



The Impact of Arctic climate change on the CCG Icebreaking program and marine transportation

**David Jackson
Manager, Icebreaking Program
Canadian Coast Guard
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History



- **1880:** Britain transfers sovereignty of Arctic to Canada
- **1880-1903:** Exploration voyages to Hudson's Bay
- **1903:** Marine Department establishes permanent stations in Eastern Arctic

CCG Arctic Legislation



- **Oceans Act**
 - section 41 gives CCG the legislative authority to provide services for the safe, economical and efficient movement of ships in Canadian waters
- **Canada Shipping Act**
 - some sections have Minister of DFO as lead, ex: SAR
- **Arctic Waters Pollution Prevention Act (AWPPA) and associated regulations**
 - **NORDREG (Arctic Canada Traffic System) vessel monitoring support is provided by CCG. NORDREG is currently a voluntary reporting system**
 - **Arctic Ice Regime Shipping System (AIRSS) support**

CCG Arctic Programs

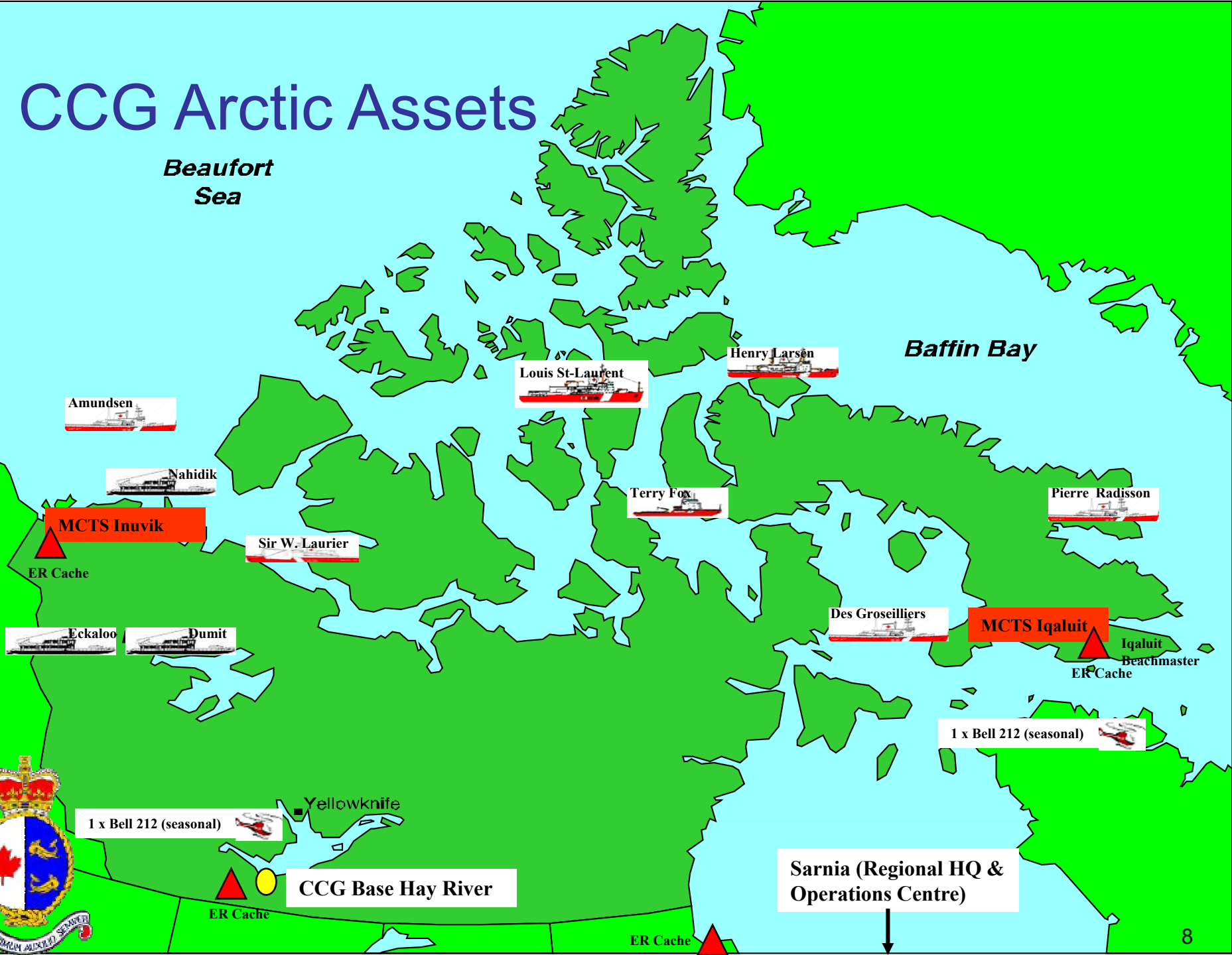


- **Ice routing & information / ship escorting / harbour breakout**
- **Maritime search and rescue (SAR)**
- **Marine navigation services**
- **Marine communications and traffic services (MCTS)**
- **Environmental response to marine spills**
- **Arctic resupply: fuel and cargo trans-shipment (Eureka, Nanisivik, Kugaaruk, Thule)**
- **Arctic ports program**
- **CCG Auxiliary (Rankin Inlet, Iqaluit, and Kimmirut)**
- **Fleet support to DFO (and other) science**
- **Fleet support to OGD's: GN, EC, DND, US Military Strategic Command**
- **No formal security role – but a major Arctic maritime player and platform provider**

CCG Arctic Assets

Beaufort Sea

Baffin Bay



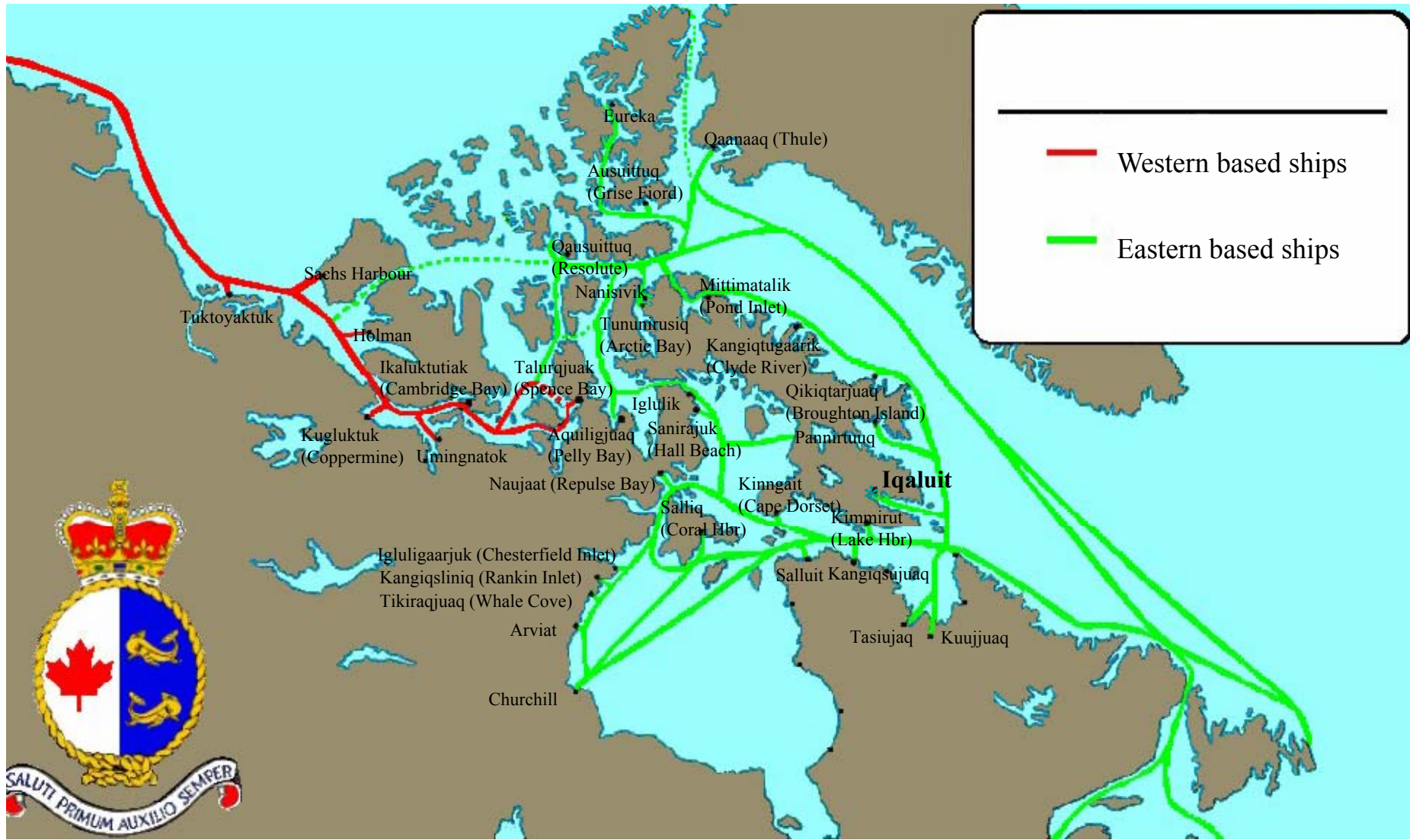
1 x Bell 212 (seasonal)

CCG Base Hay River

Sarnia (Regional HQ & Operations Centre)

1 x Bell 212 (seasonal)

Icebreaker Deployment and Commercial Traffic



CCG Arctic Assets (cont'd)



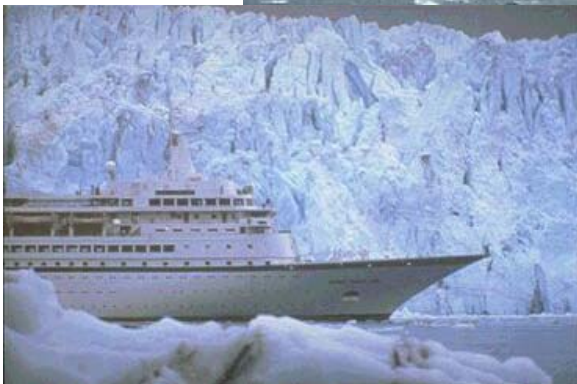
Ships (July to Nov deployment)

- **1 heavy icebreaker – CCGS Louis S. St-Laurent**
- **4 medium icebreakers – CCGS Henry Larsen, Terry Fox, Pierre Radisson, Des Groseilliers**
- **1 light icebreaker / multi-purpose vessel – CCGS Sir Wilfrid Laurier**
- **1 dedicated science icebreaker – CCGS Amundsen – externally funded on a project basis**
- **2 river class aids vessels – CCGS Dumit and Eckaloo (Mackenzie River only)**
- **1 dedicated science river class vessel – CCGS Nahidik – externally funded on a project basis**

Aircraft

- **4 helicopters carried aboard St-Laurent, Henry Larsen, Pierre Radisson and Des Groseilliers**
- **2 shore based helicopters from Parry Sound and Quebec City available to support Arctic fixed aids – for short periods during summer months**
- **CCG funded Ice Reconnaissance aircraft**

Commercial Traffic



Shipping Safety Control Zones



SHIPPING SAFETY CONTROL ZONES



2004 Arctic Voyages

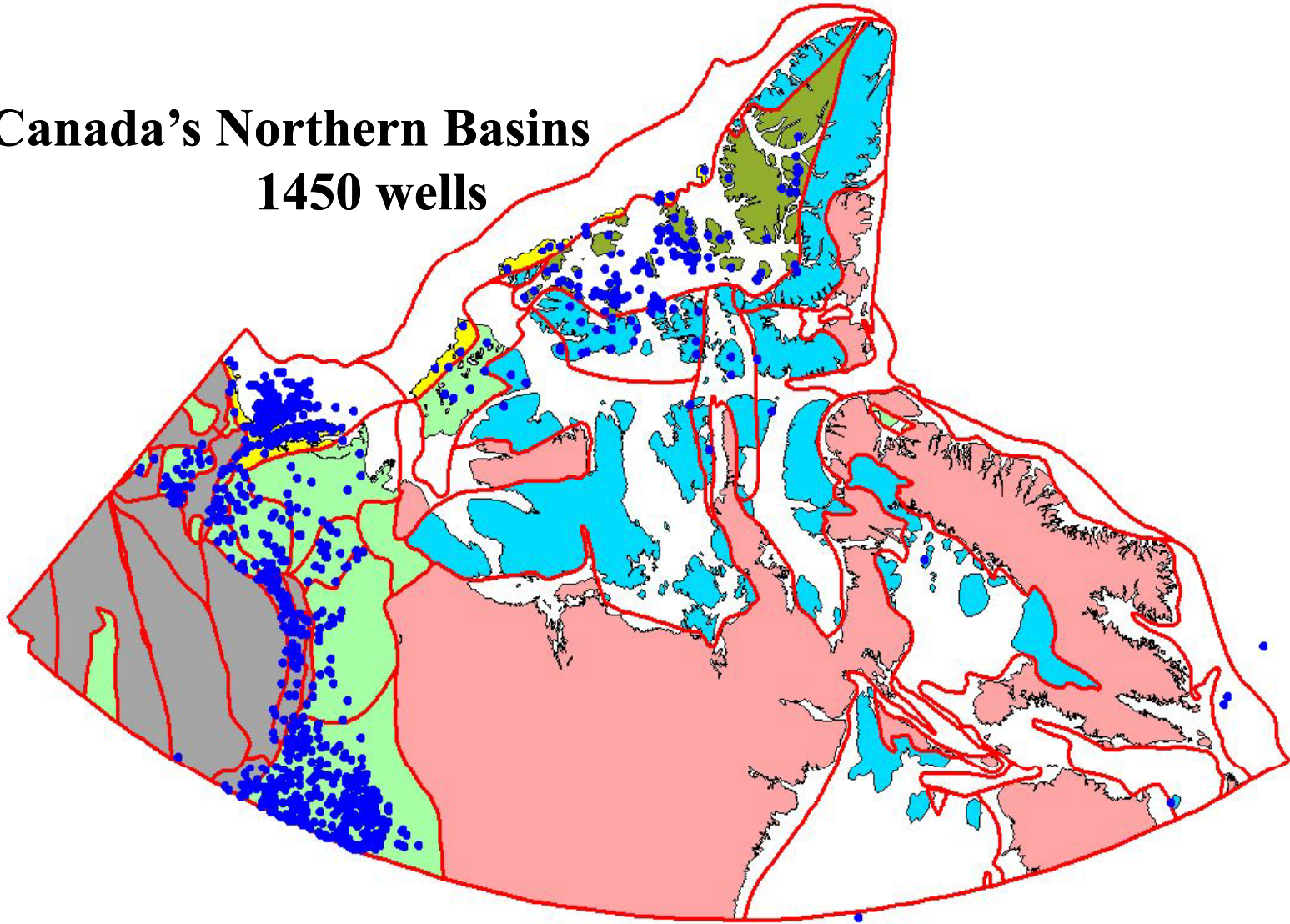


- **Total: 107 voyages from 61 different vessels**
- **Canadian government vessel voyages: 8 (7 CCG, 1 Canadian Navy)**
- **Commercial vessel voyages:**
 - Canadian vessel voyages (cargo ships, tankers, tug/barges): 62
 - Foreign cargo vessel voyages: 18 (14 Churchill)
 - Foreign cruise ship voyages: 7
 - Foreign research vessel voyages: 7
 - Foreign and Canadian pleasure craft voyages: 5 (all over-wintered)
- **NWP transits**
 - CCG: 2
 - Foreign cruise ships: 1
 - Foreign pleasure craft: 2 (2 years each to complete voyages)

Arctic Oil and Gas Exploration



Canada's Northern Basins
1450 wells



Other commercial activities



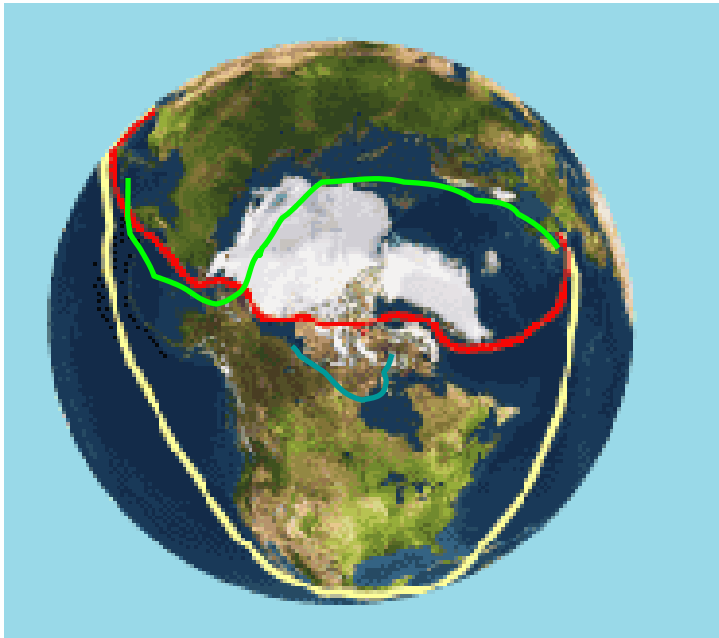
- Long term mining interests in Eastern Arctic
- Port of Churchill
- Increasing Beaufort sea presence/activity
- Increased traffic along Mackenzie River
- Bathurst Inlet Port project (possible revival of interest)
- Diamond mines in NWT

Climate Change and the Arctic



- variability in weather patterns
- melting of polar ice masses
- sea level changes
- increased thawing of permafrost
- increased coastal erosion
- changes in extent & thickness of sea ice
- displacement of aquatic, marine, and terrestrial wildlife
- Lengthening of navigation season

Northwest Passage



Distance: Germany to Japan	
Panama	15,600 n.m.
Suez	13,000 n.m.
NW Passage	9,800 n.m.
NSR	7,000 n.m.

Ice - A Navigational Hazard



Ram Ice



Growler



Impacts on Government Operations



- Longer Arctic patrols by CCG icebreakers
- Need to replace aging Icebreaker Fleet
- Need for improved Arctic marine charts and aids to navigation
- Improved Arctic port infrastructure (fuel, water, supplies, repair facilities)
- Improved monitoring of marine traffic
- Increased Traffic = Increased Risks
- Resolution of disputed areas
- UNCLOS ratification: surveys, declaration by 2013
- Review and update/strengthen legislation, standards etc

Research & Development



- Improved Ice information systems
- Improved radar detection of multi-year ice
- Arctic Ice Regime Shipping System: better science, more accurate evaluations, more useful in anticipation of increased traffic
- Multi-agency involvement

International Polar Year



- Science activities planned over 2 year period: 2007/08 and 2008/09
- CCG is providing ship-time for projects on a cost-recovered basis
- Main focus on: Climate Change impacts and Health & Well-being of northern communities

Arctic Outlook & Issues



- Current Federal Government has reinforced its commitment to the North
- Arctic shipping is currently steady-state. Increase will be gradual, yet continuous.
- Most shipping will continue to be south-north (re-supply) and north-south (resource extraction).
- Increase in cruise shipping (esp. “ecotourism”), recreational and F/V traffic
- Climate change: crews have seen greater variability in ice seasons
- CCG experience has seen very heavy ice years in the Northwest Passage and Canadian Archipelago
- NWP transits are not common. Although voyages by “adventurers” are increasing.

Conclusion



- **Shipping is, and will continue to be, driven by local supply demands as well as global resource markets.**
- **The Federal and Territorial Governments are committed to the North.**
- **Commercial economic activity is encouraged, and is increasing.**
- **Inclusion of local population/organizations is encouraged and provides an indispensable resource.**