Arkansas Citizen Scientist Lake Monitoring Network: A Pilot Study

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Why Sample Lakes?

- Model ecosystem/enhance ecological knowledge
- Sentinels of change
- Drinking water source
- Tourism/Recreation

How can each system best be managed for its use?

ADEQ's Current Lake Sampling Program

- 16 lakes sampled once every quarter
 - 2 sites per lake



Each quarter, we travel ~2715 miles, ~50 hours

Utilizing the Public

- Florida Lakewatch (since 1986)
 - > 1800 citizens monitor >600 lakes
 - Recognized by FL Legislature , established in state statues
- MN Citizen Lake Monitoring Program (>40 yrs)
 - > 900 citizens
 - Monitoring tiers
- ME Volunteer Lake Monitoring Program (since 1971)
 - Oldest program in U.S.
 - "Much of what is known about Maine's lakes and ponds is the result of the work of VLMP volunteers"

Building a Citizen Scientist Lake Monitoring Program in Arkansas

- Developed through the HAB workgroup
- Pilot Project on 2 drinking water reservoirs
- Who's already using the resource?
 - Anglers
 - Homeowners
- Start simple
 - Secchi data
 - Physical observations
- Keep participants informed/educated about their lake

- Arkansas Citizen Scientist Lake Monitoring Manual
 - Introduction and Scope
 - Lake Ecology





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 - Using a Secchi Disk





http://www.mainelakedata.org/recertify/disk.php



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Home Secchi Reading Simulator

Click 'Take Reading' to try one of the Lake Types.

				Incre
Reading Results				a si
Lake Type	Intermediate			l Bu
Actual Target Value	5.93 (±0.10) meters			Lake E
Measured Value	5.96 meters			Dep
Error (absolute)	0.03 meters			5
Error (relative)	0.40%			
Within Tolerance?	Yes			
	Lake Type	Description		
Take Reading	Clear	Clear lakes typically have a blue background color and Secchi reading greater than 4 meters.		
Take Reading	Intermediate	Intermediate lakes typically have a Secchi reading in the range of three to seven meters. The background color may be blue or muted green or brown.		
Take Reading	Productive	Productive lakes have a green background color, high algae concentrations, and typically have Secchi transparency readings less than three meters.		
Take Reading	Dystrophic	Dystrophic lakes have a distinct tea or rootbeer color with typical Secchi readings less than 3 meters.	Tolerance Rang	
Take Reading	Dystrophic and Productive	These lakes typically have a green-brown background color and limited transparency with Secchi reading typically less than three meters.	TARGEL	LQEPIH, -
		Simulator Size: • Normal • Smaller Note: Smaller animation size may improve performance on older computers.		

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On Site Training





- Arkansas Citizen Scientist Lake Monitoring Manual
 - Introduction and Scope
 - Lake Ecology
 - Using a Secchi Disk
 - Choosing a Monitoring Location



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 - Reporting Data

Reporting Data: LakeObserver App

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Secchi depth*	ft m				
	in				
Water depth*	ft m				
Pier Pulsetowate	in				
Platform	Boat/Canoe				
Disk resting on bottom? Yes No					
Disk type	Black and White				
Viewscope use	d? Yes No				
Comment					
Location	34.799316, -92.347122				
Location Date	34.799316, -92.347122 2017-07-17				
Location Date Time	34.799316, -92.347122 2017-07-17 13:56:30				

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		0 Notifications						



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 - Data Uses

Data Uses

- Create database with more frequent data collection on more lakes
- Verify predictions based on GIS (watershed size and land use)
- Identify changes that may indicate or result in low water quality events
- Prioritize lakes that may be more vulnerable to low water quality events (eutrophic to hypereutrophic)



Average Secchi depths (± standard error) taken throughout the 3rd quarter (July – September) from years 2011 – 2016 in 9 Arkansas lakes.



Average Secchi depths (± standard error) taken throughout the 3rd quarter (July – September) from years 2011 – 2016 in 9 Arkansas lakes.

Lake	Area (mi ²)		
Beaver	44.06		
Bull Shoals	70.55		
DeGray	21.56		
Fort Smith	2.19		
Greers Ferry	63.28		
Hamilton	11.25		
Millwood	45.63		
Nimrod	5.54		
Ouachita	62.5		



Average Secchi depths (± standard error) taken throughout the 3rd quarter (July – September) from years 2011 – 2016 in 9 Arkansas lakes.

	Area	Avg. Depth	
Lake	(mi²)	(ft)	Ecoregion
Beaver	44.06	58	ОН
Bull Shoals	70.55	67	ОН
DeGray	21.56	47	OM
Fort Smith	2.19	28	BM
Greers Ferry	63.28	60	BM
Hamilton	11.25	26	OM
Millwood	45.63	5	GCP
Nimrod	5.54	8	ARV
Ouachita	62.5	51	OM

Future Plans

- Expand program to lakes and ponds across the state
- Develop tiered sampling program
 - More experienced/trained members start collecting water

Questions

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