



# 2022 Water Monitoring Report

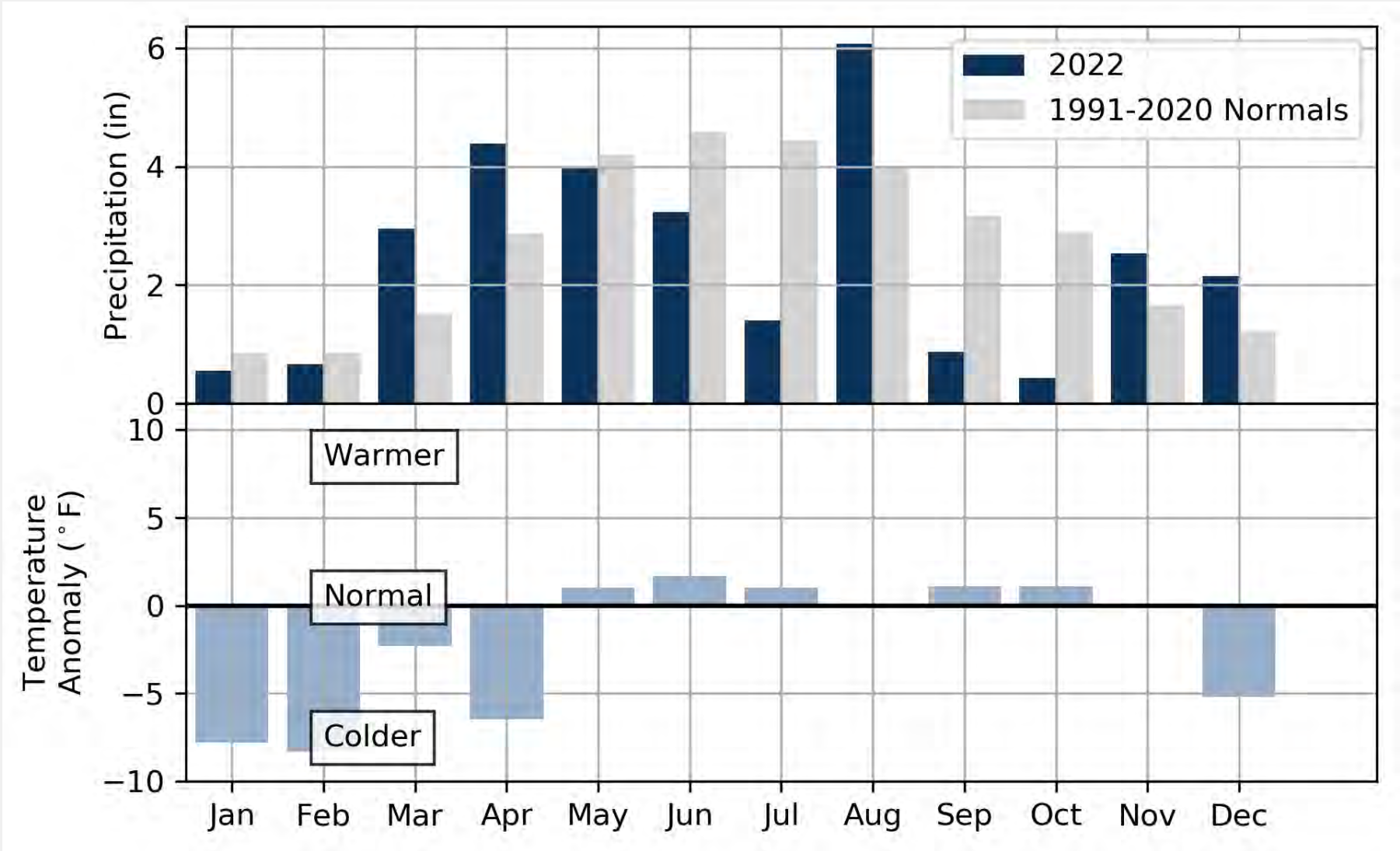
*April 13, 2023 Regular Board Meeting*

Emmons & Olivier Resources



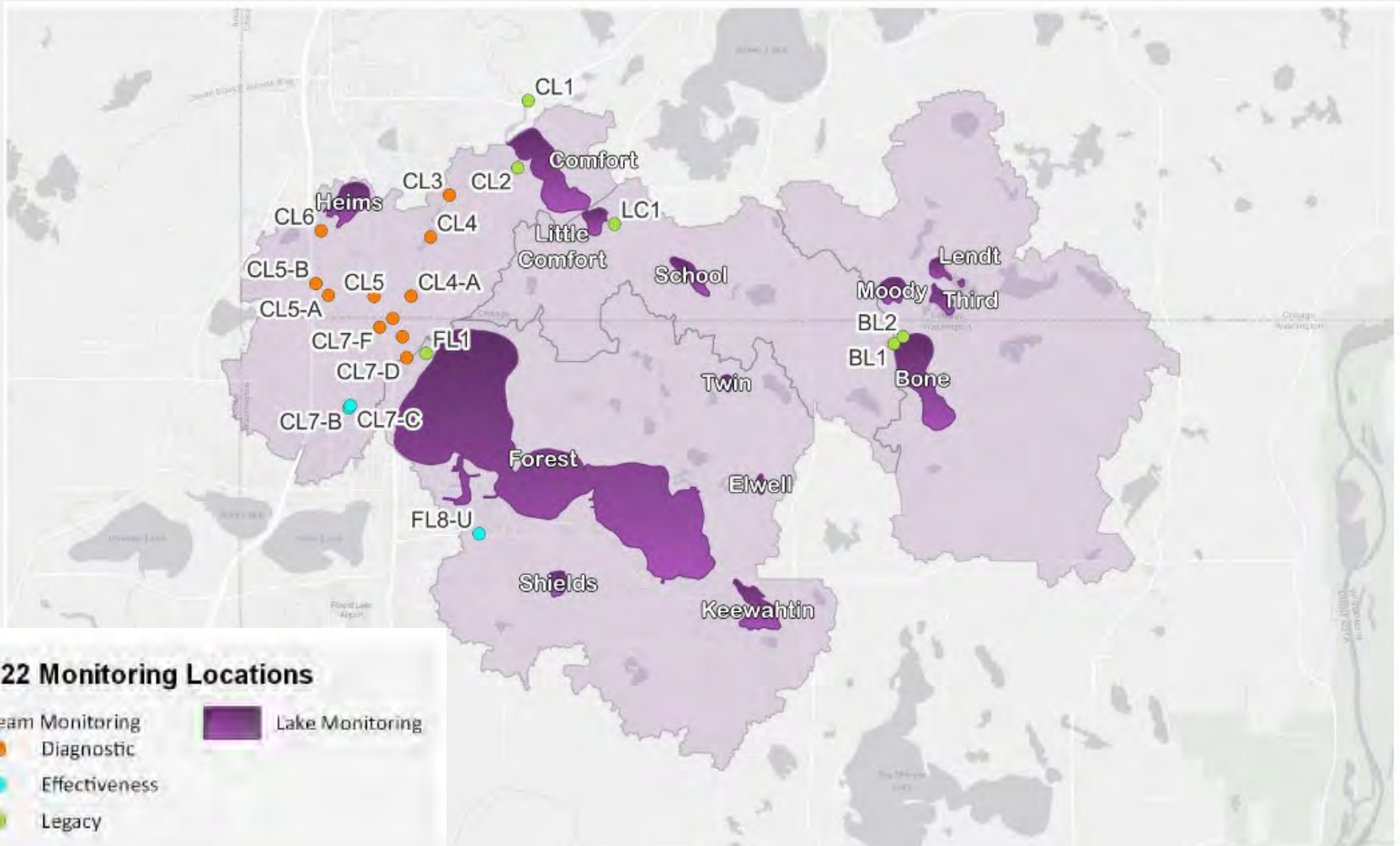


# 2022 Climate Trends





# Monitoring Locations





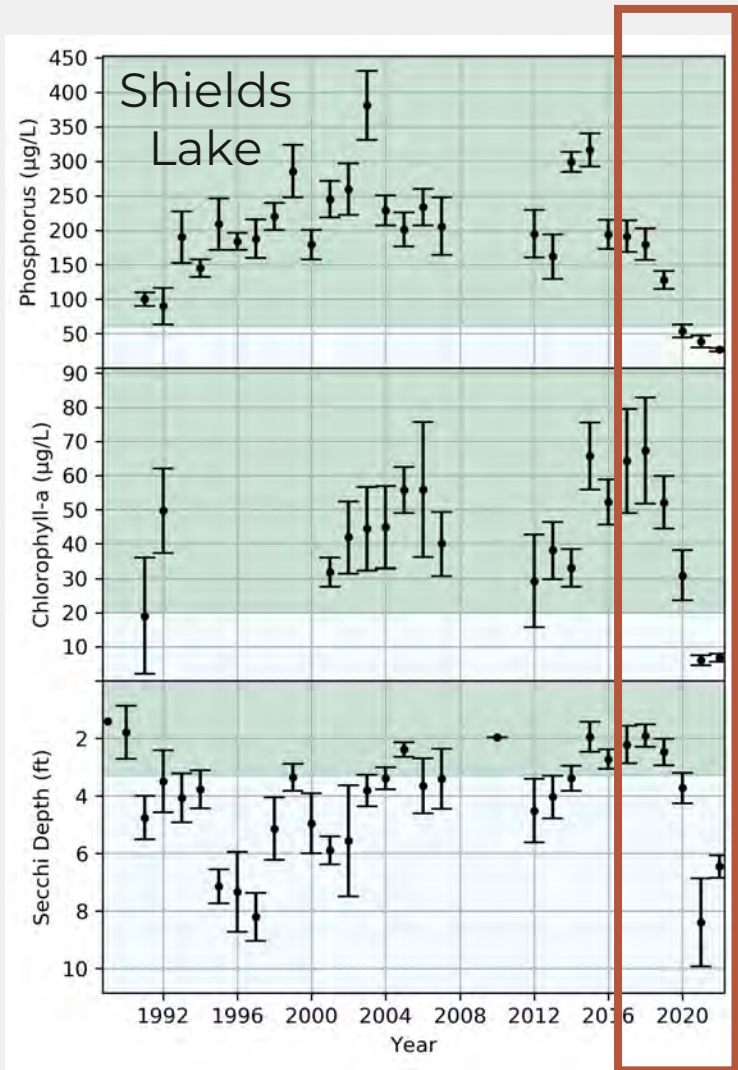
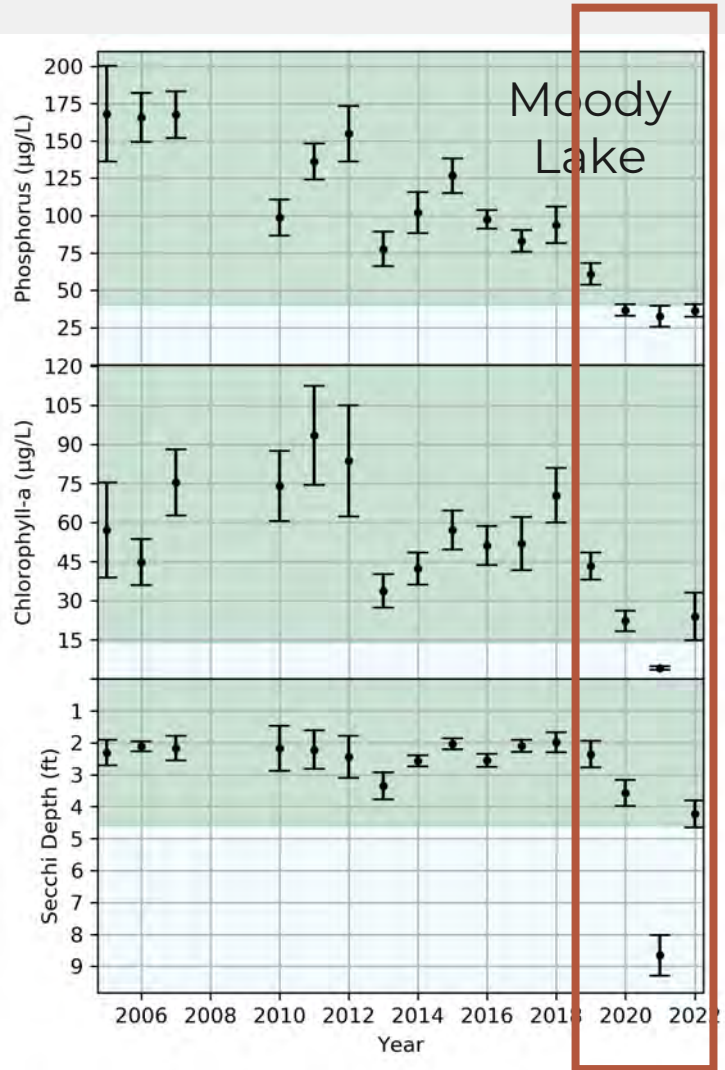
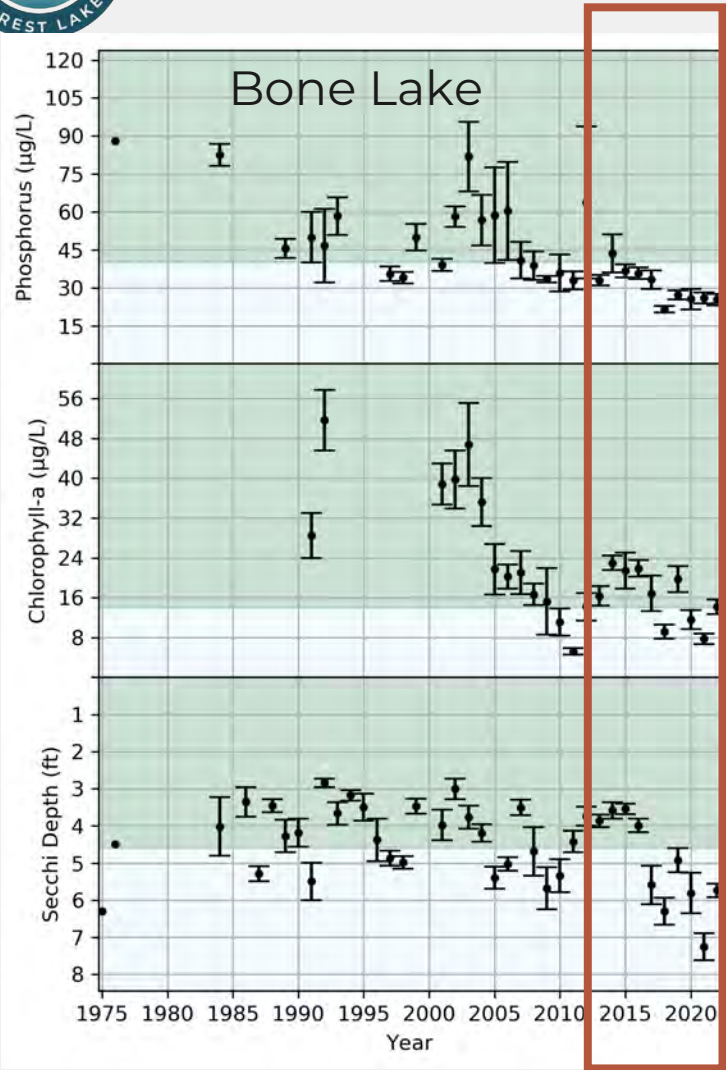


# Lake Monitoring Trends

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Bone	Significantly Improving	Significantly Improving	Significantly Improving
Comfort	Improving	Significantly Improving	Significantly Improving
Forest – West	Significantly Improving	Significantly Improving	Significantly Improving
Forest – Middle	Declining	Declining	Declining
Forest – East	Declining	Declining	Improving
Keewahtin	Improving	Improving	Declining
Little Comfort	Significantly Improving	Improving	Improving
Moody	Significantly Improving	Improving	Improving
Shields	Significantly Improving	Significantly Improving	Improving

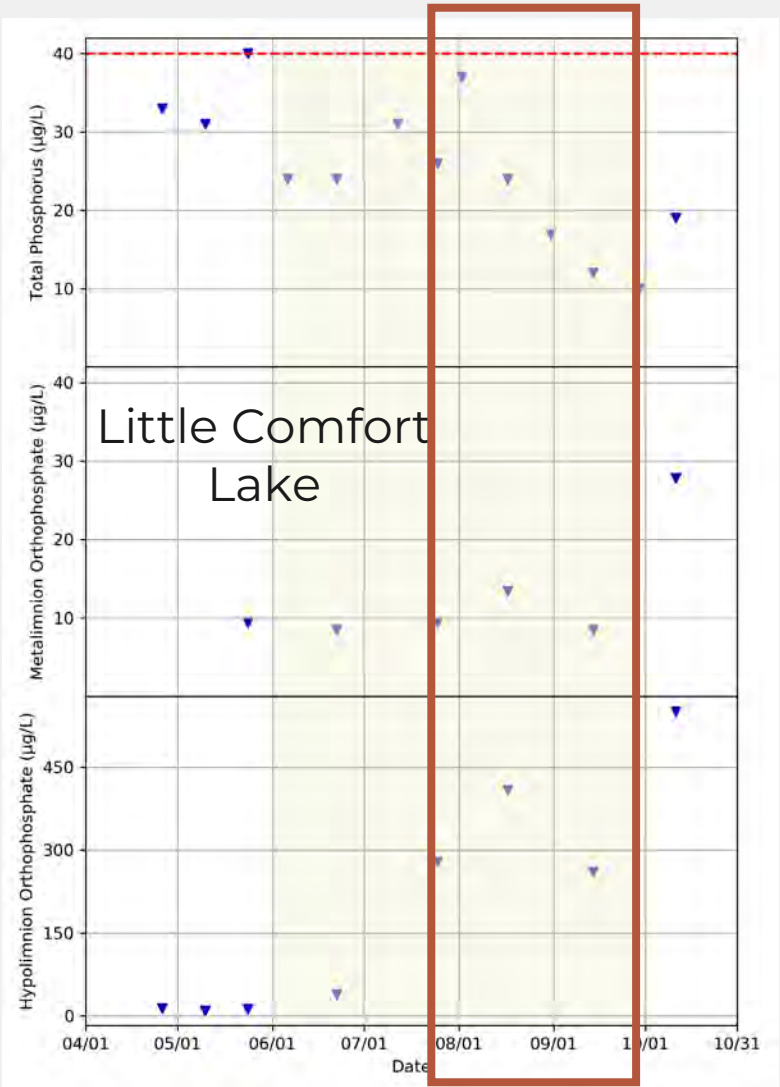


# Lake Monitoring Takeaways

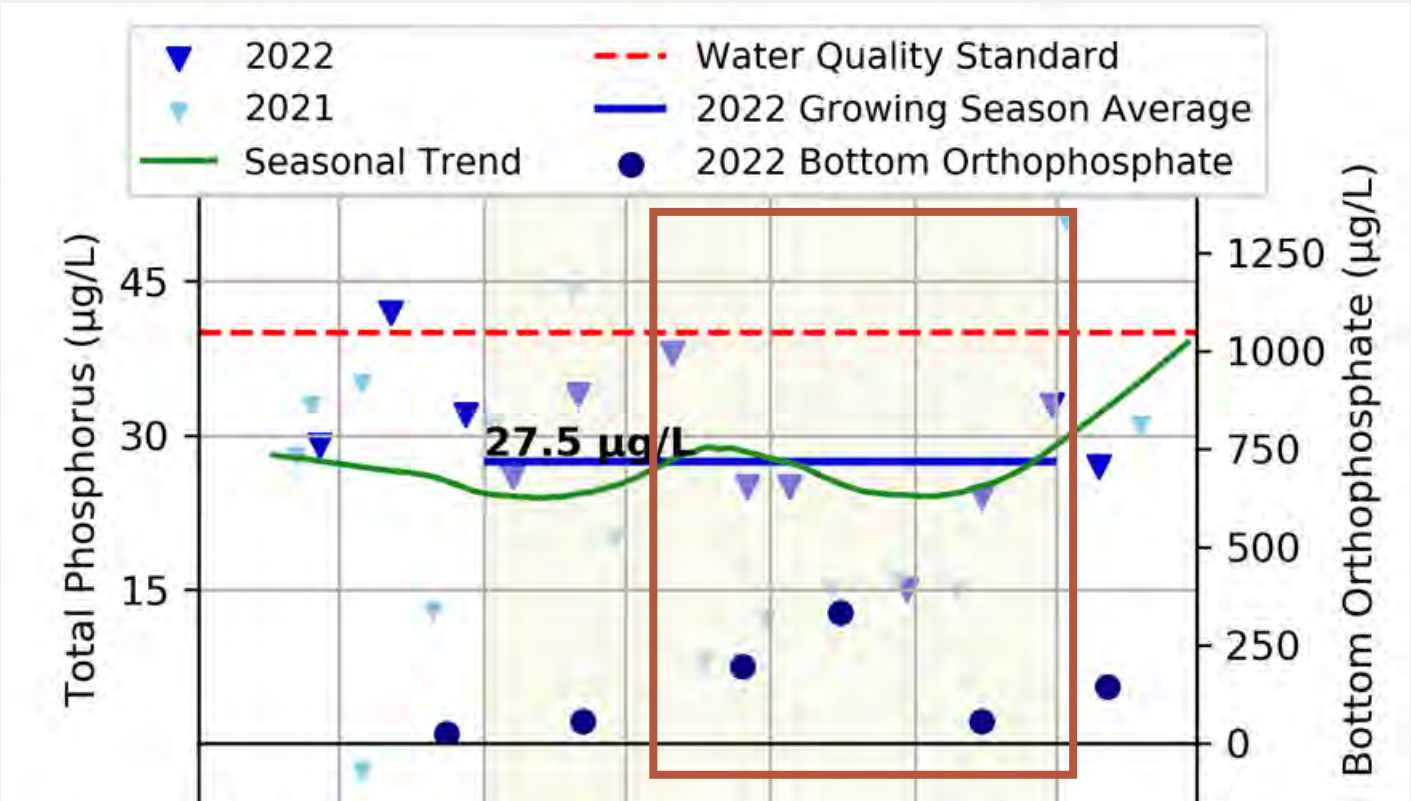




# Lake Monitoring Takeaways

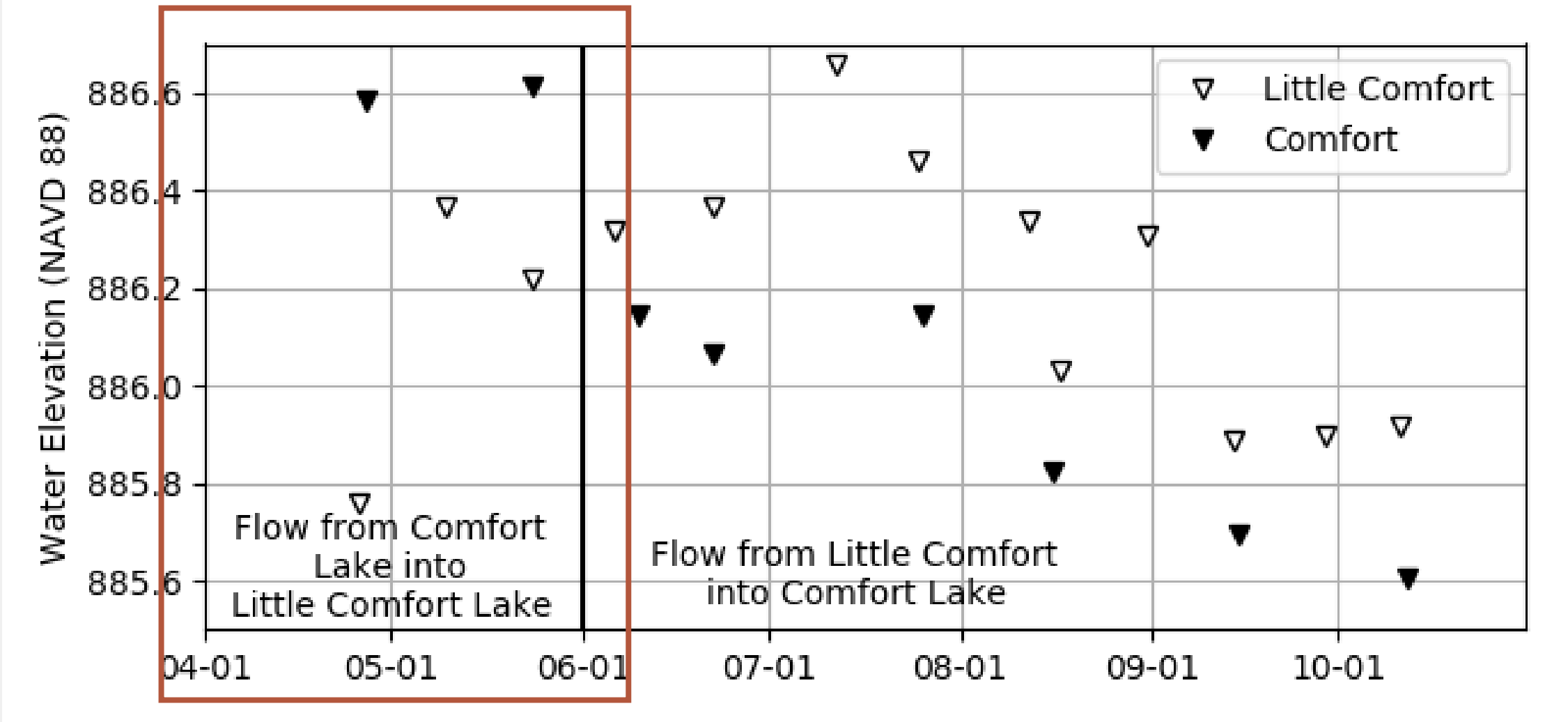


## Comfort Lake





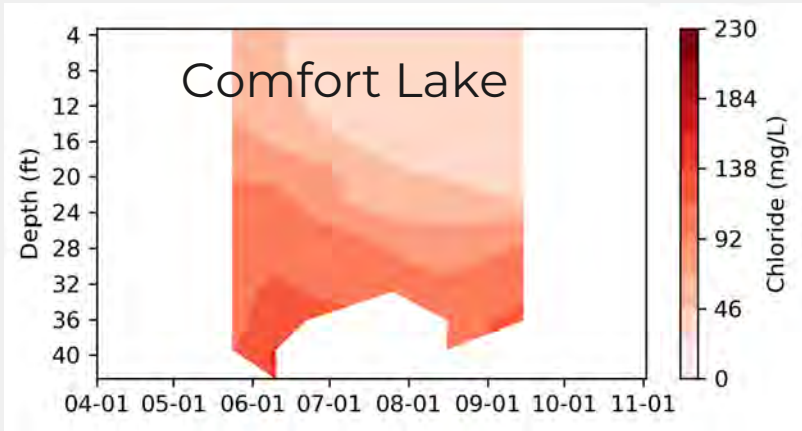
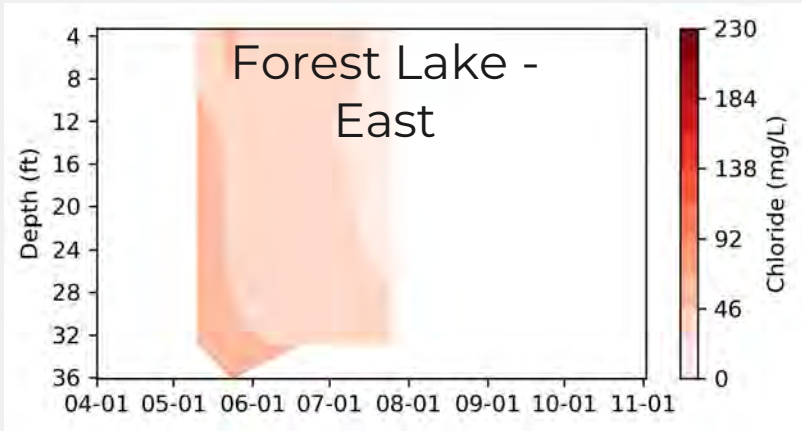
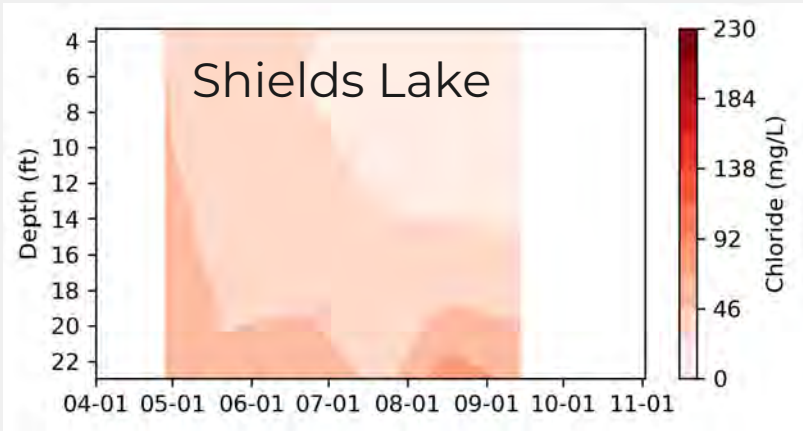
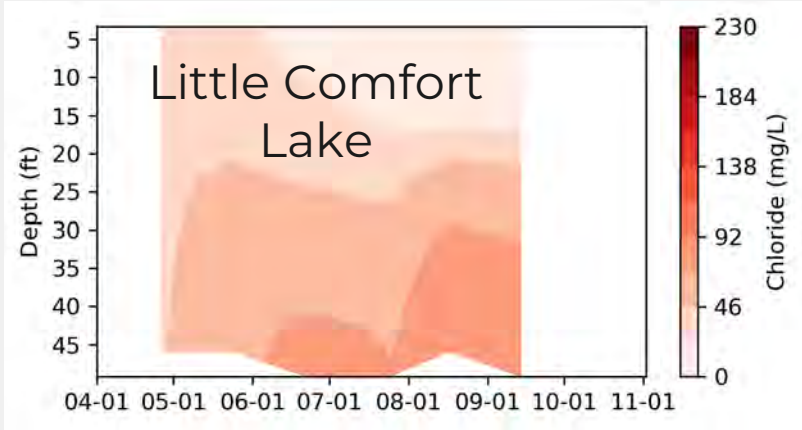
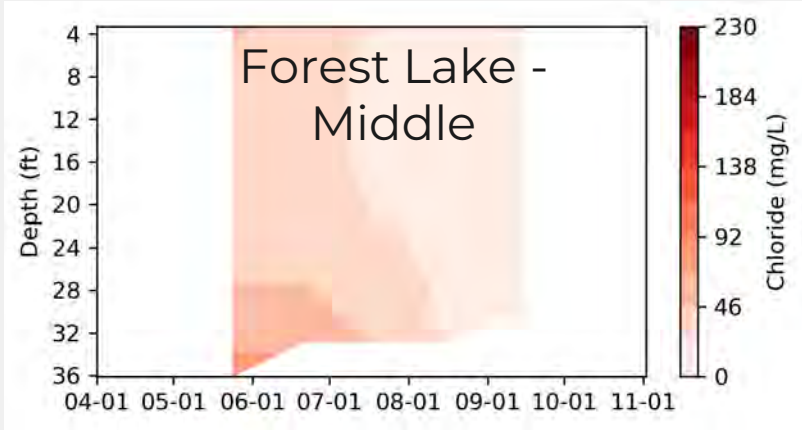
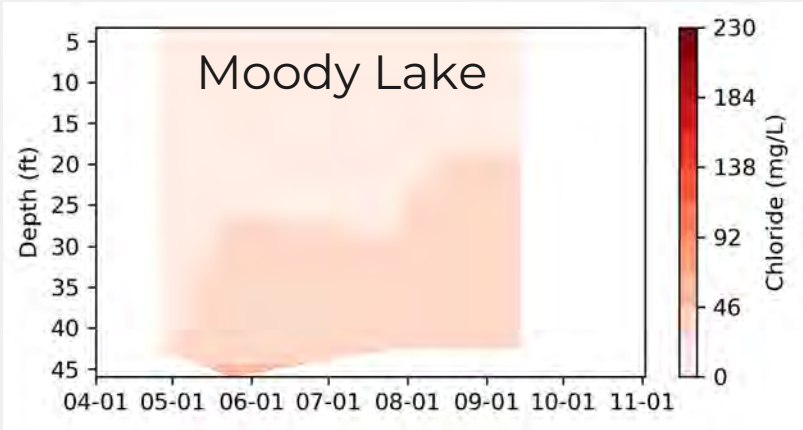
# Lake Monitoring Takeaways







# Lake Monitoring Takeaways





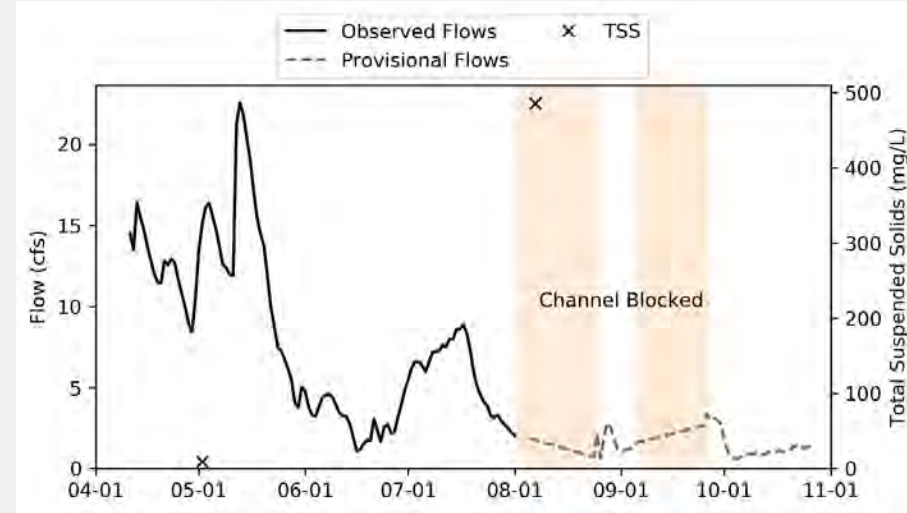
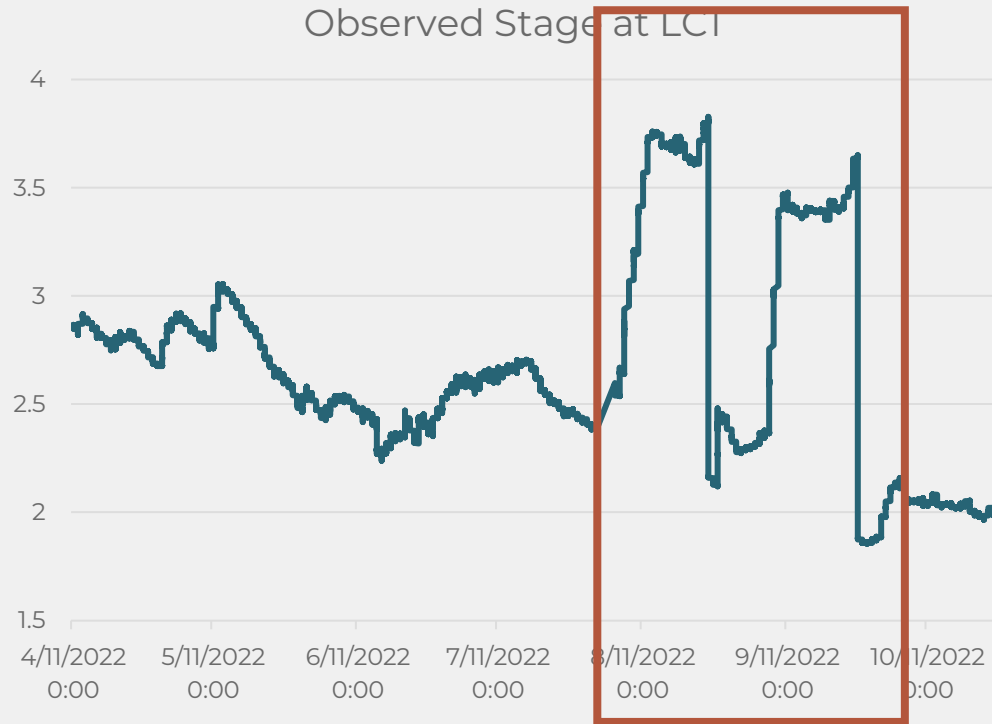


# Stream Legacy Site Takeaways

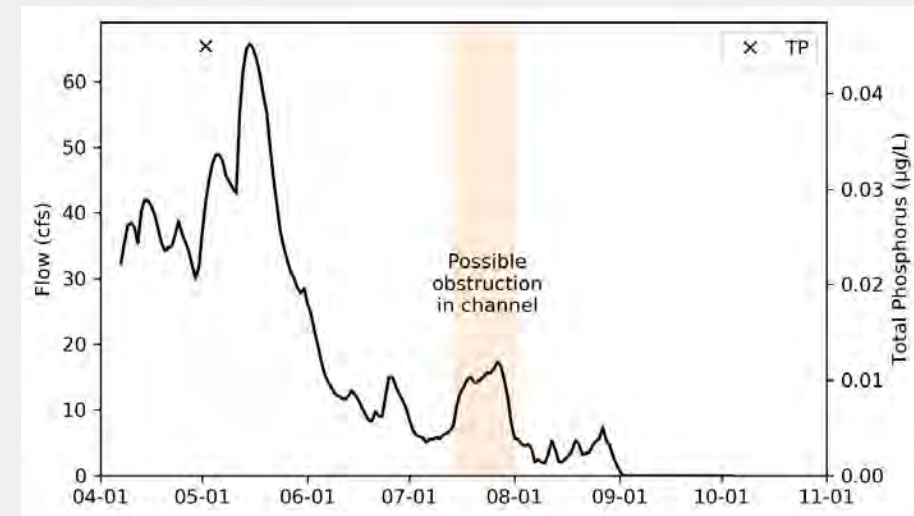
Monitoring Site		Drainage Area (acres)	Days of Flow	Number of Sample Events	Flow			Total Phosphorus		Total Suspended Solids	
					Daily Mean (cfs)	Volume (ac-ft)	Runoff depth (in)	FWMC (µg/L)	Load (lbs.)	FWMC (mg/L)	Load (lbs.)
Central Region Reference FWMC								<100		< 30	
Long-term Sites											
Bone Lake North Inlet	BL1	2,479	146	0	0.5	157	0.8	*	*	*	*
Bone Lake Outlet	BL2	5,495	135	3	5.0	1328	2.9	170	615	51	182,765
Forest Lake Outlet	FL1	8,719	189**	3	6.9	2588	3.6	111	782	60	422,106
Little Comfort Inlet	LC1	10,513	196	2	5.4	2081	2.4	*	*	*	*
Big Comfort Inlet	CL2	13,625	203**	1	8.4	3390	3.0	*	*	*	*
Big Comfort Outlet	CL1	24,558	181	1	17.5	6273	3.1	*	*	*	*



# Stream Legacy Site Takeaways



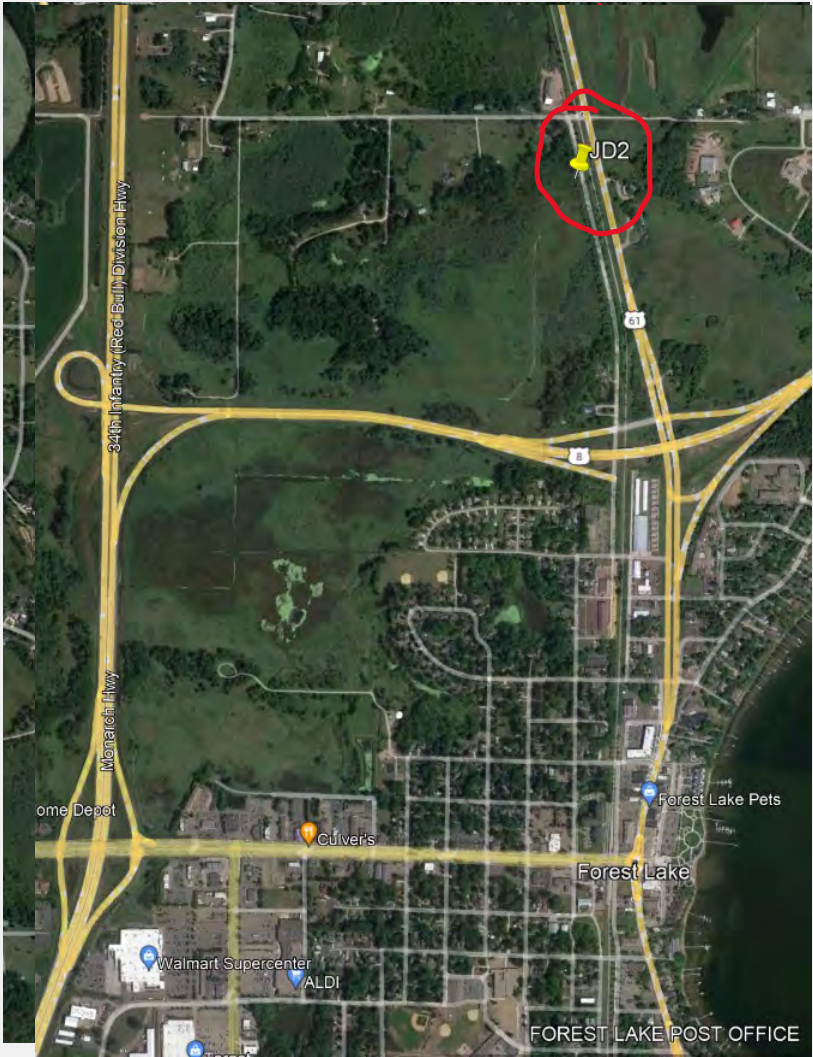
LC1 – Little  
Comfort  
Inlet



CL1 –  
Comfort  
Lake  
Outlet



# Diagnostic Monitoring Takeaways



Monitoring Site		Drainage Area (ac)	Days of Flow	Number of Sample Events	Flow		
					Daily Mean (cfs)	Volume (ac-ft)	Runoff Depth (in)
Central Region Reference FWMC							
Comfort LMD							
Sunrise River							
Forest Lake Outlet	FL1	8,719	189	3	7	2,588	3.6**
City Wetland	CL7-E	8,831	184	2	8	2,956	4.0
County Line Ditch	CL7-G	10,563	162	7	13	4,184	4.8*
Sunrise River at Greenway Ave.	CL4	12,954	203	2	9	3,449	3.2
Sunrise River at 256th St.	CL3	13,311	155	0	12	3,599	3.2
Big Comfort Inlet	CL2	13,625	203	1	8	3,390	3.0**
Big Comfort Outlet	CL1	24,558	181	1	17	6,273	3.1*
Heims Drainage Ditch							
Heims Outlet	CL6	668	184	2	0	17	0.3
Fall Brook Ave.	CL5-A	1,359	184	2	0	19	0.2
Heims Drainage Ditch	CL5	1,561	184	5	0	92	0.7
Other Tributaries							
City Pipe at Wetland	CL7-D	80	184	5	0	31	4.6
JD2	CL7-F	1,675	NA	NA	NA	1,228***	8.8





# Effectiveness Monitoring Takeaways



Outlet pipe  
downstream of  
Castlewood  
Agricultural Field







## Main Monitoring Takeaways

- General water quality trends in lakes are good (below state standards)
- 2022's drought-like conditions resulted in reduced external loads to Lakes
- Planned projects are targeting key problem areas



Looking south toward Forest Lake, from Sunrise River (CL7-E)