Manitoba Water Quality Standards, Objectives, and Guidelines 2002

Dwight Williamson, Manager
Water Quality Management Section
Manitoba Conservation

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Outline

- Brief history
- Review process
- Overview of proposed revisions
- Introduce concepts likely to be discussed during these hearings
- Ammonia objectives
- Overview of water quality in Red River in relation to MWQSOG 2002
- Concluding comments

History of Program

- 1976 - 1979
- 1980 - 1982
- 1983 - 1988
- 1988 - 1990
- 1990 - 1991
- 2000 - 2003

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Review Process

- **Information and initial comments**
  - ➤ **April 20, 2000 - September 29, 2000**
- **Detailed technical review**
  - ➤ **February 1, 2001 - October 31, 2001**
- **Final draft review**
  - ➤ **November 22, 2002 - March 31, 2003**

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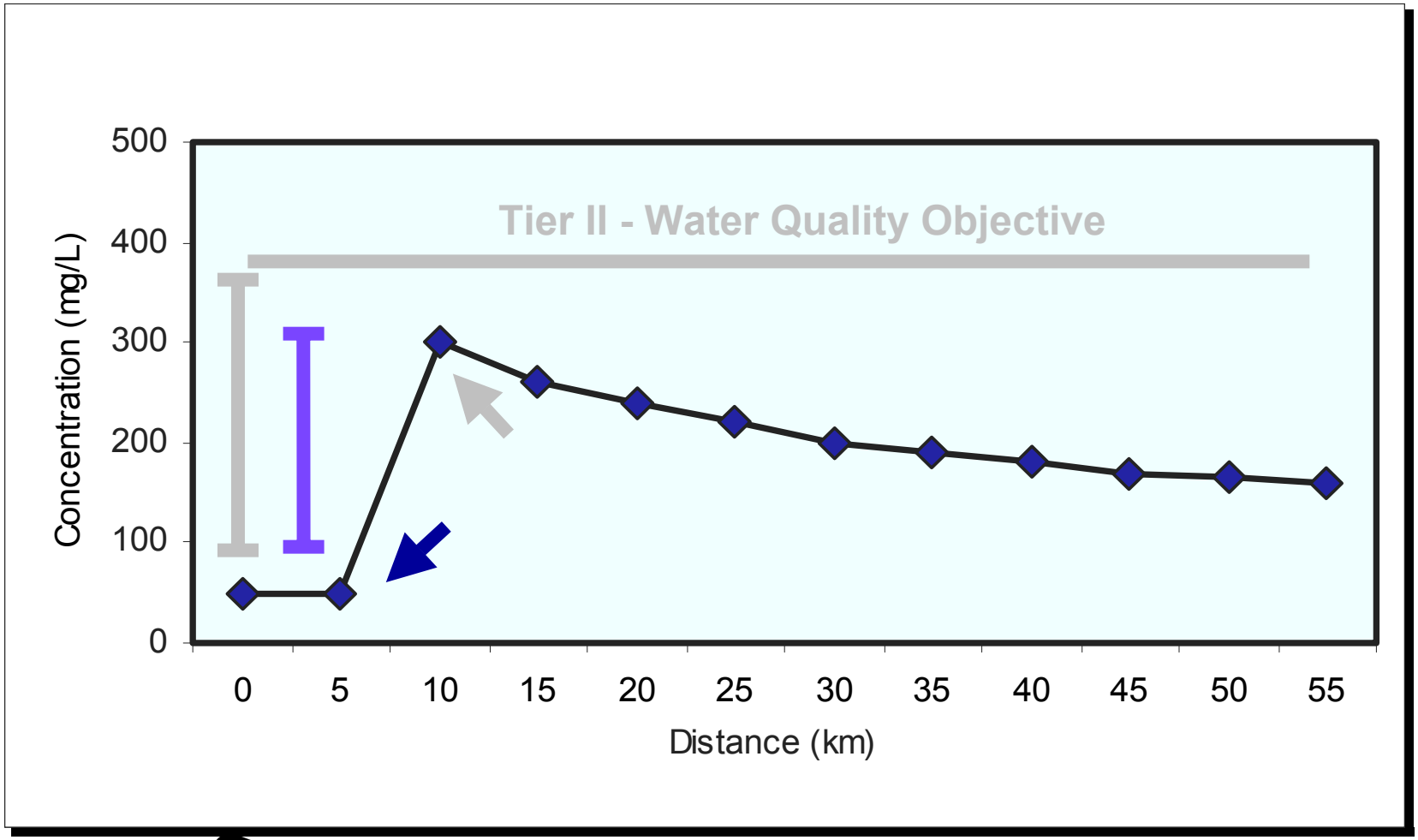
Water Quality Protection

- **Technology-Based Approach**
  - Consistent for each major water discharge sector
  - Best Practicable or Best Available Technology
- **Water Quality-Based Approach**
  - Considers unique water uses, stream flow, and water quality at each site
  - Ensures that activities do not cause exceedances of water quality objectives
  - Includes concept of assimilative capacity

Assimilative Capacity and Wasteload Allocation



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Principal Changes

- Three-tiered approach
- Surface water and groundwater quality
- Ecosystem health - biological communities
- Sediment and tissue residue guidelines

Tier I: Water Quality Standards

- **Technology-based standards**
  - ➤ **Municipal wastewater effluents**
    - – **Fecal coliform densities (200 organisms/100 mL)**
    - – **Biochemical Oxygen Demand (30 mg/L)**
    - – **Total Suspended Solids (30 mg/L)**
- **Key existing legislation is referenced, including ground water**
- **Not intended to be modified**

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Tier II: Water Quality Objectives

- Short list of variables (<20)
- Chronic and acute
- Common pollutants in Manitoba
- Good confidence for Manitoba
- May be modified based upon scientifically-sound site-specific information
- Implementation
  - Mixing zones
  - Design low flows
  - Three levels of protection
  - Develop effluent discharge limitations

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Tier II (continued)

- Ammonia
- Trace metals
- Chlorine
- Cyanide
- Dissolved oxygen
- Fecal coliform and *Escherichia coli*
- Nitrate-nitrite
- Sodium adsorption ratio and major ions or salts
- Suspended sediments and turbidity
- Temperature

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Ammonia

- Included as a Tier II Water Quality Objective
- 1988 MSWQO modified from US EPA Criteria published in 1984
- US EPA 1984 criteria superceded by new criteria published in 1999
- MWQSOG 2002 based on US EPA 1999

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Ammonia (continued)

- 12 separate objectives
  - ➤ 6 apply to cool water assemblages
    - – 3 apply when early life stages absent
    - – 3 apply when early life stages present
  - ➤ 6 apply to cold water assemblages
    - – 3 apply when early life stages absent
    - – 3 apply when early life stages present

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Ammonia (continued)

- Include both chronic and acute
- 30 day average (chronic)
- 4 day average (chronic)
- 1 hour average (acute)

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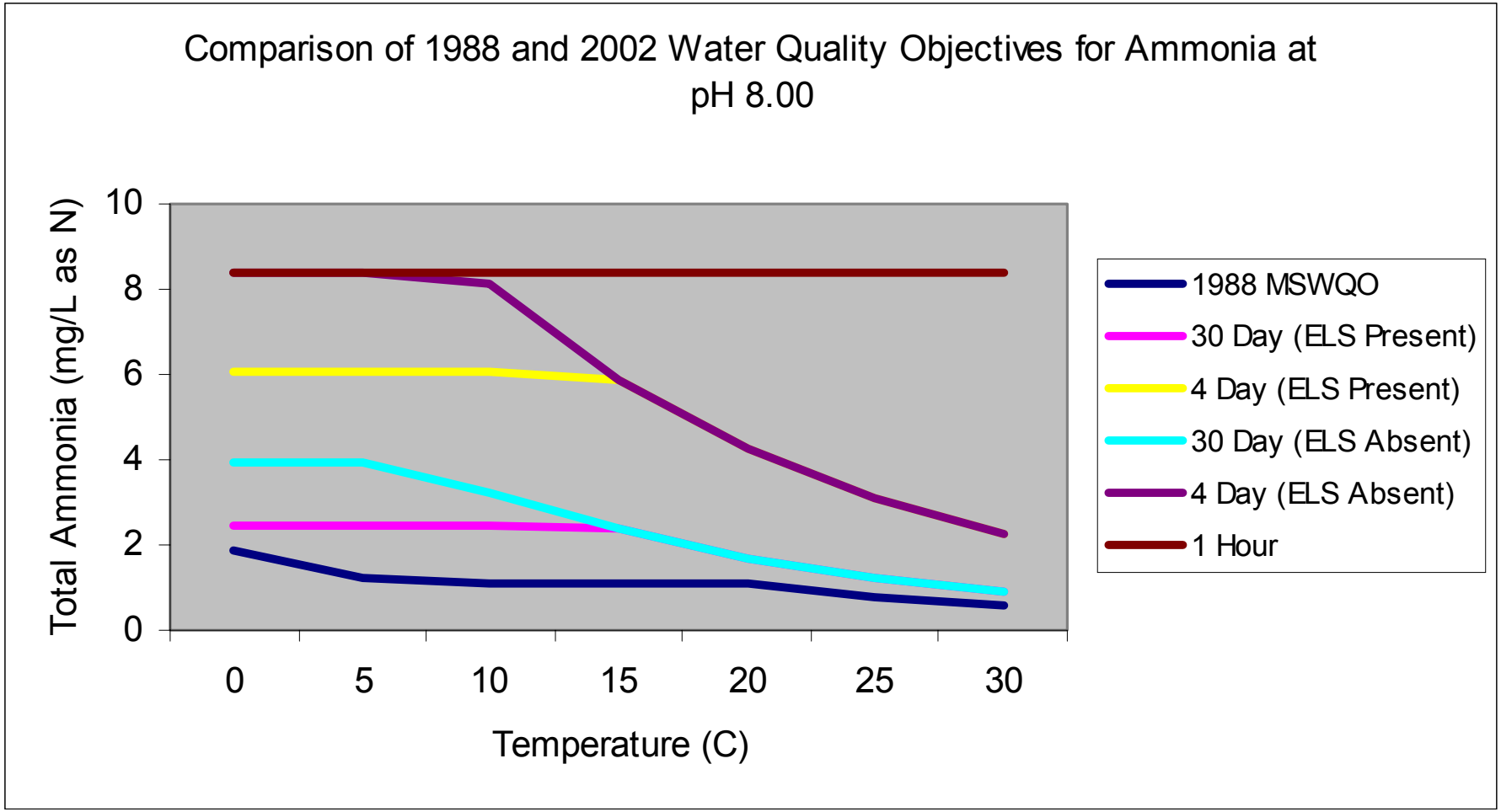
Comparison of MSWQO 1988 to MWQSOG 2002



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Implementation - Mixing Zones

- Not reasonable to require all objectives to be met at end-of-pipe
- Tier I - Water Quality Standards still apply
- A relatively small area is allowed for mixing to occur where not all objectives have to be met
- Allow a zone of passage
- Not cause acute lethality
- Others

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Implementation - Design Low Flows

- Not reasonable to require wastewater treatment systems to be designed to meet objectives all of the time especially under low stream flows
- Recognizes that healthy aquatic life communities can withstand occasional stress and can recover
- 30Q10
- 7Q10
- 1Q10

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Design Low Flows (continued)

- Statistical technique to identify the probability of a low flow event based upon historical hydrological record
- Longest period of representative historical flow record must be used to confidently predict most likely probability of future low flow event
  - ➤ fundamental statistical principle

Design Low Flows (continued)

- Similar principle used by Manitoba for predicting the probability of other hydrological events
  - ➤ low flows to allocate water for withdrawal
  - ➤ high flows to protect public health and property from flood events

Tier III: Water Quality Guidelines

- General statements of desired quality
- Long list of pollutants, mainly from CCME (>100)
- Water quality
- Sediment quality
- Tissue residues

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Tier III (continued)

- Not all pollutants of concern at present in Manitoba
- May not have good confidence for Manitoba
- Implementation
  - More flexible than Objectives
  - Assist to interpreting monitoring data
  - Can be used as a basis for developing Objectives or Standards

Other Proposed Changes

- Guidance for mixing zones
- Adoption of both acute and chronic objectives
- Objectives for metals expressed as dissolved forms
- Definition of field crop irrigation expanded to include irrigation of parklands and golf courses
- Deleted irrigation category for short-term protection of medium to fine textured soils

Other Proposed Changes (continued)

- Deleted secondary recreation category
- Fecal coliform objective identified for protection of groundwater used for drinking purposes
- Guideline for ensuring biological integrity
- Guideline for maintenance of minimum in-stream flows

Other Proposed Changes (continued)

- Guideline for promoting water conservation
- Guideline related to non-indigenous species

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Issues Presently Under Review

- Inadequate, scientifically-defensible water quality objectives for nitrogen and phosphorus
  - ➤ Nutrient Management Strategy
  - ➤ Once developed, adopt nutrient objectives in the MWQSOG

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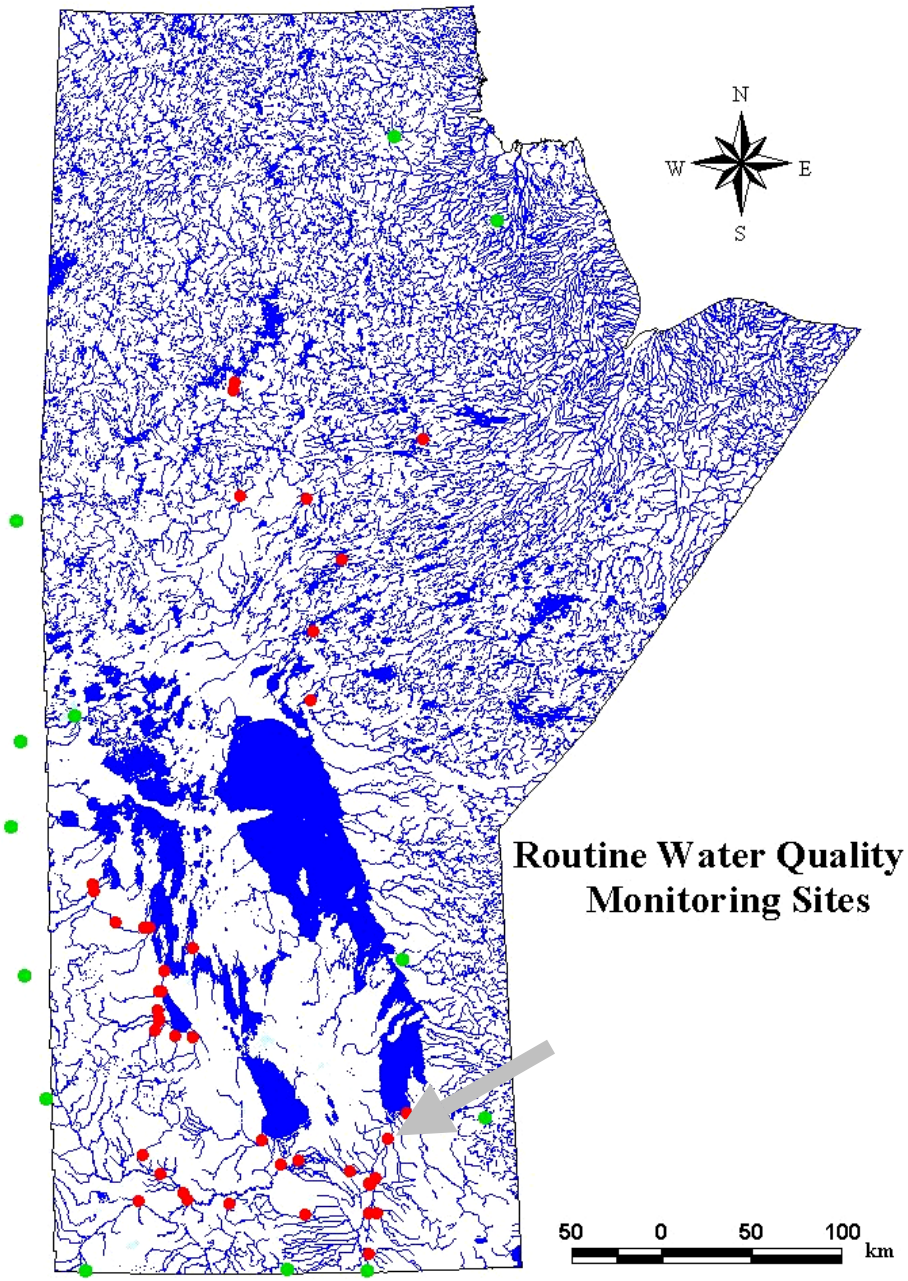
Stream Water Quality Monitoring



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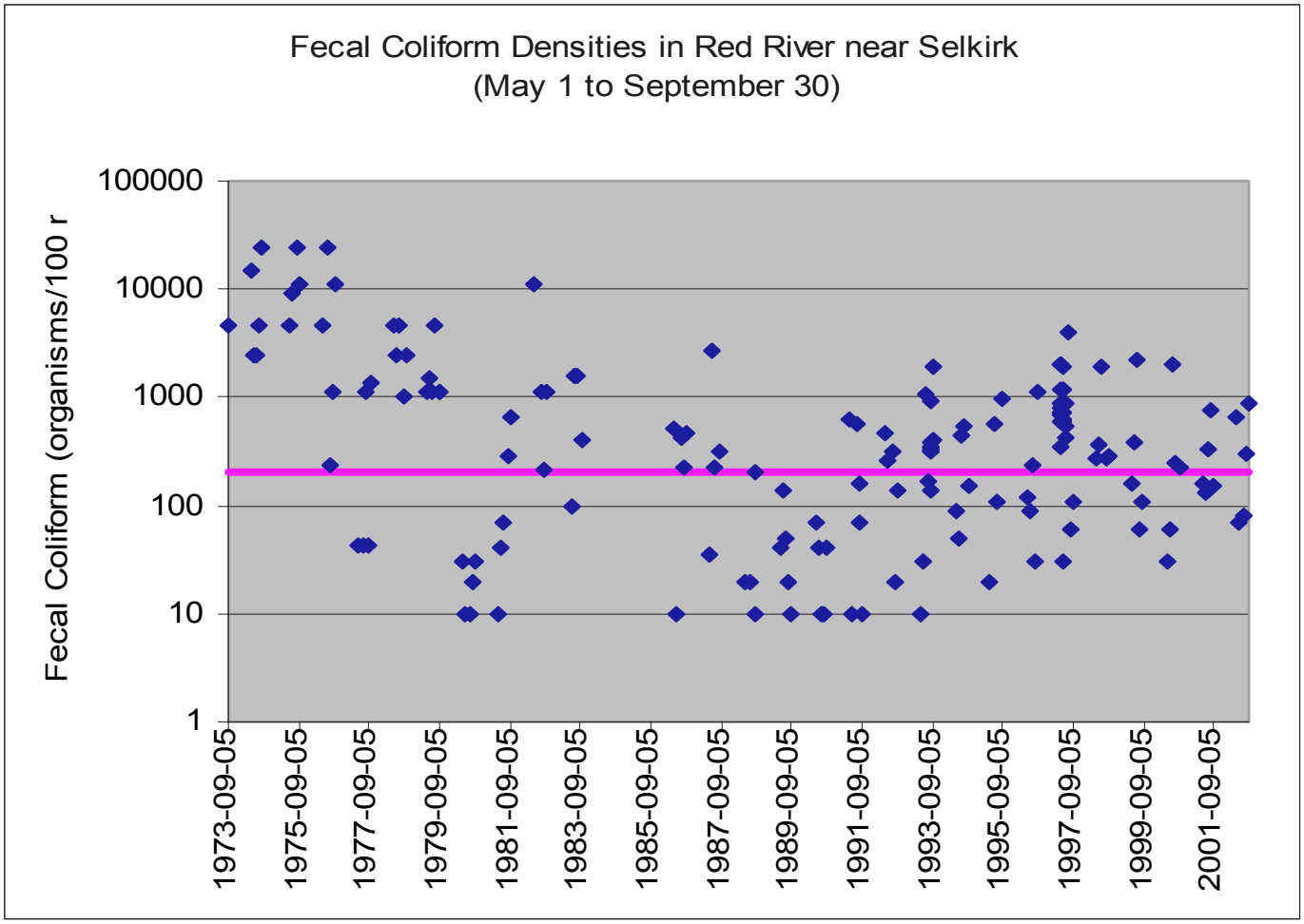
Fecal Coliform in Red River



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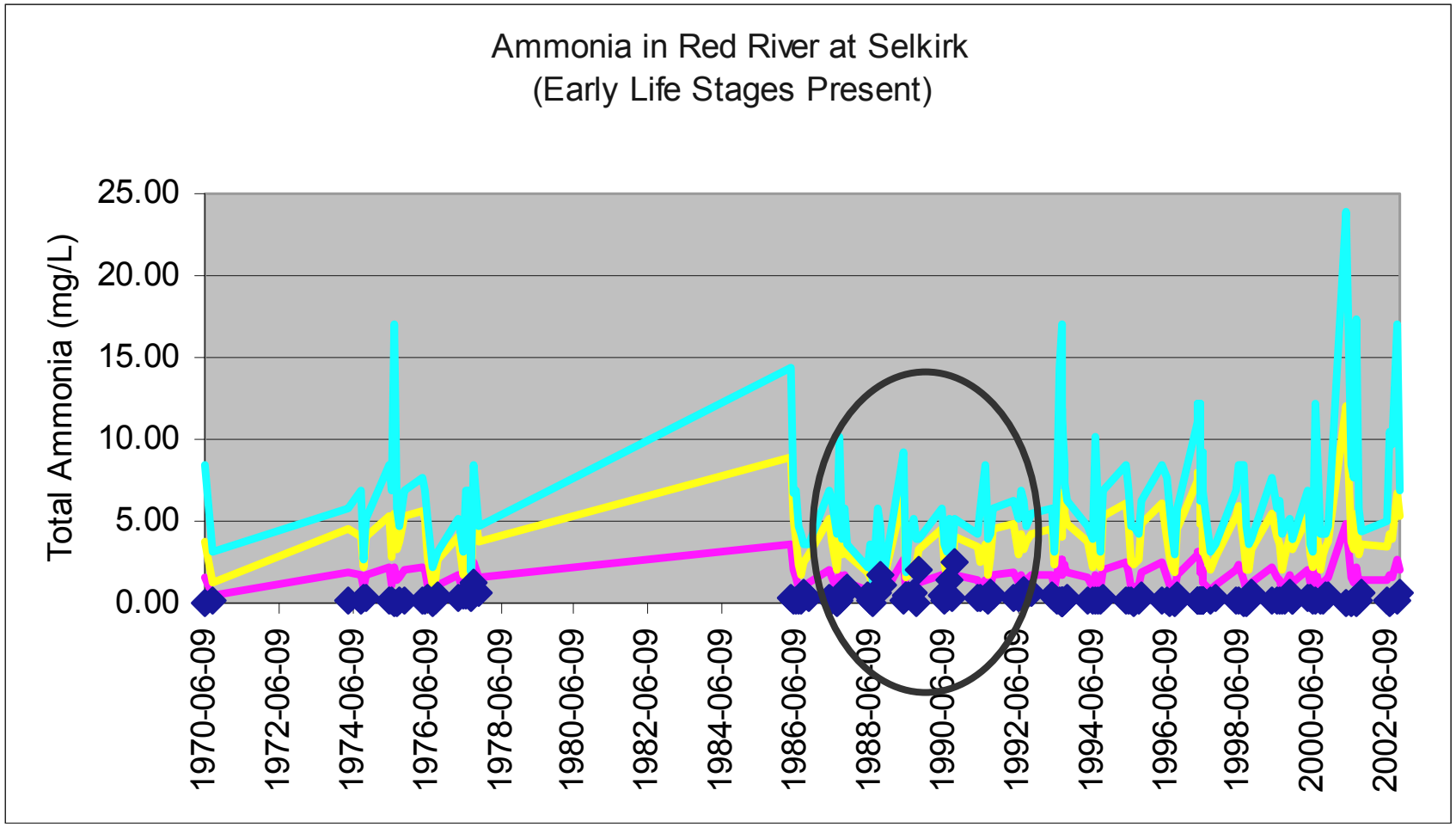
Ammonia in Red River (Early Life Stages Present)



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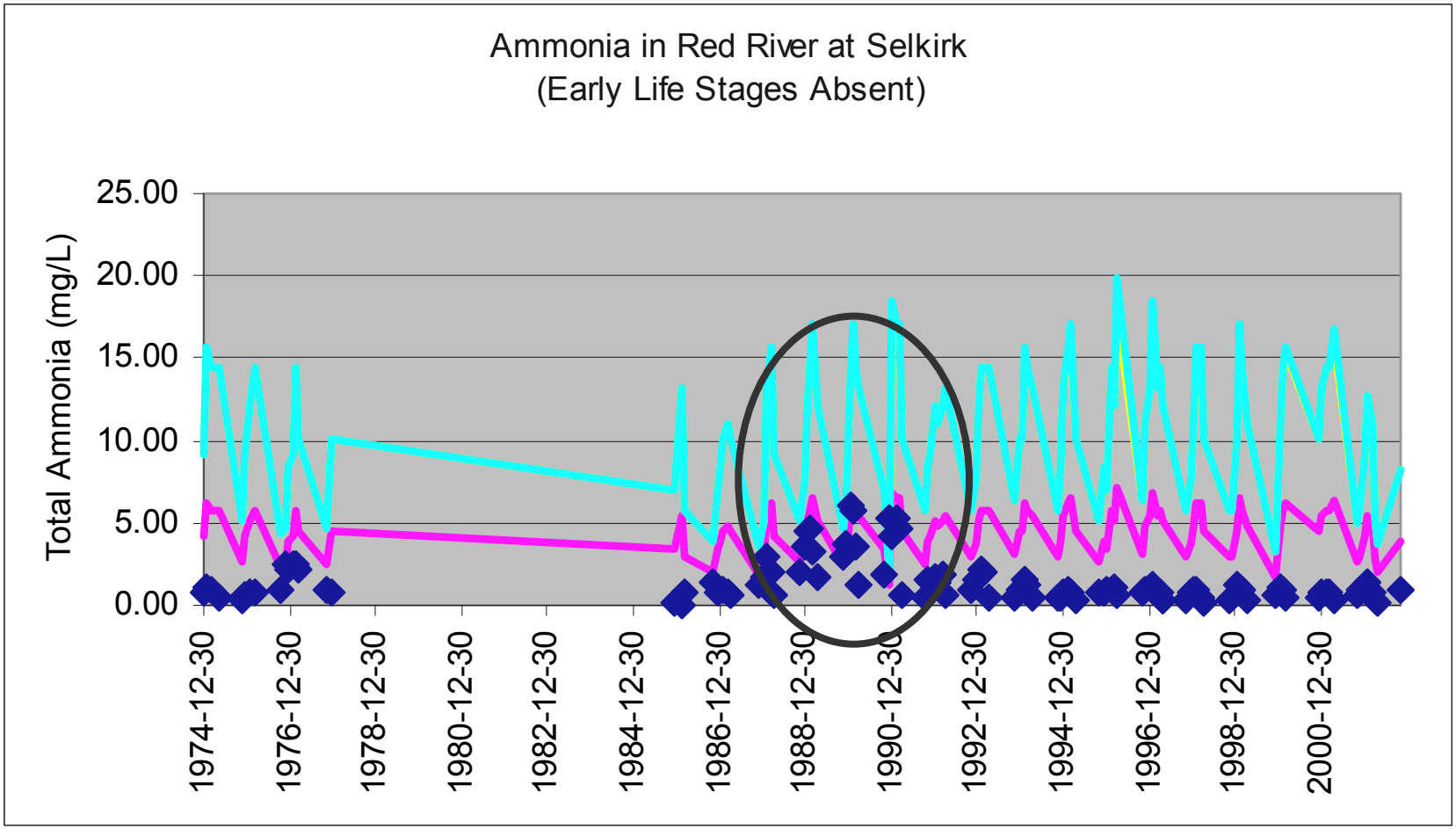
Ammonia in Red River (Early Life Stages Absent)



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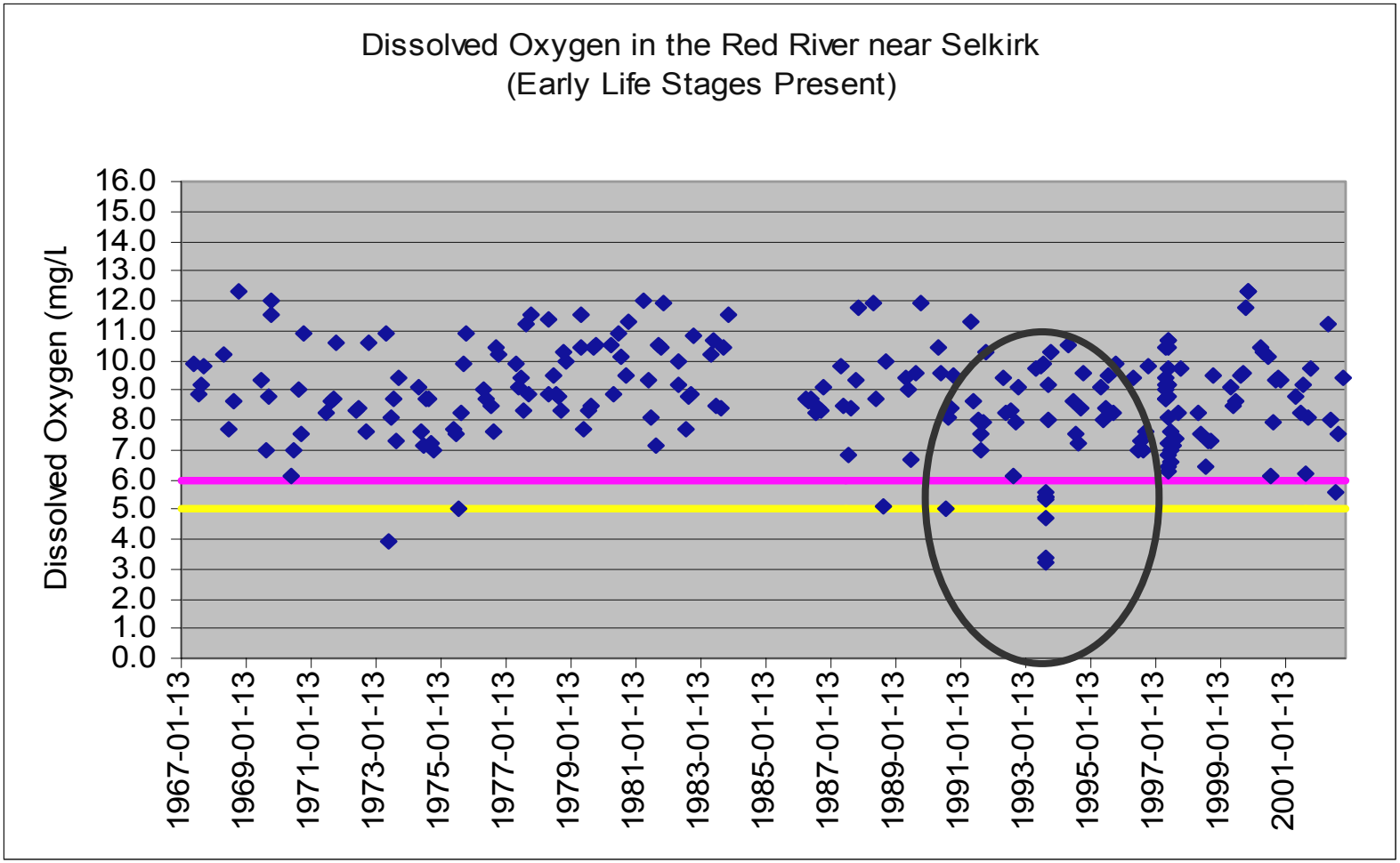
Dissolved Oxygen in Red River (Early Life Stages Present)



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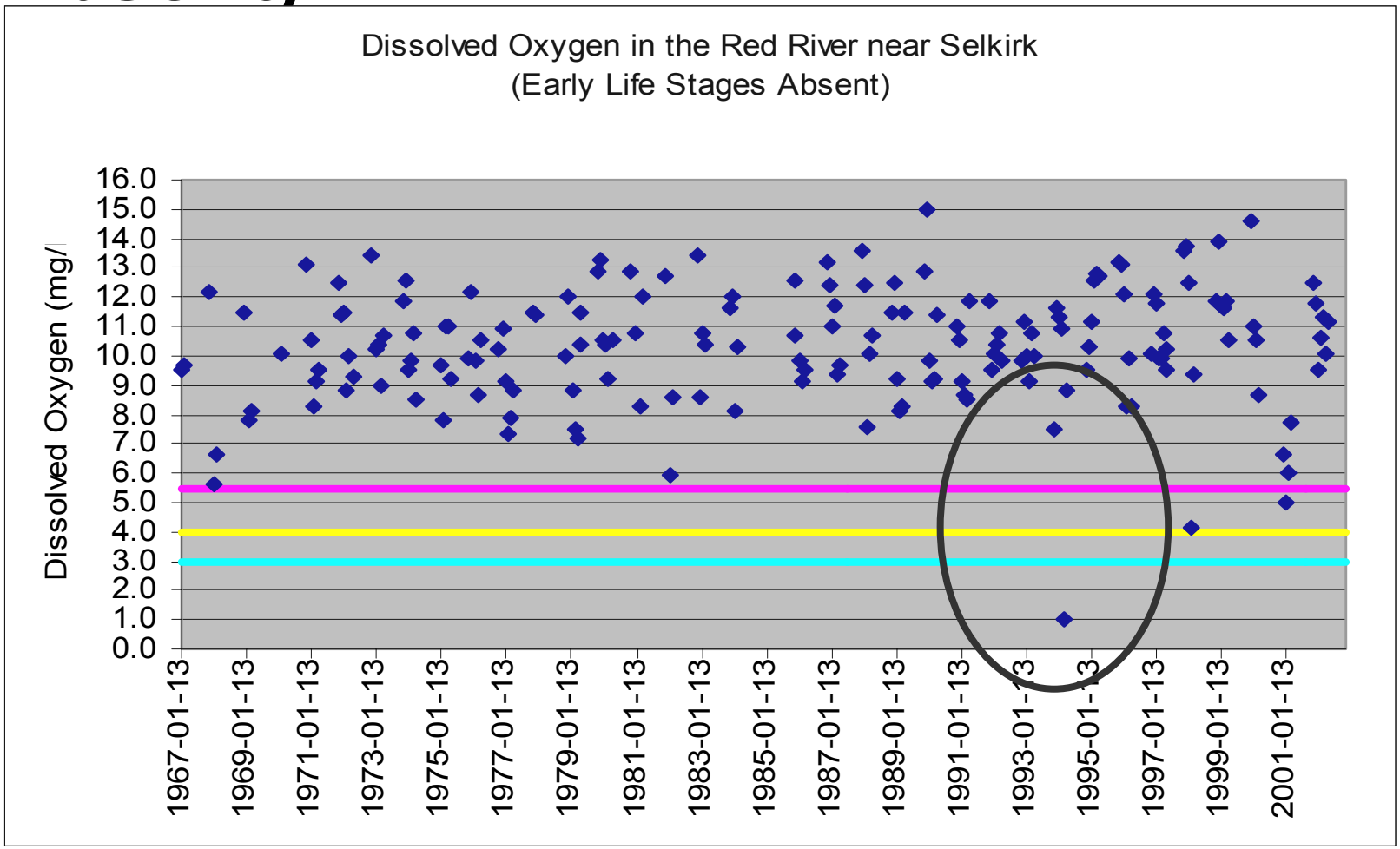
Dissolved Oxygen in Red River (Early Life Stages Absent)



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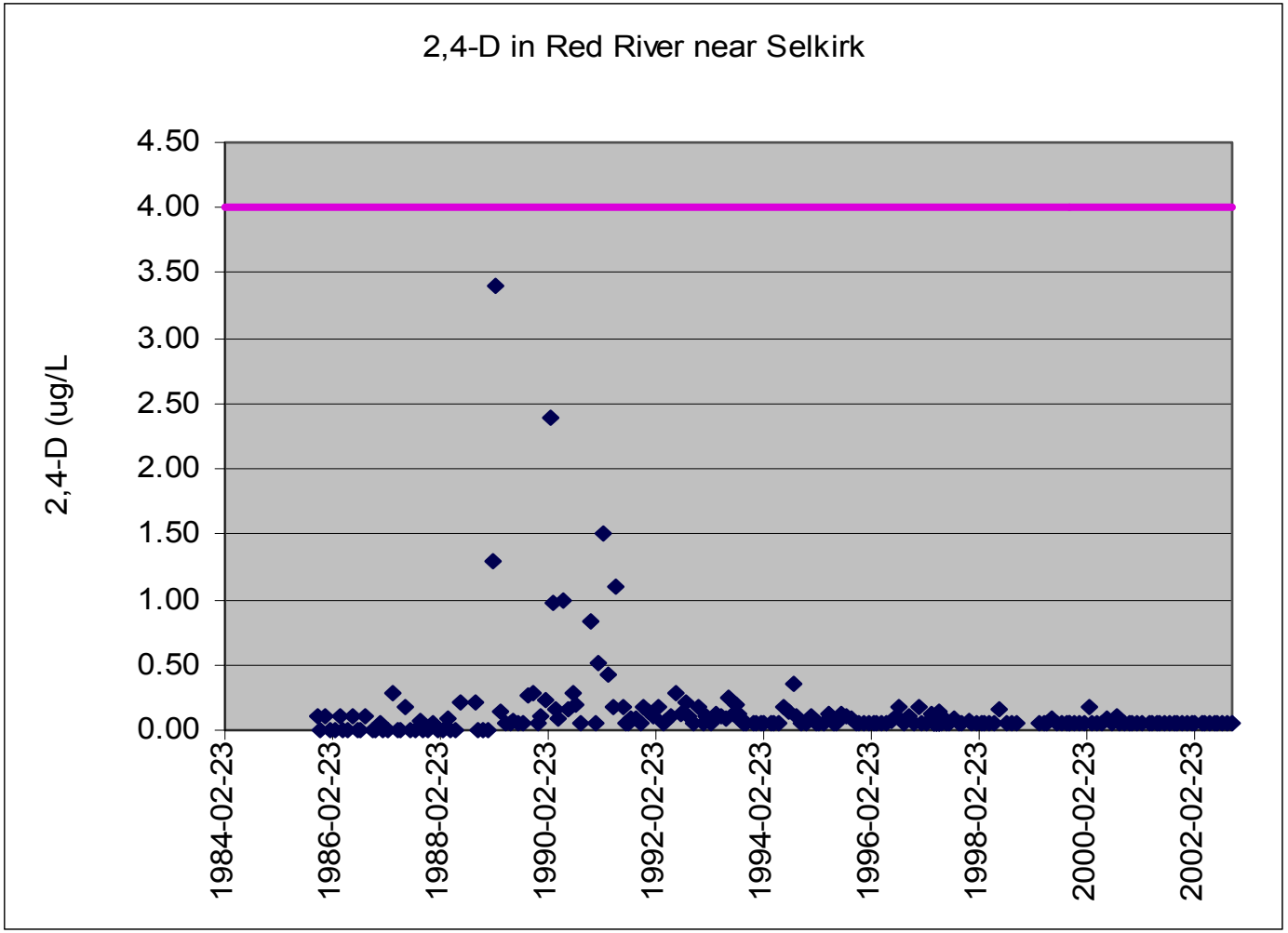
2,4-D in Red River



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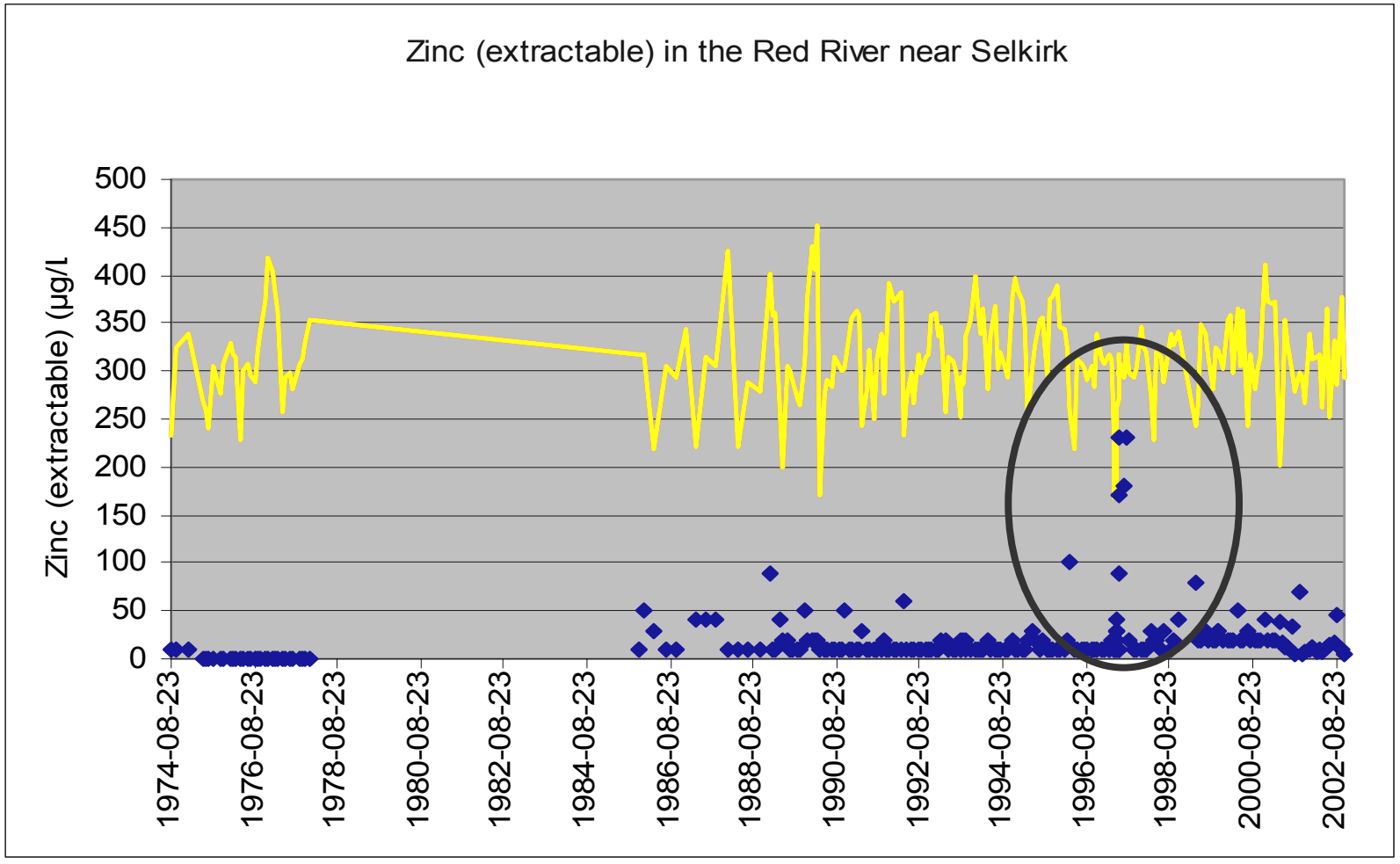
Zinc in Red River



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Concluding Comments

- Substantive revisions incorporated to MWQSOG
  - ➤ Final draft presently available for public review
- MWQSOG 2002 are the most comprehensive in Canada
- Represent the most current scientific information available and therefore, are being used to guide water quality management

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Concluding Comments (continued)

- Water quality issues of concern
  - bacteria
  - ammonia
  - dissolved oxygen
  - nutrients

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Concluding Comments (continued)

- Emerging water quality issues
  - ➤ pharmaceuticals
  - ➤ endocrine disrupting substances

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Thank You

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