Ministry of the Environment, Conservation and Parks

Status and trends of chloride in Ontario's freshwater

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Ontario

MECP chloride monitoring in Ontario

- 11 long-term monitoring programs
- > 2,500 surface and groundwater stations
- 1960's – present
- Great Lakes, inland lakes, streams, rivers, groundwaters and drinking waters

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MECP chloride reporting

- Great Lakes Binational Chloride Forum (Oct 2017, Toronto)
  - WWF-Canada, US Consular General, LSRCA, consultants
  - ~80 attendees: fed/prov. scientists, CAs, ENGOs, academics, municipalities, winter contractors, litigators
  - goal: establish a working group to ensure implementation of best practices and ***key learnings***

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Chloride trends in Ontario's surface and groundwaters

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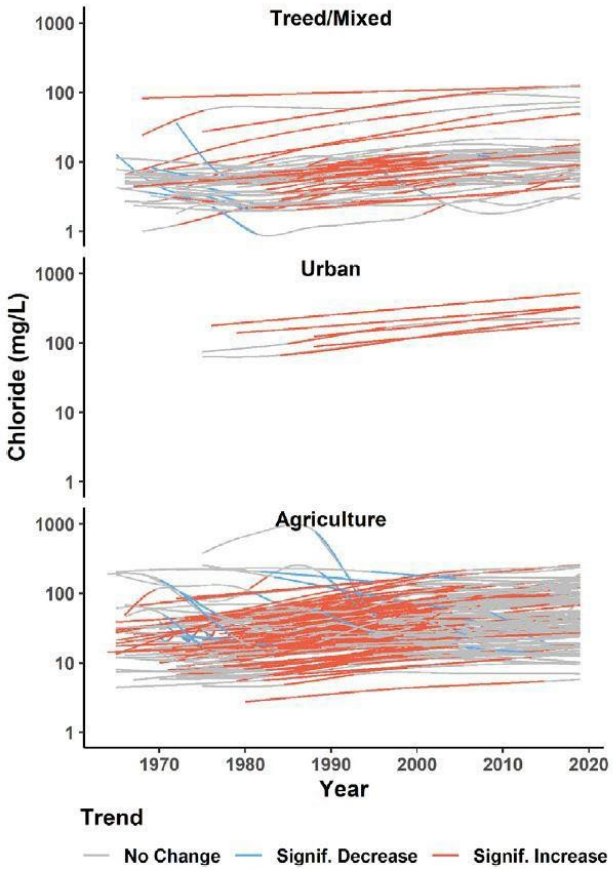
MECP chloride datasets

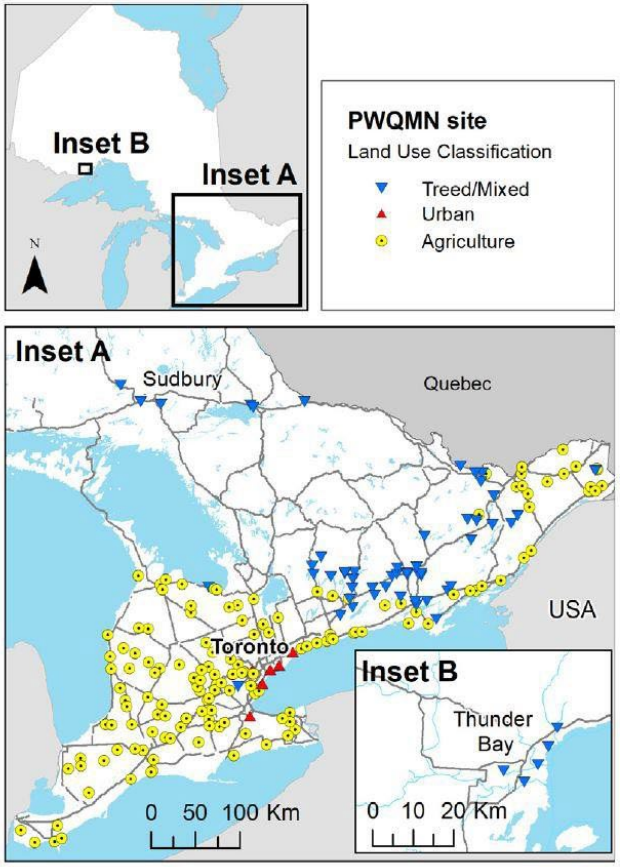
Waters Monitored	Program	Years Active	Sampling Frequency
Great Lakes Nearshore	Nearshore Long-Term Monitoring	1994 – ongoing	Seasonal, 3-yr cycle
Great Lakes Drinking Water	Great Lakes Intakes Program	1976 – ongoing	Weekly/Bi-Weekly
Streams and Rivers	Provincial Water Quality Monitoring Network	1964 – ongoing	Monthly/Seasonally
Inland Lakes, Boreal Shield	Monitoring and Assessment	1976 – ongoing	Bi-weekly/Monthly
Lake Simcoe	Lake Simcoe Monitoring Program	2000 – ongoing	Bi-weekly
Lake St. Clair, Detroit, Thames Rivers	Lake St. Clair	2016 – 2019	Monthly
Groundwater	Provincial Groundwater Monitoring Network	2001 – ongoing	Annual

All datasets publicly available on **Ontario Open Data Catalogue**
https://data.ontario.ca

- Integrating disparate datasets allowed for:
  - exploration of long-term chloride trends
  - identification of time periods of change
  - comparison of measured concentrations to CCME guidelines

Provincial Water Quality Monitoring Network (PWQMN)





Major Findings

- Urban Cl > chronic CWQG (120 mg/L)
- Increases through 90's
- Less change after 2000

Each line = 30 years of Cl data
214 streams

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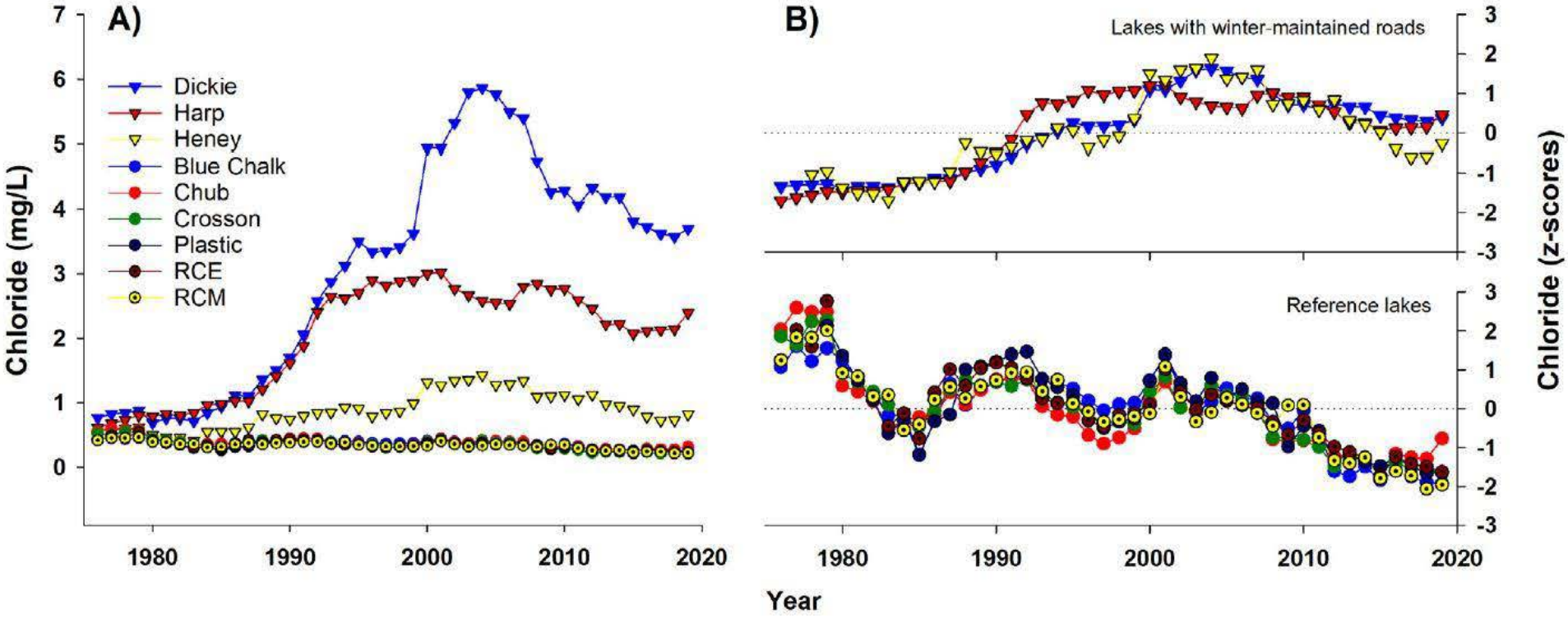
Inland Lakes Monitoring and Assessment



Dorset Long-Term "A-Lakes"

Major Findings

- Winter salted roads = increasing lake Cl
- Unmanaged roads = decreasing lake Cl

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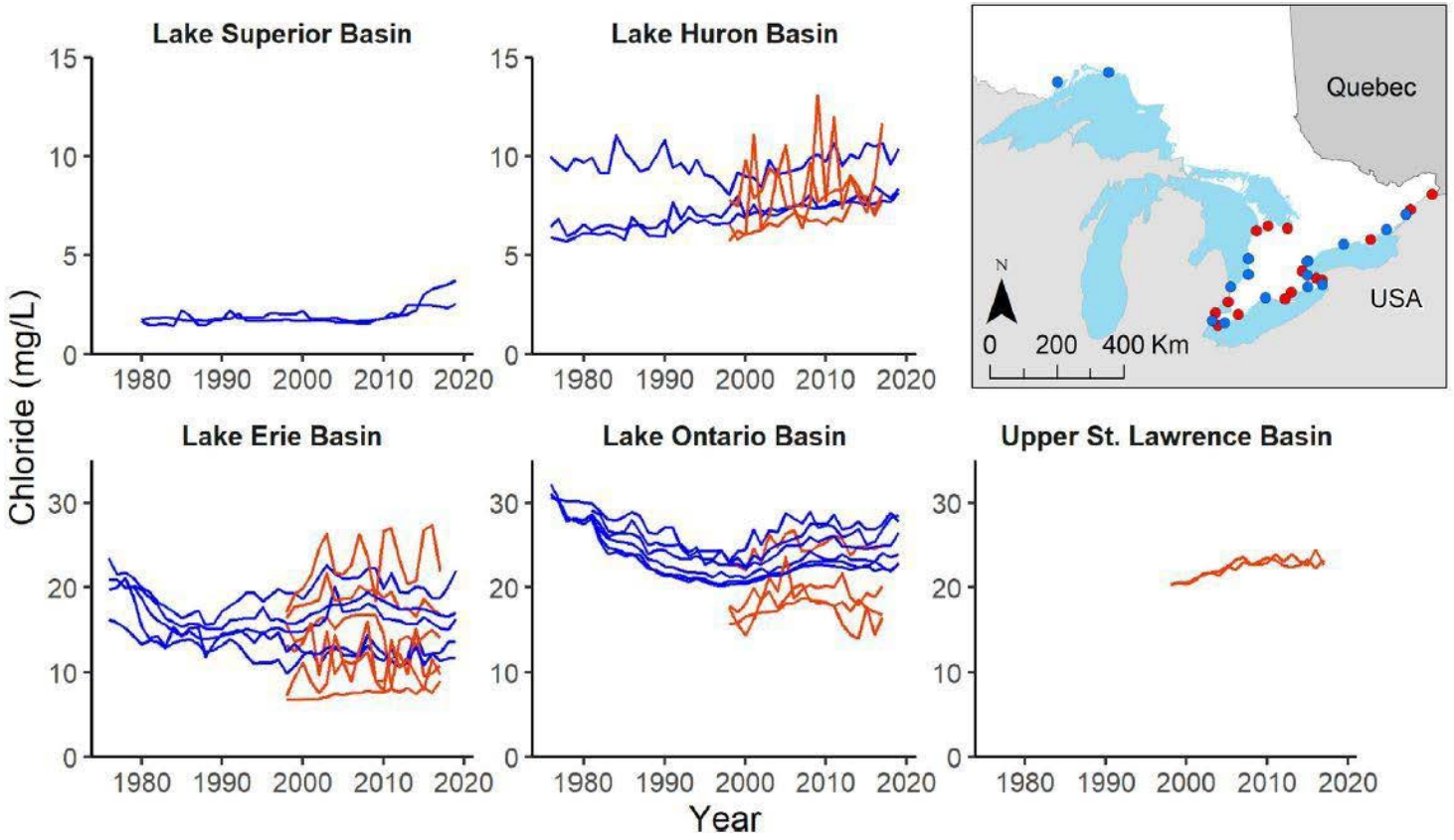
Drinking Water Intakes and Surveillance



Major Findings

- Variable long-term Cl trends among drinking water basins
- Downstream basins along the Great Lakes hydrocourse have higher Cl

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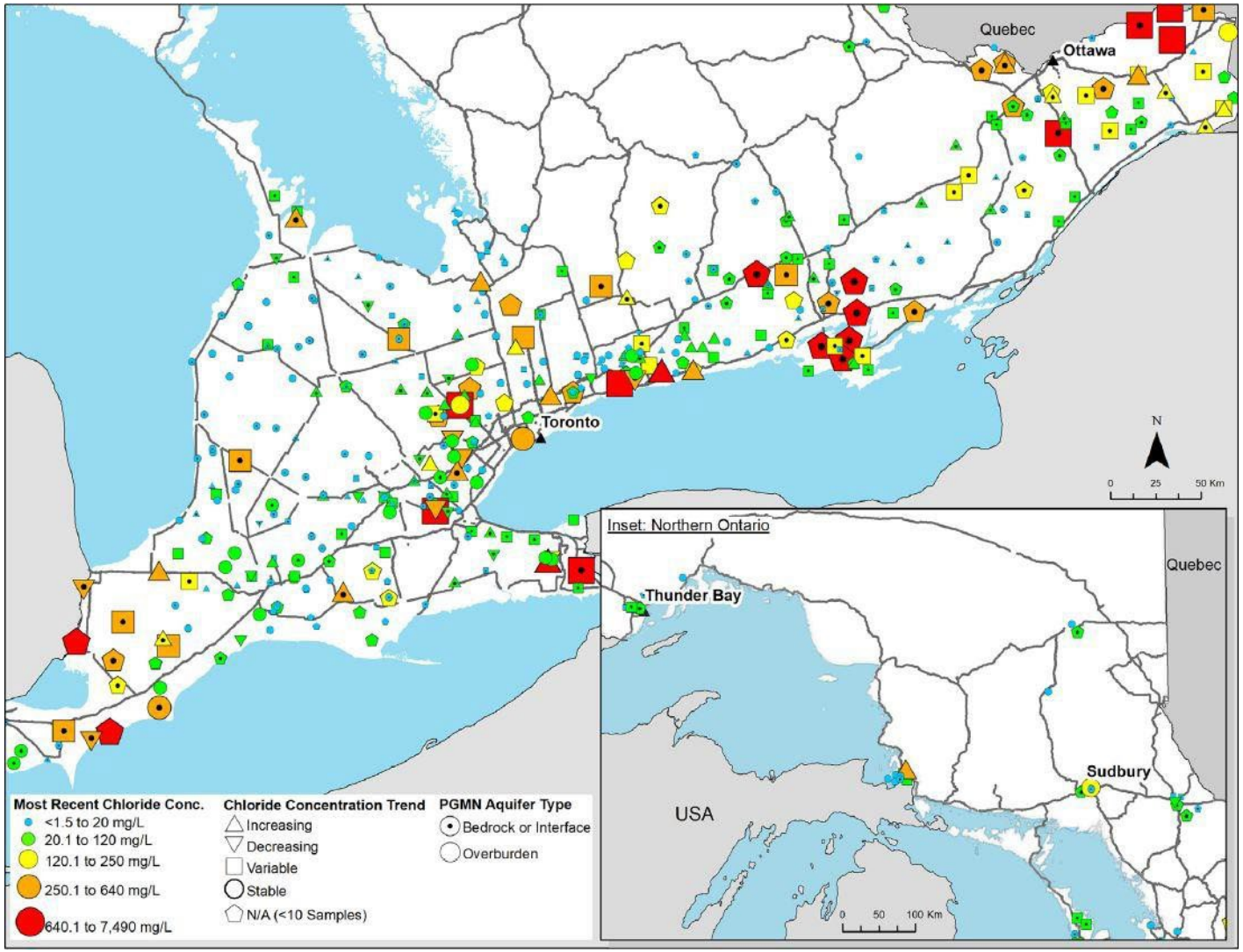
Provincial Groundwater Monitoring Network (PGMN)



Major Findings

- Chronic and acute CWQG exceedances for Cl in urban areas
- Undetermined long-term trends
- Some regional bedrock/overburden may be natural groundwater Cl sources

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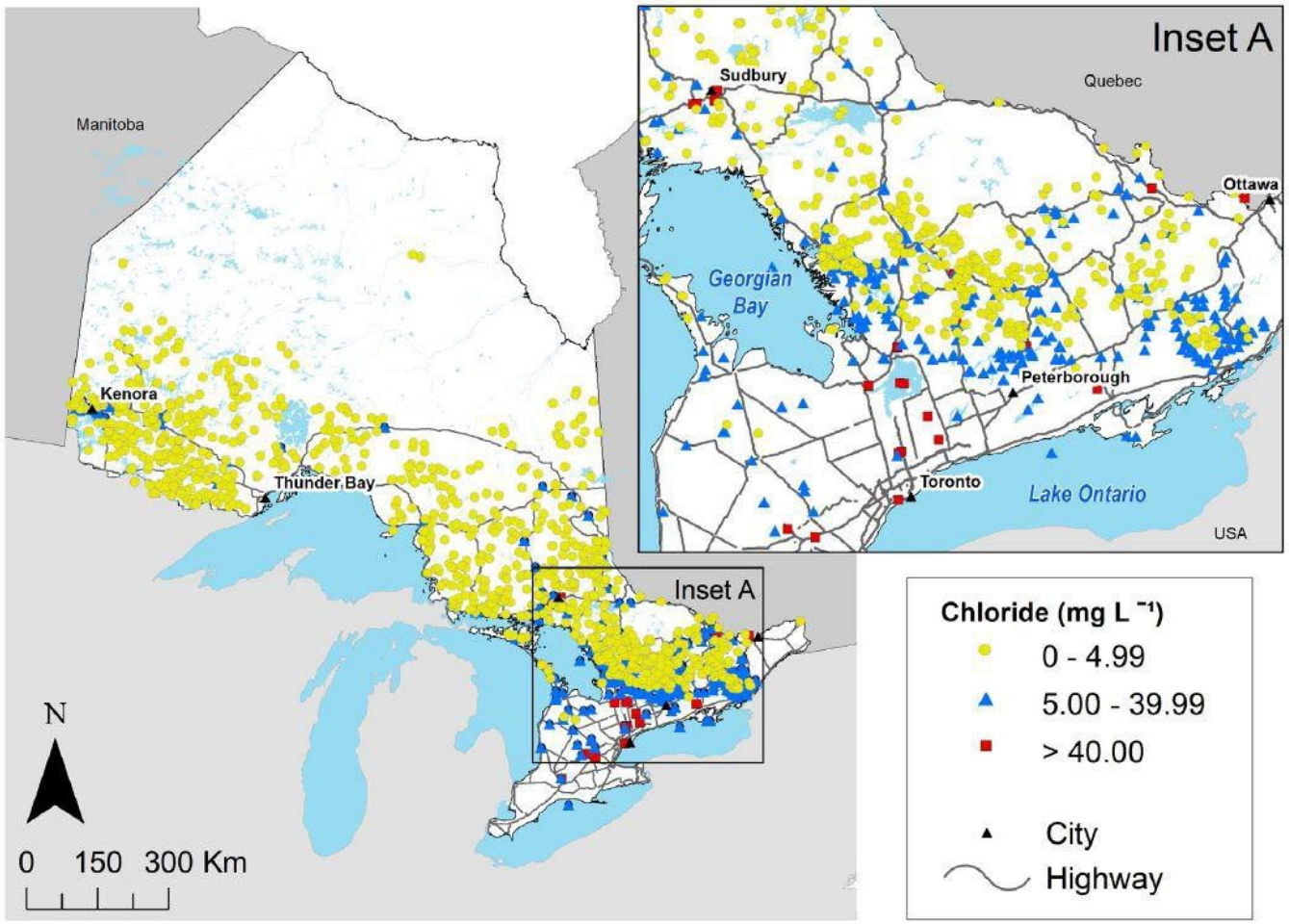
Lake Partner Program (LPP)



Citizen science-based Program
Annual spring sample (incl. Cl)

Major Findings

- Highest Cl in urbanizing lakes and those close to major roadways
- No CWQG exceedances

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Summary of Findings

- Cl is highest and increasing in urbanized and populated areas and those proximal to roadways
- Most Ontario surface waters have reported Cl concentrations that are well below CWQG
- Over the past several decades, rapid rates of change in Cl concentration have occurred in waterways with less than 10 mg/L Cl
- Areas of CWQG exceedances are most deserving of provisional efforts to curb the harmful effects of Cl on aquatic organisms and their habitats

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