

Manitoba's Nutrient Management Strategy

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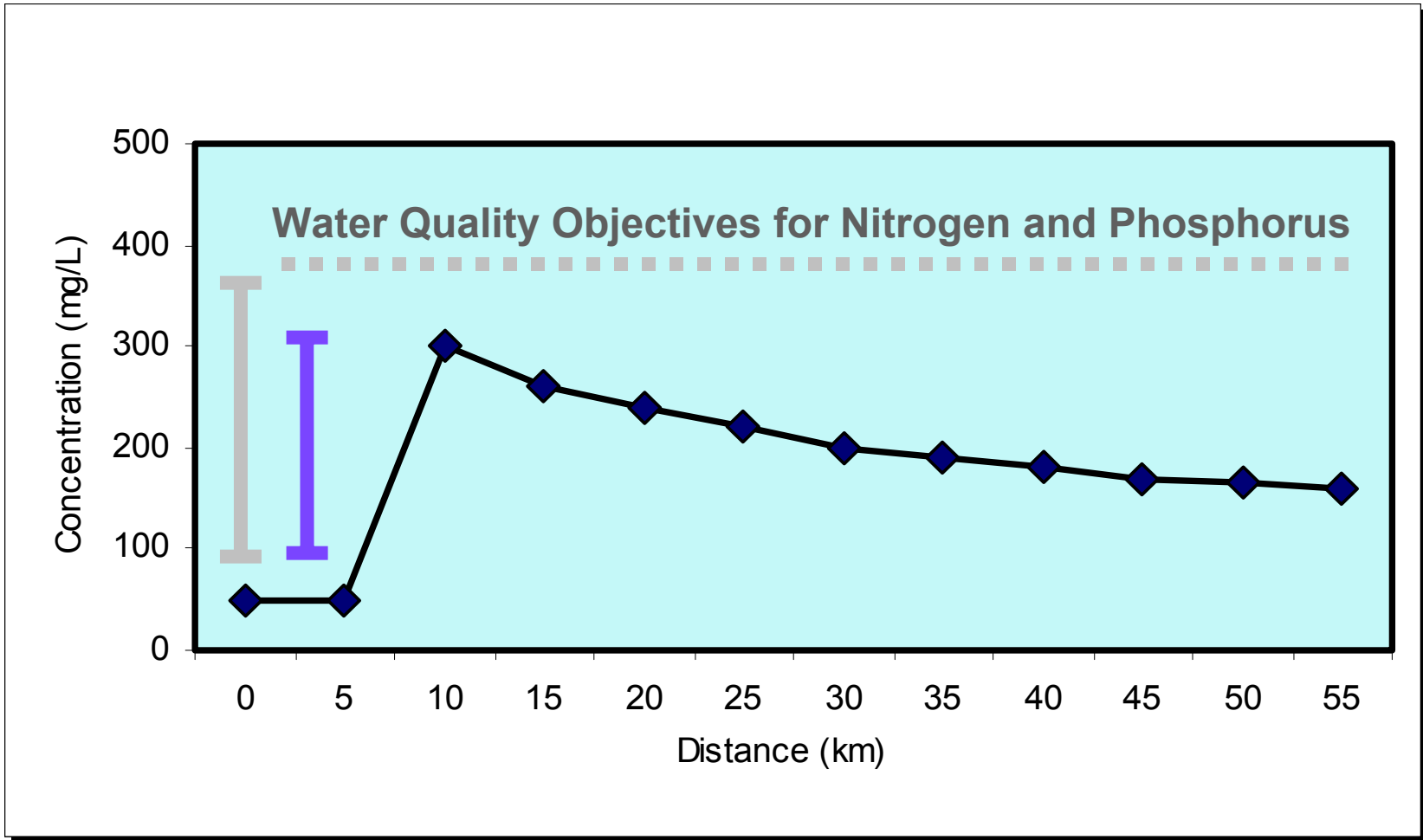
Outline

- **Background on Nutrient Management Strategy**
- **Progress**
 - **Trend analysis**
 - **Nutrient sources**
- **Lake Winnipeg**
- **Current focus**
- **Concluding comments**

Manitoba Water Quality Standards, Objectives, and Guidelines 2002

- Nutrient objectives or guidelines still not adequate

Assimilative Capacity and Wasteload Allocation



Nutrient Management Strategy

- **Draft plan released for review on April 20, 2000**
- **Identifies key steps required to develop and implement a nutrient management plan to protect surface waters in Manitoba**

Key Steps (continued)

- **Understand present status of nutrient issue in Manitoba**
- **Understand unique relationship between nutrients in Manitoba's prairie systems and algal abundance**
- **Identify most important nutrient or nutrients requiring control**

Key Steps (continued)

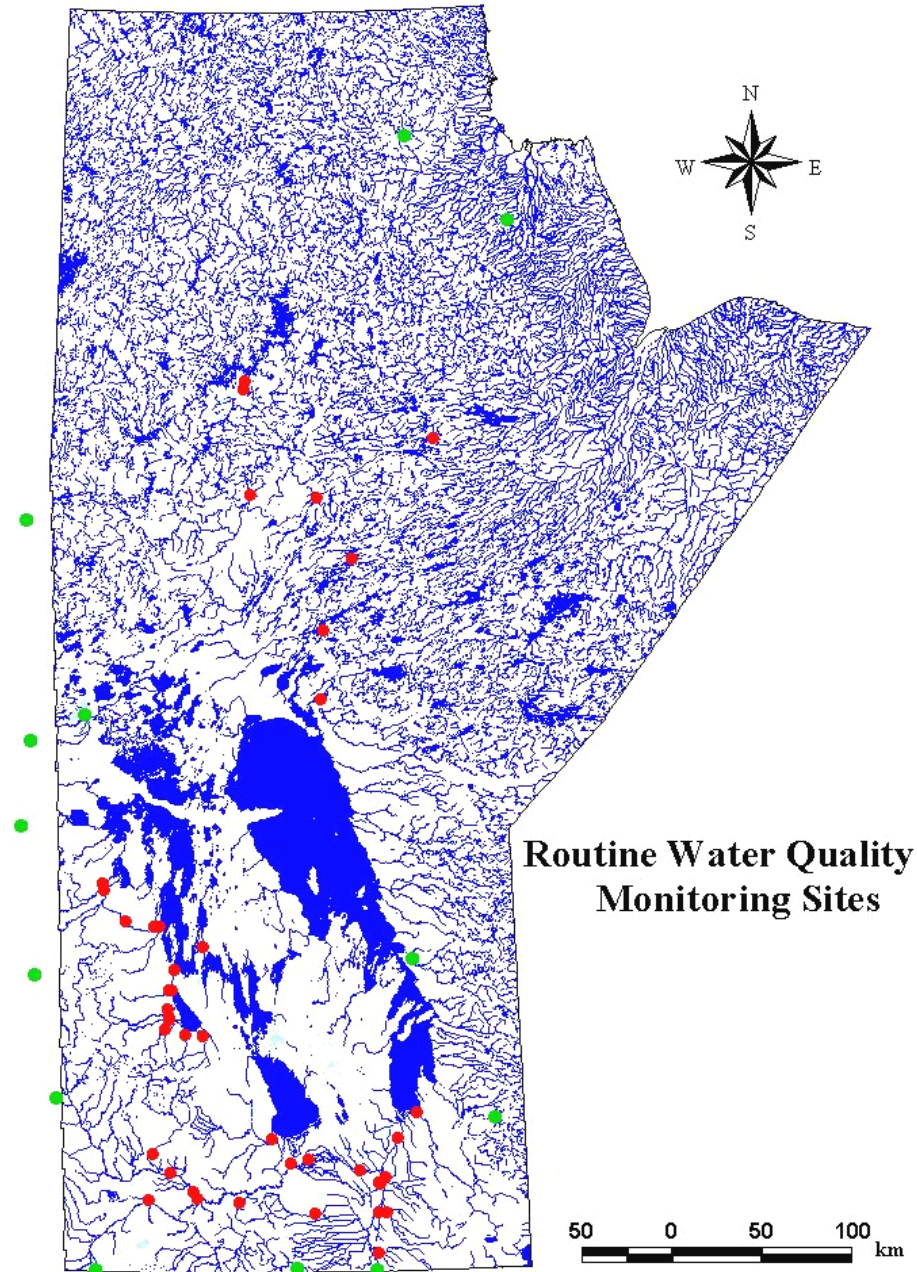
■ Develop Tier II - Water Quality Objectives

- streams in southern Manitoba, using a regional-based approach
- Lake Winnipeg, using a receiving water-based approach

■ Develop implementation plan that is fair and equitable

■ Consult with Manitobans and upstream neighbours

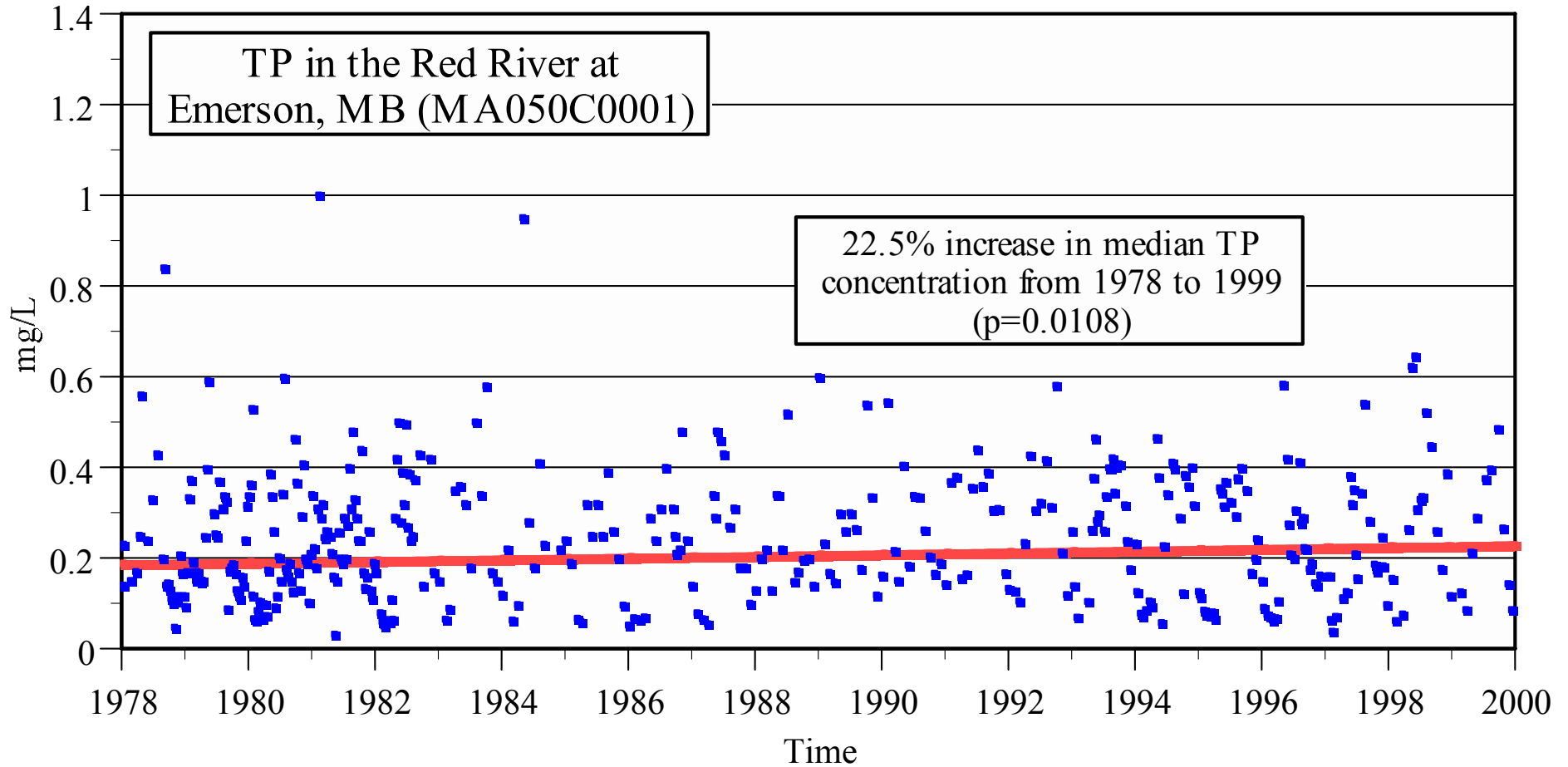
Stream Water Quality Monitoring



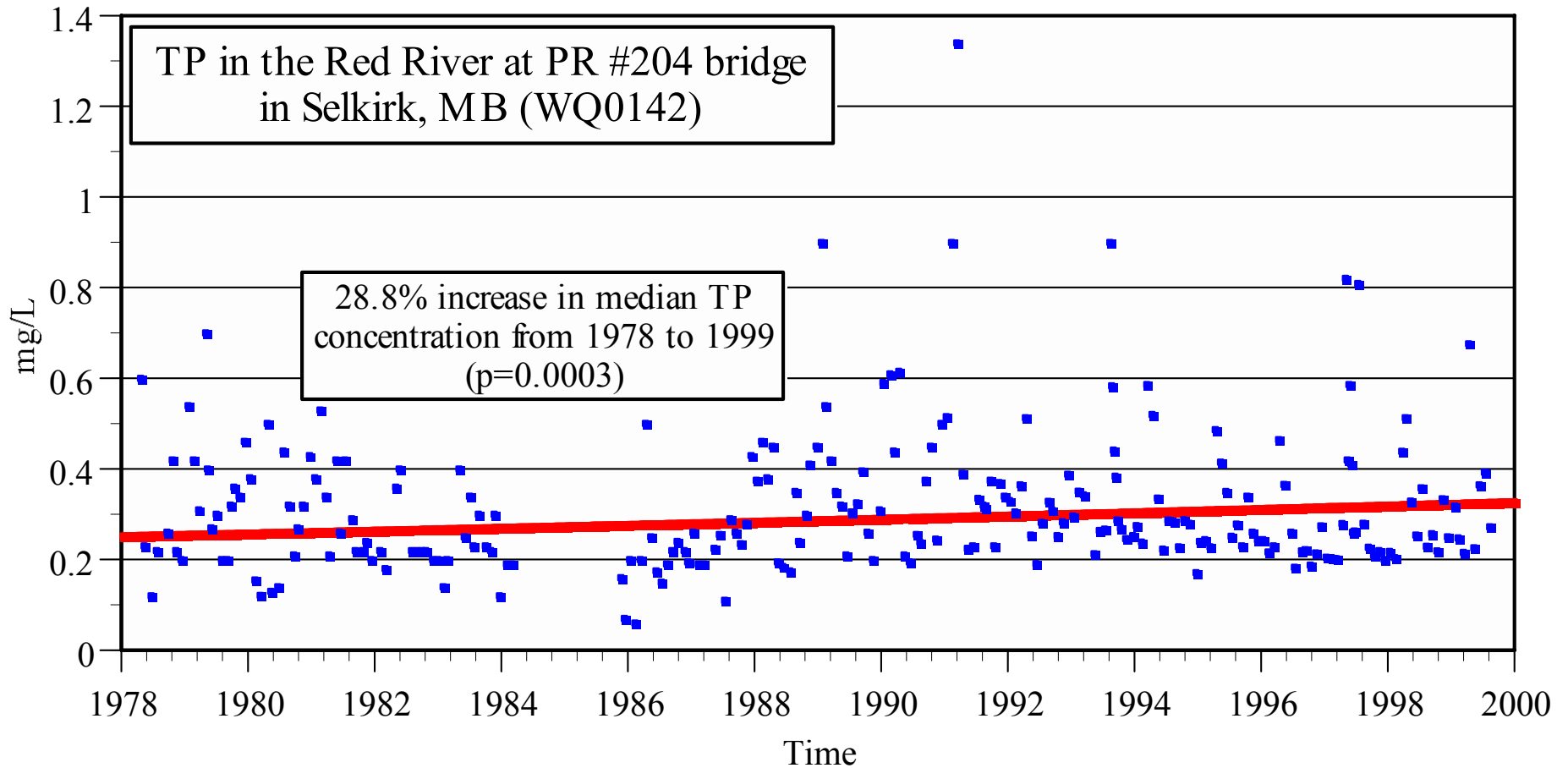
Lake Winnipeg Drainage Basin



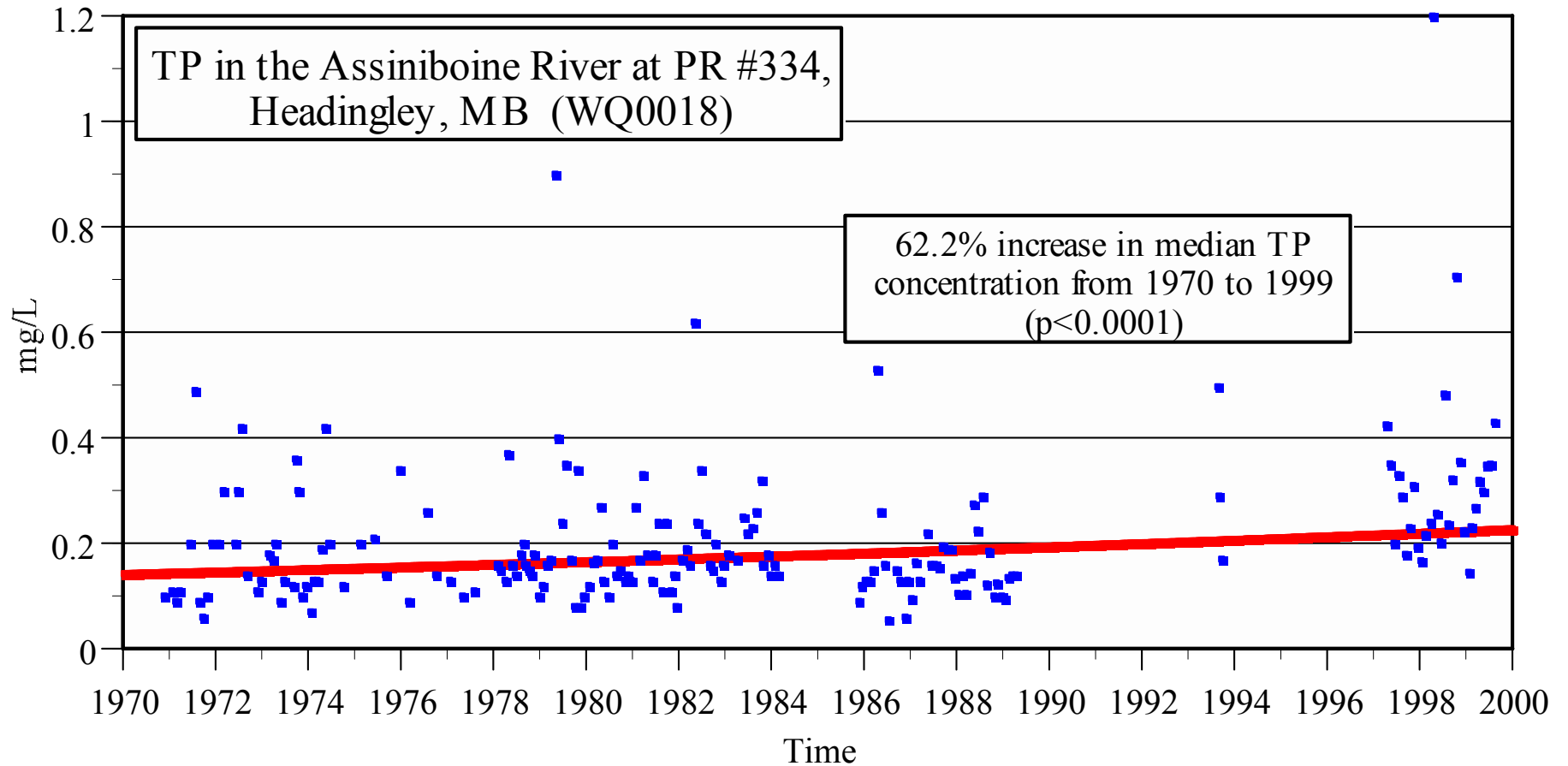
TP in Red River at Emerson



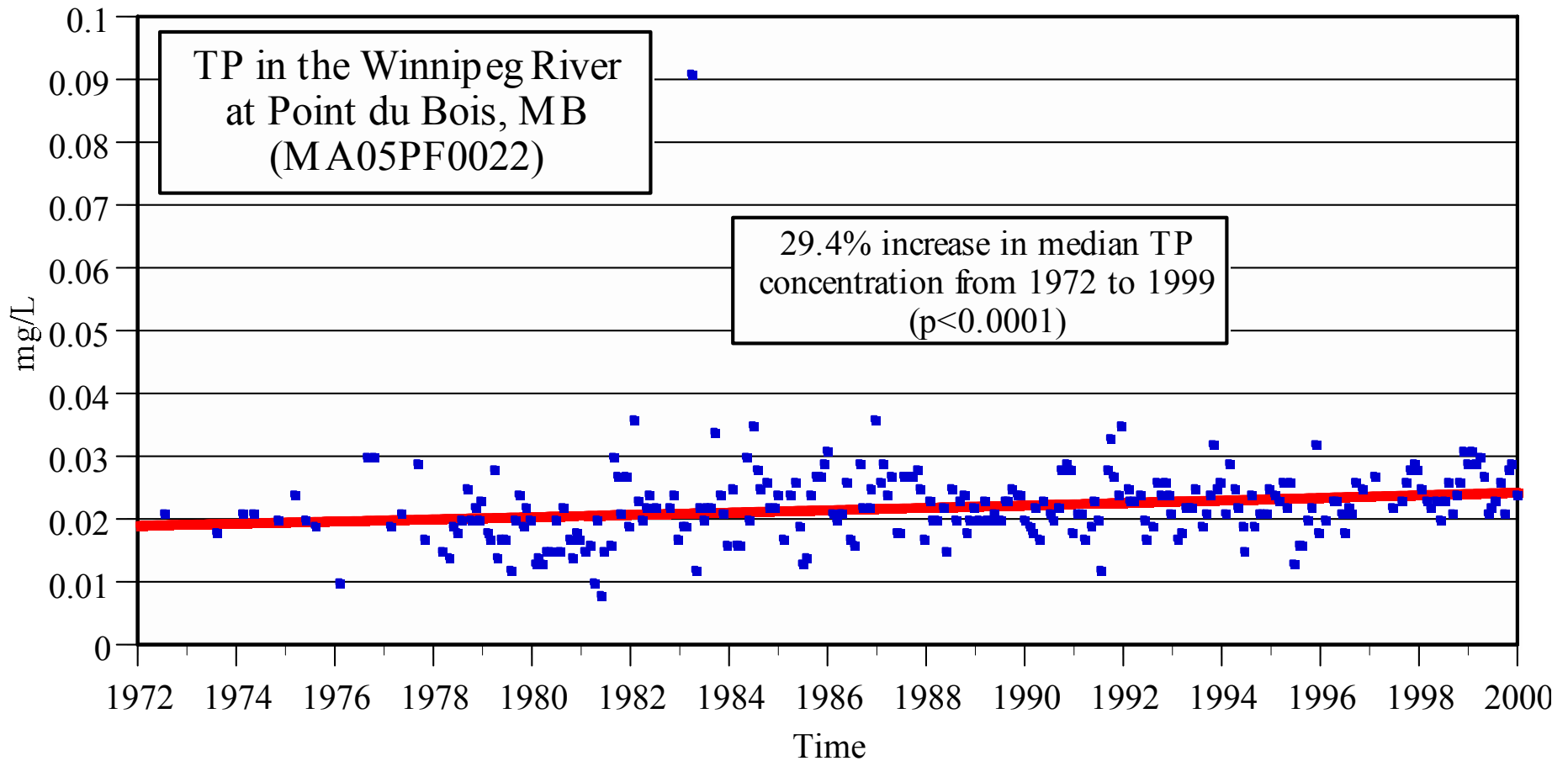
TP in Red River at Selkirk



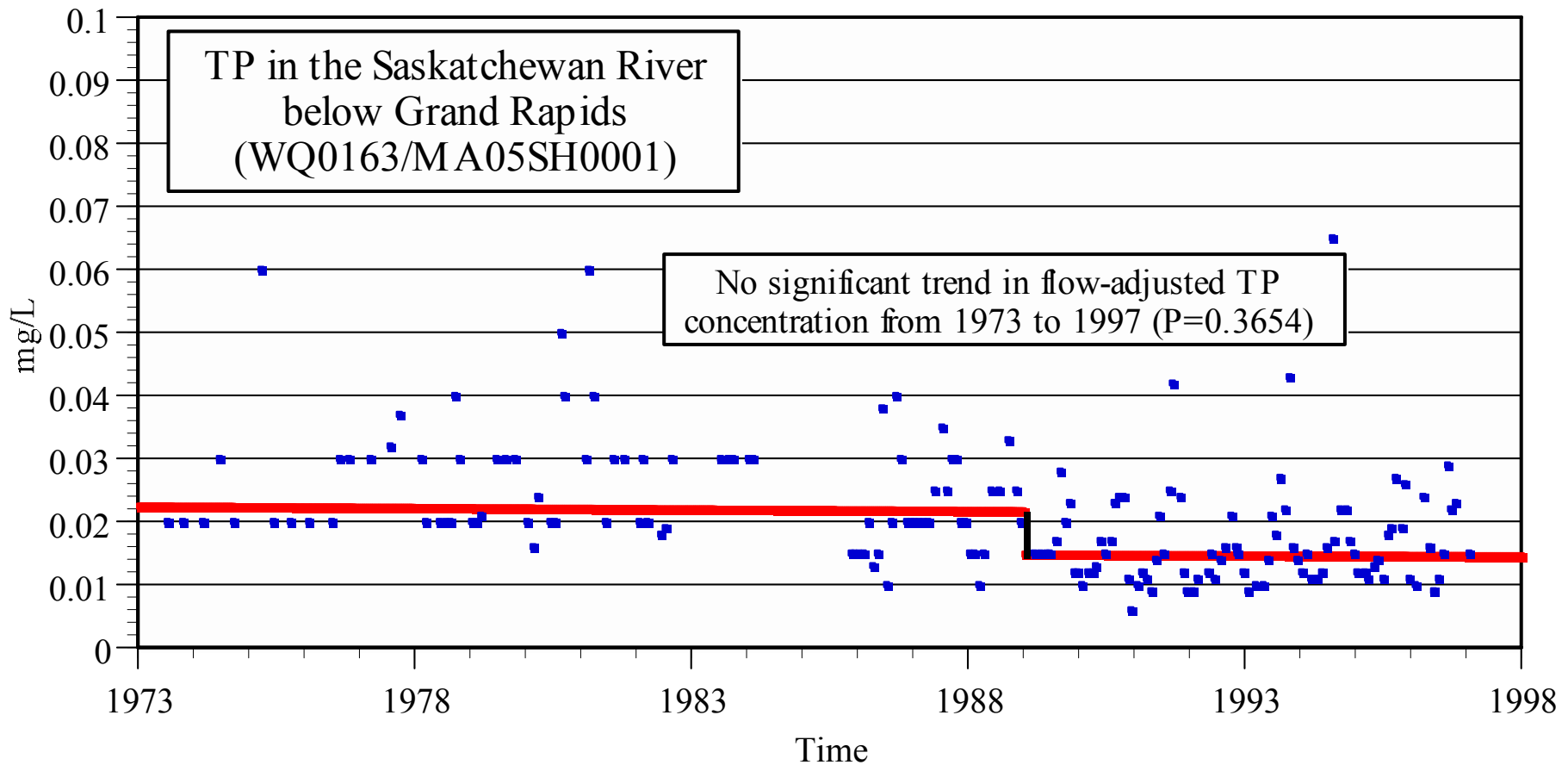
TP in Assiniboine River at Headingley



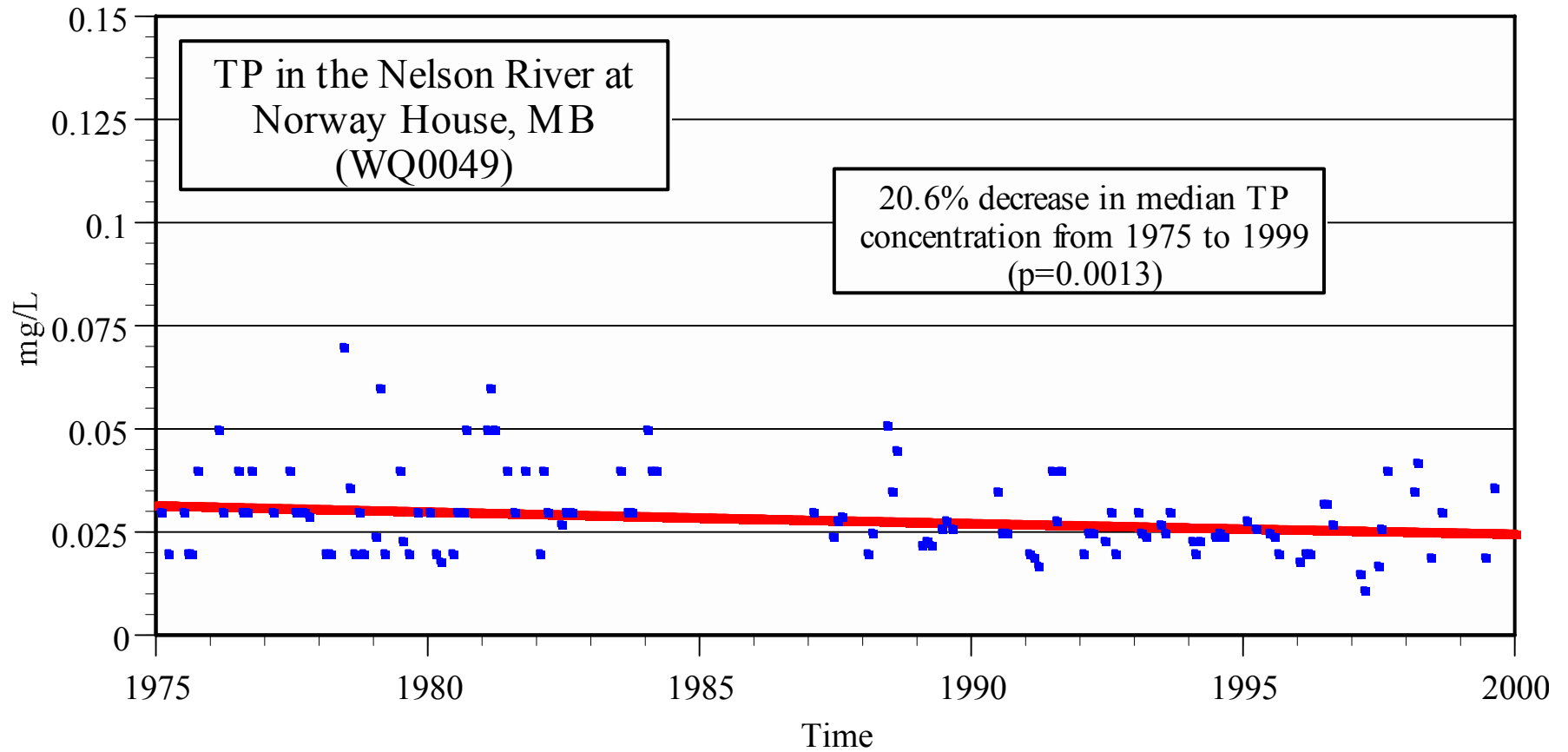
TP in Winnipeg River at Pointe du Bois



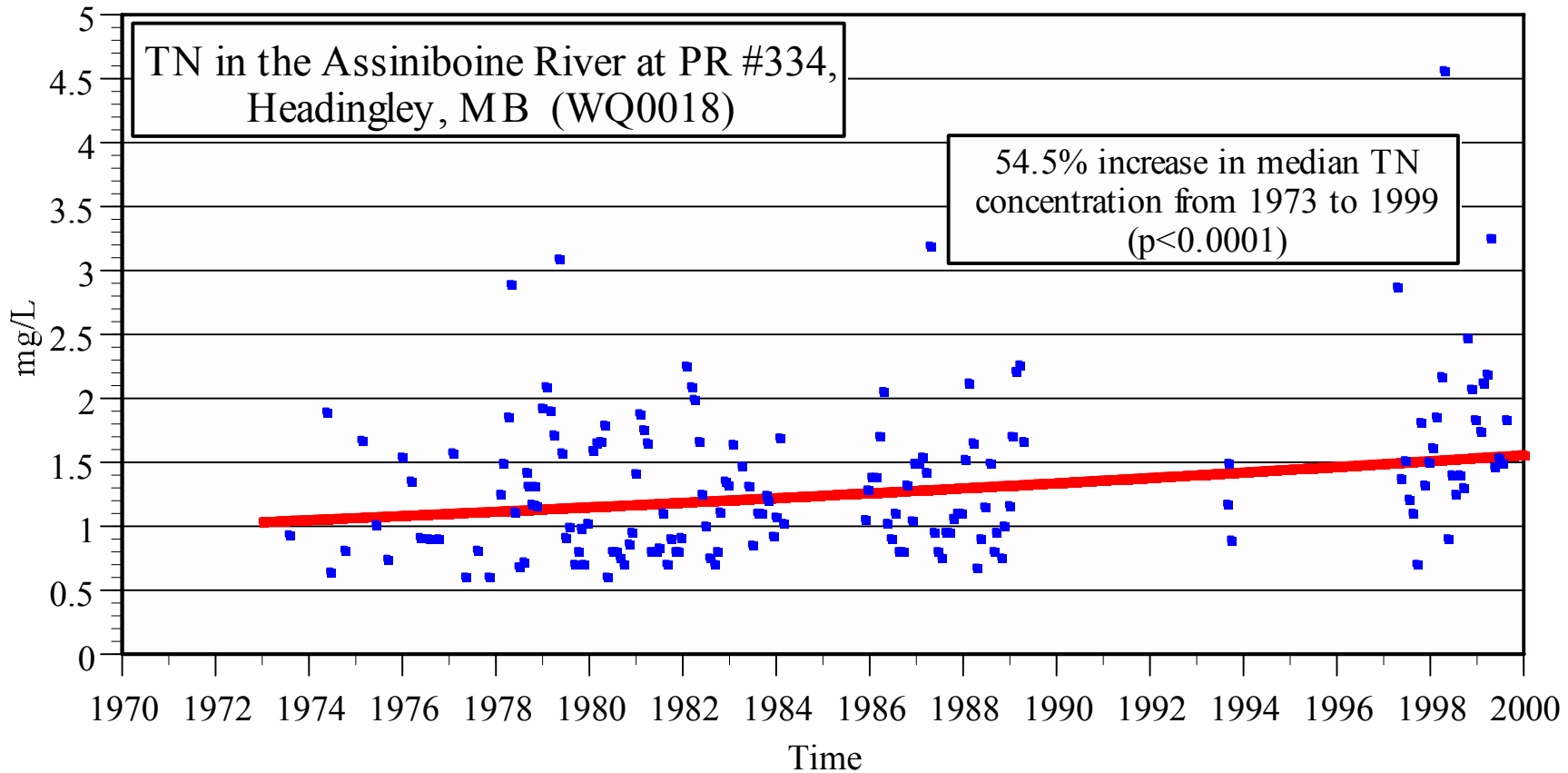
TP in Saskatchewan River below Grand Rapids



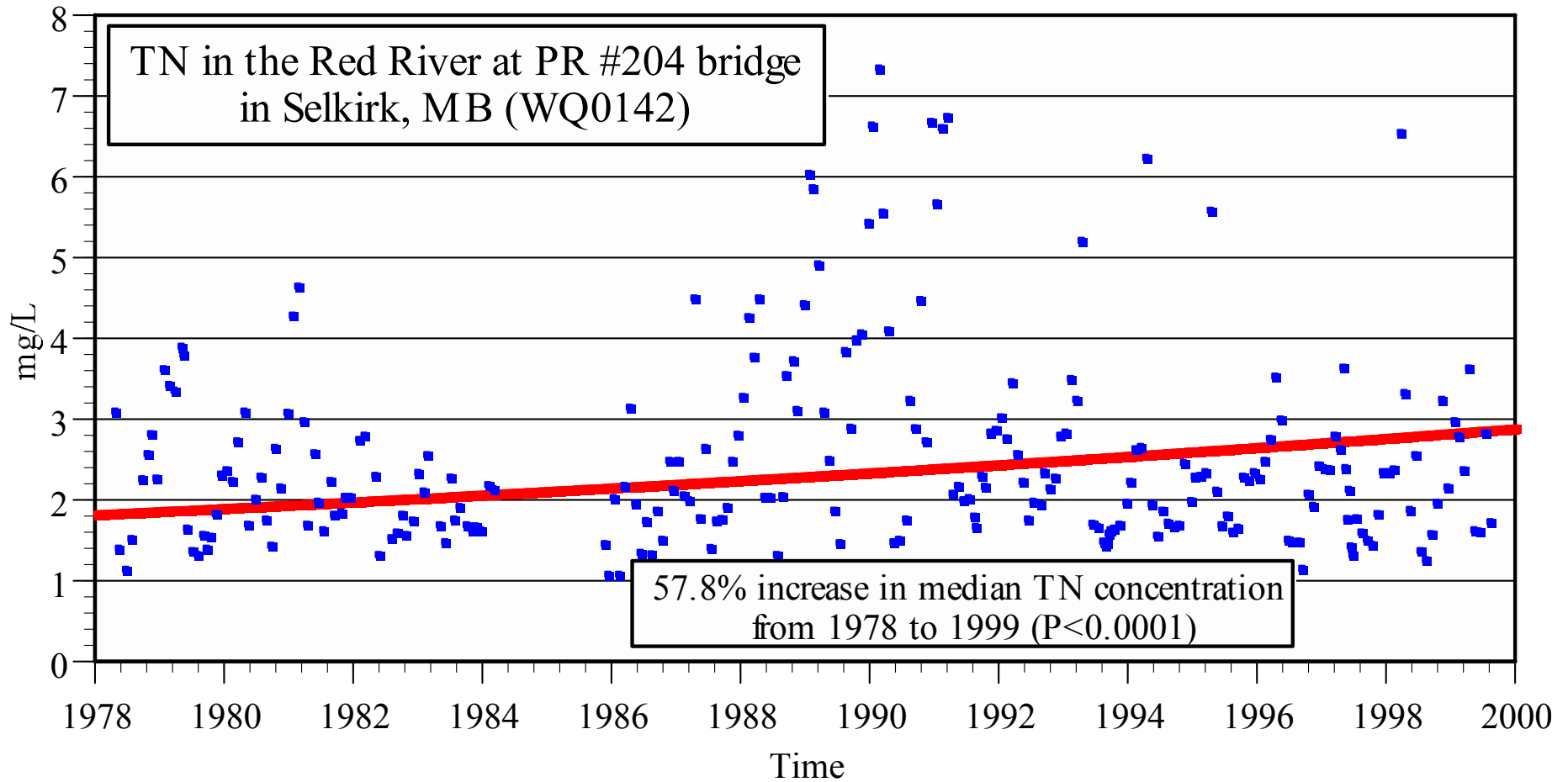
TP in Nelson River



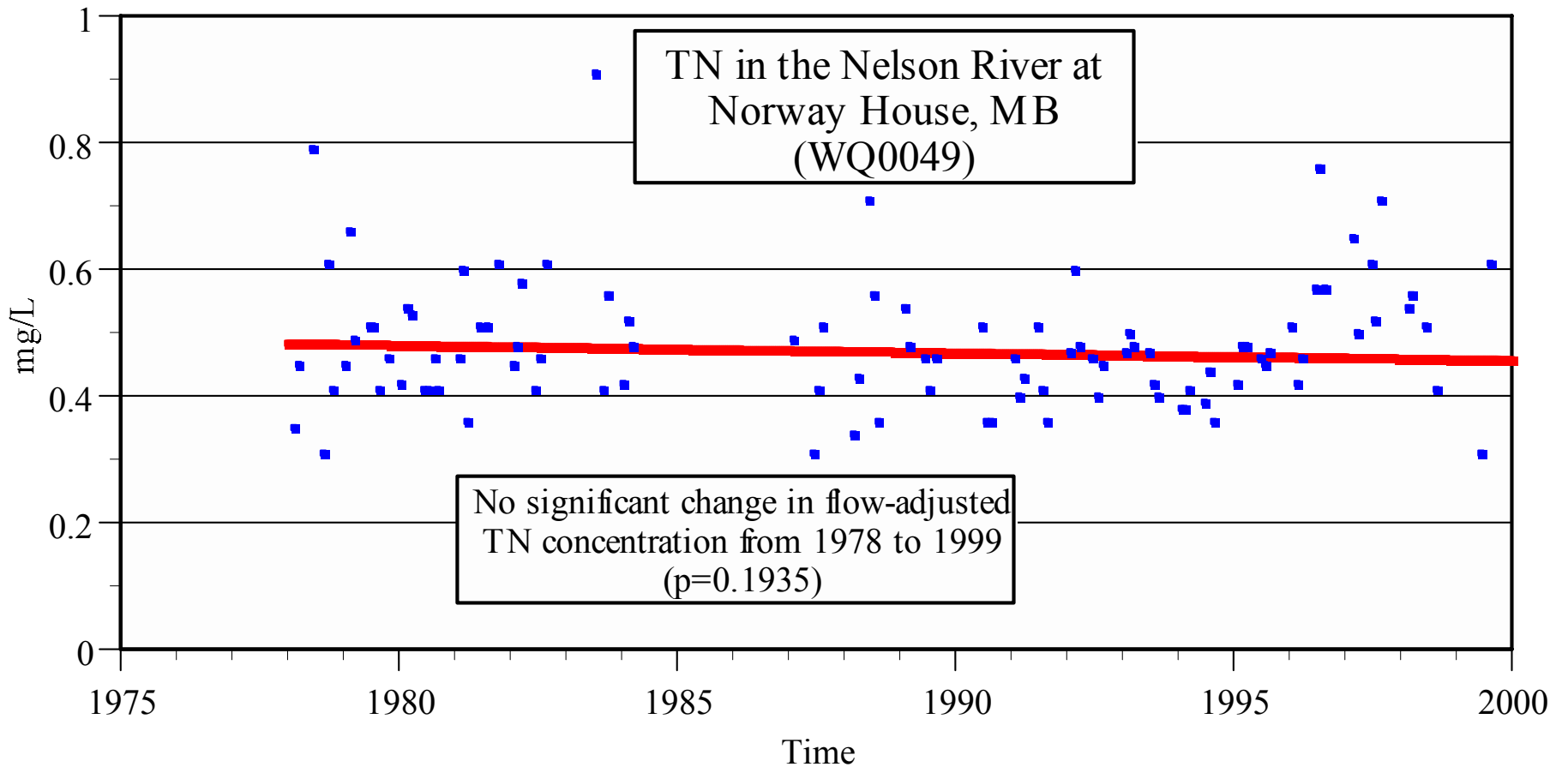
TN in Assiniboine River at Headingley



TN in Red River at Selkirk



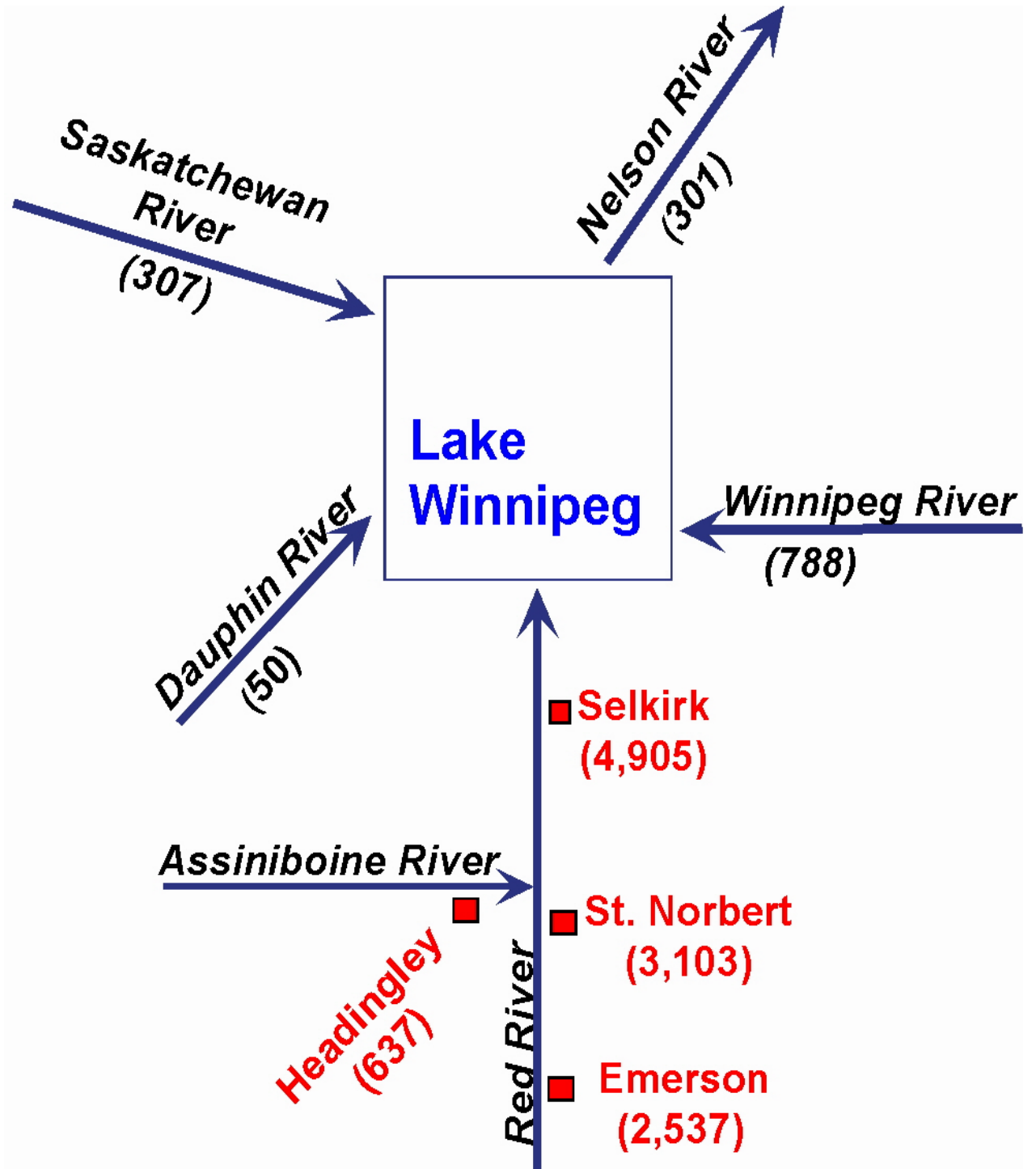
TN in Nelson River



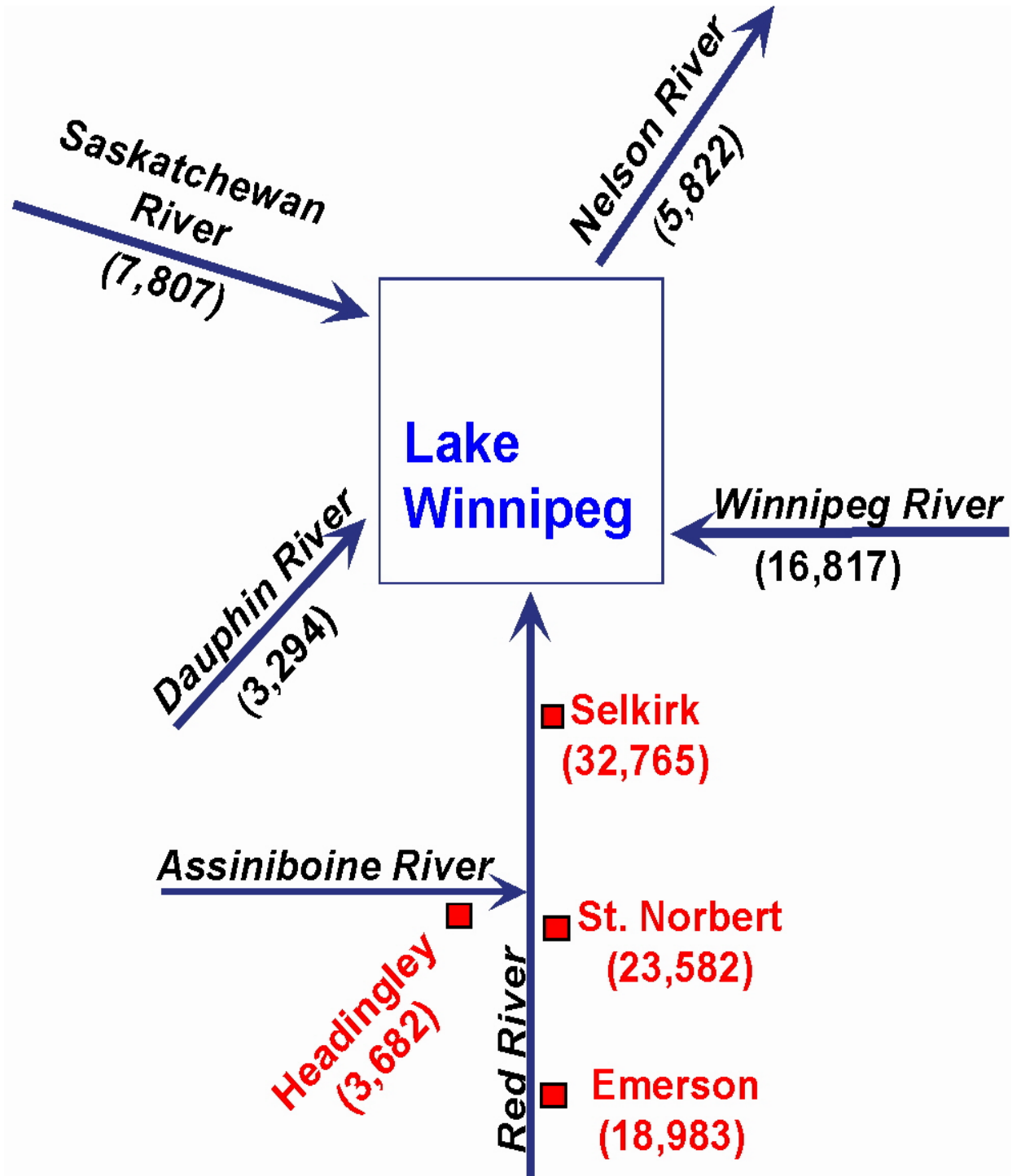
Summary - Trend Analysis

Trend	Nitrogen	Phosphorus
No Change	10 sites @ 10 streams	20 sites @ 15 streams
Increase	19 sites @ 13 streams	18 sites @ 15 streams
Decrease	4 sites @ 4 streams	7 sites @ 7 streams

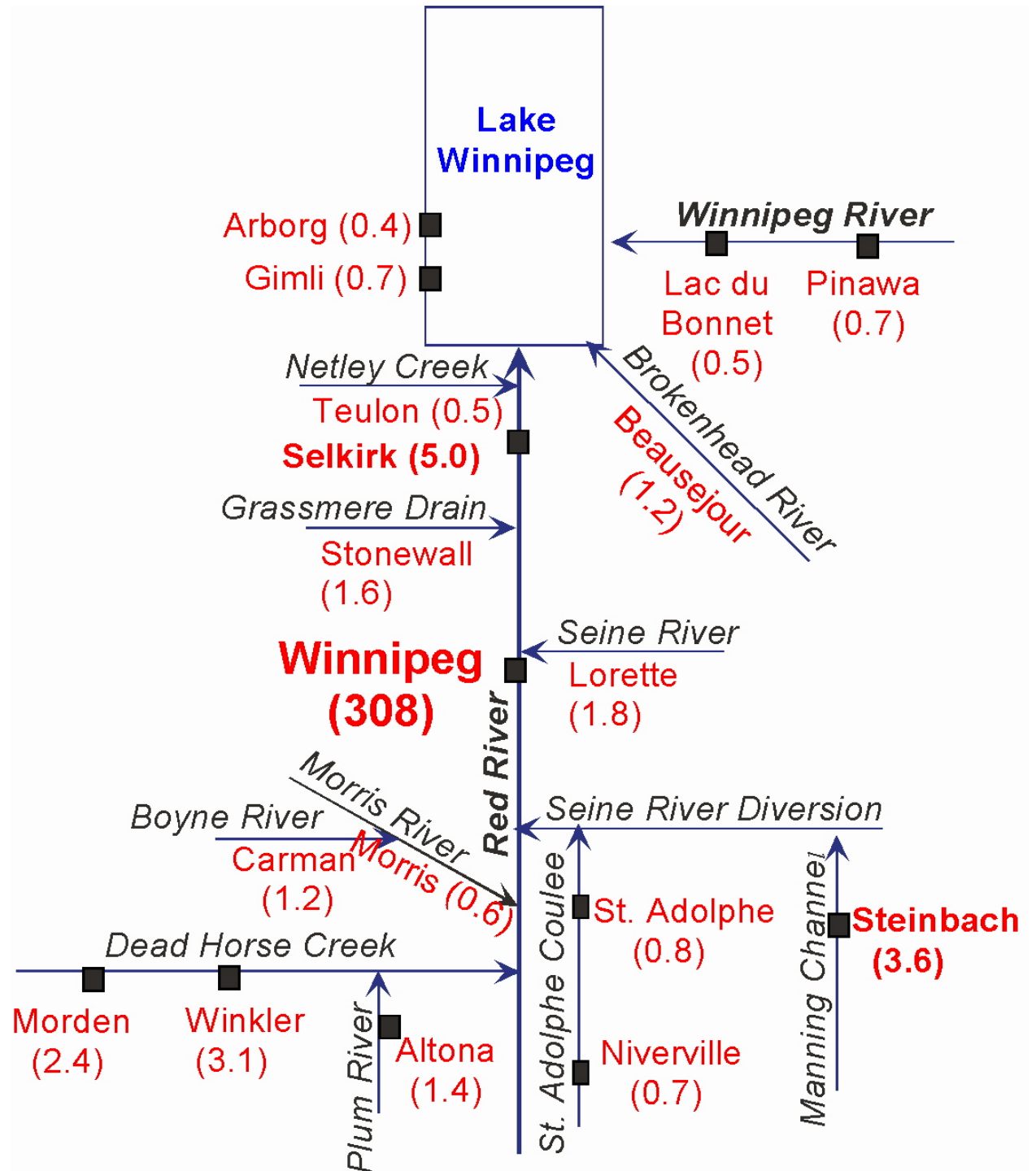
TP Loading to Lake Winnipeg



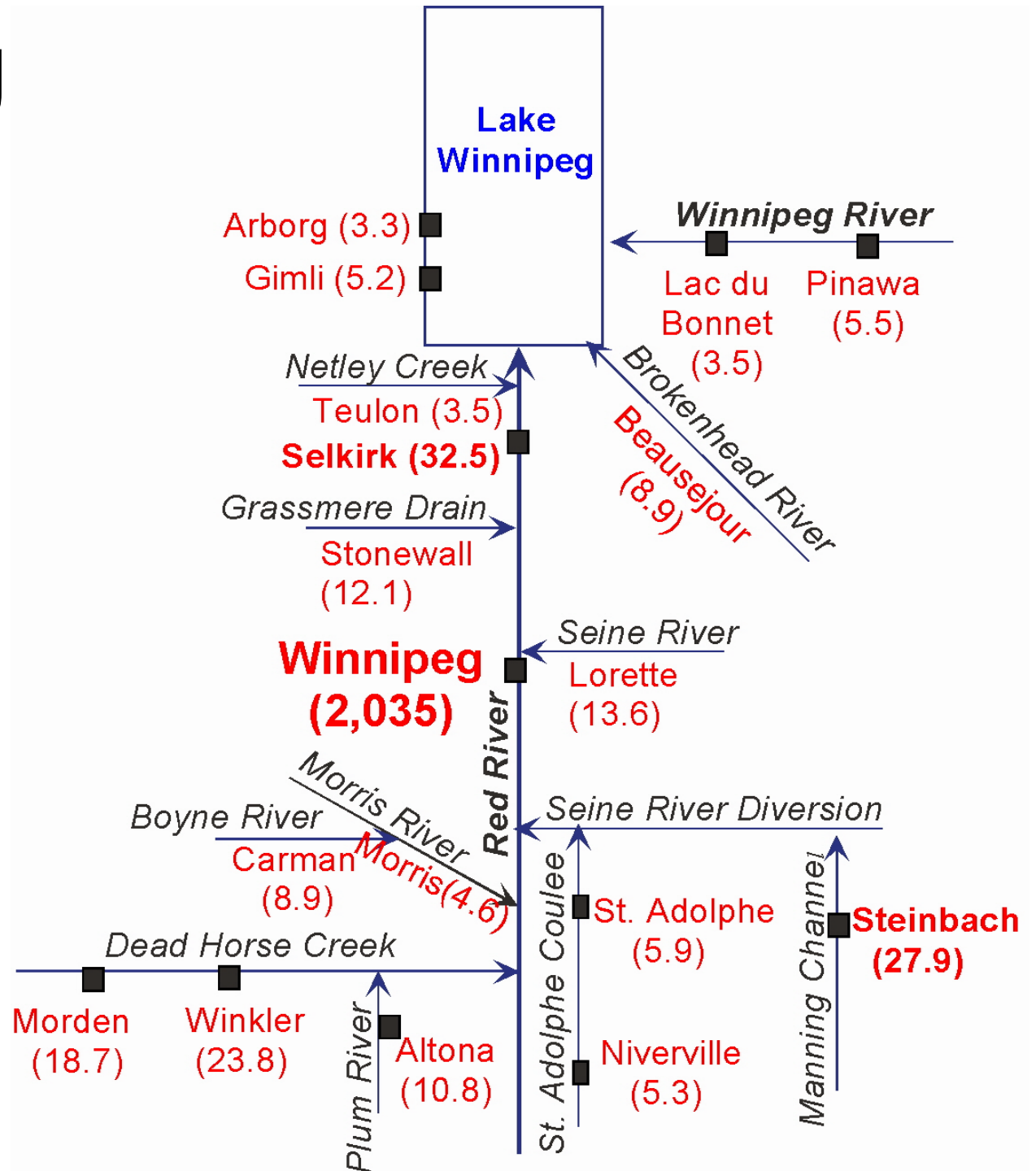
TN Loading to Lake Winnipeg



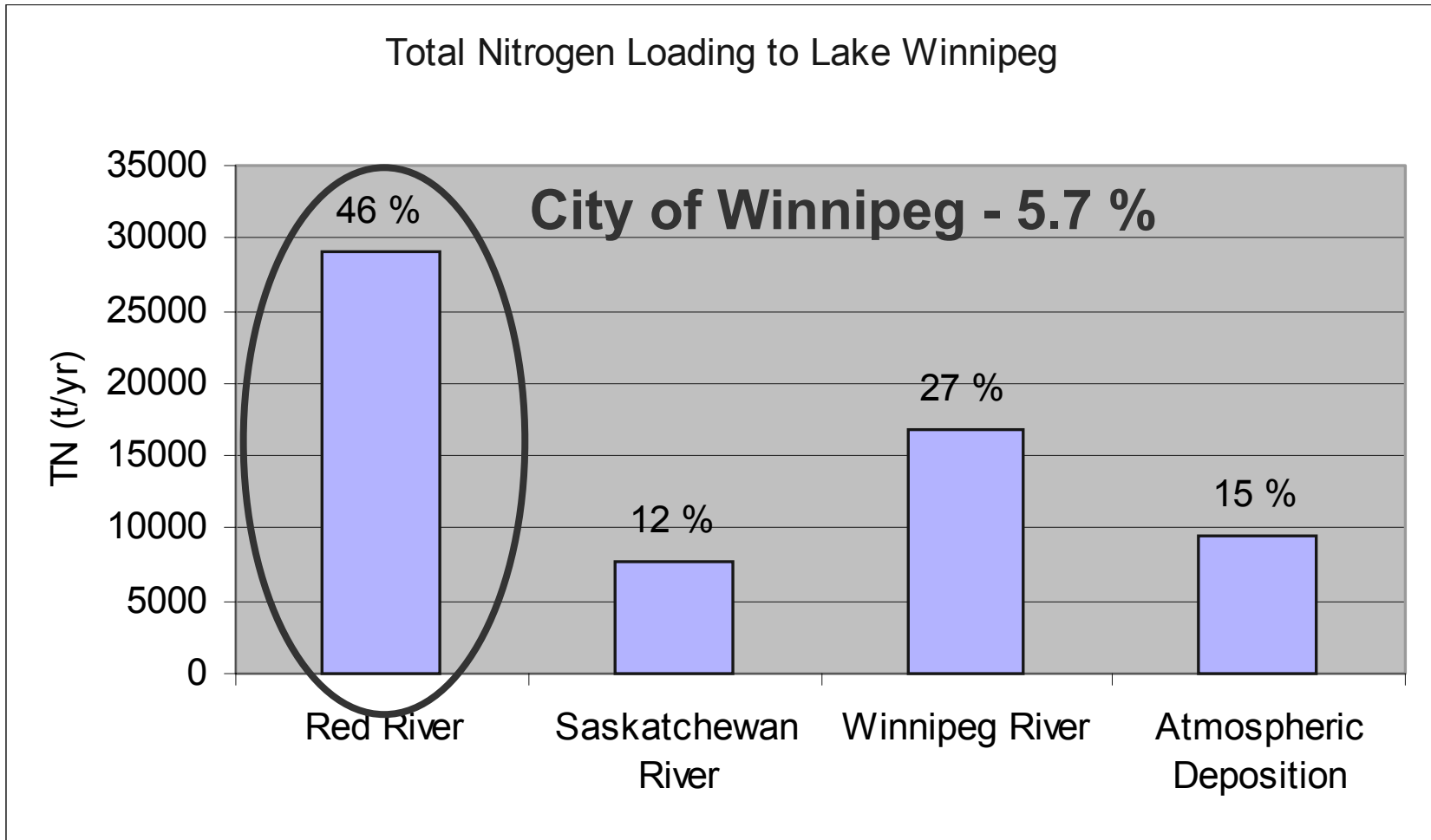
TP Loading from WWTF



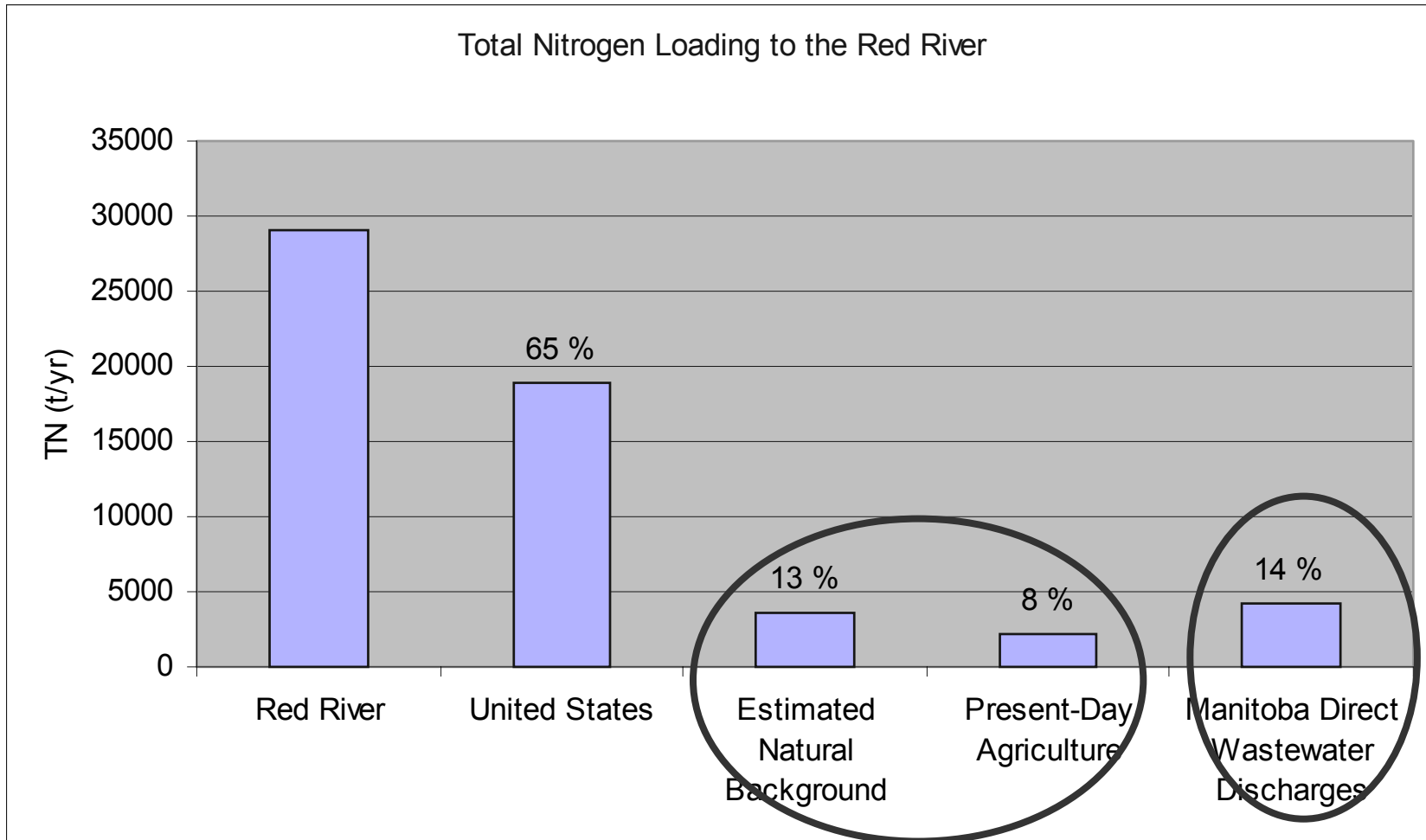
TN Loading from WWTF



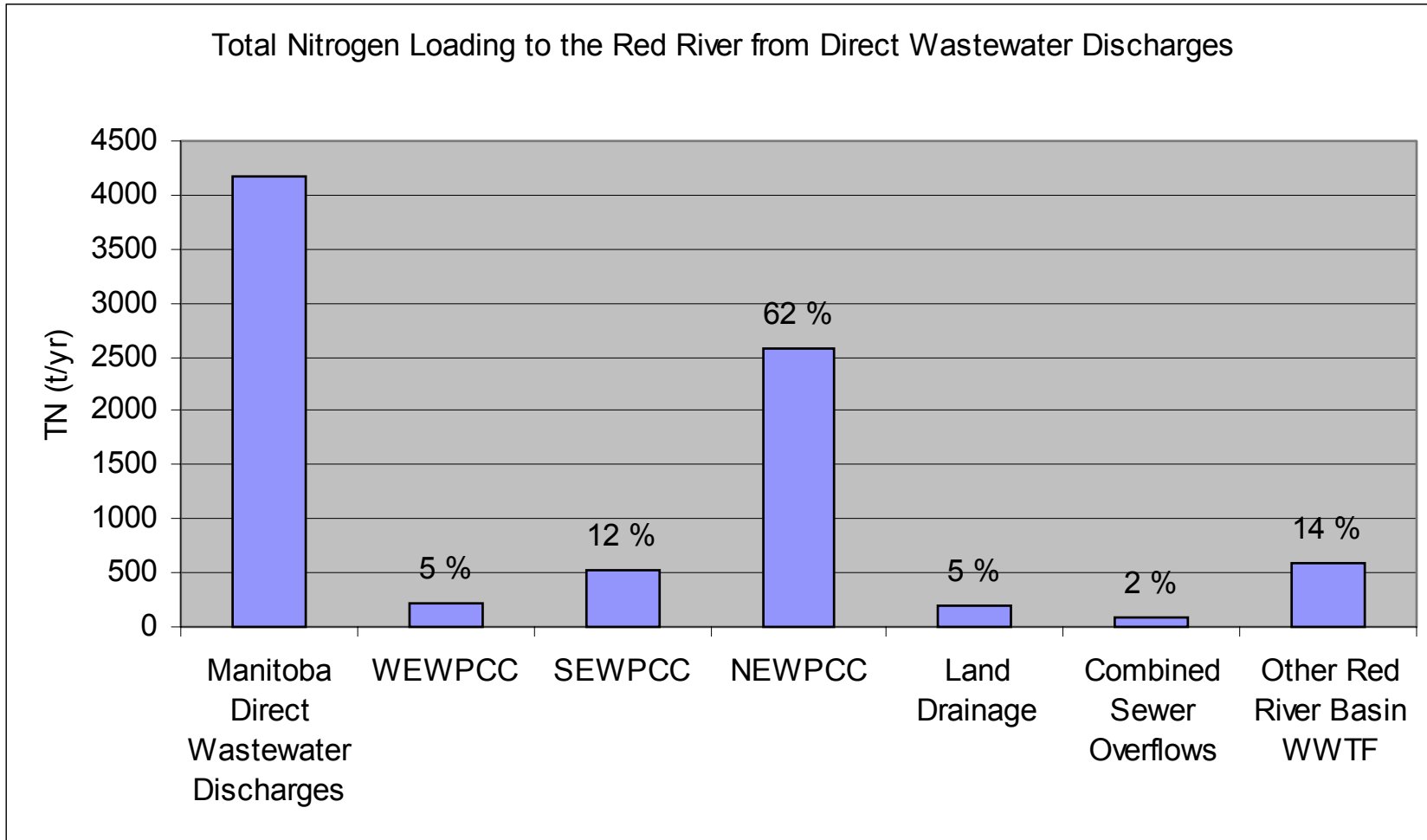
Total Nitrogen Loading to Lake Winnipeg



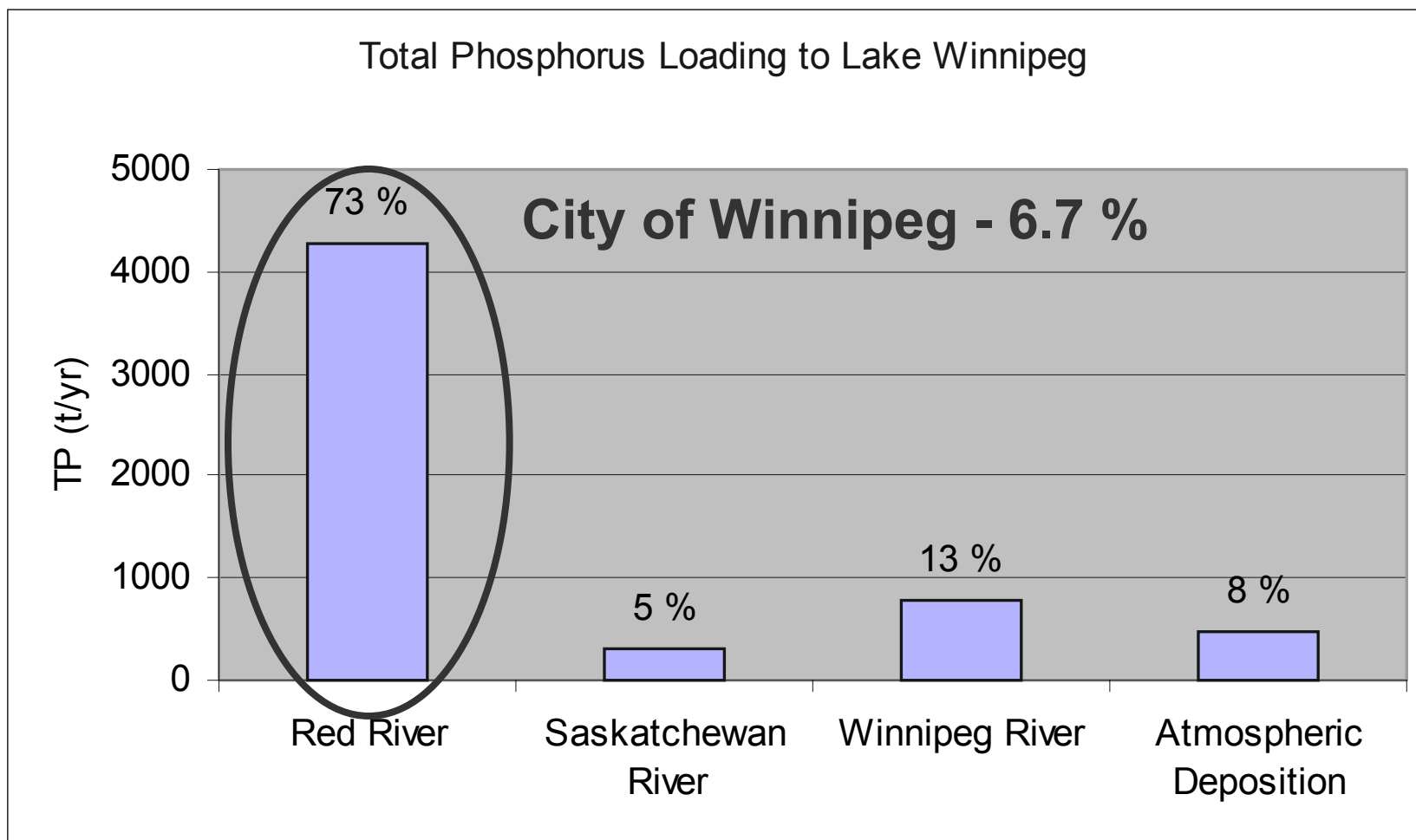
Total Nitrogen Loading to the Red River



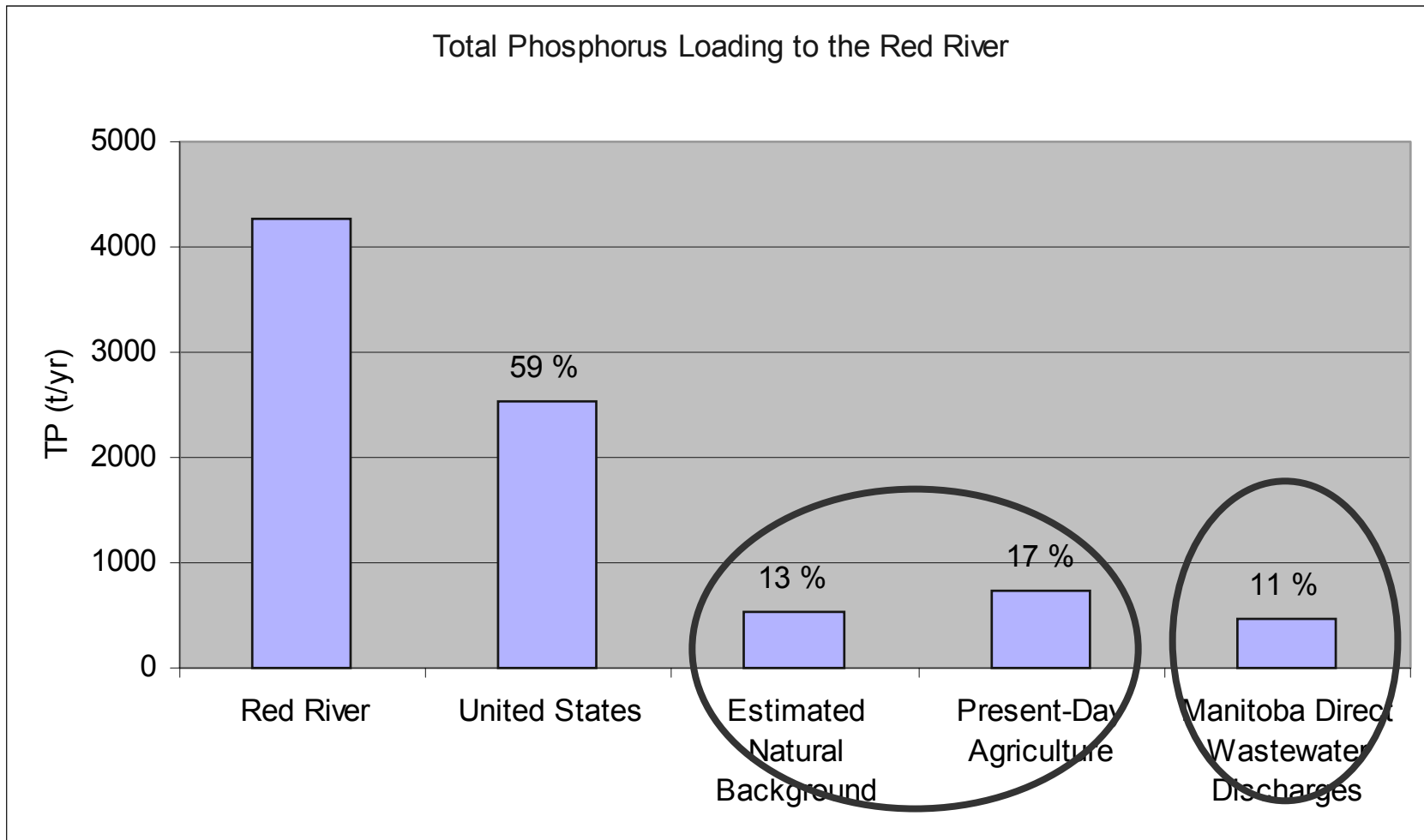
Total Nitrogen Loading to the Red River from Direct Wastewater Discharges



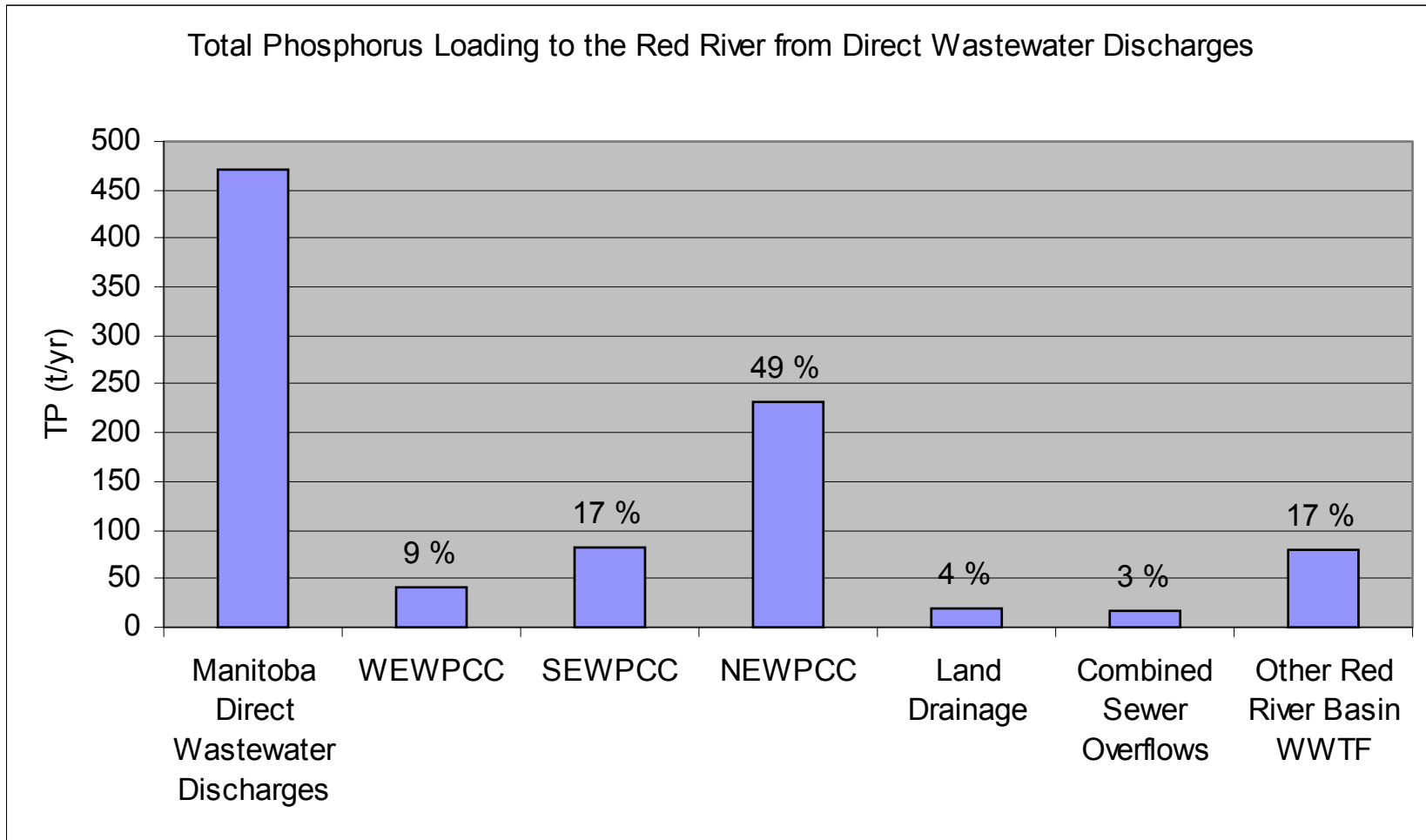
Total Phosphorus Loading to Lake Winnipeg



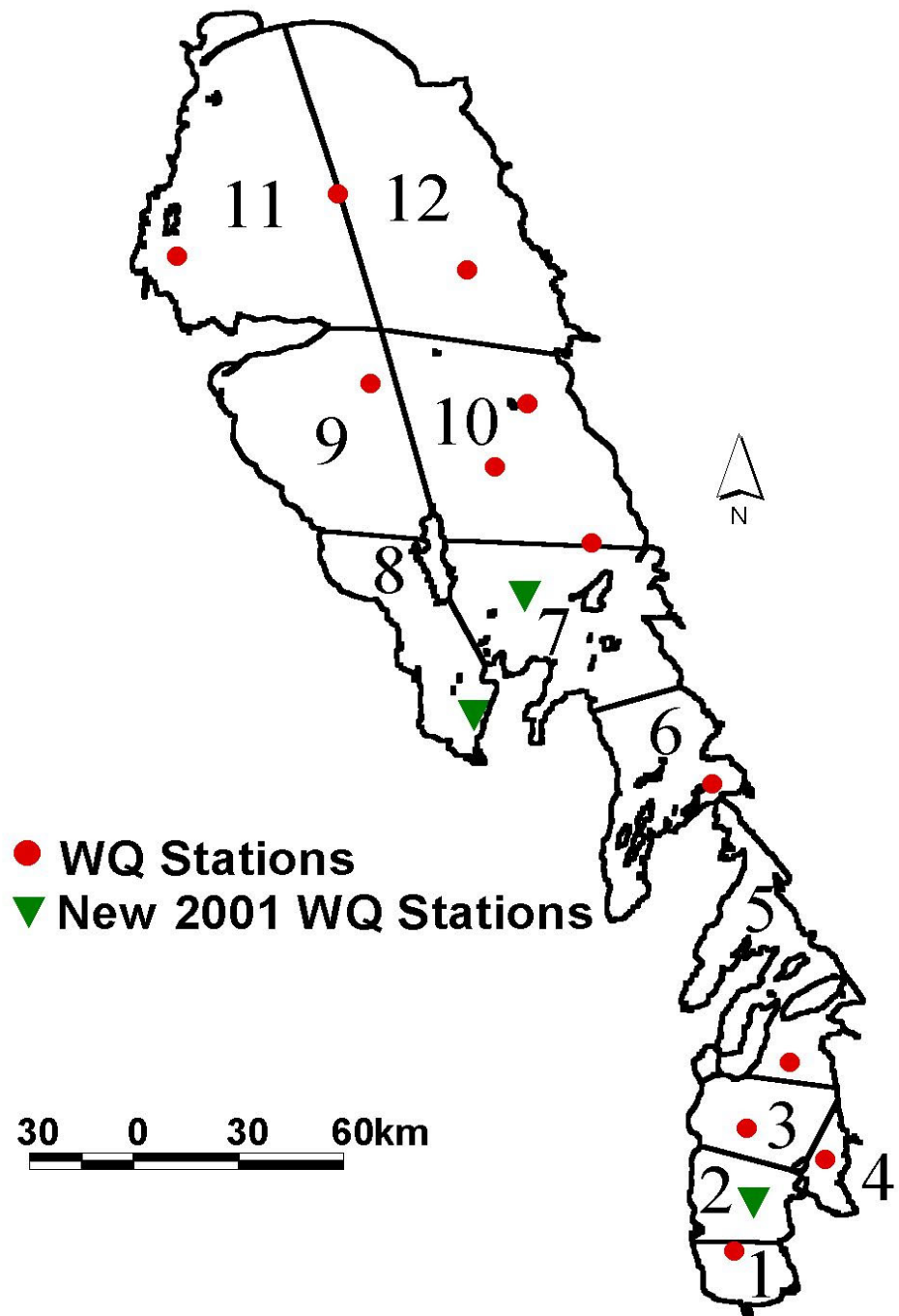
Total Phosphorus Loading to the Red River



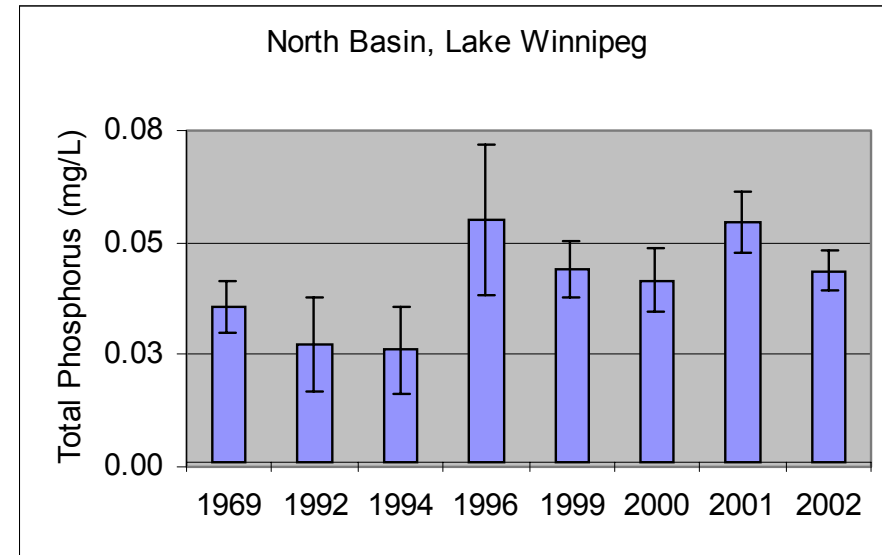
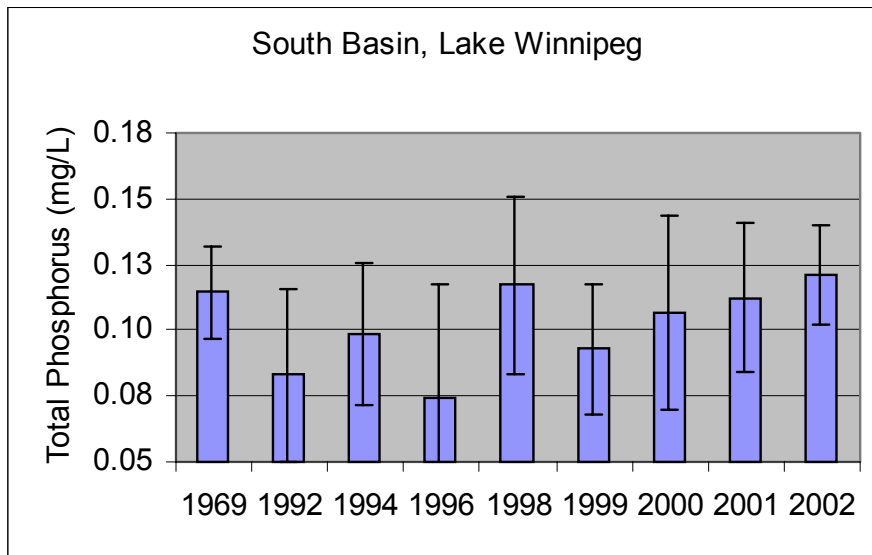
Total Phosphorus Loading to the Red River from Direct Wastewater Discharges



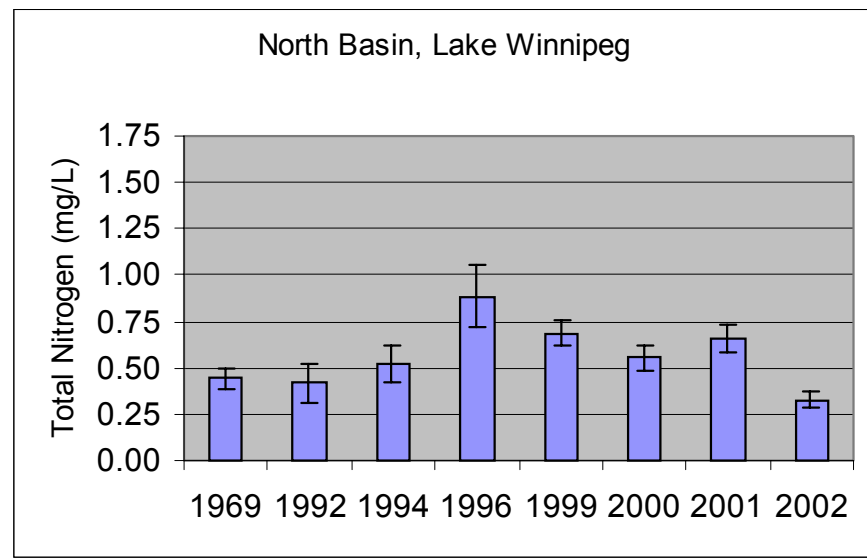
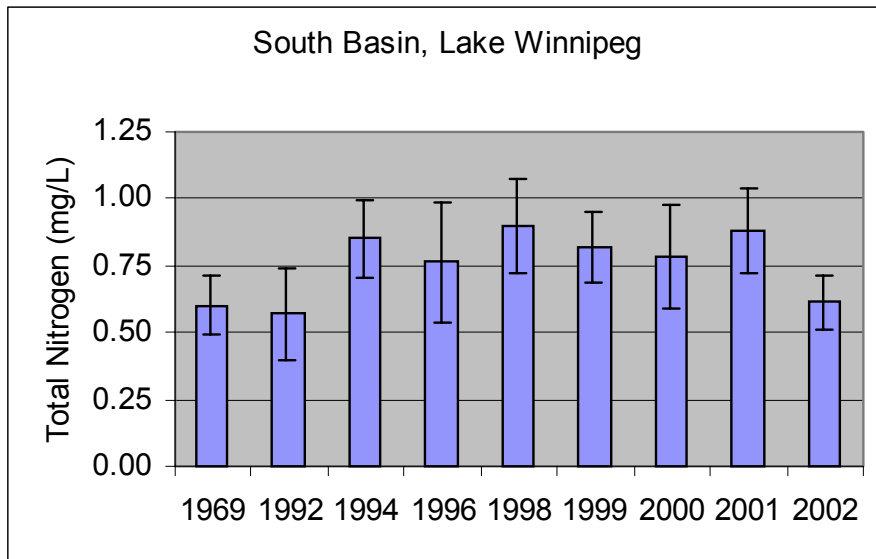
Lake Winnipeg Water Quality Monitoring



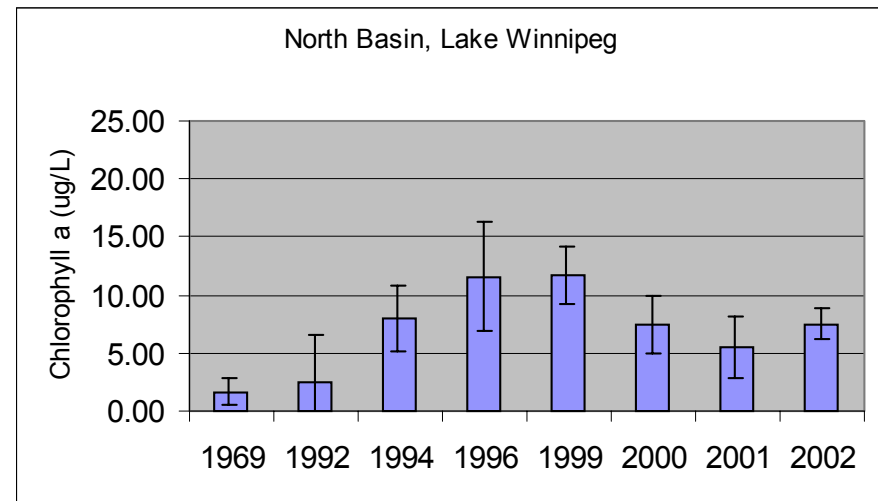
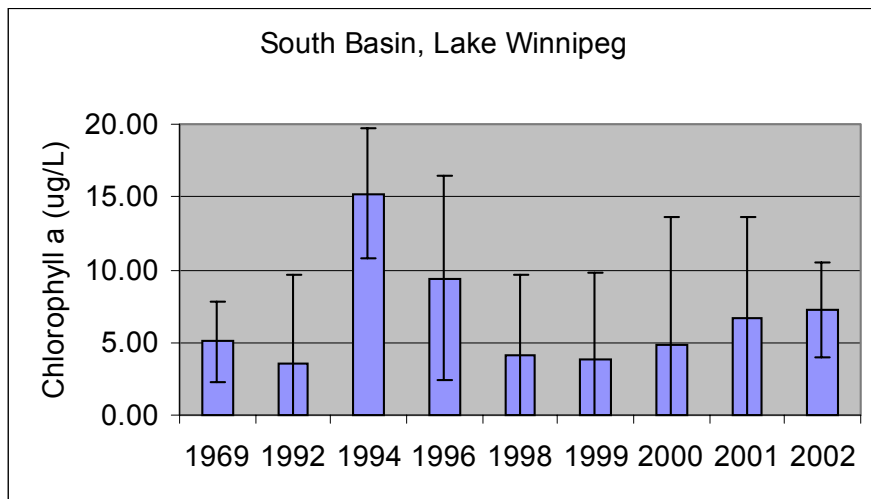
Phosphorus - Lake Winnipeg



Nitrogen - Lake Winnipeg



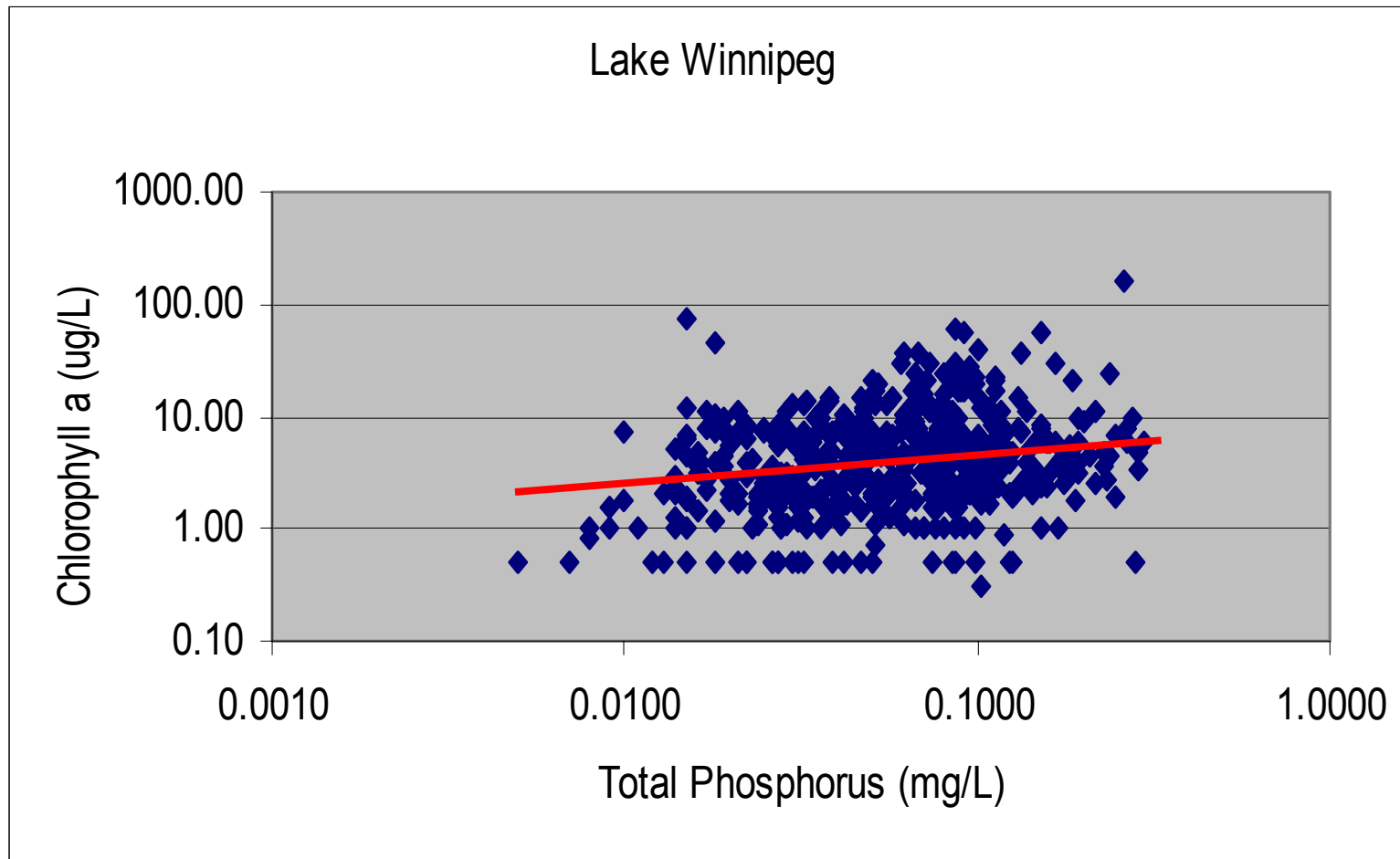
Chlorophyll a - Lake Winnipeg



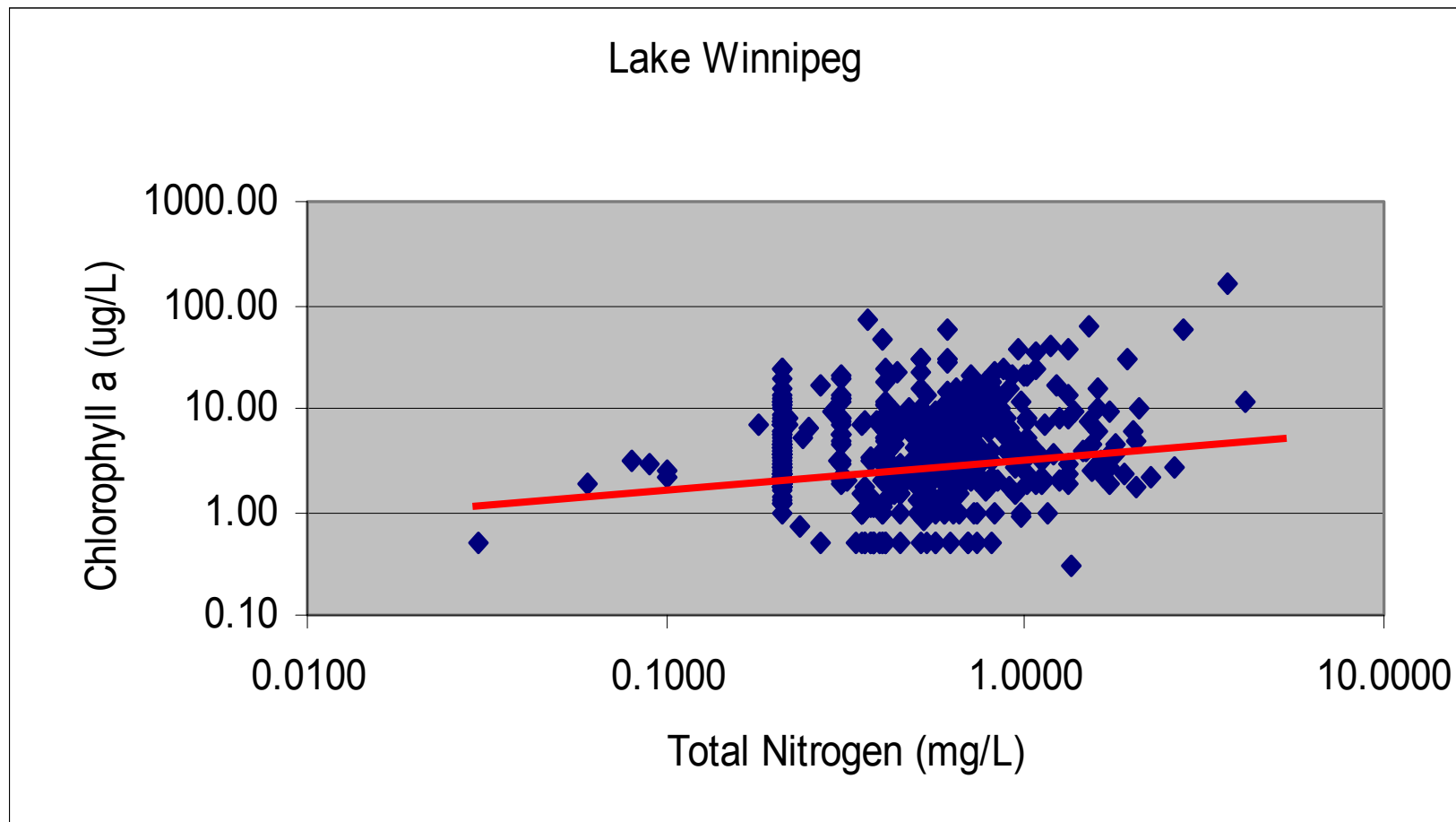
Work in Progress

- **Developing water quality model for Lake Winnipeg**
- **Developing an approach to derive water quality objectives for the Assiniboine River basin, then for Lake Winnipeg**
- **Analyzing relationships in Manitoba's prairie systems including Lake Winnipeg between nutrients, periphyton, and phytoplankton abundance**
- **Developing an approach to estimate natural background loading**

Preliminary Phosphorus - Algae Relationships



Preliminary Nitrogen - Algae Relationships



Concluding Comments

- **Statistically significant increasing trends for both phosphorus and nitrogen were commonly identified within Manitoba**
- **Overall, nitrogen has generally increased at a greater rate than phosphorus**
- **Of the nutrient loading to Lake Winnipeg, the City of Winnipeg contributes:**
 - **Nitrogen - about 5.7 %**
 - **Phosphorus - about 6.7 %**

Concluding Remarks (continued)

- **The majority of nutrients in Lake Winnipeg originate from diffuse sources off the landscape rather than municipal or industrial sources**
- **Similar to other prairie regions, it appears that nitrogen is at least as important as phosphorus in contributing to algal blooms in Lake Winnipeg**

Concluding Remarks (continued)

- **Manitoba is proceeding with an aggressive and ambitious program to manage nutrients that is ahead of other jurisdictions in Canada and parallels jurisdictions in the United States and Europe**
- **Anticipate having scientifically-defensible water quality objectives for nitrogen and phosphorus in Lake Winnipeg by sometime in 2004**
- **The overall approach is consistent with national efforts underway by the CCME**

Concluding Remarks (continued)

- **Once these have been established, an implementation plan will be developed that is fair and equitable**
 - **municipal**
 - **industrial**
 - **agriculture**
 - **cottage owners**
 - **upstream neighbours**

Concluding Remarks (continued)

- Dissolved oxygen levels in Lake Winnipeg show no change from levels measured over 30 years ago
- Management of nutrients is an urgent issue to ensure that Lake Winnipeg and other valuable resources are protected
- However, there is time to complete the scientific work underway, then to act in an effective and responsible manner as identified in our Nutrient Management Strategy

Thank You