Environment and Climate Change Canada | Environnement et Changement climatique Canada

Canada

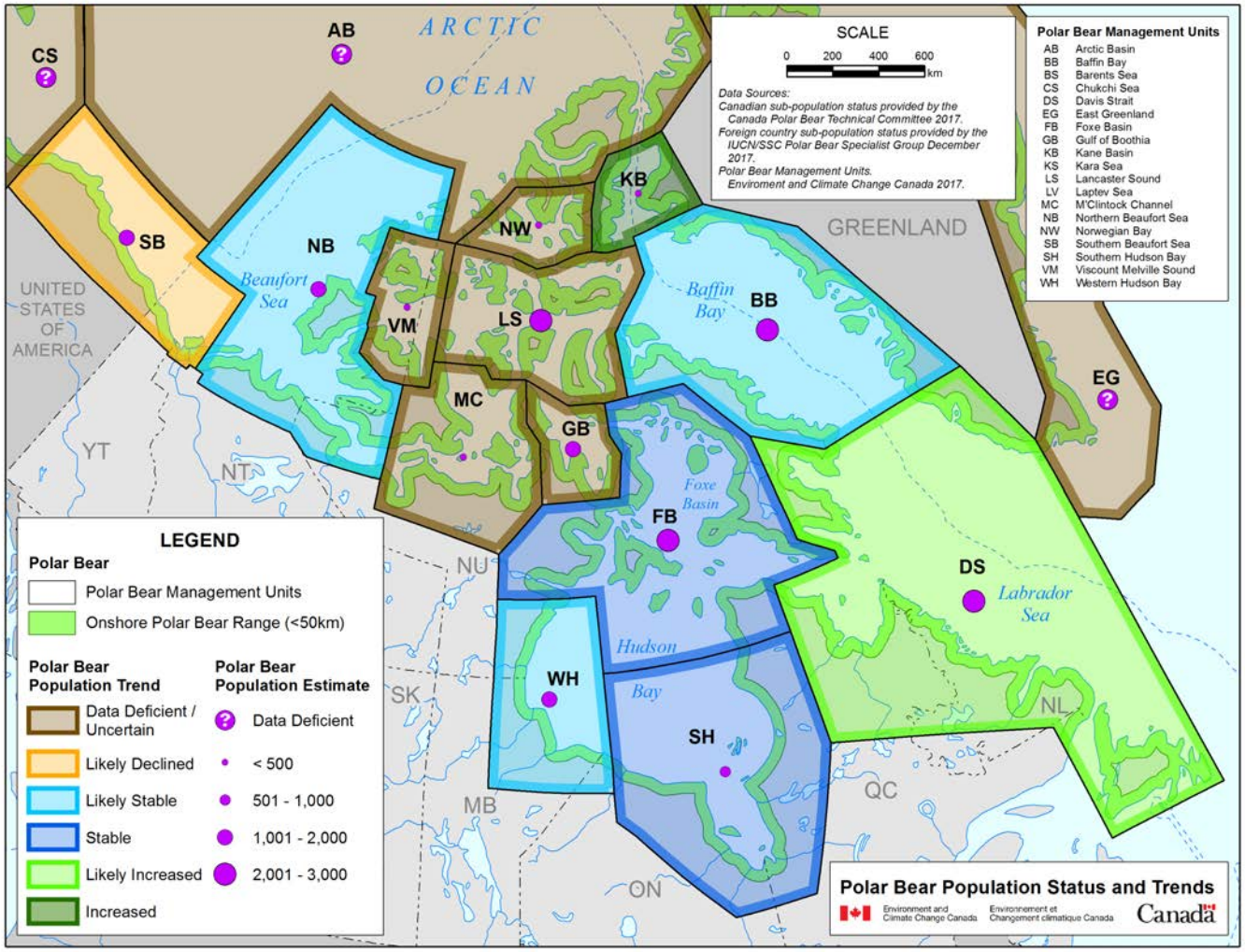
Polar Bear Research in Canada: Understanding Ecology, Environmental Change and Sustainability

Polar Bear Range States
Fairbanks, Alaska

Dr. Evan Richardson
Environment and Climate Change Canada

February 2-4, 2018

Polar Bears in Canada



Canada home to about two-thirds of world's polar bears:

- requires collaborative research and monitoring for informed management
- responsibility to ensure sustainable harvest and use within Indigenous communities

Roles in Canadian Polar Bear Research

- Territorial and Provincial
  - focus on information required to ensure sustainable harvests: monitoring techniques; population size, status and trends, health
- Environment and Climate Change Canada
  - focus on polar bear ecology and understanding Arctic ecosystems
  - understanding relationships among polar bears, seals and sea ice
  - contributing to assessments of population size and trend
- Universities
  - focus on specific questions of population health, population genetics and ecological relationships, e.g. diet and foraging, habitat use, demography and body condition
- Communities

  - Hunter harvest monitoring, local observations and TEK

Canada's Current Polar Bear Research

- Four research priorities:

  1. Habitat and climate change: understanding links among changes in climate, sea ice habitat, polar bear activities, body condition and population status

  2. Population assessment: application of less intrusive and more cost-effective monitoring techniques to assess population demography

  3. Genetics and health: research into population genetics and polar bear health

  4. Foraging ecology and ecosystem dynamics: polar bear foraging ecology in relation to prey dynamics in marine and terrestrial environments

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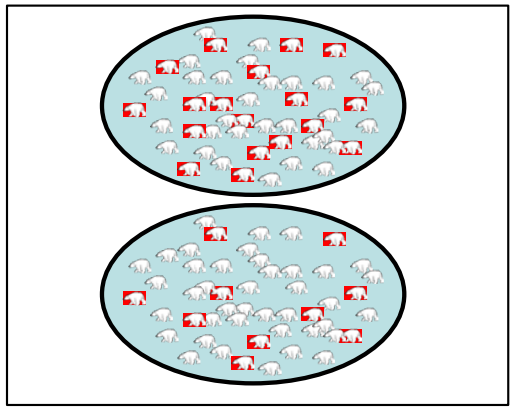
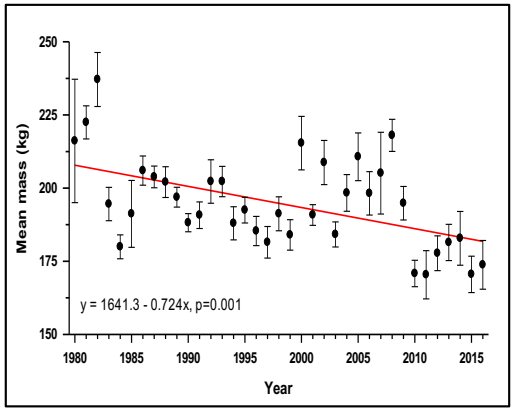
Western Hudson Bay Research: Impacts of Changing Climate





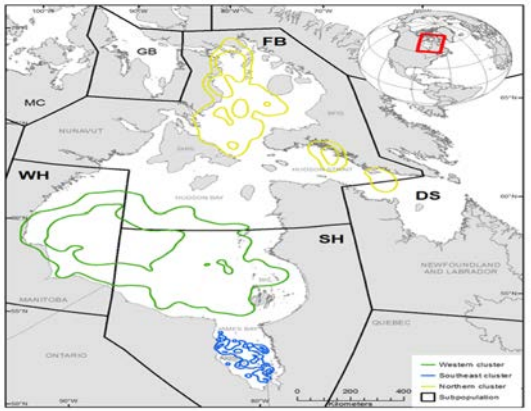
- Capture program (1980-present)
  - population demographic response to long-term environmental variation
  - climate impacts on life history (e.g. declines in growth and reproduction)
  - monitoring diet to understand changes in ecosystem function
  - changes in habitat availability
  - GPS collaring
  - tissue collection: contaminants, diet, disease and genetics

(Environment and Climate Change Canada / Manitoba)

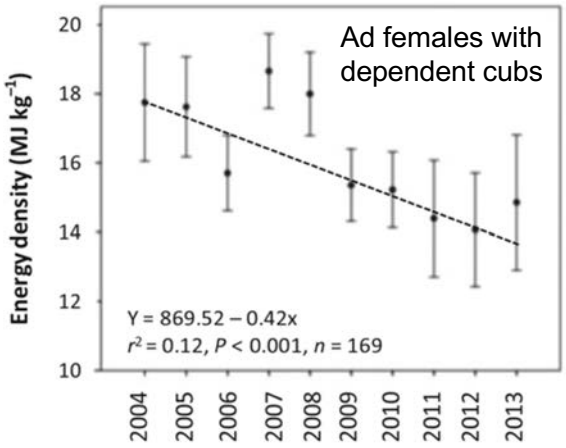
Western Hudson Bay Research: Key Findings

Reduced sea ice availability increases mortality rates

Body size is under selection and heritable

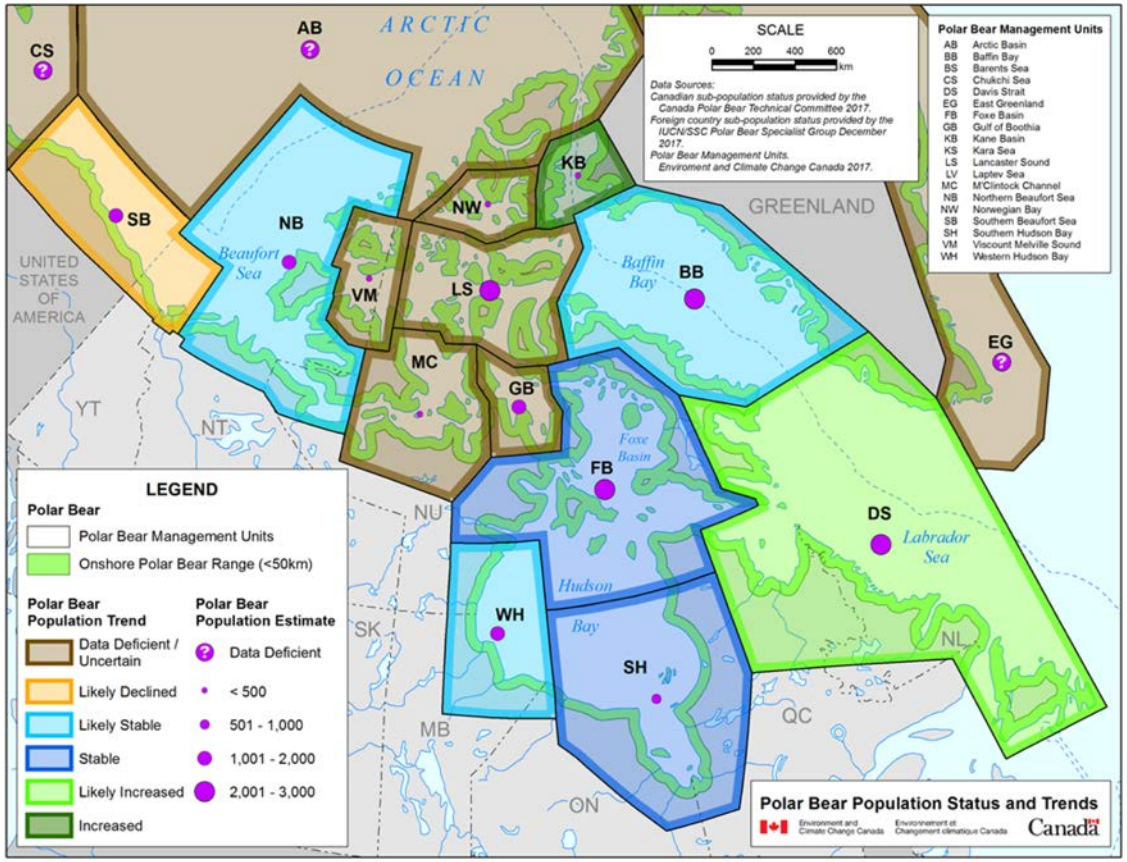


Breeding season movements influence genetic structure



Long term declines in body condition in western Hudson Bay

Beaufort Sea Research: Linking Predators and Prey



- Long-term research (1980-present)
  - linking polar bear and ringed seal population dynamics
  - tissue collection: contaminants, diet, and genetics
  - polar bear foraging ecology
  - sea ice dynamics
  - population assessments with USGS (2007 and 2015)
  - aerial survey 2017

(Environment and Climate Change Canada / NWT / USGS)

Beaufort Sea Research: Key Findings

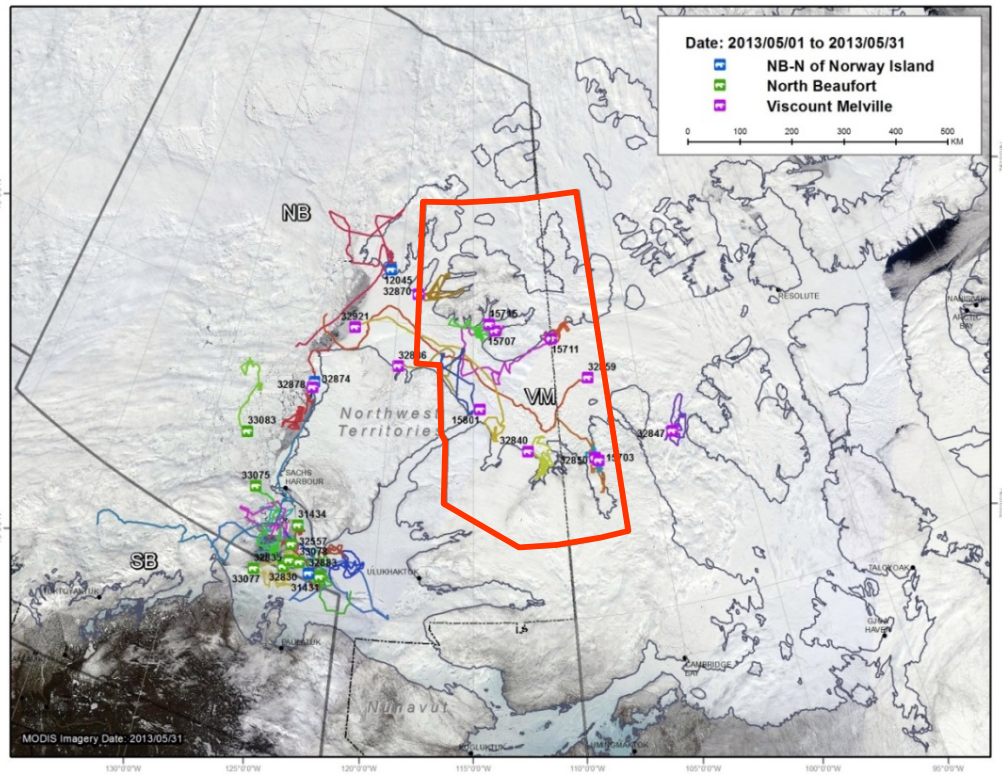
Increased long distance swimming rates

Prey abundance and availability influence nutritional condition

Population cycling in key prey species

Regional-scale variation in responses to changing climate

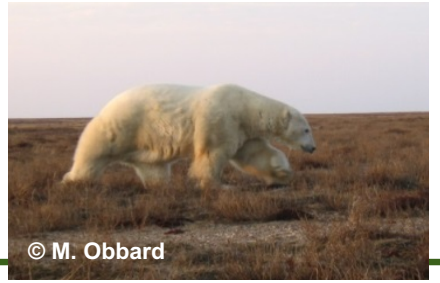
Viscount Melville Sound: multi-year sea-ice?

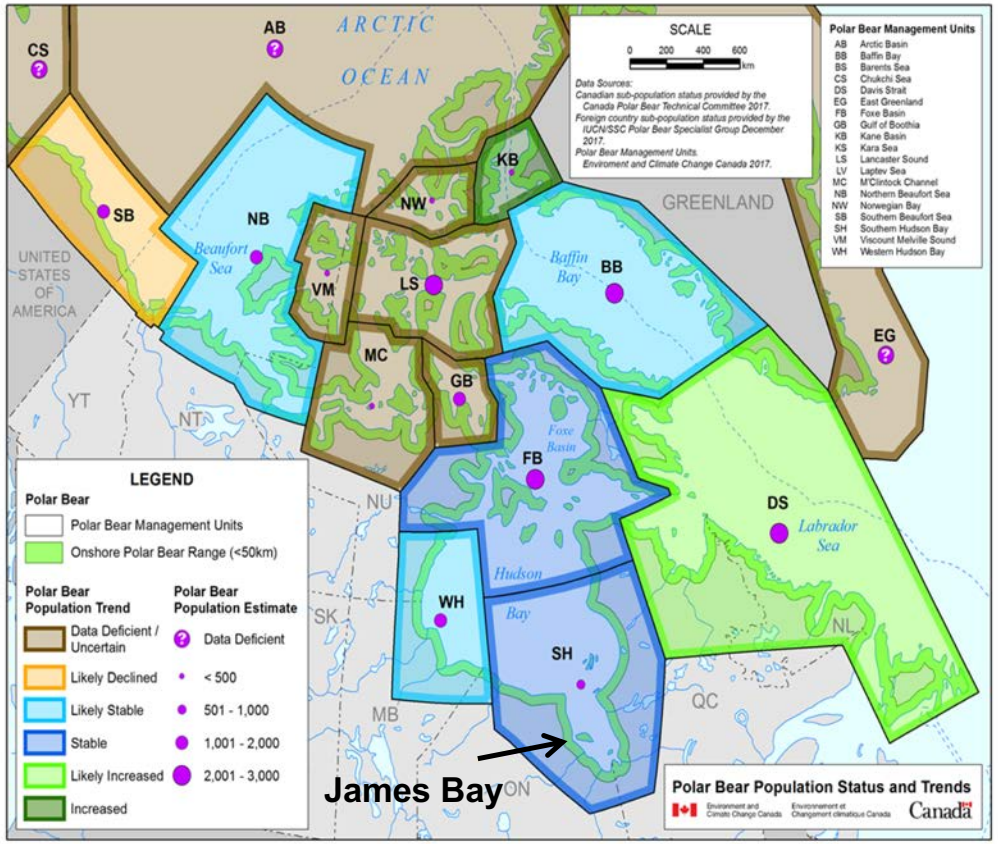


- Ongoing ecological studies
  - High mercury (Hg) loads
  - Evidence for foraging on belugas
  - 4 hybrids caught in VM
  - Ongoing genetics work to examine hybridization
  - Analysis of GPS movements and habitat use
  - preliminary community consultations on population results

(Northwest Territories/Environment and Climate Change Canada/Nunavut)

Southern Hudson Bay: Ecology at Southern Limits





(Ontario Ministry of Natural Resources/ Government of Nunavut)

- Capture program (2003-2005, 2007, 2009)
  - long-term declines in body condition (1984-present)
  - abundance estimate
  - tissue collection: contaminants, diet, and genetics
- Aerial surveys (2012/2016)
- Capture program James Bay (2012-2015)
  - GPS collaring
  - tissue collection
  - body condition and health assessment

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