Data Management Issues Related to Drought Monitoring at Environment Canada

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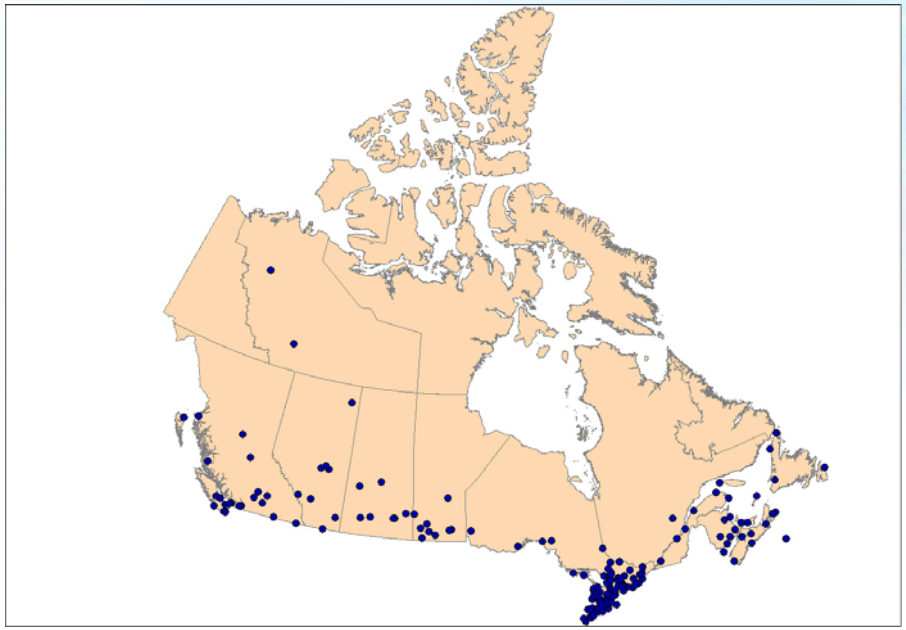
Outline

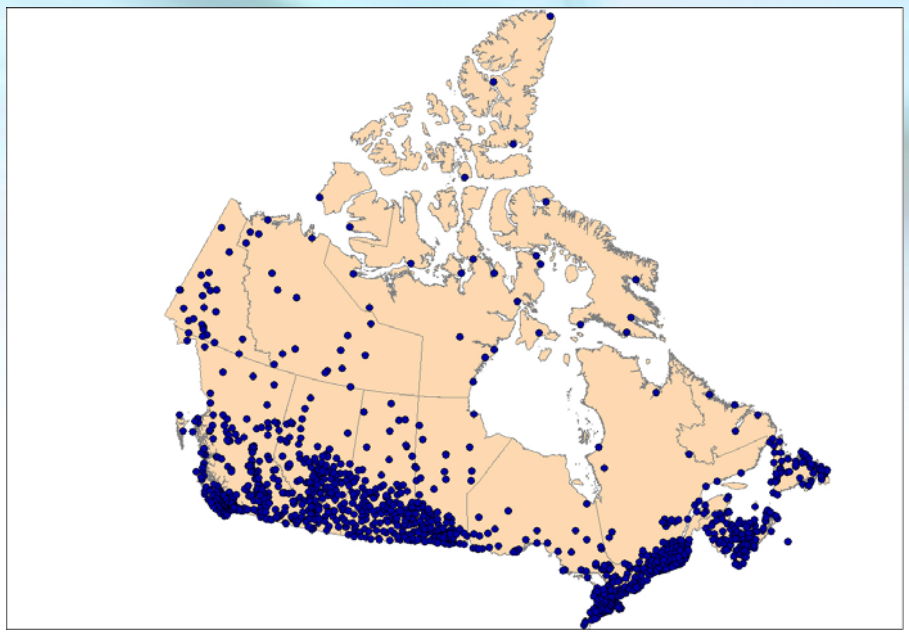
- Introduction
- Observational Networks and Data Characteristics
- Quality Control
- Forward Looking – Data Management Framework
- Summary

Introduction

- The Canadian climatological archives contain temperature and precipitation observations starting in 1840



1900 A.D. 159 stations



2000 A.D. 1313 stations

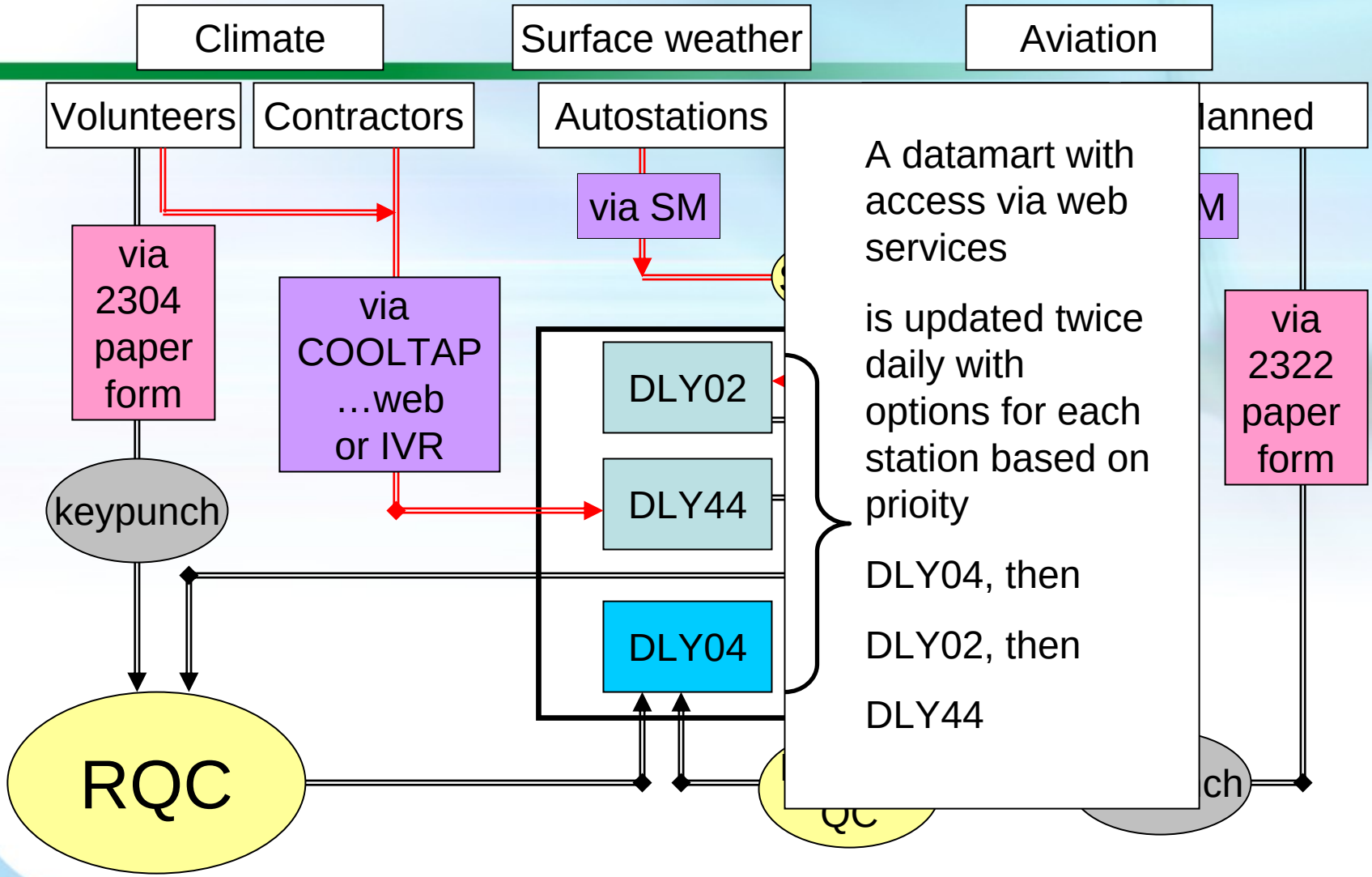
Trends and Challenges

- Automatic observing technology introduces changes often faster than data management keeps up resulting in
  - dissimilar data sets available for analysis
  - loss of long-term continuity (e.g. for comparison with long-term normals)
- Rationalization of networks (e.g. reductions and operational control reverting to other agencies such as observing sites at airports)
- Accessing and incorporating data from other agencies networks (e.g. provinces, conservation authorities, electrical utilities)
- Increased requirement for accessing data in real-time
- Use of remotely sensed data (e.g. weather RADAR) and numerical weather prediction model output to augment data sparse areas and assist the quality control of in-situ data

Environment Canada Daily T&P Data

- Synoptic data (e.g. data transmitted in WMO standard synoptic formats on the GTS)
  - Human observations – mainly airports
  - Automatic stations
    - Aviation
    - Surface weather
    - Reference Climate Stations (RCS)
- Cooperative / volunteer climate network
  - Processed from paper forms
  - Observer enters data on an Internet screen allowing for more timely access if the observer is so inclined

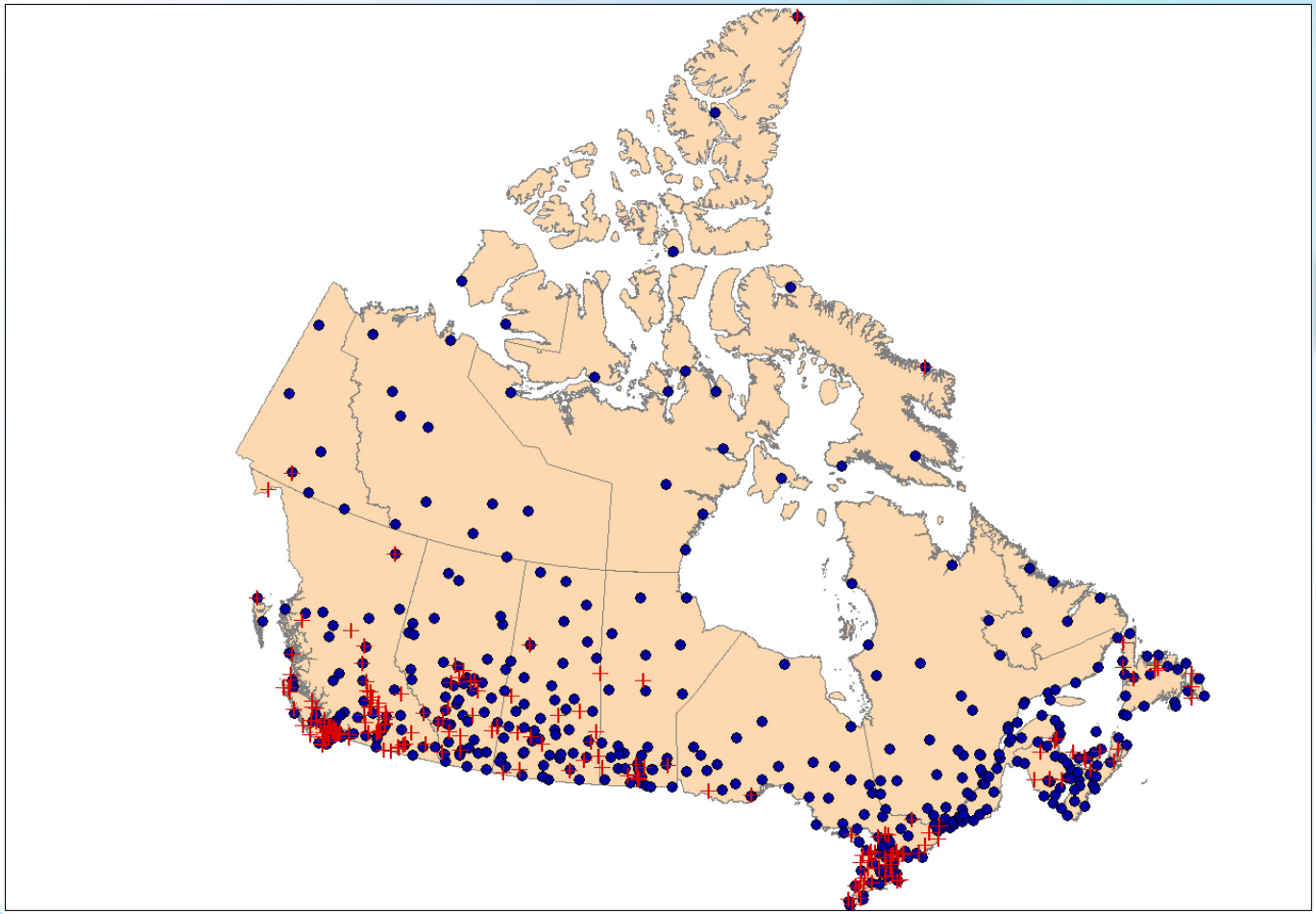
Environment Canada Daily Climate Data Reporting and Processing



Available within hours or days

Available within weeks or months

Currently for September 2006



10/24/2006

- From Synoptic Reports

  449 stations

- From volunteer observers

  (COOLTAP)

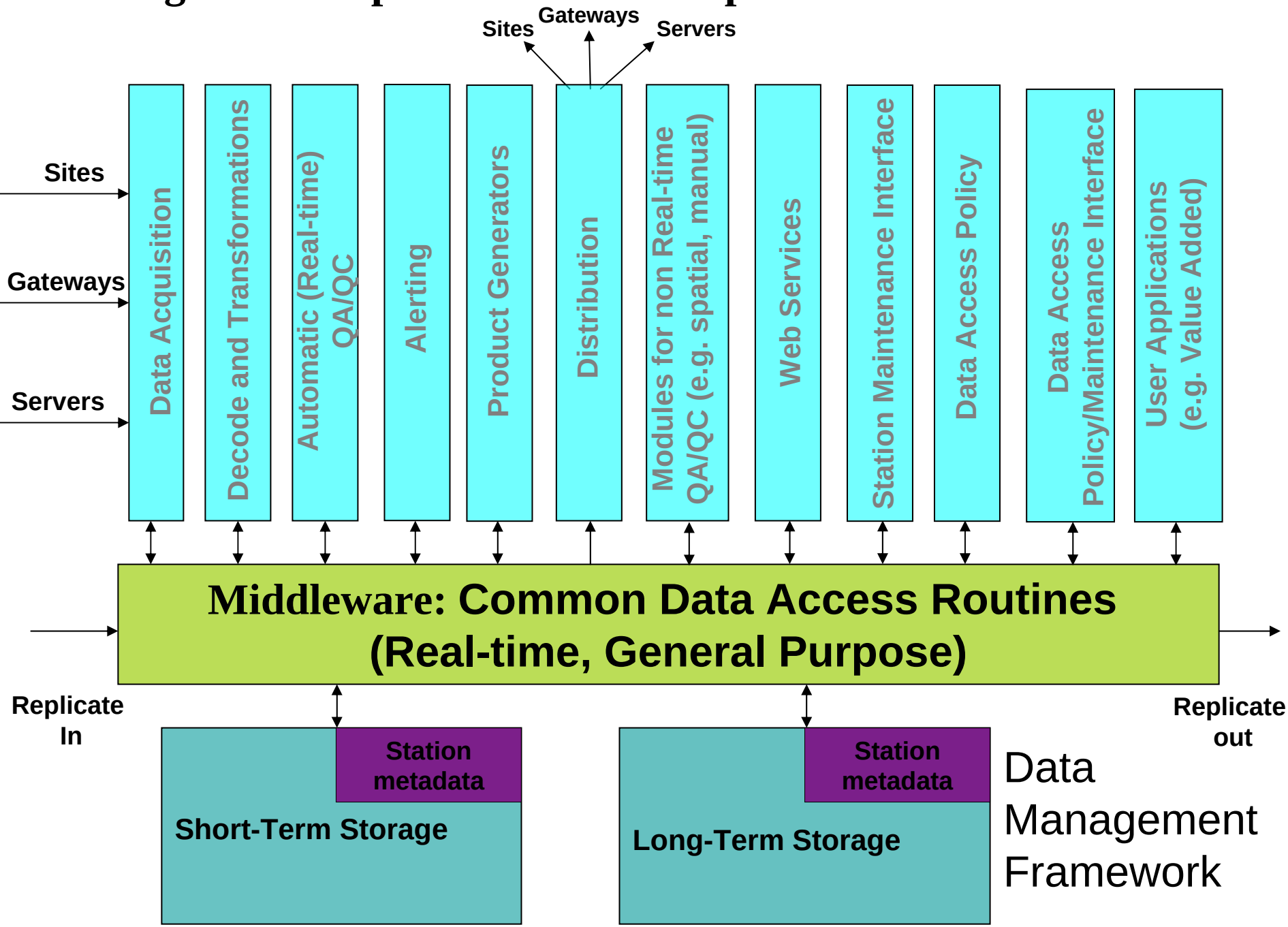
  187 stations

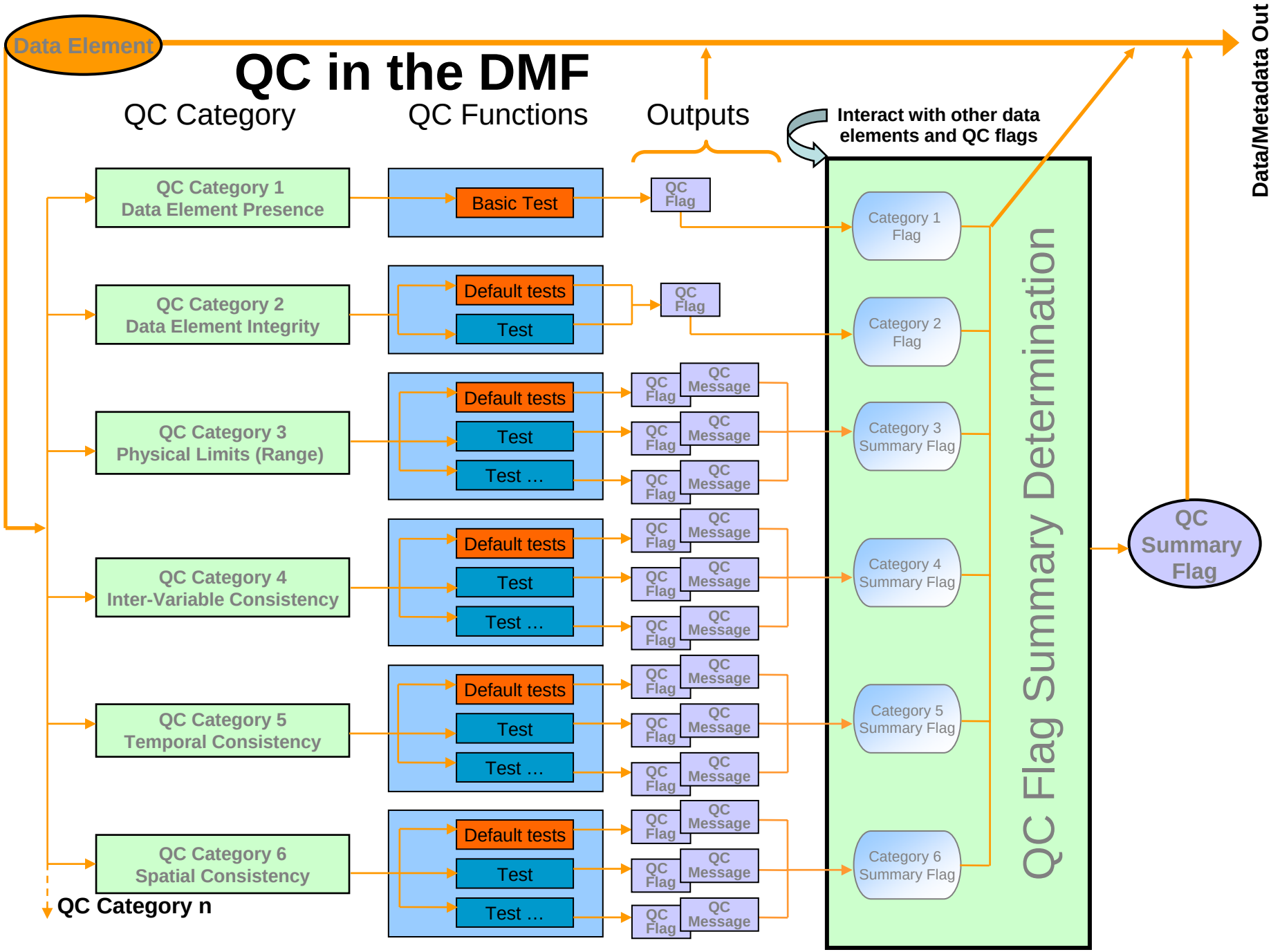
Number stations with at least 28 observations

Quality Control of Climate Data

- Based on “hard-wired” checks
  - Physical and probable limits
  - Physical consistency amongst elements
  - Trends
  - Spatial consistency
- Legacy system lacks flexibility to add new elements or data streams or to incorporate new related data into the system to assist checking e.g. RADAR, satellite, NWP model output
- The Data Management Framework (DMF) will provide a moderized approach for the future

Original concept of the DMF component-based architecture*




Data Element
QC in the DMF
QC Category
QC Functions
Outputs
Interact with other data elements and QC flags
Data/Metadata Out
QC Category 1
Data Element Presence
QC Category 2
Data Element Integrity
QC Category 3
Physical Limits (Range)
QC Category 4
Inter-Variable Consistency
QC Category 5
Temporal Consistency
QC Category 6
Spatial Consistency
QC Category n
Basic Test
Default tests
Test
Test …
QC Flag
QC Message
Category 1 Flag
Category 2 Flag
Category 3 Summary Flag
Category 4 Summary Flag
Category 5 Summary Flag
Category 6 Summary Flag
QC Flag Summary Determination
QC Summary Flag

Summary

- Climate data for drought monitoring in Environment Canada is steadily improving, especially in the area of availability of near-real time data.
- Improvements in data management are planned in the areas of
  - Near-real time quality control
  - Incorporating new data elements and other agencies' data
  - Use of related data (e.g. RADAR) to assist quality control and data completeness
  - Metadata, access systems (e.g. web services), geomatics systems

Gracias por su atención

Thank you