Depredation research: South Georgia

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COLTO depredation workshop

Punta Arenas, Chile

Centre for Environment Fisheries & Aquaculture Science

Fisheries and Oceans Canada

LEO TERRAM PROPRIAM PROTEGAT

British Antarctic Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

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Outline

A. Background

B. Analysing data from fishing vessels

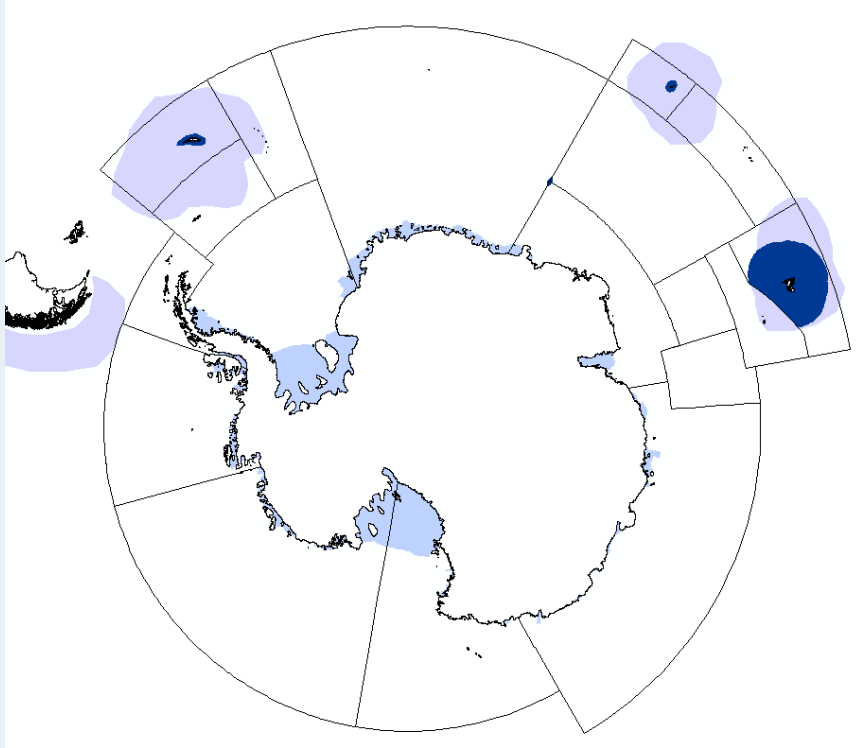
C. What now?

D. Current research

E. Future research

CCAMLR: Who depredates?

Orcas, sperm whales. Occasionally fur seals, leopard seals, elephant seals (extremely rare)



South Georgia: Subarea 48.3
South Sandwich Islands: Subarea 48.4
South Orkney Islands: Subarea 48.2

CCAMLR: Who depredates?

Orcinus orca

Ecotype A:
Eats minke whales

Ecotype B:
Eats seals, small mammals

Ecotype C:
Eats fish

Ecotype D:
Eats fish?


BBC

R Pitman

Seals & small mammals
Penguins?

M Unwin

Eat penguin? Fish?

R Pitman

P Tixier

P Tixier

Subarea 48.3, status in 2012:

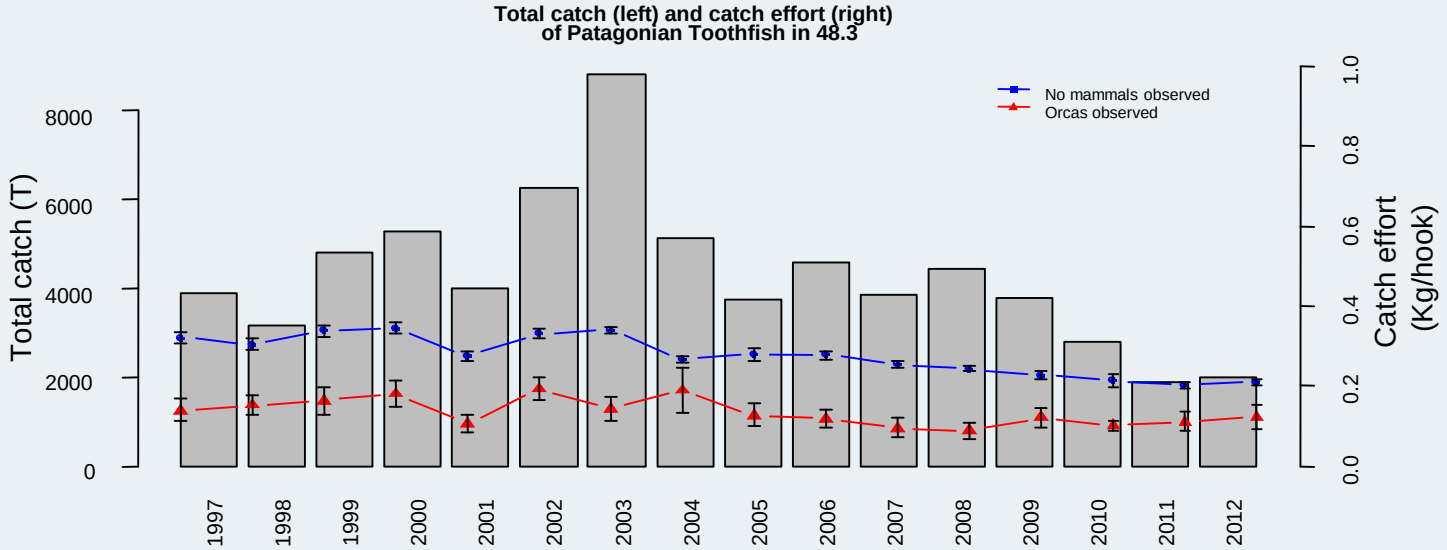
Reports from fishermen

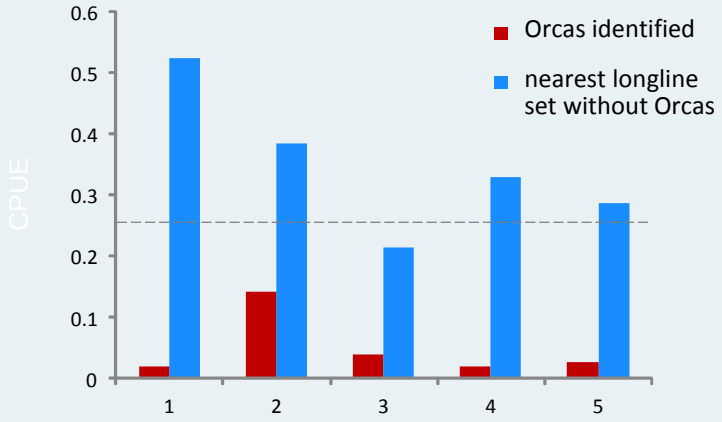
- at least half the fish taken off
- Orcas follow the ships
- significant losses
- attracted by hauling activity

Available scientific evidence

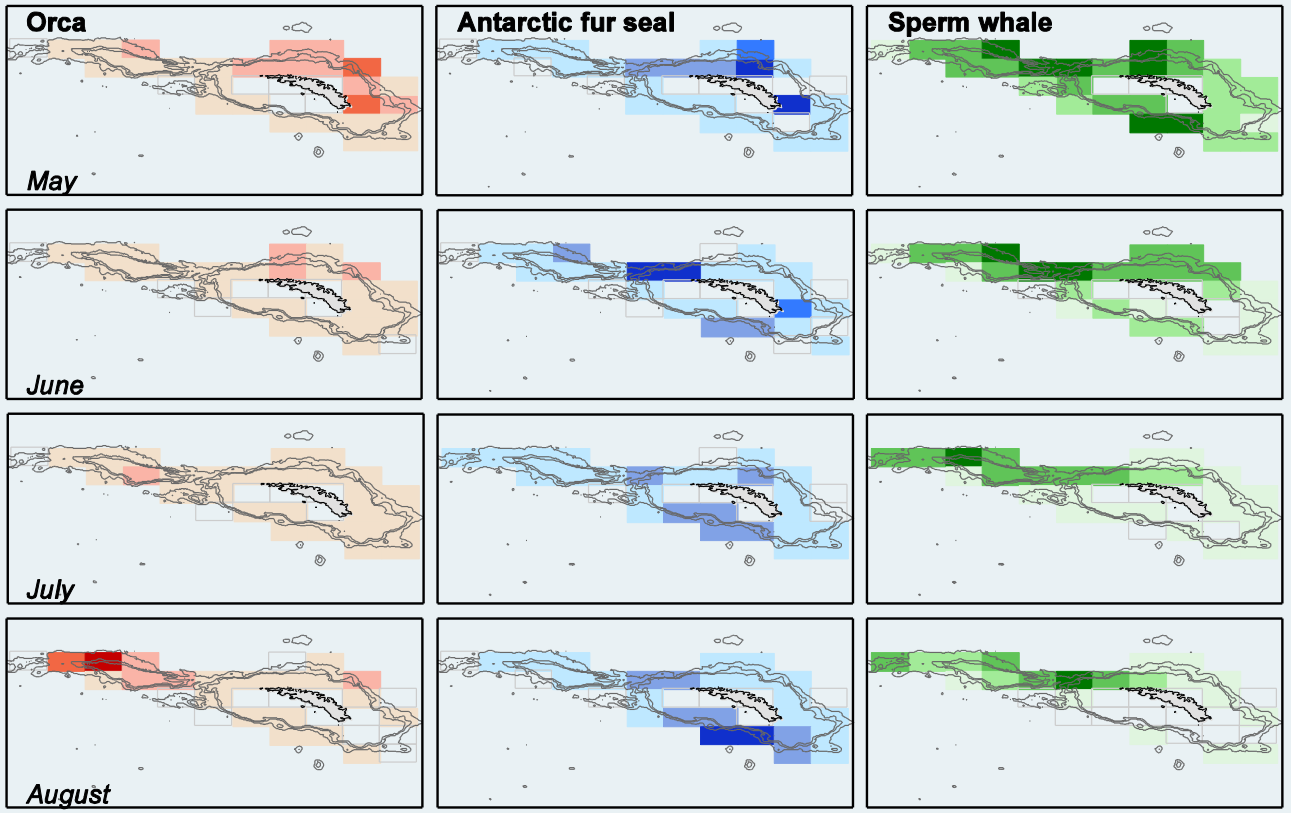
- Catch correction: around 5%
- no evidence available
- no evidence available
- anecdotal evidence

Using time-series analyses: Is there a problem?





B. Depredating species movements



For details on spatial analysis of depredation around South Georgia see:

Söffker M, Trathan P, Clark J, Collins MA, Belchier M, Scott R (2015) The Impact of Predation by Marine Mammals on Patagonian Toothfish Longline Fisheries. PLoS ONE 10(3): e0118113. doi:10.1371/journal.pone.0118113

B. What have we learnt?

- *at least half the fish taken off*
- *Orcas follow the ships*
- *significant losses*

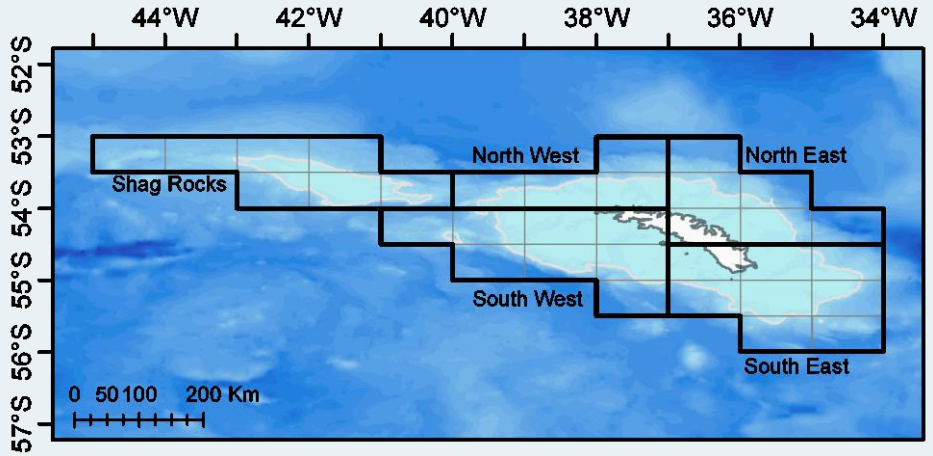
Yes, but very localised

- *attracted by hauling activity*

No evidence (trend in May)

however: winter fishery only! Spatial scale?

Encourage fishery to fish 'opposite' to movement of orcas



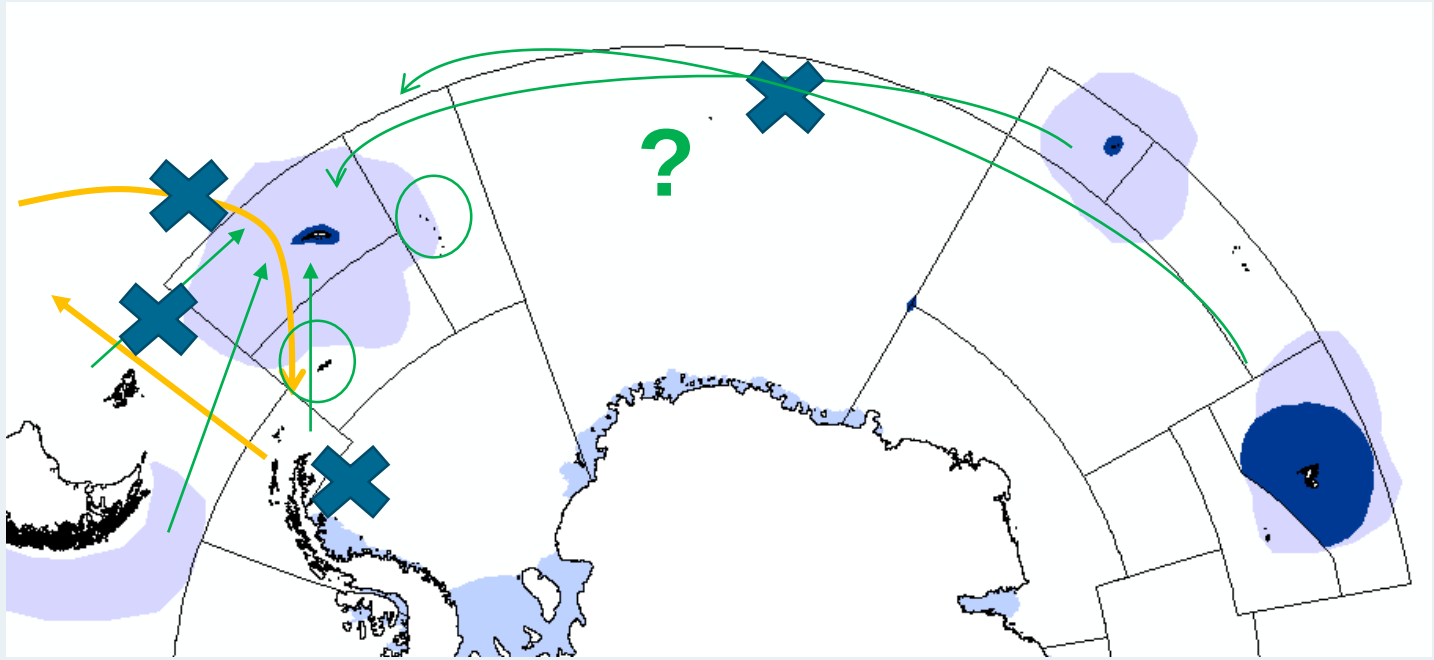
New research questions:

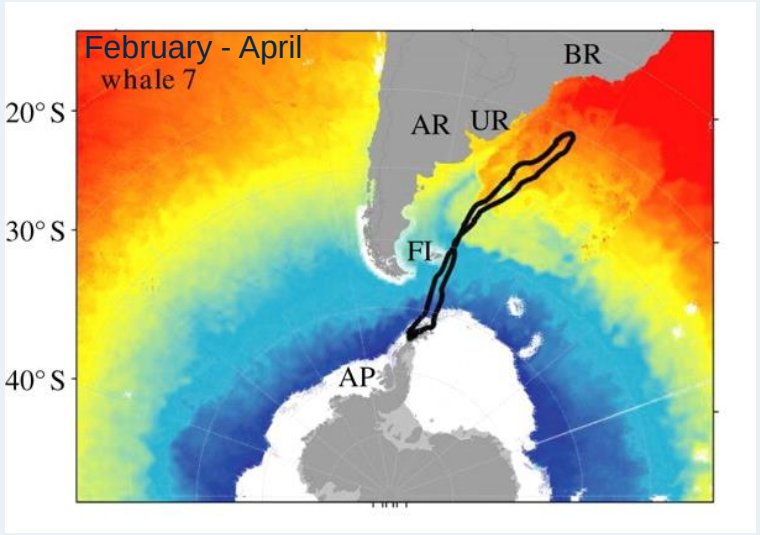
- Where do they go? What is this east-west movement?
- Are there orcas coming in for resources? Migration exchange with other Subareas?
- Why do they depredate? (Prey switching)
- Is it a specialised subgroup? Knowledge transmission?
- How does depredation affect orca population dynamics?
- Do orcas and sperm whales only depredate near vessels/surface?
- Is there a recent shift in group dynamics in sperm whales?
- What is the role of climate/climate change in depredation patterns?

D. Current research

- Movement: Coming in for resources? Migration exchange with other Subareas? Where do they go?

  - Comparison with Weddell Sea catalogue, collaborating with Crozet/Kerguelen: no matches to date (sperm whales and orcas)
  - Photo collection in South Orkneys under way
  - Movement from South Sandwich Islands (but no vessel interaction)?





Durban J W , and Pitman R L Biol. Lett.
doi:10.1098/rsbl.2011.0875

D. Current research

- Is it a specialised subgroup? Knowledge transmission?

- First evidence of ‘teachers’
- Hypothesized vertical and/or horizontal learning transfer -> further analysis needed (MSc student?).
- Photo catalogue shows groups that depredate often, and those that do so uniquely/opportunistically. No data on non-depr orcas (FV)
- Tagged female with calf: known to depredate consistently since 2005

D. Current research

- Do orcas and sperm whales only depredate near vessels/surface? Is there a recent shift in group dynamics in sperm whales? -> in progress (developing experimental approaches)

- What is the role of environment in depredation patterns? -> in progress (fur seal depredation)

3- year research plan orcas (seeking funding)

- Increase isotope and tracking sampling size for statistical analysis
- Assess how depredation affects orca population dynamics
- Establish the role of natural prey in prey-switching
- Evaluate economic cost-benefits of different depredation mitigation measures
- Develop close collaboration with other CCAMLR subareas (such as in place with 58.5.1 and 58.6)

Develop understanding of sperm whale depredation & population movements

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