Poplar River TMDL Public Meeting
Cook County Courthouse
February 28, 2008
Record of Meeting

Below is a generalized summary of comments, questions, and responses during the public meeting. Not all details could be captured, and much more discussion

❖ Agenda

6:00	**Overview**	**Dave Stark (SWCD)**
6:20	**MPCA Comments**	**Karen Evens (MPCA)**
6:40	**Turbidity Report (Overview)**	**Troy Naperala (URS)**
7:15	**Questions and Comments**	**Open**
7:30	**Break**	
7:45	**Optional Technical Discussion**	**Troy Naperala (URS)**
9:00	**Adjourn**	

❖ Attendance

- Forty-one people signed the attendance sheet.

❖ Dave Stark, Cook Cty SWCD: Overview

- Troy Naperala contract over on March 31
- Have clearly heard that we need more public input on process
  - We are taking a break. There will be approximately a month (until April 17) to comment on reports (a Technical Advisory Committee meeting will follow shortly thereafter).
- WLA (pipe from ponds below Caribou Highlands) estimated at < 1% of total load
- TMDL = sum WLA + sum LA + MOS
- How were loads calculated?
  - Water quality data assessment
  - River channel assessment
  - Watershed modeling

- Web address: www.lakesuperiorstreams.org/northshore/poplar/TMDL/index.html
- *Question: Thanks for the overview of where we are at today, but what will be the next steps?*
  - *Karen will answer.*

(WLA = Waste Load Allocation; TMDL = Total Maximum Daily Load; LA = Load Allocation; MOS = Margin of Safety)

❖ **Karen Evens, MPCA: History and future process.**

- Why we are not at the point we thought we would be at.
  - Pieces of process changed.
  - Data led us to do things differently
  - Public was huge part of why we didn't want to take it all the way to TMDL at this point. We want more public in the process.
- Scheduling was a big issue.
  - We had 4 different projects going on at the same time. Not all on same schedule.
  - The Ham Lake fire contributed to the scheduling difficulties.
  - Change at legislature slowed things down (change in MPCA)
- Part of the process was to review the upland model – when got to that stage we realized that we needed more detailed modeling. This added work that required more funding. EPA provided funding, but the work took a while.
- Held a public meeting in June – got a lot of feedback in emails, letters, and calls from then on. Also feedback at various meetings related to the TMDL.
  - Feedback told us we aren't ready to go to the final pathway of TMDL.
  - Instead, ready to make some conclusions, summarize what we've learned up to this point, bring public in, have more discussion of what the data mean, future directions to go in, etc. We want to slow the pace down to allow more time for deliberation.
  - So, we are not focused on TMDL timeline at this time.

- Will wrap up project, get summary report, and then have dialogue to inform future decisions.
- Want to get biological report wrapped up into our overall review. Might require additional investigations.
- Target date could be late 2008 or 2009.
- Could go back into research mode. Like going to doctors and they say – you need more tests.
- Original TMDL schedule was very aggressive.

❖ **<u>Troy Naperala: Overview of what the data say</u>**

- Two sampling sites. Upper site represents relatively flat terrain. Lower site is high gradient. Would expect to see water quality differences at the two sites, even without human impacts.
- 69-76% of sediment loads come from the lower watershed. Contribution from lower watershed is 690-2,700 tons/year. Determined by subtracting upper load from lower river load.
- Varies year to year based on stream flow, rain and snowfall, etc.
- Load duration curve – allows us to analyze when exceedances of the 10 NTU criterion occur.
  - Can see that high stage in river or rainfall events mean more sediment. High total suspended solids (TSS) is related to high flow.
  - Turbidity is higher at lower station. Exceed water quality criterion more often at higher flows.
- Geomorphological assessment
  - Landslides and gullies and ravines were far more important than channel bed incision, channel migration, or streambank erosion in contributing to sediment loads.
  - Lots of fine sediment at the toe of the mega slump. Additional major slumps are above ski resort.
  - Gullies and ravines are common in steep-valleyed watersheds.

- Considered near channel sources to be just part of the picture so did some modeling.
- Not including near channel sources, largest contributors are ski runs (65%), forest (27%), slumps (5%),

➢ Primary sources on a tons per acre basis include the slumps (18.8), ski runs (4); developed areas (.8) etc.

➢ In their report they combined near-channel and upland sources, but Troy cautioned that they are comparing apples and oranges. Observations from one day compared to aerial photos combined with model results of sediment loads.

- When observations and models are combined, they estimate that the ski runs contribute 34%; forest 14%; gullies/ravines 11%; other landslides 10%; megaslump 26%; channel incision and stream migration 3%; developed and golf 2%.
  - Caveats – this will vary year to year. Channel migration only occurs periodically.

➢ Summary:

- 51% of exceedances occur during the highest 10% of flows (> 260 cubic feet per second (cfs)
- 73% of exceedances during 40% highest flows
- 55% of total sediment loads occur in April-May
- Need 60-89% of reduction in loads to meet 10 NTU criterion 90% of the time.

❖ **QUESTIONS**

➢ *Question: Megaslump – is it really a landslide. What is the landslide triggered by?*

- *Triggered by the river itself. Many years of the river working on the side of valley.*

➢ *Question: Did it happen all at once or was it gradual?*

- *Slow and steady, but big storm events cause bursts of erosion. Has gotten worse than it was in the 1930s.*

- *Question by Marty Rye: Is there a point where the river is considered not impaired longitudinally? These seem like relatively discreet inputs, can you go above a certain station and see that it is unimpaired?*
  - *Only two sampling sites, but above upper station it is not impaired.*
  - *MPCA considers whole extent between two stations impaired, mainly because there are no officially-usable data in between.*
    - *There are data coming in at golf course, in between two other stations. These are real-time data that can be observed on http://lakesuperiorstreams.org/northshore/poplar/TMDL/index.html.*
    - *These data points weren't used to calculate the loads, since they are not lab certified data. However, Troy did look at data from real-time sonde, and they do support other sampling sites – high flow does correspond to higher sediment loads.*
  - *Desire for more sampling above and below megaslump. Agencies didn't want to do more sampling at this point until report is looked at carefully and additional sampling can be carefully planned.*
- *Question: Considering the variation in load range from upstream to downstream, what would the load have been in pre-settlement conditions?*
  - *Don't really know answer. Did try doing model runs with all land in forests, but doesn't truly answer question.*
- *Question: You estimate that 36% is caused by our activities; 64% is naturally-occurring. Is that right? Mike Lippman?*
  - *Yes, roughly.*
- *Question: Jim Hall: Were there fish and invertebrates in the river 20 years ago?*
  - *Some information out there, mostly anecdotal. None conclusive about fishery decline and didn't point to a specific cause.*
  - *Doing study to look at this. The Natural Resources Research Institute is doing a macroinvertebrate study. No actual fisheries work as part of TMDL. Will share report with MDNR fisheries. Another good reason to not rush the process. We will need to follow-up with NRRI*
  - *Fishery impacted at lake-wide level in the Great Lakes, so it is hard to pin fish impacts down to just the one river.*

- *Water quality standards name the beneficial use that the Poplar River needs to protect as aquatic integrity of life in the river. There is a large range of information in the loading portion of the data. Agency staff will talk with MDNR and MPCA experts. Get better feel as we move forward before we set final numbers for loading. More pieces that have to come into the story. Don't have whole picture as well as we'd like.*

➢ *Question: I've been up here after huge rains. Entire west end of Lake Superior turns red. Is that the same kind of turbidity that we are seeing in the Poplar?*

- *Yes, loads you see in the lake are coming in from tributaries.*
- *Removing vegetation does lead to erosion.*
- *Just starting to work on loading. Have done work on the Nemadji, Poplar, Knife, and some Duluth streams. But truly looking at upper watershed loads, etc. is in its infancy. TMDL process is helping move that process forward. Will help us understand our streams better and know better how to manage them.*

➢ *Question: If all north and south shore rivers behave this way, then why focus on the Poplar River? The slopes that the ski hills are on were there before the megaslump, and you've told us that the megaslump is natural. So, why the big focus on the Poplar?*

- *When you take trees off of a steep slope, you get erosion. But we need to understand the relationship to manage the problem.*

➢ *Question: Jane Howard – from the Star. If erosion is truly natural, does MPCA not believe nature can take care of itself? Why spend lots of money on this if it is natural?*

- *PCA has to move forward based on the data we have. Based on our water quality standards in MN – we have to develop TMDL.*
- *Troy's group made recommendations to us about what to do to improve the situation. We also have folks who say that the megaslump can be influenced by human behavior. For example, the wastewater pipe on the ski run – when it was placed, there was no erosion below that pipe. Sensitivity of the clay soils to disturbance has caused additional erosion. Question of natural factors versus the human activities that exacerbate the problem requires more time and more study.*
- *Marty Rye – To answer the "why care?" question…..It matters to the Poplar.*

- *Question: Why spend money on it?*
  - *Legislature determined this was an important water quality question. They have provided money for study and implementation.*
  - *We all acknowledge that there is a natural component and a human component. We need to deal with human part.*
- *Question: Amount of sediment coming out of the Poplar is different than the amount coming out of the Cascade, Brule, etc., right? Poplar has more sediment coming out than other North Shore streams?*
  - *North Shore loading study showed of six watersheds up and down the shore that had different characteristics – streams with more development in their watersheds had more sediment coming out. But have to understand that these rivers are not all the same type.*
  - *Another reason for doing Poplar – there was some interest among local people in working on it.*
- *Question: What should we think of the recent Duluth News Tribune article about the Poplar River? It talks about phosphorus inputs.*
  - *The article was mis-leading. Agencies should write a response to newspaper.*

❖ **TECHNICAL PORTION AFTER BREAK**

❖ **<u>Troy Naperala's Detailed Talk</u>**

- Downstream – 35% of samples exceed 10 NTU.
- Troy provided an explanation of the relationship between turbidity and TSS. Turbidity can't be used to estimate loads. It is a measurement of clarity. Because most of the loss of clarity in the Poplar River is caused by sediment, turbidity provides an excellent estimate of total suspended sediment in the river.
- *Question: When will you have 2007 data?*
  - *Should be available soon, but we don't know when exactly (Greg Johnson, MPCA).*
- There is a seasonal component to sediment load at both the lower and upper station. Highest loads are in May and, to a lesser degree, in the fall.

- Most of the sediment originates in the lower Poplar, so they focused modeling and physical channel assessment on lower Poplar. Sources:
  - Channel bed incision
  - Channel migration – occurs infrequently, associated with high flow events. Sediment load large and flushed from system quickly.
  - Streambank erosion – gradual stream migration; these are natural processes; bottom of Poplar heavily armored by large boulders, so very little streambank erosion in Poplar.
  - Landslides near active channel – more severe streambank erosion.
- *Question: The left picture on your slide shows an armored bank on the left side of the stream. Since this looks like it is armored, is it still susceptible to erosion?*
  - *Remember that the stream is not always this low. Flow is often above the rocks that are visible in the picture, thus hitting the exposed sediment.*
  - *Megaslump has portions with virtually no vegetation and parts that are stepped back with bare soils higher up on the slope.*
  - *Overland flow is also causing erosion higher up on the slope. Pretty thin area of rock armoring the bank in many areas, so it is easy for water to overtop the rocks. Rocks that are there are really just part of streambed and probably AREN'T really armoring the slope in any real sense. Scour at toe over-steepens the slope and destabilizes the whole slope.*
- Gullies and ravines: bare soil, steep slope, fine suspended sediment at base of slope.
- Near-channel sources. We used a method involving developing an estimate of the land that was originally there that is now eroded away. This method gave a range, rather than a single value, because it is such a semi-quantitative way of gathering data.
- Upland sources – used computer models to estimate.
  - Varies from year to year based on many factors – sunlight, precipitation, snowfall, snowmelt timing, etc.
- *Question: did you consider the 10 million gallons pumped out of the river to make snow in terms of turbidity sources?*

- *We did look at snowmaking in our hydraulic model. Model was inconclusive. Varied significantly from year to year, based on when the snow melted, as well as length of time it took for melting to occur.*

- *Question: What percentage of snow evaporates versus melting and going down to the river?*

  - *We don't know. This also would vary from year to year. Can't separate natural snow from manmade snow. Should remember that ski hills are more sensitive areas and have more snowmelt on them. The amount of water for snowmaking is small relative to the amount of water in the river.*

- *Question: Why did a previous PowerPoint slide say the megaslump contributed only 5% and this slide says it is much higher?*

  - *The earlier slide was just looking at computer model results, which just looked at upland erosion from rainfall hitting soil and mobilizing soil and surface runoff. This slide looks at whole picture – channel sources plus watershed sources.*

- A load duration curve method was used to calculate TMDL.

  - For different flow ranges, we calculated how many pounds of sediment can come down the river. From that, we subtract a margin of safety (MOS), the waste load allocation (WLA), and come up with the load allocation (LA). The LA represents all the nonpoint sources of sediment to the river.

  - The range is 1000 to 3000 tons/year. The LA is somewhere around 1200

- *Question: Do you have any analyses that break down sediment load by acre? Forest looks like it contributes a large load, but that is just because we don't see it corrected by load/acre.*

  - *On a per-acre basis, we estimate that forest is .32 tons/acre; slumps 18.8 tons/acre; ski runs 4 tons/acre.*

- *Question: Are numbers based on a generic type of forest or on specific types?*

  - *Not really distinguished. Based on generic type of dense forest for this type of environment. Differences in forest types are not important to the model, compared to other sources of uncertainty.*

- As part of our work, we estimated potential reductions that might be required to meet turbidity standard all the time. At high flows, we would need to reduce loads by 90%.

- Recommended erosion controls – if implemented – would result in benefits to water quality.
  - Ravine sediment contributions should be mitigated by slowing and/or removing the flowing water and restoring the gully.
  - Megaslump should be stabilized.
  - Runoff from dirt roads, parking lots, and bare areas should be controlled and treated.
  - Ski runs are 34% of sediment load – recommend vegetative cover. Active restoration is needed.
  - Reduce erosion from trails and roads. Remove roads and trails as much as possible.

❖ QUESTIONS

- *Question: Any study on what is in the material from various sources? Maybe sediment from some sources contains more dangerous materials than from forest?*
  - *Haven't looked at that. Poplar is also listed for mercury, but that wasn't part of this study.*
  - *The North Shore Study is focused on conventional pollutants – TSS, phosphorus (P), nitrogen (N), bacteria. Summary of those data is in the data evaluation report. Testing for other parameters can be very expensive. The TMDL water quality analysis and testing focused on total suspended solids (TSS) and turbidity.*
  - *Wastewater issue – sampled for E coli over two years around Lutsen. Saw that E coli counts were higher above the wastewater treatment plant. All those sampling data are on MPCA website at http://www.pca.state.mn.us/data/eda/. Type in Poplar River and can see all those data.*
- *Question: The final report is well-written and clear. But, look in report on Figure 12 on page 31. That figure shows four different scenarios that you put into the upland model. Scenario 3, existing conditions, shows 1000 tons/year from upland sources. Stormwater controls in place show a reduction of 200 tons/year. This seems to say that from upland sources we can only reduce 200 tons/year. How do these numbers translate into turbidity? Tom Ryder.*

- *They don't translate exactly into turbidity. The 20% reduction involves essentially increasing vegetation cover to 100%.*

- *We think you could get additional reductions from stormwater controls, such as berms across the ski hill to slow water down. We just can't model those things in the WEPP watershed scale model. You could probably get greater than 20%. The question is, how does this relate to turbidity levels? Controlling sediment may not get you to 10 NTUs all the time, but will result in reductions to the maximum level and frequency of exceedances.*

➢ *Question: Don't you also need to look at May, which is the worst loading month, and analyze how much erosion controls would help the peak period of loading? If we implement good Best Management Practices (BMPs) to reduce erosion and sediment at the worst time of year, could we have a larger reduction than what was estimated in the model? Of course, revegetation wouldn't be as effective in May, when the worst problem occurs, because there isn't much vegetation up and growing in May to slow water down.*

- *Would have some impact in May, because vegetation is there, even if not actively growing – will still have biomass there.*

➢ *Question: The channel assessment showed that the channel straightened out in 1990. Did the study look at that, as to how channel modification impacted down-cutting, steepening of slope, greater stream power, etc., in that reach?*

- *Couldn't see anything.*

➢ *Question: Do you consider the stream bed to be "armored?"*

- *Looked at distribution of cobble in the river. Found to be bimodal. Lots of small cobble, lots of large boulders, not much in between. Not a lot of erosion from stream bed itself. Contract budget limited what we could work on. Other studies to answer some of these questions may be a result of what has been learned with the Poplar to date.*

➢ *Question: What about rain-on-snow events? How do they impact erosion? We've all seen the rivers plug up with ice and divert the flow off in another direction.*

- *These rivers have some similarities to mountain streams out west, but have these ice flows. Model doesn't do a really good job of estimating developed areas, so peak flows and how water is responding need to be kept in mind.*

➢ *Question: How was the 20% area on ski hill as being open soil estimated?*

- *We estimated percent cover for ski runs. We estimated 80% cover, 20% bare ground. Estimated from aerial photos. Includes roads and bare areas.*

➢ *Question: When building dams – worry about probable maximum floods. Get lots of water when ground still frozen – recognize that heavy rain in April is just as bad as ice jam. Huge flows. Can wash out the whole river.*

- *Probable Maximum Flood is used for designing dams as a worst case scenario, but it is very rare.*

➢ *Question: The fact is that the river is exceeding turbidity limits. The river is in noncompliance, whether the cause is manmade or natural. What is the next step? Are people who are contributing to the problem going to be forced to take protective action? Will we clean this up?*

- *The next step is to pull everyone back together, look at report, and see if we can come up with a TMDL. The regulations say that NPS control is voluntary.*
- *The longer term next step is to look at the broader process of how you achieve a TMDL. We need to have a public participation plan and an implementation plan. It is okay to start with projects that are "low hanging fruit." Do more with developed parts of watershed, but can also work on problems in other areas. There is a section in the report about "reasonable assurance" – meaning, how do we intend to get to the end goal of an unimpaired river? We also need to be monitoring for effectiveness. When we get all this done, there will be a draft document that goes out for an official 30-day public comment period. When that time period ends, we will respond to comments and send the whole works to EPA. They look for weaknesses in the document.*
- *We want to do this in a measured, careful fashion.*
- *The most immediate step is to take a closer look at all the information contained in the final report from the contractor and give feedback.*
- *Then we plan to reconvene a meeting to talk about some of these options. Do we need more monitoring? More evaluation? Did we not do enough? Do we need to do more? How do we spend our money wisely?*
- *There will be an April 17, 2008 meeting in the community to talk about these things. We don't have a date set for a draft TMDL. We are waiting to see the biological report, which won't be completed until sometime in June.*
- *This whole process is based on environmental laws and regulations, but the NPS portion of the TMDL is voluntary. That is why public participation is so*

important. WLA, or point source inputs, is the only truly regulated piece (although it is possible to manage NPS through county stormwater ordinances, subdivision ordinances, and other means, but these are county-level policies). The TMDL sets the stage for new, point source permitted entities that would want to come in to the Poplar River watershed.

- *Comment: We owe you a round of applause for excellent presentation.*