

**APPENDIX A**

INTERNATIONAL RED RIVER BOARD DIRECTIVE

DIRECTIVE TO THE  
INTERNATIONAL RED RIVER BOARD

1. Pursuant to the Boundary Waters Treaty of 1909, responsibilities have been conferred on the Commission under a 1948 Reference from the governments of Canada and the United States with respect to the use and apportionment of the waters along, across, or in the vicinity of the international boundary from the eastern boundary of the Milk River drainage basin on the west up to and including the drainage basin of the Red River on the east, and under the May 1969 authorization from the governments to establish continuous supervision over the quality of the waters crossing the boundary in the Red River and to recommend amendments or additions to the objectives when considered warranted by the International Joint Commission.
2. This directive replaces previous directives and instructions provided by the International Joint Commission to the International Souris-Red Rivers Engineering Board, and in the February 8, 1995 Directive to the International Red River Pollution Board. This Directive consolidates the functions of those two former boards into one board, to be known as the International Red River Board (Board).
3. The Board's mandate is to assist the Commission in preventing and resolving transboundary disputes regarding the waters and aquatic ecosystem of the Red River and its tributaries and aquifers. This will be accomplished through the application of best available science and knowledge of the aquatic ecosystem of the basin and an awareness of the needs, expectations and capabilities of residents of the Red River basin.
4. The geographical scope of the Board's mandate shall be the Red River basin, excluding the Assiniboine and Souris Rivers. The Board's activities shall focus on those factors which affect the Red River's water quality, water quantity, levels and aquatic ecological integrity.
5. The Board's duties shall be to:
  - A. Maintain an awareness of basin-wide development activities and conditions that may affect water levels and flows, water quality and the ecosystem health of the Red River and its transboundary tributaries and inform the Commission about transboundary issues.
  - B. Provide a continuing forum for the identification, discussion and resolution of existing and emerging water-related issues relevant to the Red River basin.
  - C. Recommend appropriate strategies to the Commission concerning water quality, quantity and aquatic ecosystem health objectives in the basin.
  - D. Maintain continuing surveillance and perform inspections, evaluations and assessments, as necessary, to determine compliance with objectives agreed to by governments for water quality, levels and quantity in the Red River basin.
  - E. Encourage the appropriate regulatory and enforcement agencies to take steps to ensure that agreed objectives are met.
  - F. Encourage the appropriate authorities, such as resource and emergency planning agencies, to establish and maintain contingency plans, including early warning procedures, for appropriate reporting and action on accidental discharges or spills, floods and droughts.
  - G. Monitor and report on flood preparedness and mitigation activities in the Red River basin and their potential effects on the transboundary aquatic ecosystem, and encourage and facilitate the development and maintenance of flood-related data and information systems

and flood forecasting and hydrodynamic models. In carrying out this responsibility, the Board shall:

- i. Monitor progress by the governments (federal, state, provincial, municipal) in implementing the recommendations of the Commission's report on Red River basin flooding, and in maintaining and advancing the work of the Task Force's legacy projects, and to this end provide opportunities for the public to comment on the adequacy of such progress.
  - ii. Encourage governments to develop and promote a culture of flood preparedness in the Red River valley.
  - iii. Encourage government efforts to develop and implement a long-term strategy for flood mitigation and emergency preparedness.
  - iv. Encourage the sharing of accurate and timely transboundary information to support the development of improved flood forecasting techniques and procedures for early flood warnings and to improve communication of flood forecasts.
  - v. Provide through the activities of the Board a forum for the exchange of best practices and for other flood-related information on preparedness, mitigation, response, and recovery, to assist in transboundary problem solving.
  - vi. Promote the application of innovative technologies for supporting flood modelling and mapping.
  - vii. Monitor the adequacy of data and information collection networks (meteorological, hydrometric, water quality) for flood preparedness, forecasting and mitigation, within the larger context of overall water management needs in the basin.
  - viii. Monitor potential transboundary effects of flood mitigation and other works in the basin, and encourage cooperative studies necessary to examine these effects.
  - ix. Encourage governments to integrate floodplain management activities in watershed and basin management.
  - x. Interact with all levels of government to help decision-makers become aware of transboundary flood-related and associated water management issues.
  - xi. Assist in facilitating a consultative process for resolution of the lower Pembina River flooding issue.
- H. Involve the public in the work of the Board, facilitate provision of timely and 'pertinent information within the basin in the most appropriate manner including electronic information networks, and conduct an annual public meeting in the Red River basin;
- I. Provide an annual report to the Commission, plus other reports as the Commission may request or the Board may feel appropriate in keeping with this Directive.
- J. Maintain an awareness of the activities of other agencies and institutions, in the Red River basin;
6. The Board shall continue to report on the non-Red River geographic areas under the responsibility of the former International Souris-Red Rivers Engineering Board, including the Poplar and Big Muddy basins, but excluding the Souris River basin, until the Commission determines otherwise.

7. The Board shall have an equal number of members from each country. The Commission shall normally appoint each member for a three-year term. Members may serve for more than one term. Members shall act in their personal and professional capacity, and not as representatives of their countries, agencies or institutions. The Commission shall appoint one member from each country to serve as co-chairs of the Board. An alternate member may not act as a co-chair.
8. At the request of any member, the Commission may appoint an alternate member to act in the place of such member whenever the said member, for any reason, is not available to perform such duties as are required of the member.
9. The co-chairs of the Board shall be responsible for maintaining proper liaison between the Board and the Commission, and among the Board members. Chairs shall ensure that all members of the Board are informed of all instructions, inquiries, and authorizations received from the Commission and also of activities undertaken by or on behalf of the Board, progress made, and any developments affecting such progress.
10. Each chair, after consulting the members of the Board, may appoint a secretary. Under the general supervision of the chair(s), the secretary(ies) shall carry out such duties as are assigned by the chairs or the Board as a whole.
11. The Board may establish such committees and working groups as may be required to discharge its responsibilities effectively. The Commission shall be kept informed of the duties and composition of any committee or working group. Unless other arrangements are made, members of the Board, committees, or working groups will make their own arrangements for reimbursement of necessary expenditures.
12. The Commission should also be informed of the Board's plans and progress and of any developments or cost impediments, actual or anticipated, which are likely to affect carrying out the Board's responsibilities.
13. The Commission shall be informed, in advance, of plans for any public meetings or public involvement in the Board deliberations. The Board shall report, in a timely manner, to the Commission on these meetings, including representations made to the board.
14. The Board shall provide the text of media releases and other public information materials to the Secretaries of the Commission for review by the Commission's Public Information Officers, prior to their release.
15. Reports, including annual reports, and correspondence of the Board shall, normally, remain privileged and be available only to the Commission and to members of the Board and its committees until their release has been authorized by the Commission.
16. If, in the opinion of the Board or of any member, any instruction, directive, or authorization received from the Commission lacks clarity or precision, the matter shall be referred promptly to the Commission for appropriate action.
17. In the event of any unresolved disagreement among the members of the Board, the Board shall refer the matter forthwith to the Commission for decision.
18. The Commission may amend existing instructions or issue new instructions to the Board at any time.



## **APPENDIX B**

B.1 WATER QUALITY OBJECTIVES

B.2 WATER QUALITY ALERT LEVELS

## B.1 WATER QUALITY OBJECTIVES

The purpose of the water quality objectives and alert levels is to restore and maintain the chemical, physical, and biological integrity of the waters of the Red River. Five specific objectives were adopted for the Red River at the international boundary by the IJC in 1969.

Water quality objectives are used when necessary to secure government commitment to pollution abatement action. Compliance with the objectives is the primary means by which the International Red River Board identifies major water quality issues to the IJC.

The term 'exceedance' is used to describe a situation where an objective is not met. A situation is classified as an exceedance if an individual instantaneous sample, obtained from the continuous auto-monitor, or through a grab sample, is equal to or greater than the corresponding water quality objective (except for dissolved oxygen, which must be observed to be equal to or less than the objective). The five specific parameters and corresponding objective are listed below.

Fecal Coliform	200 colonies/100 ml
Chloride	100 mg/L
Sulphate	250 mg/L
Total Dissolved Solids	500 mg/L
Dissolved Oxygen	5 mg/L

## B.2 WATER QUALITY ALERT LEVELS

Water quality alert levels are used to complement water quality objectives. If exceeded, alert levels will trigger investigative action on the part of the IRRB or its representatives. The exceedance is addressed in terms of its magnitude, implications to water uses and possible resolutions. On the basis of alert level exceedances and subsequent investigations, the IRRB may advance proposals for additional objectives.

Water quality alert levels, for a wide range of parameters, in addition to the five specific parameters noted above, were developed by a working group in 1985. These alert levels were approved by the predecessor International Red River Pollution Board in January 1986. The alert levels that are currently in effect are listed in the following table. Further, the table provides a comparison of alert levels with the North Dakota and Minnesota Water Quality Standards, and with the Manitoba Water Quality Objectives as of 1990. The table has not been updated to reflect recent state and provincial revisions. The IRRB Aquatic Ecosystem Committee established by the IRRB in June 2001 will be reviewing the issue of objectives and alert levels with respect to monitoring requirements, analytical methodologies, and reporting protocols.

## COMPARISON OF WATER QUALITY ALERT LEVEL STANDARDS AND OBJECTIVES

August 20, 1990

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Objectives</i>	<i>Origin/Rational</i>
Fecal Coliform	200/100 ml geometric mean 10% of samples not to exceed 2,000 based on a minimum of 5 samples in a 30 day period from Mar. 1 – Oct. 31. HH*	200 fecal coliforms per 100 ml. This standard shall apply only during the recreation season, May 1 to September 30. HH	100/100 ml. At least 90% of samples in any consecutive 30 day period should have a fecal coliform density of less than 100 per 100 ml. HH	200/100 ml geometric mean with 10% of samples not to exceed 400 based on min. 5 samples – 30 day period – May 1 – Oct. 31 and for the balance of year not to exceed 1000/100 ml. Current IJC objective.	Minnesota and North Dakota based on primary body contact recreation.
Chloride	100 mg/l (total) ID	100 mg/l (total) ID	100 mg/l (soluble) ID	100 mg/l (dissolved) Current IJC Objective	All agencies based on industrial consumption.
Sulfate	250 mg/l (total) DW	250 mg/l (total) DW	250 mg/l (dissolved) DW	250 mg/l (total) Current IJC Objective	All agencies based on domestic consumption.
TDS	500 mg/l DW	None	500 mg/l DW	500 mg/l Current IJC Objective	All agencies, excluding North Dakota based on domestic consumption.
Dissolved Oxygen	5 mg/l (minimum)	5 mg/l (minimum)	47% saturation or more.	5 mg/l (minimum) Current IJC Objective	All agencies for the protection of aquatic life.

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 DW – Drinking Water  
 HH – Human Health  
 AL – Aquatic Life  
 ID – Industrial Consumption  
 IR - Irrigation

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Chemical Characteristics					
pH	6.5 - 9.0 AL	7.0 - 9.0 AL	6.5 - 9.0 AL	6.5 - 9.0	All agencies based on protection of aquatic life.
Temperature	5° F above natural in streams and 3° F above natural in lakes, based on monthly average of the maximum daily temperature, except in no case shall it exceed the daily average temperature of 86° F. AL	85° F. The maximum increase shall not be greater than 5° F above natural background conditions. AL	Site-specific objectives can be developed using procedures set out in the Manitoba Surface Water Quality Objectives. AL	None	All agencies based on protection of aquatic life.
Dissolved Gas					
Ammonia-N	0.04 mg/l as N unionized (warm water) AL	Unionized as N (dissolved). Calculation from standards. See page 8-10. AL	Variable, ranging from 0.0184 to 0.050 mg/l ammonia as NH <sub>3</sub> .*		Minnesota and North Dakota for the protection of aquatic life.
Metals (Total)					
Aluminum	Total 125 µg/l AL	None	None	None	Minnesota for the protection of aquatic life.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Cadmium	Total The chronic standard shall not exceed: [0.7852 {ln (total hardness mg/l)} - 3.49]. For hardness values greater than 400 mg/l, 400 mg/l shall be used in the calculation of the standard. Cadmium standards in µg/l at various hardness values: 50 mg/l hardness = 0.66 µg/l, 100 mg/l hardness = 1.1 µg/l, 200 mg/l hardness = 2.0 µg/l AL	Total The one-hour average, concentration in µg/l cannot exceed the numerical value given by [1.128 {ln(hardness as mg/l)} - 3.828] more than once every 3 years on the average. AL The four day average concentration in µg/l cannot exceed the numerical value given by [.7852 {ln(hardness as mg/l)} - 3.490] more than once every 3 years on the average.	[0.7852 {ln(hardness as mg/l)} - 3.49], where hardness is expressed in mg/l CaCO <sub>3</sub> and the resultant objective is expressed in µg/l. (e.g.) 50 mg/l CaCO <sub>3</sub> = 0.66 µg/l, 100 mg/l CaCO <sub>3</sub> = 1.1 µg/l, 200 mg/l CaCO <sub>3</sub> = 2.0 µg/l. AL	Less than detection.	Minnesota and Manitoba for the protection of aquatic life and wildlife.
Chromium	None	Total 50 µg/l DW	[0.8190 {ln (hardness)} + 1.561], where hardness is expressed in mg/l CaCO <sub>3</sub> and the resultant objectives is expressed in µg/l. (e.g.) 50 mg/l CaCO <sub>3</sub> = 120 µg/l, 100 mg/l CaCO <sub>3</sub> = 210 µg/l, 200 mg/l CaCO <sub>3</sub> = 370 µg/l.	50 µg/l	North Dakota based on domestic consumption.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Chromium, Trivalent	Total The chronic standard shall not exceed: exp. $[0.819 \{\ln(\text{total hardness mg/l}) + 1.561\}]$ . For hardness values greater than 400 mg/l, 400 mg/l shall be used in the calculation of the standard. Chromium +3 standards in $\mu\text{g/l}$ at various hardness values: 50 mg/l hardness = 117 $\mu\text{g/l}$ , 100 mg/l hardness = 207 $\mu\text{g/l}$ , 200 mg/l hardness = 365 $\mu\text{g/l}$ . AL	None	$[0.8190 \{\ln(\text{hardness}) + 1.561\}]$ , where hardness is expressed in mg/l $\text{CaCO}_3$ and the resultant objective is expressed in $\mu\text{g/l}$ . (e.g.) 50 mg/l $\text{CaCO}_3 = 120 \mu\text{g/l}$ , 100 mg/l $\text{CaCO}_3 = 210 \mu\text{g/l}$ , 200 mg/l $\text{CaCO}_3 = 370 \mu\text{g/l}$ . AL	None	Manitoba and Minnesota for the protection of aquatic life.
Chromium, Hexavalent	Total The chronic standard is 11 $\mu\text{g/l}$ AL	None	11 $\mu\text{g/l}$ AL	None	Manitoba and Minnesota for the protection of aquatic life.
Copper	Total The chronic standard shall not exceed: exp. $[0.62 \{\ln(\text{total hardness mg/l}) - 0.57\}]$ . For hardness values greater than 400 mg/l, 400 mg/l shall be used in the calculation of the standard. Copper standards in $\mu\text{g/l}$ at various hardness values: 50 mg/l hardness = 6.4 $\mu\text{g/l}$ , 100 mg/l hardness = 9.8 $\mu\text{g/l}$ , 200 mg/l hardness = 15 $\mu\text{g/l}$ . AL	Total The one-hour average concentration in $\mu\text{g/l}$ cannot exceed the numerical value given by $[.9422 \{\ln(\text{hardness as mg/l}) - 1.464\}]$ more than once every 3 years on the average. The four-day average concentration in $\mu\text{g/l}$ cannot exceed the numerical value given by $[.8545 \{\ln(\text{hardness as mg/l}) - 1.465\}]$ more than once every 3 years on the average. AL	$[0.8545 \{\ln(\text{hardness}) - 1.465\}]$ , where hardness is expressed in mg/l $\text{CaCO}_3$ and the resultant objective is expressed in $\mu\text{g/l}$ . (e.g.) 50 mg/l $\text{CaCO}_3 = 6.5 \mu\text{g/l}$ , 100 mg/l $\text{CaCO}_3 = 12 \mu\text{g/l}$ , 200 mg/l $\text{CaCO}_3 = 21 \mu\text{g/l}$ .		Minnesota and Manitoba for the protection of aquatic life.
Iron	300 $\mu\text{g/l}$ DW	None	300 $\mu\text{g/l}$ DW	300 $\mu\text{g/l}$	Minnesota, Manitoba based on domestic consumption.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Lead	Total The chronic standard shall not exceed: exp. $[1.273\{\ln(\text{total hardness mg/l})\}-4.705]$ . For hardness values greater than 400 mg/l, 400 mg/l shall be used in the calculation of the standard. Lead standards in $\mu\text{g/l}$ at various hardness values: 50 mg/l hardness = 1.3 $\mu\text{g/l}$ 100 mg/l hardness = 3.2 $\mu\text{g/l}$ 200 mg/l hardness = 7.7 $\mu\text{g/l}$ AL	Total The one-hour average concentration in $\mu\text{g/l}$ cannot exceed the numerical value given by $[1.266\{\ln(\text{hardness as mg/l}) - 1.416\}]$ more than once every 3 years on the average. The four-day average concentration in $\mu\text{g/l}$ cannot exceed the numerical value given by $(1.266\{\ln(\text{hardness as mg/l}) - 4.661\})$ more than once every 3 years on the average. AL	$[1.273\{\ln(\text{hardness})\} - 4.705]$ , where hardness is expressed in $\mu\text{g/l CaCO}_3$ and the resultant objective is expressed in $\mu\text{g/l}$ . (e.g.) 50 mg/l $\text{CaCO}_3 = 1.3 \mu\text{g/l}$ , 100 mg/l $\text{CaCO}_3 = 3.2 \mu\text{g/l}$ , 200 mg/l $\text{CaCO}_3 = 7.7 \mu\text{g/l}$ ,		Manitoba, Minnesota and North Dakota for the protection of aquatic life and wildlife.
Manganese	50 $\mu\text{g/l}$ DW	None	50 $\mu\text{g/l}$ DW	50 $\mu\text{g/l}$	Minnesota and Manitoba based on domestic consumption.
Mercury	Total 0.0069 $\mu\text{g/l}$ AL	Total Acute 2.4 $\mu\text{g/l}$ Chronic 0.012 $\mu\text{g/l}$ AL	Acid soluble mercury 0.006 $\mu\text{g/l}$	Less than detection in water. 0.5 micrograms per gram in fish fillets.	Minnesota, North Dakota and Manitoba for protection of aquatic life, animal life and humans as a result of bioconcentrations in tissue in the food chain.
Nickel	Total The chronic standard (CS) shall not exceed the human health-based criterion of 88 $\mu\text{g/l}$ . For waters with total hardness values less than 50 mg/l, the CS shall not exceed: exp. $[0.846\{\ln(\text{total hardness mg/l})\} + 1.1645]$ . AL and HH	None	$[0.76\{\ln(\text{hardness})\} + 1.06]$ , where hardness is expressed in mg/l) $\text{CaCO}_3$ and the resultant objective is expressed in $\mu\text{g/l}$ (e.g.) 50 mg/l $\text{CaCO}_3 = 56 \mu\text{g/l}$ , 100 mg/l $\text{CaCO}_3 = 96 \mu\text{g/l}$ , 200 mg/l $\text{CaCO}_3 = 160 \mu\text{g/l}$ , AL	None	Minnesota for the protection of aquatic life and human health. Manitoba for the protection of aquatic life.
Selenium	Total 5 $\mu\text{g/l}$ AL	10 $\mu\text{g/l}$ DW	10 $\mu\text{g/l}$ DW	10 $\mu\text{g/l}$	Manitoba and North Dakota based on domestic consumption. Minnesota for the protection of aquatic life.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Silver	Total The chronic standard shall not exceed 1.0 µg/l. AL	The one-hour average concentration in µg/l cannot exceed the numerical value given by [1.72 {ln(hardness)} as mg/l]-6.52] more than once every three years on the average. AL	0.1 µg/l AL	None	Manitoba, Minnesota and North Dakota for protection of aquatic life.
Zinc	Total The chronic standard shall not exceed: exp. [0.8473 {ln(total hardness mg/l)} + 0.7615], For hardness values greater than 400 mg/l, 400 mg/l shall be used in the calculation of the standard. Zinc standards in µg/l at various hardness values: 50 mg/l hardness = 59 µg/l 100 mg/l hardness = 106 µg/l 200 mg/l hardness = 191 µg/l AL	Total The one-hour average concentration in µg/l cannot exceed the numerical value given by [.8473 {ln(hardness as mg/l)} +.8604] more than one every 3 years on the average. The four-day average concentration in µg/l cannot exceed the numerical value given by [.8473 {ln(hardness as mg/l)}+.7614] more than once every 3 years on the average. AL	47 µg/l AL	47 µg/l	Minnesota, North Dakota and Manitoba for the protection of aquatic life.



<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Nutrients					
Nitrates (N)	Total 10 mg/l DW	Dissolved 1.0 mg/l DW	Total 10 mg/l DW	Total 10 mg/l	Minnesota and Manitoba based on domestic consumption.
Toxic Substances					
Arsenic	Total 50 µg/l DW and AL	Total 50 µg/l DW	Acid soluble arsenic 50 µg/l DW	Total 10 µg/l (under review)	Minnesota based on domestic consumption and for protection of aquatic life.
Boron	500 µg/l IR	750 µg/l IR	500 µg/l IR	Total 500 µg/l	Minnesota, Manitoba based on irrigation water.
Chlorine	Total residual 6 µg/l	None	None	None	Minnesota for protection of aquatic life.
Cyanide	Free cyanide 5.2 µg/l AL	Total 5 µg/l AL	Free cyanide 5.2 µg/l cyanide AL	Total 5 µg/l	Minnesota and North Dakota for protection of aquatic life.
Dioxin	None	None	None	Not detectable in any media analyzing to parts per trillion.	Task Force
PCBs	Total 0.000029 µg/l AL and HH	Total Acute 2.0 µg/l Chronic 0.014 µg/l AL	014 µg/l AL	Not detectable in water, in fish total PCBs not exceeding 2 micrograms per gram in fillets.	Body burden: Manitoba, North Dakota and Minnesota for protection of aquatic life, animal life and human life.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Phenolics	None	None	1 µg/l DW	10 µg/l	North Dakota to protect against taste and odor in water and fish.
Phenol	123 µg/l AL	Total 10 µg/l DW	1.0 µg/l 2.0 AL	None	North Dakota to protect against taste and odor in water and fish.
Pentachlorophenol	The chronic standard shall not exceed: exp.[1.005 {pH} - 5 .290]. Pentachlorophenol standards in µg/l at, various pH values: pH 7.0 = 5.7 µg/l, pH 7.5 = 9.5 µg/l, pH 8.0 = 16 µg/l. AL	Acute 20.0 µg/l Chronic 13.0 µg/l AL	0.06 mg/l DW	None	Minnesota and North Dakota for the protection of aquatic life. Manitoba based on domestic consumption.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Pesticides and Volatile Hydrocarbons	Acenaphthene 12 µg/l Acrylonitrile 0.38 µg/l Anthracene 0.029 µg/l Benzene 6.9 µg/l Bromoform 128 µg/l Carbon Tetrachloride 1.9 µg/l Chlordane 0.00029 µg/l Chlorobenzene 10 µg/l Chloroform 55 µg/l Chlorpyrifos 0.041 µg/l  DDT 0.0017 µg/l 1,2-Dichloroethane 3.8 µg/l Dieldrin 0.000026 µg/l Di-2-Ethylhexyl phthalate 1.9 µg/l Di-n-Octyl phthalate 30 µg/l Endosulfan 0.15 µg/l Endrin 0.016 µg/l Ethylbenzene 68 µg/l Fluoranthene 4.1 µg/l Heptachlor 0.00039 µg/l Heptachlor epoxide 0.00048 µg/l Hexachlorobenzene 0.00022 µg/l Lindane 0.032 µg/l Methylene chloride 46 µg/l Parathion 0.013 µg/l Phenanthrene 2.1 µg/l 1,1,2,2-Tetrachloroethane 1.54 µg/l Tetrachloroethylene 3.8 µg/l 1,1,1-Trichloroethane 263µg/l 1,1,2-Trichloroethylene 25µg/l 2,4,6-Trichlorophenol 2.0µg/l Toluene 253 µg/l Toxaphene 0.0013 µg/l Vinyl Chloride 0.15 µg/l Xylene(total m, p and o)	Aldrin (total) Acute 3.0 µg/l Chlordane (total) Acute 2.4 µg/l Chronic 0.0043 µg/l Dieldrin (total) Acute 2.5 µg/l Chronic .002 µg/l Endosulfan (total) Acute .22 µg/l Chronic .06 µg/l  (continued) Endrin (total) Acute .18 µg/l Chronic .0023 µg/l Heptachlor (total) Acute .52 µg/l Chronic .004 µg/l Lindane (Hexachlorocyclohexane) Acute 2.0 µg/l Chronic .06 µg/l Toxaphene (total) Acute .73 µg/l Chronic .0002 µg/l AL	Aldicarb 0.009 mg/l Aldrin + Dieldrin 0.0007 mg/l Atrazine 0.06 mg/l Azinphos-methyl 0.02 mg/l Bendiocarb 0.04 mg/l  Benzene 0.005 mg/l Benzo (a) pyrene 0.00001 mg/l Bromoxynil 0.005 mg/l Carbaryl 0.09 mg/l Carbofuran 0.09 mg/l Carbon tetrachloride 0.005 mg/l Chlordane 0.0043 µg/l Chlorpyrifos 0.09 mg/l Cyanazine 0.01 mg/l Diazinon 0.02 mg/l Dicamba 0.12 mg/l 1,2-Dichlorobenzene 0.2 mg/l 1,4-Dichlorobenzene 0.005 mg/l DDT and metabolites 0.001 µg/l 1,2-Dichloroethane 0.005 mg/l Dichloromethane 0.05 mg/l	Not detectable in water**	All agencies for the protection of aquatic life, animal life domestic consumption and human health.

<i>Parameter</i>	<i>Minnesota Standards</i>	<i>North Dakota Standards</i>	<i>Manitoba Objectives</i>	<i>Red River Pollution Board Alert Levels</i>	<i>Origin/Rational</i>
Oil and Grease	500 µg/l HH	No visible film or sheen upon the waters.	Free from oil and grease residues which cause a visible film or sheen upon the waters or any discolouration of the surface of adjoining shorelines, or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.	No visible sheen on the surface.	All agencies based on aesthetics, taste and odor in water and fish, and bathing.

**APPENDIX C**

**WATER POLLUTION CONTROL CONTINGENCY PLAN**

**LIST OF CONTACTS**

**Notification List**  
**For D.O. Depletions, Non-toxic, Oil, and Toxic Spills**

**United States:**

Minnesota Pollution Control Agency - Detroit Lakes, MN

Will Haapala  
(218) 846-0730 office  
(218) 846-0719 fax  
1-800-422-0798 (24hr)

Molly MacGregor  
(218) 846-0494 office  
(218) 846-0719 fax  
1-800-422-0798

Minnesota Department of Natural Resources - Bemiji, MN (fisheries)

Henry Drews  
(218) 755-3959 office  
1-800-422-0798 (24hr)

North Dakota Health Department - Bismark, ND

Dennis Fewless  
(701) 328-5150 office  
(701) 328-5200 fax  
1-800-472-2121 (24hr in-state - ask for REACT Officer)  
(701) 328-9921 (24hr out-of-state - ask for REACT Officer)

Environmental Protection Agency - Denver, CO

Max Dodson  
(303) 312-6598 office  
(303) 312-6897 fax  
1-800-424-8802 (24hr National Response Center)

John Giedt  
(303) 312-6550 office  
(303) 312-6897 fax  
1-800-8802 (24hr National Response Center)

**Canada:**

Manitoba Water Stewardship - Winnipeg, MB

Dwight Williamson  
(204) 945-7030 office  
(204) 948-2357 fax  
(204) 256-3706 res.  
(204) 944-4888 (24hr telephone service emergency number)

Environment Canada - Regina, SK

David Donald  
(306) 780-6723 office  
(306) 780-6810 fax  
(306) 586-1468 res.

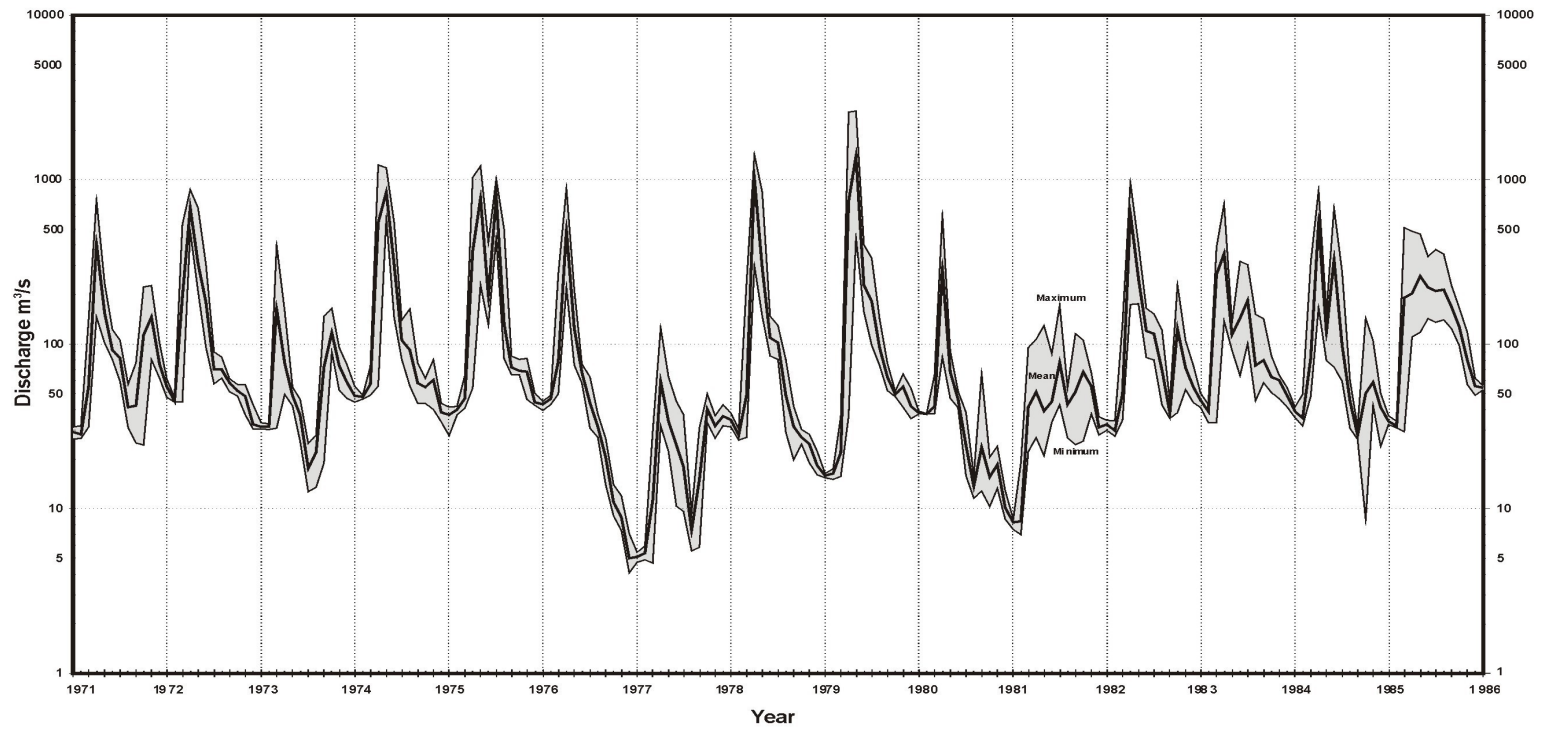
Environment Canada - Winnipeg, MB

Michael Kowalchuk  
(204) 983-5500 office  
(204) 983-5248 fax  
(204) 256-7784 res.

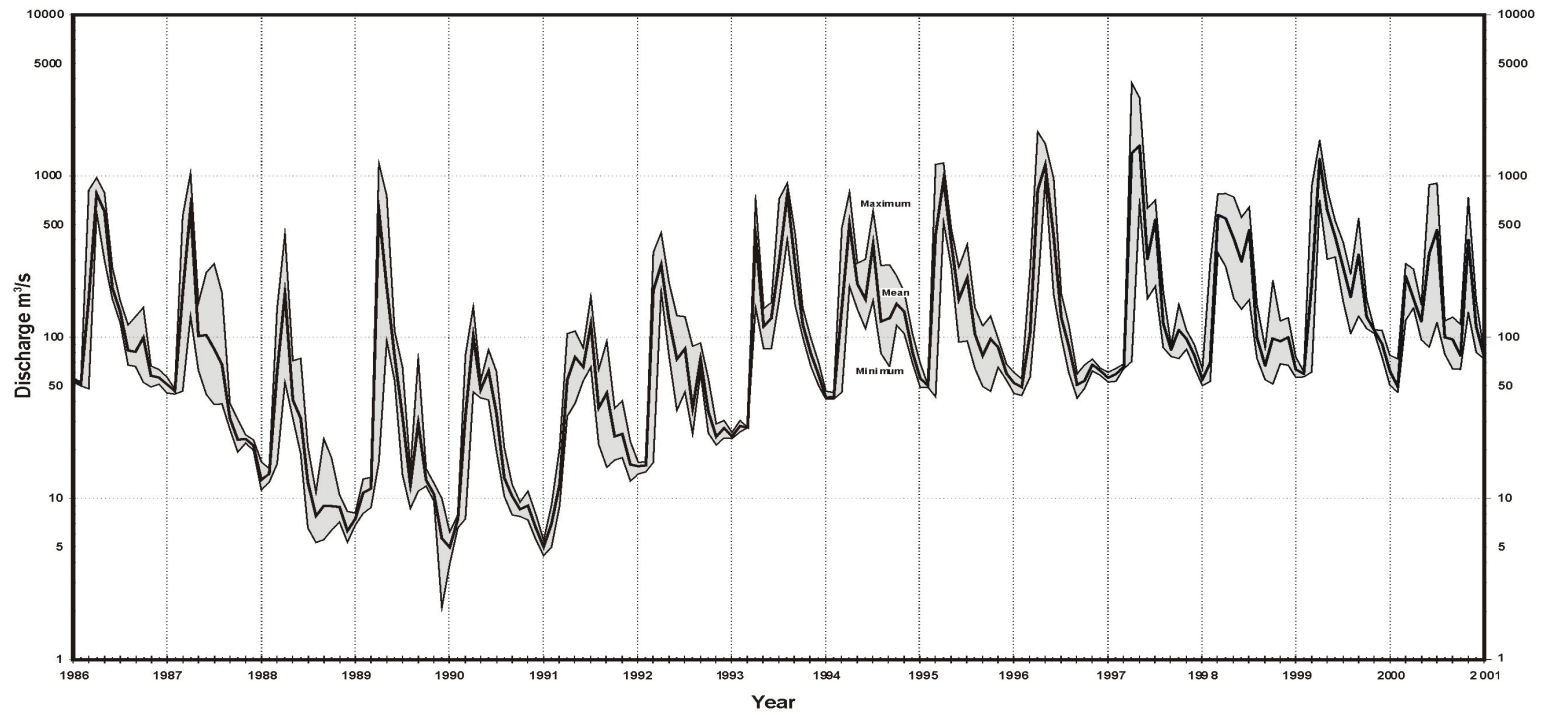
## **APPENDIX D**

### **HISTORICAL STREAMFLOW AND WATER QUALITY CHARACTERISTICS**

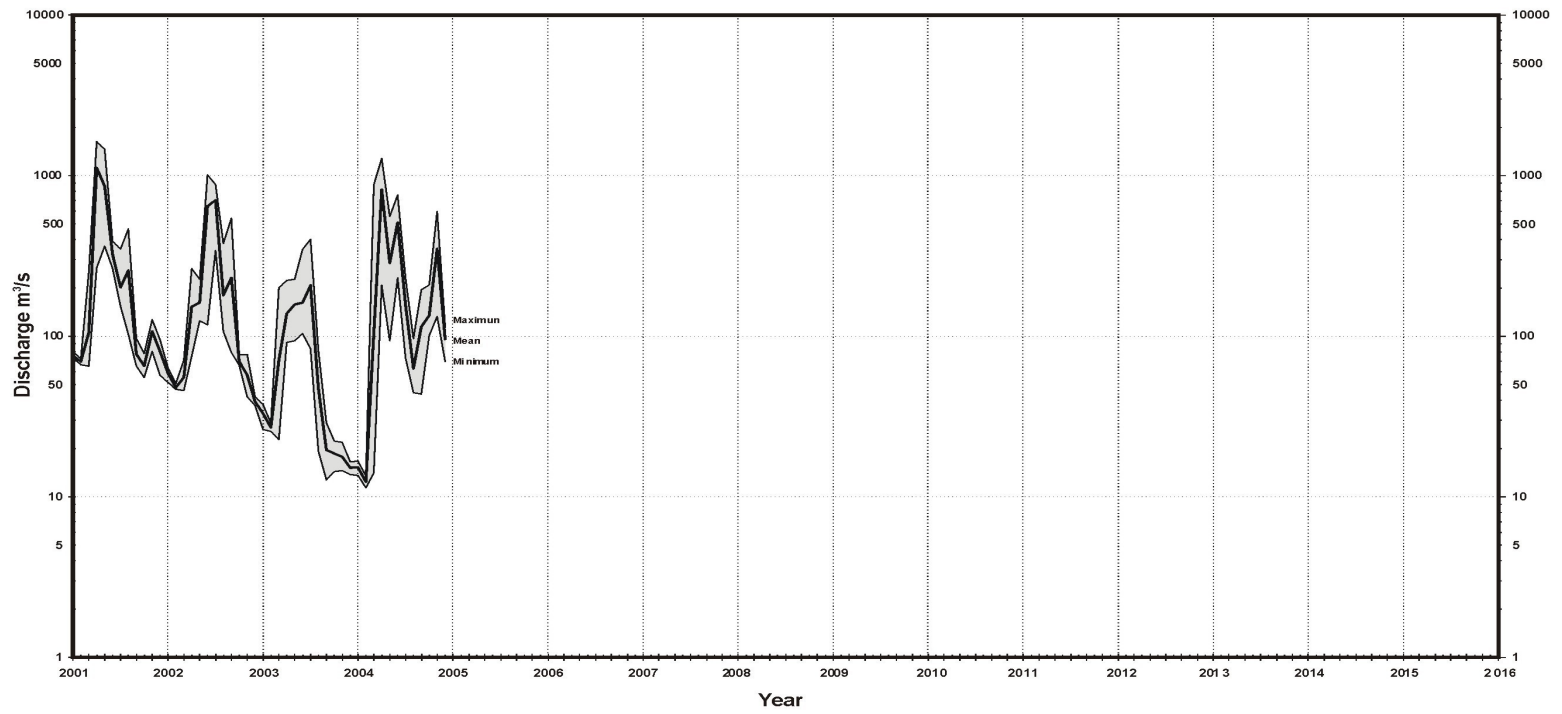




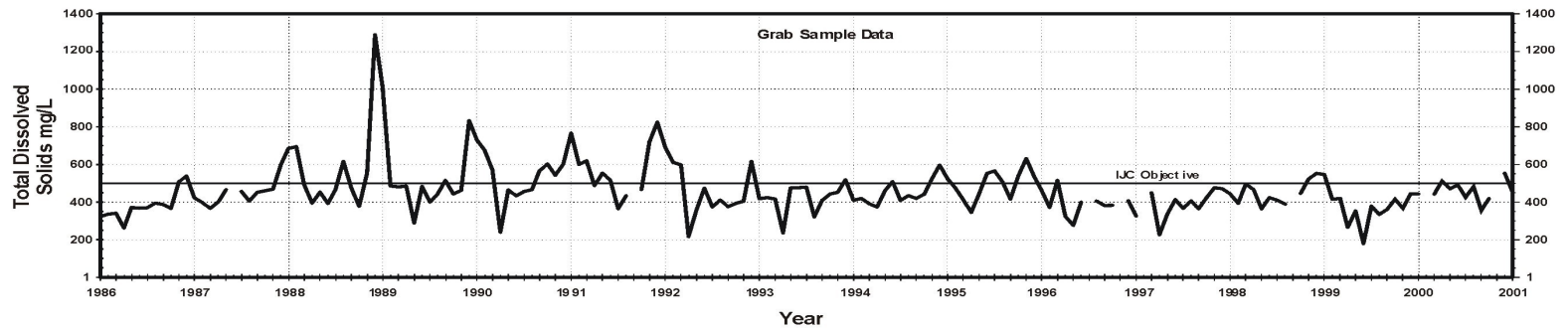
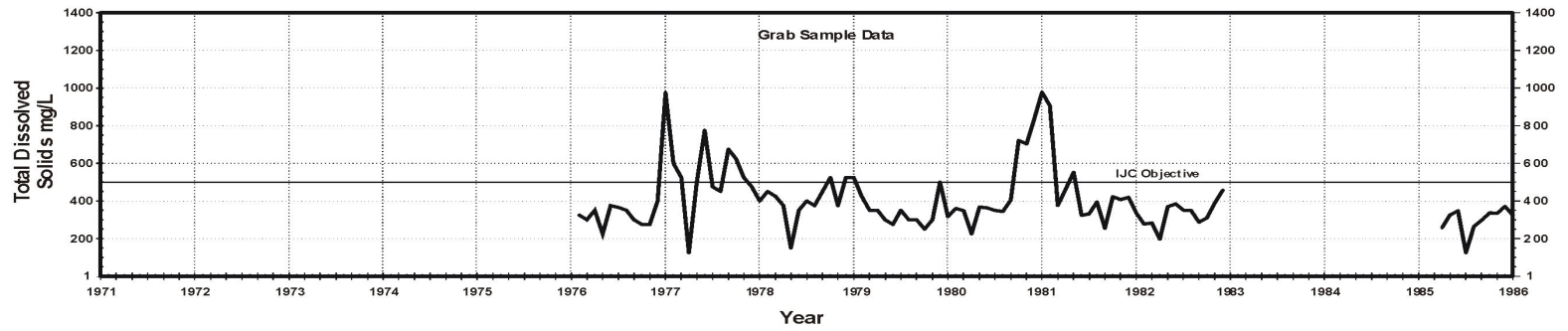
**Figure 2a**  
**Variability in mean monthly Discharge (m<sup>3</sup>/s), 1971-1986**  
**Red River near the International Boundary**



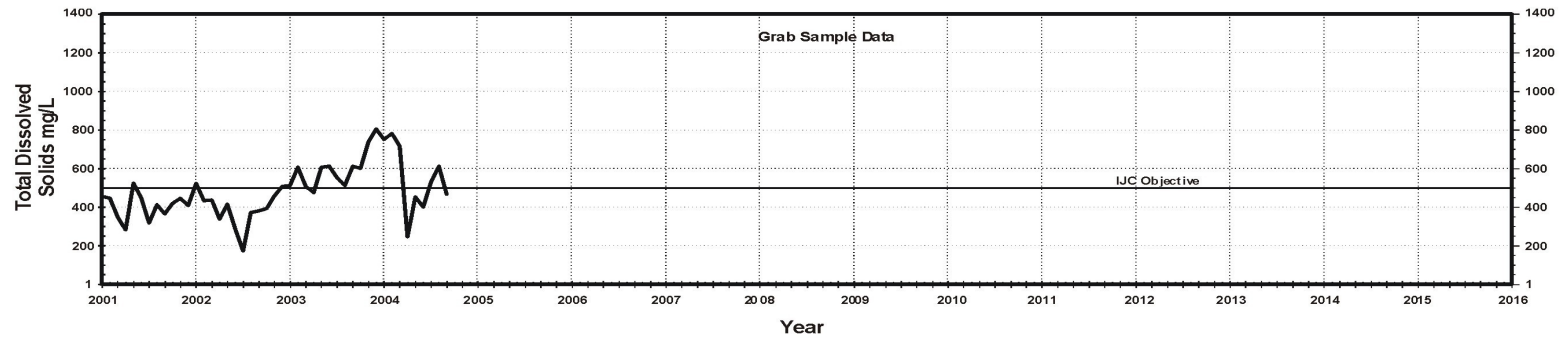
**Figure 2a**  
**Variability in mean monthly Discharge (m<sup>3</sup>/s), 1986-2001**  
**Red River near the International Boundary**



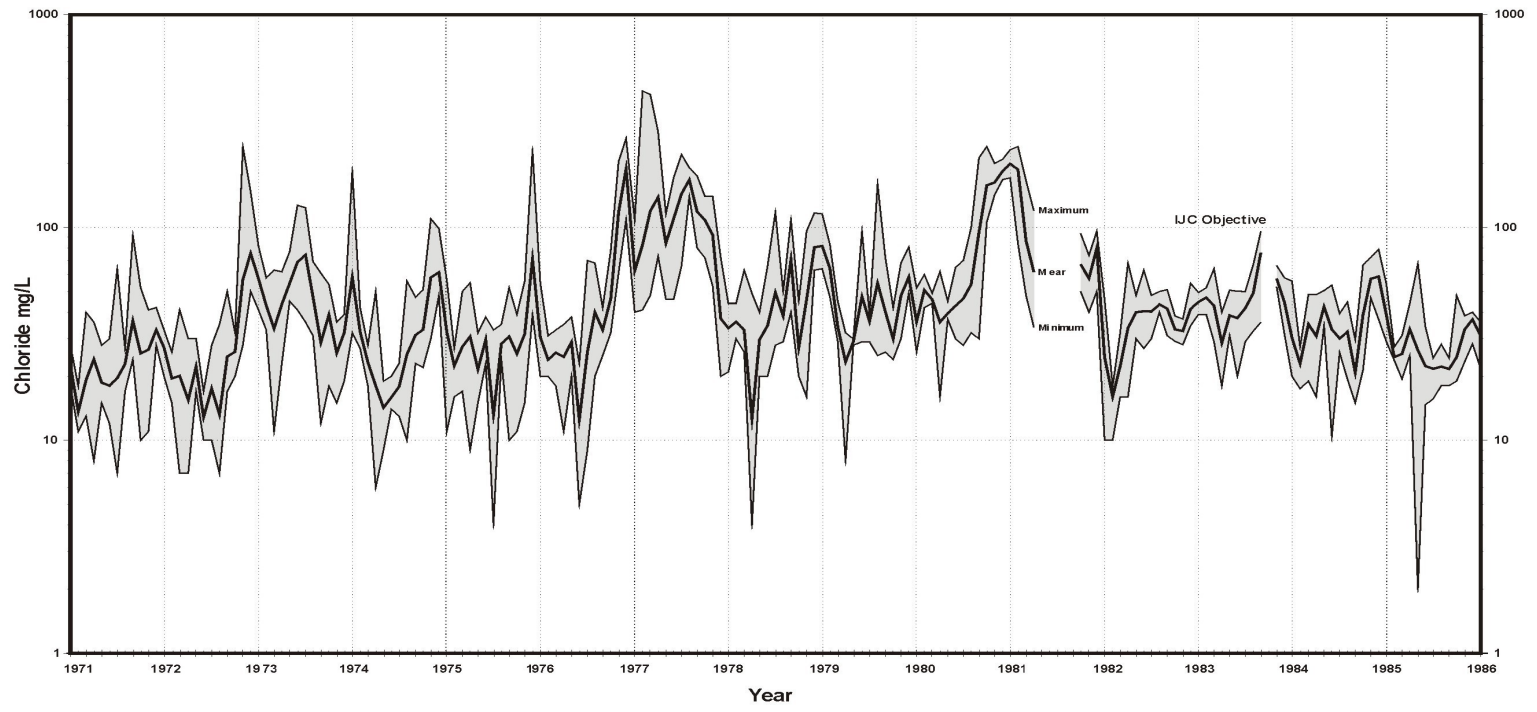
**Figure 2a**  
**Variability in mean monthly Discharge (m<sup>3</sup>/s), 2001-2016**  
**Red River near the International Boundary**



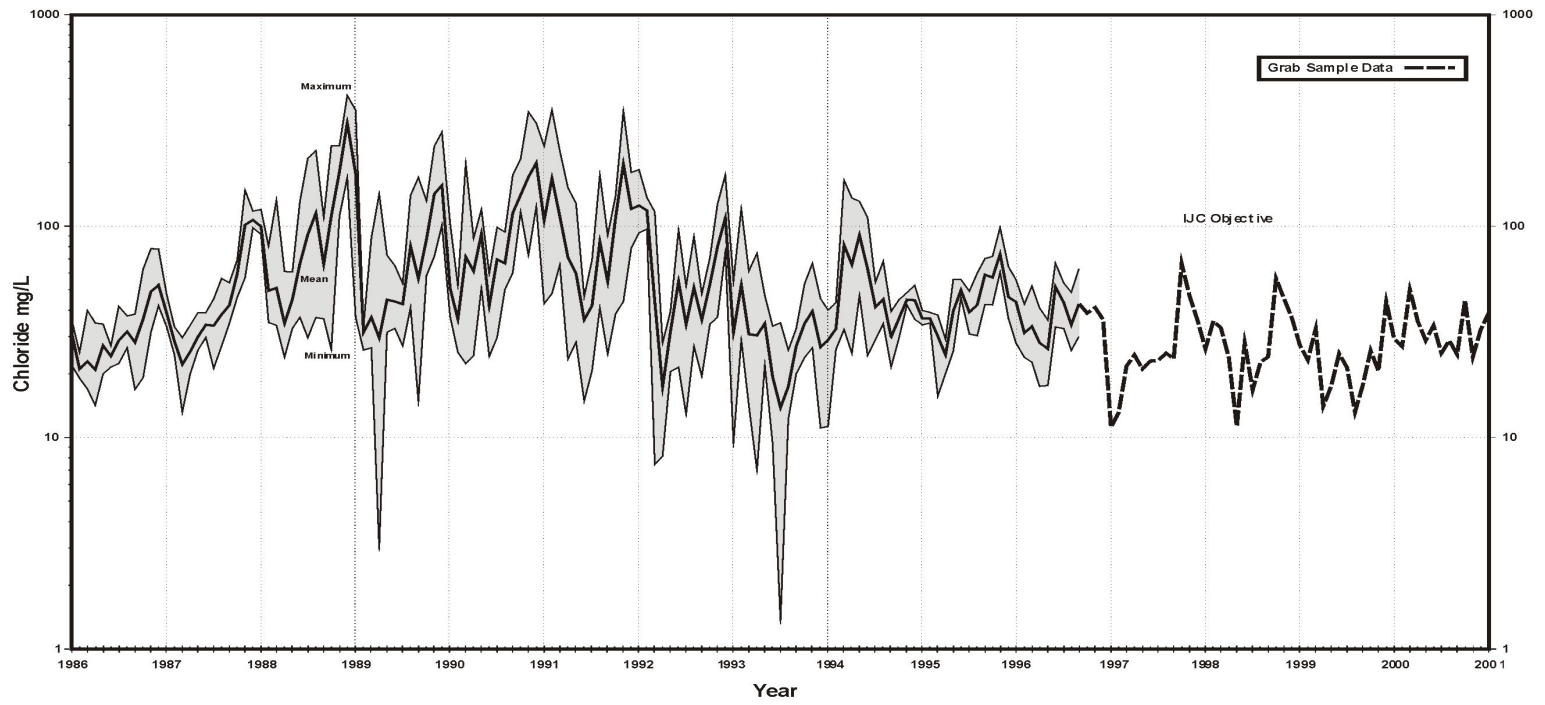
**Figure 3a**  
**Mean monthly Total Dissolved Solid (mg/L), 1971-2001**  
**Red River near the International Boundary**



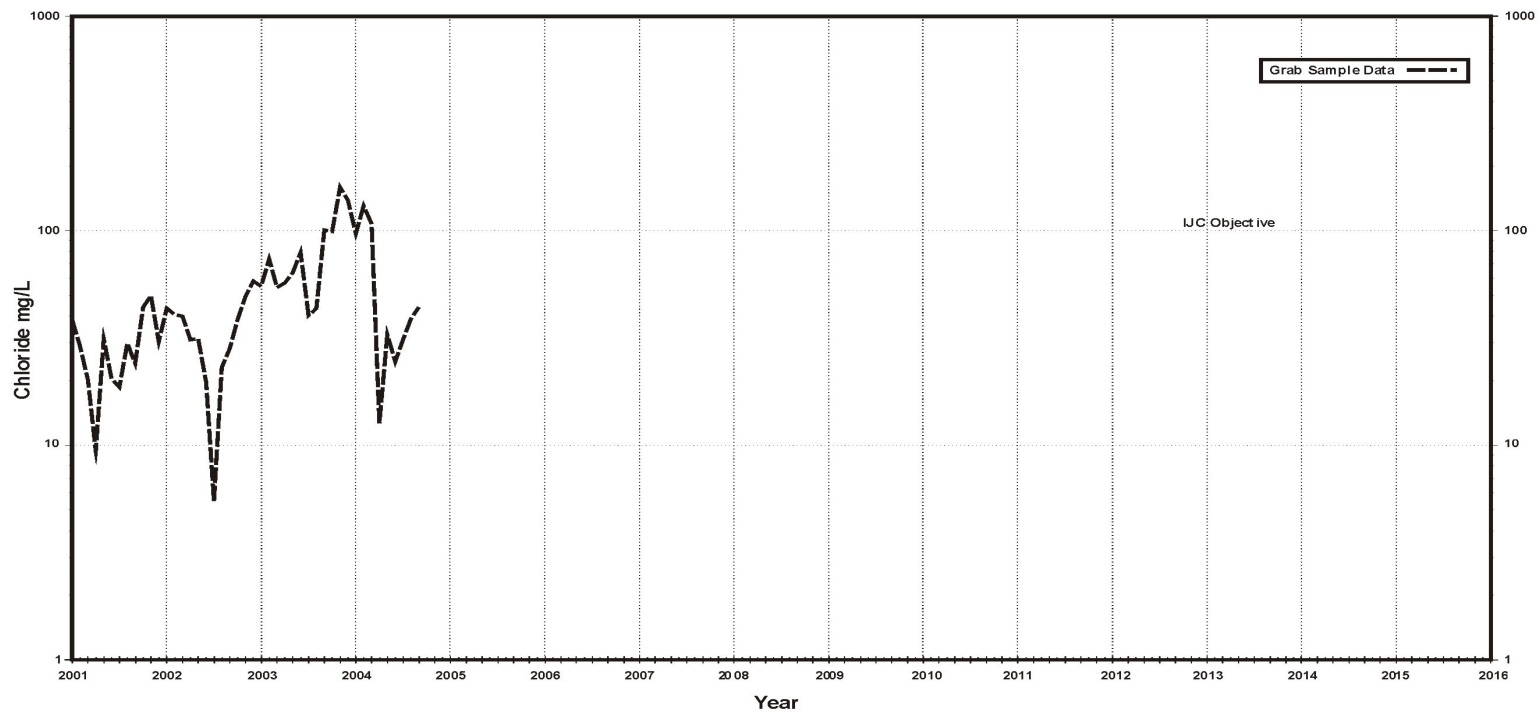
**Figure 3b**  
**Mean monthly Total Dissolved Solid (mg/L), 2001-2016**  
**Red River near the International Boundary**



**Figure 4a**  
**Variability in monthly Chloride Levels (mg/L), 1971-1986**  
**Red River near the International Boundary**

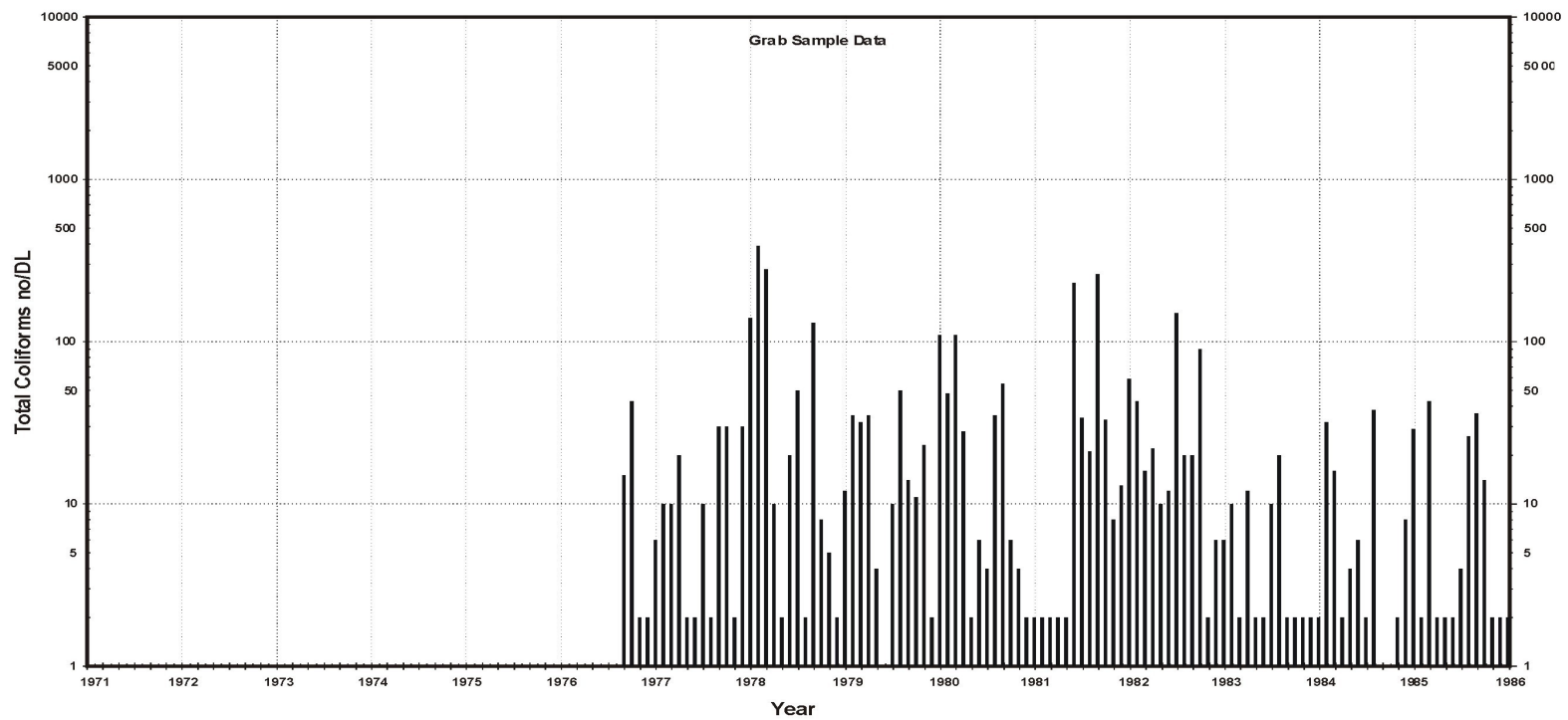


**Figure 4b**  
**Variability in monthly Chloride Levels (mg/L), 1986-2001**  
**Red River near the International Boundary**

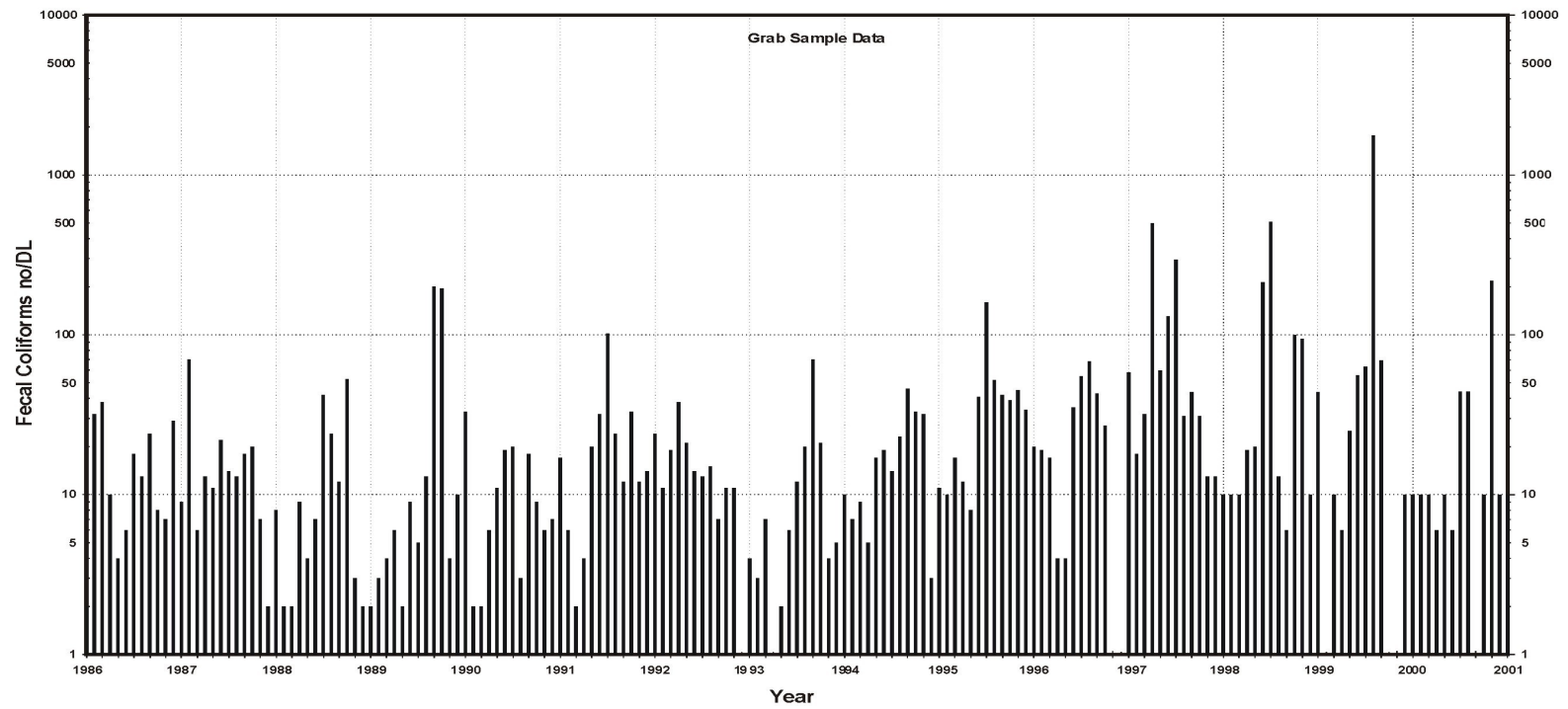


**Figure 4c**  
**Variability in monthly Chloride Levels (mg/L), 2001-2016**  
**Red River near the International Boundary**



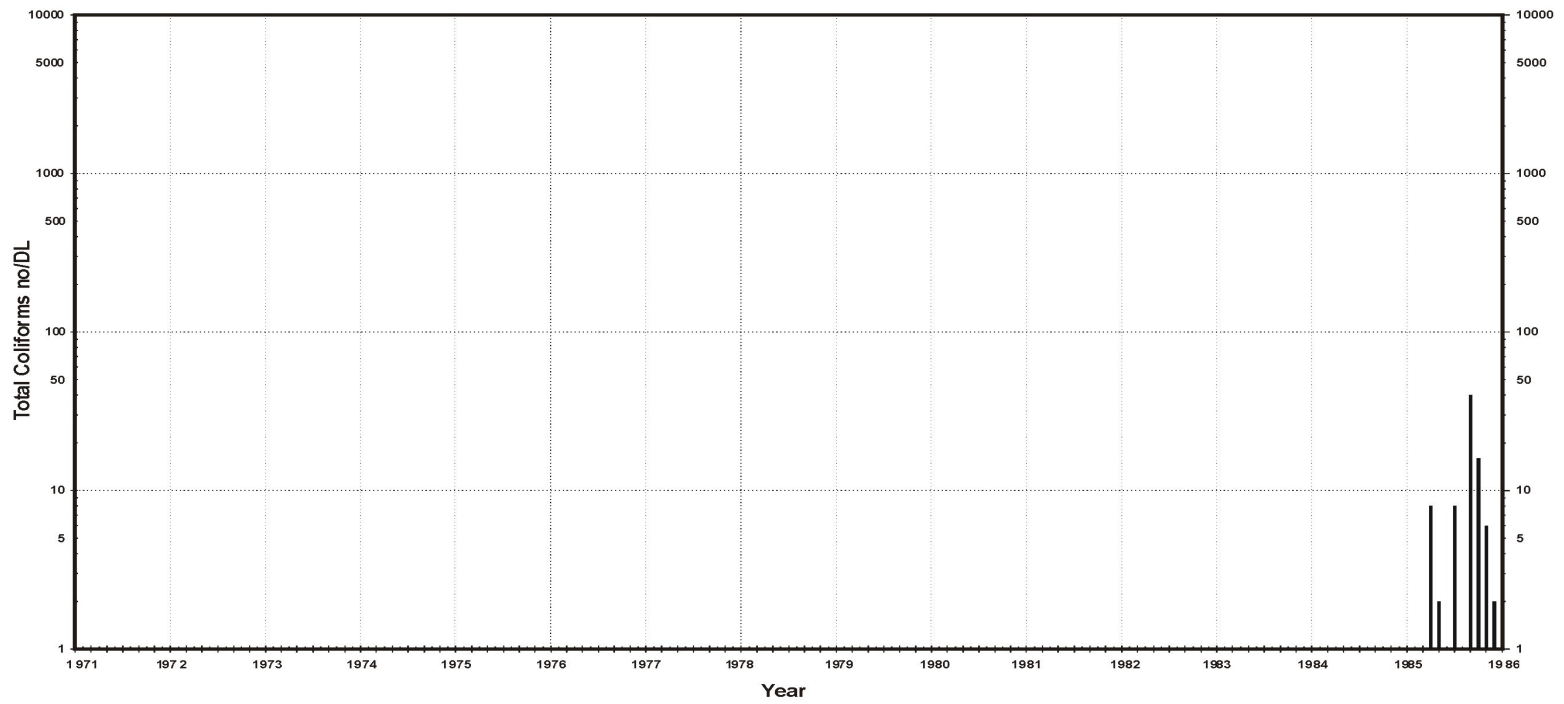


**Figure 5a**  
**Variability in Fecal Coliforms (no/DL), 1971-1986**  
**Red River near the International Boundary**

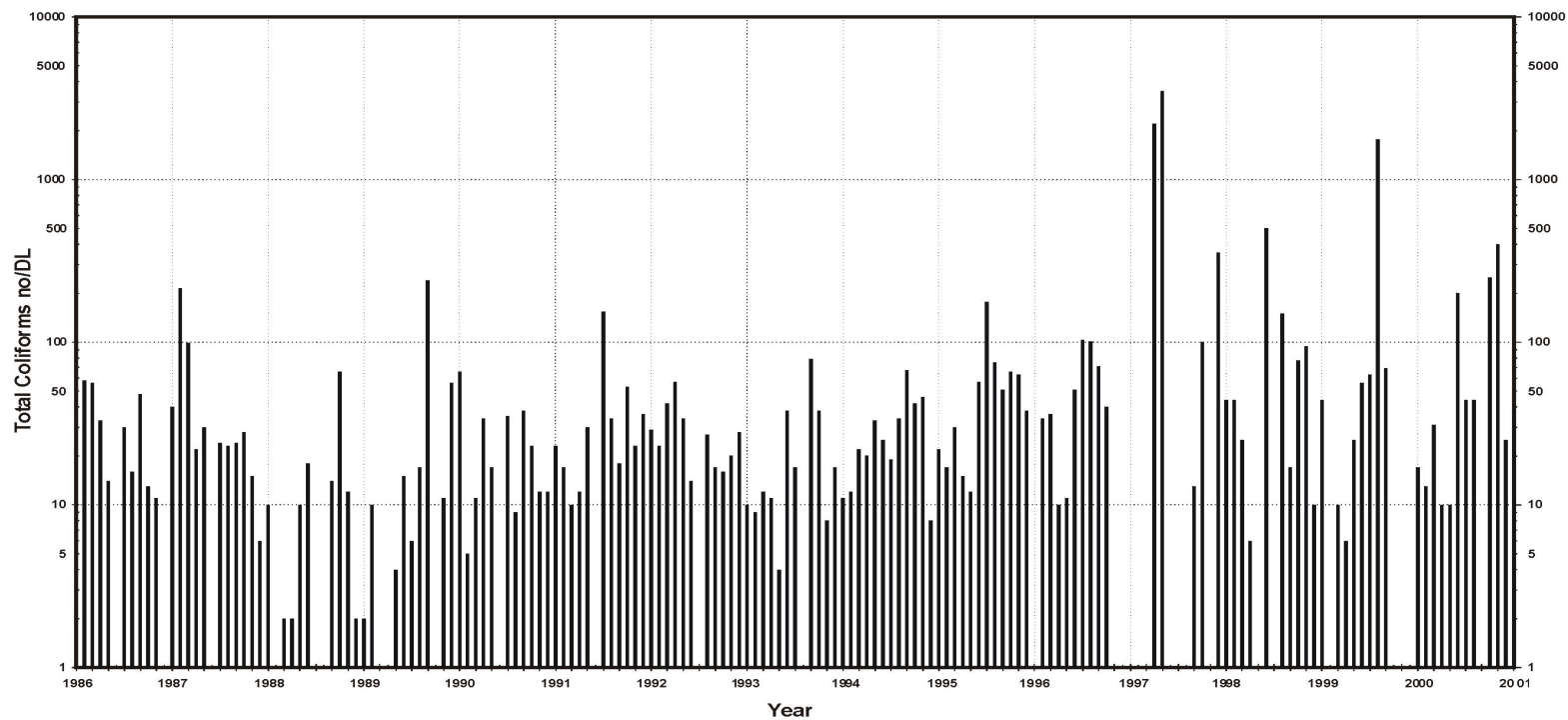


**Figure 5b**  
**Variability in Fecal Coliforms (no/DL), 1986-2001**  
**Red River near the International Boundary**

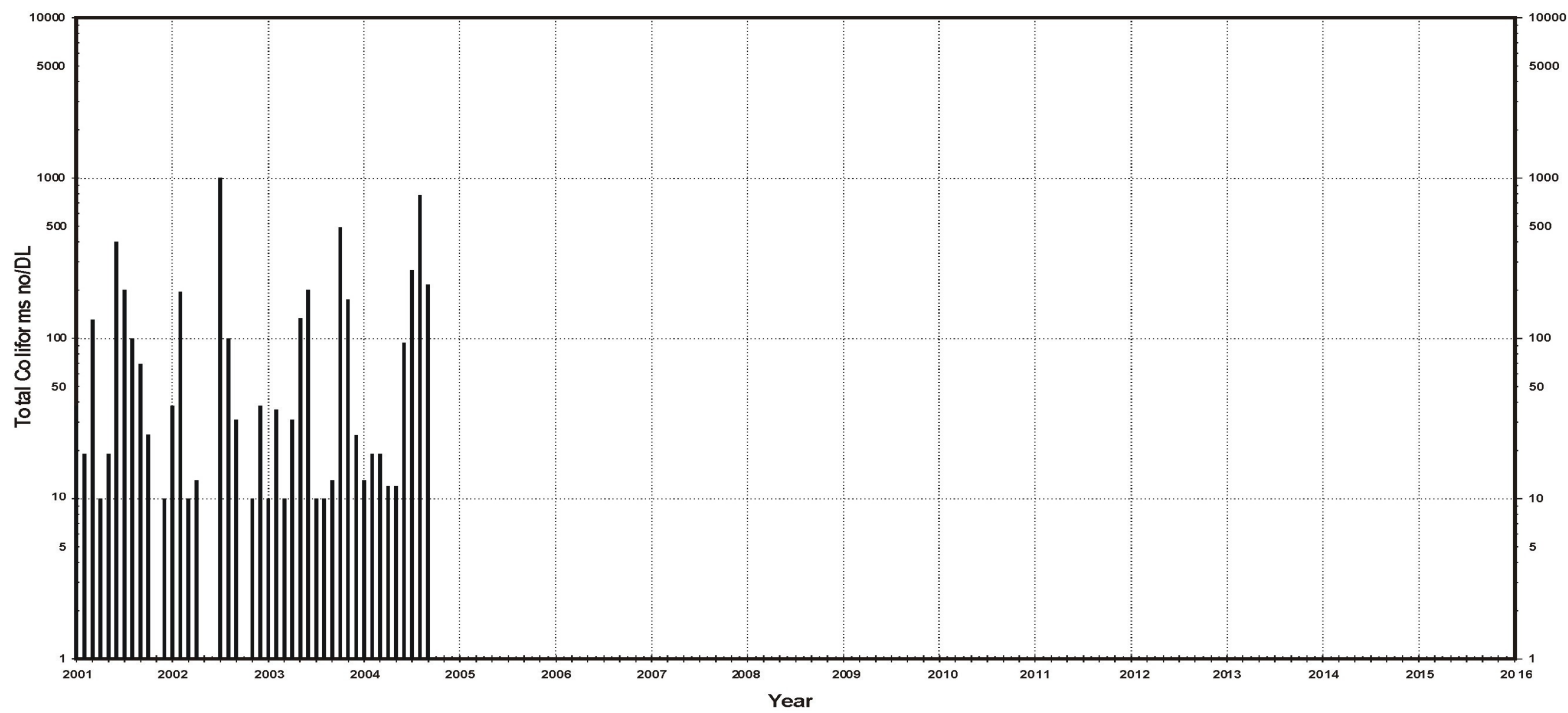




**Figure 6a**  
**Variability in Total Coliforms (no/DL), 1971-1986**  
**Red River near the International Boundary**



**Figure 6b**  
**Variability in Total Coliforms (no/DL), 1986-2001**  
**Red River near the International Boundary**



**Figure 6c**  
Variability in Total Coliforms (no/DL), 2001-2016  
Red River near the International Boundary

**APPENDIX E**

**HYDROLOGY COMMITTEE & AQUATIC ECOSYSTEM COMMITTEE  
MEMBERSHIP LIST**

**International Red River Board  
Hydrology Committee**

*Membership:*

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