

Developing a Regional Monitoring Framework for the Saint John Harbour



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Outline



CANADIAN WATER NETWORK
RÉSEAU CANADIEN DE L'EAU

- CWN Background
- Consortium process
 - What
 - Where
 - Why
 - When
 - How

bringing water research to life

Canadian Water Network

- Network of Centres of Excellence (NCE)
 - Hub: University of Waterloo
- Response to Walkerton Tragedy (2000)
- Cross-disciplinary studies
 - Biologists, chemists, hydrologists, engineers, etc





Delivery through three integrated national programs

Protecting
Watersheds
and Ecosystems

Protecting
Public Health

Ensuring Sustainable
Water Infrastructure

Watershed Consortia

- What are they?
 - Canadian Water Network (CWN) initiative
 - Protecting watersheds theme
 - Process for large scale monitoring
 - Regions, watersheds, political units
 - Partnership of stakeholders
 - Pooling/sharing resources
 - More efficient monitoring
 - Developing regional standards, methods, etc.

Important Notes

- Will not replace existing monitoring requirements
 - Looks for synergies with existing monitoring requirements
 - Reallocate existing resources
 - Develop and use regional reference sites
- Consistent monitoring
- End-user driven
 - Knowledge pull vs. research push

Need for Watershed Consortia

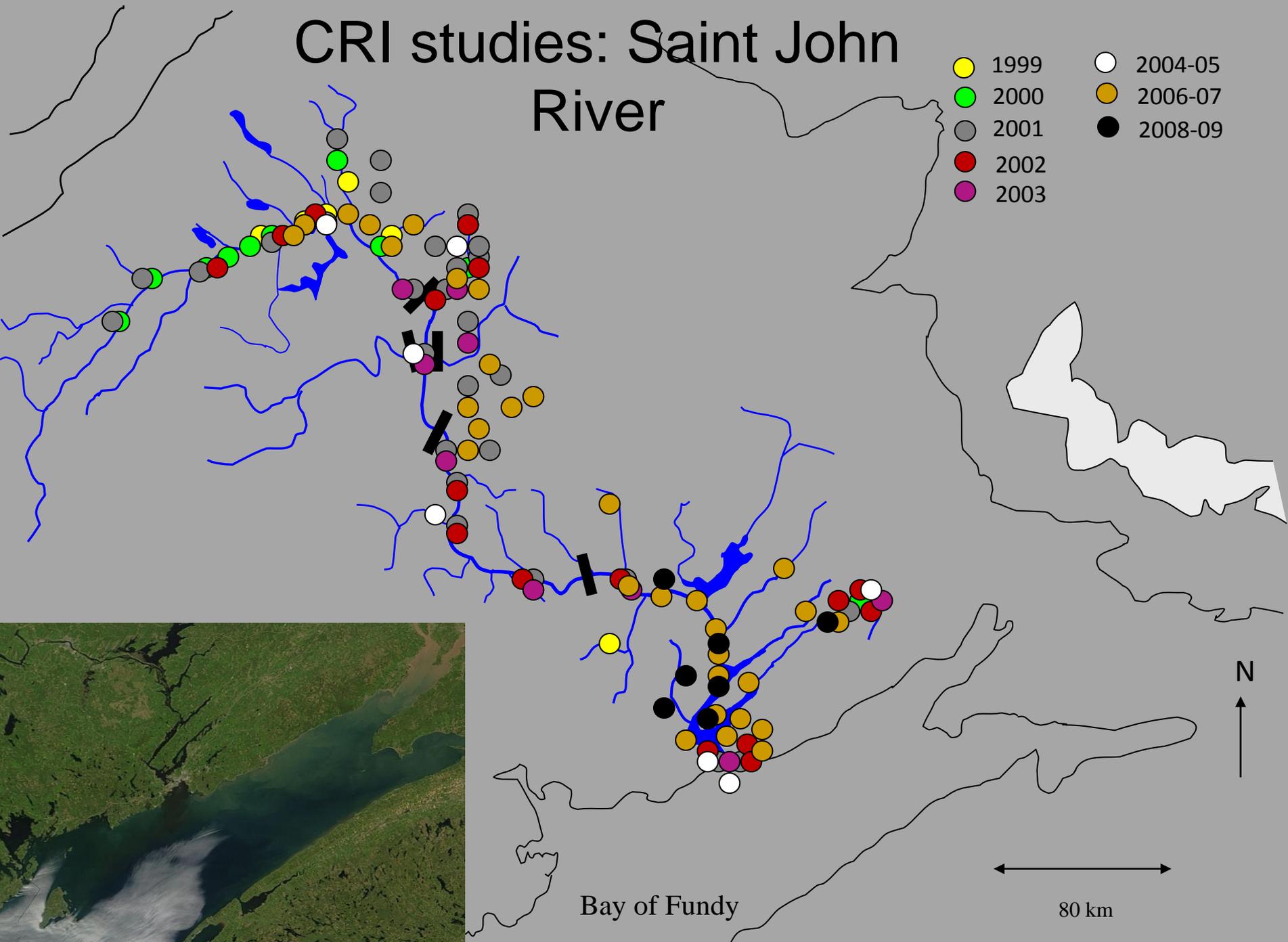
- As environmental assessment exists now:
 - Site (local) focus
 - Short term studies
 - EIA endpoints (what is measured)
 - Proponent specific
- Project approval process
 - Not an apparatus of environmental protection
 - Duinker and Greig 2006

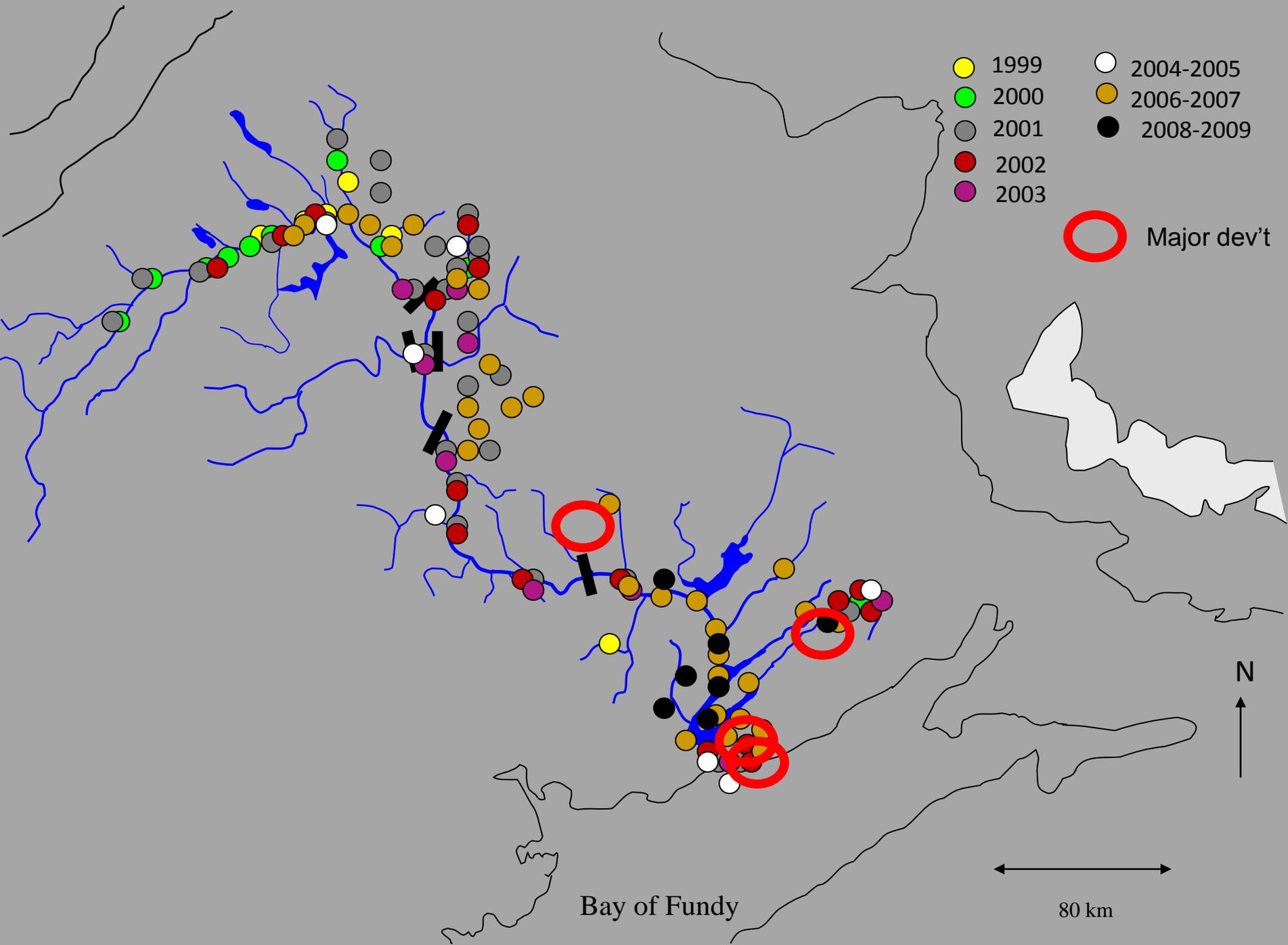
Need for Watershed Consortia

- 'Culture of practice'
 1. No common collection philosophy
 - Collected inconsistently
 - Different endpoints, methods, detection limits
 2. Raw data not easily accessed and used
 3. (In)Applicability of academic research
- Limits on regional (cumulative) assessments

CRI studies: Saint John River

- 1999
- 2000
- 2001
- 2002
- 2003
- 2004-05
- 2006-07
- 2008-09





Overall Goals of the Consortium

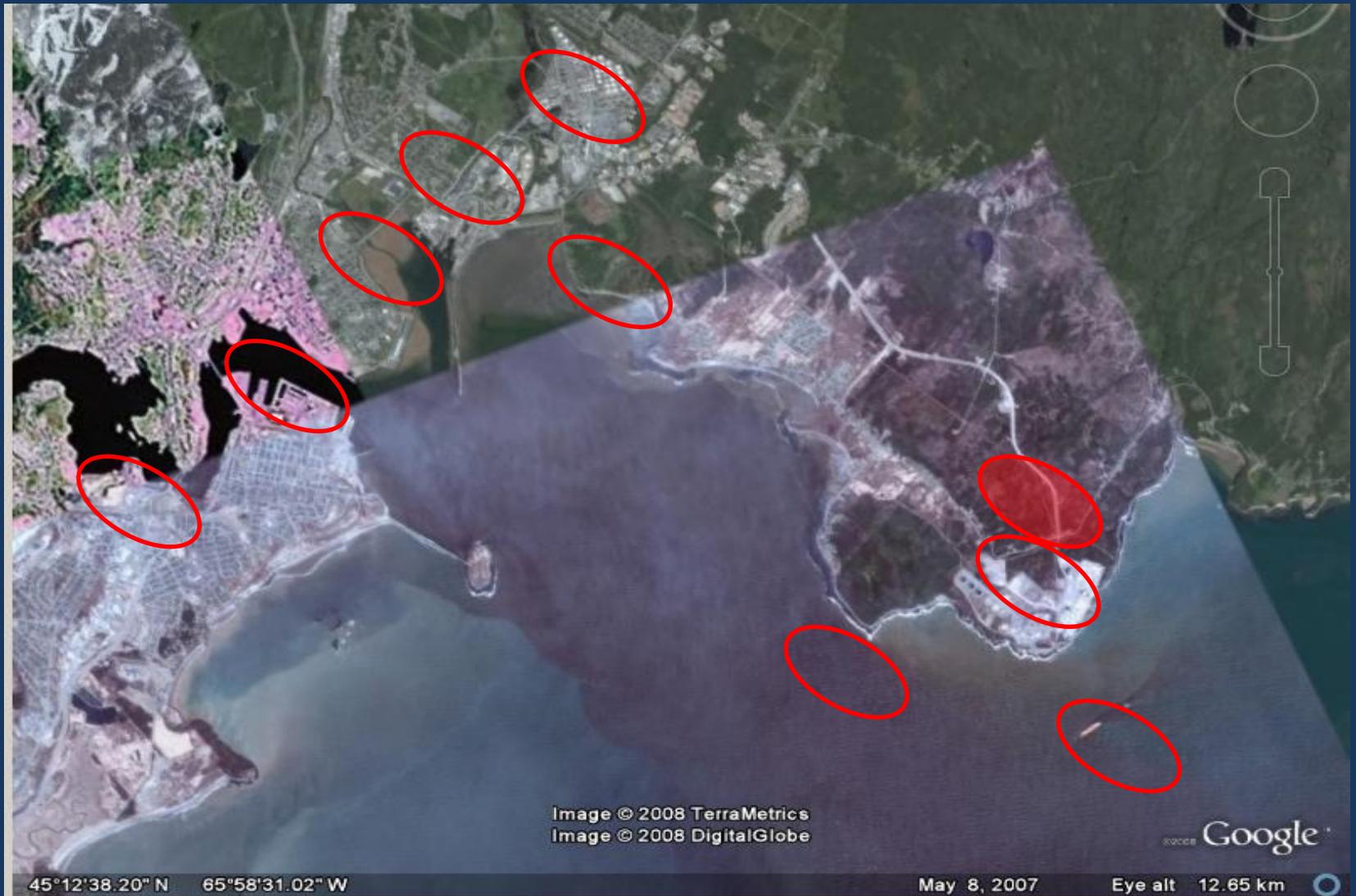
- Overcome weaknesses of project-specific assessments
 - Move towards cumulative effects assessment
- **Develop a standardized approach**
 - Accessible, current, complete data
 - Regional datasets and baselines
- Provide data to detect unpredicted changes

Goals: In the next 3-5 years...

- Establish a core level of consistency for
 - sample station selection
 - indicator selection
 - sampling methods, frequency
- Background contamination levels
- Potential impact zones associated with activities
- Thresholds of impacts
- 3-5 regions in Canada

Saint John Consortium

- Where
 - Saint John Harbour
 - Operational harbour since 1700s
 - Large industrial facilities
 - Oil Refinery
 - Pulp mills
 - Brewery
 - Sewage issues
 - ‘East coast energy hub’
 - LNG terminal



Saint John Consortium

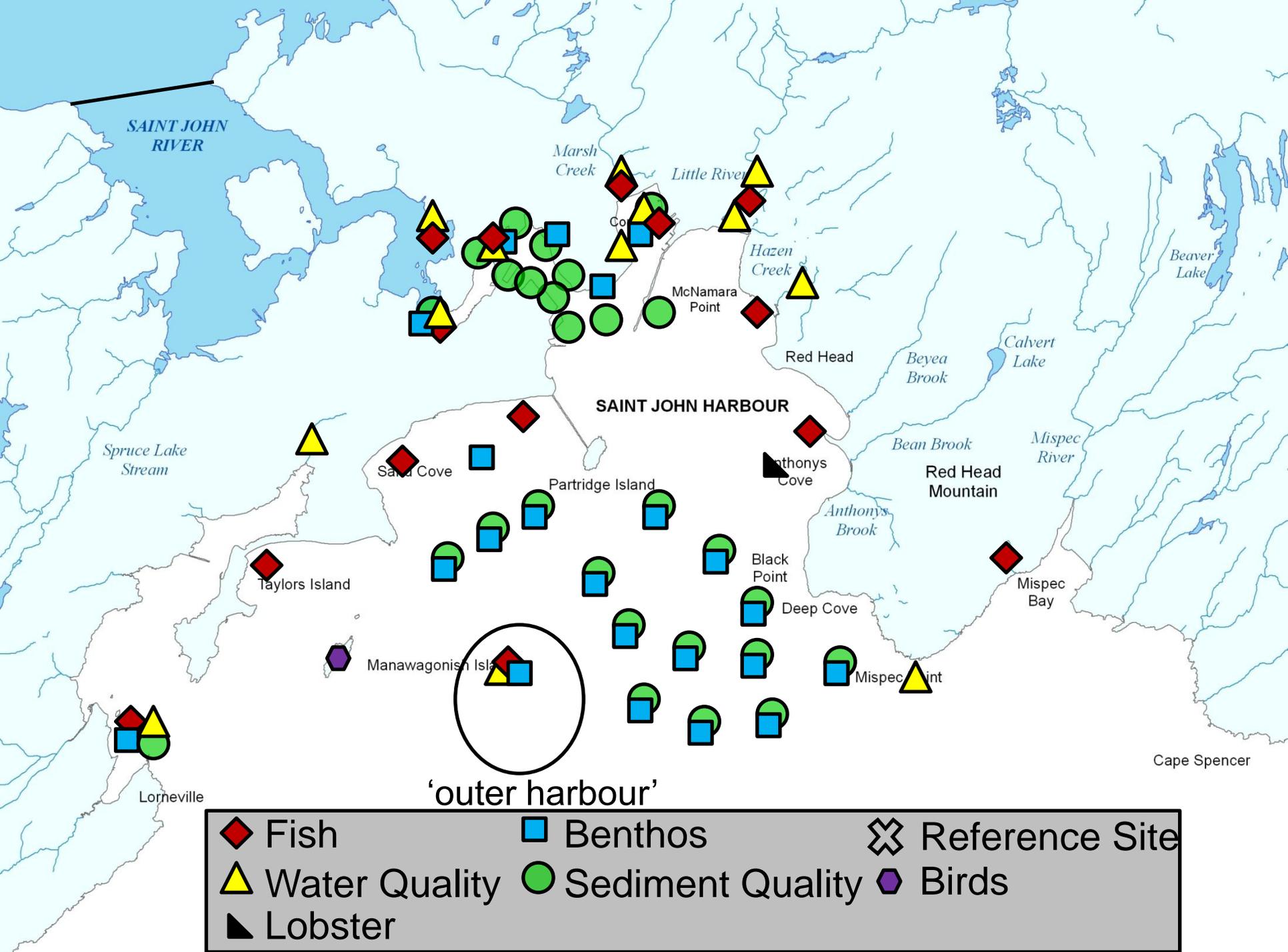
- Key steps
 - Develop Terms of Reference
 - Understand current monitoring in the harbour
 - Identify data needs
 - From end-users
 - Develop research questions
 - RFP for academics
 - Research proposals to fill data/method gaps

The Saint John Harbour Environmental Monitoring Partnership (SJH-EMP)

- ACAP Saint John
- Aquila Tours
- Bay Ferries Ltd
- Canadian Coast Guard
- Canaport LNG (Repsol)
- Emera, Brunswick Pipeline
- Emera, Bayside Power
- Enterprise Saint John
- Environment Canada (EC)
Environmental Stewardship
Branch
- Fisheries and Oceans Canada
- Fundy North Fishermen
Association
- Irving Oil
- JD Irving
- NB Environment
- Port Authority
- Potash Corp N. B. Division
- Saint John Board of Trade
- City of Saint John (Water)
- Saint John Waterfront
Development

| Reasons for monitoring | Timing | Site |
|----------------------------------|--------------|-------------------------------|
| Condition of approval to operate | Regular | Fixed |
| Condition of EIA | Regular | Fixed |
| Government monitoring program | Regular | Fixed |
| Protect public concern | Regular | Fixed |
| Dredging requirement | Regular | Variable (within small areas) |
| Gulfwatch | Annual | Fixed |
| Regulatory decisions | Occasional | Fixed |
| Spills or releases | Occasional | Fixed |
| Research | Occasional | Variable |
| Disposal | Intermittent | Variable (to be fixed) |

Patchy data



Chemical/physical

Biological

| | | | |
|-------------------|--|--------------------------------------|---------------------|
| Effluent toxicity | Temperature | Metals | Mussel contaminants |
| Air emissions | “Coliforms” | PAHs | Lobster settling |
| Water levels | TSS | PCBs | Benthic community |
| Current | Salinity | DDD | Adult fish survey |
| Sediment toxicity | pH | Pesticide effects on crustaceans | Fish community |
| Seabed morphology | Sediment particle size (Sedimentation) | Brominated and fluorinated compounds | VEC impacts |
| | TOC | Body burdens | Species at risk |

Research Questions

1. Sediment transport models (funded)
2. Mobility of fishes and lobsters
3. Lobster settlement
4. Habitat creation
5. Benthic invertebrate study
6. Fish sentinel studies

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Research proposals submitted by
academics

Review by international experts under way

Consortium Summary

- Incorporates existing monitoring
- Provides basis for EIA
- Focuses research
- Detect cumulative effects
- Provide regional baselines
- Develop thresholds
- Define endpoints of relevance for SJH
- Develop synergies by focusing questions, combining sites
- Reduce duplication of effort

Why a Consortium Approach?

To create a venue and mechanism for multiple organizations with a shared interest in addressing key water management challenges through advancing and applying research and technology to jointly support and fund science-based solutions

Saint John Harbour is the pilot project

Data Gaps Among Studies

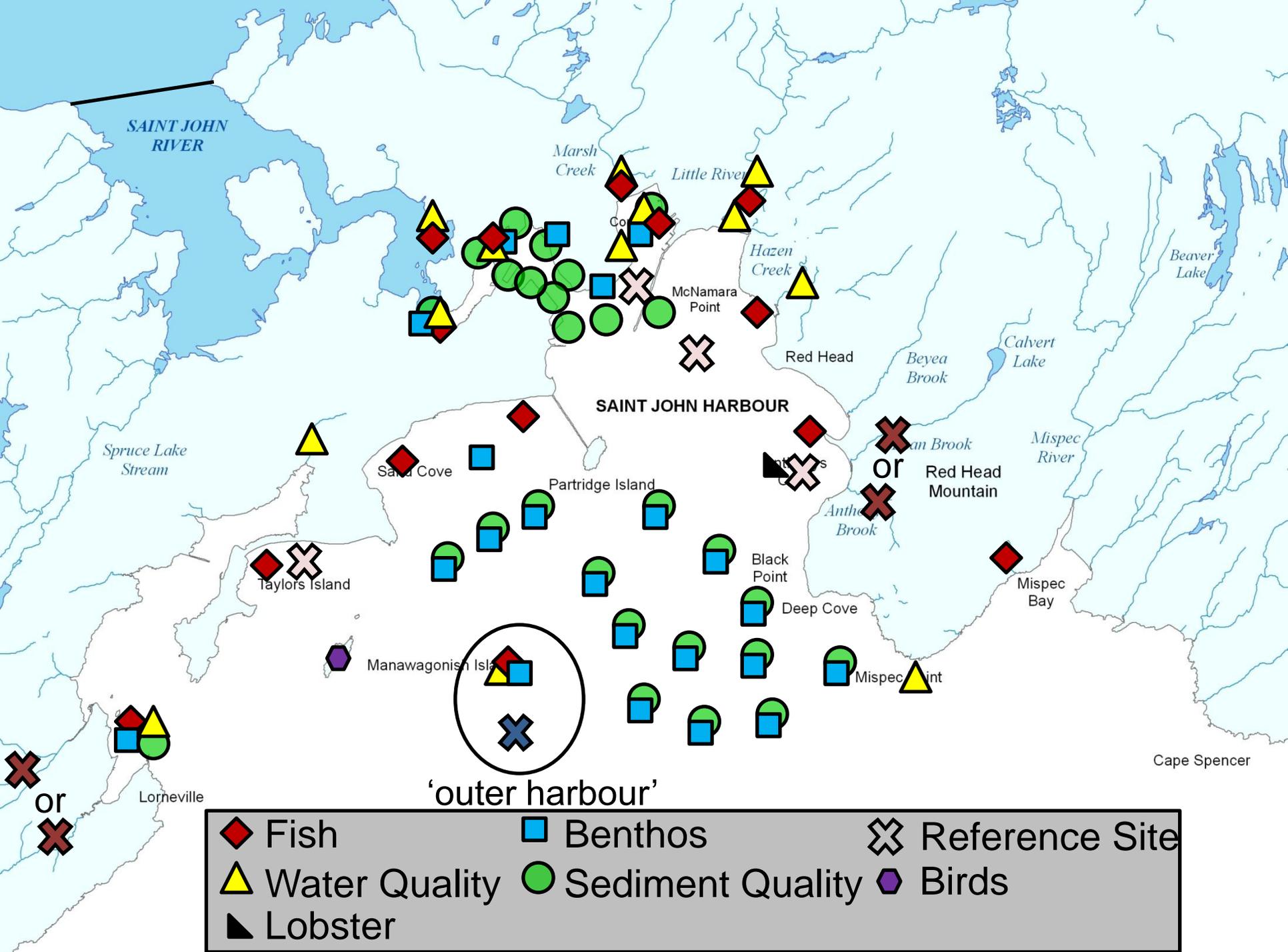
| Study | Year | Ref. Site | Fish 1 | Fish 2 | Invert 1 | Invert 2 | Sed. Chem 1 | Sed. Chem 2 | WC 1 | WC 2 |
|-------|------|-----------|--------|--------|----------|----------|-------------|-------------|------|------|
| A | 2005 | 1 | █ | █ | █ | █ | █ | █ | █ | █ |
| A | 2005 | 2 | █ | █ | █ | █ | █ | █ | █ | █ |
| A | 2005 | 3 | █ | █ | █ | █ | █ | █ | █ | █ |
| B | 2006 | 1 | █ | █ | █ | █ | █ | █ | █ | █ |
| B | 2006 | 2 | █ | █ | █ | █ | █ | █ | █ | █ |
| B | 2006 | 3 | █ | █ | █ | █ | █ | █ | █ | █ |
| C | 2005 | 4 | █ | █ | █ | █ | █ | █ | █ | █ |
| C | 2005 | 5 | █ | █ | █ | █ | █ | █ | █ | █ |
| C | 2005 | 6 | █ | █ | █ | █ | █ | █ | █ | █ |

Missing data: big problems when building regional datasets

Data Gaps Among Studies

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| C | 2005 | 6 | | | | | | | | |

No missing data: meaningful studies
Value grows with time



Process

- Step 1 *Workshop*
 - ID major stakeholders, barriers, common interests, geographic scope
 - Develop terms of reference
- Step 2
 - ID existing monitoring programs, rationale, requirements, and overlap
 - Identify potential regional reference sites

Process

- Step 3
 - Identification of
 - monitoring requirements that
 - overlap spatially (same endpoints)
 - could shift to increase overlap (different endpoints)
 - reference areas that could shift to provide overlap
 - potential and anticipated developments
 - upcoming monitoring requirements
 - Development of data concerns and desires
 - Create map that overlaps monitoring, potential development, reference sites

- Pooling/sharing resources
 - More efficient monitoring
- Developing regional standards, methods, etc.
- Process for large scale monitoring
 - Regions, watersheds, political units

Step 4

- How will CE be detected
 - Review available information on ecological thresholds, triggers, etc.
- Identify key reference sites
- Discuss data gaps
- Develop science questions
 - Develop key focus and questions for decision-making around effects and cumulative effects

| | | | |
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- **Step 5**

- Meet with key stakeholders individually to discuss their specific needs, specific upcoming monitoring for 2011 and 2012
- Identify potential resources or partnerships for site-specific data collection

- **Step 6**

- Discussion of framework
- Presentation of refined list of science needs
- Identify existing resources and resource needs
- Prioritization of data needs

Acknowledgements

- Canadian Water Network
- Canadian Rivers Institute