

Oklahoma Water Watch 1993-2001 Data Summary

OWW Staff

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Data Collection Activity

- More than 10,000 data points have been collected since 1993.
- More than 90 volunteers have invested over 10,000 hours testing.
- More than 90 sites have been monitored (48 active).
- 6 in-lake sampling sites.
- Groups involved include GLA, students, tribes, etc.

■ Basic Parameters:

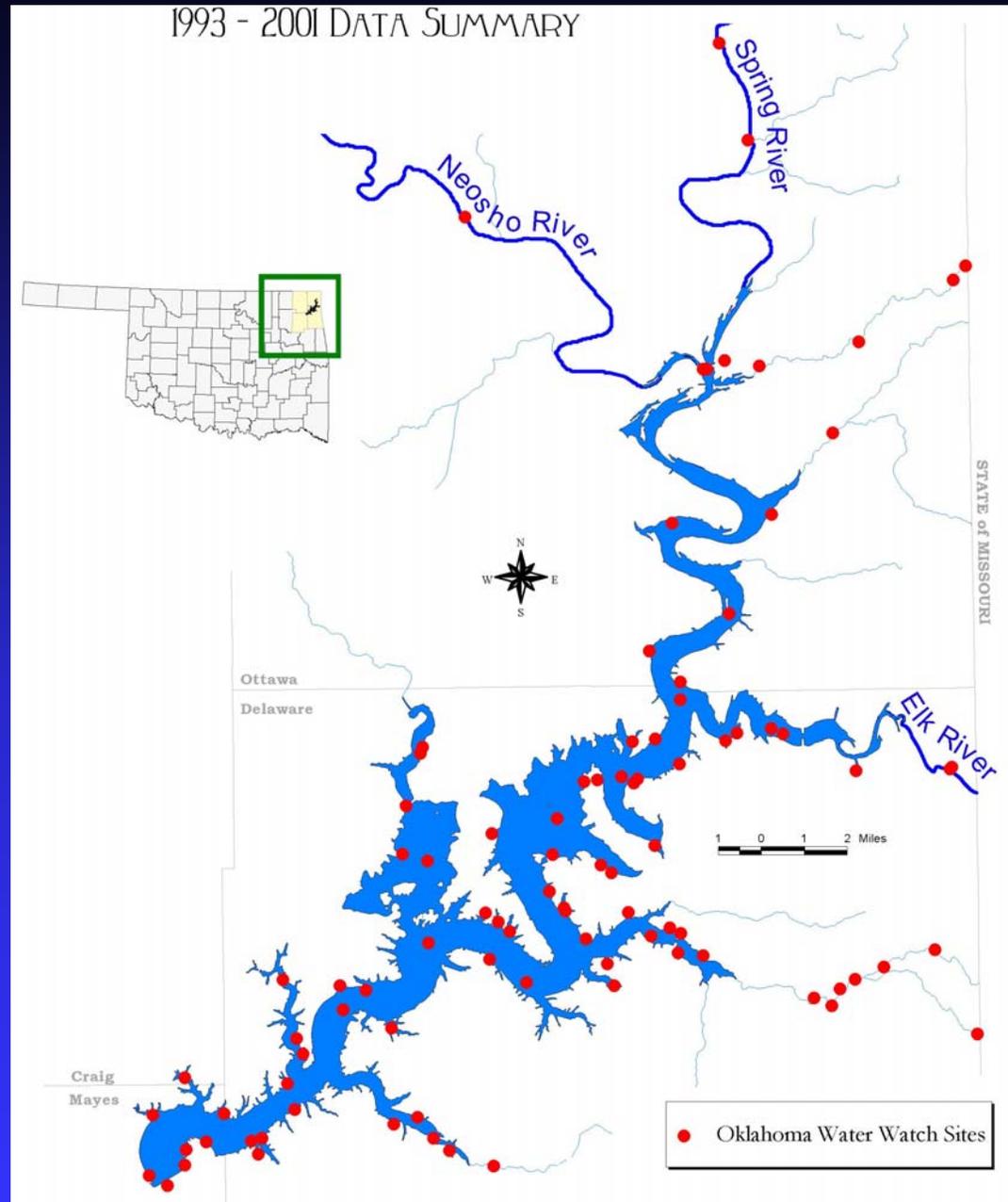
- ◆ DO, pH, air and water temp., color, and Secchi disk depth

■ Advanced Parameters:

- ◆ ammonia nitrogen
- ◆ nitrate nitrogen
- ◆ ortho-phosphate

■ In-Lake Sampling:

- ◆ Hydrolab
- ◆ nutrients (surface and bottom)
- ◆ Chlorophyll
- ◆ Secchi disk depth



1993-2001 Data Summary

- Executive Summary
- Introduction
- Limnology 101
- Materials and Methods
- Surface Water Quality
 - ◆ Upper Lake
 - ◆ Mid-Lake
 - ◆ Lower Lake
- In-lake Sampling
- River Data

Grand Lake Sections

- Upper Lake
- Mid-Lake Above Honey Creek
- Honey Creek
- Mid-Lake Below Honey Creek
- Lower Creek

UPPER LAKE
 Secchi 38 cm
 Ammonia 0.24 mg/l
 Nitrate 0.74 mg/l
 Orthophosphate 0.25 mg/l

MID-LAKE ABOVE HONEY CREEK
 Secchi 50 cm
 Ammonia 0.36 mg/l
 Nitrate 0.58 mg/l
 Orthophosphate 0.11 mg/l

LOWER LAKE
 Ammonia 0.76 mg/l
 Nitrate 0.39 mg/l
 Orthophosphate 0.09 mg/l

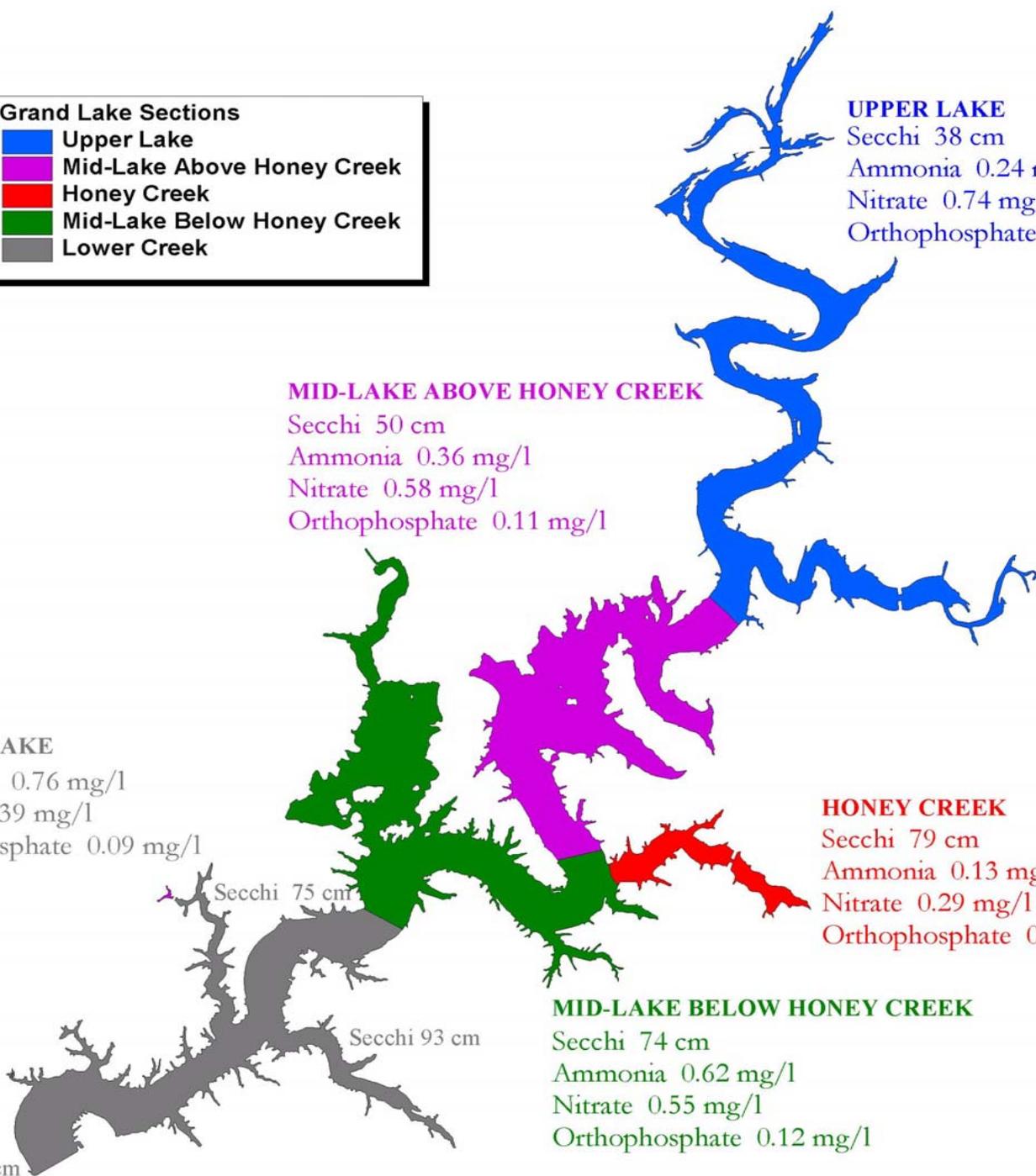
HONEY CREEK
 Secchi 79 cm
 Ammonia 0.13 mg/l
 Nitrate 0.29 mg/l
 Orthophosphate 0.06 mg/l

MID-LAKE BELOW HONEY CREEK
 Secchi 74 cm
 Ammonia 0.62 mg/l
 Nitrate 0.55 mg/l
 Orthophosphate 0.12 mg/l

Secchi 75 cm

Secchi 93 cm

Secchi 129 cm



Color Summary

	Brown	Green	Transparent
Upper Lake	45%	54%	
Mid-Lake	48%	50%	
Honey Creek	30%	38%	32%
Horse Creek	73%	19%	
Lower Lake	31%	67%	

As you move down lake, less brown and more green:

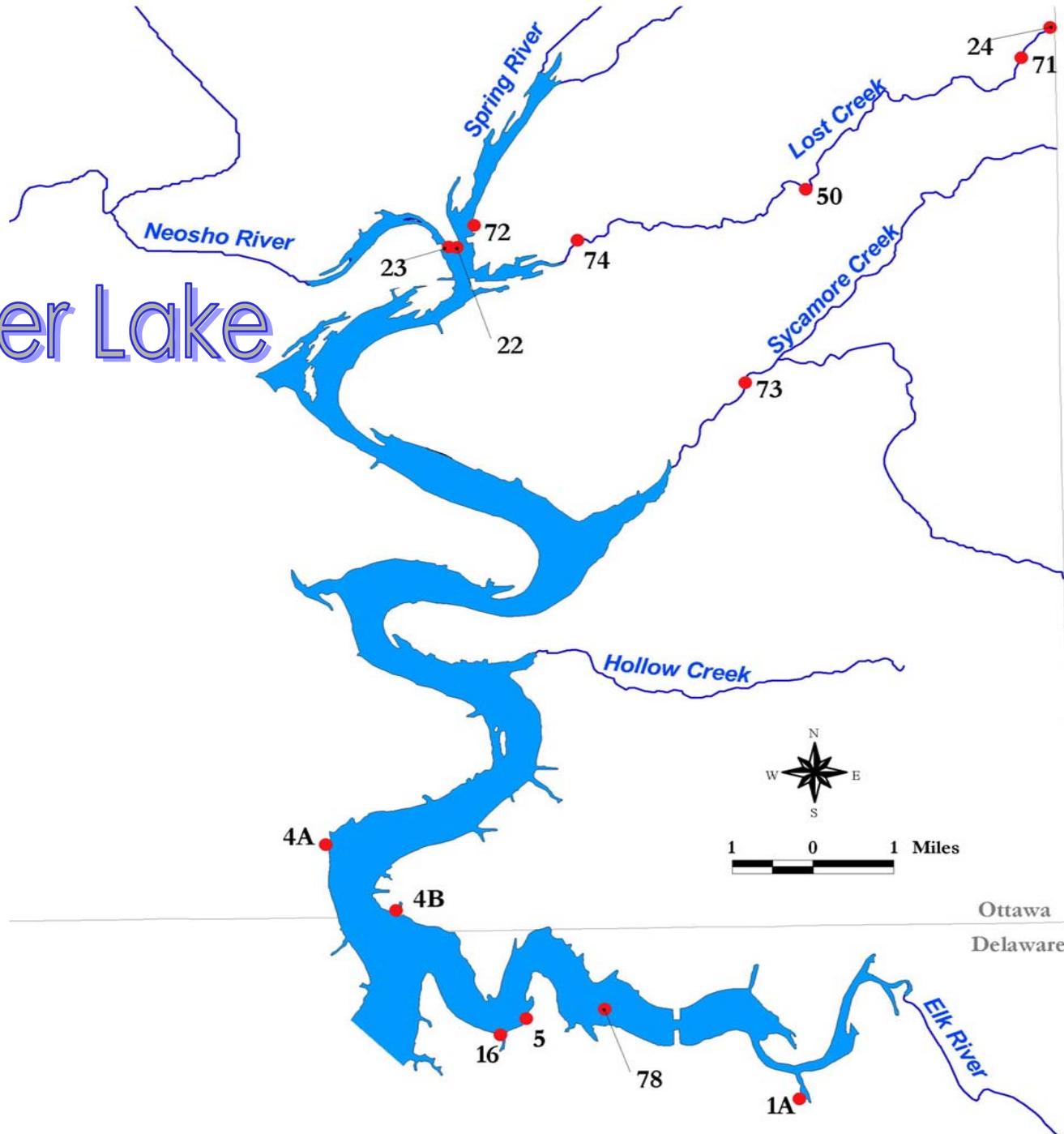
- Horse Creek = brownest
- Lower Lake = greenest
- Honey Creek = clearest

Surface Water Quality Trends

Trend Summary for Grand Lake from 1993 - 2001				
	Secchi Disk Depth	Ammonia Nitrogen	Nitrate Nitrogen	Ortho-phosphate
Upper Lake	↓	↓	-	↓
Mid-lake Above Honey Creek	↑	↓	↓	↑
Mid-lake Honey Creek Cove	↑	↓	NS	↑
Mid-lake Below Honey Creek	NS	NS	NS	↓
Lower Lake Upper	NS	↓	↓	NS
Lower Lake Dam	↑	-	-	-
Drowning Creek	↑	-	-	-

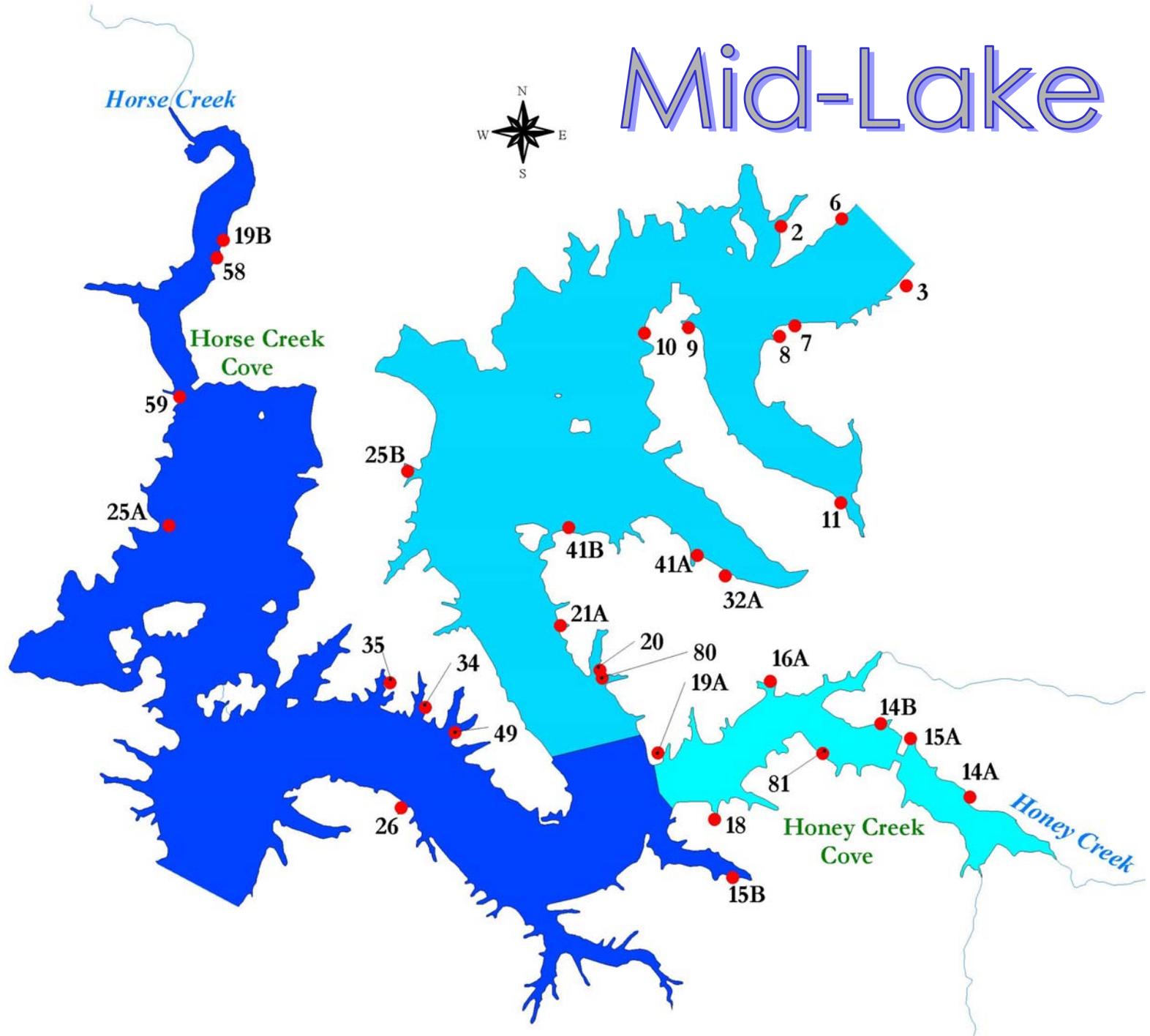
NS= no significant trend

Upper Lake

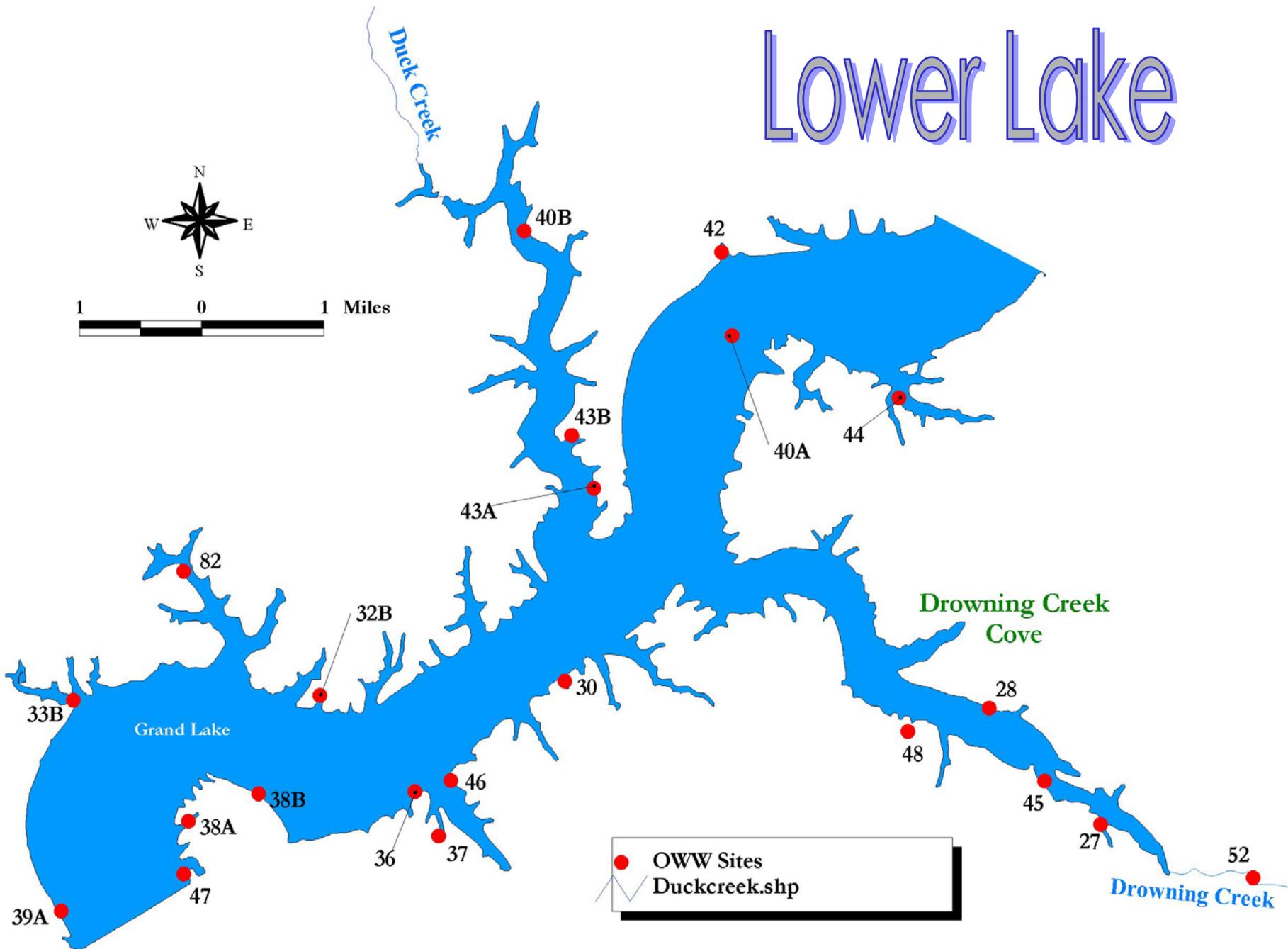


Ottawa
Delaware
State of Arkansas

Mid-Lake

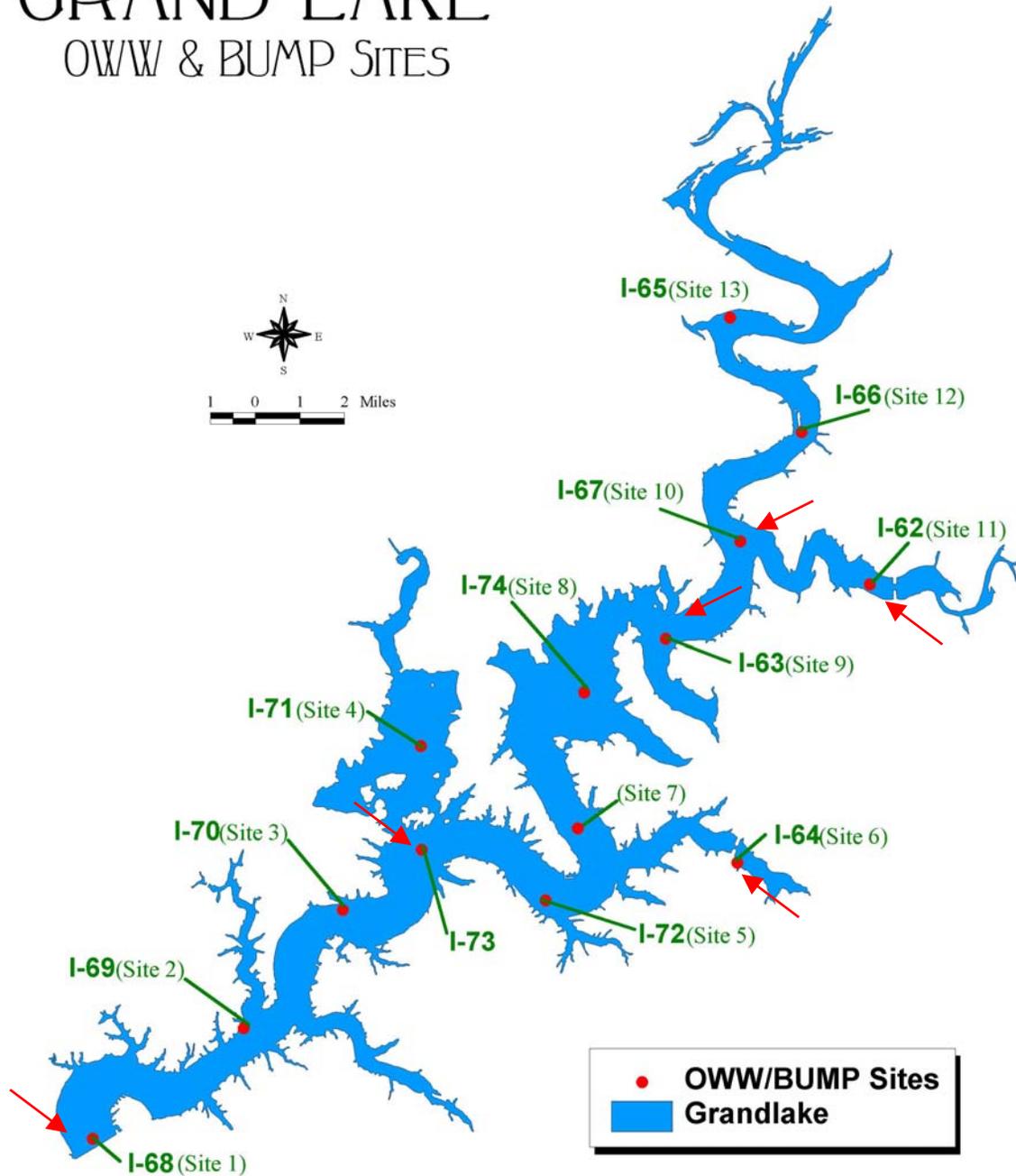


Lower Lake



GRAND LAKE

OWW & BUMP SITES



In-Lake Sampling

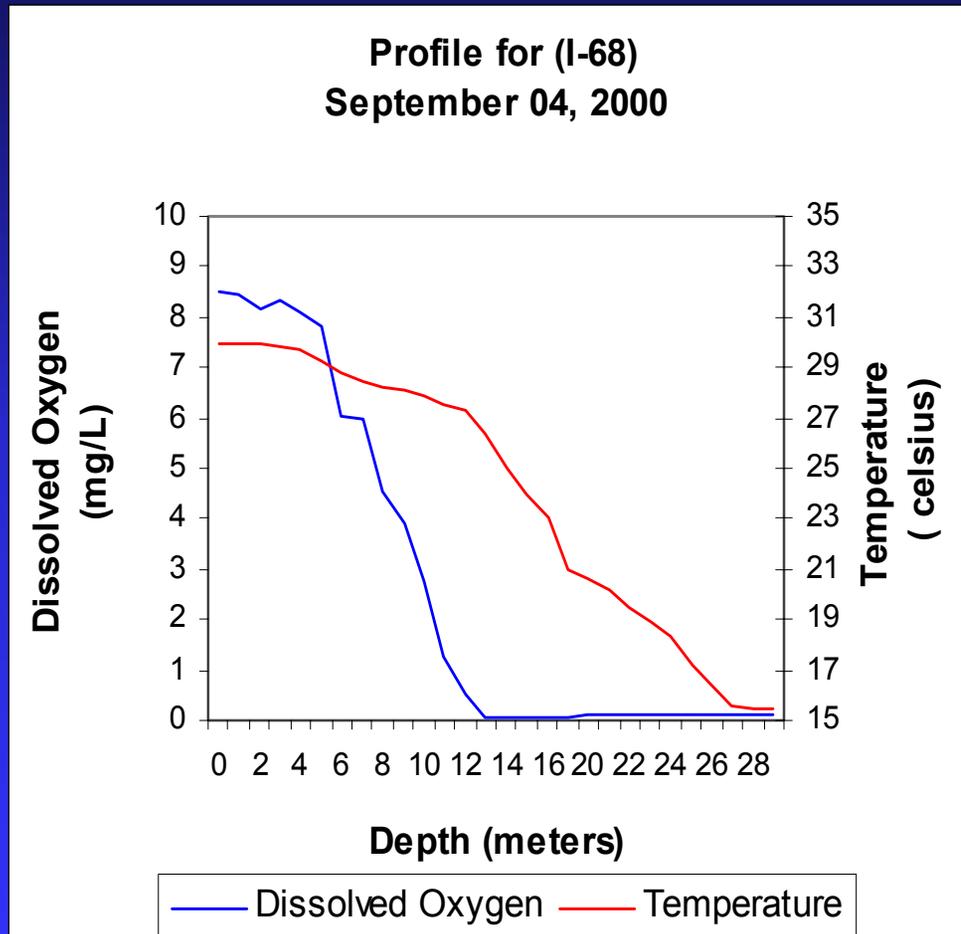
D.O. Criteria

- If >70% of water column is less than 2 mg/L:
 - ◆ FWP beneficial use is not supported.
- Between 50-70%
 - ◆ partially supported.
- Less than 50%
 - ◆ fully supported.

In-Lake Sampling and D.O.

I-68 (dam)	July 2000 September 2000	60% 60%
I-73 (Horse Creek Cove)	August 2000* September 2000	100% 50%
I-64 (Honey Creek Cove)	August 2000*	100%
I-62 (Elk River Cove)	August 2000	50%

D.O., Temperature and Depth Vertical Profile



Trophic State Index and Chlorophyll-a

- OWW data (n=16) chl-a TSI = 58
- BUMP data (n=51) chl-a TSI = 59
- Both classify Grand Lake as “eutrophic”

What are “Trophic States” (TSIs)?

- Oligotrophic:
 - ◆ low productivity, tends to be very clear
- Mesotrophic:
 - ◆ moderate productivity, slight greenish in color
- Eutrophic:
 - ◆ high productivity, not so clear, green to brown in color
- Hypereutrophic:
 - ◆ excessive productivity, recreation is likely impaired

How does Grand Compare?

	Annual TSI (chl-a)	Turbidity (NTU)	Secchi (cm)	Year Sampled
Grand Lake	58	45	62	2001
Eufaula Lake	51	21	65	2000
Lake Texoma	57	8		2000
Broken Bow Lake	40	6	204	2001
McGee Creek Reservoir	45	5	128	1999
Tenkiller	58	6	118	2000

River Data Summary

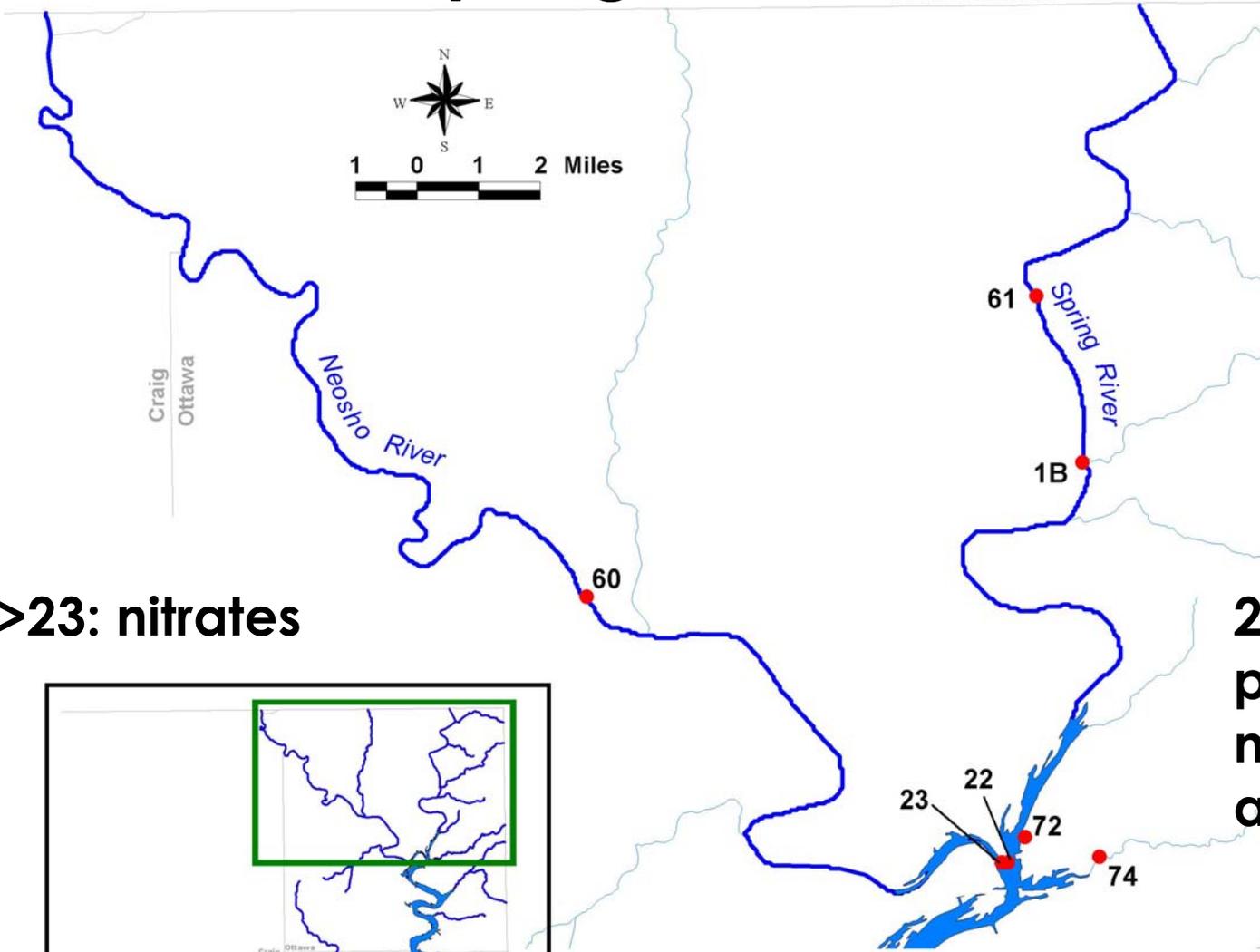
- Neosho River

- Spring River

- Lost Creek

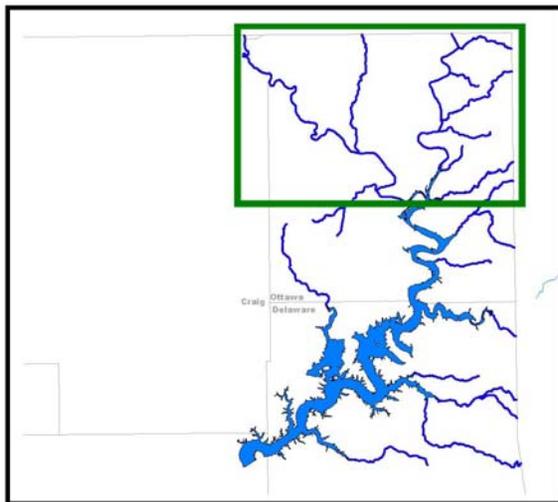
Neosho and Spring Rivers

State of Kansas

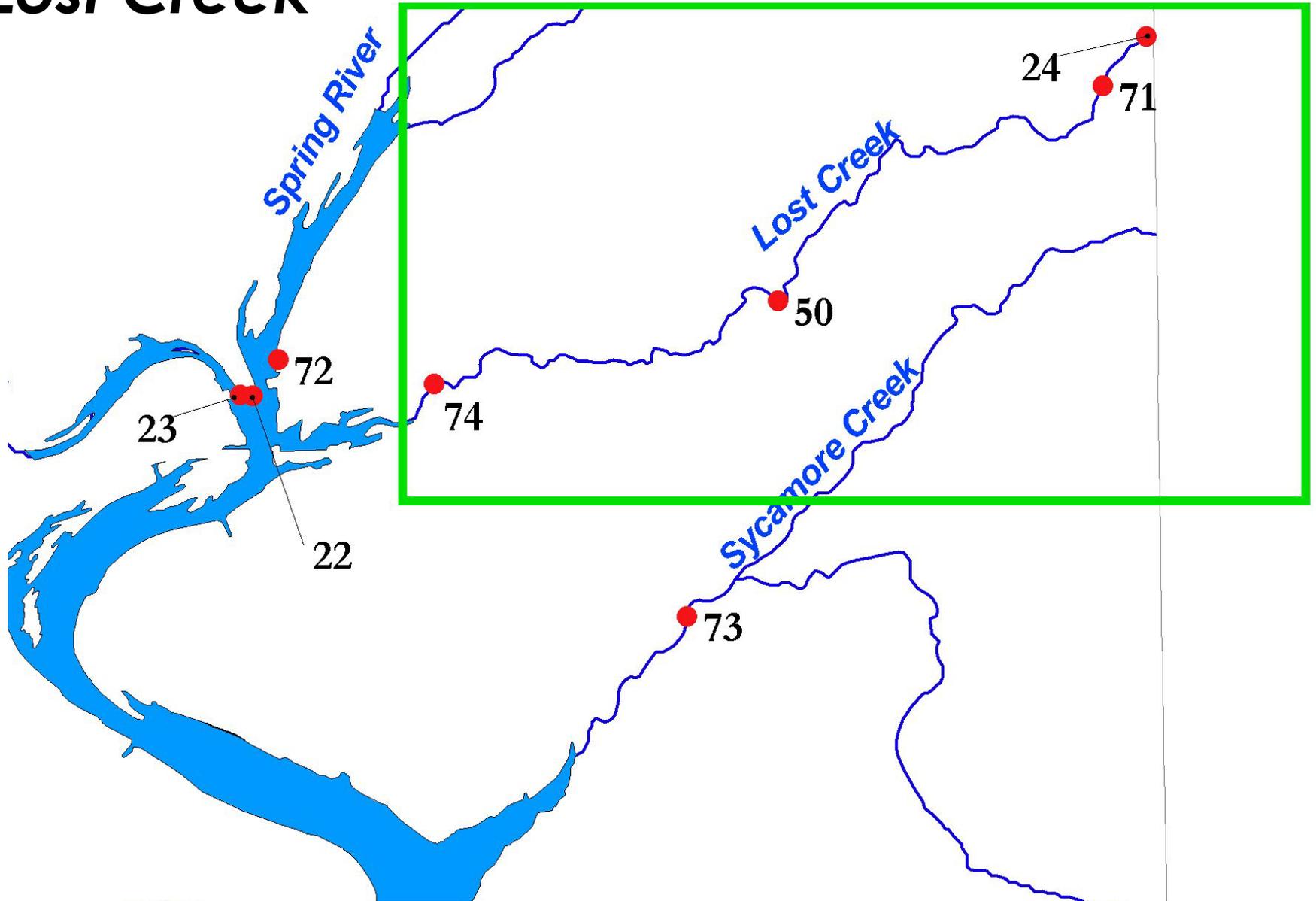


22>23: nitrates

22>72: ortho-phosphates, nitrates & ammonia



Lost Creek



50>24: ortho-phosphate

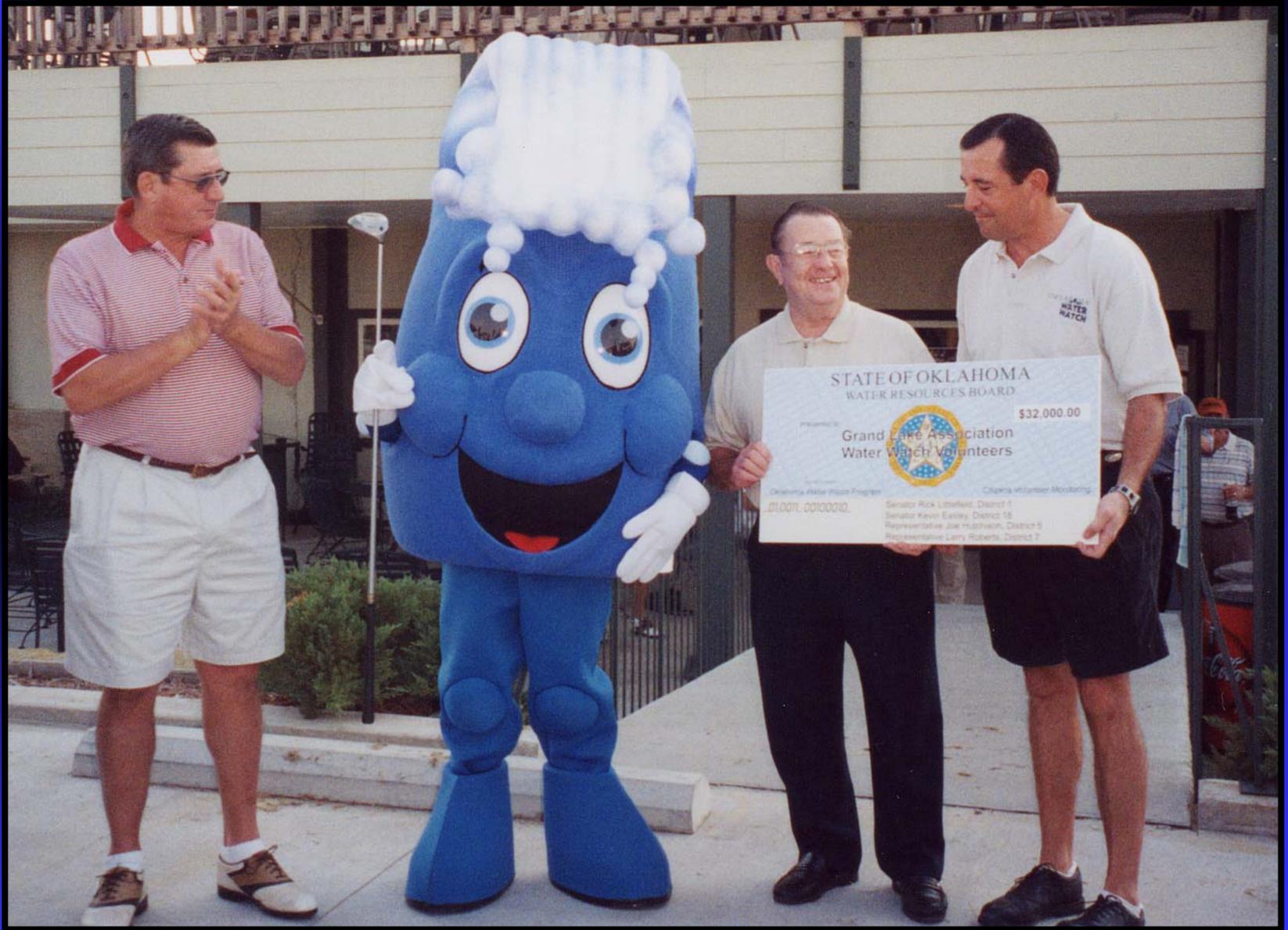
Future of OWW

- Focus on surface water quality and nutrients
- In-lake sampling and chlorophyll-a
- Improve QA and data collection
- Turbidity?
- Education?









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