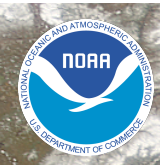
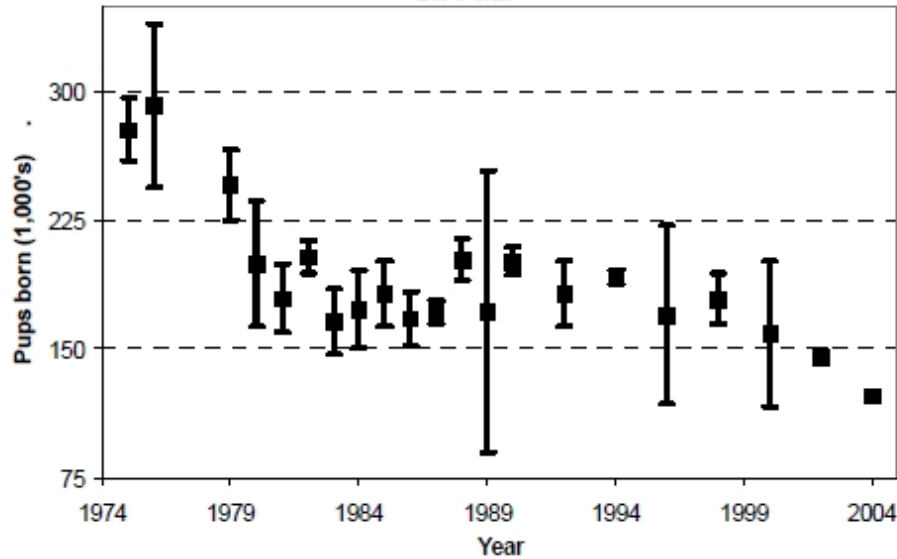


Using Regional Food Webs to Explore Fisheries and Foragers Interactions: A Case study on Northern Fur Seals

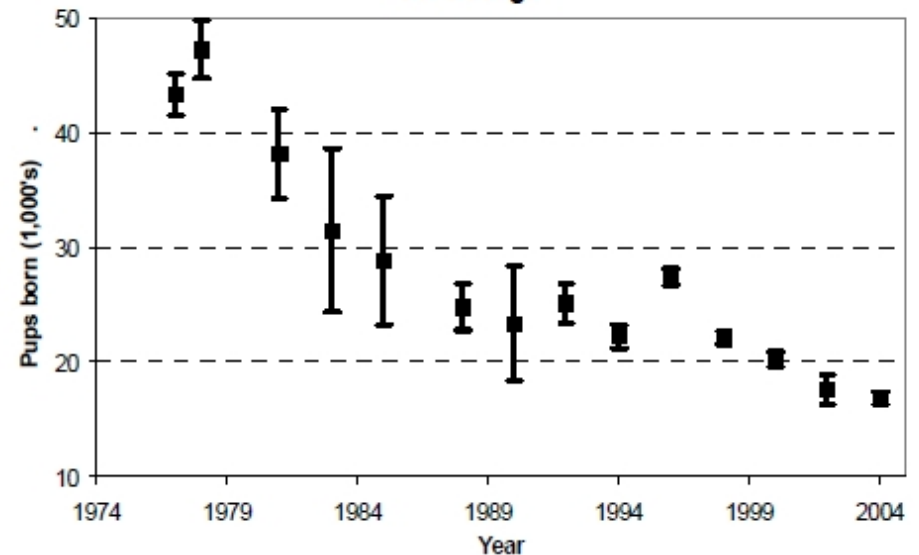
Ivonne Ortiz and Bruce Robson



St. Paul



St. George



St. Paul

Depleted: <50% of population in 1950's

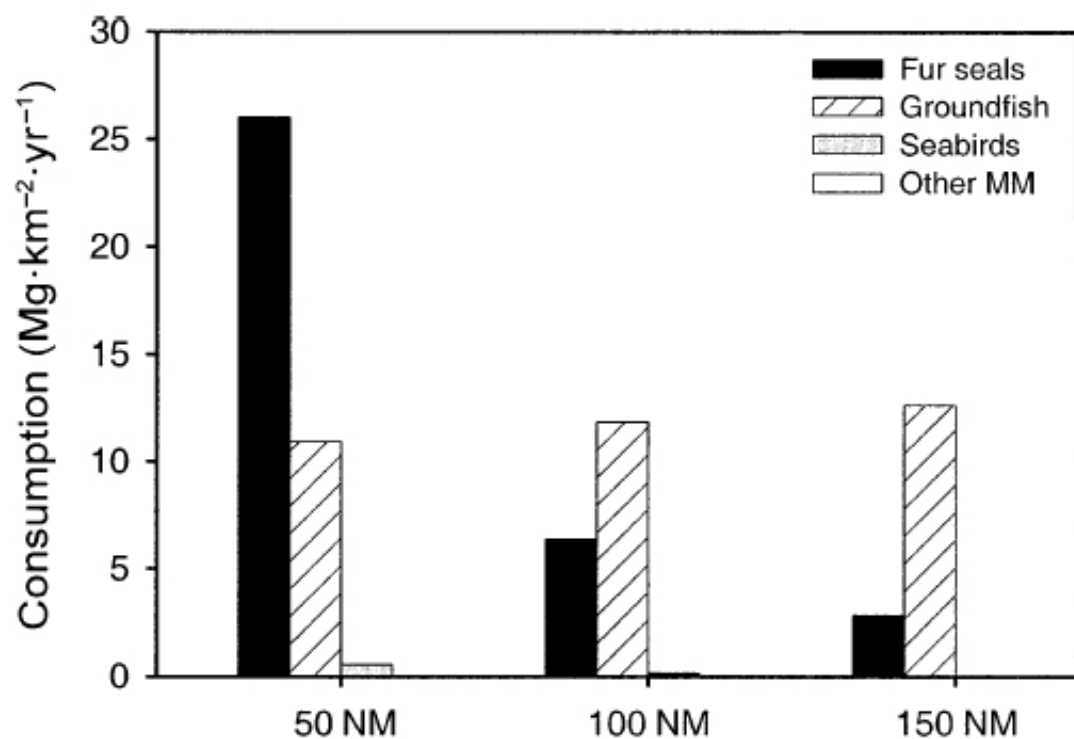


St. George

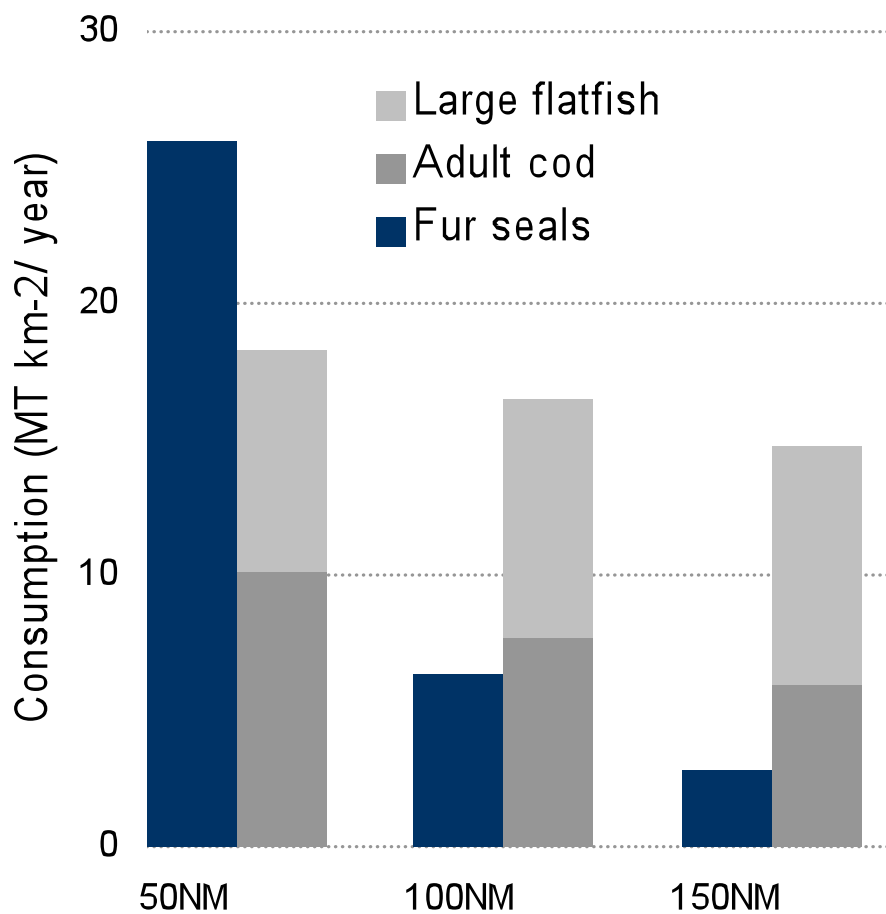
other concerns: climate change, pollock availability, fisheries interactions, potential conservation actions...

Resources around the islands

- 1990's model (Ciannelli et al. 2004)
- ~ 40 groups
- Open ecosystems, (not mass balanced)

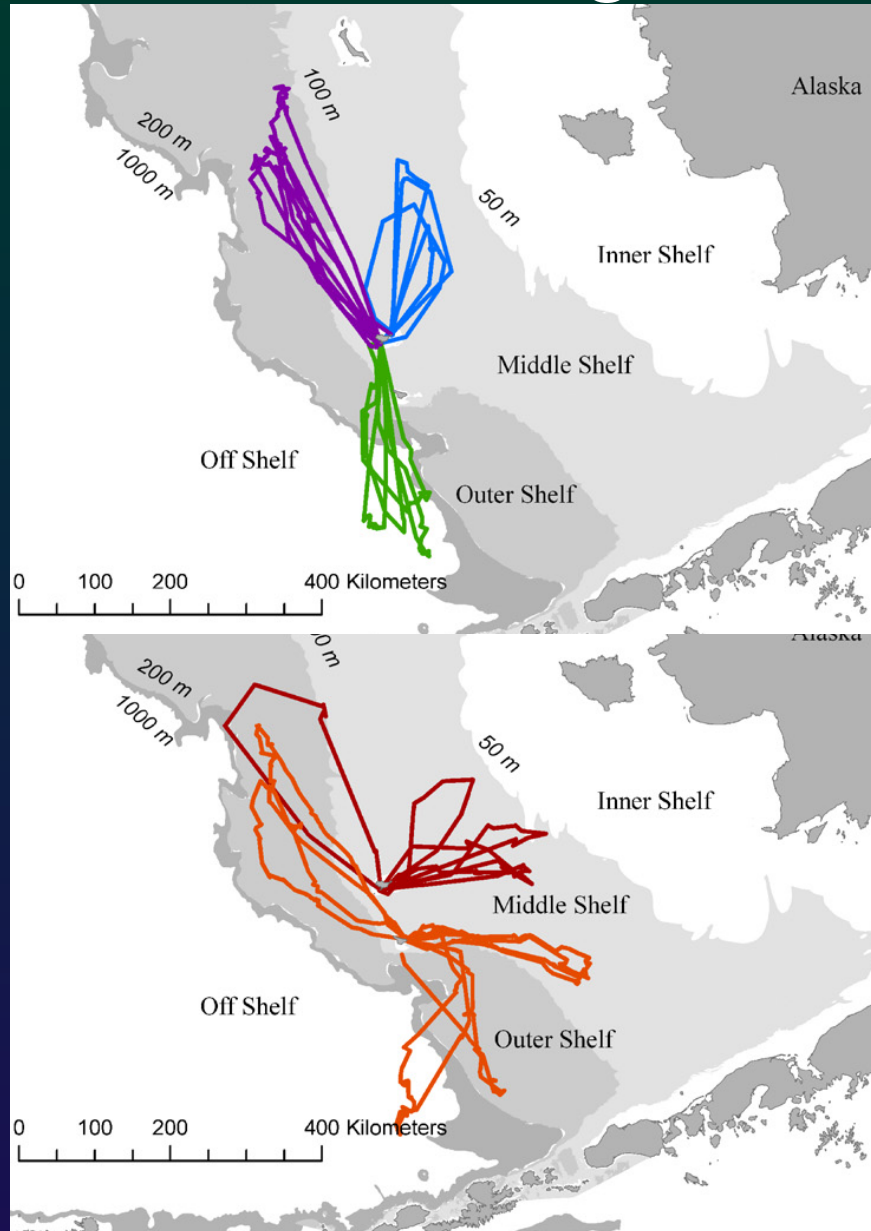


Updated circular model



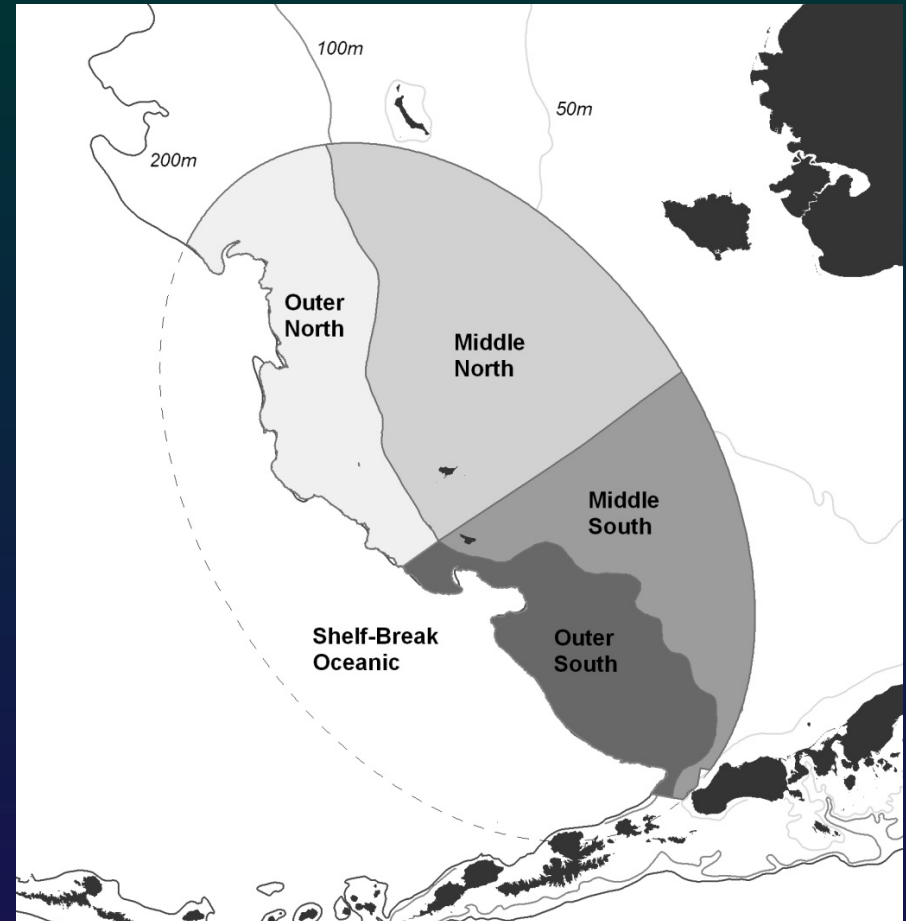
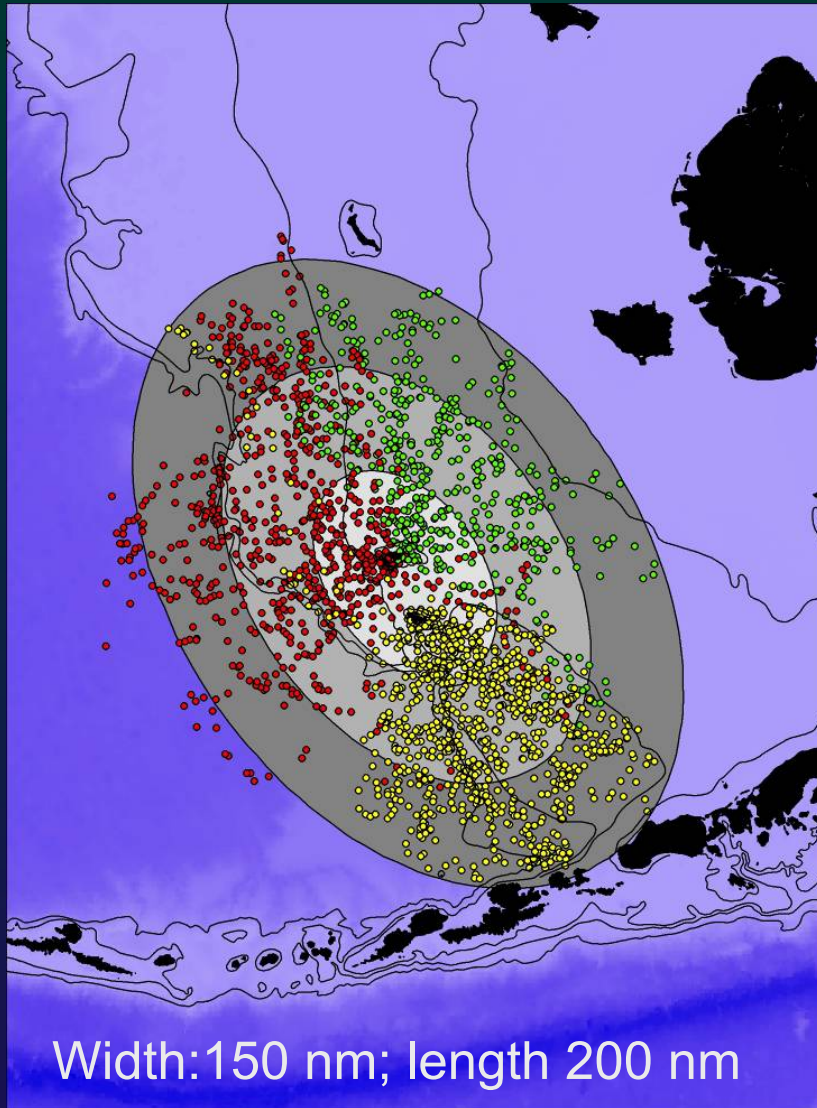
1990's

Tailor regions to fur seal foraging



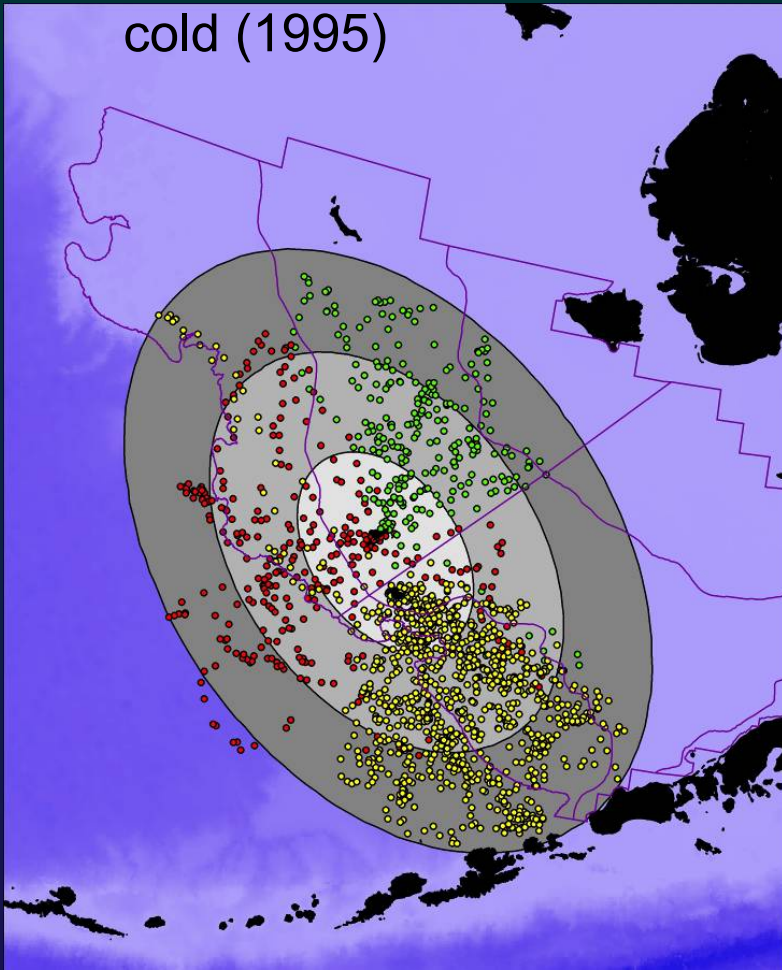
- Telemetry data: fur seals go further
- Breeding sites have separate foraging habitats
- Most fur seals have high site fidelity but some individuals do change foraging route

Tailor regions to fur seal foraging

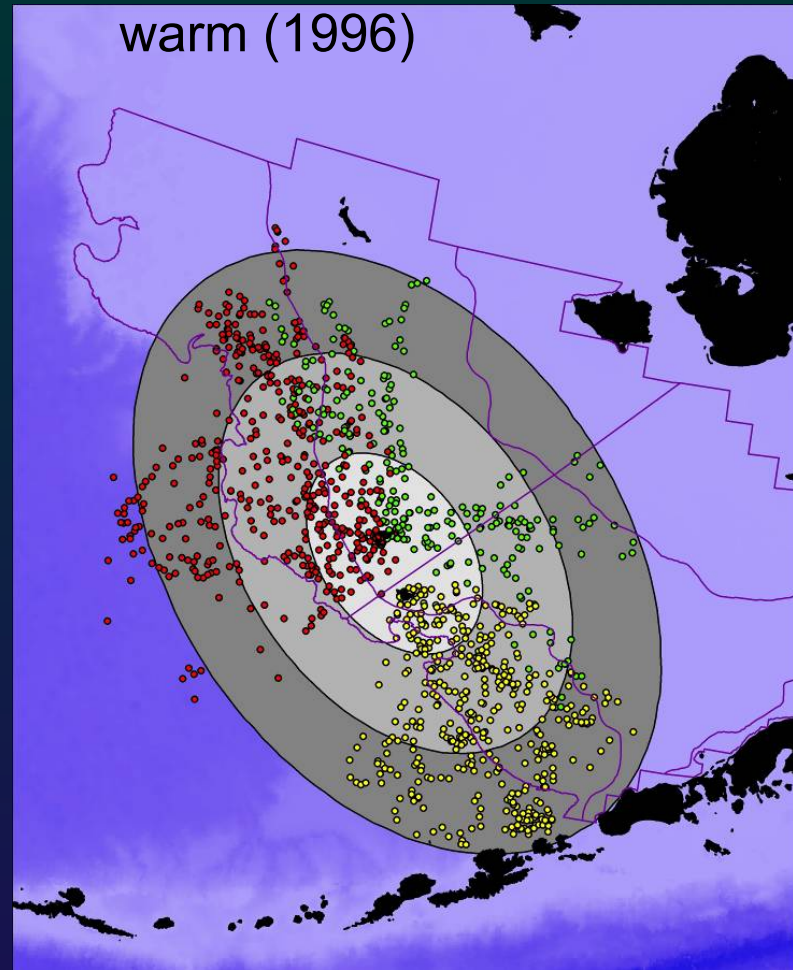


Changes in fur seal foraging during cold/ warm years

cold (1995)



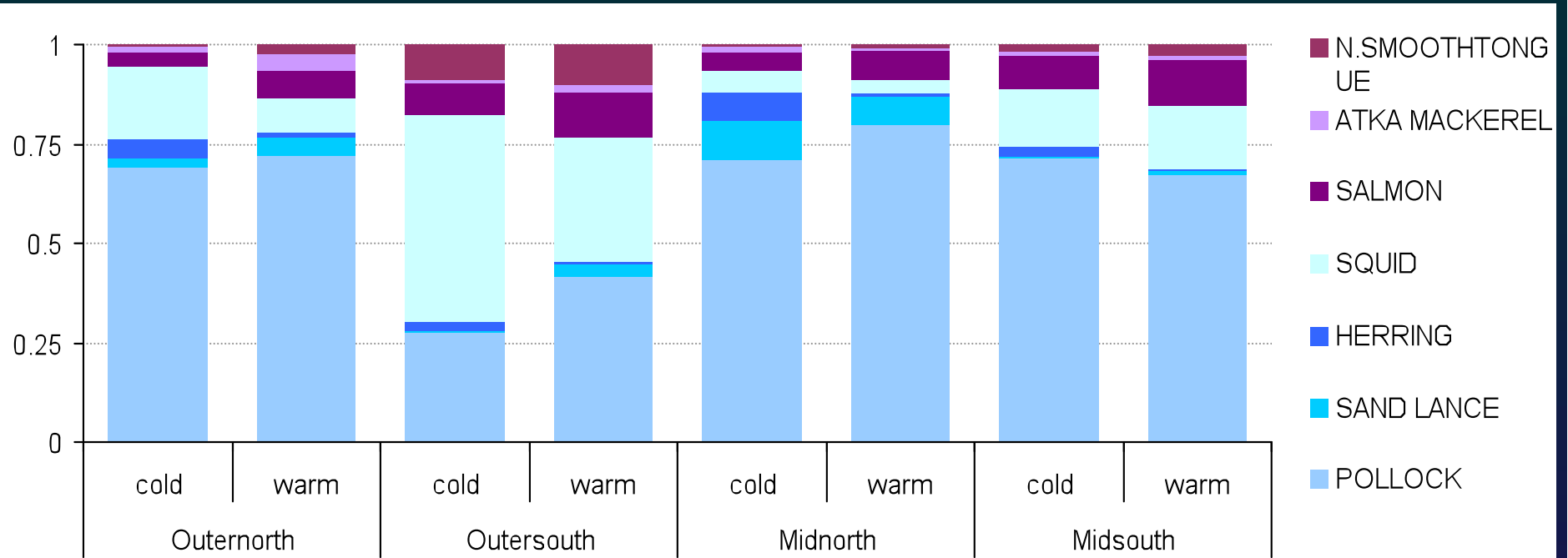
warm (1996)



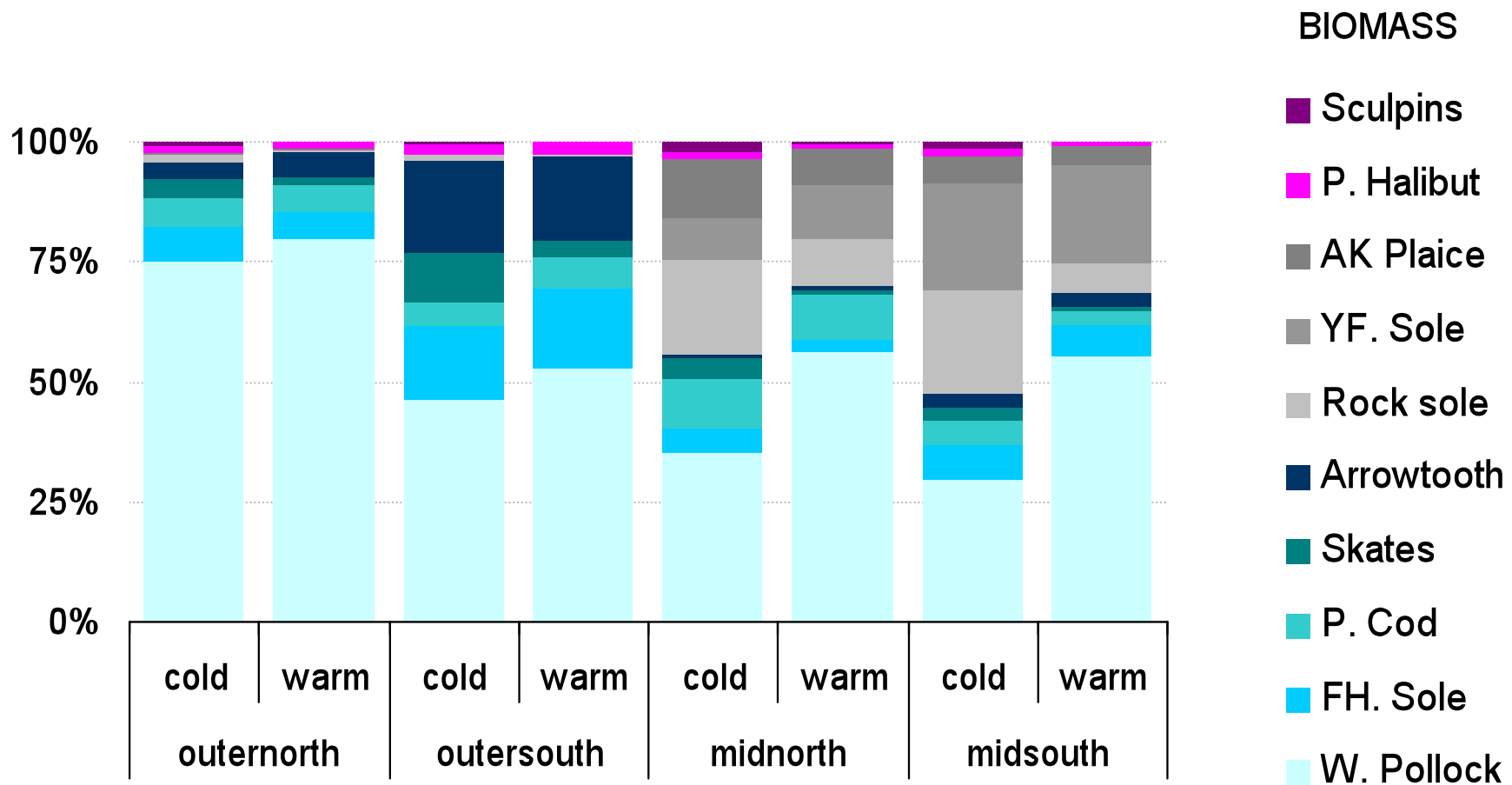
Model set up

- Fish cold years: average of 1999, 2006, 2007
- Fish warm years: average 2003, 2004, 2005
- NFS cold year diets 1002, 1994, 1995
- NFS warm year diets: 1996, 1997, 1998
- # of NFS scats: 142-438 for region/temp combo

Northern fur seal diets

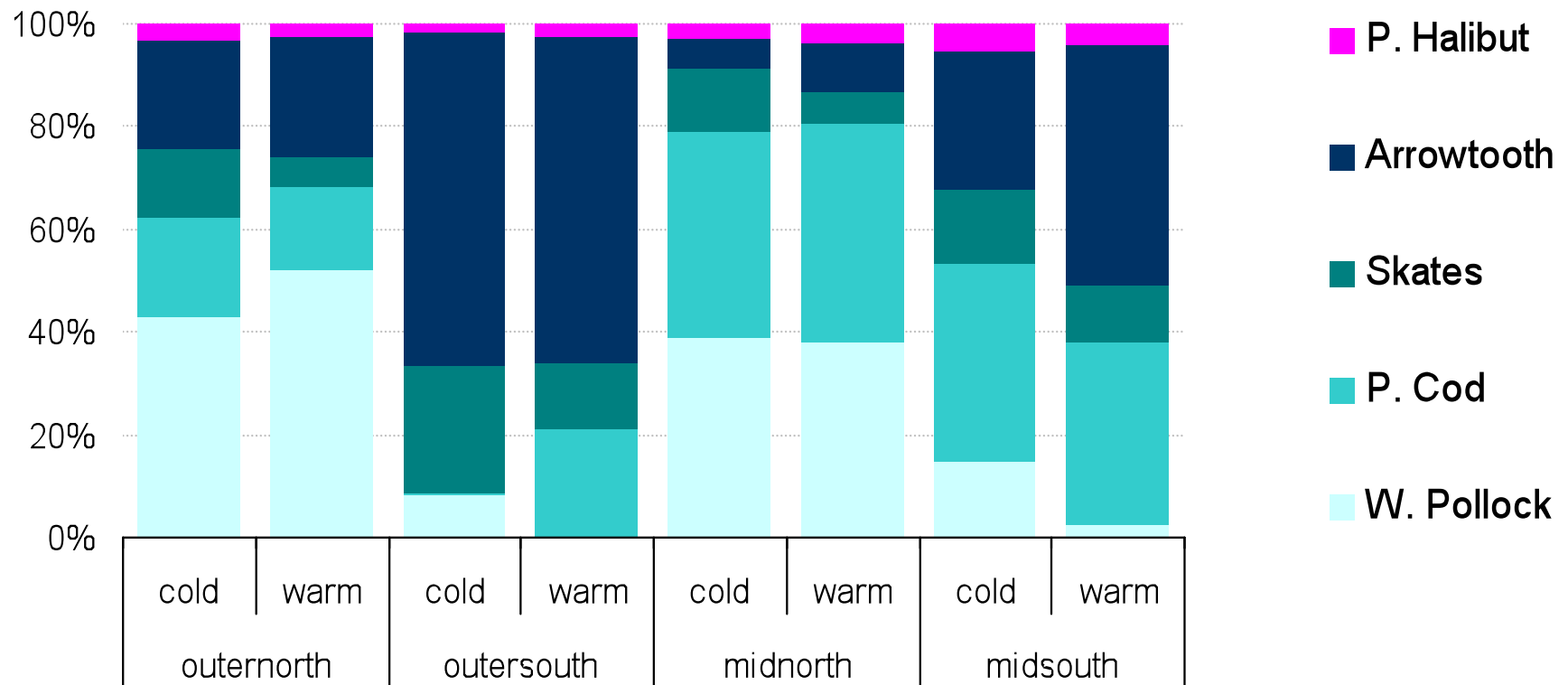


biomass comparison

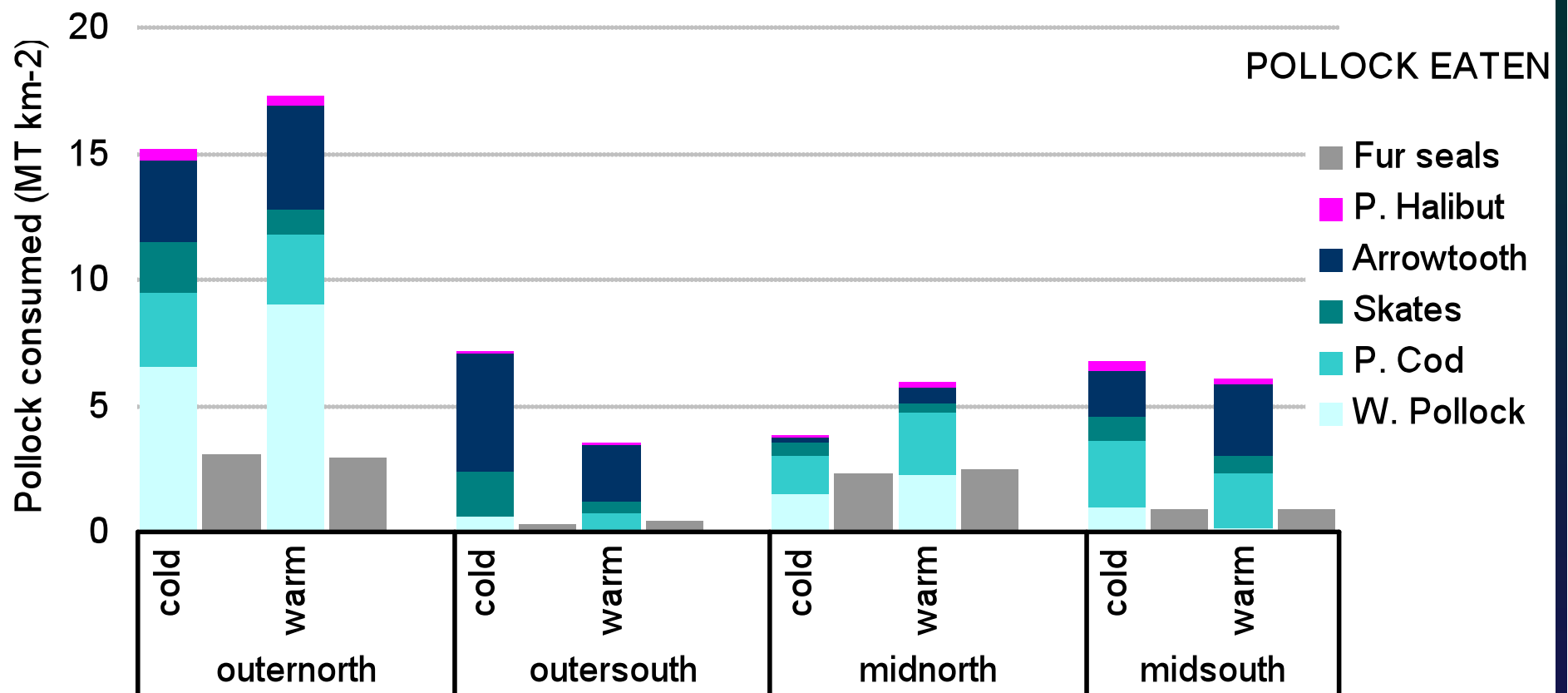


major consumers of pollock

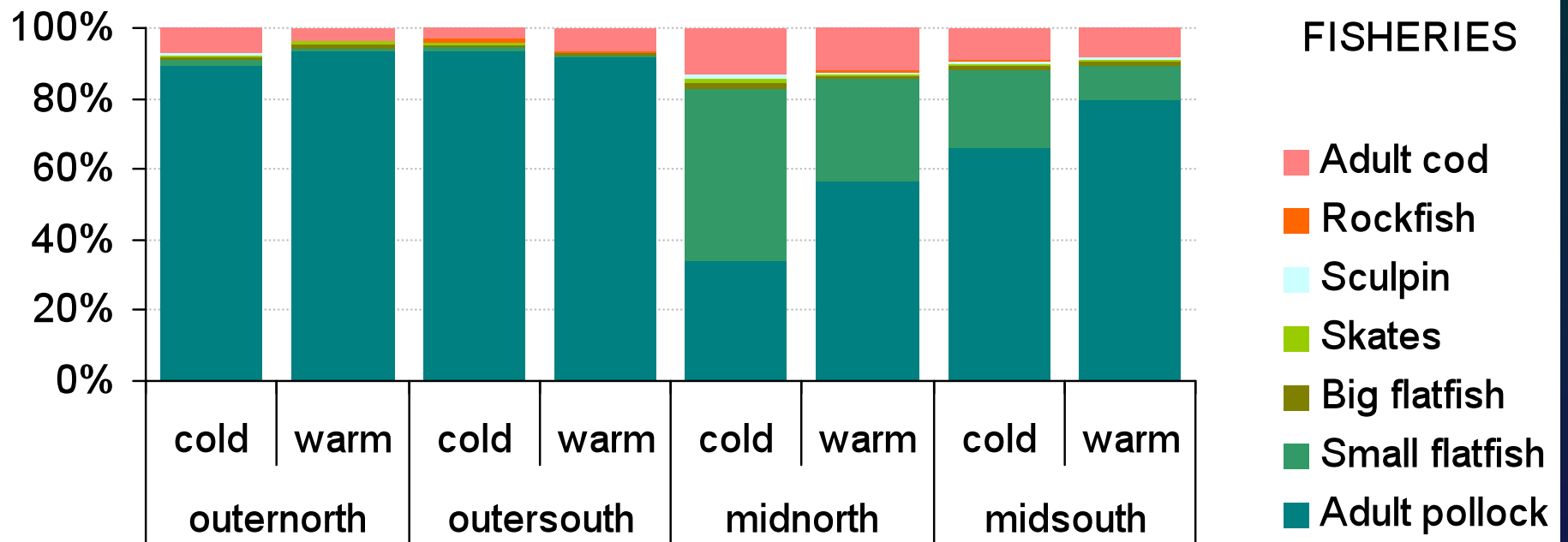
POLLOCK EATEN



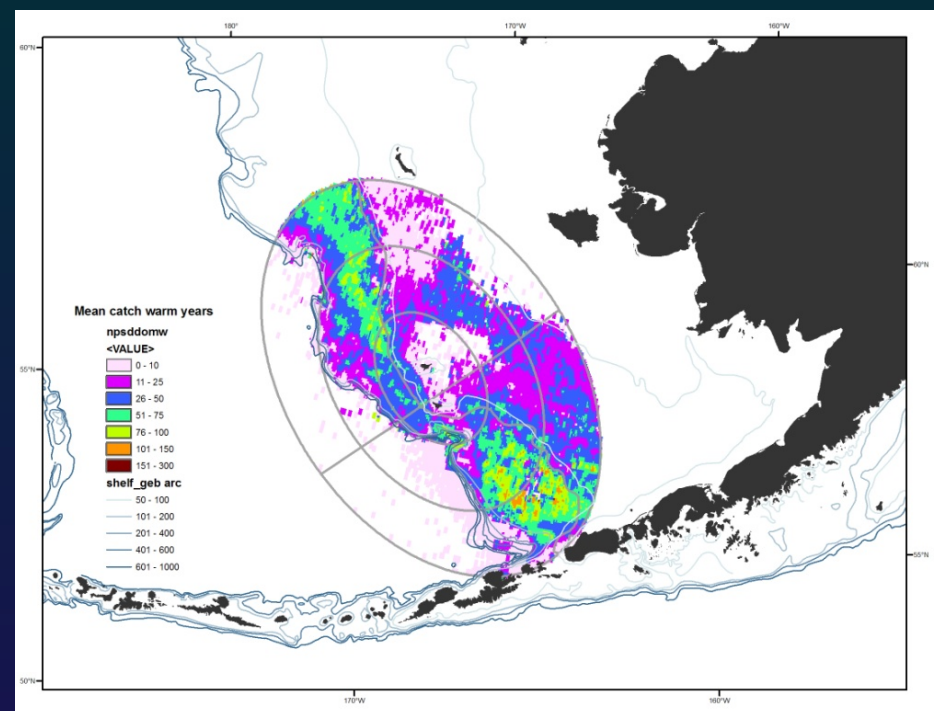
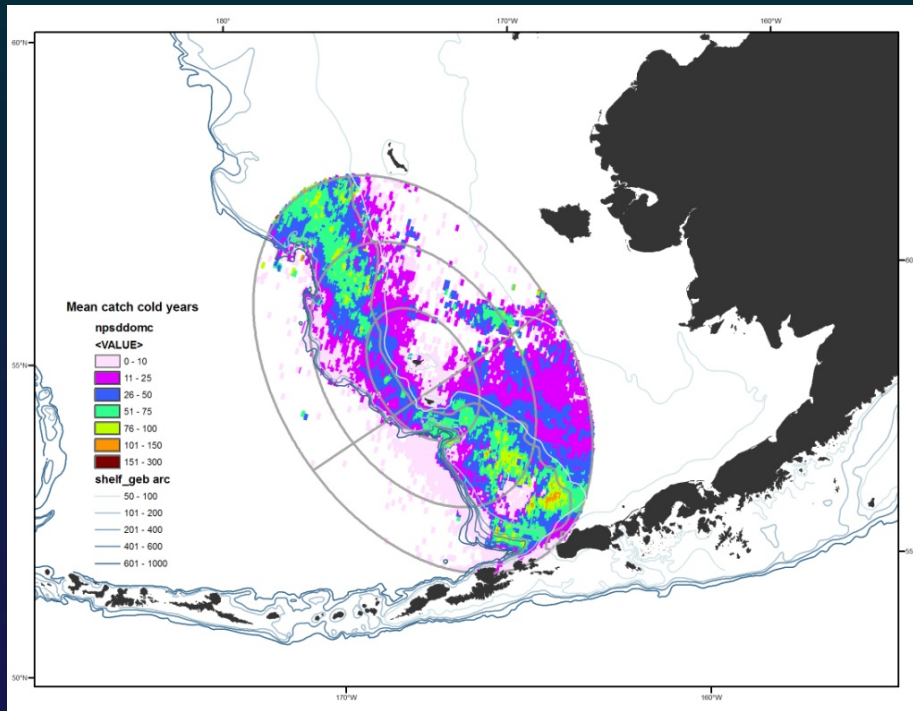
major consumers of pollock



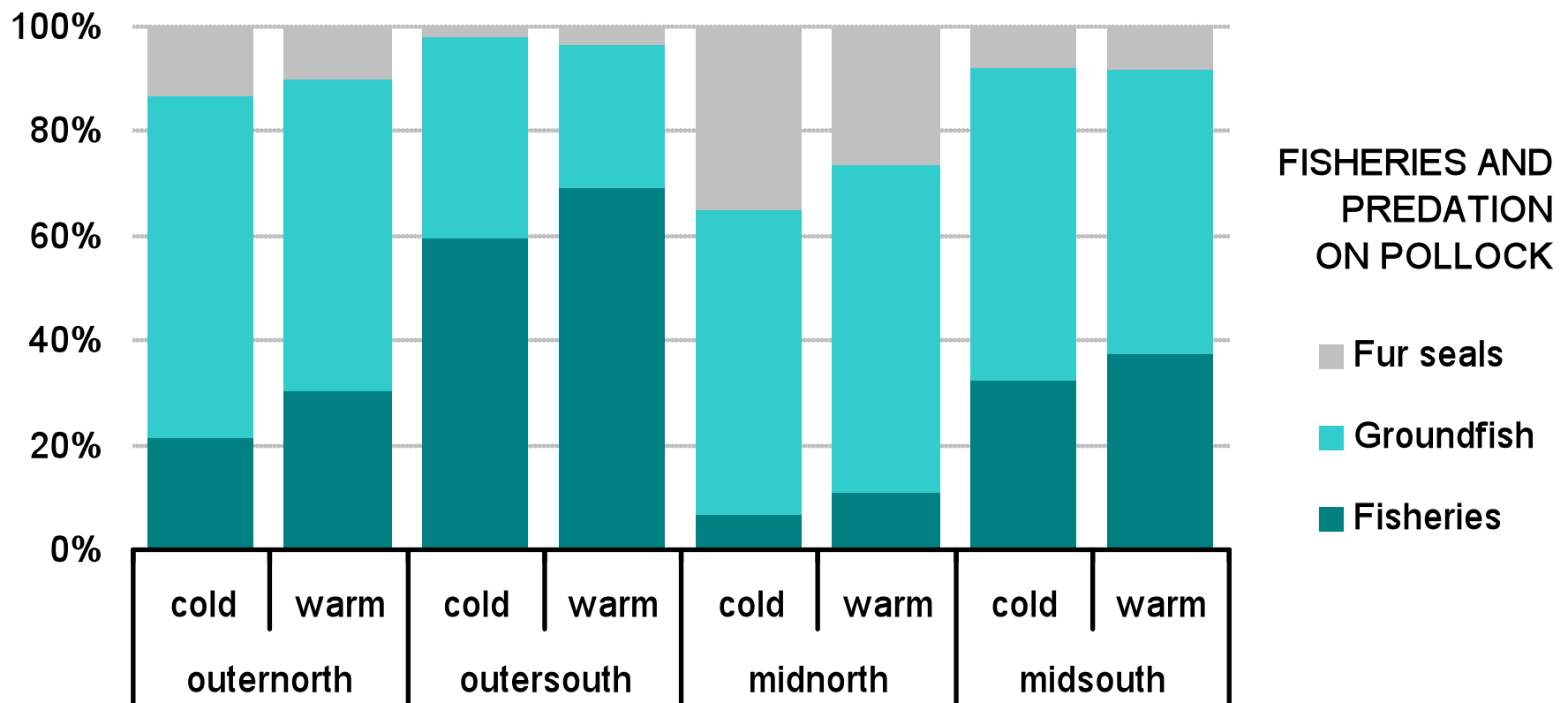
Fisheries removals



Spatial distribution of fisheries



Fisheries and predation on pollock



summary

- there are clear differences across foraging habitats
 - interaction with other pollock consumers is different across foraging habitats
 - differences across foraging habitats prevail between cold/warm years
 - same action will have different effect on the foraging habitats and breeding sites

questions?