

Long Lake TMDL Public Review Meeting

4/28/11

Present: Cory Netland, Stephanie Klamm, Darrell Schindler, Bob Ast, Doris Ast, Lee Ganske, Royal Ashburn, Mark Zondervan, Gary Swenson, Blaine Field, Ethan Jenzen, and Richard Larson,

The meeting was held at the Health and Human Services Building in Willmar.

TMDL Update

Cory opened the meeting up with introductions.

Public Comment Review Period for the Long Lake/Ringo Lake Excessive Nutrient Report will be from April 18th to May 18th, 2011.

Darrell Schindler from Minnesota Pollution Control Agency (MPCA) gave a brief overview of what a Total Maximum Daily Load (TMDL) is and the components involved. He talked about the TMDL process, watershed and current land use, current water quality and model results/assessment report.

The Long/Ringo TMDL is for excessive nutrients with the limited factoring being Phosphorus.

A TMDL is a process and a formula. The TMDL allocation formula determines; the amount of a specific pollutant that can be discharged to a water body and still meet water quality standards.

The process started out with assessing the water in question, determine whether it is impaired, then it is placed on the 303d list (Impaired Waters List), the water body is further studied, then a complete pollutant load allocation formula is created, after that a restoration strategy is developed along with an implementation strategy is put in place, the water body is monitored after BMPs are in place to see if they are making an impact.

The TMDL must also include a formula for load allocation: $LA(s) + WLA(s) + \text{Margin of Safety} + \text{Reserve Capacity} = \text{Total Maximum Daily Load (TMDL)}$

Here LA(s) = load allocations from nonpoint sources

WLA(s) = waste load allocations from point sources

Margin of Safety = to account for potential scientific error

Reserve Capacity = set aside for future development.

In the Long/Ringo TMDL there is no point sources, nonpoint sources include residential, urban, ag, business, lakes, wetlands.

Long/Ringo Lakes Watershed overview

Long and Ringo lakes are in the Northern Central Hardwoods Forest, the total watershed is 8,372 acres (including Ringo lakes watershed). Long Lake was impaired for excessive nutrients and listed on the impaired waters list in 2002, Ringo was listed in 2010 also for excessive nutrients. Long Lakes water body acres are 1,568 acres with a max. depth of 16 feet, Ringo lake water body acres is 735 acres with a max. depth of 10 feet, and a total watershed acreage of 4,368.

In 2008, MPCA contracted with Hawk Creek Watershed Project (HCWP) to complete a TMDL. HCWP agreed to do the data collection, public outreach, and daily oversight of the project, while MPCA helped in data collection, analysis, modeling and reviewing the project.

MPCA along with HCWP did a detailed GIS layer on the land use within the Long/Ringo Watershed. An older version of the land use had about 300 acres that were not mapped correctly, the old layer had wheat/small grains listed where there is now gravel pits. HCWP and MPCA did ground truthing on the entire Long/Ringo Watershed. Below is a break down of the land use

Land Use Category	Cultivated % (acres)	CRP % (acres)	Urban % (acres)	Wooded % (acres)	Open Water/ Wetland % (acres)	Pasture/Grass/ Hay/Idle Grass % (acres)	Gravel Pit % (acres)
Ringo Lake	11 (496)	9 (386)	15(640)	15 (655)	35 (1509)	11 (506)	4 (177)
Long Lake ¹	12 (1037)	7 (571)	13 (1087)	12 (973)	41 (3430)	12 (1004)	3 (271)

Hawk Creek collected a total of 32 samples on Long (2 sites) and 16 samples on Ringo lakes for Total Phosphorus, secchi readings, Chlorophyll-a, other nutrients, pH, water temperature, and other parameters. Below are the results from the sampling completed in 2008-09 for Long and Ringo Lakes and the mean value along with the eco region ranges and the standard for lakes in that eco region

Parameter Means	Long Lake 2008	Long Lake 2009	Long Lake Mean 2008 – 2009	Typical Range for CHF Ecoregion1	Ecoregion Standard
Total Phosphorus (µg/L)	113	141	127	23-50	<60
Chlorophyll a (µg/L)					
Mean	15	11	13	5-22	<20
Maximum	39	34	39	7-37	
Secchi disk (m)	1.77	1.97	1.87	1.5-3.2	>1.0

Parameter Means	Ringo Lake 2008	Ringo Lake 2009	Ringo Lake Mean 2008 – 2009	Typical Range for CHF Ecoregion1	Ecoregion Standard
Total Phosphorus (µg/L)	114	135	125	23-50	<60
Chlorophyll a (µg/L)					
Mean	56	45	50	5-22	<20
Maximum	90	54	90	7-37	
Secchi disk (m)	0.23	0.22	0.22	1.5-3.2	>1.0

Long Lake samples are 2 1/2 times higher than expected for TP, Chlorophyll-A is below the standard for the eco region and secchi disk readings are also below the eco region average. This does not make sense, TP and Chlorophyll-A should be high together and the secchi readings should be lower.

In 2010, an MPCA crew took some zooplankton and phytoplankton samples on Long Lake. There is an abundance of zooplankton in Long Lake that are consuming the phytoplankton making the water clear (increasing the secchi readings and keeping the Chlorophyll-A particles low).

If there is a change in this situation, (loss of zooplankton, the tables would turn and we would have a turbid water state like Ringo. Ringo has high TP and Chlorophyll-a results and low Secchi disk readings, which makes sense. The zooplankton that were observed in Long Lake are not as present in Ringo lake also.

Trophic Status Index (TSI) is a combined score of TP, Chlorophyll-a, and secchi readings for a year. This is used to gauge the health of a lake. Long and Ringo both measure in the eutrophic/hypereutrophic ranges. These lakes are classified as nutrient rich, algal blooms present, decreased transparency, war water fisheries, dominance of rough fish are all characteristics. Below are charts of Long and Ringo's TSI scores.

	Carlson's TSI		
	Long Lake 2008	Long Lake 2009	Long Lake 2008-2009
TP TSIP	72	76	74
Chl-a TSIC	57	54	56
Secchi TSIS	52	50	51
TSI Mean	61	60	60

	Carlson's TSI		
	Ringo Lake 2008	Ringo Lake 2009	Ringo Lake 2008-2009
TP TSIP	73 70	75	74
Chl-a TSIC	70	68	69
Secchi TSIS	81	82	82
TSI Mean	75	75	75

When doing TMDL modeling, there are 4 models that can be ran using the data, land use, livestock inventory, and the residential inventory collected by HCWP and MPCA. BATHTUB, MINLEAP, Chiaudani/vigni and Reckhow/Simpson For this TMDL, MPCA used the BATHTUB model since there was plenty of data collected by the two office. BATHTUB is the most used model for analysis since it takes in account land use, livestock, water quality results, eco region and rainfall. Below are the results from the models and the mean value that observed for the lakes.

Long Lake Model Results

Model	Observed	MINLEAP	Chiaudani/ Vighi	Reckhow/ Simpson	Reckhow/ Simpson¹	BATHTUB
TP (µg/L)	127	38	36	46-67	56-73	55
Chla (µg/L)	13	13.1	na	17.7-30.6	na	26.3
Secchi (m)	1.9	1.7	na	1.0-1.4	na	1.2
Phosphorus Load (lbs/yr)	na	1,316	na	2,101- 4,035	2,974- 4,618	2,521

¹ Includes estimate of livestock contribution.

Ringo Lake Model Results

Model	Observed	MINLEAP	Chiaudani/ Vighi	Reckhow/ Simpson	Reckhow/ Simpson¹	BATHTUB
TP (µg/L)	125	57	38.6	67-103	85-117	88
Chla (µg/L)	50.3	24.0	na	30.6-57.4	na	34.0
Secchi (m)	0.2	1.2	na	0.7-1.0	na	0.2
Phosphorus Load (lbs /yr)	na	673	na	1,045- 2,088	1,536- 2,572	1,366

¹ Includes estimate of livestock contribution.

Darrell summarized his presentation by stating that Long Lake’s water quality is generally good, except for the high phosphorus results and the presence of blue-green algae, Ringo Lake’s water quality is poorer, it is a shallower lake and heavily wind swept.

Cory gave a brief update on the TMDL process also, stating that the assessment report in in the process now, and out for public comment, and that the next step would be completing and implementation plan, in which the committee would need stakeholders and partners for a technical team, the implementation plan would be addressing the excessive nutrient of phosphorus only.

As far as what the models are showing is that much of the phosphorus is internal loading, but there are things that can be addressed externally to control excessive internal loading such as Best Management Practices on shorelines, agricultural fields and residential areas.

Non compliant septic systems are not accounted for as external loading but rather internal loading. According to the results from the modeling;

Long Lake

	Bathtub	Measured
Secchi	1.2 m	1.9 m

Phosphorus	54.6 ppb	127 ppb
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Bathtub estimates internal loading of P as well.

95% of P retained in lake!

Internal = 78% of the Phosphorus

External = 18.4% Precipitation = 3.7%

Noncompliant ISTS not accounted for (part of internal loading)

Chlorophyll-A	26.3 ppb	13 ppb
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Ringo Lake

	Bathtub	Measured
Secchi	0.2 m	0.2 m

Phosphorus	88.3 ppb	125 ppb
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Bathtub estimates internal loading of P as well.

92% of P retained in lake!

Internal = 44.5% of the Phosphorus

External = 47.5% Precipitation = 8%

Noncompliant ISTS not accounted for (part of internal loading)

Chlorophyll-A	34.0 ppb	50.3 ppb
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TMDL = WLA + LA + MOS

Loading Capacity

Long = 3.7 kg/day

Ringo = 0.89 kg/day

Outside of Construction Stormwater, there is no wasteload (WLA) allocation for this TMDL (No point sources)

WLA for Long = 0.03 kg/day

WLA for Ringo = 0.01 kg/day

Load Allocation (LA) = Existing and future non-point sources from landuse, atmospheric deposition, and internal loading

LA for Long = 3.31 kg/day

LA for Ringo = 0.79 kg/day

Margin of Safety (MOS)

10%-accounts for uncertainty, effectively lowering the target from 60 ppb to 54 ppb

Budget idea for the Implementation Strategy for External Loading:

Municipal sources = none

Urban = 50% of homes = \$145,750 for shore land buffers, rain gardens, lawn fertilizer reduction, vegetation management, permeable pavers, rain barrels

Small business = \$41,250 for permeable pavers, rain gardens, storm water settling basins

Individual septic system upgrades \$416,500 (replacements for 49 homes along the shore), currently there is \$1,776,500 (watershed wide) and 3% low interest loans for the watershed.

Agricultural areas = \$95,000

Gravel Pits = require permits = no cost-share funds for these areas

Budget idea for the Implementation Strategy for Internal Loading:

There would be roughly \$500,000 for all practices listed below;

Fish Management (limit of rough fish), In-lake Vegetation management, limited boat traffic (no wake zones), Chemical Treatment (Alum treatment), Lake Drawdown

Monitoring Plan would be taking 1 sample every 3 years to check on implemented BMP success, there is no plan on doing any biological sampling, and fisheries would be done as scheduled.

What's next for the TMDL: MPCA would like to receive comments/response on the draft assessment report before May 18th, 2011. After MPCA receives all the comments, the report will be resubmitted to the EPA for final approval, when it's approved, HCWP and MPCA will develop an implementation plan along with stakeholders and technical team support on how to tackle the problem.

Questions from Stakeholders and Participants during the 4-28-11 Long/Ringo Lake TMDL Meeting

Doris Ast: **Is the draft TMDL Report on the website?**

Cory: Yes, it is on the MPCA and HCWP websites along with meeting dates and minutes

Doris Ast: **What is in-lake vegetation?**

Cory: In-Lake vegetation is vegetation such as bull rush, cattails, submerges/emergent lake vegetation that helps hold the wave back from the shore, and soil on the bottom of the lake

Bob Ast: **Are there any samples of the sediment in Long/Ringo Lake**

Cory: Not that we are aware of

Bob Ast: **Would a lab do sediment analysis?**

Cory: They might analysis soil samples

Bob Ast: **If the majority of P is in the soil, would carp be the problem?**

Cory: They could be, and the vetch (open water) is high on Long Lake which allows for the lake to be wind tossed

Bob Ast: **Did you even sample Swan Lake, a commercial fisherman thinks that the carp are down in Willmar lake now?**

Cory: Yes, we (HCWP) sampled it in 2008 and it was murky, and in 2009 it was clearer with vegetation, we were thinking that in 2008 the lake winter killed, and killed of some of the carp in Swan Lake, we found carcasses in the summer of 2009 on the shores, and that is why in 2009 is was clearer but weed-choked.

Doris Ast: **Would a commercial fisherman do all the lakes and wetlands in the watershed?**

Bob Ast: They would need to do sonar and have a large amount of fish to take out in order to make it worth their time! Last winter they were working in South Dakota.

Blaine Field: **On Long Lake the bird population is 2 to 3 times higher then other areas with pelicans, cormorants. Is this considered in the assessment report?**

Cory: In a nesting survey on the island the report said that there are 1352 cormorant nests, they contribute (recycle) to the lake by taking fish out and putting feces back in, but the lake would be higher in nitrogen then phosphorus, they are not confined like turkeys, and are gone from November to the spring. It's hare to make a fair comparision since they are not confined and can move from lake to lake to feed.

Darrell: As for the island with the cormorants, my biggest conclusion is that the research is poor, there is very little data, and it's a wild guess based on the research, most of the research I found is based on seagulls. The numbers are down on the island which use to be near 2,000, and now is down to 1,000.

Gary Swenson: **What about the turkey barns?**

Cory/Darrell: Turkeys are confined and some of manure is applied in the watershed but most is applied out of the watershed.

Gary Swenson: **Can we manage the lakes with more zooplankton?**

Darrell: It would be hard to do

Gary Swenson: **As for the fisheries in the lake, does the DNR consult citizens with what they want in the lakes or do they just dump in what they want? Where do I find information on what's in the local lakes for fisheries?**

Darrell: The MN DNR controls the lakes and you can find out the fisheries surveys and reports on the MN Lake Finder.

Bob Ast: MN DNR fisheries manages the Long Lake area for walleyes.

Royal Ashburn: **If the mean TP for Long Lake was 127 mg/L, could the TP be higher in 2010, and if 78% is external, and the external is 22%, if you eliminate all 22%, we are still 2 times higher in the internal, can we even control it?**

Cory: Don't know if we will get below the 60 ug/L that is the eco region standard.

Royal Ashburn: **What is Alum, and is it toxic to vegetation and fish?**

Ethan: Aluminum Sulfate binds with phosphorus and settles out into soil, if the lake is wind swept, the phosphorus/soil can still become suspended, we would still need to reduce the amount of phosphorus in the lake.

Royal Ashburn: **What would happen if the lake went up, what would a dam do?**

Cory: Higher water would choke out vegetation already there, in lake vegetation needs light penetration for it to grow, no vegetation and you get green algae, or you can have weeds and clear water.