



Marine Mammals of British Columbia

Current Status, Distribution and Critical Habitats



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Outline

- Brief (very) introduction to marine mammals of BC
- Historical occurrence of whales in BC
- Recent efforts to determine current status of cetacean species
- Recent attempts to identify Critical Habitat for Threatened & Endangered species
- Overview of pinnipeds in BC

Marine Mammals of British Columbia

- 25 Cetaceans, 5 Pinnipeds, 1 Mustelid



Baleen Whales of British Columbia

Family Balaenopteridae – Rorquals (5 spp)

Blue Whale *Balaenoptera musculus* ★★★



Fin Whale *Balaenoptera physalus* ★★



Sei Whale *Balaenoptera borealis* ★★★



Minke Whale *Balaenoptera acutorostrata*



Humpback Whale *Megaptera novaeangliae* ★★



SARA Status
★★★ = Endangered
★★ = Threatened
★ = Spec. Concern

Family Balaenidae – Right Whales (1 sp)

North Pacific Right Whale *Eubalaena japonica* ★★★



Family Eschrichtiidae – Grey Whales (1 sp)

Grey Whale *Eschrichtius robustus* ★



Toothed Whales of British Columbia

Family Physeteridae – Sperm Whales (3 spp)

Sperm Whale *Physeter macrocephalus*



Pygmy Sperm Whale *Kogia breviceps*



Dwarf Sperm Whale *Kogia sima*



Family Ziphiidae – Beaked Whales (4 spp)

Hubbs' Beaked Whale *Mesoplodon carlhubbsii*



Stejneger's Beaked Whale *Mesoplodon stejnegeri*



Baird's Beaked Whale *Berardius bairdii*



Cuvier's Beaked Whale *Ziphius cavirostris*



Toothed Whales of British Columbia

Family Delphinidae – Dolphins (9 spp)

Pacific White-sided Dolphin *Lagenorhynchus obliquidens*



Striped Dolphin *Stenella coeruleoalba*



Northern Right Whale Dolphin *Lissodelphis borealis*



Short-Beaked Common Dolphin *Delphinus delphis*



Long-Beaked Common Dolphin *Delphinus capensis*



Killer Whale *Orcinus orca*



Short-finned Pilot Whale *Globicephala macrorhynchus*



False Killer Whale *Pseudorca crassidens*



Risso's Dolphin *Grampus griseus*



Family Phocoenidae – Porpoises (2 spp)

Dall's Porpoise *Phocoenoides dalli*

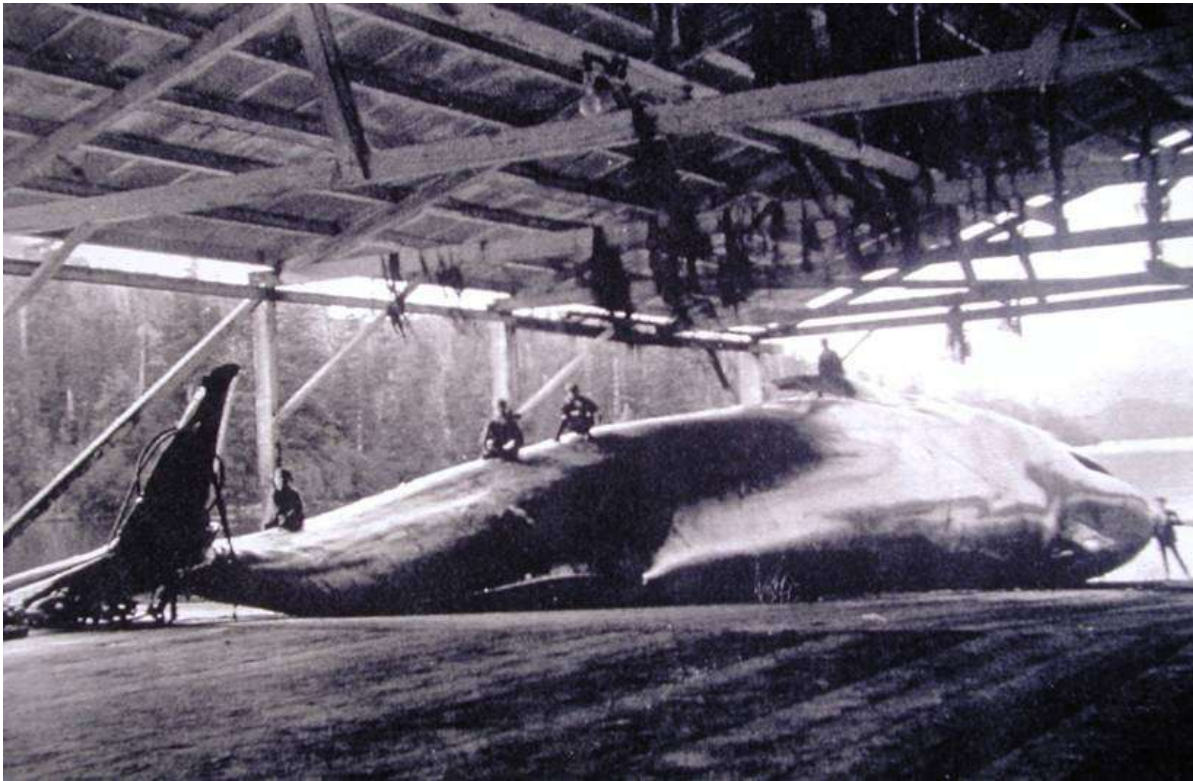


Harbour Porpoise *Phocoena phocoena*



Historical whaling in British Columbia

- Total of 25,403 whales taken during commercial whaling era in BC, 1908 – 1967



Blue whale, ca. 1925, Rose Harbour, QCI

Species	Total
Blue whale	1,380
Fin whale	7,716
Sei whale	4,108
Humpback whale	5,621
Sperm whale	6,514

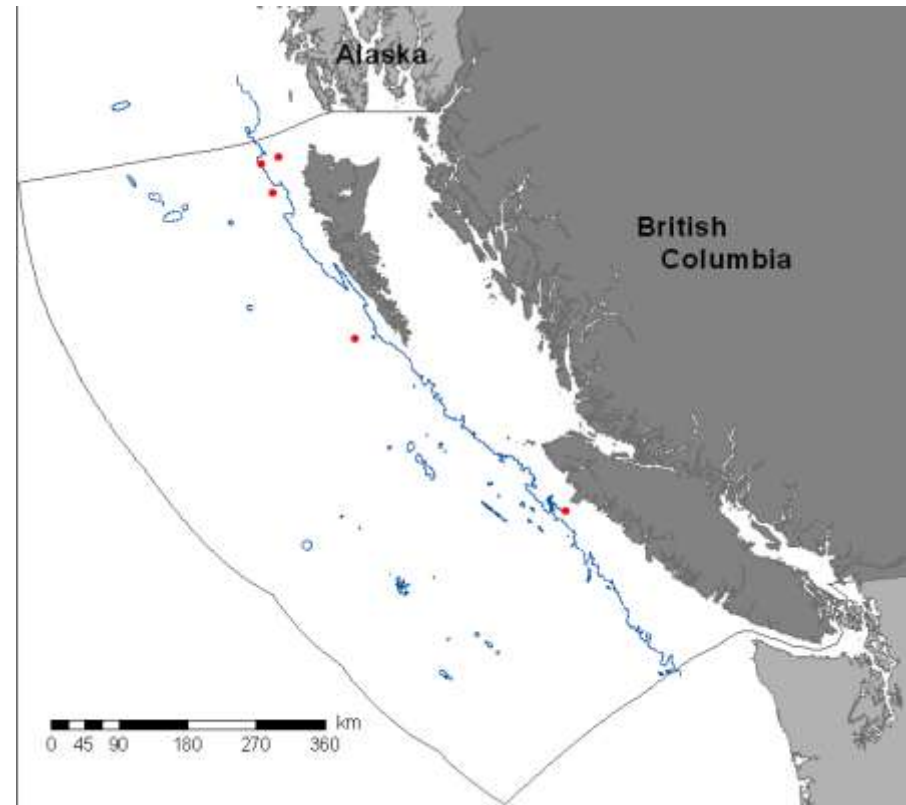
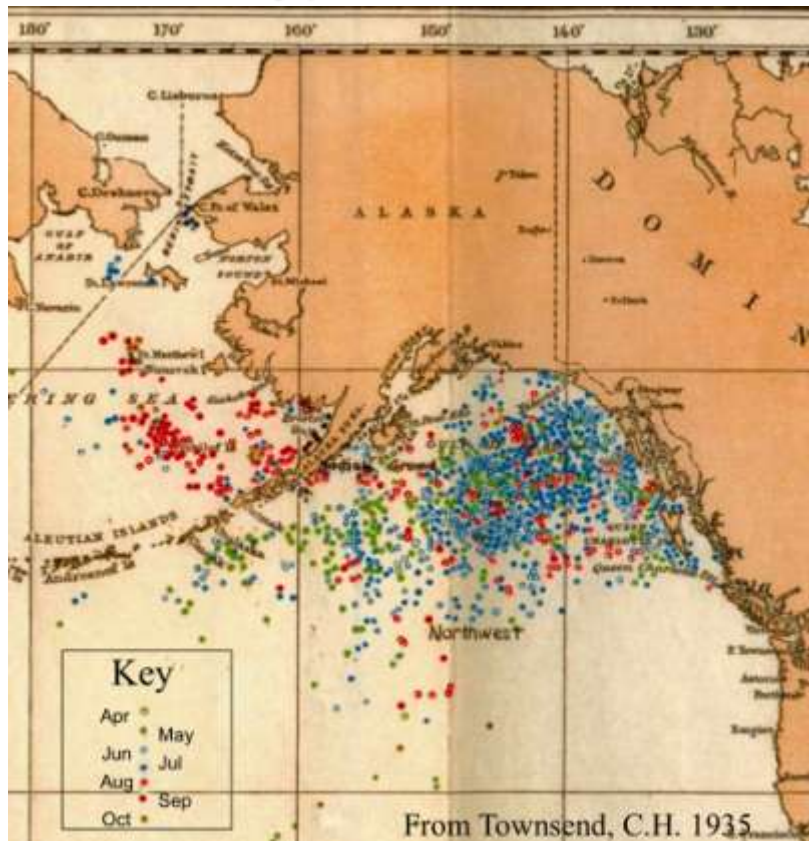
Distribution of whale catches

North Pacific Right Whale



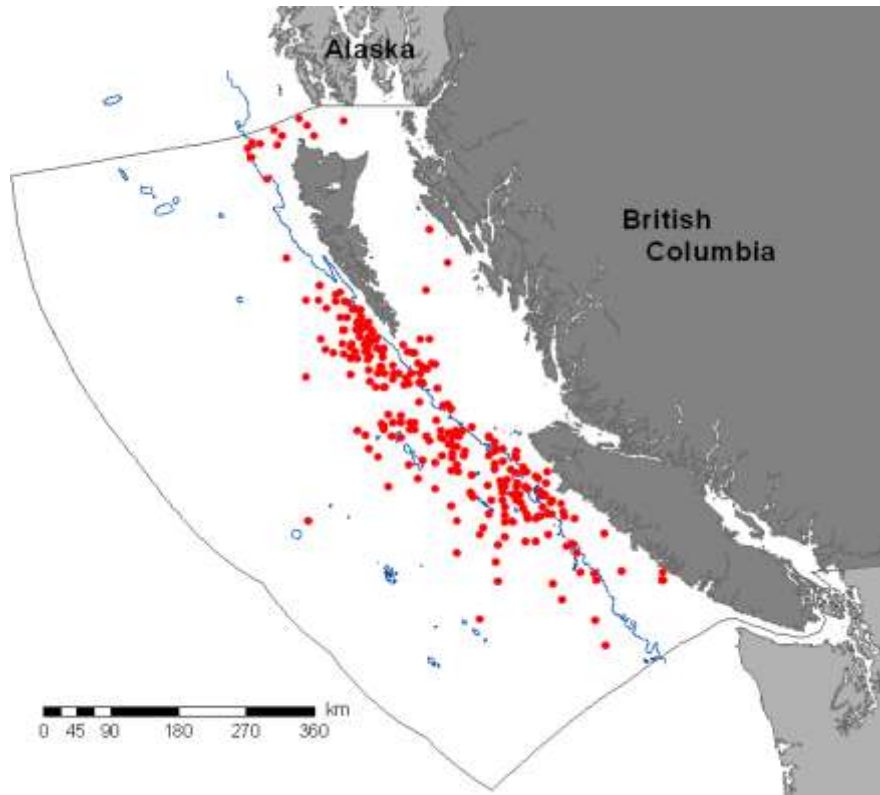
Est. 15,374 right whales taken in North Pacific, mostly prior to 1875

5 right whales taken in BC, 1908 – 1951

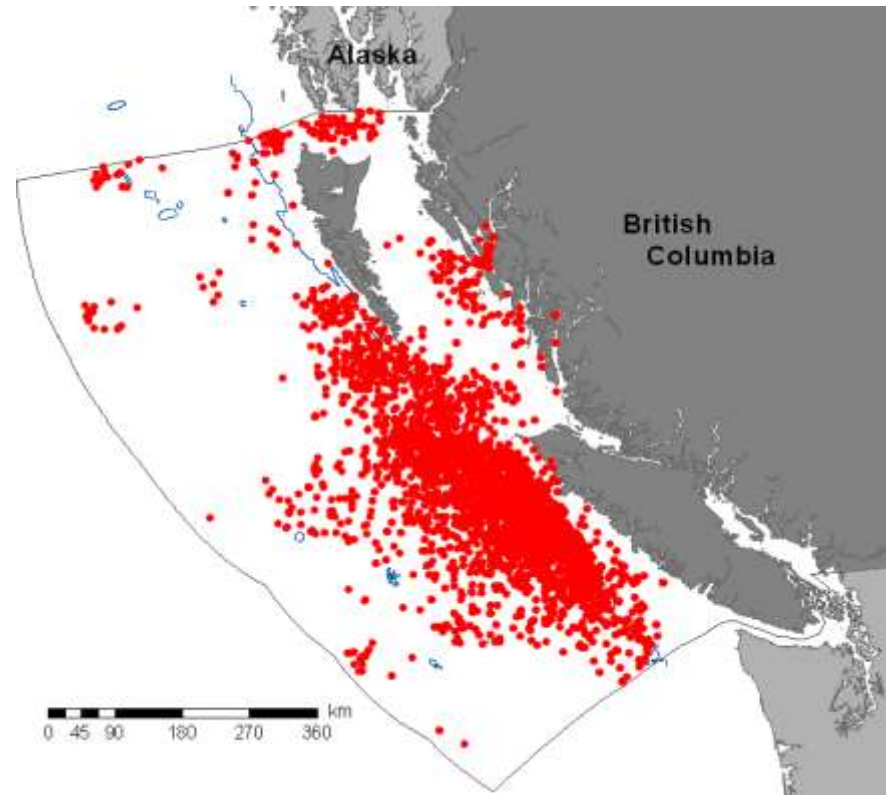


Distribution of whale catches

Blue whale



Fin whale

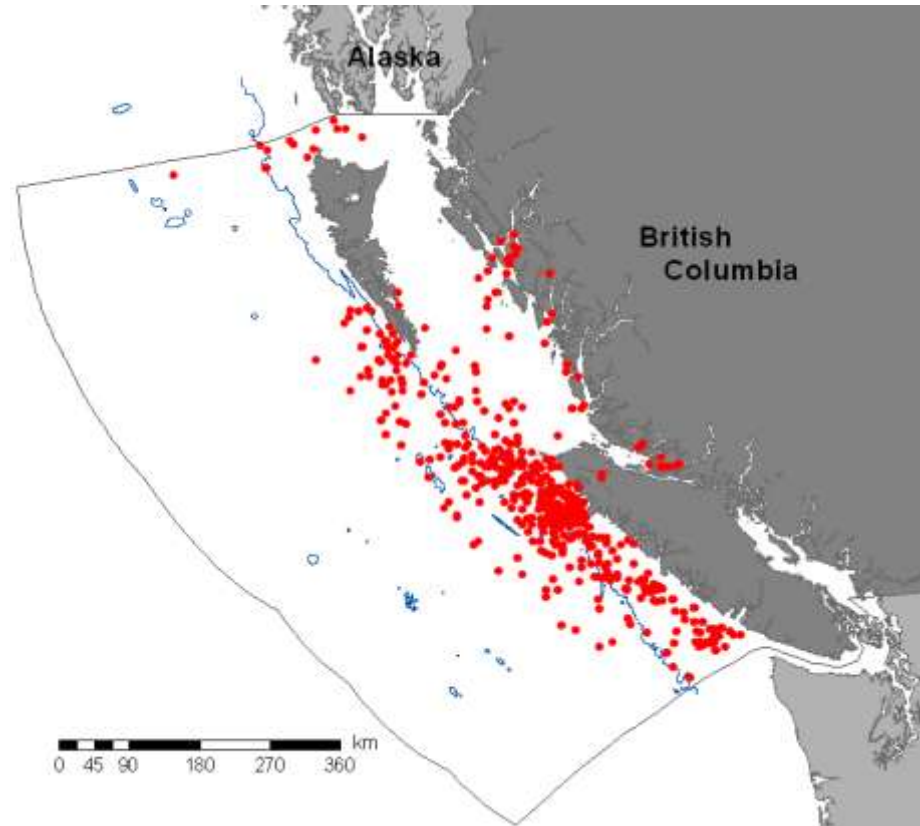
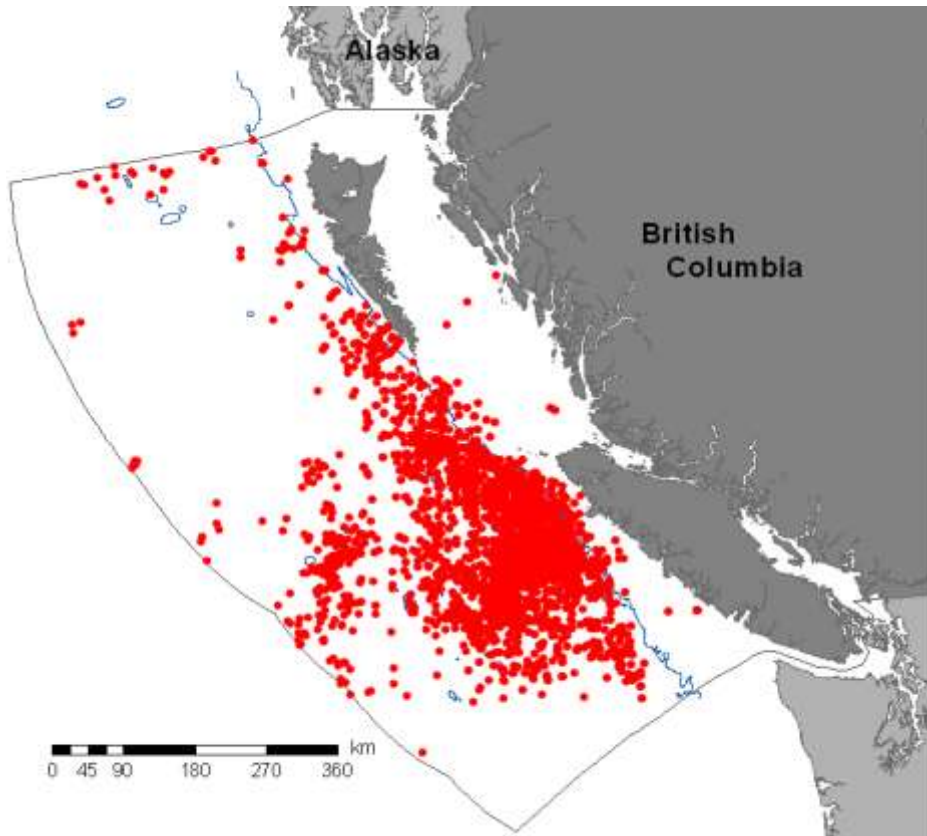


Distribution of whale catches

Sei whale

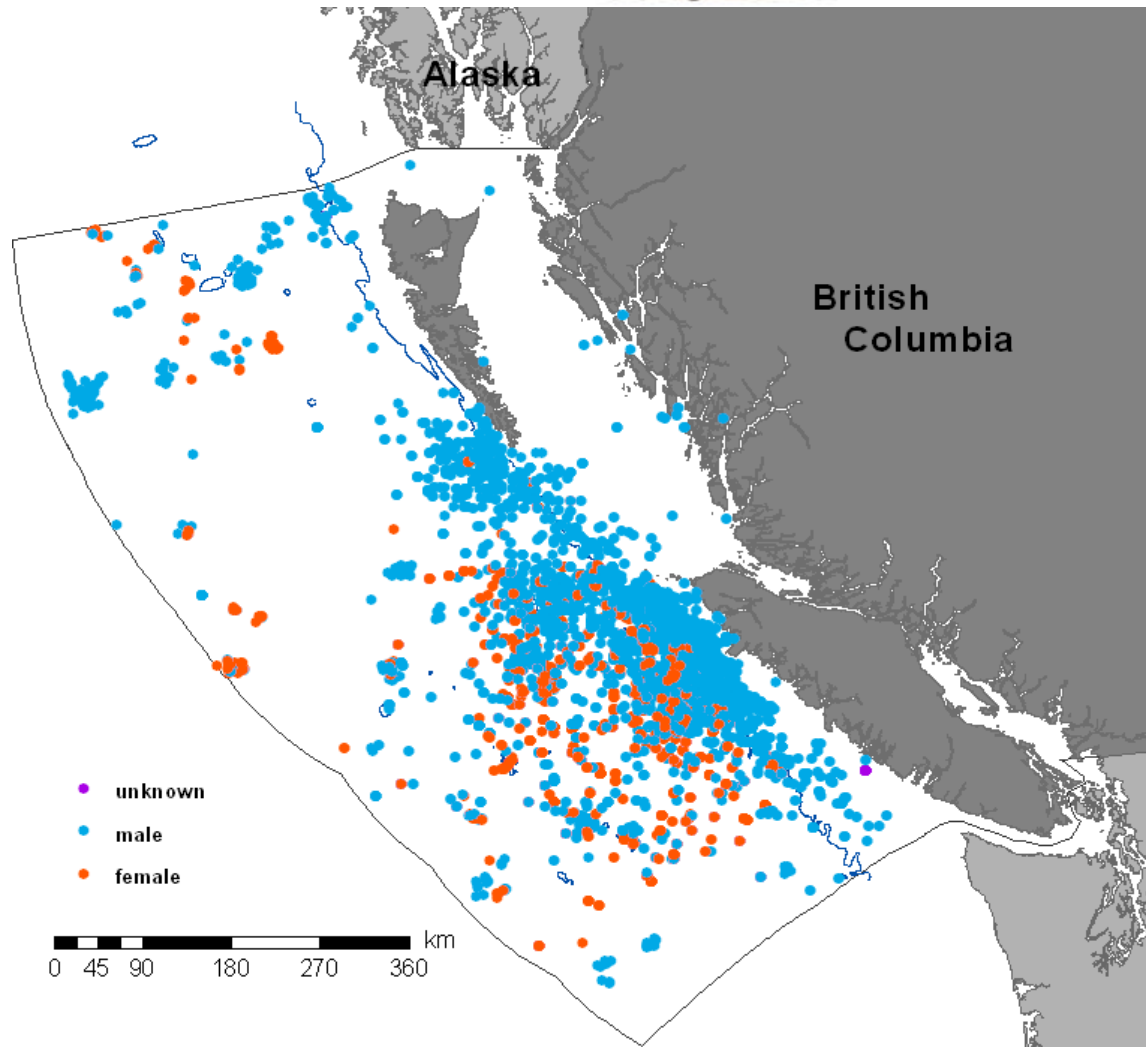


Humpback whale



Distribution of whale catches

Sperm Whale



Cetacean Research Program ship surveys, 2002–2010

- Visual surveys using standardized protocols
- Skiffs deployed in aggregations for photo-ID & biopsy sampling
- Abundance estimates in selected strata using Distance



Population assessment by photo-ID

Blue whale



Fin whale



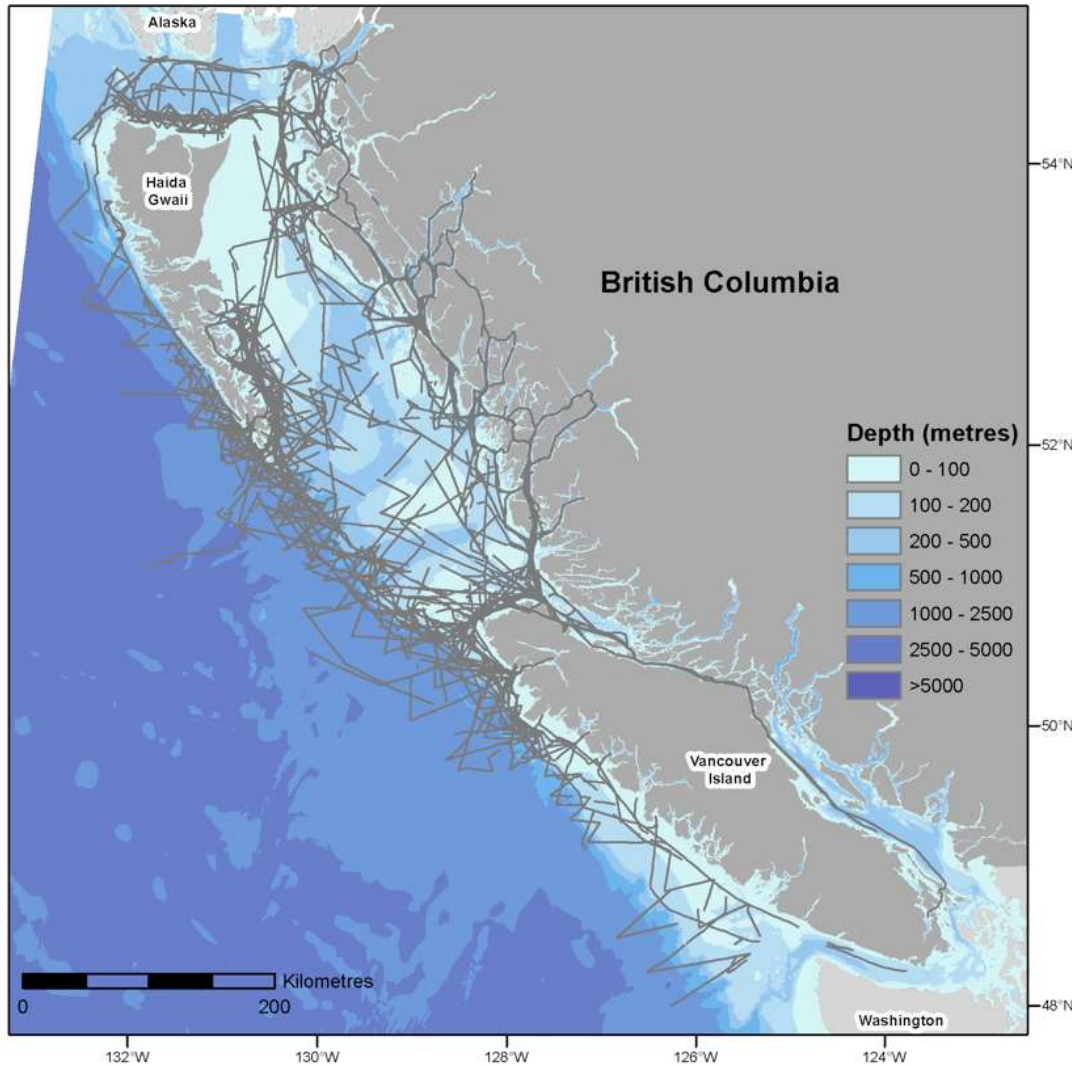
Humpback whale



Killer whale



Cetacean Research Program ship surveys, 2002–2010

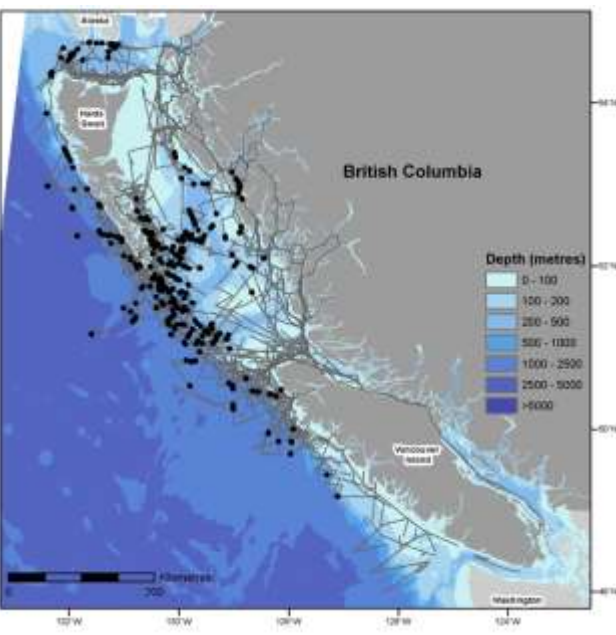


- Total on-effort survey distance = 38,190 km
- Total time = 2,263 effort hours.
- Total cetacean sightings = 5,001
- Total individuals sighted = 31,248

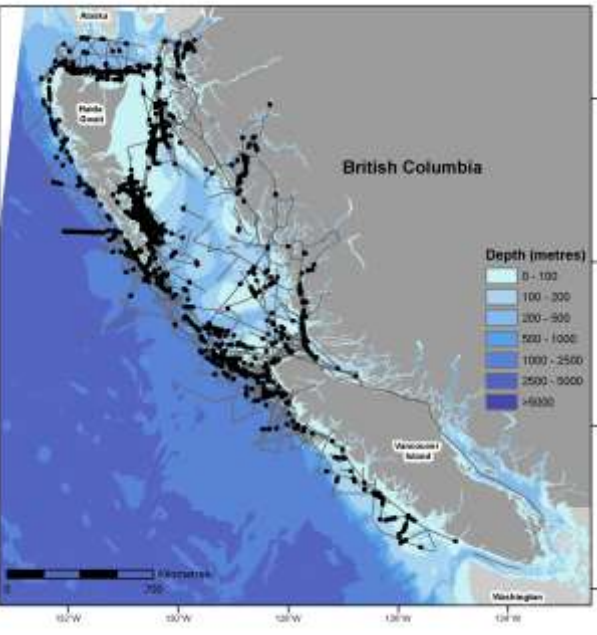
Cetacean Research Program ship surveys, 2002–2010

On-effort sightings:

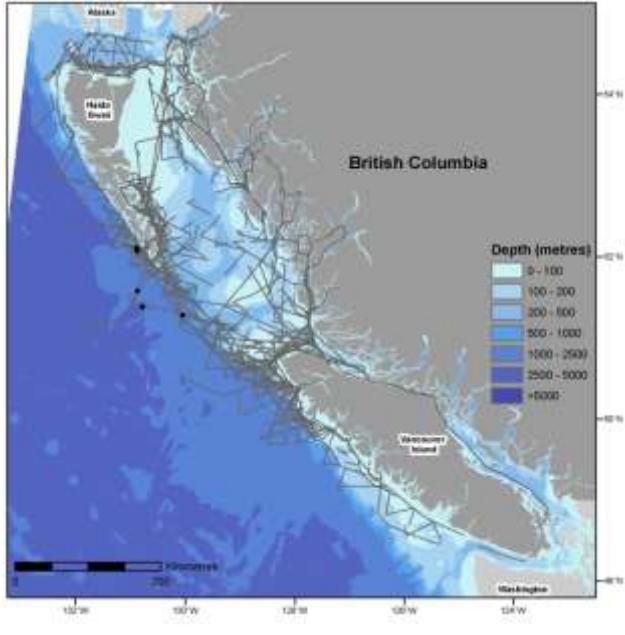
Fin whale



Humpback whale



Blue whale

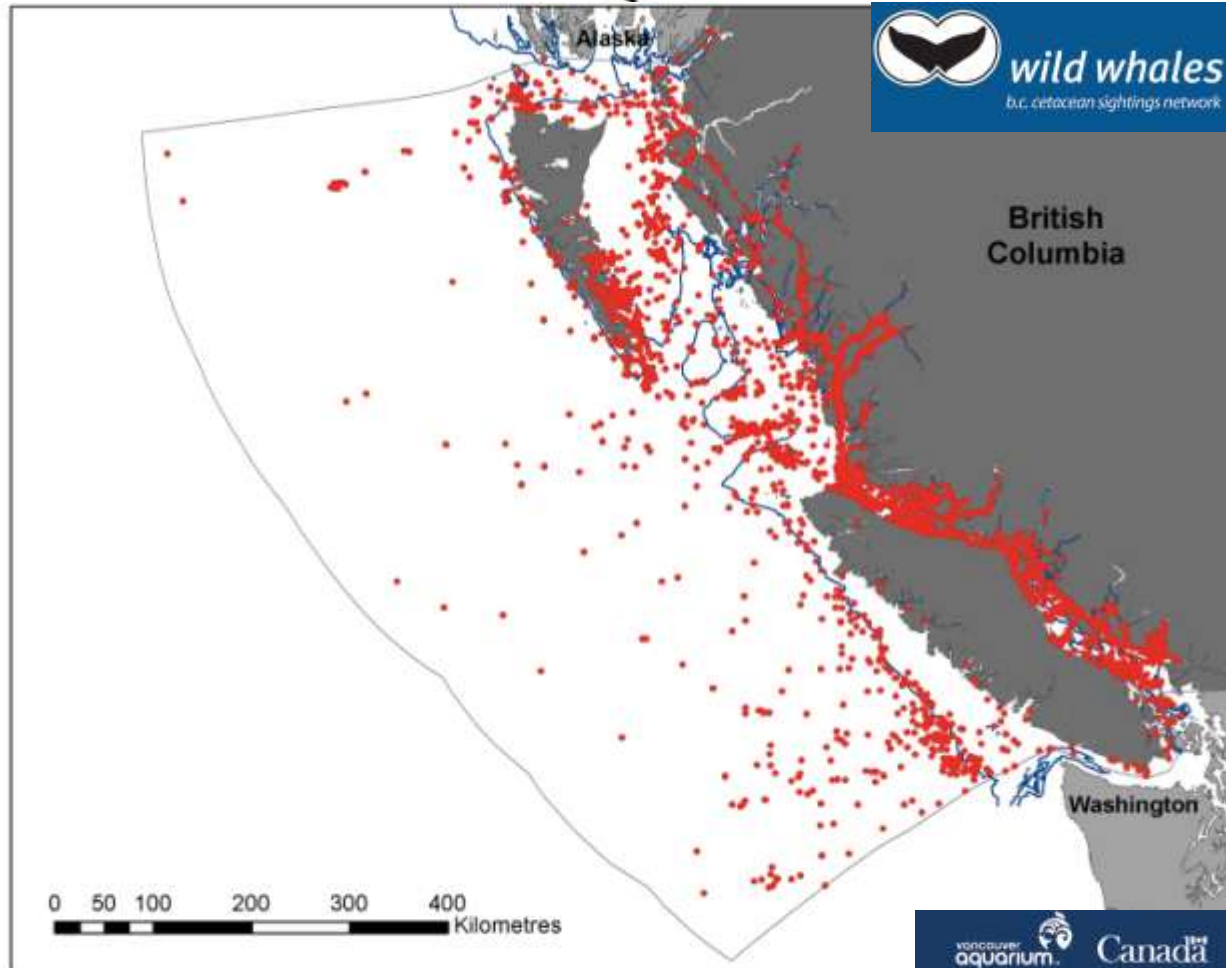


Opportunistic sightings: BC Cetacean Sightings Network

Pacific White-sided Dolphin



N = 4992 sightings



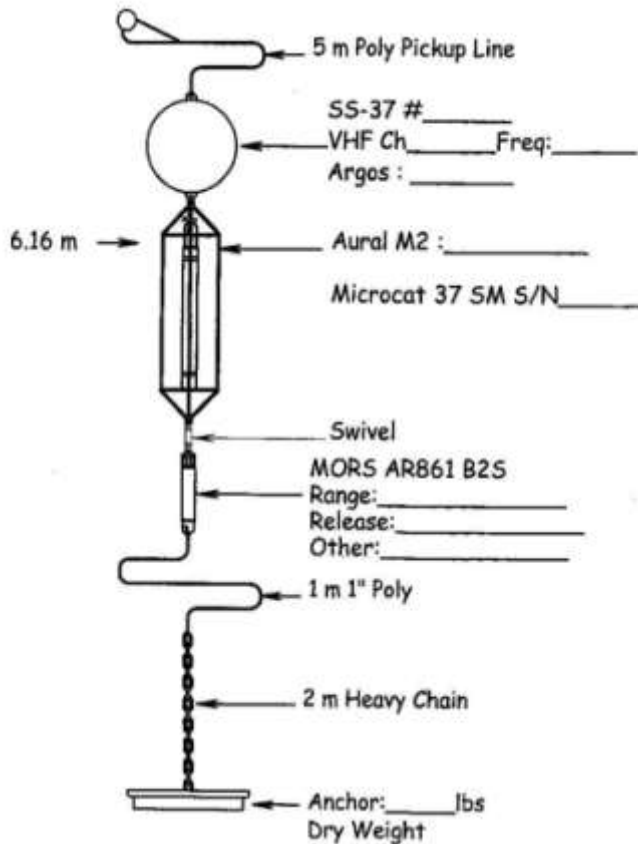
Acoustic monitoring of whale occurrence

- Passive acoustic monitoring helpful to determine seasonal occurrence of cetaceans, particularly for rare species seldom observed at sea
- Distinctive vocalizations can convey species, population, and group identity
- Vocalizations are detectable at 10s or 100s of km, day and night, in all weather conditions



Submersible acoustic recorders

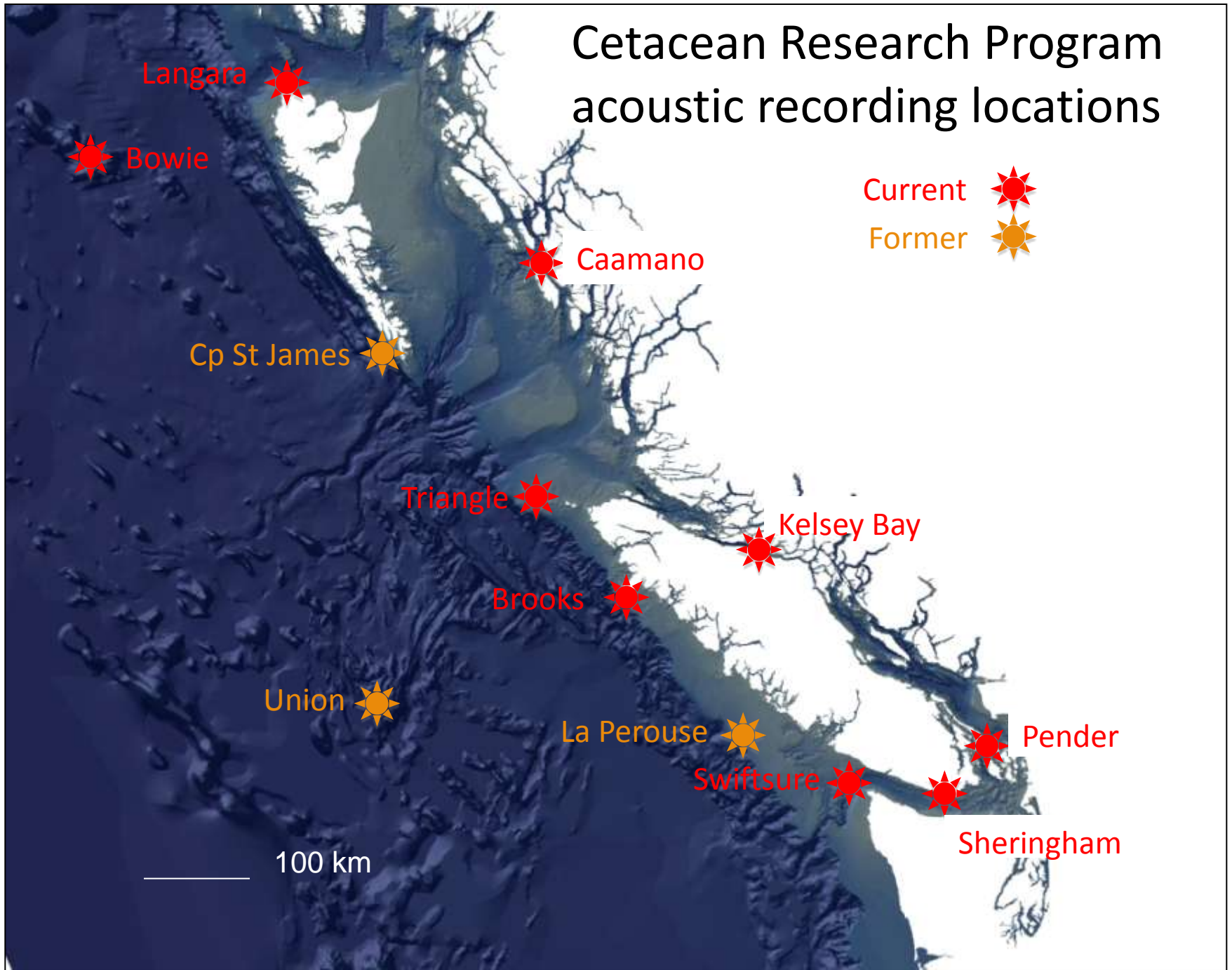
- PATC and AURAL recording instruments
- Deployments of 6 mo to 1 yr



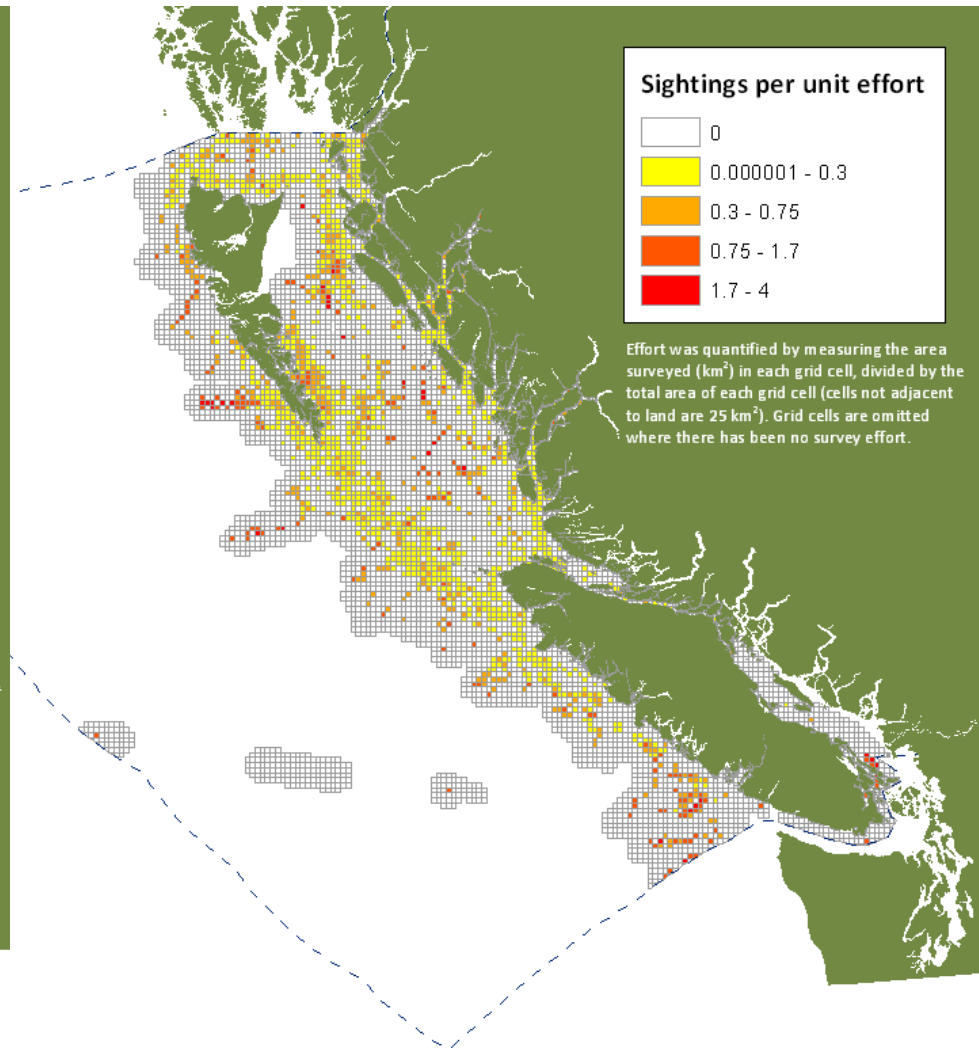
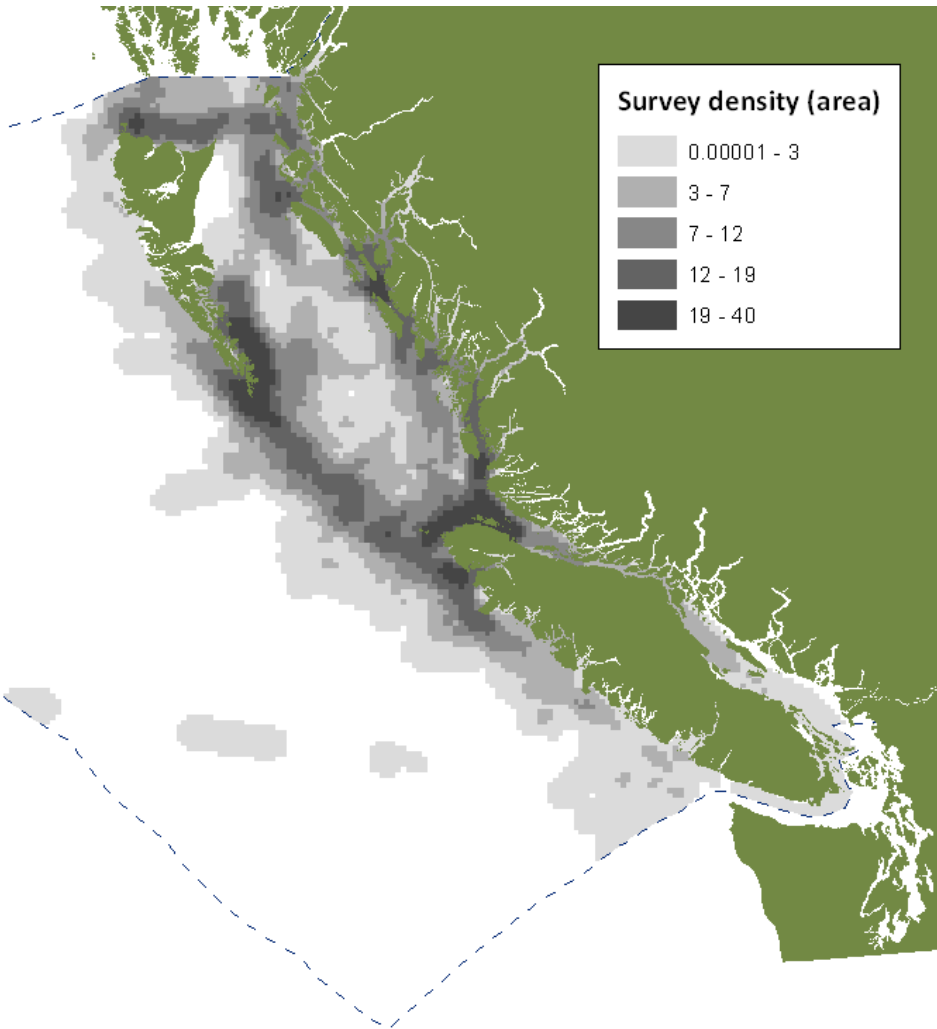
Land-based acoustic recorders



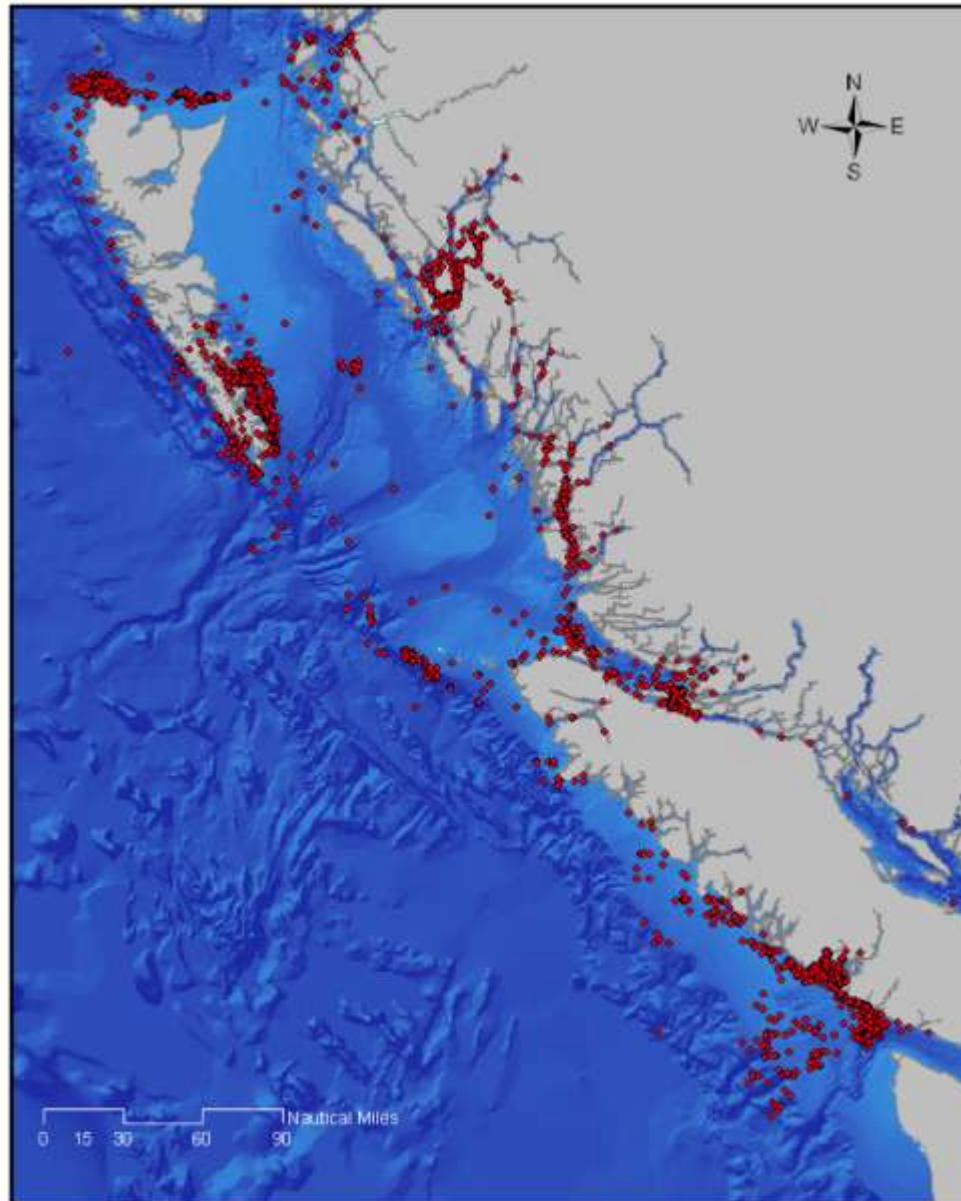
Cetacean Research Program acoustic recording locations



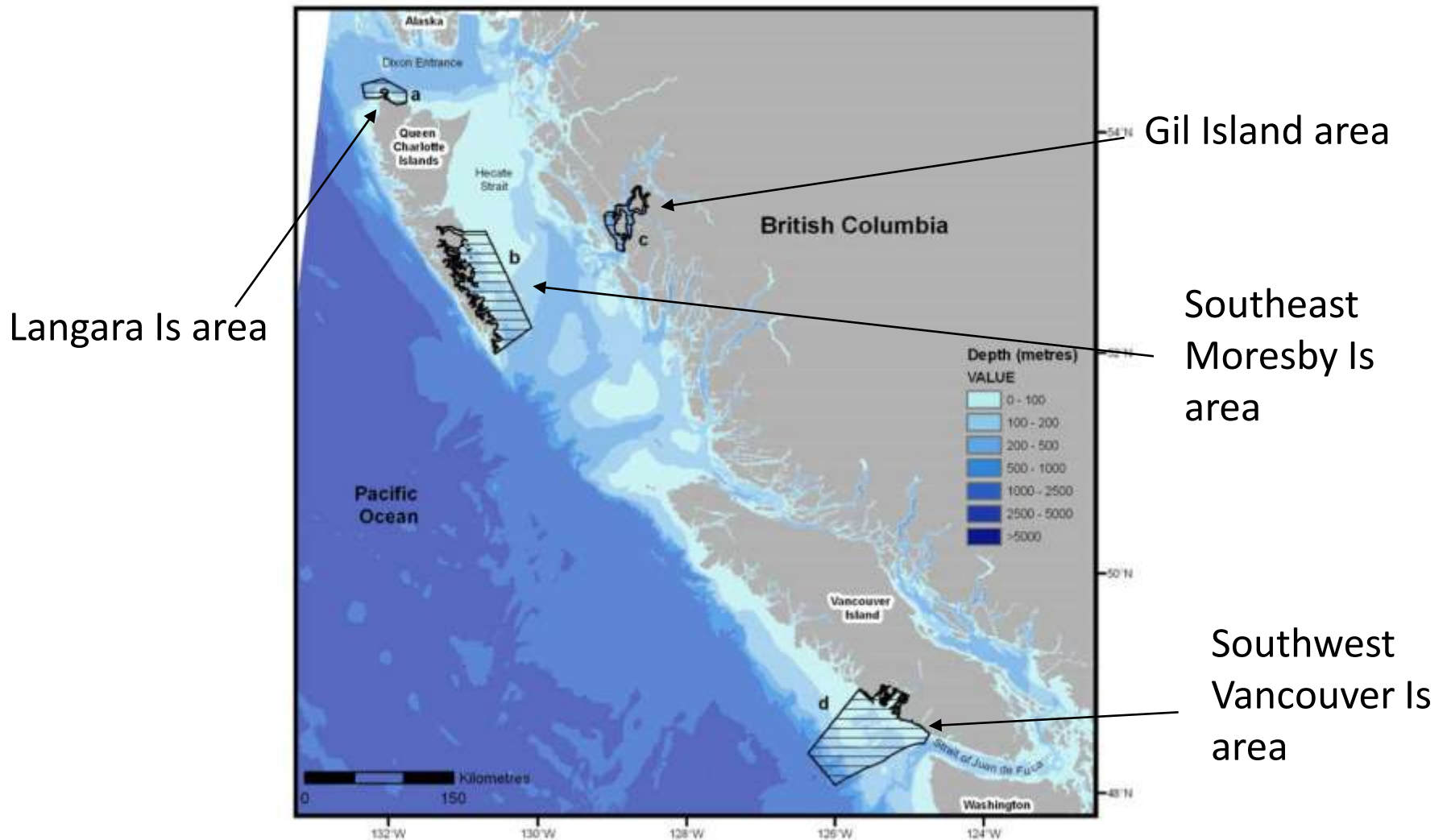
Identification of important cetacean habitats



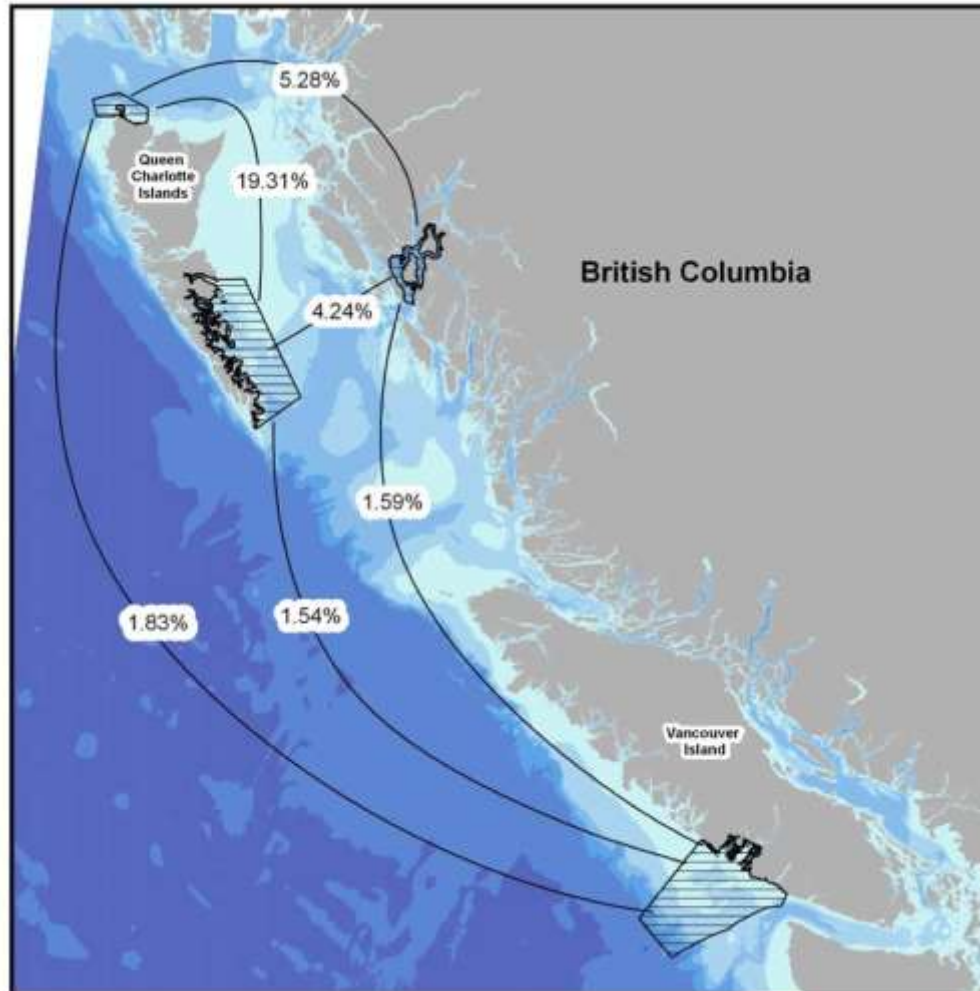
Assessment of Critical Habitats: Humpback Whale



Assessment of Critical Habitats: Humpback Whale



Assessment of Critical Habitats: Humpback Whale



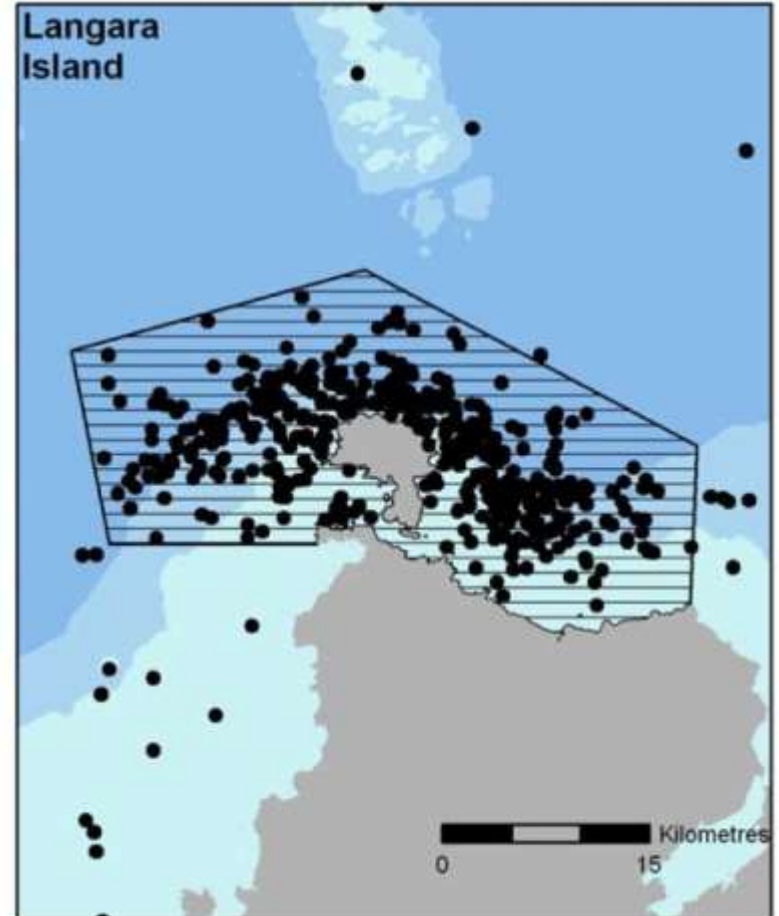
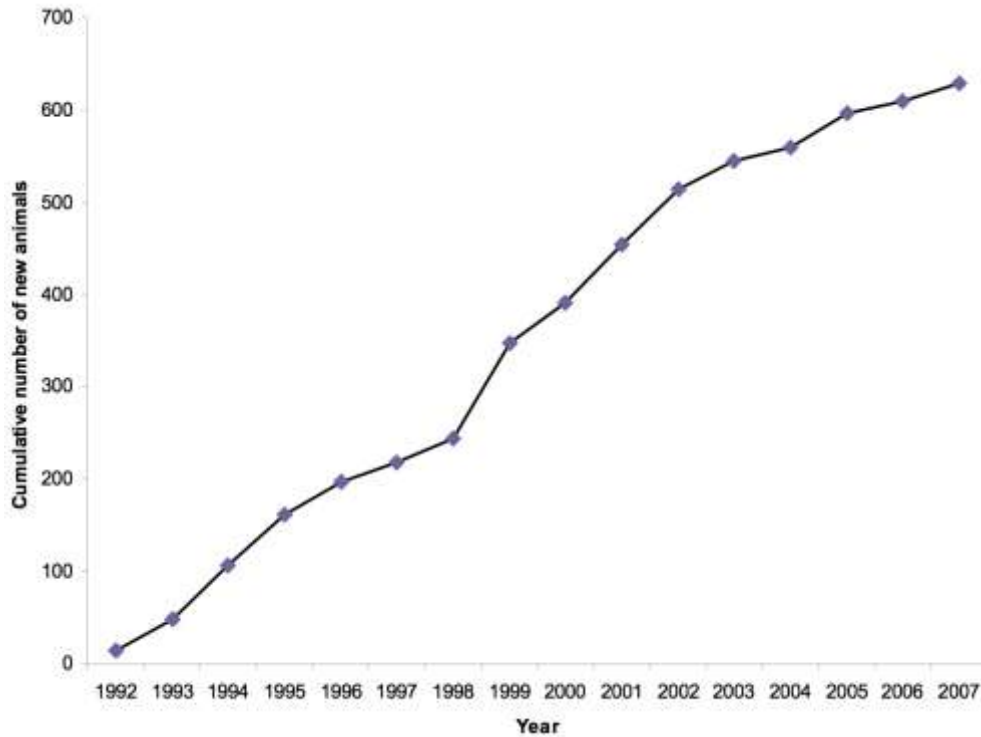
Overall low rates of inter-matches between areas

Highest rate between Langara and SE Moresby.

Lowest rates between SW Vancouver Island and the other three areas

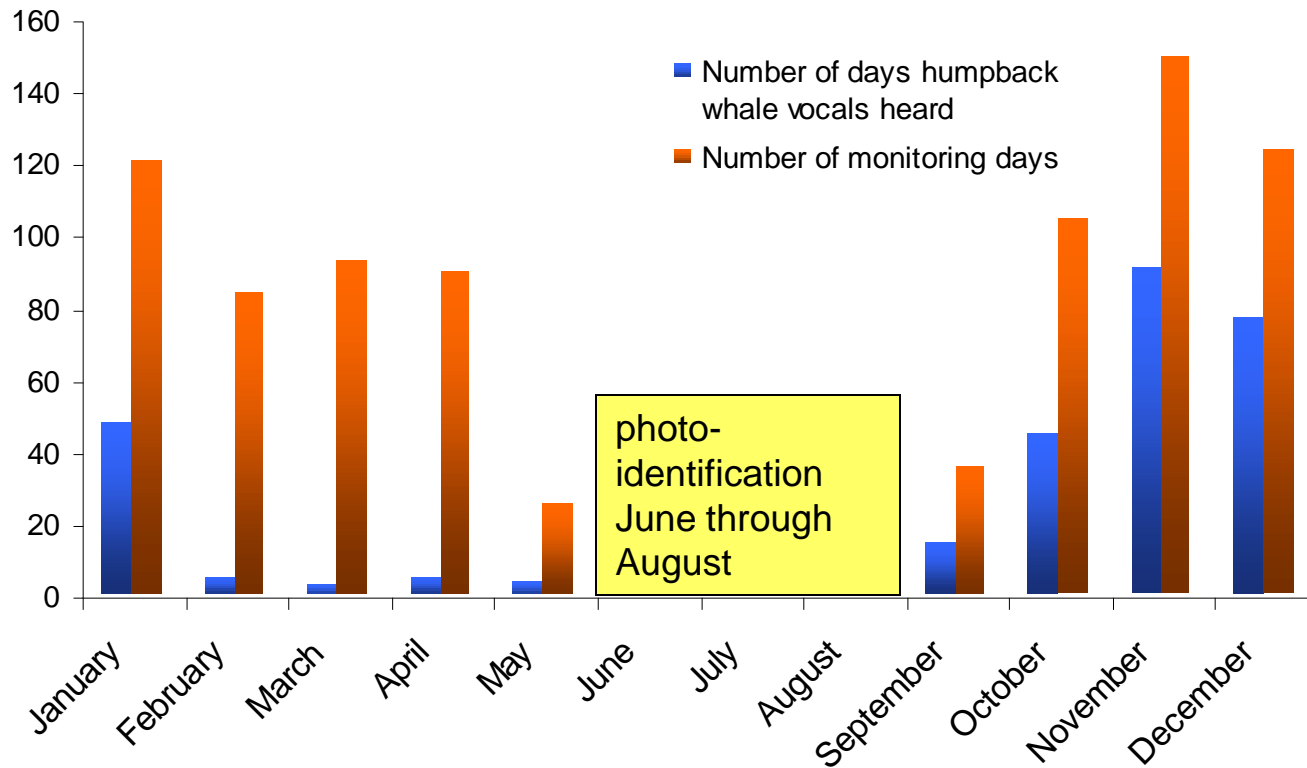
Assessment of Critical Habitats: Humpback Whale

Min number alive in 2006, Langara Island = 597 whales



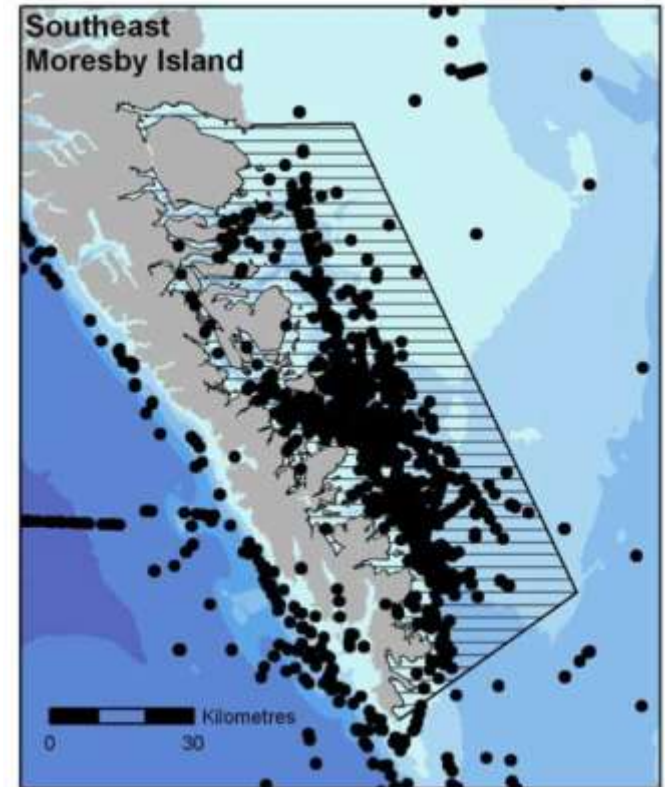
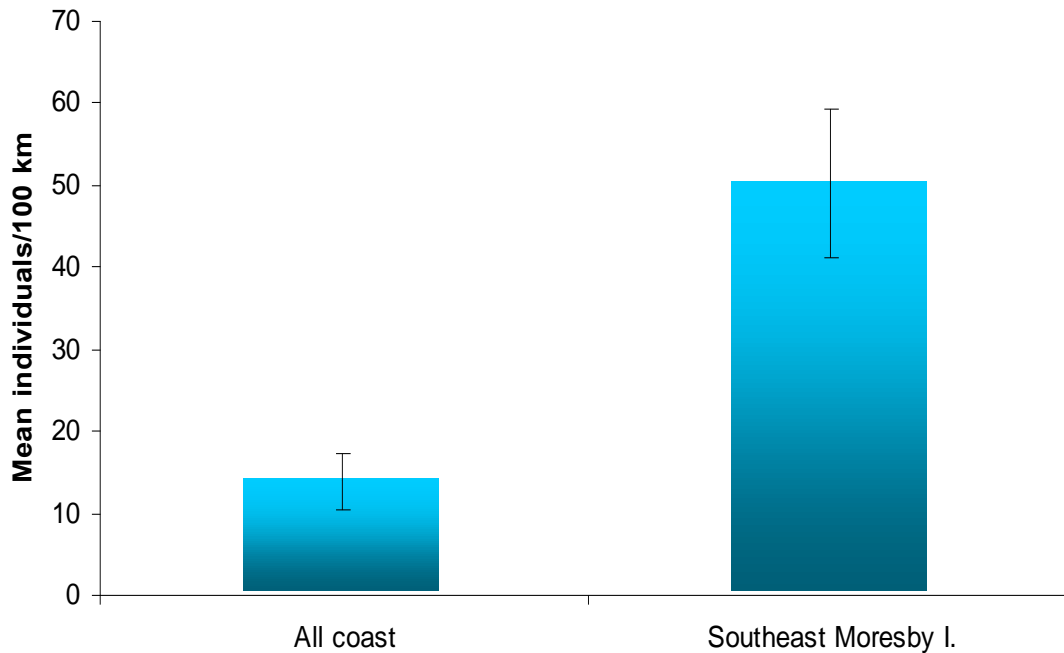
Assessment of Critical Habitats: Humpback Whale

Acoustic monitoring Langara Island area (2003-2008)



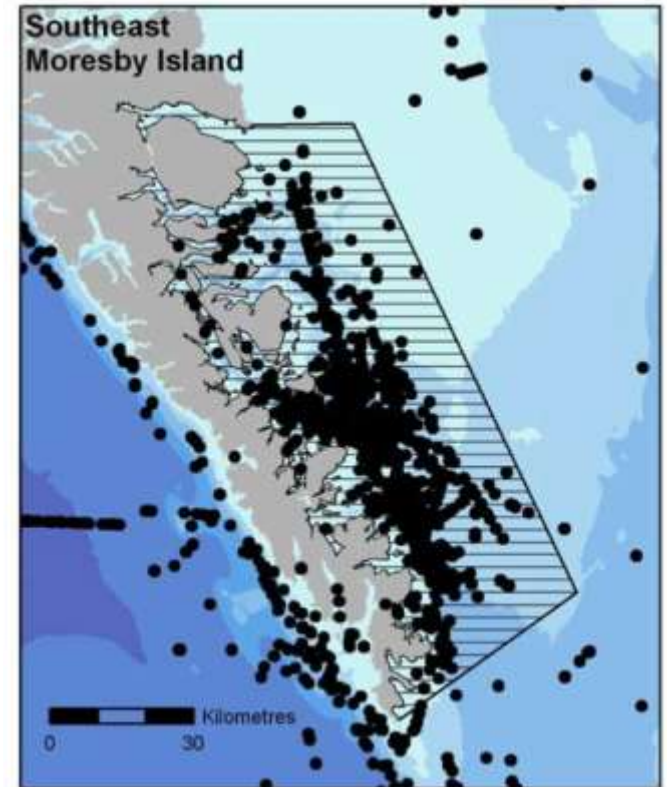
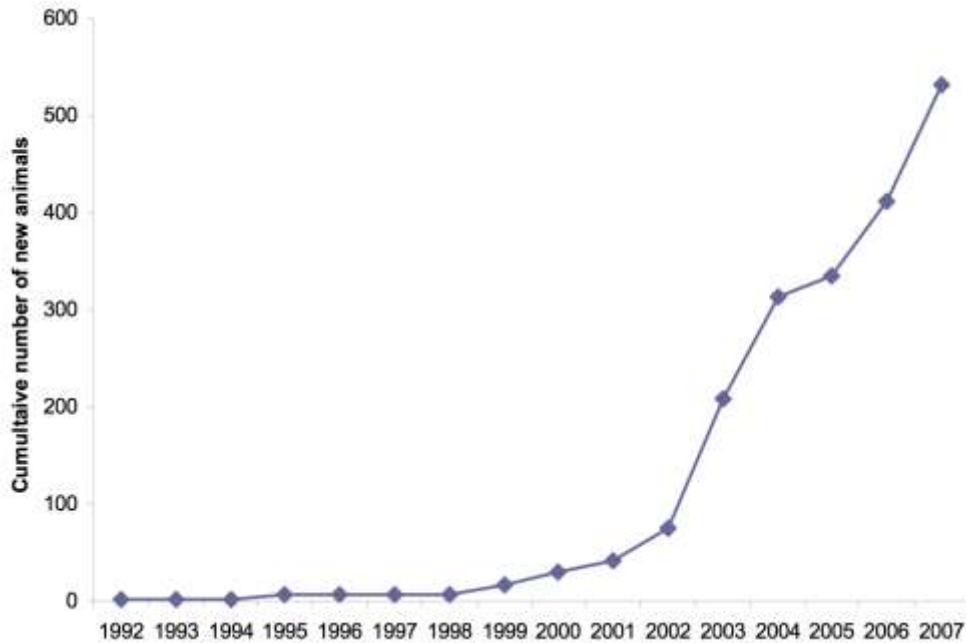
Assessment of Critical Habitats: Humpback Whale

Humpback whale sightings per 100km were significantly higher in Southeast Moresby than coast wide. ($t_{(0.05, 5)} = -4.971, p = 0.004$),



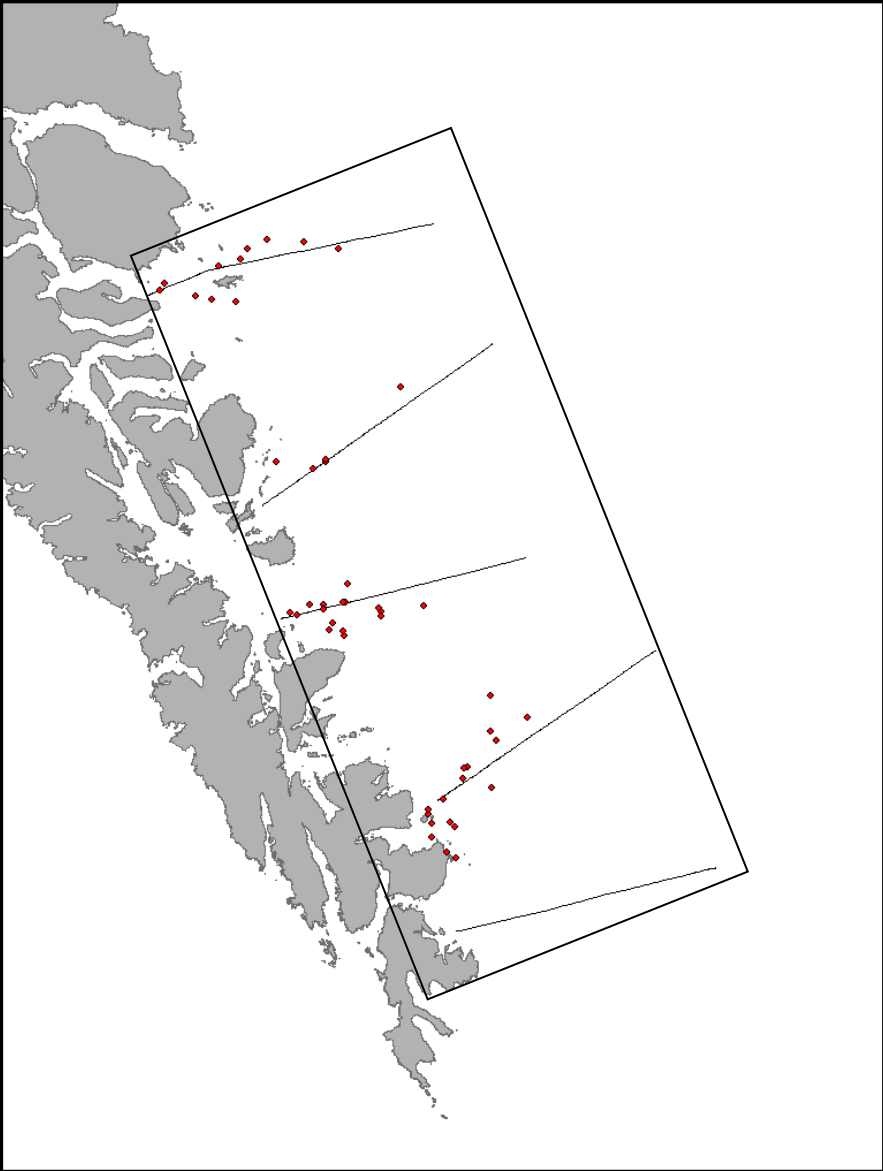
Assessment of Critical Habitats: Humpback Whale

Min number alive in 2006, SE Moresby Is = 403 whales



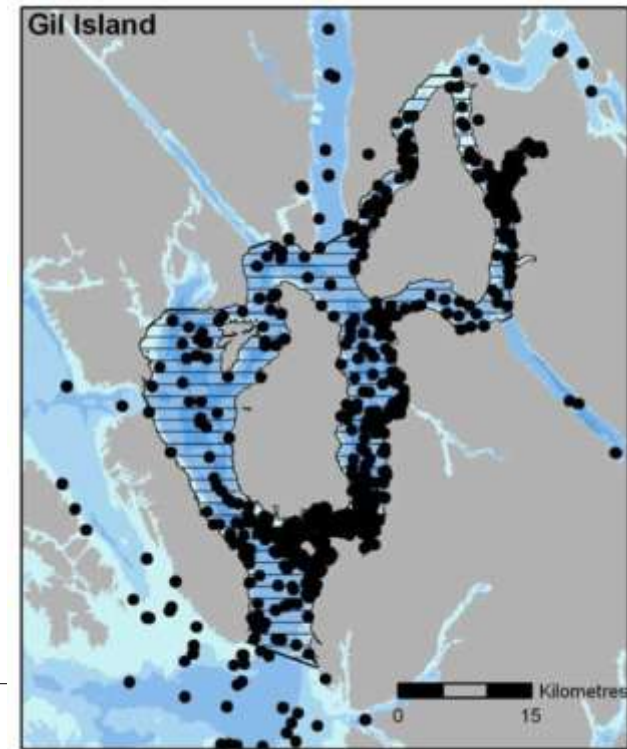
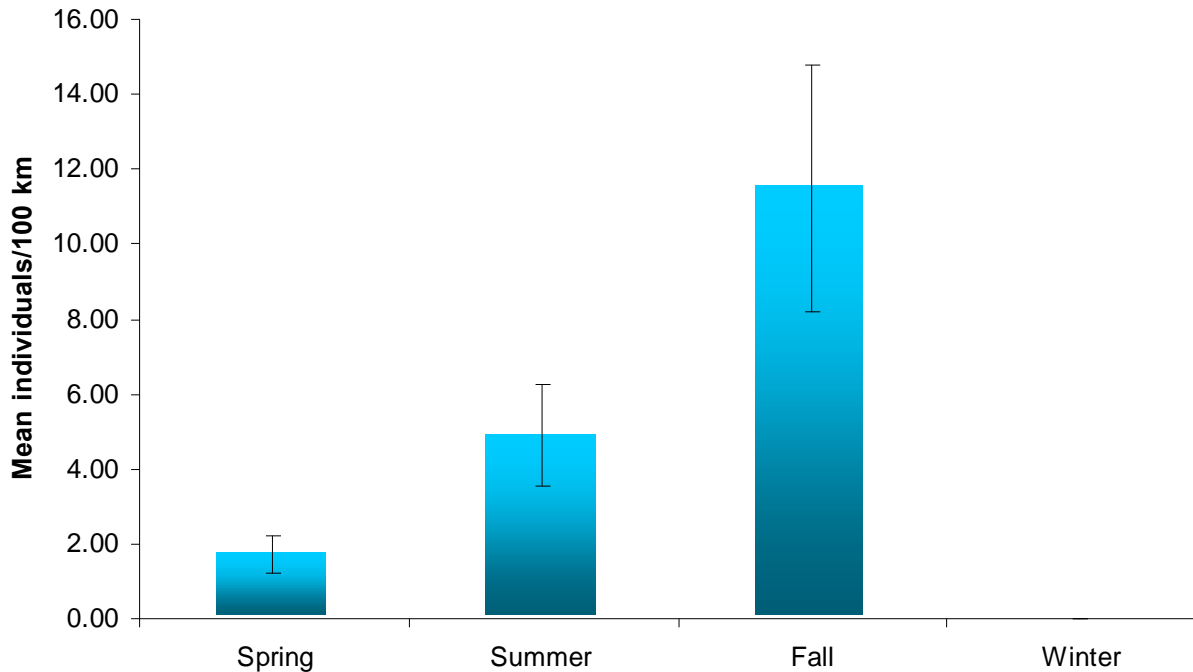
Line-transect survey, SE Moresby Island, May 2008

N = 325 (95% CI 130-810; CV = 0.36)



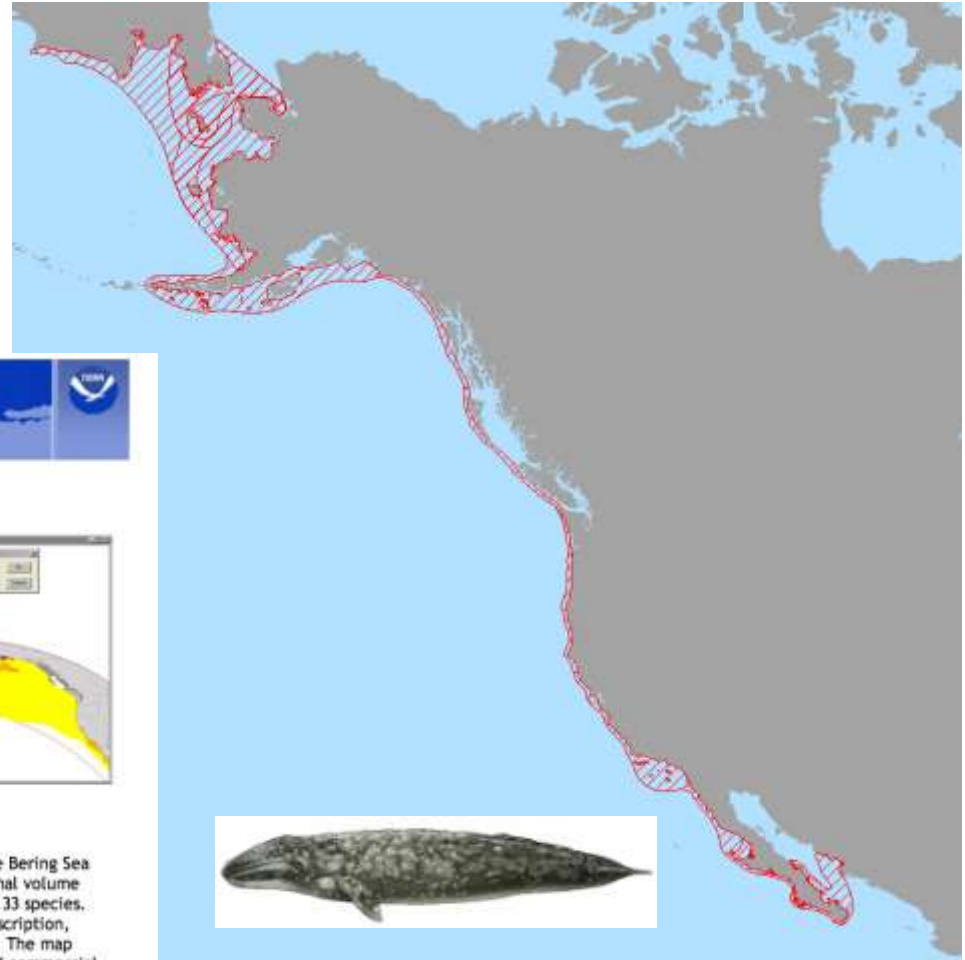
Assessment of Critical Habitat: Humpback Whale

Humpback whale sightings per 100km increase from spring through fall during Gitga'at small boat surveys (2005 – 2008) $\chi^2_{(0.05, 2)} = 6.748, P = 0.034$



Migration corridors as Critical Habitat

Grey whale migration corridor thought to closely follow outer coast

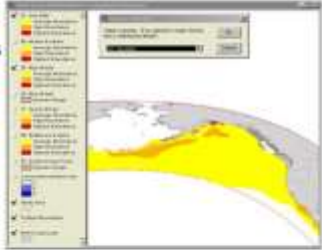


West Coast of North America
Living Marine Resources
Data Atlas

Home
Background
Data Download
Metadata

Welcome to the West Coast of North America Living Marine Resources Data Atlas Web site

The West Coast of North America Data Atlas was the fourth in a set of hardcopy atlases, published by NOAA's strategic assessment program during the late 1980's, covering the major coastal areas of the nation. This series was part of a national program characterizing potential conflicts among users of the U.S. Exclusive Economic Zone (EEZ) and adjacent coastal areas. The goal of the strategic assessment program is to communicate this information to decision makers and public and private institutions involved in resource-use issues.



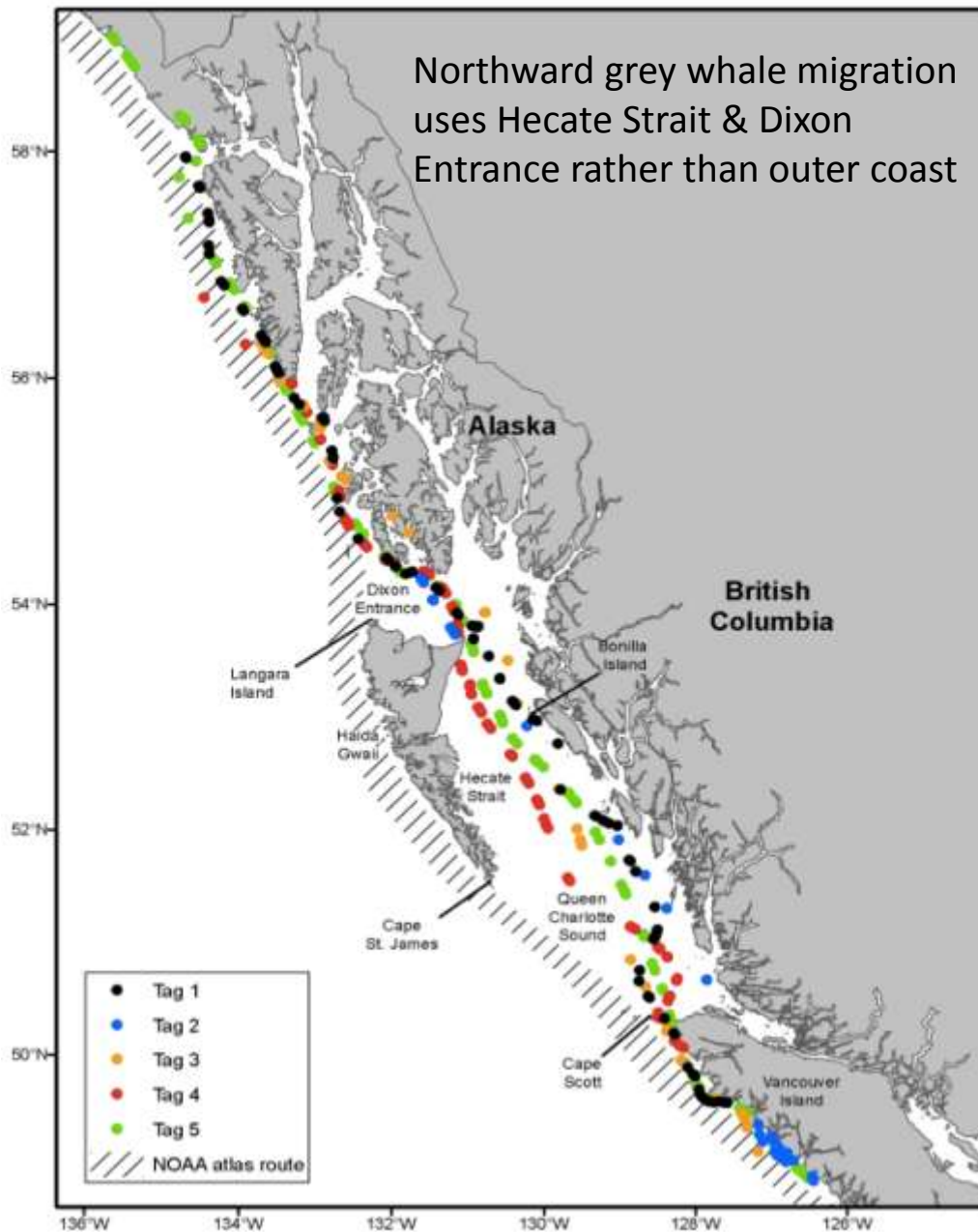
Two preliminary volumes covering the study area region from the Bering Sea south to the Gulf of California were published. The Marine Mammal volume presents information on the spatial and temporal distributions of 33 species. The Invertebrate and Fish volume contains 66 species. A map, description, vertical profile, and scale drawing are provided for each species. The map shows important areas by life stage, abundance, time period, and commercial and recreational use. The description is a written summary of scientific knowledge on topics such as life history attributes and catch statistics. For the digital atlas, all 99 species were included in the digitized geographic files.

This site is where you can download a GIS ArcView 3.x tool, data, images, and text that together can be used to create a CD-ROM that is the WCNA Digital Atlas.

Site Owner: Special Projects
National Oceanic and Atmospheric Administration
Revised March 28, 2009 <http://westcoastatlas.noaa.gov/welcome.html>

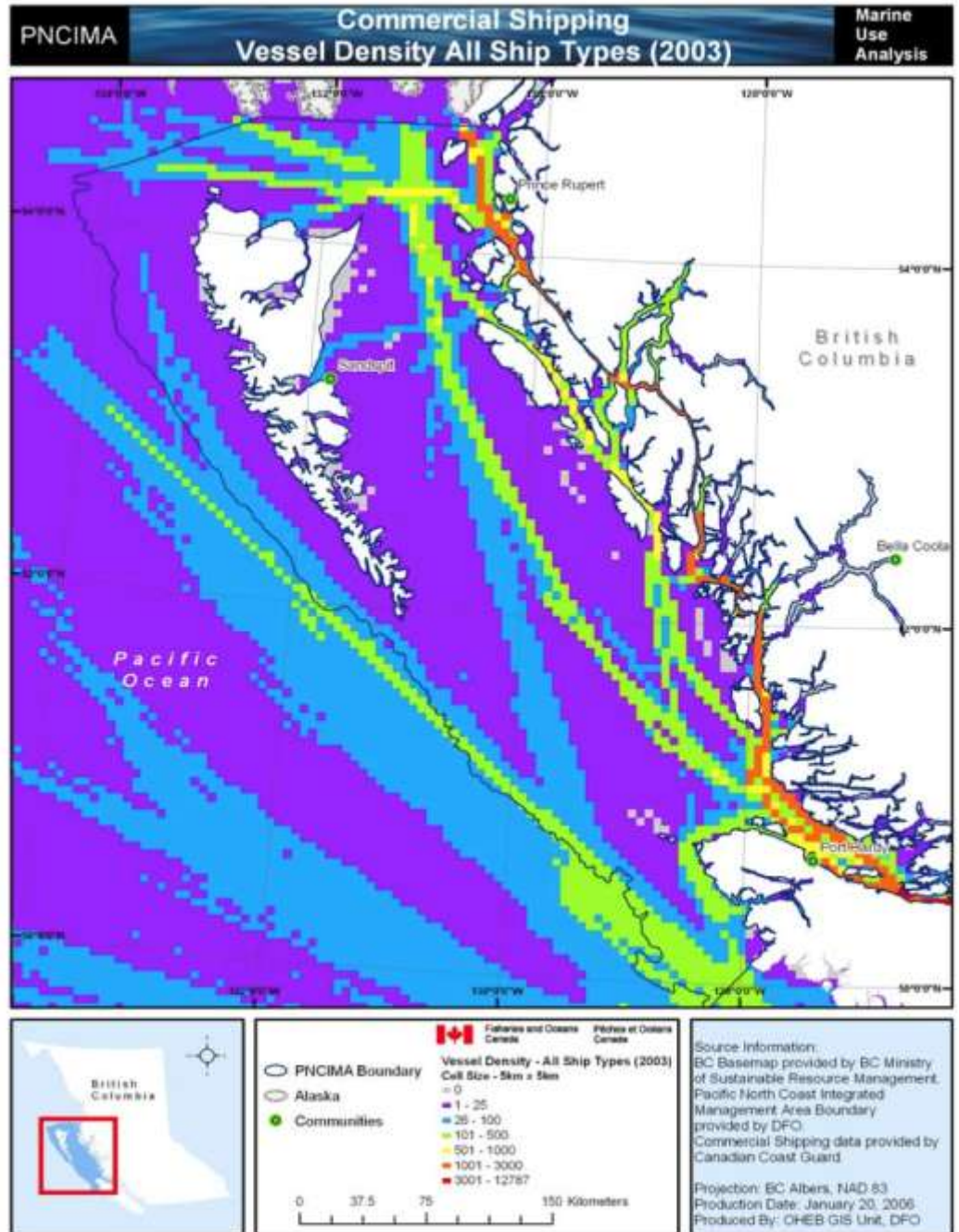
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Northward grey whale migration
uses Hecate Strait & Dixon
Entrance rather than outer coast

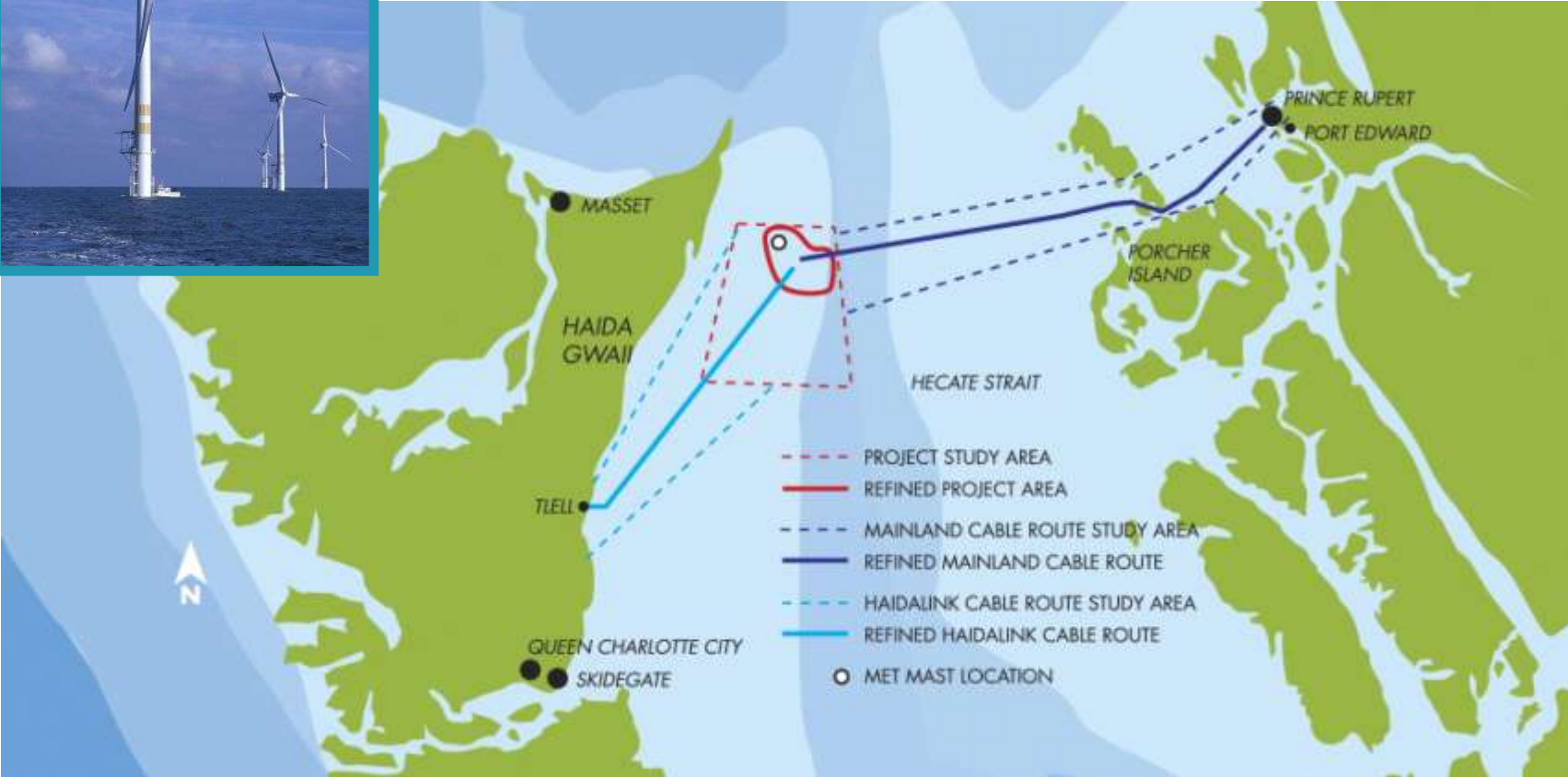


Grey whale migration overlaps shipping corridors

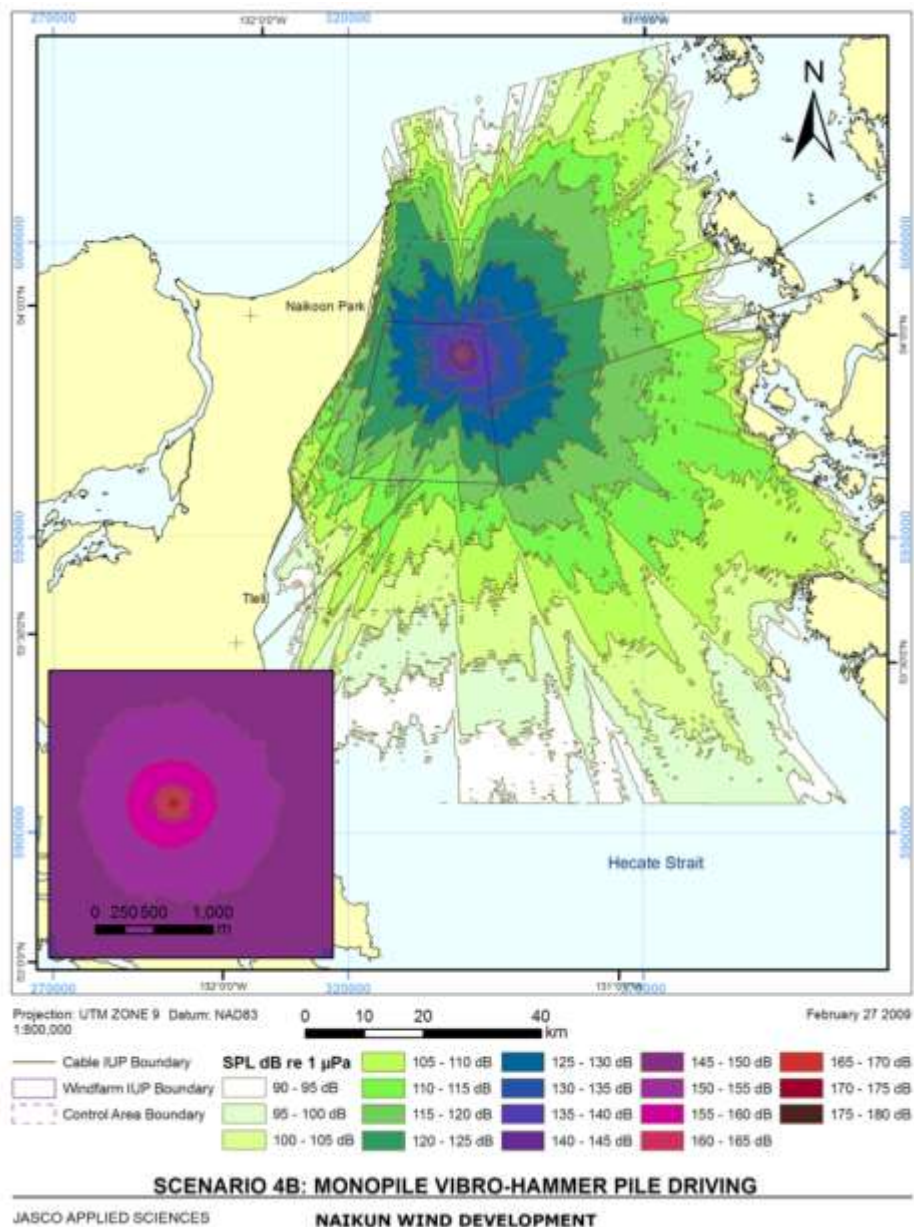
- Hecate Strait – Dixon Entrance corridor has higher potential for anthropogenic impacts than outer coast of Haida Gwaii



Naikun Wind Energy proposal



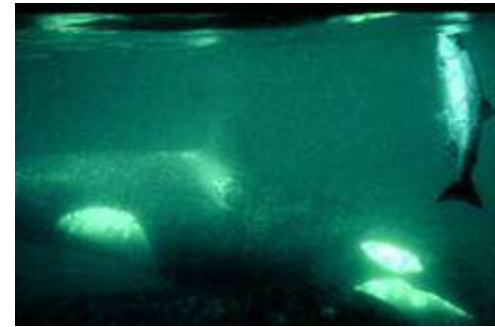
Potential noise propagation, Naikun Wind Farm pile driving



Killer whale ecotypes in northeastern Pacific

Residents: salmon specialists

- stable social structure
- travel in moderate to large groups
- seasonal movements related to salmon
- do not hunt mammals



Transients: mammal specialists

- dynamic social structure
- travel in small groups
- year-round presence in inshore waters
- do not feed on fish



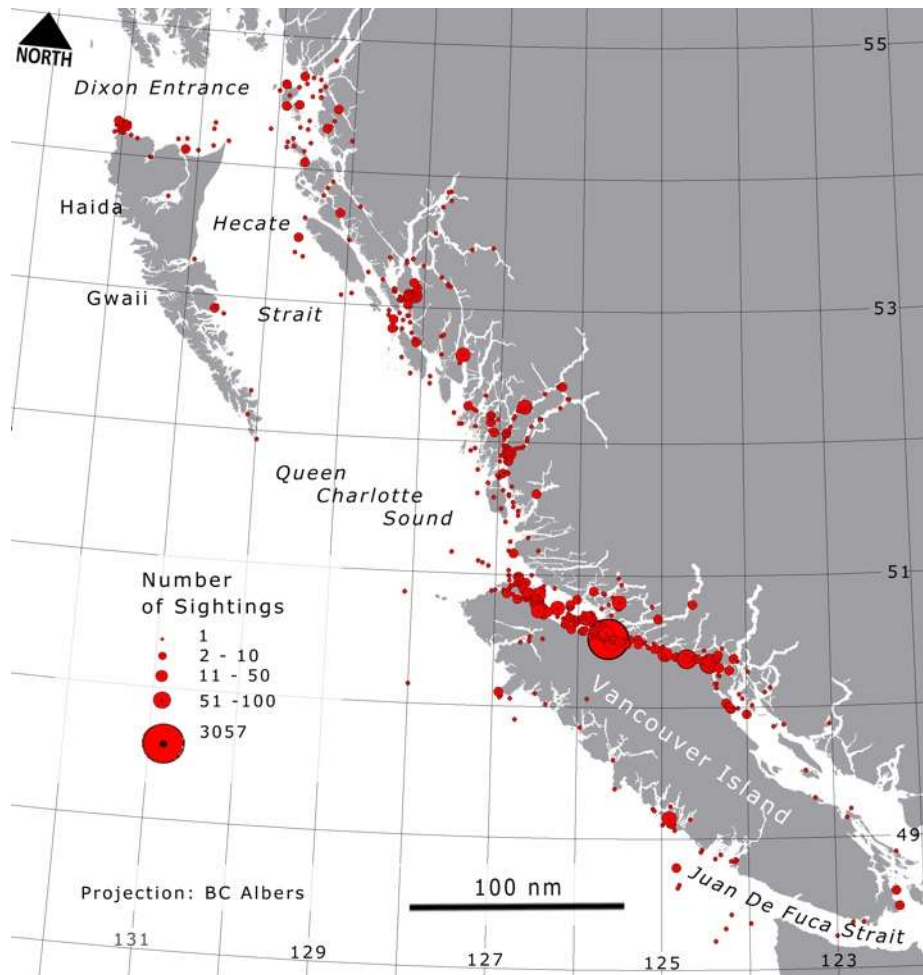
Offshores: shark specialists?

- travel in large groups
- wide ranging seasonal movements
- feed on deep-water and surface sharks, and some teleost fishes

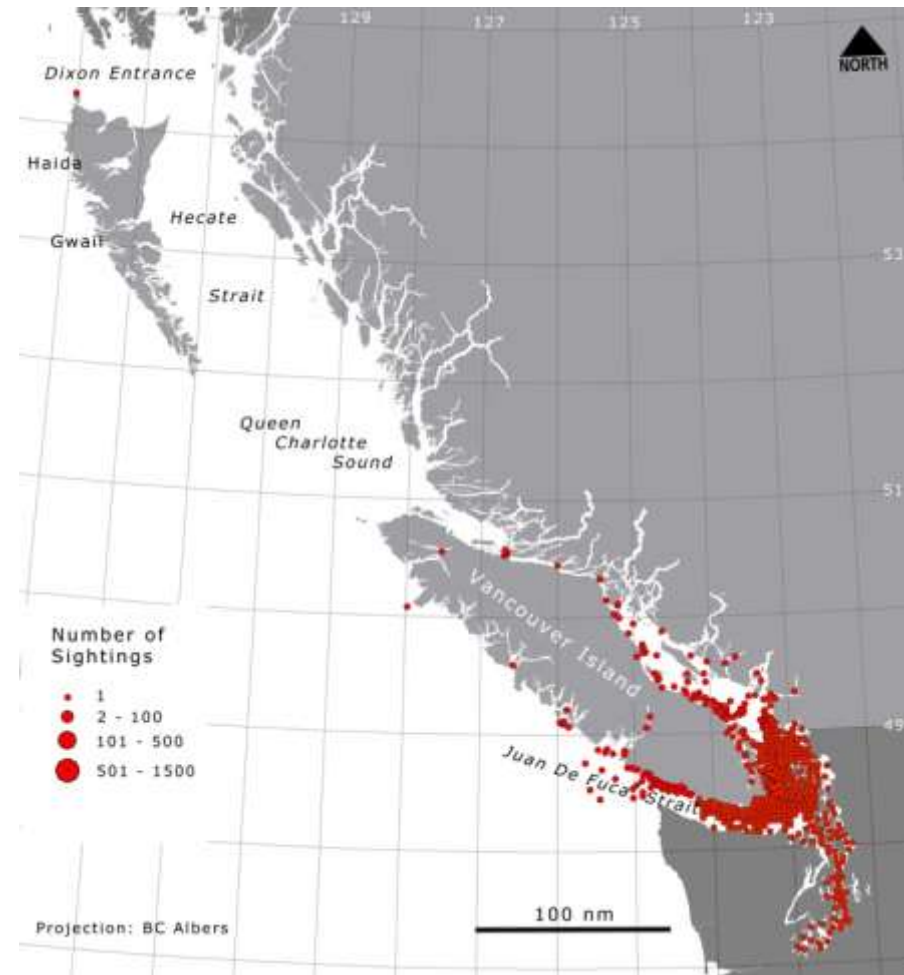


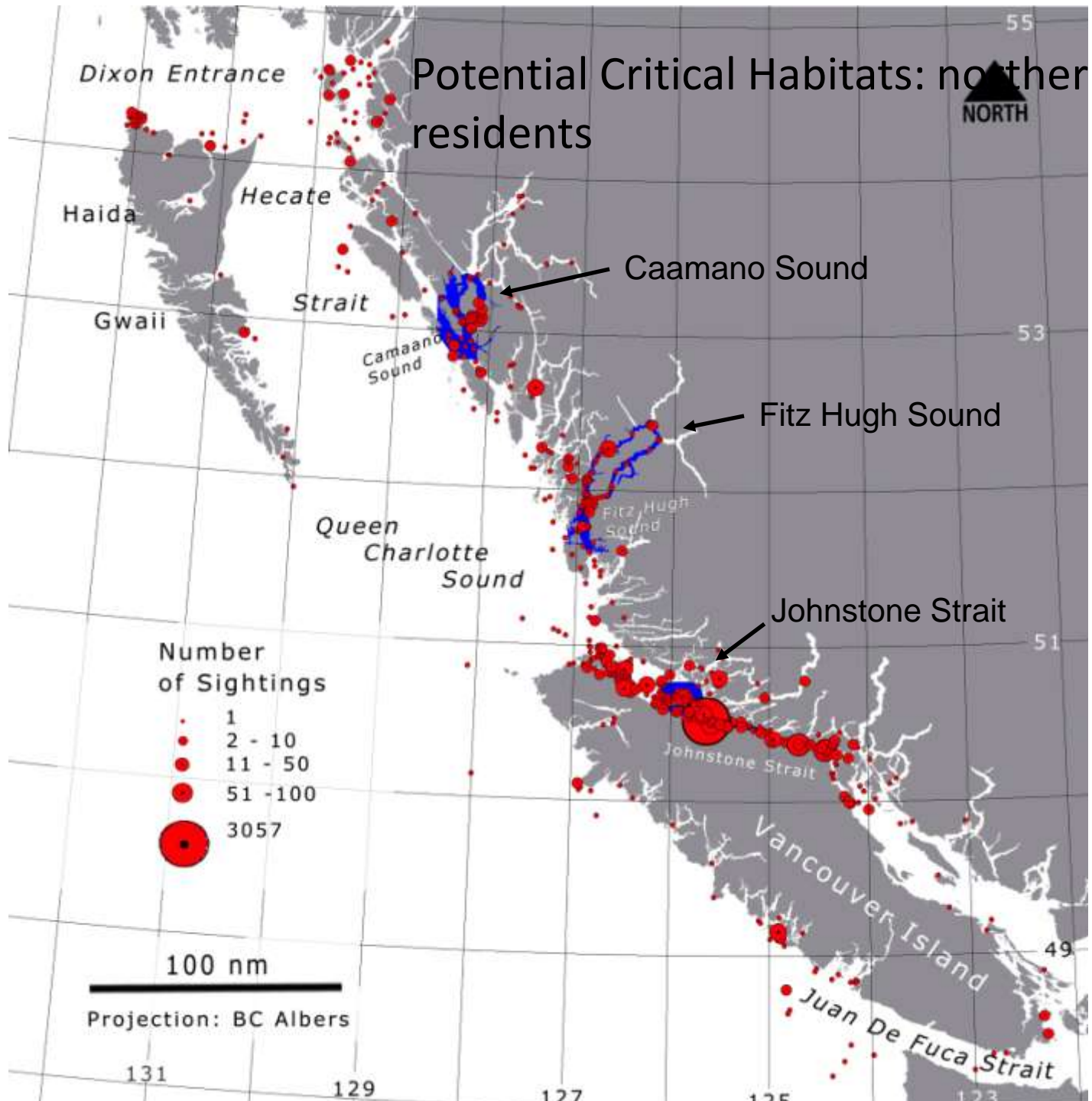
Distribution of Northern and Southern Resident Killer Whales

Northern resident



Southern resident

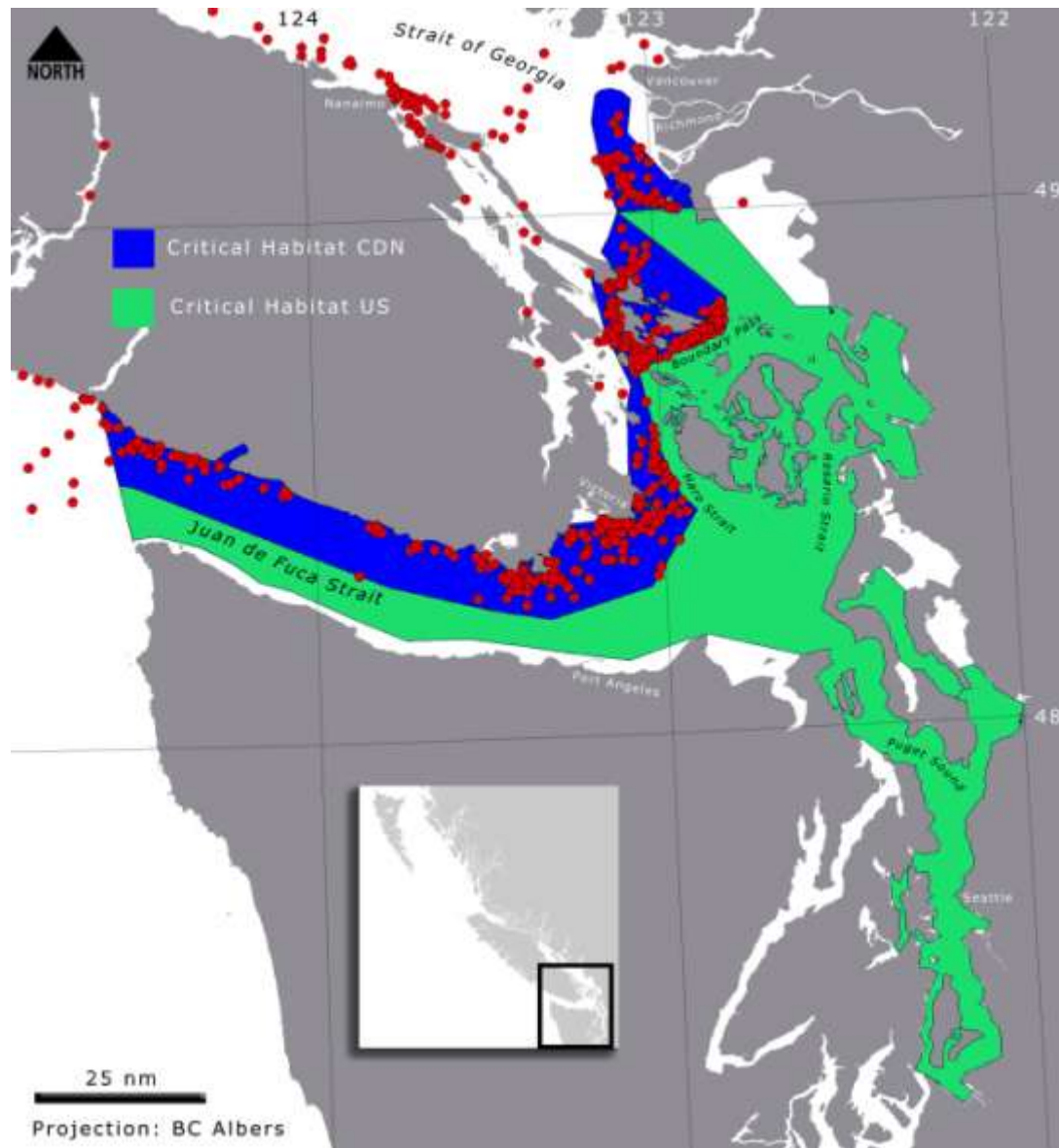




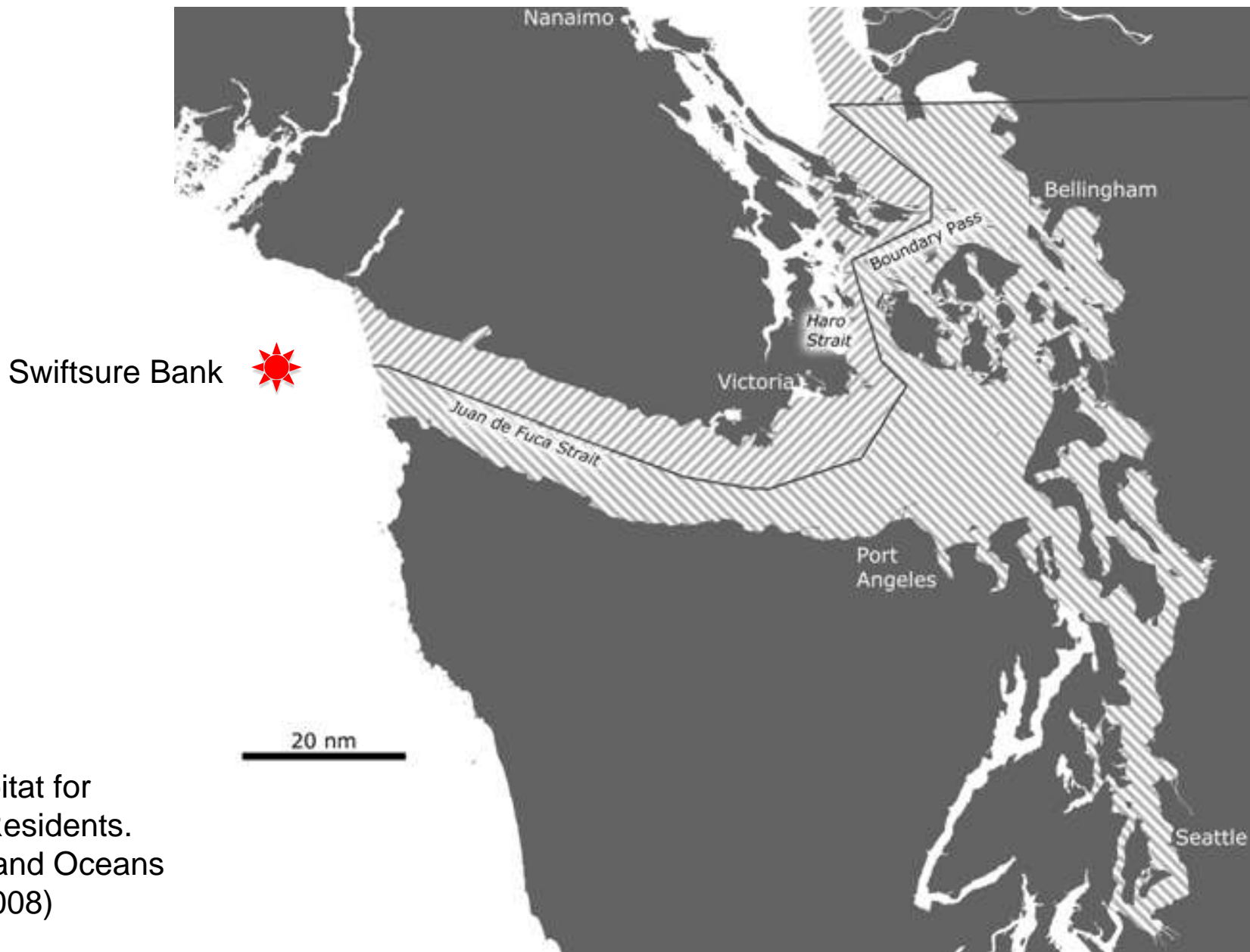
Critical Habitat designated for Northern Resident Killer Whales, 2009



Critical Habitat designated for Southern Resident Killer Whales, 2009

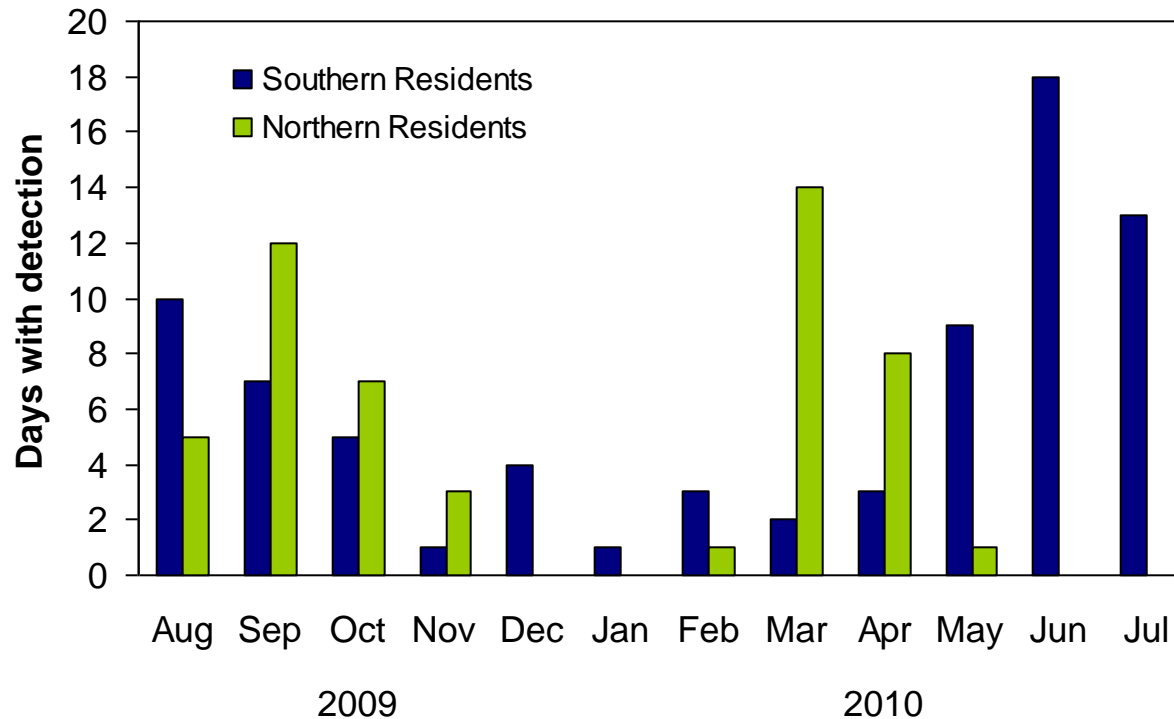


Acoustic monitoring to identify Critical Habitat



Critical habitat for
Southern Residents.
(Fisheries and Oceans
Canada, 2008)

Resident killer whale detections, Swiftsure Bank, 2009 – 2010

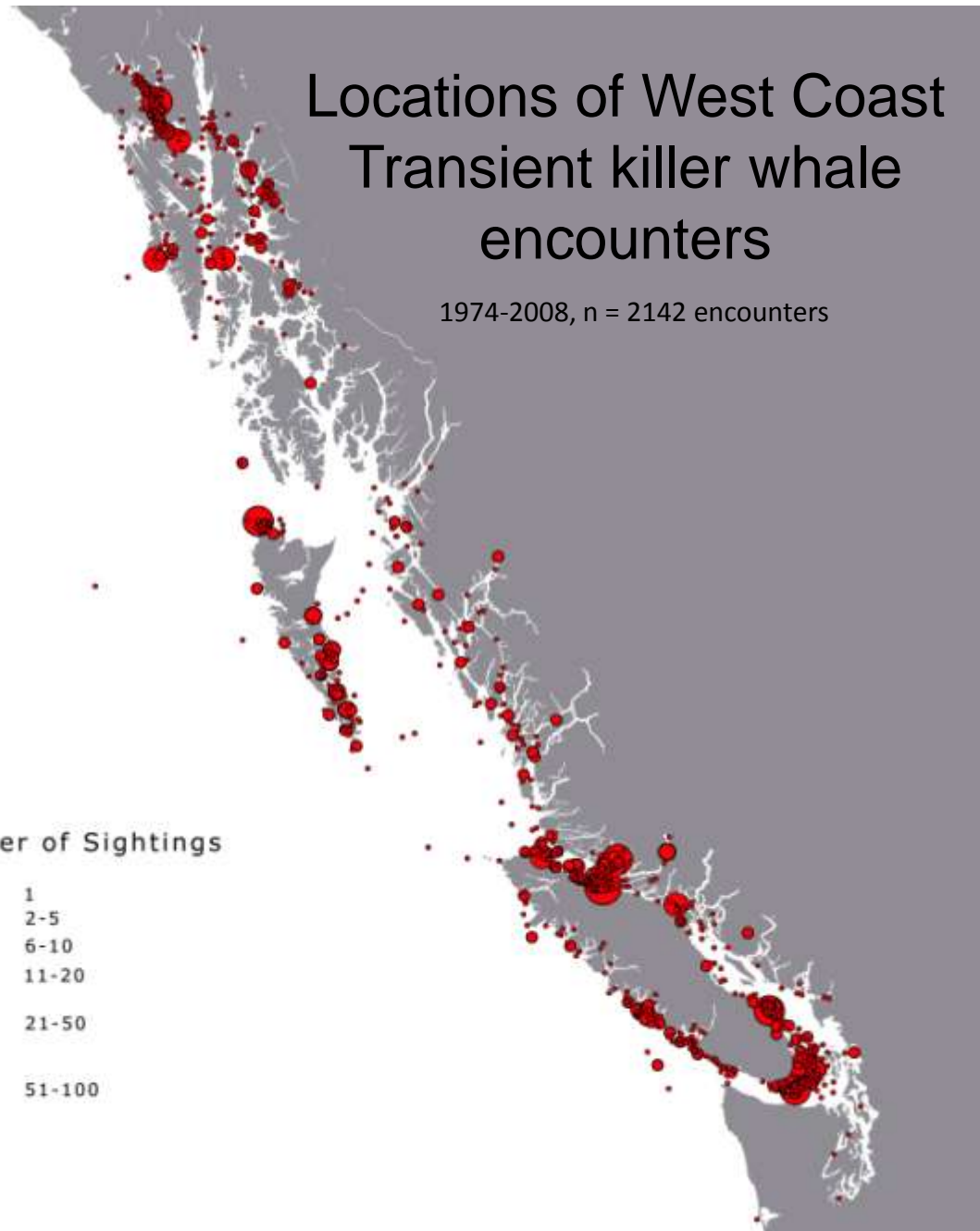
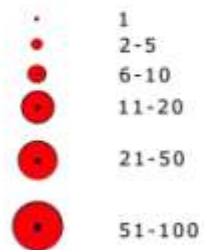


Riera, A., Ford, J.K., Hildebrand, J.A., Wiggins, S.M., and Chapman, N.R. 2011. Use of acoustic monitoring to delineate critical habitats of killer whales off southwestern Vancouver Island and Washington. Presentation at Biennial Conference on the Biology of Marine Mammals, Tampa, FL, Nov 2011.

Locations of West Coast Transient killer whale encounters

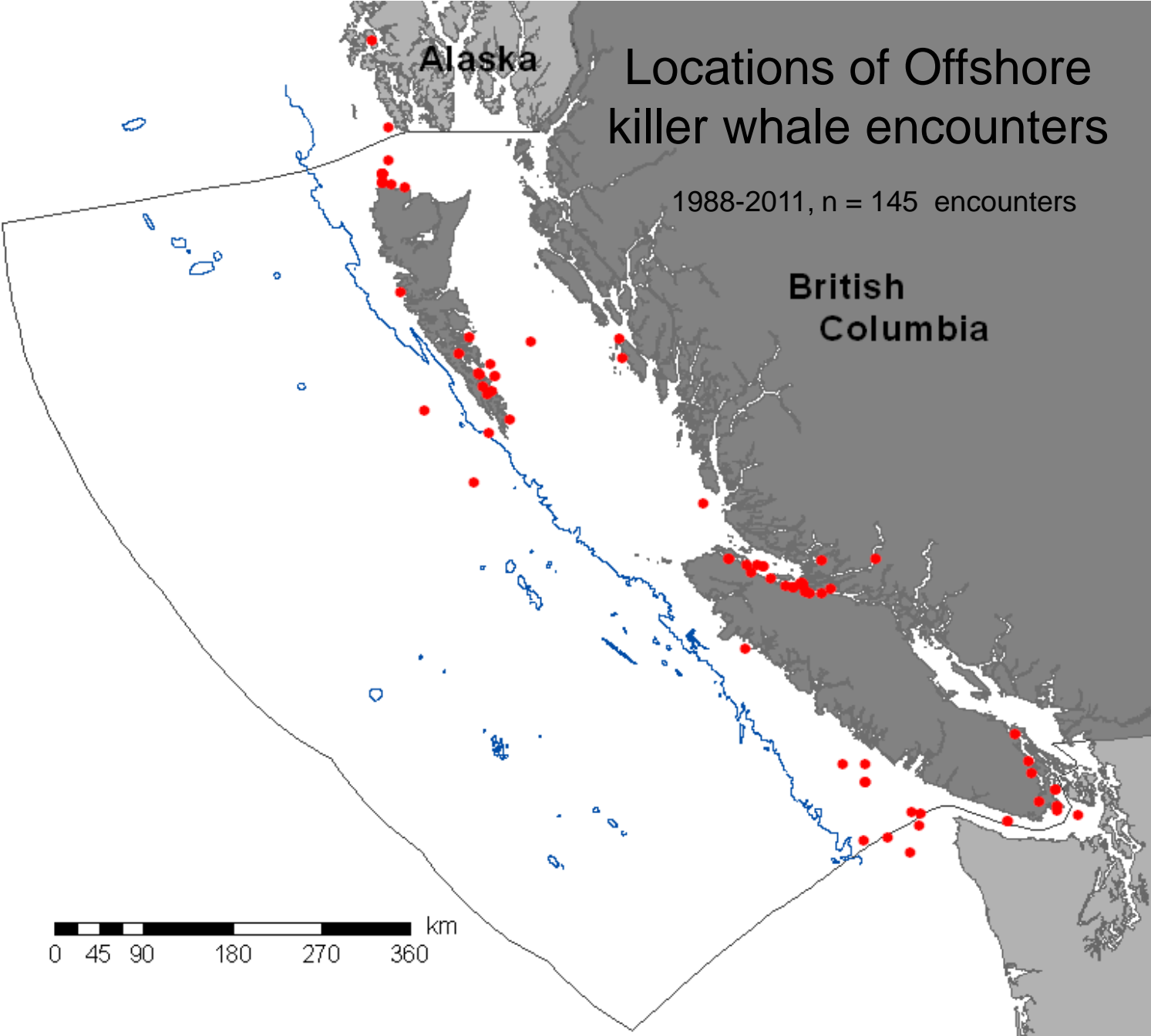
1974-2008, n = 2142 encounters

Number of Sightings



Locations of Offshore killer whale encounters

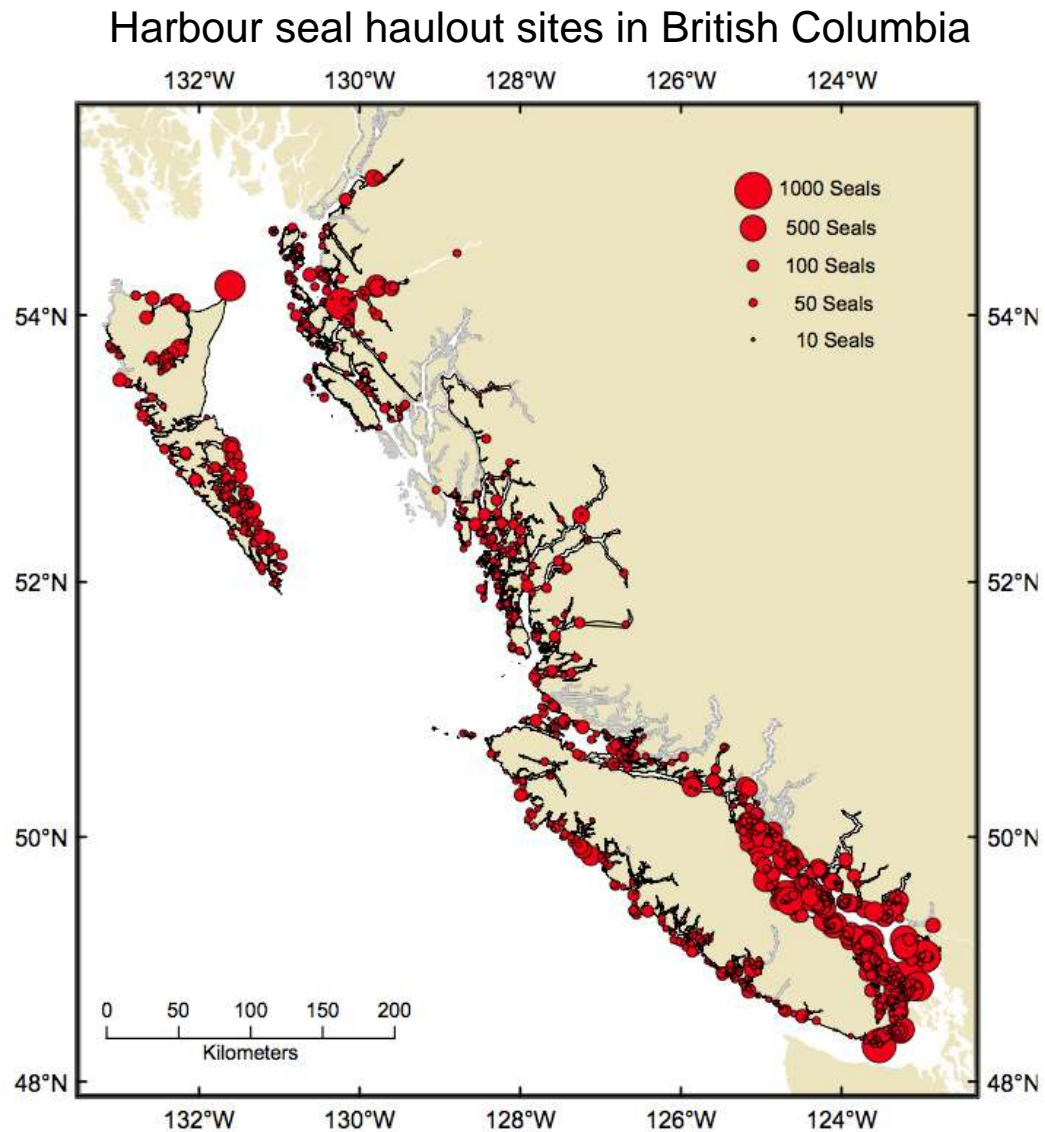
1988-2011, n = 145 encounters



Harbour seal
Phoca vitulina

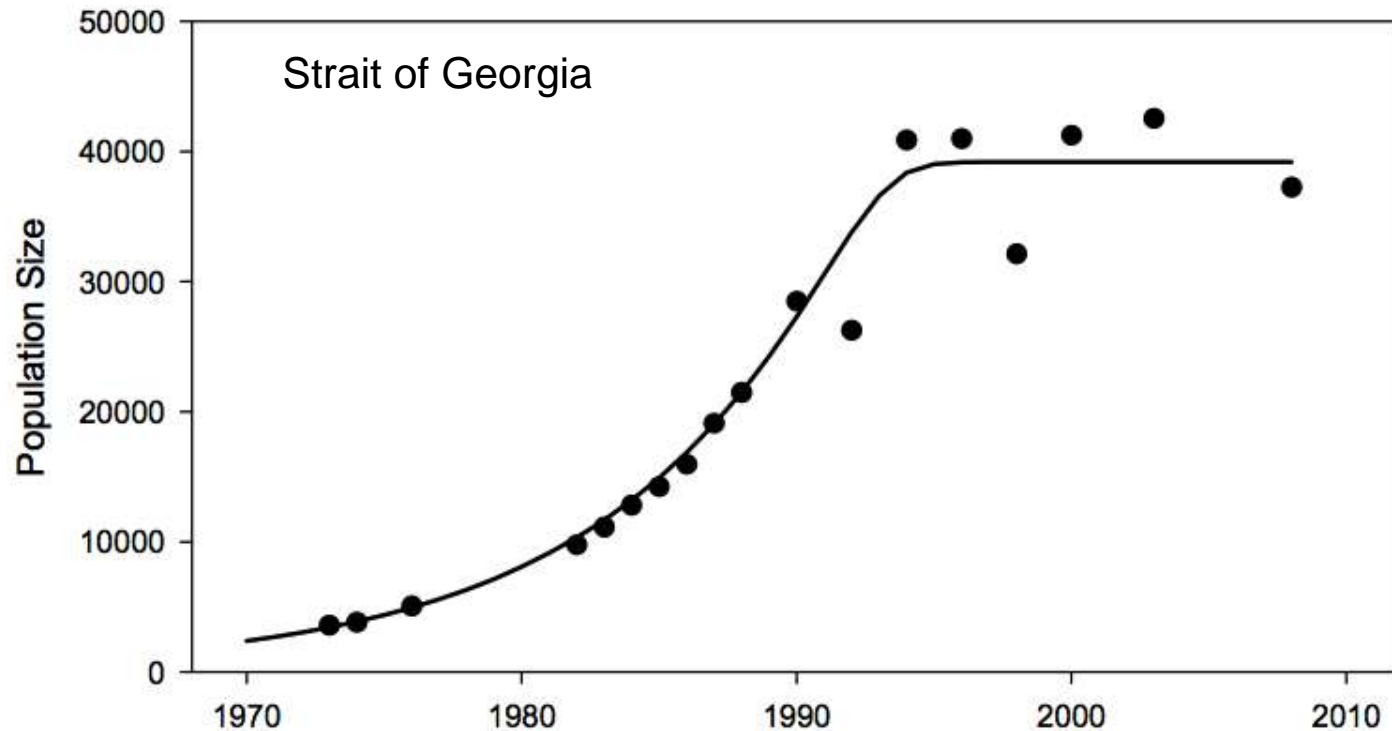


Distribution: Harbour seal



Status: Harbour seal

- Population severely depleted by control programs and harvest, ended in 1970
- Abundance increased 10-fold since early 1970s
- Increased at 11.5% per year before stabilizing in 1990s
- Current abundance: ca. 40,000 Strait of Georgia, 105,000 BC coast



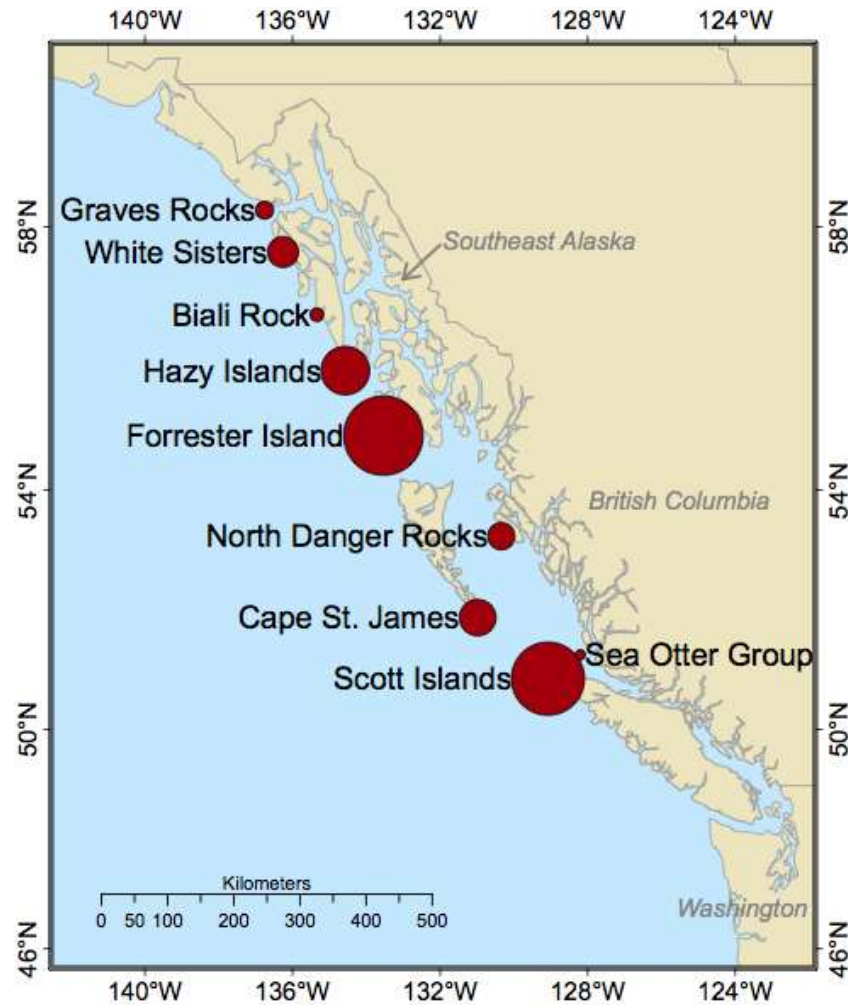
Steller sea lion

Eumetopias jubatus



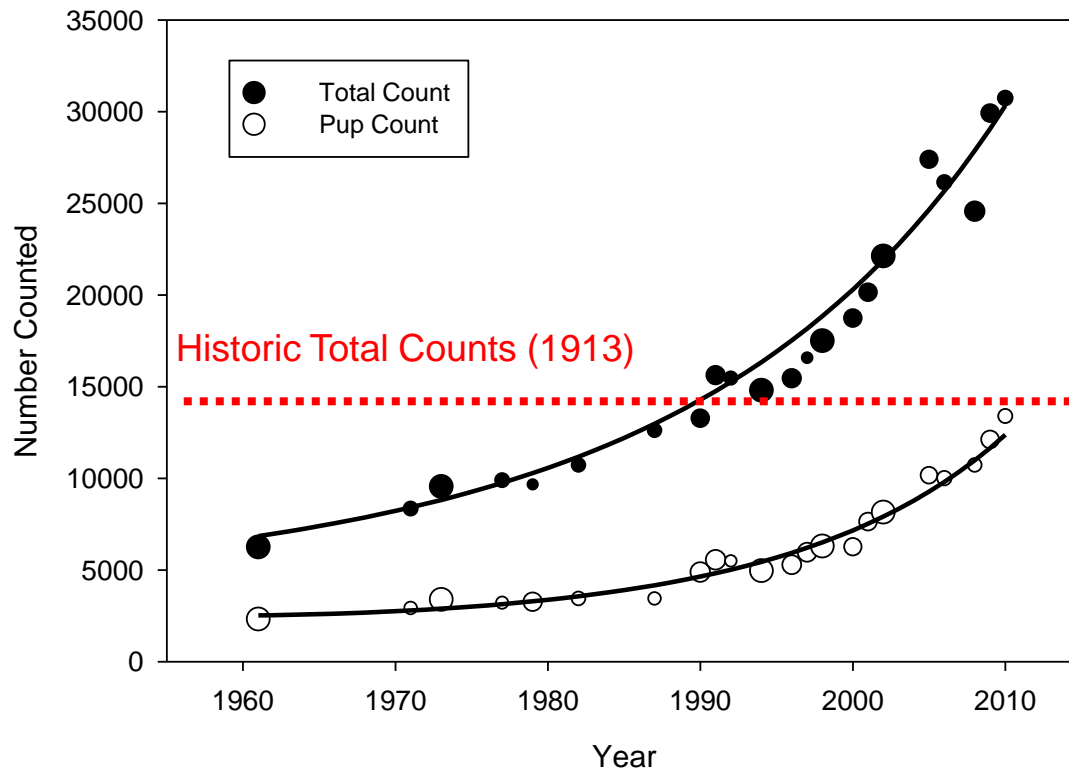
Steller sea lion distribution

Breeding rookeries in British Columbia and SE Alaska



Status: Steller sea lion

- Population depleted to 25-30% of historical abundance by control programs and harvests, 1912-1967
- Abundance increasing at 3.5% per annum (5% in recent years)
- Numbers in B.C. currently range from 32,000 in summer to 48,000 in winter



Thank you....

