Lake Protection and Prioritization

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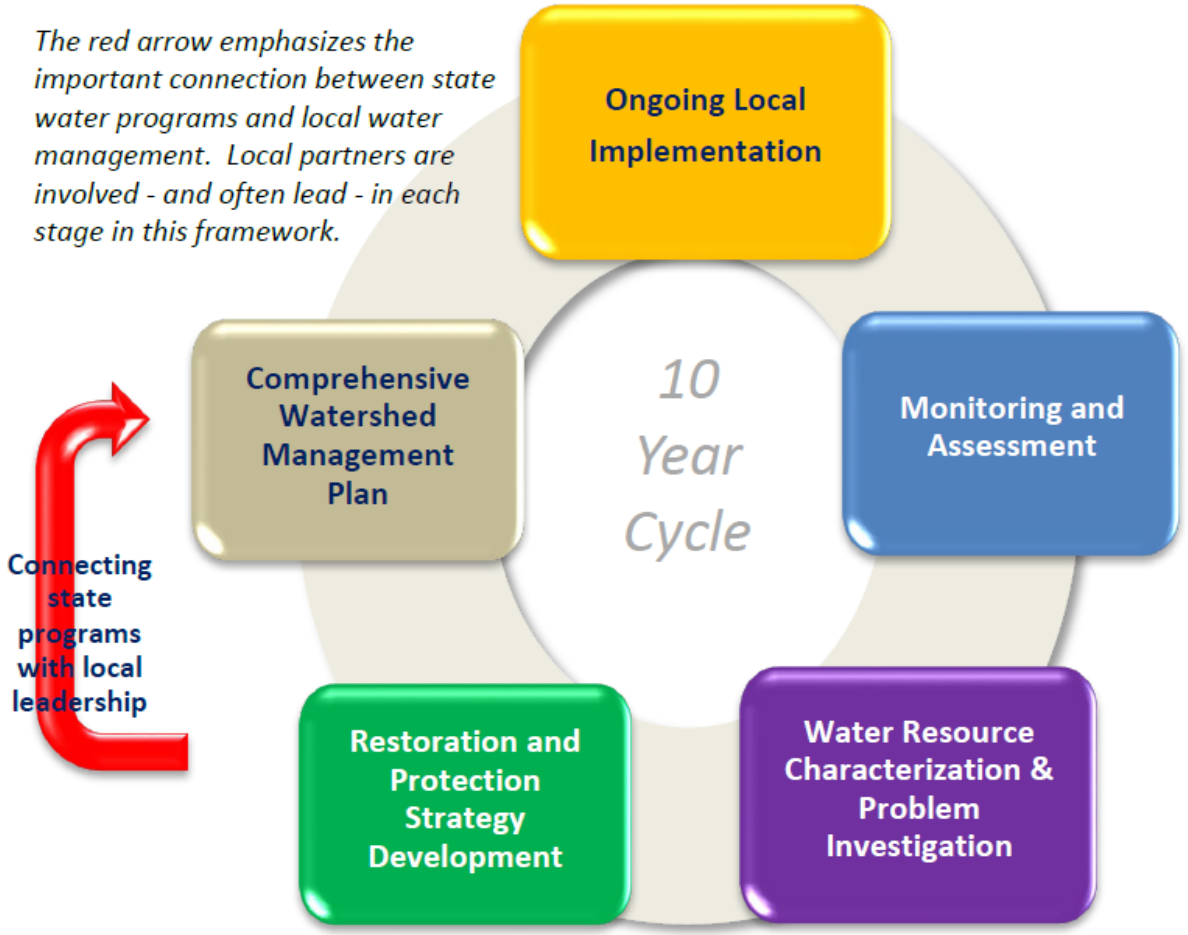
MINNESOTA POLLUTION CONTROL AGENCY

Minnesota's Watershed Approach

Minnesota has adopted 10 year cycle of:

- Monitoring and assessment
- Characterization and problem investigation
- Strategy development
- Planning
- Implementation

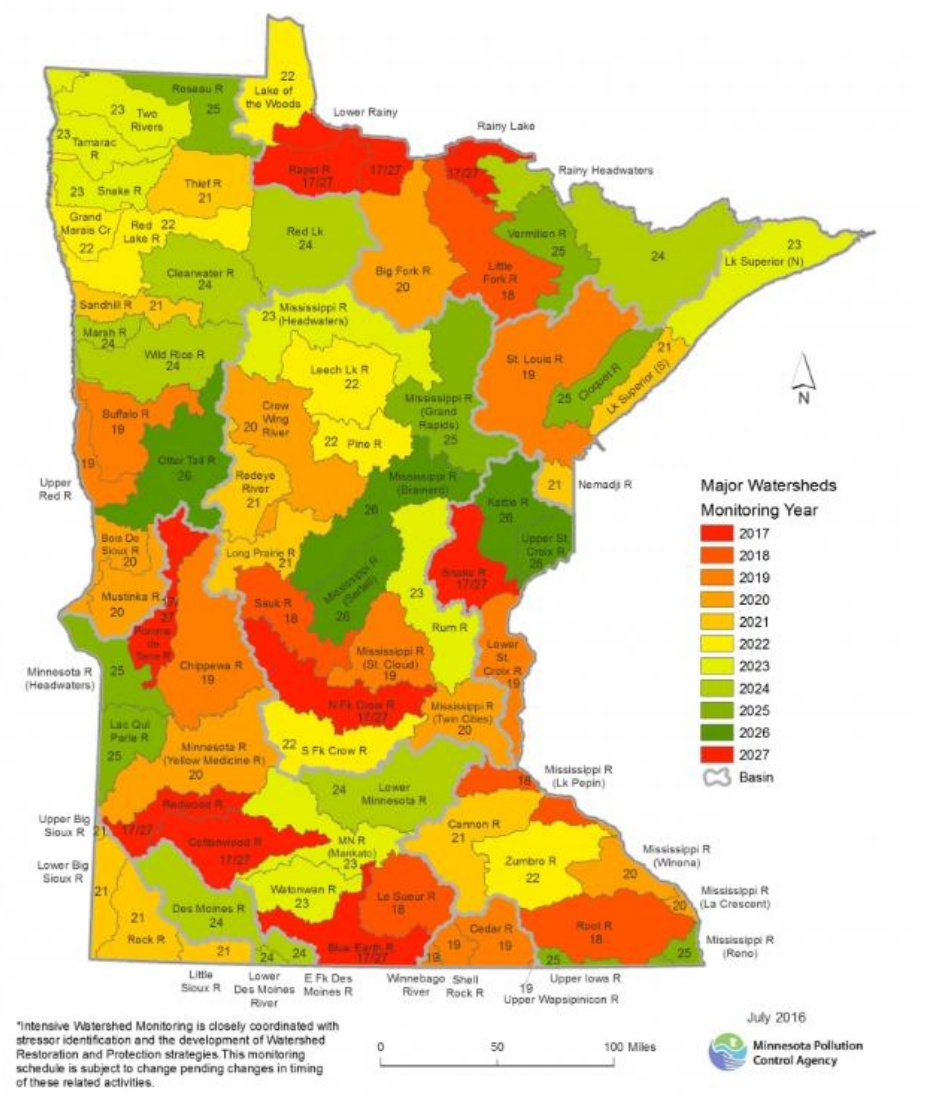
Watershed Restoration and Protection Strategies - WRAPS



Minnesota's Watershed Approach

Approach is implemented at HUC-8 scale

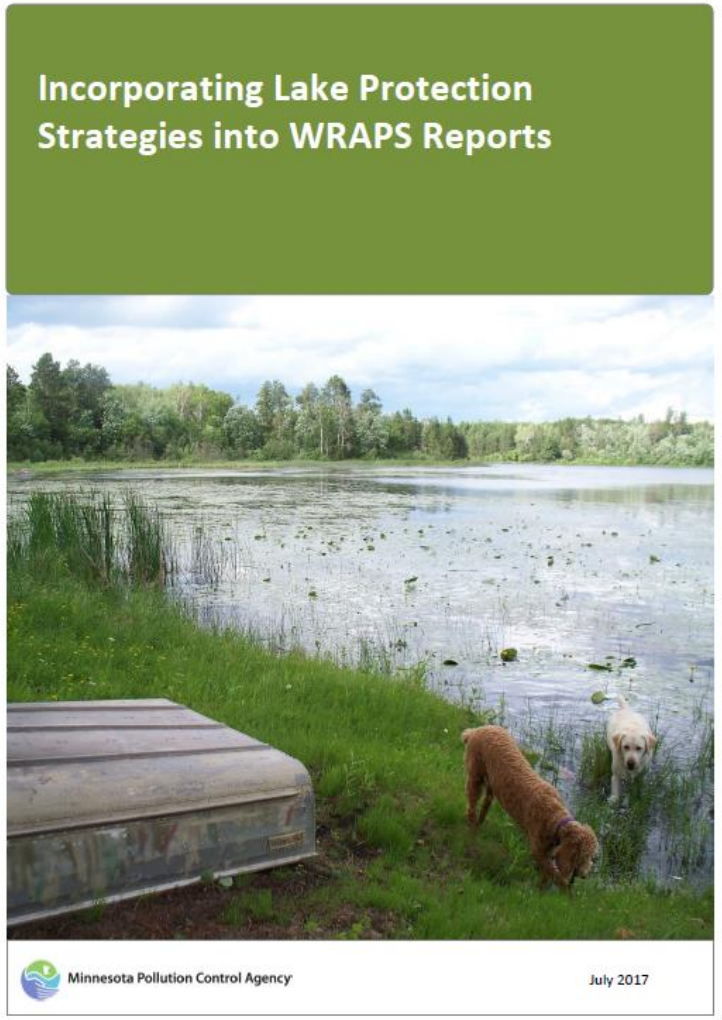
- Stream sites established to monitor at minor watershed scale
- Lake monitoring focused on all lakes larger than 500 acres and 50% of lakes between 100 – 500 acres
  - Statewide, approximately 40% of lakes not meeting their beneficial use designations – TMDLs, restoration strategies, implementation
  - Majority of lakes monitored are in good or excellent condition – next steps?



Minnesota's Watershed Approach

Guidance document

- Five step process to prioritize lakes for protection and develop protection strategies
- Developed by interagency team – MPCA, MDNR, BWSR, MDA, MDH
- https://pca.mn.us/sites/default/files/wq-ws4-03c.pdf



Protection and Prioritization – 5 Step Process

1. Summarize current water quality state for supporting waters
2. Quantify and target the amount and type of protection needed
3. Summarize and rank the “high quality unimpaired waters at greatest risk”
4. Incorporate local values – recreational, aesthetic or economic
5. Recommend protection implementation approaches tailored to the watershed

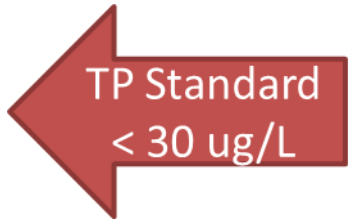
Step 1: Summary of Current Water Quality

Provides current water quality data, based on the most recent 10 years

Allows for ranking to see how close they are to the standard

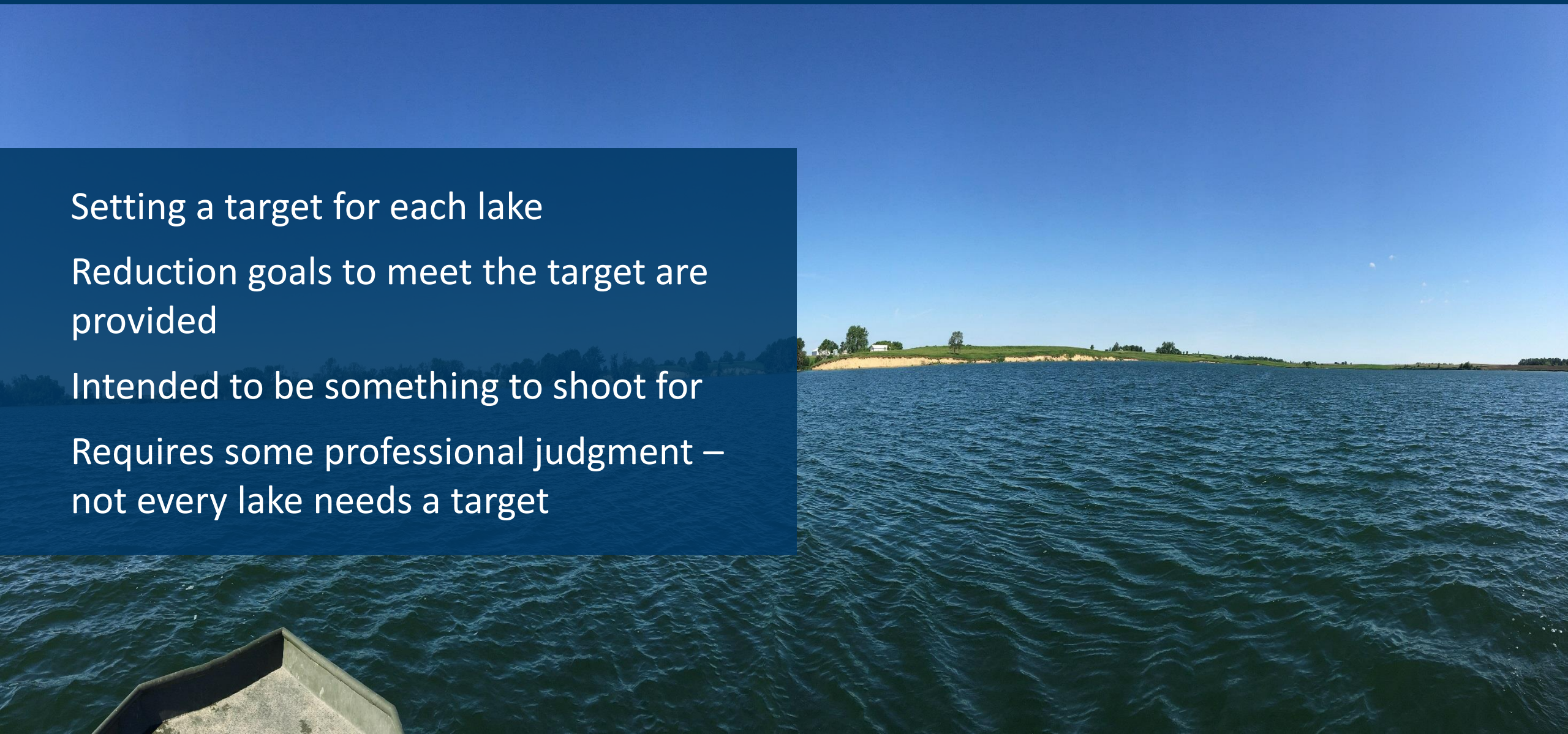
Step 1 Example – Leech Lake Watershed

Lake_Name	DNR ID	Depth Class	LAKE Acres	Watershed Acres	Mean TP (ug/L)
Portage	11047600	Deep	277	2,245	8
Benedict	29004800	Deep	464	12,715	9
Moccasin	11029600	Deep	272	2,162	10
Grave	11008600	Deep	372	4,260	11
Kabekona	29007500	Deep	2,433	61,932	12
Ten Mile	11041300	Deep	5,080	25,431	14
Child	11026300	Deep	285	77,928	16
Leech	11020300	Deep	110,310	748,797	17
Inguadona	11012000	Deep	1,133	166,460	17
Shingobee	29004300	Deep	172	10,427	18
Lower Trelipe	11012900	Deep	618	14,865	20
Laura	11010400	Shallow	1,255	9,293	21
Big Sand	11007700	Deep	730	2,957	22
Boy	11014300	Deep	3,466	241,063	23
Horseshoe	11028400	Shallow	127	543	24
Lower Sucker	11031300	Deep	592	18,874	28
Little Sand	11009200	Shallow	409	3,584	29
Paquet	11038100	Deep	145	31,277	31
Rice	11016200	Deep	270	135,570	35
Twin	11048400	Shallow	169	3,631	37
Portage	11049000	Deep	361	3,028	46

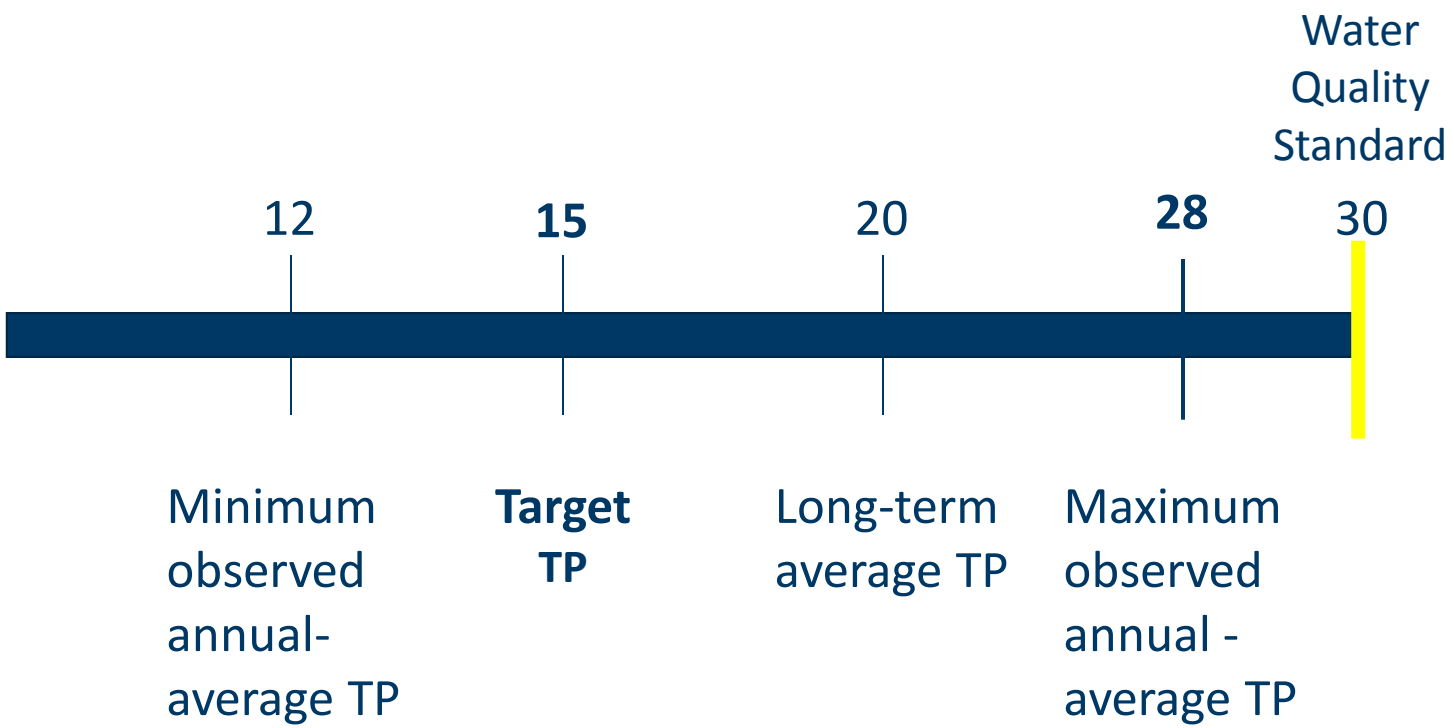


Step 2: Developing a Target for Protection

- Setting a target for each lake
- Reduction goals to meet the target are provided
- Intended to be something to shoot for
- Requires some professional judgment – not every lake needs a target



Step 2 – Example – Lower Trelipe Lake



Step 2 – Example – Lower Trelipe Lake

Mean TP 20 ug/L

- Predicted load 1410 lb/year

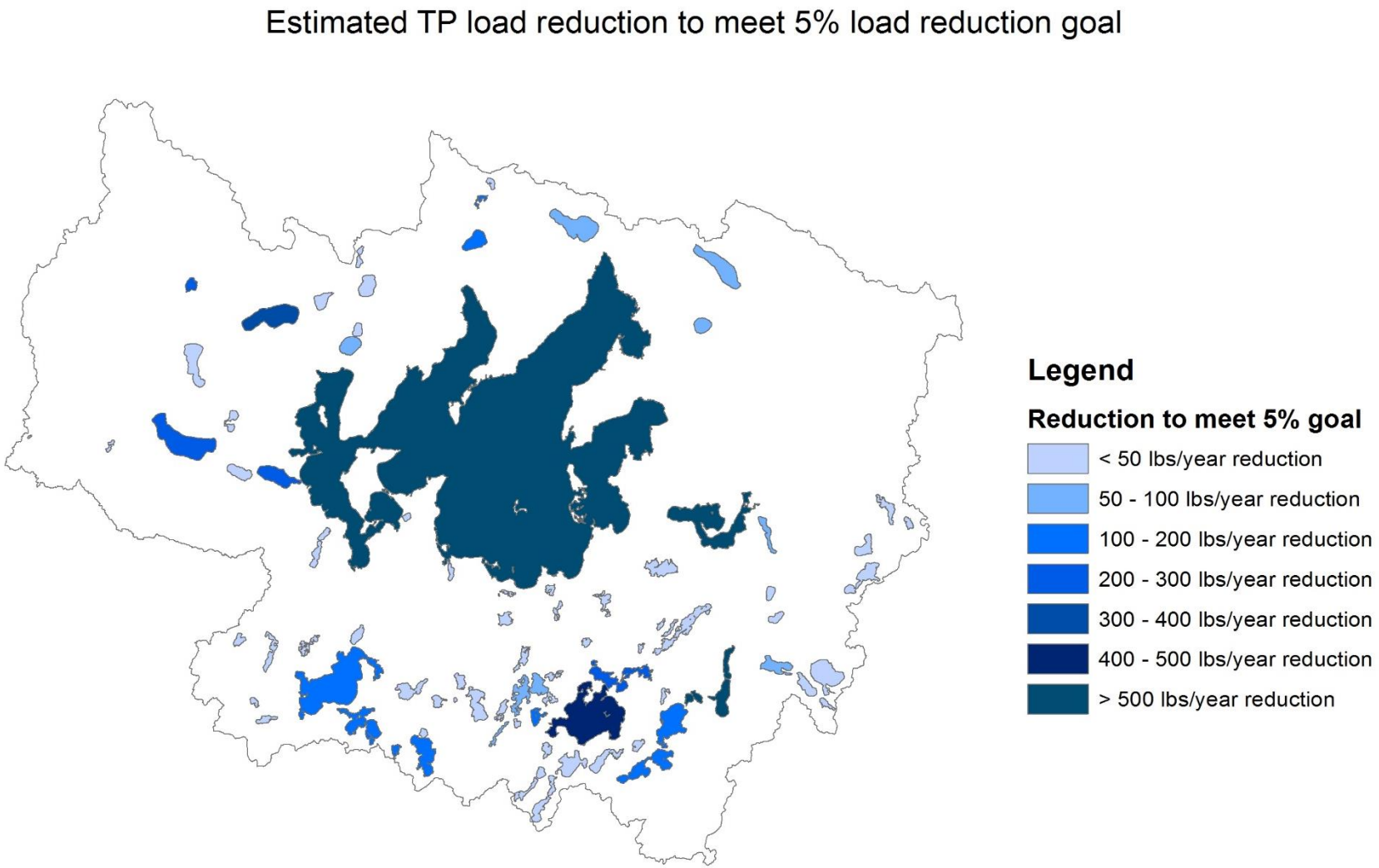
Target TP 15 ug/L

- Predicted load 1043 lb/year

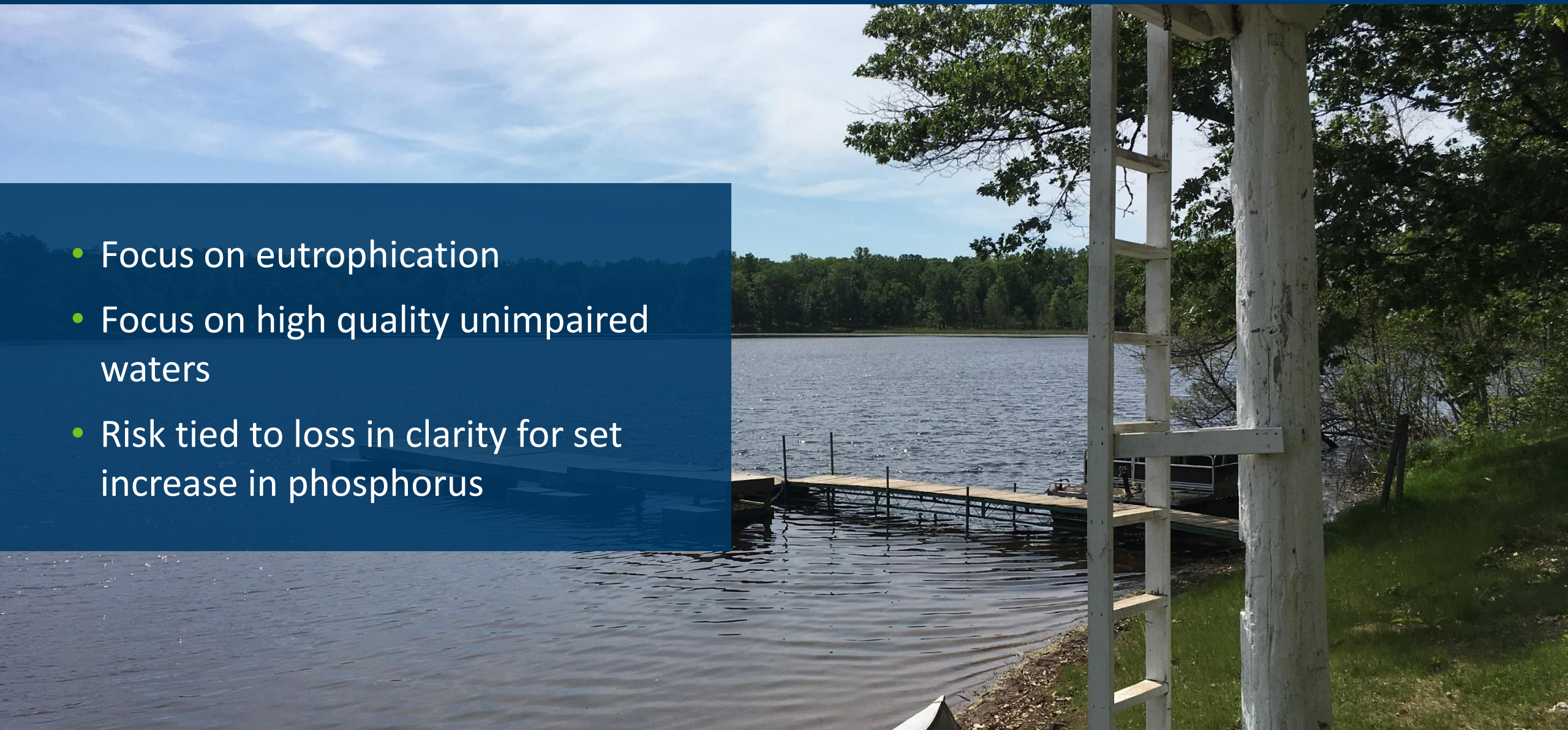
Load Reduction Goal (5%)

- 70 lbs/year

Developing a Target for Protection

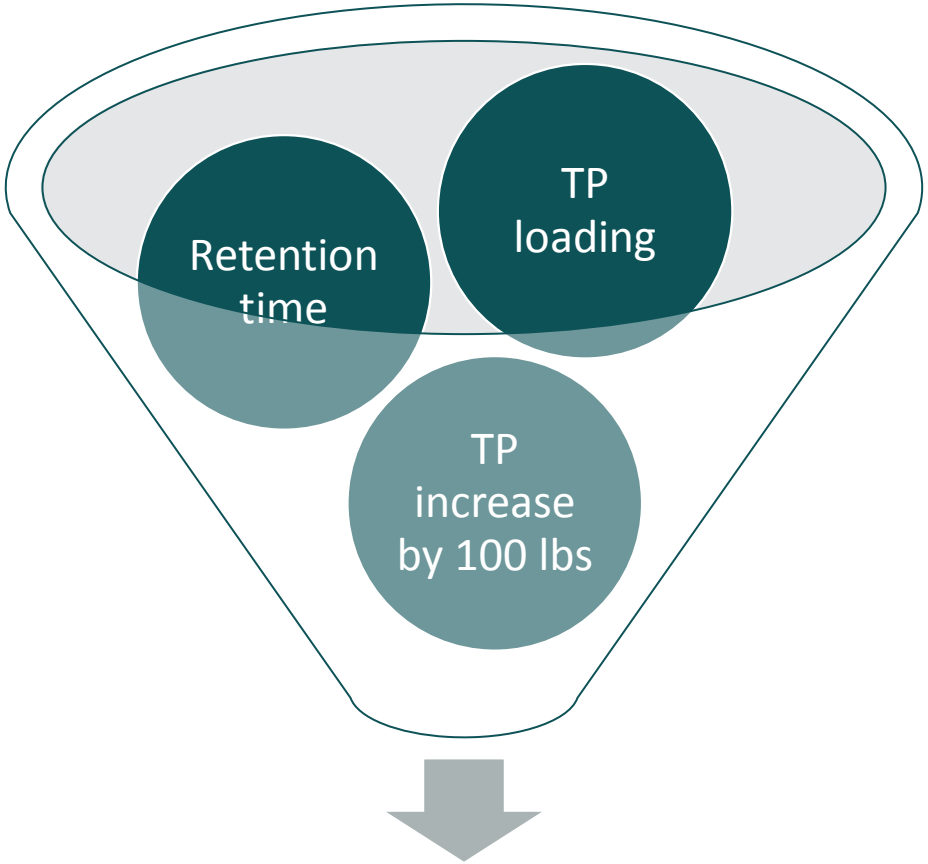


Step 3: Identifying Unimpaired Waters at Highest Risk



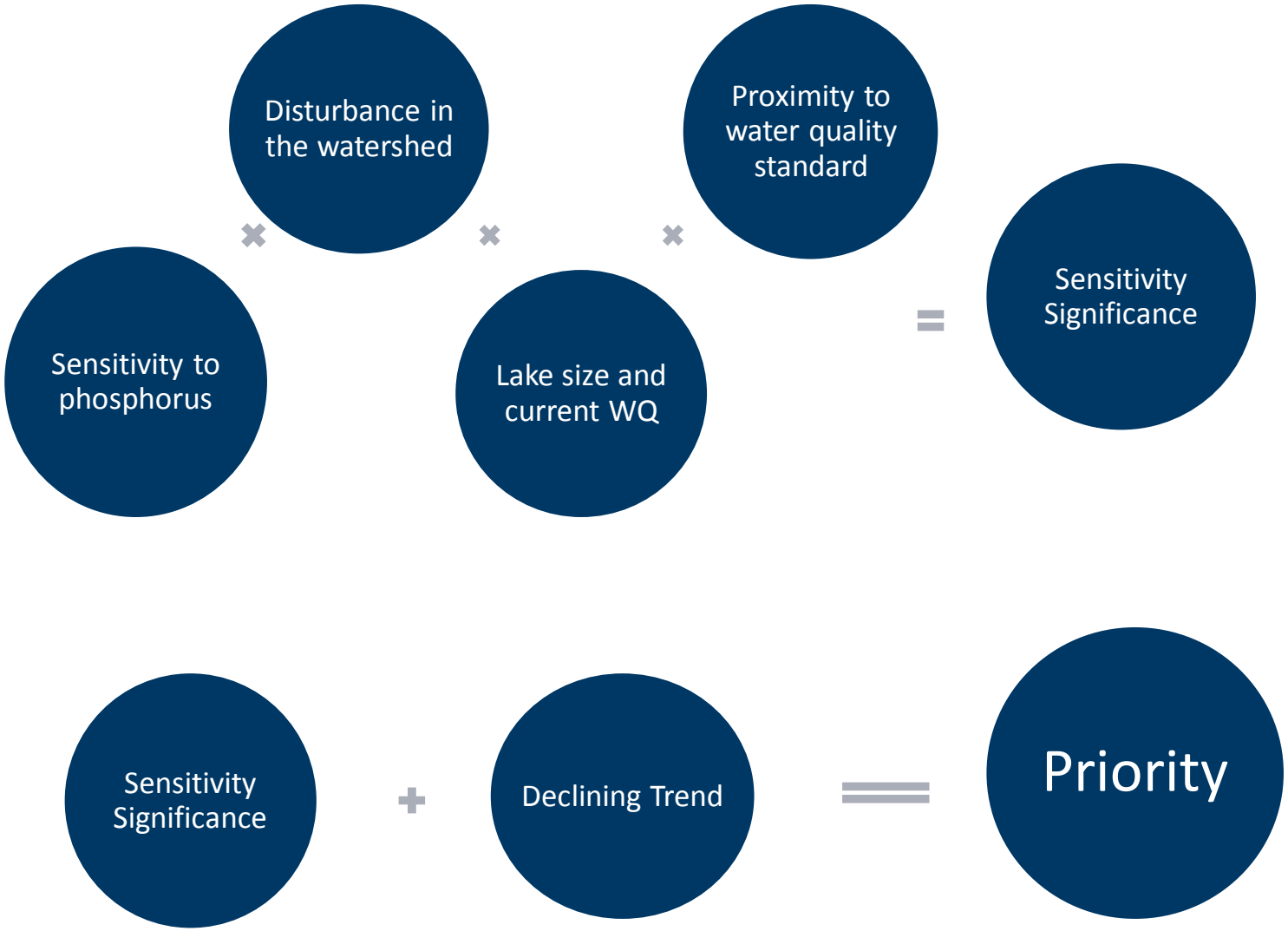
- Focus on eutrophication
- Focus on high quality unimpaired waters
- Risk tied to loss in clarity for set increase in phosphorus

Step 3: Identifying unimpaired waters at risk



Sensitivity = Loss in Secchi Transparency (inches)

Step 3: Identifying unimpaired waters at risk

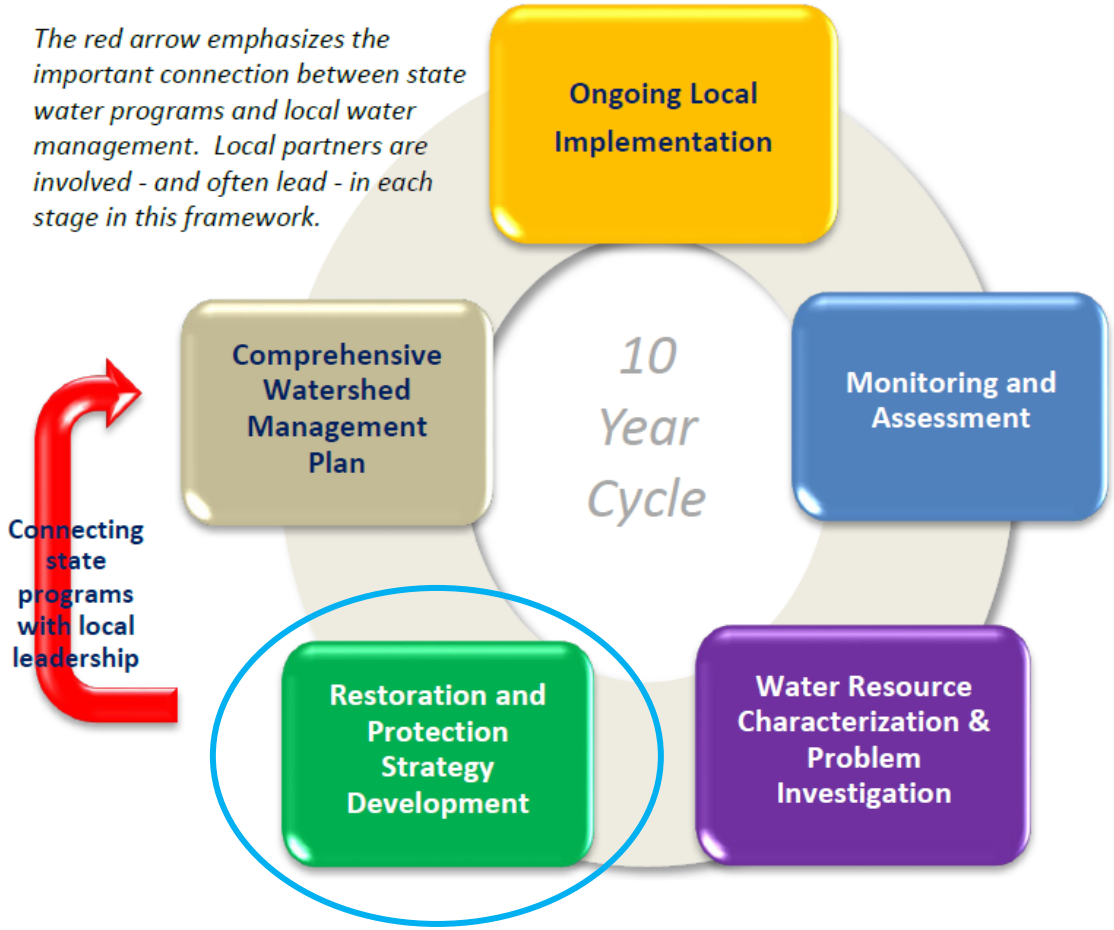


Step 3 – Example – Leech Lake Watershed

Lake_Name	DNR ID	Depth Class	LAKE Acres	Watershed Acres	% Disturbed Land Use	Mean TP (ug/L)	Presence of Trend	Priority Class
Portage	11047600	Deep	277	2,245	4%	8	Decreasing Trend	A
Ponto	11023400	Deep	388	1,431	10%	9	Decreasing Trend	A
Blackwater	11027400	Deep	767	6,705	7%	14	Increasing Trend	A
Cooper	11016300	Deep	133	898	9%	15	Increasing Trend	A
Garfield	29006100	Deep	960	3,379	7%	18	No Evidence of Trend	A
Baby	11028300	Deep	737	21,615	4%	12	Decreasing Trend	B
Kerr	11026800	Deep	83	339	7%	14	Decreasing Trend	B
Ten Mile	11041300	Deep	5,080	25,431	3%	14	Decreasing Trend	B
May	11048200	Deep	143	5,361	6%	9		B
Moccasin	11029600	Deep	272	2,162	3%	10		B
Kabekona	29007500	Deep	2,433	61,932	4%	12	Increasing Trend	B
Woman (main lake)	11020102	Deep	4,925	99,588	4%	15	Increasing Trend	B
Girl	11017400	Deep	428	104,328	5%	13	Decreasing Trend	C
Broadwater Bay	11020101	Deep	795	99,588	4%	14	Decreasing Trend	C
Kid	11026200	Deep	168	16,917	4%	14	No Evidence of Trend	C
Lost	11026900	Deep	69	16,125	4%	15	Increasing Trend	C
Lower Trelipe	11012900	Deep	618	14,865	3%	20	No Evidence of Trend	C
Trillium	11027000	Deep	155	15,565	4%	25	Increasing Trend	C
Paquet	11038100	Deep	145	31,277	4%	31		C

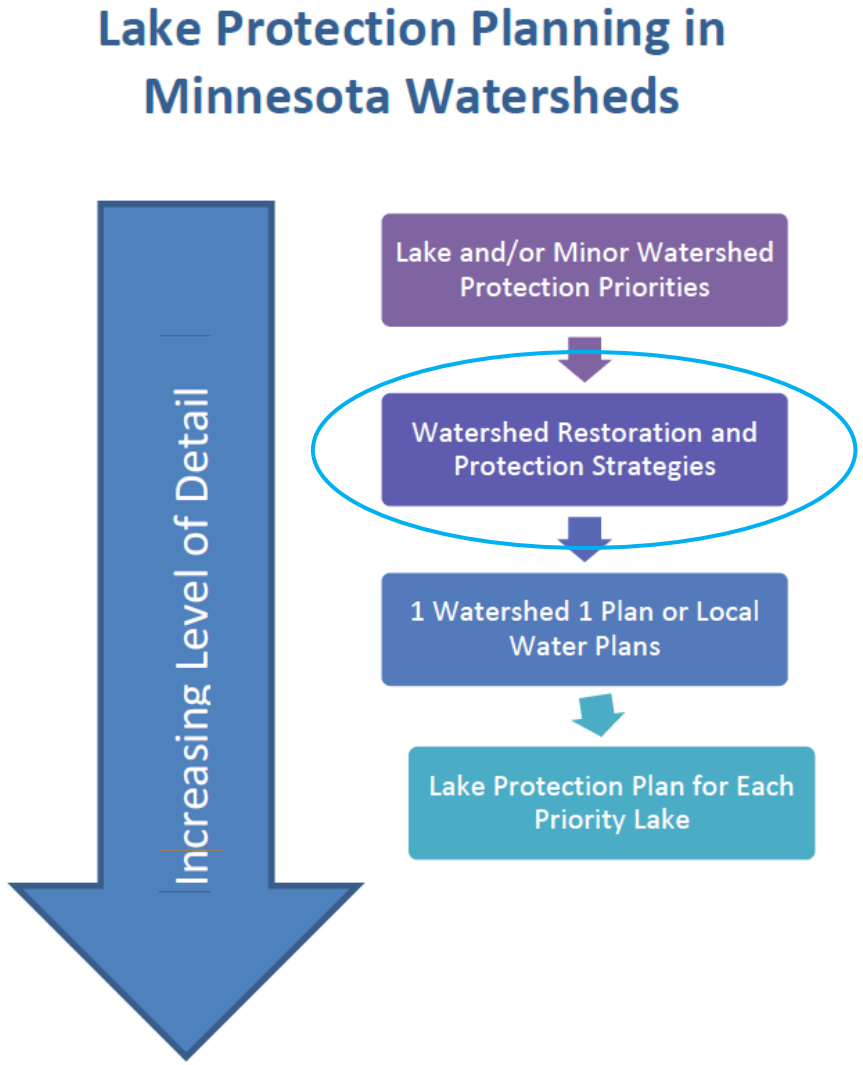
Step 4 – Incorporate local values

- WRAPS core team
  - Agency staff, local government, watershed districts, lake associations, stakeholders
  - Protection prioritization approach should be introduced early in the process
- Evaluation of lake prioritization data
- Evaluate local values and data not accounted for in steps 1-3
  - Demographics
  - Local planning and zoning ordinances
  - Economic analyses
  - Lake management plans
  - Aquatic invasive species status
  - Land use data
  - Political considerations
- Align local information and values with prioritization results



Step 5 – WRAPS protection strategies

- Protection strategy development
  - WRAPS core team discusses and selects protection strategies for each minor watershed and lake.
  - Use available data to decide which strategy will be most effective.
  - Consider local willingness to adopt strategies
- Incorporate lake protection strategies into WRAPS report



Step 5 – WRAPS protection strategies

Table 10. Strategies and actions proposed for the Headwaters Pine River Subwatershed. Red rows = impaired waters requiring restoration; Green rows = unimpaired waters requiring protection

HUC-10 Subwatershed	Location & Upstream Influence Counties	Waterbody	Data Source	In a High Groundwater Vulnerability Area	Parameter (incl. non-pollutant stressors)	Water Quality		Strategies (see key below)	Strategy types and estimated scale of adoption needed to meet final water quality target	Interim 10-yr Milestones	Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
						Current Conditions	Goals / Targets and Estimated % Reduction				SWCD	MDH	MPCA	NRCS	DNR	Non-profits	Landowners	LGUs	
Headwaters Pine River (0701010501)	Cass	Deep Portage Lake (11023700)	A1, A2, E, F, G	Yes	Phosphorus (influenced most strongly by watershed Ph. Loads)	12 ug/l	Target Mean TP ≤ 10.0 ug/l	Conservation easement acquisition (possible W and N of lake)	Approx. 1000 acres Tax Forfeit land available NW of Lake. At least 75% of lake shed must be left in forestland.	50 "hotspot" acres in Conservation easement	X				X	X	X	X	2026
								Shoreline Protection	Native buffers along 50% of the shoreline	Work with private landowners to install buffers along 50% of shoreline.	X				X	X	X	X	2026
								Infiltration on developed properties	25% of residential properties install infiltration basins	25% of lots install infiltration basins	X			X	X	X	X	X	2024
	Cass	Horseshoe (11-0358-00)	A2, C, E, F, G,	Yes	Phosphorus (influenced most strongly by watershed Ph. Loads)	16.5 ug/l	Target Mean TP ≤ 14.0 ug/l	Shoreline Protection	Implement buffers along 50% of the shoreline	Work with private landowners to install buffers along shoreline.	X				X	X	X	X	2026
								Infiltration on developed properties	10% of residential properties install infiltration basins	10% of lots install infiltration basins	X			X	X	X	X	X	2024
	Cass	Sylvan (11024600)	A2, C, E, F	No	Phosphorus (influenced most strongly by watershed Ph. Loads)	13 ug/l	Target Mean TP ≤ 10.5 ug/l	Shoreline Protection	Work with private landowners to install buffers along shoreline.	50 foot native buffers along 75% of residential shoreline	X						X	X	2026
									Increase number of residential properties with infiltration basins in areas south of lake	Utilize SAM tool to determine scale of adoption necessary to meet targets	X				X	X	X	X	2026
								Increased forest acres	Add upland forest acreage and use conservation easements to protect existing forest.	Increase existing forest cover to 75% in lake shed	X			X	X	X	X	X	2024
	Crow Wing	Clough (18041400)	C, E, F, G	Yes	Phosphorus	21 ug/l	Target Mean TP ≤ 17.5 ug/l	Conservation easement acquisition (possible NE of Lake)	Roughly 150 acres Tax Forfeit Land available. 200 acres+ of large parcel private land SE of Lake	Work with private landowners and programs to enroll landowners in conservation easements. The goal is 75% forest land in lake shed.	X				X	X	X	X	2026
								Shoreline Protection	Work with private landowners to install buffers along shoreline.	Implement buffers along 50% of the shoreline	X				X	X	X	X	2026

Thank you!

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Step 3 – Example – Leech Lake Watershed