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RE: Public Comment on Recommendations by the International Red River Board on proposed nutrient concentration objectives and nutrient load targets for the Red River at the boundary between the United States and Canada

To Whom It May Concern:

Thank you for the opportunity to comment on the Recommendations by the International Red River Board on proposed nutrient concentration objectives and nutrient load targets for the Red River at the boundary between the United States and Canada ("the Recommendations). Our organization coordinates and manages water quantity and quality projects at the headwaters of the Red River, in the Mustinka River Watershed and the Minnesota portion of the Bois de Sioux River Watershed. Our governmental jurisdiction covers 1,280,797 acres. We do strongly recommend that in the future, the International Joint Condition increase its publicity and outreach for such opportunities – particularly for affected watersheds, like our own; we stumbled upon the comment period completely on accident, and nearly missed it altogether. The following are our comments.

1. **Why are these nutrient concentrations and nutrient load targets being released in advance of the release of two extremely important studies – the State of the Lake report and the USGS Red River Trend Analysis?**

In our opinion, the State of the Lake and the USGS trend analysis reports are extremely important in filling-in data gaps for the past twenty years. They will provide important information that should be considered and carefully reviewed before the International Red River Board makes proposed recommendations on concentration objectives and nutrient load targets.

It was anticipated that the Manitoba Sustainable Development and ECCC would release the second "State of the Lake Report" for Winnipeg in 2019. The first report examined data from 1999 – 2007.

USGS is currently finalizing a water quality trend analysis for the international Red River Basin. It was originally thought that the analysis would be published in 2019, but USGS is now states that the analysis will be available Spring 2020. For 34 sites in the Red River Basin, the trends from 2000-2015 are analyzed for sulfate, chloride, total dissolved solids, nitrate plus nitrite, total nitrogen, total phosphorus, and total dissolved solids. For five sites, 3 main-stem Red River sites, plus a Sheyenne River and a Red Lake River, site trends from 1970-2015 are analyzed for sulfate, total dissolved solids, nitrate plus nitrite and total phosphorus.

In addition, these reports may reveal insights behind the downward trend in Total Phosphorous and Total Nitrogen loads. According to the graphs below, as provided in the Recommendation, there appears to be a significant downward trend following the flood of 2011 – without the implementation of a nutrient concentration objective or nutrient load target. A great deal of research has been conducted on the factors that contribute to increased nutrient flows. Was any research conducted on why the trends are decreasing, and if corresponding decrease in nutrient concentrations is occurring also? These recent downward trends are also an important justification for waiting for the USGS trend analysis.

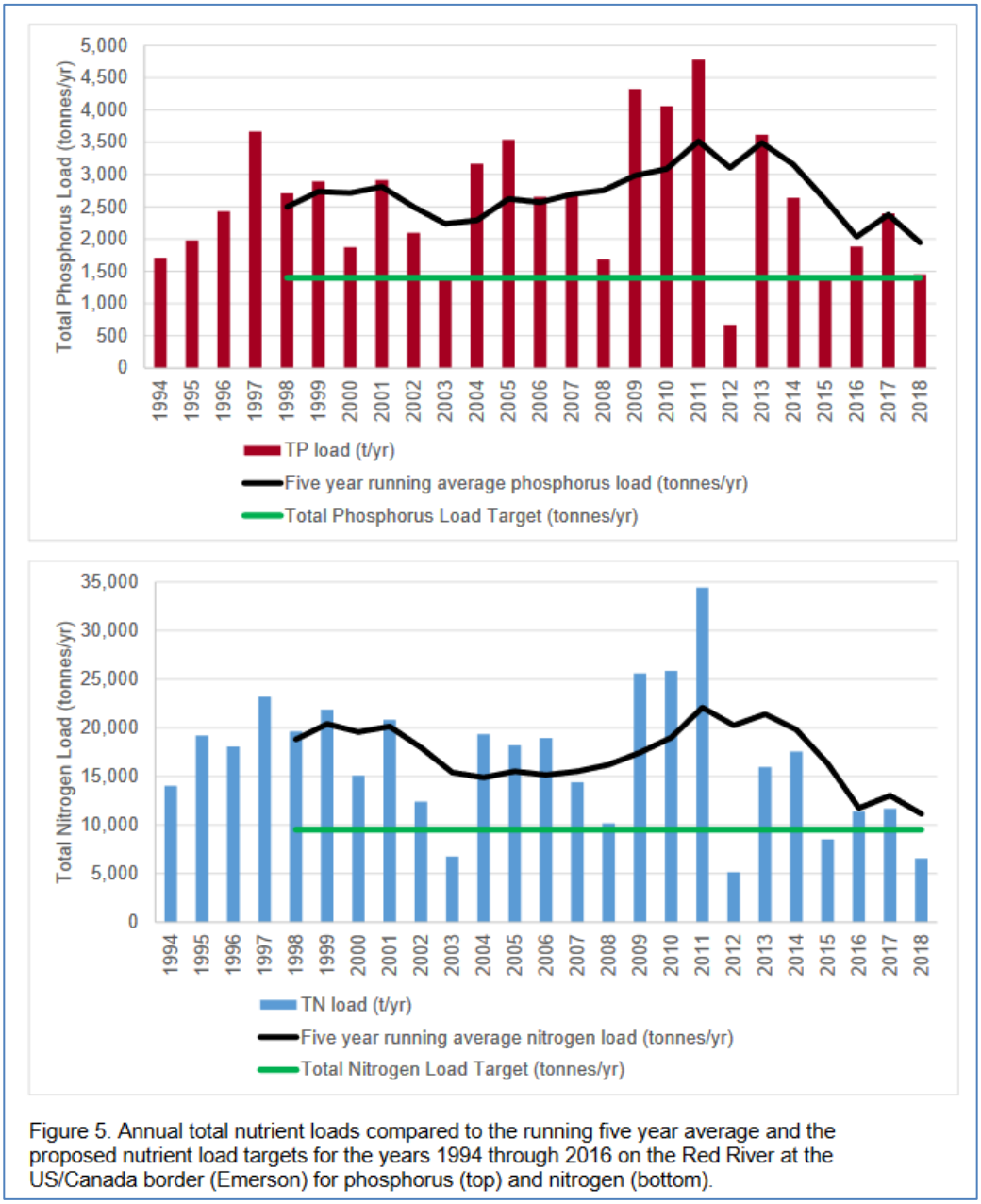

Figure 5. Annual total nutrient loads compared to the running five year average and the proposed nutrient load targets for the years 1994 through 2016 on the Red River at the US/Canada border (Emerson) for phosphorus (top) and nitrogen (bottom).

2. How will a five-year average flow benefit the Red River Basin if high-flow years are becoming more frequent?

According to the chart above provided in the Recommendations, one consequence of using a five-year average will have (under our current increased precipitation conditions), will be to ensure that we do not meet Total Phosphorous and Total Nitrogen load targets. See years 2012, 2015, and 2018 – in these years, loads met or were less than the proposed targets. Using the five-year average results in an excess determination for each year. Based on the climate over the past 20 years, it would be highly unlikely that we would sustain five years of low flow years in order for that

five-year running average to drop below targets. The five-year average will instead ensure that we are perpetually above targets.

3. **Is one summer of bacteria collection enough data from which to base basin-wide nutrient reduction strategies?**

   The "Stressor Response Model for the Red River of the North Topical Report RSI-2611" states, "Data gaps that prevented developing a stressor-response model were identified that led to supplemental periphyton (attached algae), phytoplankton (sestonic algae), and water quality data collection effort during the summer of 2015. This data resulted in developing an effective nutrient-stressor-response model for the Red River by using a combination of algae, water quality, and land-use information."

4. **What aspect of highly developed urban areas encourages the growth of Phytoplankton, to the extent that urban were eliminated as sites for evaluation?**

5. **The removal of too much nitrogen may stimulate algal growth; has it been determined that lowering TN to the proposed levels will not have an adverse effect?**

6. **According to the Recommendations, the 2016 RESPEC report was peer reviewed by two individuals. Is it common for a scientific report, whose conclusions will affect the entire Red River Watershed Basin, at 45,000 square miles and 1.3 million people, to be peer reviewed by a two-person panel?**

7. **How do the proposed nutrient concentration objectives address the concerns by peer reviewers: documented uncertainty and recommended adaptive management?**

   The Recommendations states, "[The Peer Review noted] the lack of certainty around the nutrient concentration objectives proposed and suggest that additional data may be available in the future to further assess the proposed targets. Ongoing adaptive management will be required to assess the effectiveness of the proposed concentration objectives." How will this be achieved with the hardline concentration objectives and targets in the Recommendations, and how will changes be adapted for contributions from legacy nutrients, internal loading, and climate change?

8. **It is noted that RESPEC recommended nutrient concentration objectives significantly higher than baseline nutrient concentrations observed in the absence of anthropogenic influences (which should be the case). How will the nutrient concentration objectives and nutrient load targets be adapted for a changing population, which includes increasing urban populations on the Red River and on Lake Winnipeg, and the pressure on increasing plant and animal agriculture to continue to provide sustenance for this growing population?**

9. **How was the ratio of the total phosphorous to total nitrogen determined for the nutrient concentration objectives and the nutrient load targets, and how could a balance of these ratios be managed on a basin-wide scale if BMP's are implemented?**

   The Manitoba Clean Environment Commission's March 2009 Report, "An investigation into nutrient reduction and ammonia treatment at the City of Winnipeg's wastewater treatment facilities" states that, "We recommend that the amount of nitrogen removed be kept carefully in balance with phosphorus so as not to favour algal growth." BMP's many not equally reduce phosphorous and nitrogen in proportion. Some BMP's may reduce one nutrient and increase the other – which we fear could result in a circular firing squad of increasing regulations.

10. **As the proposed nutrient concentration objectives and nutrient load targets were calculated for the Red River, how much of the nutrient concentrations and loads are sourced from the river and streambanks themselves? How much from high-flow snow melt?**

    How do the recommended nutrient concentration objectives and nutrient load targets recognize the delay in nutrient management actions and subsequent water quality?

We know from TSS measurements that there is a great deal of soil particulate in the Red River. According to the Lake Winnipeg Basin Initiative Phase II Final Report 2012/2013 – 2016/2017, "…internal nutrient loading adds approximately as much phosphorus to the water column as is delivered from watershed-based tributary sources. The top 7 cm of sediments in Lake Winnipeg will remain a significant and active source of internal nutrient loading for several decades, a process which may delay the response of the lake to nutrient management actions in the watershed." What are the comparable figures and lag time for the Red River? Without this specific information, any implementation efforts will be prone to fail; we will overestimate anticipated nutrient reductions and timelines. We also risk the potential for future unnecessary, ineffective, and increasing overregulation. We also risk masking positive gains brought by increasing precision agriculture, wastewater treatment facility improvements, and conservation programs in the Basin over the past two decades.

11. **The Recommendations state, "Substantial consideration was also given to results from sites meeting regional regulatory limits on primary productivity measures." This statement was also made in the "Stressor Response Model for the Red River of the North Topical Report RSI-2611" with no further explanation. What does this mean, and how does it influence the recommended nutrient concentration objectives and the nutrient load targets?**

12. **On page 7, the Recommendations reference Lake Winnipeg Stewardship Board's, "Reducing Nutrient Loading to Lake Winnipeg and its Watershed" report which states that,**

    > **"Based on 1994-2001 data, the Red River supplies 54 percent of the phosphorus load, and 30 percent of the nitrogen load to the lake, despite the fact that it delivers only 11 percent (1964-2005) of the flow to Lake Winnipeg (Table 3)."**

    For the calculation of the nutrient load concentration objectives and nutrient load targets, were different time spans used to skew comparisons of concentration, load, and flow?

    The researchers paired flow data with a wide time span (the result: a lower-than-average flow) with a narrower window of nutrient load, which included the historical 1997 flood (the result: a higher-than-average nutrient load).

13. **The Recommendation states that, outside of high-flow years, nutrient concentration objectives and nutrient load allocations can be used to meet nutrient load targets. In reality, there is no escape from high-flow years; they are a certainty. How will the recommended nutrient concentration objectives and nutrient load targets be applied-to or adapted for high-flow years?**

14. **We do not believe that the nutrient load targets are feasible, especially given the significant contribution from snowmelt. The charts below are pulled from the "Lake Winnipeg: Nutrients and Loads Status Report" from February 2019; we have added a red line depicting the approximate location of the proposed nutrient load target of 1,400 tons per year for phosphorous and the nutrient load target of 9,525 tons per year for nitrogen.**

    The difference between the proposed loads and our average load dramatic and wide.

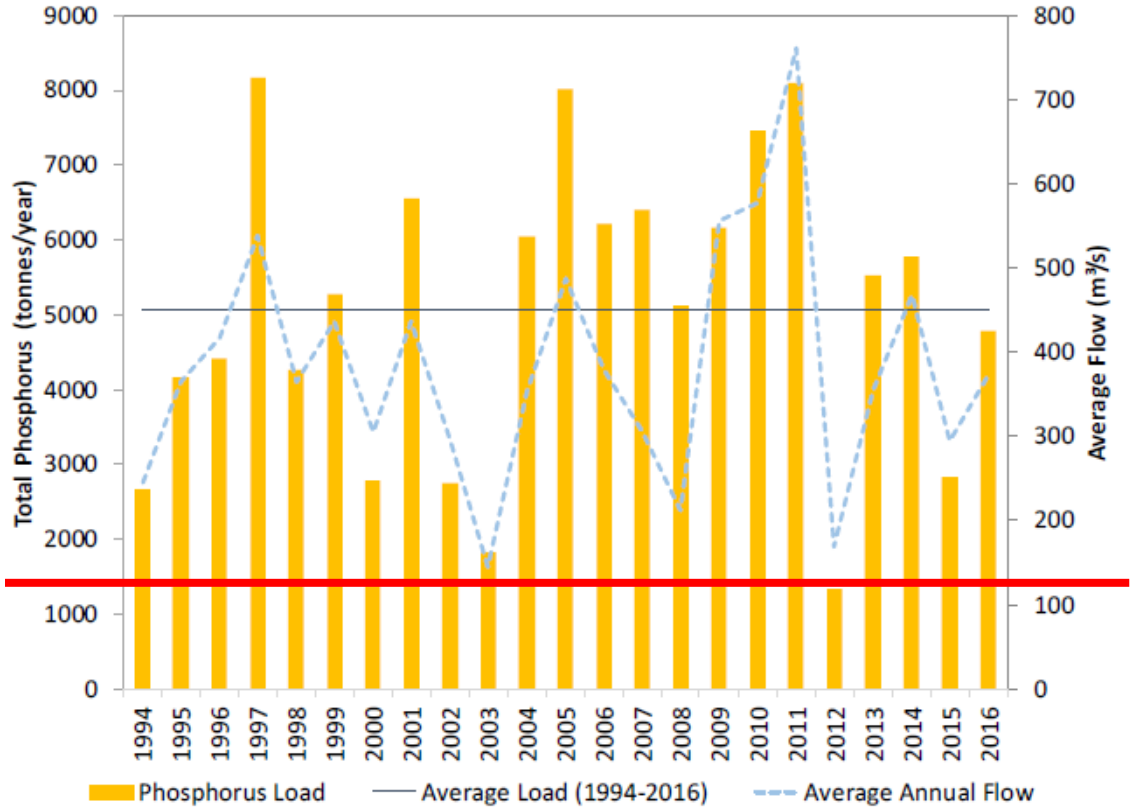

Figure 4. Annual total phosphorus loads (t/yr) and flows in the Red River (at Selkirk), 1994 to 2016.

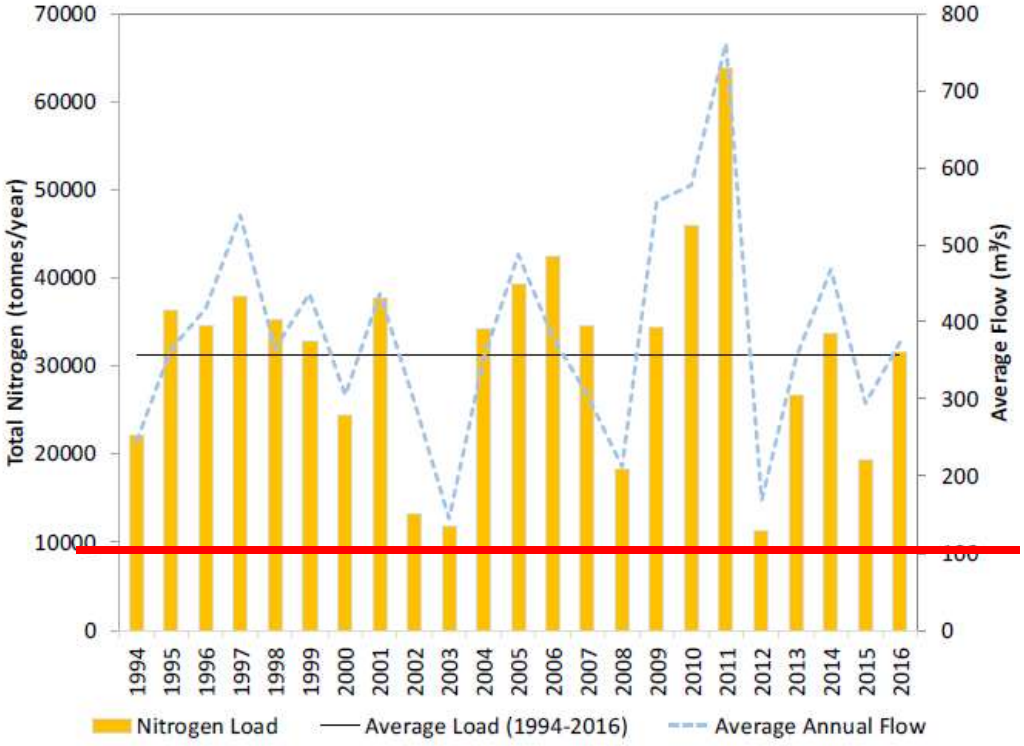

Figure 5. Annual total nitrogen loads (t/yr) and flows in the Red River (at Selkirk), 1994 to 2016.

15. **The following information was provided to our office from the Minnesota Pollution Control Agency. Of the fifteen sites, four do not have an average that meets the TN concentration standard, and thirteen did not have an average that would meet the TP concentration standard.**

Name	Parameter	First Year	Last Year	Number of Years	FWMC (mg/L)
Mustinka River nr Wheaton, CSAH9	NO2+NO3	2011	2015	5	1.6
Bois de Sioux River nr Doran, MN	NO2+NO3	2007	2015	9	1.2
Snake River nr Big Woods, MN220	NO2+NO3	2009	2015	7	1.2
Red River of the North nr Kragnes, CSAH26	NO2+NO3	2007	2015	8	1.1
Red River of the North at Emerson, Manitoba,	NO2+NO3	2013	2015	3	0.93
Sand Hill River at Climax, MN	NO2+NO3	2007	2015	9	0.91
Buffalo River nr Georgetown, CR108	NO2+NO3	2007	2015	9	0.81
Red River of the North at Grand Forks, ND	NO2+NO3	2007	2015	9	0.8
Two Rivers nr Hallock, CSAH16	NO2+NO3	2009	2015	7	0.8
Clearwater River at Red Lake Falls, MN	NO2+NO3	2007	2015	9	0.62
Tamarac River nr Robbin, MN220	NO2+NO3	2009	2015	7	0.62
Wild Rice River at Hendrum, MN	NO2+NO3	2007	2015	9	0.52
Red Lake River at Fisher, MN	NO2+NO3	2007	2015	9	0.42
Otter Tail River at Breckenridge, CSAH16	NO2+NO3	2007	2015	9	0.26
Thief River nr Thief River Falls, MN	NO2+NO3	2007	2015	9	0.24

Name	Parameter	First Year	Last Year	Number of Years	FWMC (mg/L)
Otter Tail River at Breckenridge, CSAH16	TP	2007	2015	7	0.084
Thief River nr Thief River Falls, MN	TP	2007	2015	9	0.088
Clearwater River at Red Lake Falls, MN	TP	2007	2015	9	0.117
Red Lake River at Fisher, MN	TP	2007	2015	9	0.159
Wild Rice River at Hendrum, MN	TP	2007	2015	7	0.202
Buffalo River nr Georgetown, CR108	TP	2007	2015	7	0.229
Sand Hill River at Climax, MN	TP	2007	2015	7	0.279
Red River of the North nr Kragnes, CSAH26	TP	2007	2015	6	0.329
Red River of the North at GF, Riverside Walkway	TP	2007	2015	9	0.336
Bois de Sioux River nr Doran, MN	TP	2007	2015	7	0.337
Two Rivers nr Hallock, CSAH16	TP	2009	2015	7	0.205
Tamarac River nr Robbin, MN220	TP	2009	2015	7	0.305
Snake River nr Big Woods, MN220	TP	2009	2015	7	0.315
Mustinka River nr Wheaton, CSAH9	TP	2011	2015	3	0.384
Red River of the North at Emerson, Manitoba	TP	2013	2015	3	0.396

16. **How do the nutrient concentration objectives and nutrient load target recommendations recognize the unique hydrology of the Red River?**

The Recommendations state, "The seasonal application of nutrient concentration objectives has been used elsewhere including by the Prairie Provinces Water Board (PPWB 2015), the Bow River Basin in Alberta, the North Saskatchewan River, and Montana. Proposed concentration objectives are also comparable to those concentrations observed in the headwaters region of the Red River during the study and to those objectives applied elsewhere including in Minnesota and Montana." Effort may have been made to compare proposed objectives and standards to others in similar climates, but beyond this attempt, the Red River Basin can be compared to no other. In this way, it seems the recommended objectives completely ignore the challenges of working with a cold-climate river that thaws South-to-North; the Red River's hydrology has a wide range of implications, and there is no discussion or acknowledgement of this fundamental difference in the nutrient recommendations. Our soils are also very different – naturally high in phosphorous and are historically prone to movement with snowmelt!

17. **In the Red River Basin, what is the relationship between nutrient concentrations and loads? Will achieving one necessarily have a positive effect to achieving both?**

18. **Why are these proposed objectives and targets aimed to include the extreme, highest loading months, April and May – which are often the result of snowmelt and flooding, and skew the averages for the rest of the year? The flooding is so dramatic and widespread, that there is very little that we can do to mitigate its effects apart from diversions and impoundments; spring floods easily overwhelm field-scale BMP's.**

19. **Throughout the Red River Basin reports, the importance of temperature on nutrient concentrations is emphasized. How do the proposed objectives and targets account for the influence of climate change-induced temperatures on nutrient loads and concentrations and the effectiveness of BMP's?**

20. **Please be mindful of assuming "runoff" is purely the consequence of row cropping. Excess precipitation can be a problem anywhere; how often do we receive precipitation in equal measure to the needs or capacities of the ground? In addition to land planted with agricultural crops (which can vary significantly due to land features and management practices), runoff can occur on pasture, CRP, streambanks, buffers, roads, wetlands, lakes, cities and towns, etc.**

    As demonstrated from the issues raised above, we have very serious concerns that the Board's proposed nutrient concentrations objectives and nutrient load targets have been formulated as unachievable straight standards in today's changing climate. We also believe that they are based on conditions that ignore both our current reality and historical soil and water conditions, which are the result of many high-flow years with extreme snowmelt and runoff. As was found in a study reported in the Environment and Climate Change Canada Report "Lake Winnipeg Basin Initiative Phase II Final Report" from 2012/2013 to 2016/2017:

> Individual BMPs produced small to modest reductions in TP and TN loads at watershed outlets. When two or more BMPs were combined, the reductions were higher. Reductions in TP and TN loads were doubled or more when all BMPs were applied compared to a single BMP. Also, reductions from combined BMPs were slightly less than the sum of reductions from individual BMPs, which may be due to complex interactions of nutrient processes among the combined BMPs. Furthermore, reduction efficacies of BMPs varied among the study watersheds and may be attributed to variable land uses across the watersheds. The BMPs were most effective in reducing nutrients in the Boyne Watershed, followed by La Salle and then Little Saskatchewan. **However, all the combined BMPs that were evaluated were unable to meet the pre-determined nutrient reduction targets in any of the watersheds.**

We are living in unusual times. The Water Survey of Canada states, "The last decade has been the period of highest annual flows on the Red since record keeping was initiated in 1920." Climate conditions will prevail whether the proposed nutrient concentration objectives and nutrient load targets are used or abandoned. We do feel it is the Board's responsibility, in recommending water quality policy, to be open, transparent, and brutally realistic about which water quality conditions we can be improved, and to what degree. Policy can improve conditions for the Red River Basin or policy can simply *appear to improve* conditions for the Red River Basin – but in both cases, *our resources will be exhausted in the pursuit.*

Sincerely,

Linda J. Vavra

Linda Vavra
President

Jamie Beyer
Administrator