National Planning Using the Global Climate Observing System Framework: Canada's Approach

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Presentation Outline

- Context Setting: Canada's National Monitoring Networks
- Early GCOS Initiatives
- Development of a Comprehensive National Plan
- Further Planning of Canada's GCOS Commitments
- Concluding Remarks

Challenges Facing Canada's National Networks

- The networks are a result of collaboration with the different levels of government
- Insufficient funding
- Capacity issues
- Need to be modernized/automated
- Maintaining national standards
- Data management and archiving

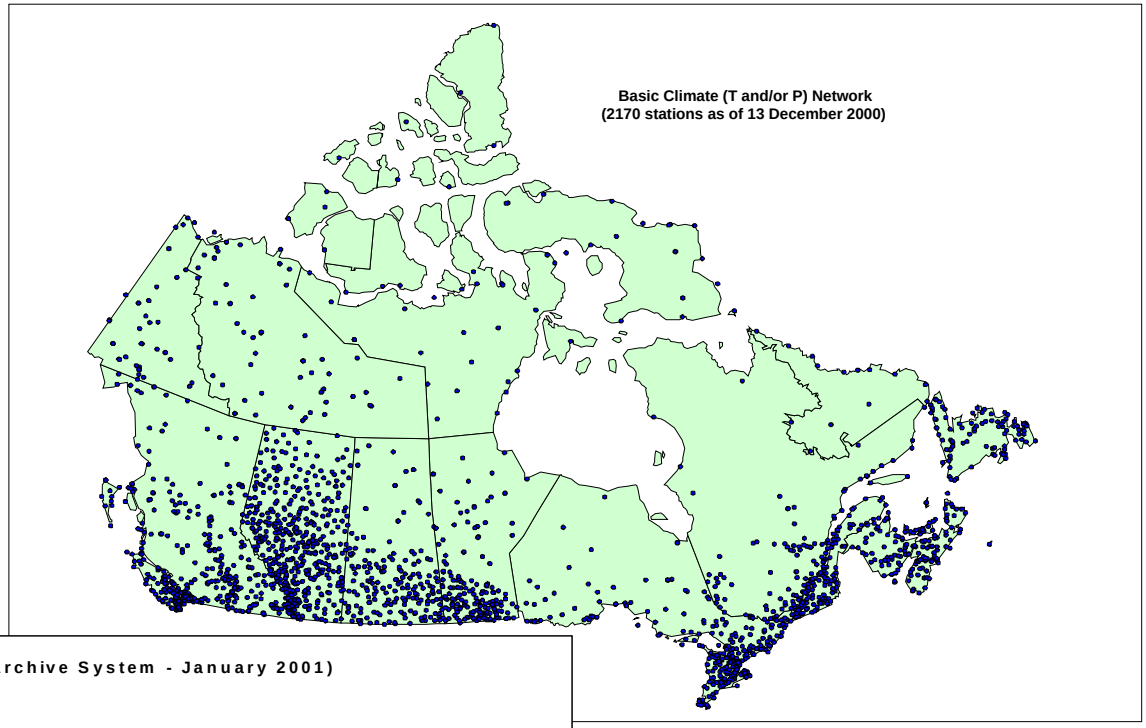
MSC's GCOS Monitoring Responsibilities

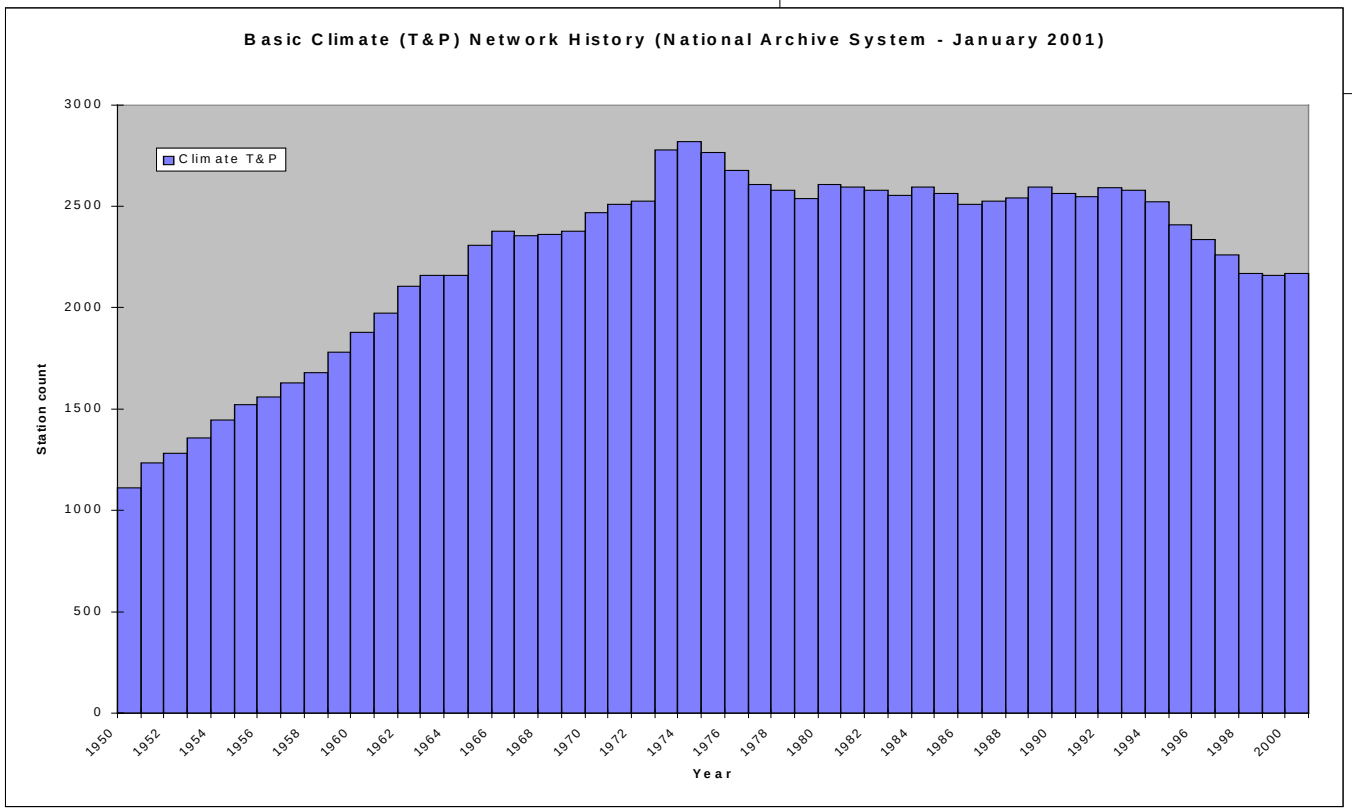
- **atmosphere (MSC Lead)**
- **hydrosphere (MSC Lead)**
- **cryosphere (Shared Lead)**
- **oceans (Shared Lead)**
- **terrestrial**

State of MSC's National Monitoring Networks

- Cooperative Climate Network (Basic Temperature and Precipitation)
- Supplementary Climate Networks
- Water Quantity (Hydrometric) Network
- Buoy and Volunteer Observing Ships (VOS)
- Atmospheric Composition

Canada's Cooperative Climate Network

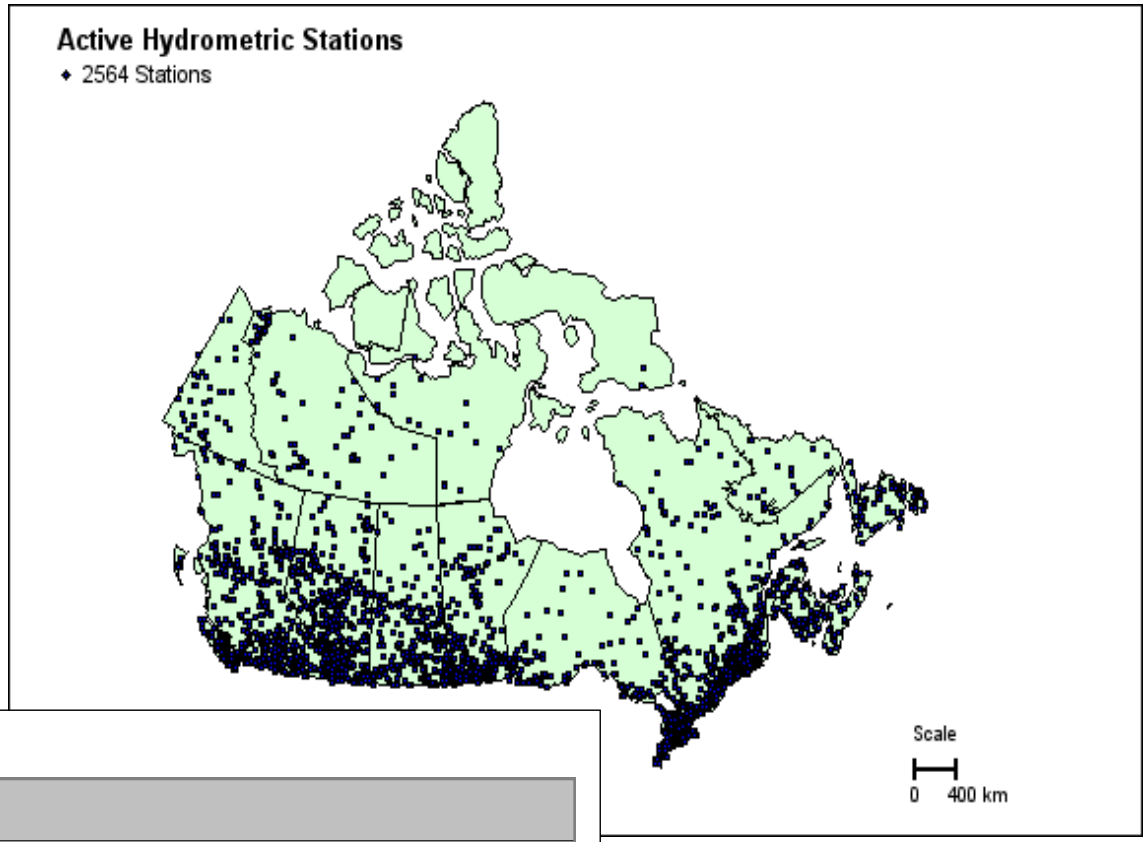


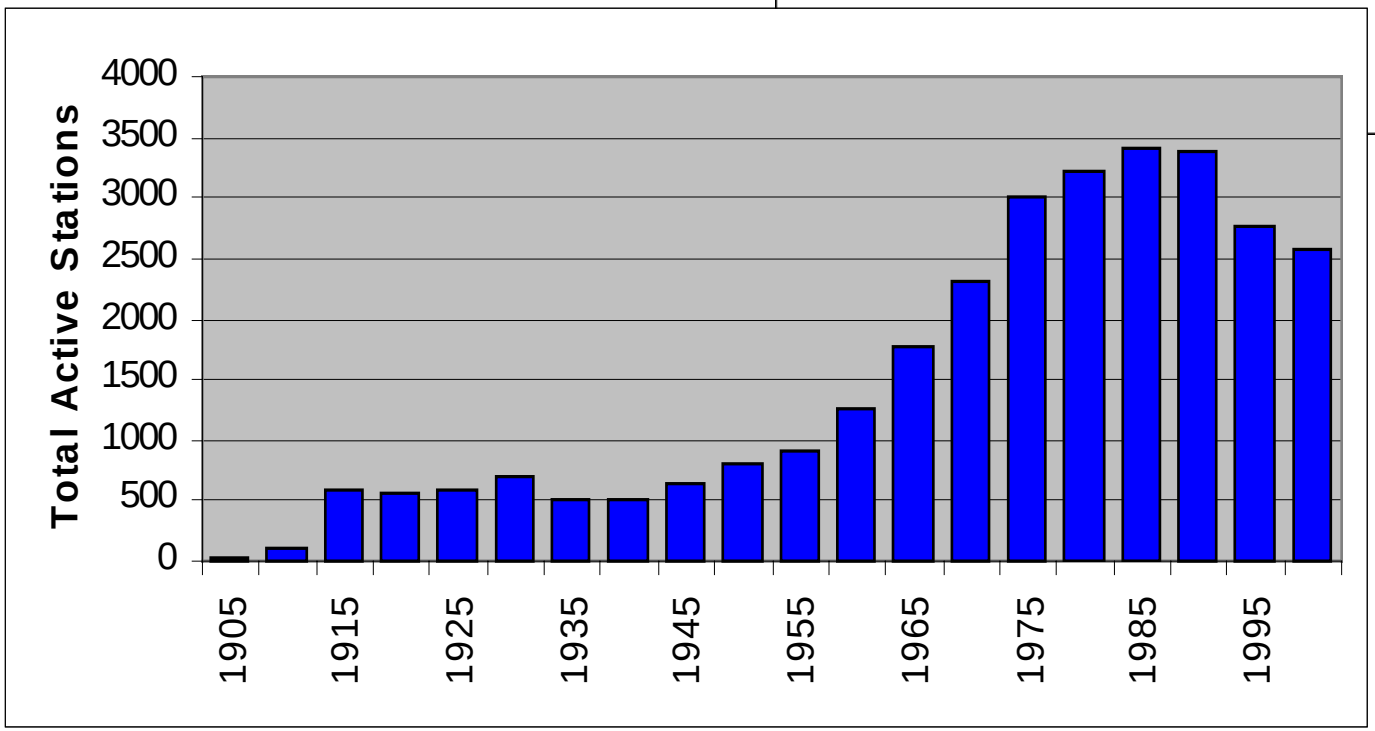


Canada's Supplementary Climate Networks

Supplementary Climate Programs	Year 1980	1990	Currently
Global Solar Radiation	53	50	42
Bright Sunshine	310	299	220
Wind Velocity	321	417	705
Rate of Rainfall	491	443	436
Pan Evaporation	135	111	47
Soil Temperature	68	59	28
Snow Depth/Fall	2608	2563	1582
Snow Surveys	134	111	34
Ice Thickness	130	116	33
Freeze/Break up	265	145	50
Upper Air	35	34	32(5)

Canada's Water Quantity Network





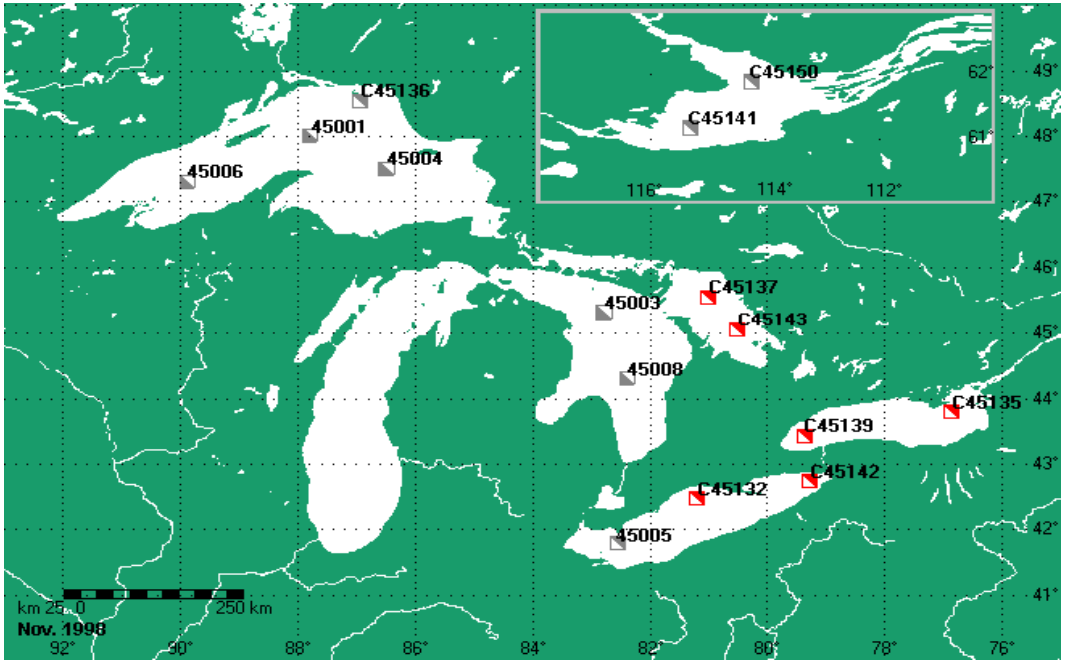
Canada's Marine Network

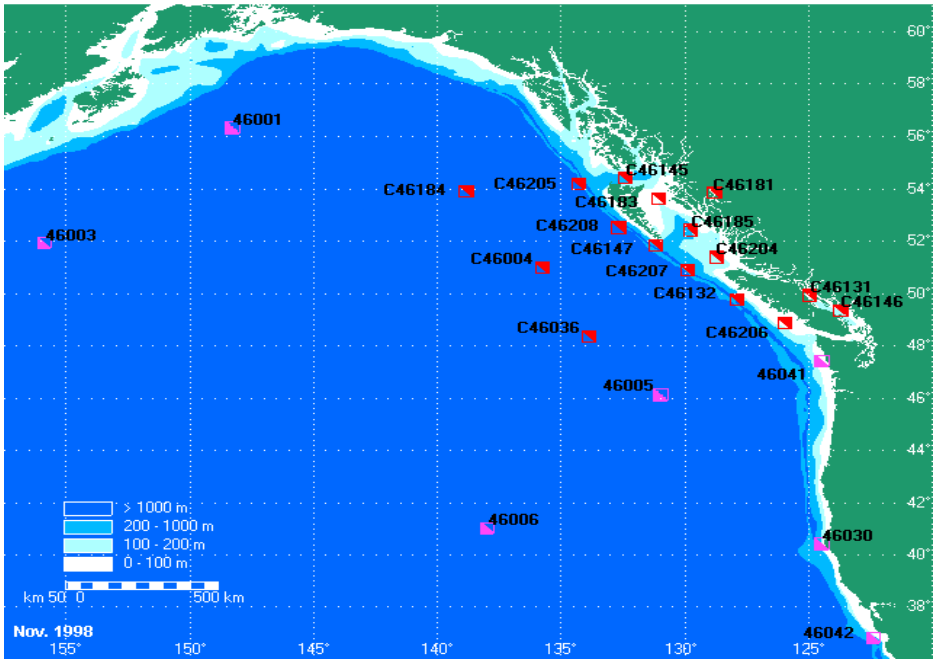
Buoy Network

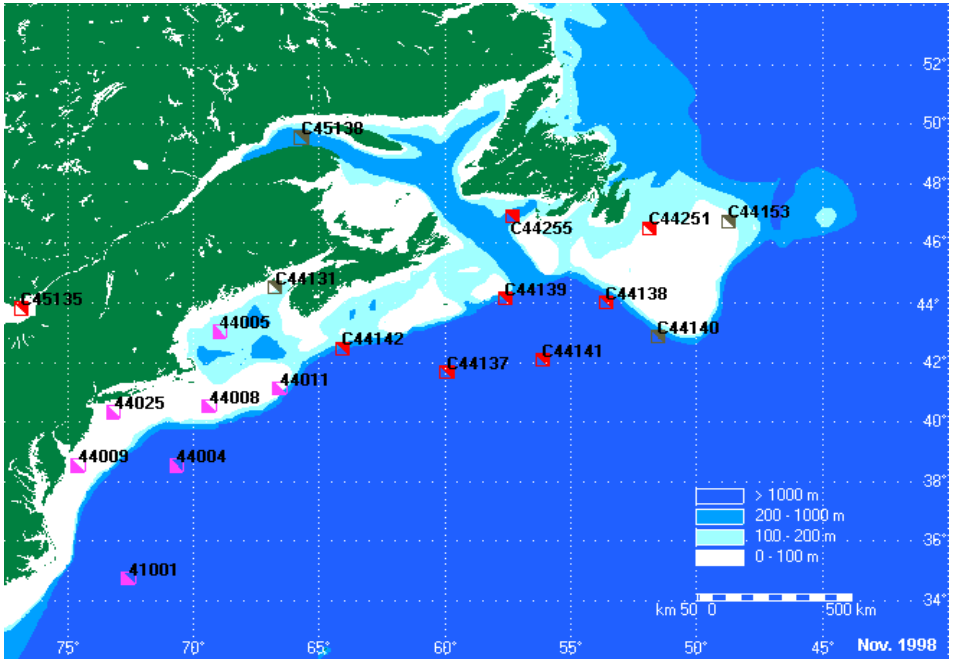
- 45 moored
- 6 drifting

VOS

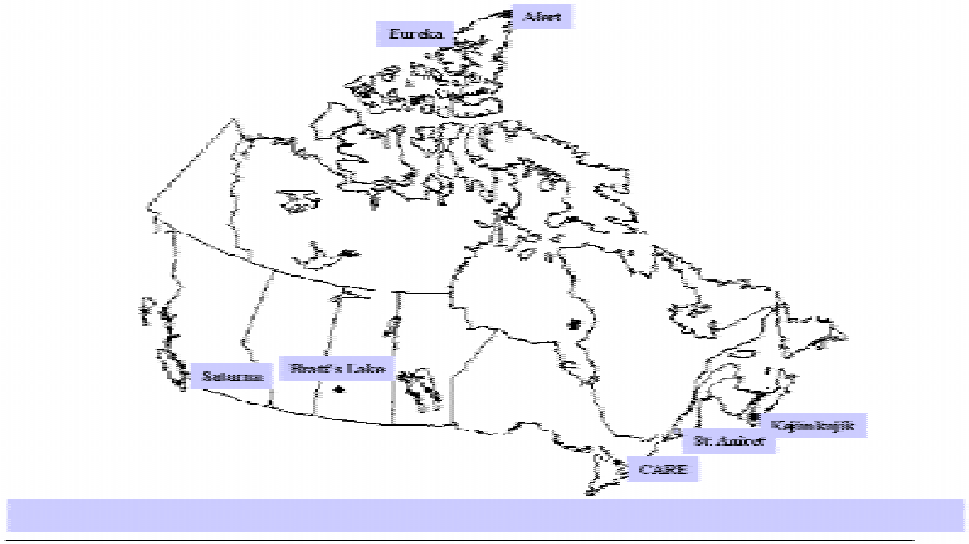
- ~300 vessels







Canada's Atmospheric Composition Monitoring Networks

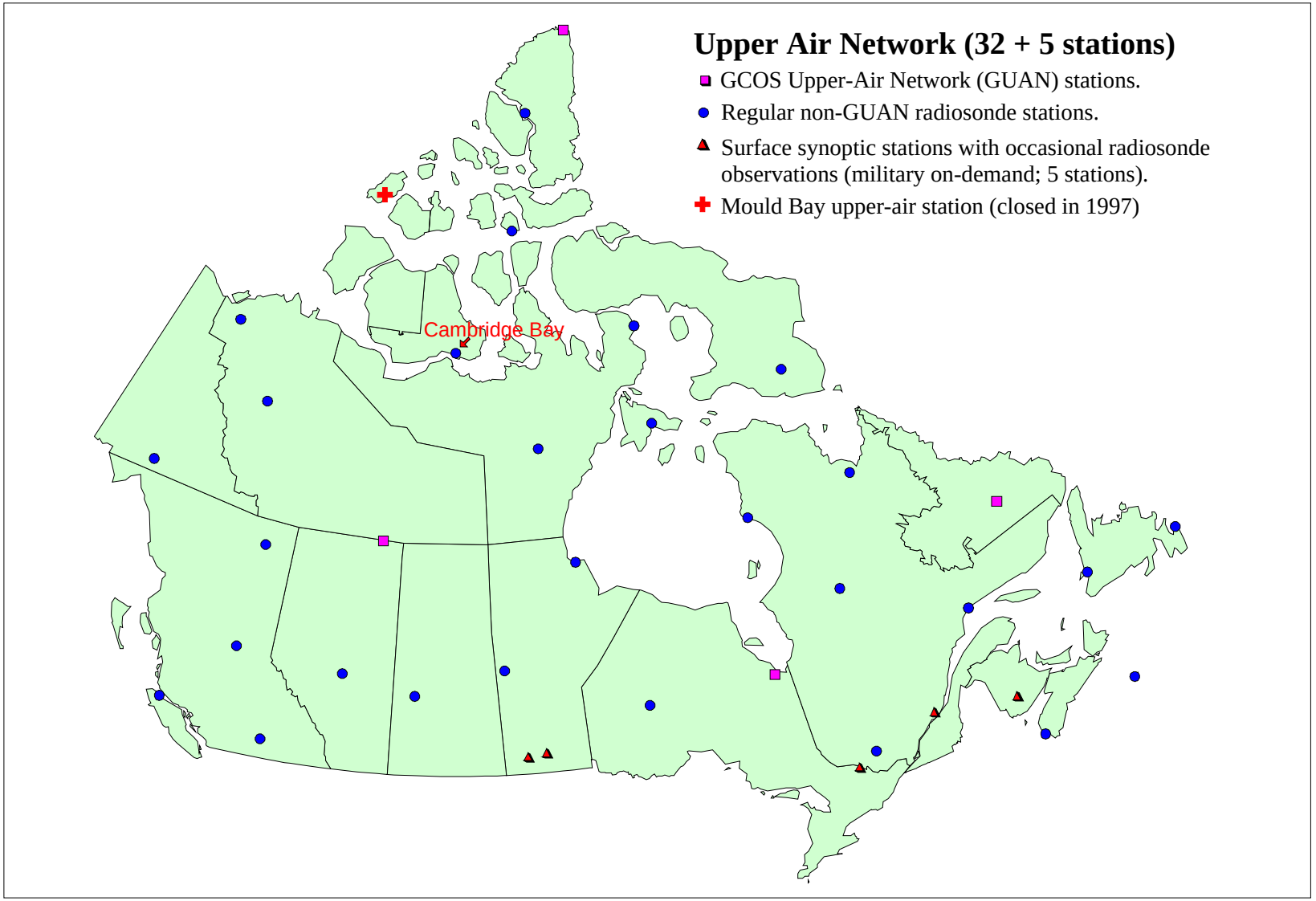


Canada's Core Network (7 stations)

GCOS Upper Air (GUAN)

- Canada's first GCOS commitment related to the upper air network
- In 1994 , Canada agreed to provide data from 5 key stations
- Budget cutbacks resulted in the closure of one station in 1996
- Canada subsequently identified an alternate site (Cambridge Bay) and is following the "best practices" guidelines

Canada’s Upper Air Network



A Long-Term Strategy for the Surface Network

To define the climates of Canada and address climate change/variability, Canada recognized the need to maintain a viable:

"Baseline Network of Long-Term Climate Monitoring Stations"

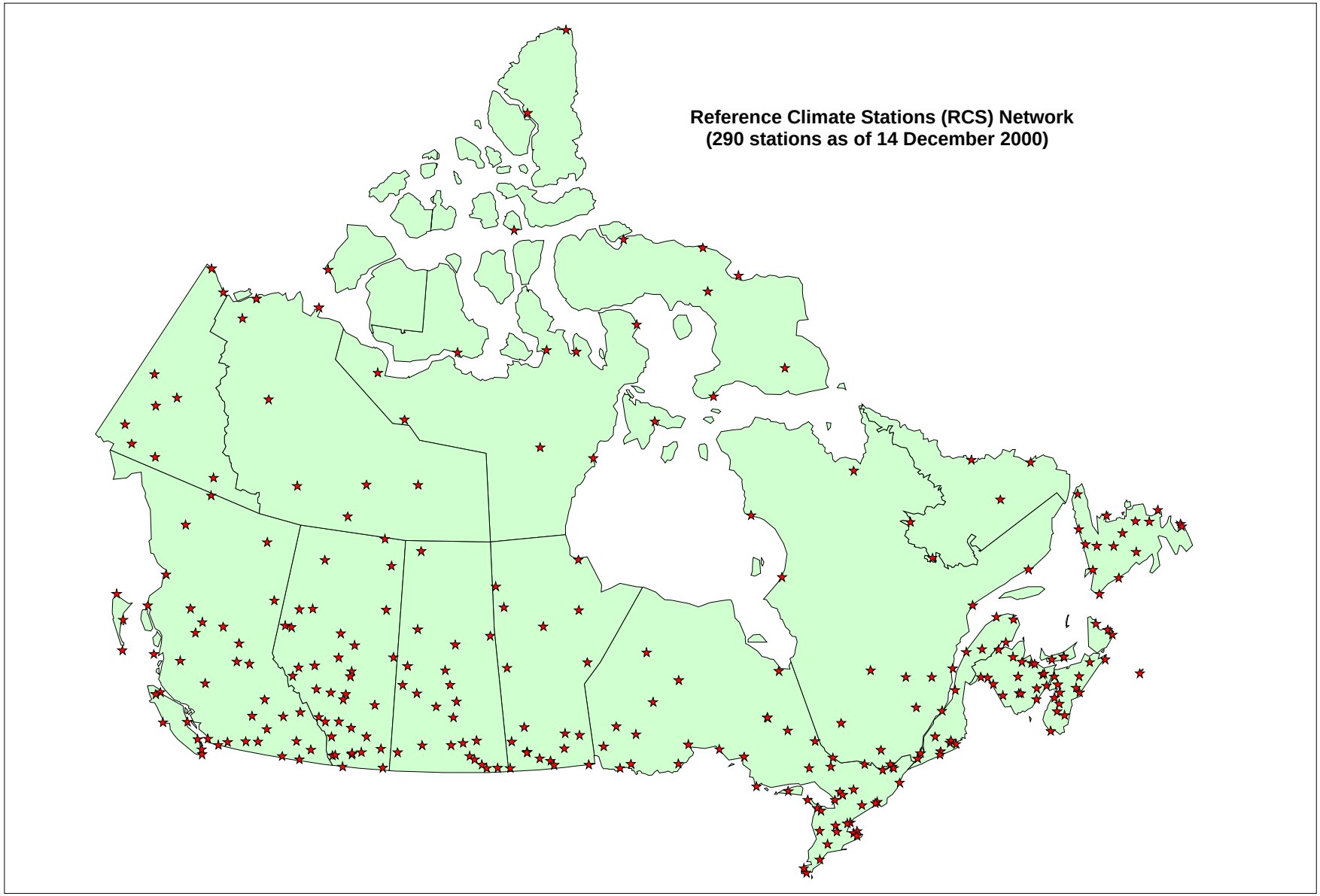
This network is being used to meet Canada's international obligations under:

- Framework Convention on Climate Change
- Kyoto Protocol
- Global Climate Observing System (GCOS)

Reference Climate Network (RCS)

- Major review completed in 1996:
  - applied consistent criteria: > 30 yrs. of record, no significant record gap, high quality data, etc.
  - resulted in 300 stations being identified
  - protected during major network downsizing period in the 1990s
  - 290 still operating today
  - need to automate vulnerable stations

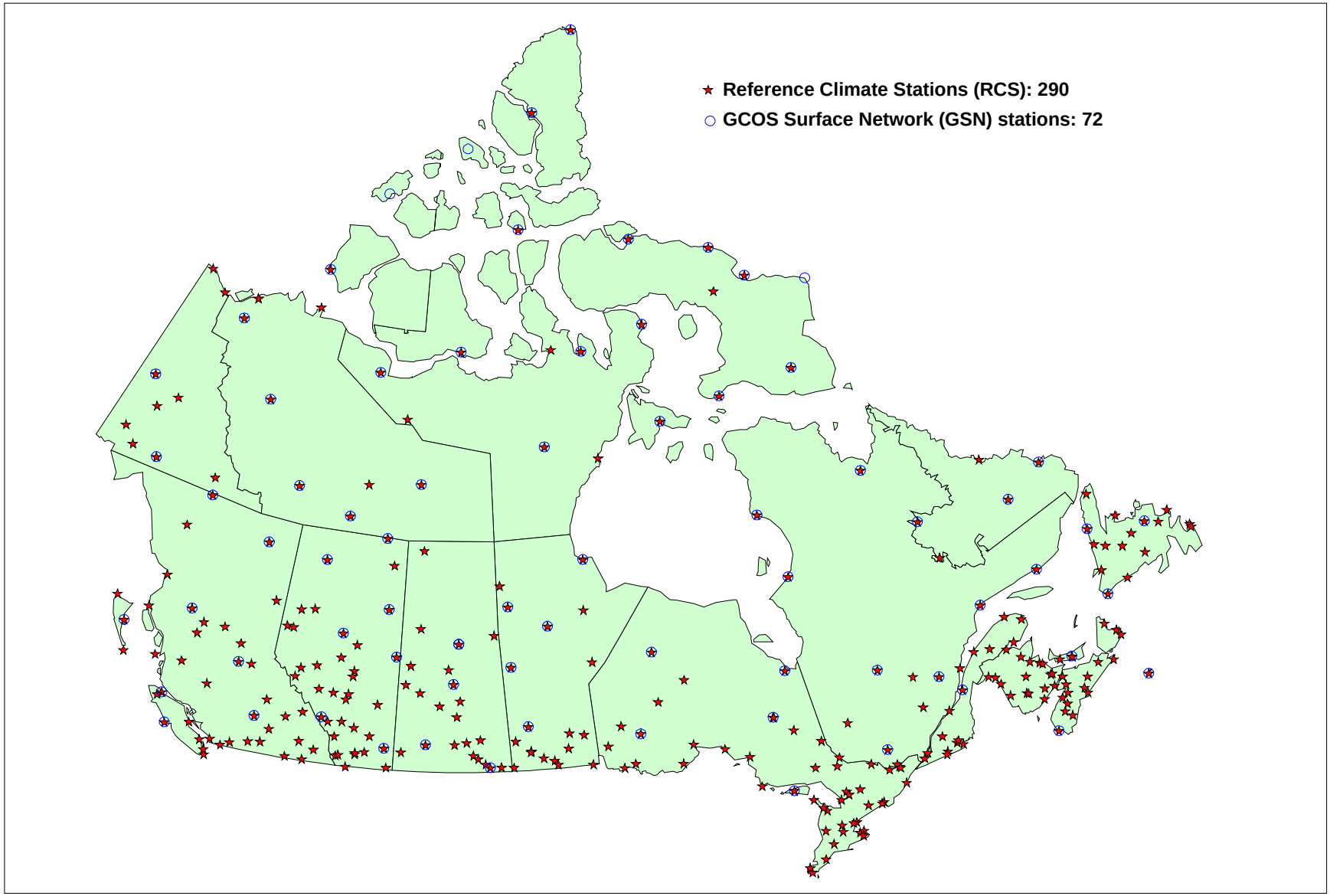
Canada's Current RCS Network



Canada's GCOS Surface Network (GSN)

- Canada worked very closely with the international working group to identify 72 stations in 1998 as their contribution to the GSN
- These stations are a subset of the existing RCS network
- Canada is working to ensure it is adhering to the guidelines: reporting in a timely manner, proper metadata, etc.

Canada's RCS/GSN Networks



Developing a National GCOS Plan

- By 1999 Canada initiated the development of a national plan that would effectively address the GCOS requirements for each of the major components:
  - **atmosphere (MSC Lead)**
  - **hydrosphere (MSC Lead)**
  - **oceans (Shared Lead)**
  - **cryosphere (Shared Lead)**
  - terrestrial

Approach

- Five working groups were formed comprised of experts and the appropriate monitoring agencies
- Each group reviewed Canada's monitoring programs in the context of meeting the international GCOS requirements
- The working groups completed their respective assessments, proposed strategies and put forth recommendations

National Workshop

- Component plans vetted at this multidisciplinary workshop
- Cross cutting monitoring needs and data integration issues were discussed
- Common issues: data management, modelling, the use of remote sensing reviewed

National Workshop

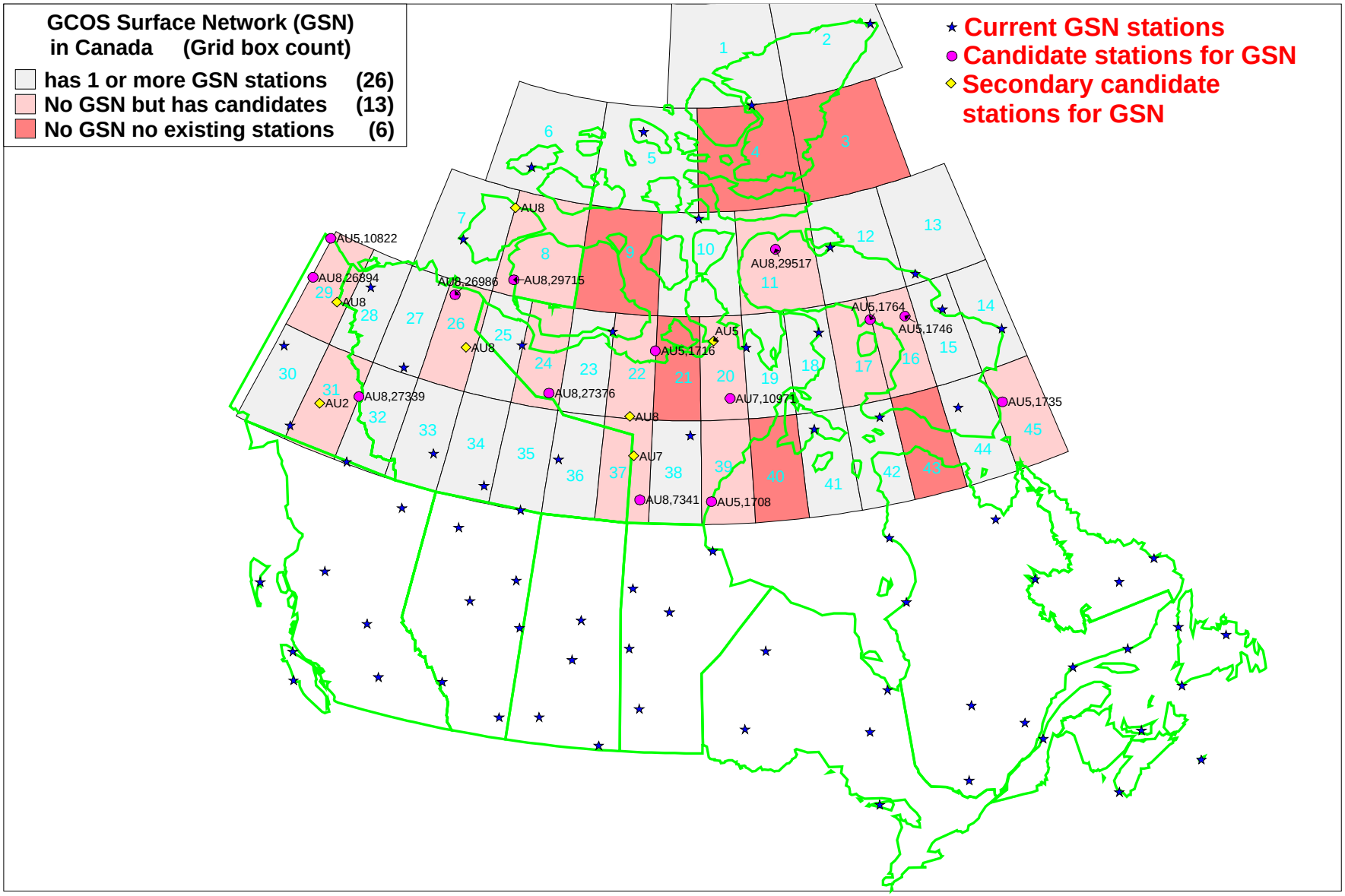
- Specific recommendations on the path forward for each component
- Costing of short term (< 2 years) and longer term (2-10 years) action plans
- Comprehensive report: "***Plan for Canadian Participation in the Global Climate Observing System***" (1999)

Next Steps

- The national plan set the stage for identifying the next steps in the development of more detailed plans within each component
- Proposals were submitted to a Climate Change Action Fund (CCAF) for funding to carry out this work
  - MSC received $300K (Cdn) to develop their plans

Enhancing Canada's GSN

- Climate change is going to be more pronounced in the sensitive north
- Canada recognizes the need to put more resources into monitoring in the north
- Plans call for enhancing 20 of the existing GSN stations and adding another 19 to fill gaps


GCOS Surface Network (GSN)
in Canada (Grid box count)
has 1 or more GSN stations (26)
No GSN but has candidates (13)
No GSN no existing stations (6)
Current GSN stations
Candidate stations for GSN
Secondary candidate stations for GSN
AU5,10822
AU8,26894
AU8
AU8,26986
AU8,29715
AU8
AU8,29517
AU5,1764
AU5,1746
AU5
AU5,1716
AU8
AU8,27376
AU7,10971
AU5,1735
AU2
AU8,27339
AU8
AU7
AU8,7341
AU5,1708
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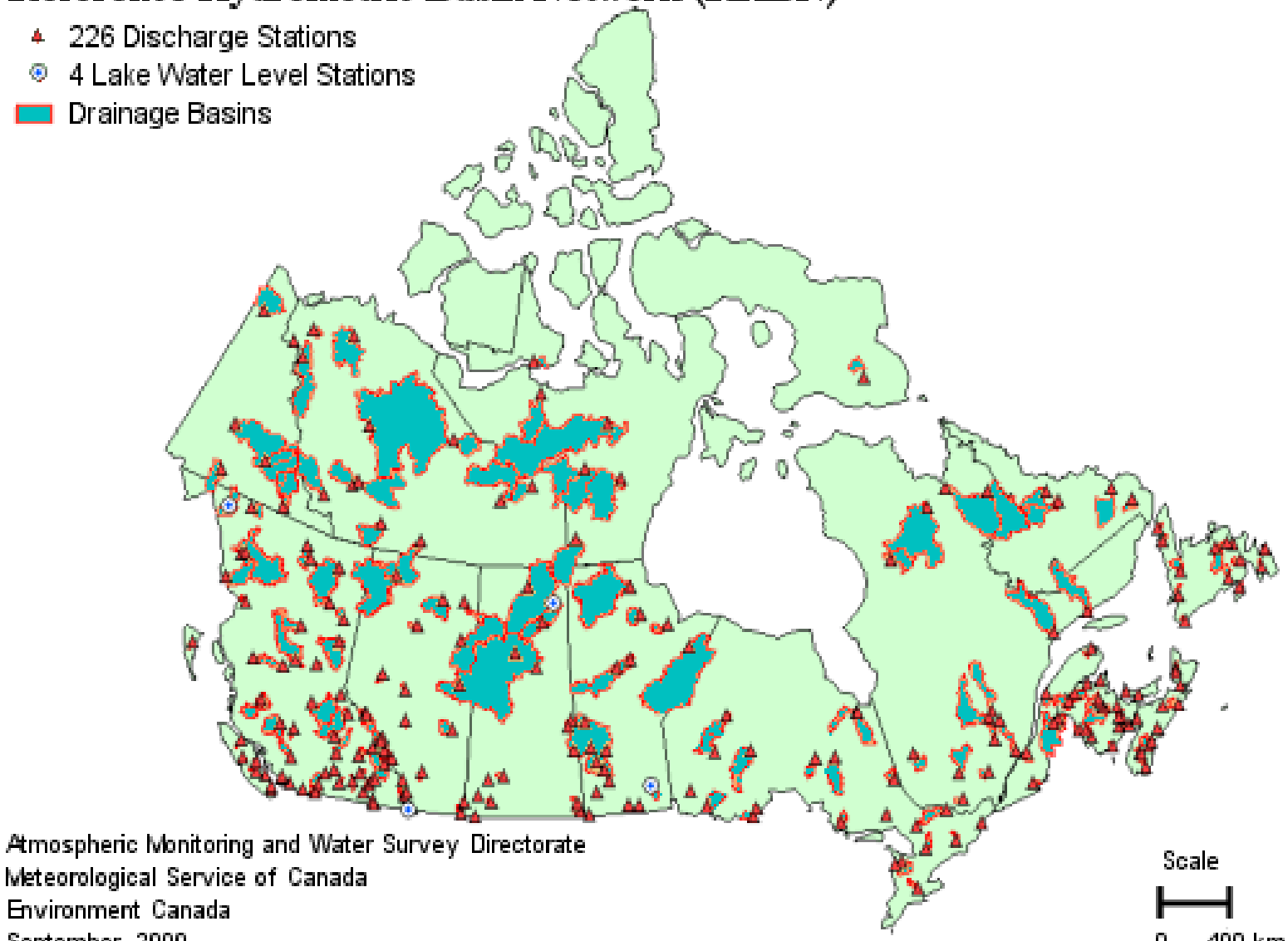
Further Component Assessments

- Detailed requirement studies have been completed and national strategies are being put in place for each of the monitoring networks:
  - cryosphere (glaciers, permafrost, snow and freshwater ice)
  - supplementary climate networks (radiation, bright sunshine, soil temp, wind, evaporation, etc.)
  - a sub-network of hydrometric stations for addressing climate change impacts (RHBN)

Reference Hydrometric Basin Network (RHBN)



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Coordination Mechanism

- To ensure that these GCOS plans are properly implemented and evolve, Canada is looking into establishing a “National Systematic Observations Board” that will:
  - promote awareness of GCOS
  - facilitate dialogue amongst the monitoring agencies
  - harmonize monitoring activities
  - ensure accountability

Concluding Remarks

- Canada strongly supports the GCOS goals
- Canada has adopted the GCOS framework as an integral part of its national planning process
- Canada is committed to the development and sustaining of the GCOS networks to meet both their domestic and international requirements