Environment Canada Environnement Canada

Canada

Towards a National Automated Real-time Water Quality Monitoring Network

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Presentation to the Real-time Water Quality Monitoring Workshop

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Purpose and Outline

- Provide a better understanding of Environment Canada's National Automated Real-time (ART) Water Quality Monitoring Network

- Outline:
  - How it started
  - Key factors and players
  - The network today
  - Path forward

How it started – Red River, MB

1971 – Red River at Emerson, Manitoba

- To monitor water quality at the Canada – United States border
- Schneider automated system
- Dissolved Oxygen, pH, Chloride, Conductivity and Temperature
- Measurements taken on a continuous basis
- A computer in Winnipeg was programmed to dial-up the probe on a regular basis to retrieve the data

Atlantic Region

1994-2000 – Hayward Brook Watershed, New Brunswick

- To assess response of water quality and quantity subjected to various forest harvesting treatments
- To assess the utility of automated water quality and quantity monitoring stations
- Results indicated that the impact from industry and road building do have a short term impact on water quality, although the system does recover in a short period
- Many events recorded in the real time signature could be attributed to physical changes as a result of landuse

Atlantic Region (2)

1998-2004 – The Pockwock Bowater Study, Nova Scotia

- To measure the response of stream water (quality and quantity) when forest harvesting occurs and Special Management Zones or buffers are maintained
- The results of the data confirmed that the management zones provided sufficient buffering area for the forest harvesting practices that took place
- There was no significant change in water quality

Atlantic Region (3)

2000 – Real-time monitoring in Pockwock Watershed, NS

- Data transmission via cell modem

2001 – Leary's Brook, NL

- Partnership with Newfoundland & Labrador
- Connected directly to a phone line through the Water Survey of Canada (WSC) data logger and their infrastructure

2005 – EC Satellite Hook up with Hydrometric Service

- Through the WSC infrastructure

Québec

2003 – St. Lawrence River at Levis, Québec

- To measure suspended sediments from drainage basin

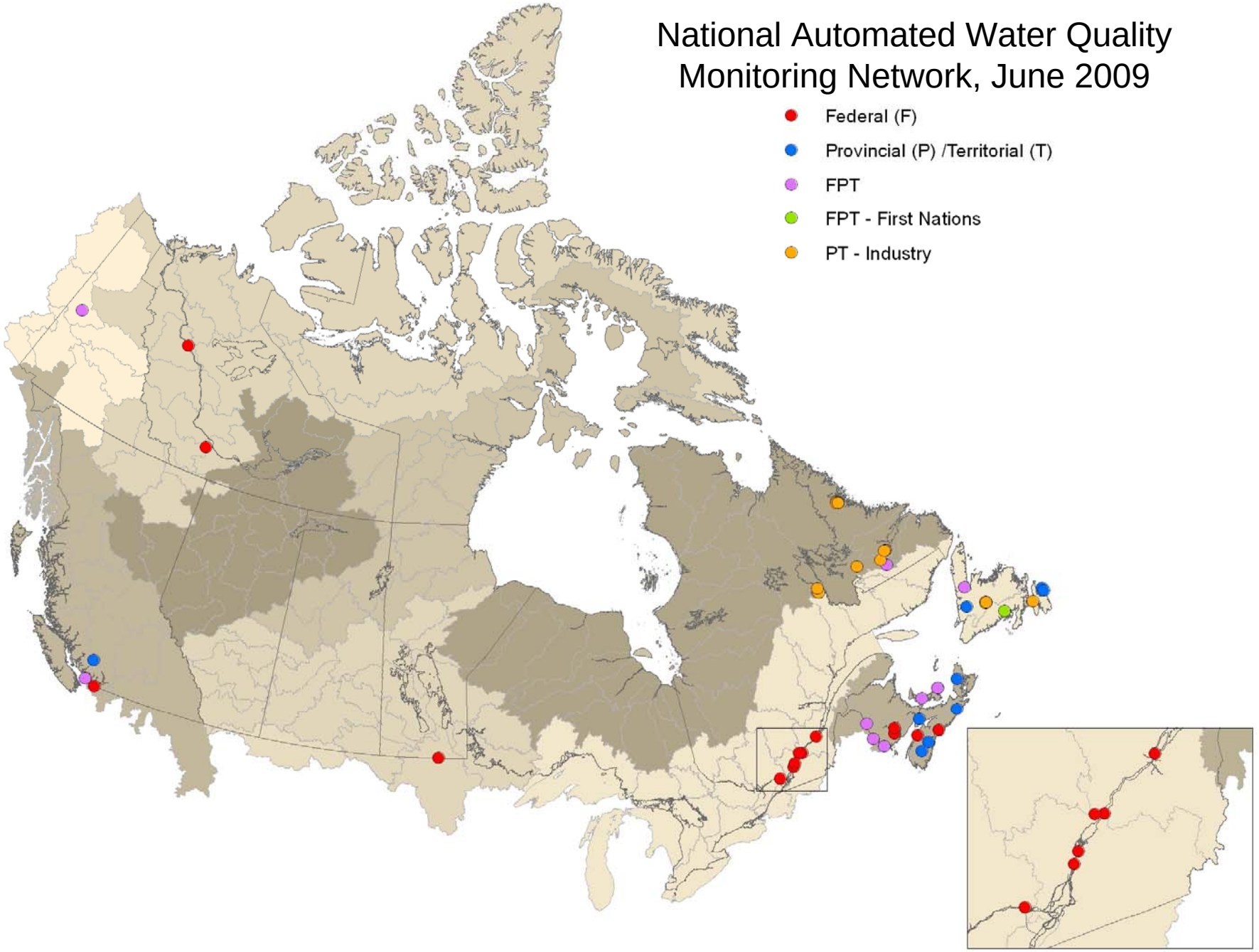
2004 – Ottawa River at Carillon, Québec

- To monitor main tributary to the St. Lawrence River
- Combined with automated sampling technology

The National Network

- Goal: To bring together existing automated sites within a national EC network, implement new sites, and expand network with interested partners (Federal agencies, provinces/ territories, NGOs)
- Maximizing integration with hydrometric network (WSC)
- Operational benefits of automated *in situ* monitoring to EC's national monitoring program:
  - Demonstrating *state-of-the-art* technology;
  - Cost-effective alternative to conventional grab sampling (*e.g.,* remote locations)
  - Primary screening of basic water quality at sites of interest
  - Demonstrating early detection/warning potential
  - Gathering background and trend data
  - Providing near real-time information to public and water managers for more rapid intervention

National Automated Water Quality Monitoring Network, June 2009

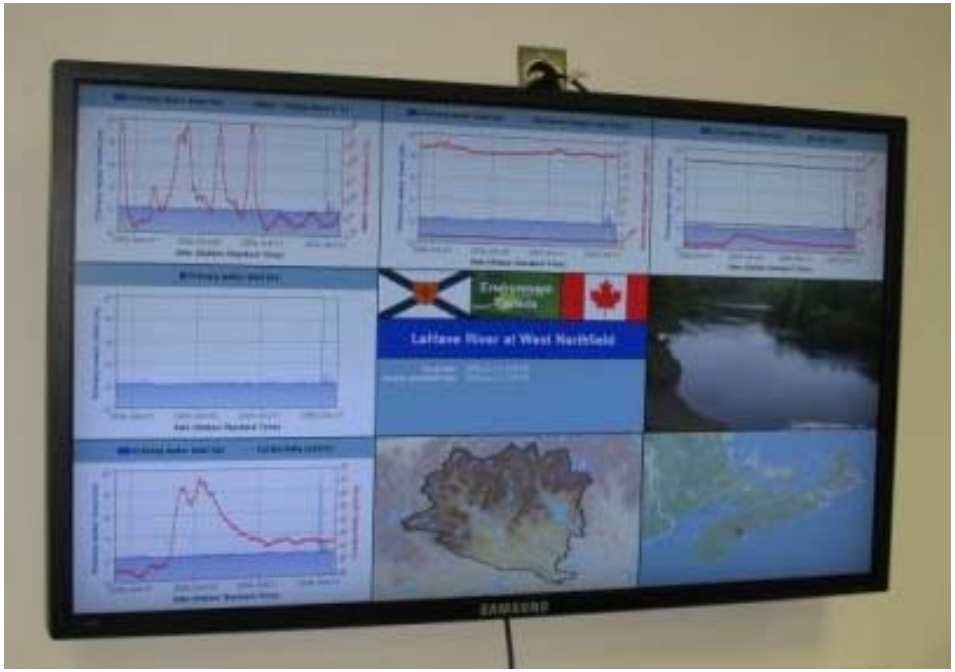


Key Players and Factors in Network Expansion

- Partnership opportunities
  - Provinces/Territories
    - Water Quality Monitoring Agreements
  - Water Survey of Canada
  - NGOs
  - Other Federal Departments
- National Environment Canada Network Team
- Evolving capacity, improvements, credibility, popularity of this technology
- Synergies with partner expertise and implementation (*e.g.,* US)
- Capacity sharing (e.g., communication infrastructure, consistent QA/QC, calibrations, data, etc.)

Since the 2007 workshop

- 7 stations installed in 2007
- 8 stations installed in 2008
- National database, August 2008
- Acquisition of Aquarius for data correction
- Display panels, since January 2009
- Buoy in Main Arm of the Fraser River estuary, November 2007



- Recognition of ART as a priority in EC national monitoring program


Inspecting the buoy

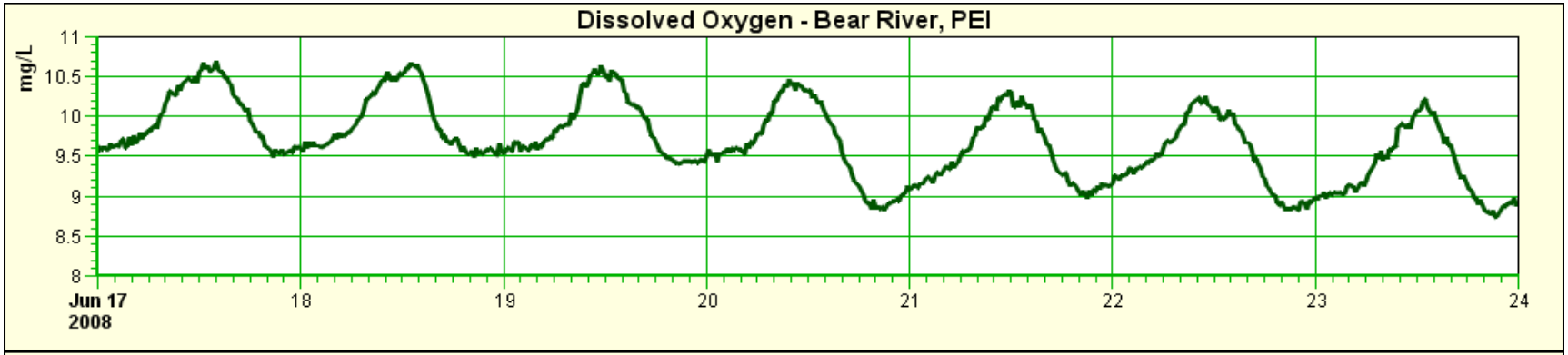
The national network in numbers

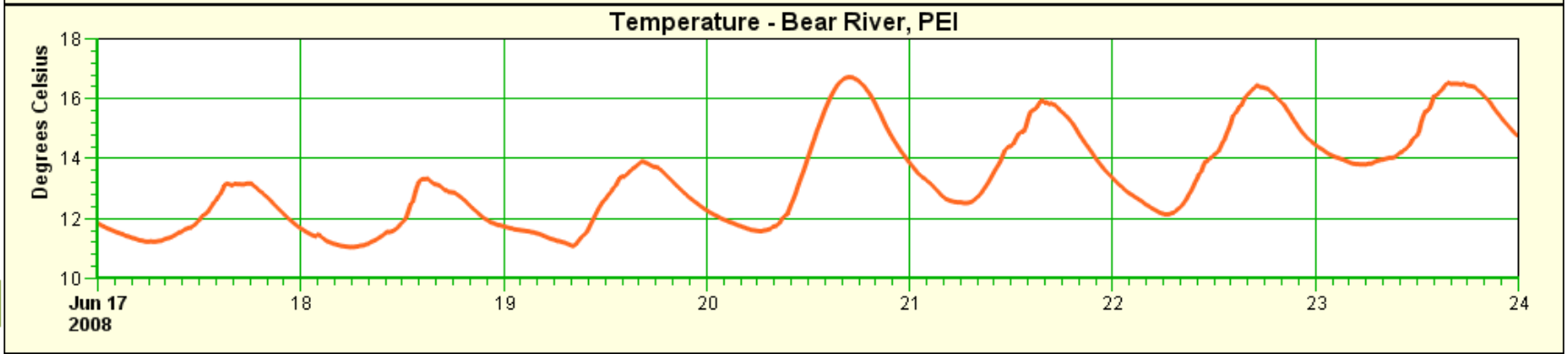
- National Environment Canada Team
- 13 partners
- 10 YSI
- 26 Hydrolabs
- 1 Quanta
- 6 auto-samplers
- 39 sites co-located at WSC sites
- 29 communicate via GOES satellite
- 9 via direct phone line
- 5 via cell phone
- 552 calibration/maintenance operations

*5 parameters * 4 readings/hour * 24 hours/day * 365 days/year * 48 sites*
*= **8,409,600 measurements/year***

What we are getting from the data

- Baseline water quality characterisation
- Timely measures of change in water quality
- Support and triggers for grab sample monitoring
- Support for other monitoring programs, such as Pesticide Science Fund and Canadian Aquatic Biomonitoring Network (CABIN)
- Time series data to support research and modelling
- Growing capacity and expertise in use of basic, conventional WQ data





Path forward

- Report real-time water quality information on the web
- Using ART data in reporting on water quality (maximizing use of limited basic parameters)
- National consistency in real-time monitoring (QA/QC Manual)
  - Data correction procedures
- Expand the network (4 sites to be deployed in 2009)
- Testing of the s::can spectrolyser
- Research on use of automated RT data in predicting annual water quality; reducing dependence on grab sampling

Canada

EC National Network Team

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Thanks to our Partners

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- Fisheries and Oceans Canada
- Province of Newfoundland & Labrador
- Province of Nova Scotia
- Province of New Brunswick
- Province of British Columbia
- Province of Prince Edward Island
- Yukon Government
- Parks Canada Agency
- Conne River First Nation
- Sackville River Association (SRA)
- The Clean Annapolis River Project (CARP)
- Participating municipalities

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