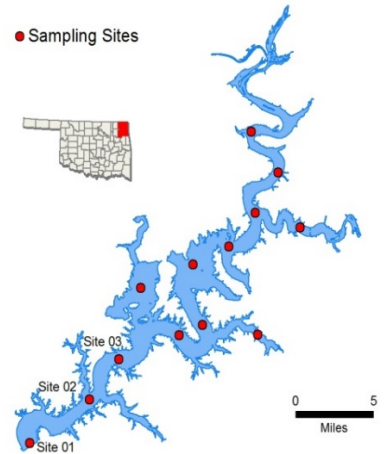


# Grand, Lower Lake (1-3)



Sample Period		Times Visited	Sampling Sites
October 2017 – August 2018		4	3

General	Location	Mayes County
	Impoundment	1940
	Area	1,820 acres
	Capacity	13,900 acre-feet
	Purposes	Flood Control, Hydropower

Parameters		Parameter ( <i>Descriptions</i> )	Result	Notes/Comments
		In Situ	Average Turbidity	6 NTU
Average Secchi Disk Depth	122 cm			
Water Clarity Rating	Excellent			
Chlorophyll-a	6.08 mg/m <sup>3</sup>			
Trophic State Index	48		Previous value = 48	
Trophic Class	Mesotrophic			
Profile	Salinity	0.11 – 0.18 ppt		
	Specific Conductivity	236.0 – 363.9 μS/cm		
	pH	6.78 – 8.83 pH units	Neutral to slightly alkaline	
	Oxidation-Reduction Potential	37.2 to 508.4 mV		
	Dissolved Oxygen	Up to 81% of water column < 2.0 mg/L in August		
Nutrients	Surface Total Nitrogen	0.48 mg/L to 1.99 mg/L		
	Surface Total Phosphorus	0.02 mg/L to 0.15 mg/L		
	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited	

Beneficial Uses	<a href="#">Click to learn more about Beneficial Uses</a>	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
	Fish & Wildlife Propagation		S	S	NS	NEI						
	Aesthetics						S	*				
	Agriculture								*	*	S	
	Primary Body Contact Recreation											NEI
	Public & Private Water Supply											

*S = Fully Supporting*  
*NS = Not Supporting*  
*NEI = Not Enough Information*

Notes

\*Standards revision, true color is for permitting purposes only.

NTU = nephelometric turbidity units  
 μS/cm = microsiemens per centimeter  
 E. coli = Escherichia coli

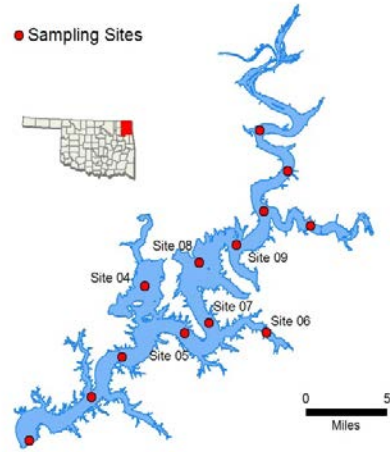
OWQS = Oklahoma Water Quality Standards  
 mV = millivolts  
 Chlor-a = Chlorophyll-a

mg/L = milligrams per liter  
 μS/cm = microsiemens/cm

ppt = parts per thousand  
 En = Enterococci

# Grand, Mid Lake (4-9)

● Sampling Sites



Sample Period	Times Visited	Sampling Sites
October 2018 – August 2019	4	6

General	Location	Mayes County
	Impoundment	1940
	Area	1,820 acres
	Capacity	13,900 acre-feet
	Purposes	Flood Control, Hydropower

Parameters	In Situ	Parameter ( <i>Descriptions</i> )	Result	Notes/Comments
		Average Turbidity	11 NTU	4% of values > OWQS of 25 NTU
		Average Secchi Disk Depth	84 cm	
		Water Clarity Rating	Excellent	
		Chlorophyll-a	16 mg/m <sup>3</sup>	
		Trophic State Index	58	Previous value = 58
	Trophic Class	Eutrophic		
	Profile	Salinity	0.11 – 0.17 ppt	
		Specific Conductivity	241.2 – 351.4 μS/cm	
		pH	7.06 – 8.80 pH units	
		Oxidation-Reduction Potential	21.6 to 458 mV	
		Dissolved Oxygen	Up to 56% of water column < 2.0 mg/L in August	
	Nutrients	Surface Total Nitrogen	0.515 mg/L to 2.48 mg/L	
		Surface Total Phosphorus	0.027 mg/L to 0.171 mg/L	
		Nitrogen to Phosphorus Ratio	14:1	Phosphorus limited

Beneficial Uses	<a href="#">Click to learn more about Beneficial Uses</a>	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
	Fish & Wildlife Propagation	S	S	NS	NEI							
	Aesthetics					S	*					
	Agriculture							*	*	S		
	Primary Body Contact Recreation										NEI	
	Public & Private Water Supply					NEI						

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 NS = Not Supporting  
 NEI = Not Enough Information

Notes

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NTU = nephelometric turbidity units  
 μS/cm = microsiemens per centimeter  
 E. coli = Escherichia coli

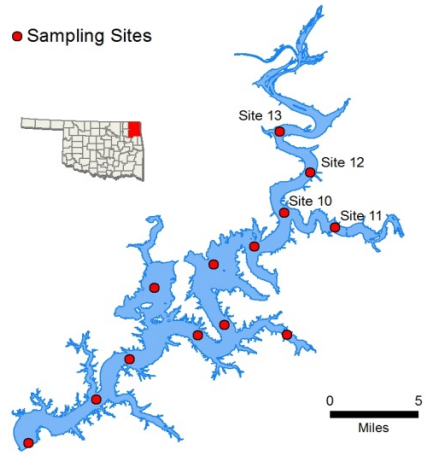
OWQS = Oklahoma Water Quality Standards  
 mV = millivolts  
 Chlor-a = Chlorophyll-a

mg/L = milligrams per liter  
 μS/cm = microsiemens/cm

ppt = parts per thousand  
 En = Enterococci

# Grand, Upper Lake (10-13)

● Sampling Sites



Sample Period	Times Visited	Sampling Sites
October 2017 – August 2018	4	4

General	Location	Mayes County
	Impoundment	1940
	Area	1,820 acres
	Capacity	13,900 acre-feet
	Purposes	Flood Control, Hydropower

Parameters	In Situ	Parameter ( <i>Descriptions</i> )	Result	Notes/Comments
		Average Turbidity	24 NTU	38% of values > OWQS of 25 NTU (n=16)
		Average Secchi Disk Depth	51 cm	
		Water Clarity Rating	Average	
		Chlorophyll-a	28 mg/m <sup>3</sup>	
		Trophic State Index	63	Previous value = 59
	Trophic Class	Hypereutrophic		
	Profile	Salinity	0.13 – 0.19 ppt	
		Specific Conductivity	253.0 – 451.7 μS/cm	
		pH	7.19 – 8.80 pH units	
		Oxidation-Reduction Potential	72.4 – 450.0 mV	
		Dissolved Oxygen	Up to 30% of water column < 2.0 mg/L in August	
	Nutrients	Surface Total Nitrogen	0.715 mg/L to 2.66 mg/L	
		Surface Total Phosphorus	.04 mg/L to 0.348 mg/L	
		Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses	<a href="#">Click to learn more about Beneficial Uses</a>	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
	Fish & Wildlife Propagation	NS	S	S	NEI							
	Aesthetics					S	*					
	Agriculture							*	*	S		
	Primary Body Contact Recreation										NEI	
	Public & Private Water Supply					NEI						

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Notes

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 μS/cm = microsiemens per centimeter  
 E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards  
 mV = millivolts  
 Chlor-a = Chlorophyll-a

mg/L = milligrams per liter  
 μS/cm = microsiemens/cm

ppt = parts per thousand  
 En = Enterococci