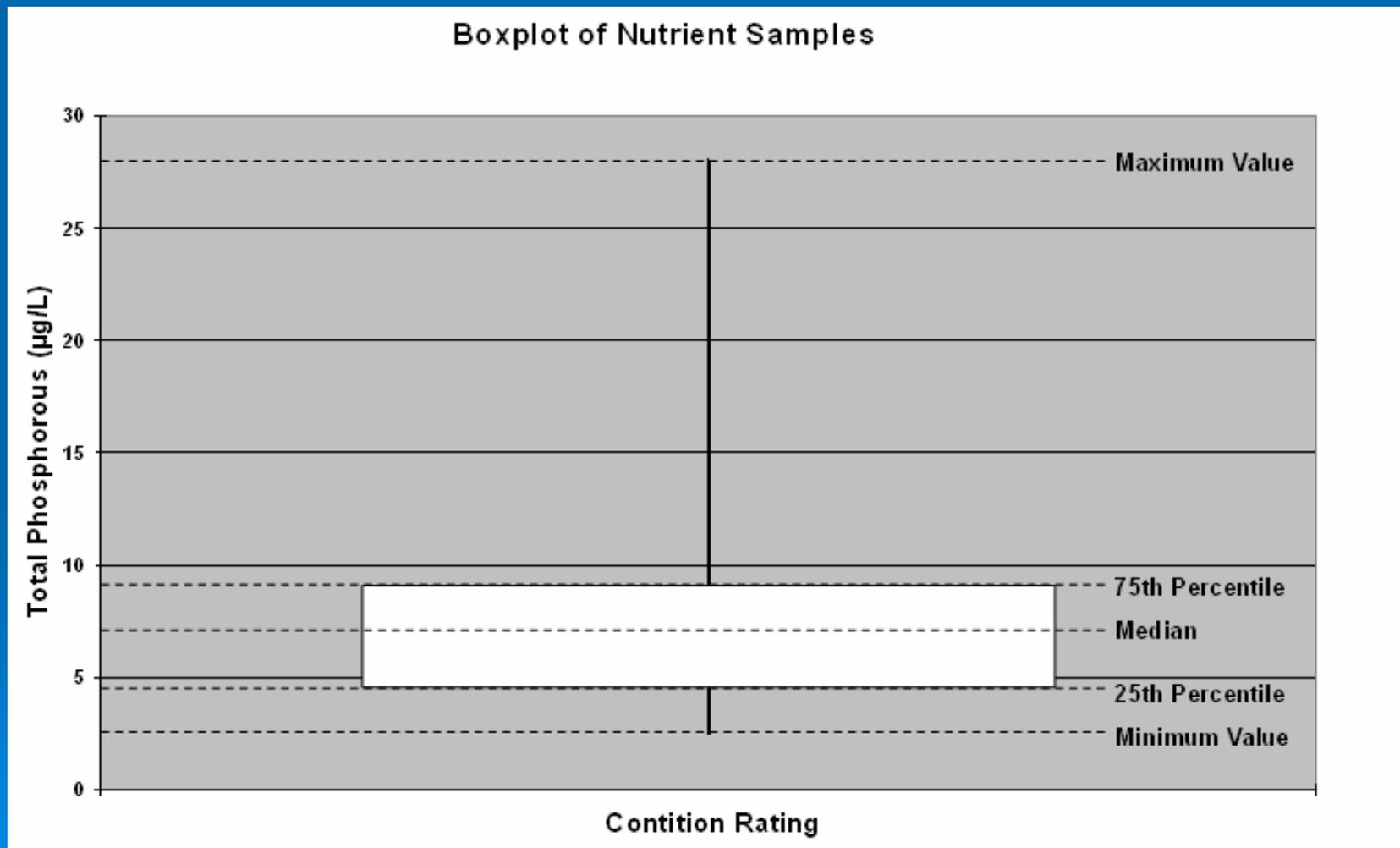
# Developing Numeric Target

## ➤ EPA recommendations

- Reference Sites in Northern Idaho compared
- 21 sites with TP data and passing WBAG II scores compared and 75<sup>th</sup> percentile evaluated



# Developing Numeric Target



# Results

- Pend Oreille Lake Nearshore TMDL
  - TP target = 9  $\mu\text{g/L}$
- EPA recommendation
  - TP 10  $\mu\text{g/L}$
- North Idaho data evaluation
  - TP 9  $\mu\text{g/L}$

Consistency between approaches suggests that 9  $\mu\text{g/L}$  is appropriate

# How does this target relate

## ➤ Converting mg/L to pounds per day

Load (pounds per day) = streamflow (cfs) x mg/L x 5.396

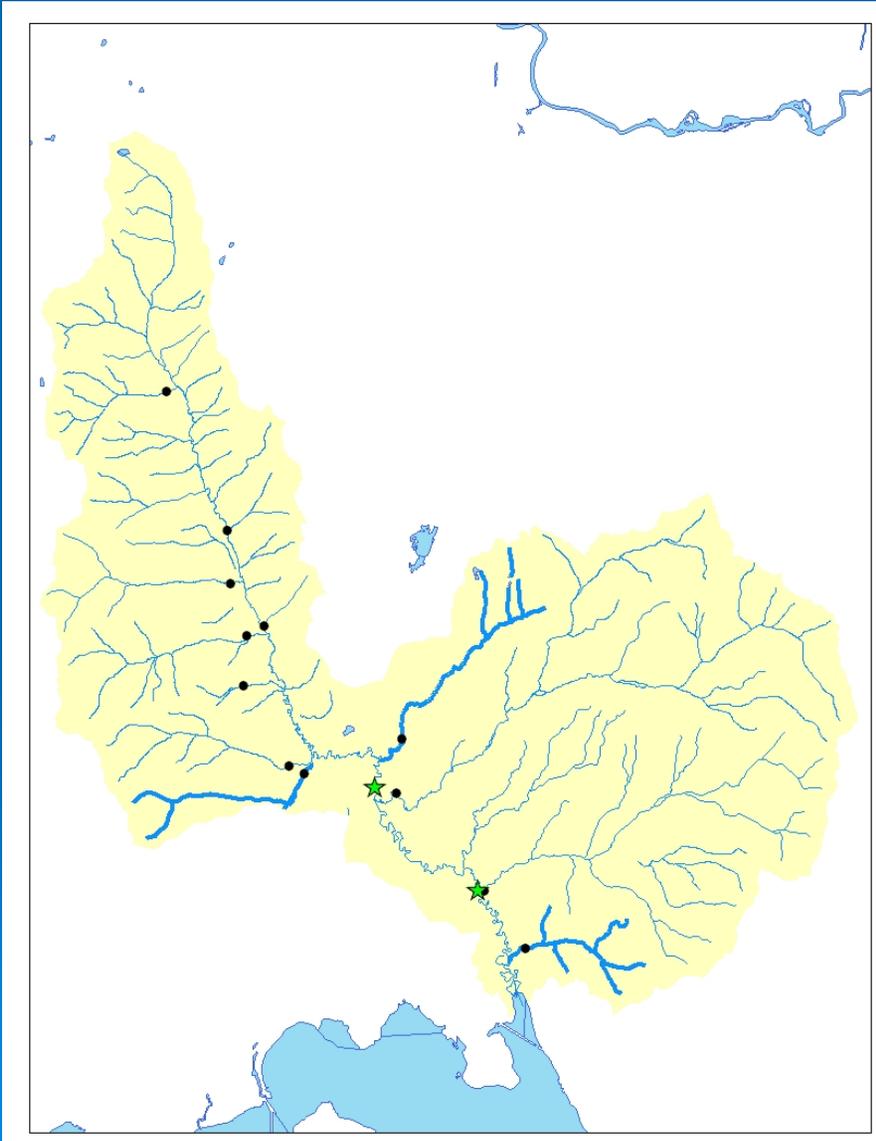
At Target 0.009 mg/L

Pack River at 200 cfs = 9.7 pounds per day

Sampled at 0.016 mg/L

Pack River at 200 cfs = 17.3 pounds per day

# TP Samples above 9 $\mu\text{g}/\text{L}$



- Colburn Creek
- Sand Creek
- Trout Creek
- Pack River above Rapid Lightning
- Pack River at Colburn Road

# TMDL Pollutant Loads



# Streams sampled in 2006 with TP values above 9µg/L

Stream	Date	TP (µg/L)	TP Target (µg/L)	Flow (cfs)
Colburn Creek	8/09/2006	29	9	1.99
	8/23/2006	27	9	1.78
Sand Creek	8/08/2006	26	9	2.00
	8/22/2006	24	9	1.75
Trout Creek	8/08/2006	11	9	2.28
	8/22/2006	14	9	1.74
Pack River – above Rapid Lightning Creek	8/08/2006	11	9	35.42
	8/22/2006	16	9	45.18
Pack River – at Colburn road	8/08/2006	17	9	37.91
	8/22/2006	15	9	29.15

# Total Phosphorous Loads

## Sand Creek total phosphorous load calculations.

Date	Measured TP ( $\mu\text{g/L}$ )	Discharge (cfs)	Current Load (pounds/day)	Target Load (pounds/day)	Load Reduction (pounds/day)
8/08/2006	26	2.00	0.28	0.09	0.19
8/22/2006	24	1.75	0.23	0.08	0.15

68%

65%

## Colburn Creek total phosphorous load calculations.

Date	Measured TP ( $\mu\text{g/L}$ )	Discharge (cfs)	Current Load (pounds/day)	Target Load (pounds/day)	Load Reduction (pounds/day)
8/08/2006	29	1.99	0.31	0.09	0.22
8/22/2006	27	1.78	0.26	0.08	0.18

71%

69%

## Trout Creek total phosphorous load calculations.

Date	Measured TP ( $\mu\text{g/L}$ )	Discharge (cfs)	Current Load (pounds/day)	Target Load (pounds/day)	Load Reduction (pounds/day)
8/08/2006	11	2.28	0.13	0.11	0.02
8/22/2006	14	1.74	0.13	0.08	0.05

15%

38%

# Annual TP Loads

Stream	Target Annual Total Phosphorous Load (pounds)
Sand Creek	196
Colburn Creek	255
Trout Creek	144