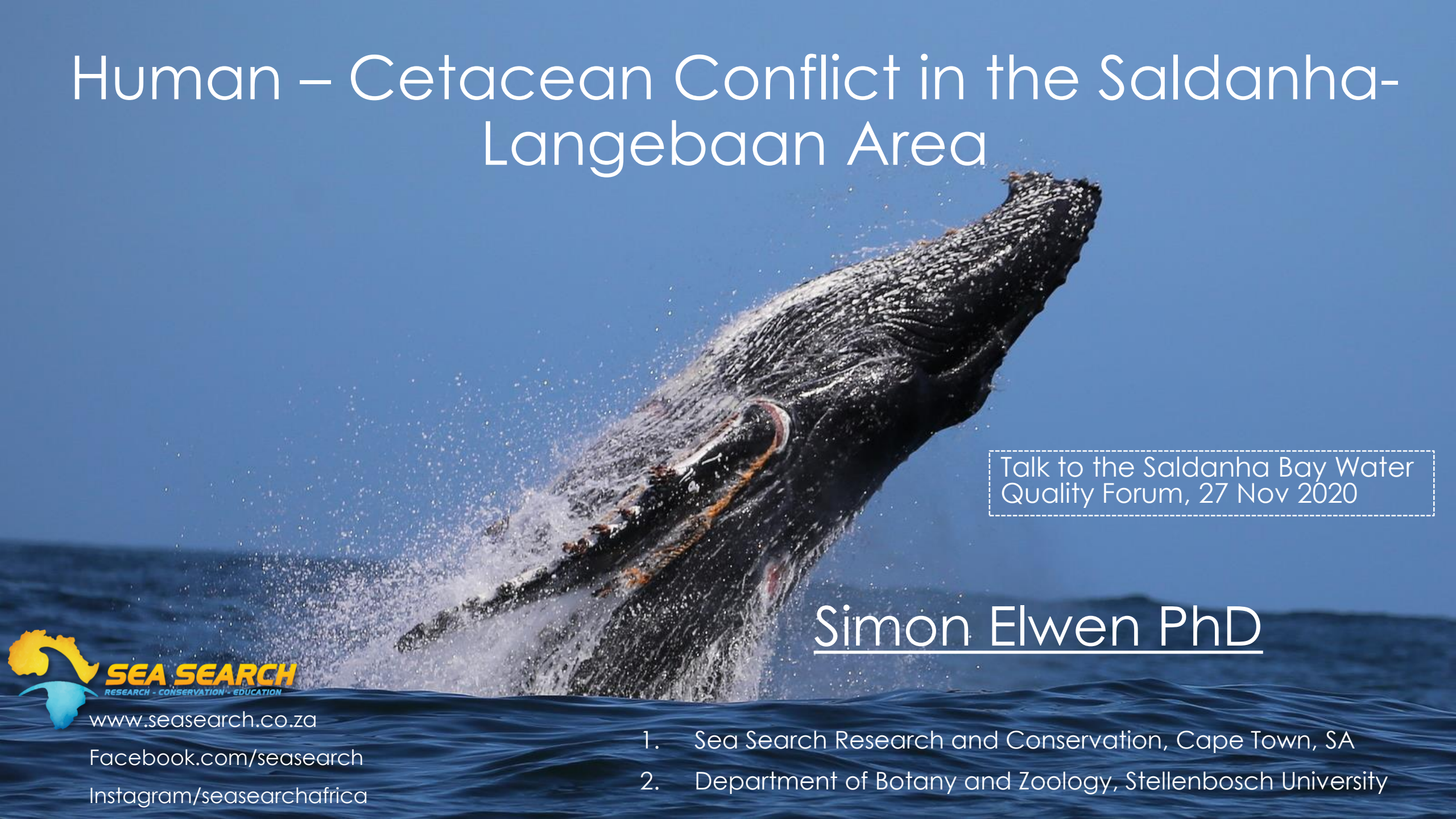
Human – Cetacean Conflict in the Saldanha-Langebaan Area



Talk to the Saldanha Bay Water Quality Forum, 27 Nov 2020

Simon Elwen PhD

SEA SEARCH
RESEARCH - CONSERVATION - EDUCATION

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2. Department of Botany and Zoology, Stellenbosch University

Ship Strike

There are many human impacts on the marine world such as plastic, chemical and noise pollution, overfishing and habitat loss etc. Here I will concentrate on the two of main relevance for large whales in Saldanha Bay: Ship Strike

Entanglement

..and entanglement. In SA these most often occur in trap fisheries like lobster and octopus but with increasing aquaculture farms… the chance of overlap and interaction increases significantly.

Seals

Seals are recognised as a species of concern especially for the aquaculture industry but we don't currently have any data on these interactions...but are happy to help. There have been some effective deterrent methods developed internationally.

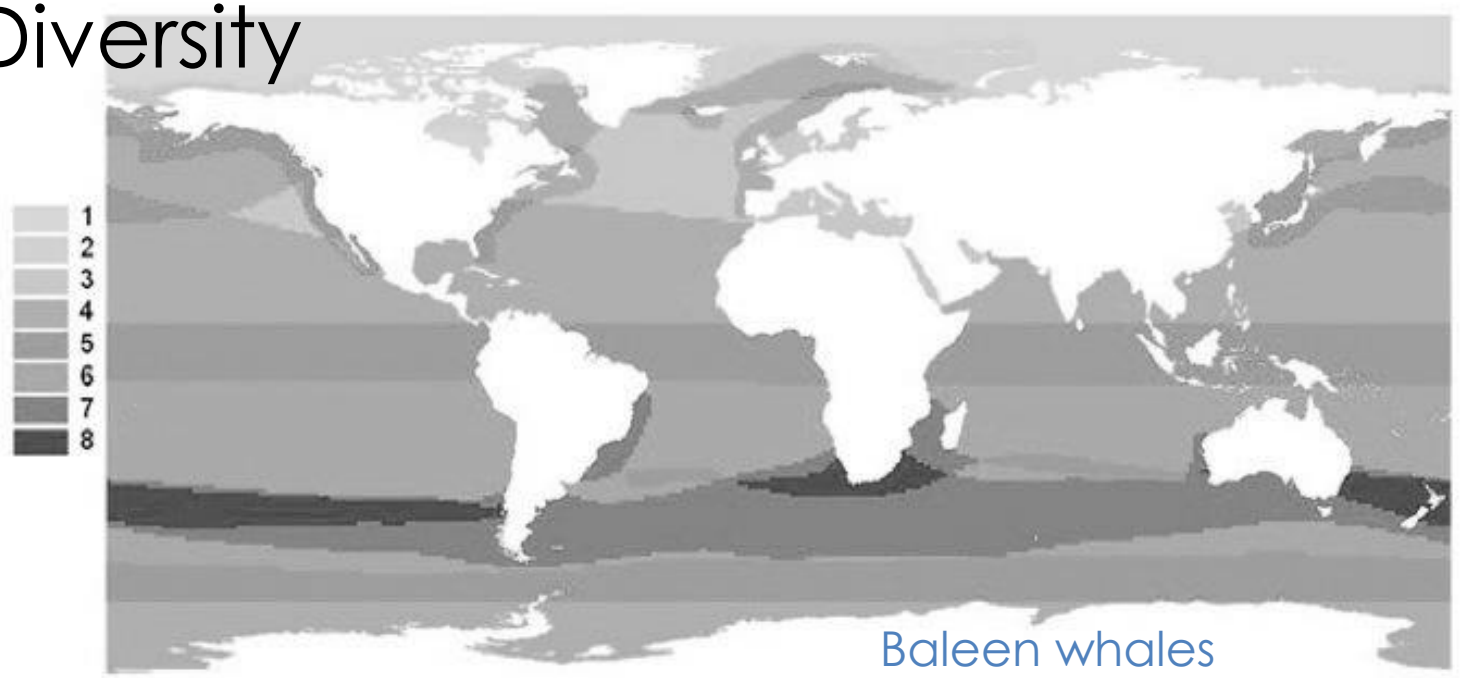
Species in the area

A quick introduction to the whale and dolphin species in southern Africa

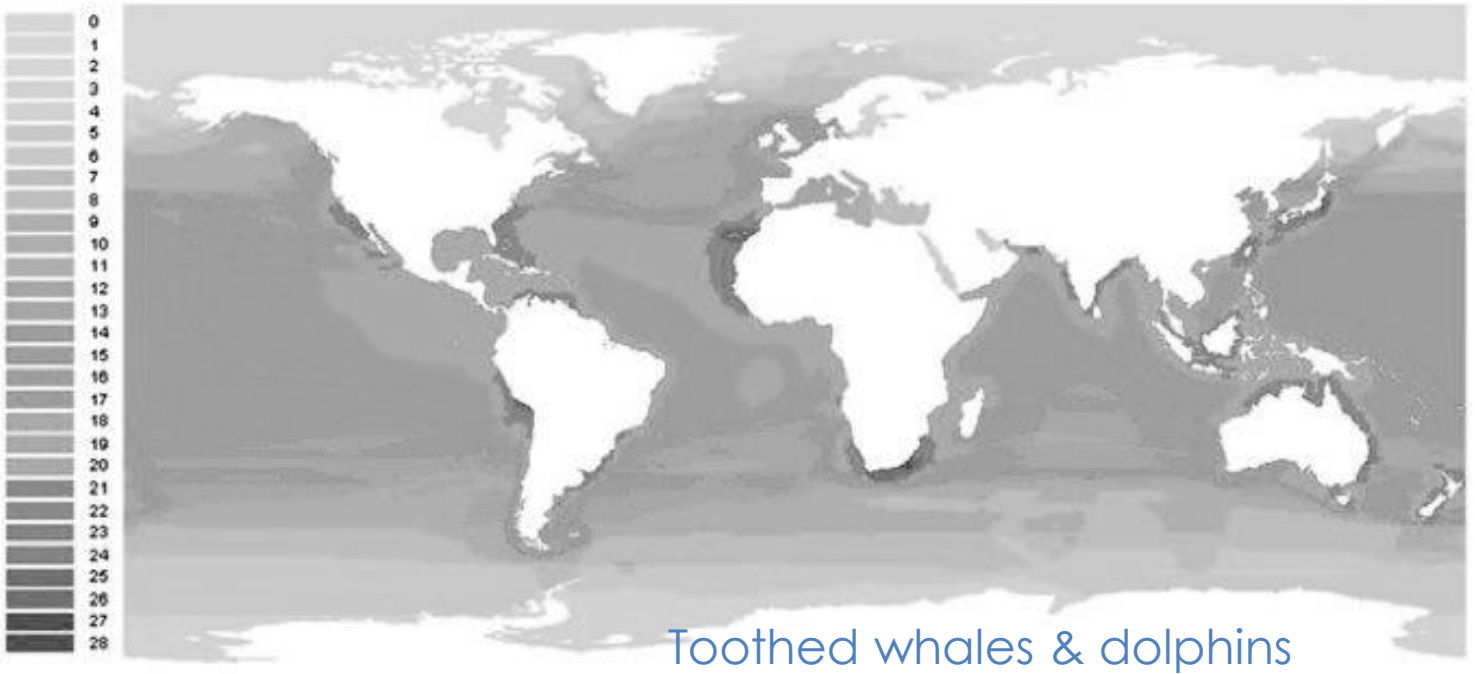
Global Marine Mammal Diversity

(Pompa et al. 2011)

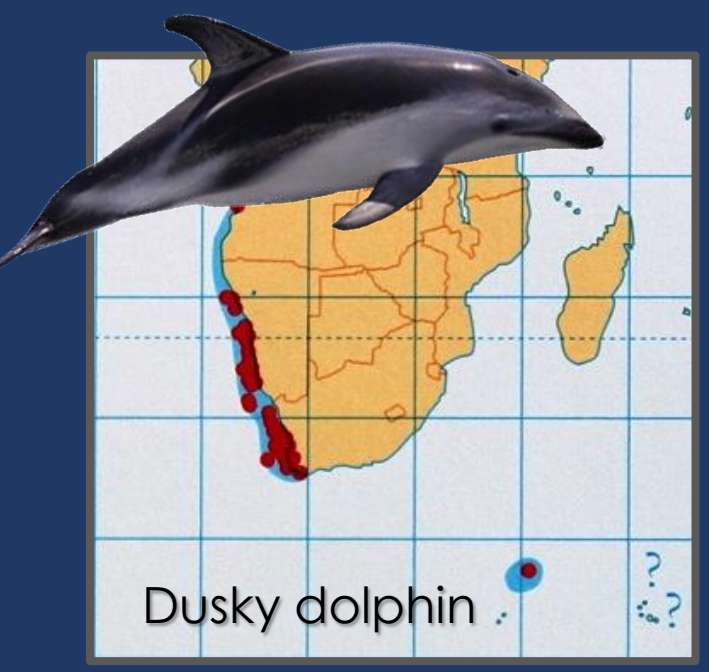
The southern African region has been identified as a major hotspot for cetacean species diversity for both the number of baleen whale species and toothed whale and dolphin species. Much of this diversity is due to the wide range of oceanographic conditions around the coast…



Baleen whales



Toothed whales & dolphins

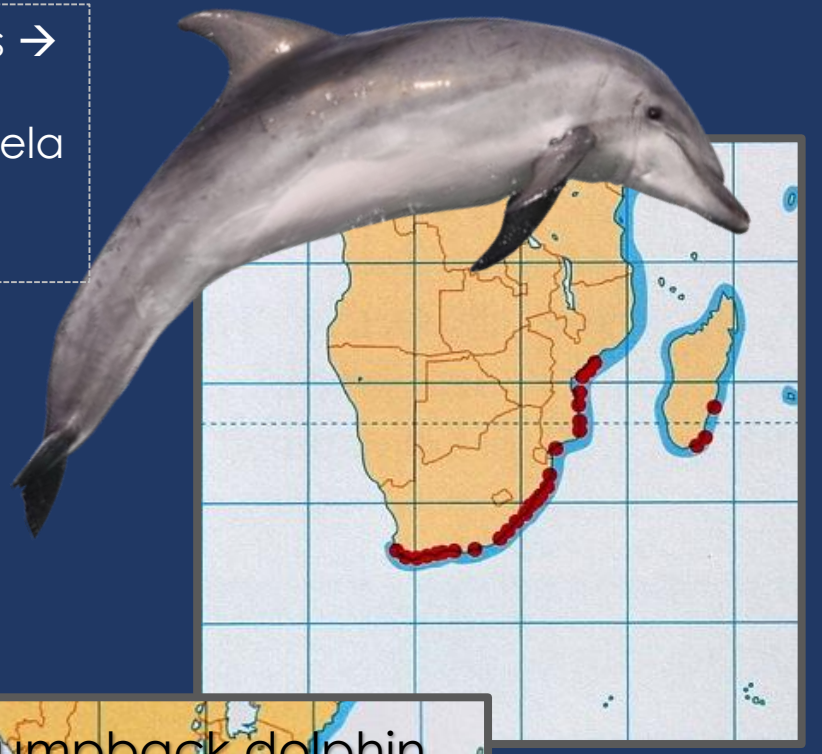


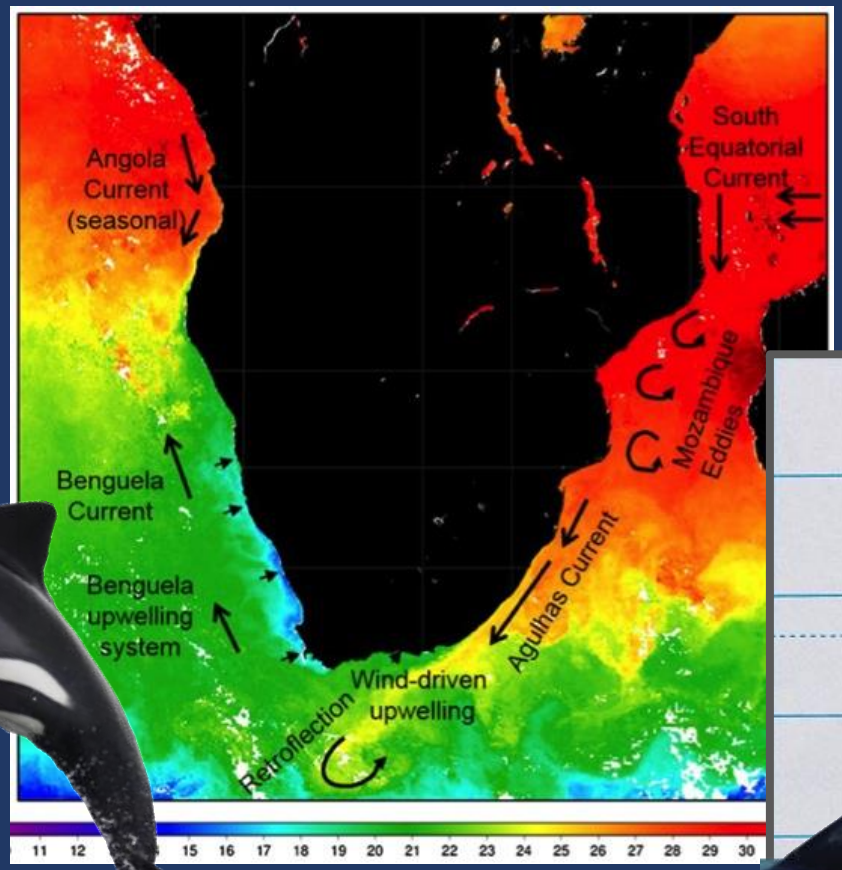
Two species associated with the warm Agulhas →

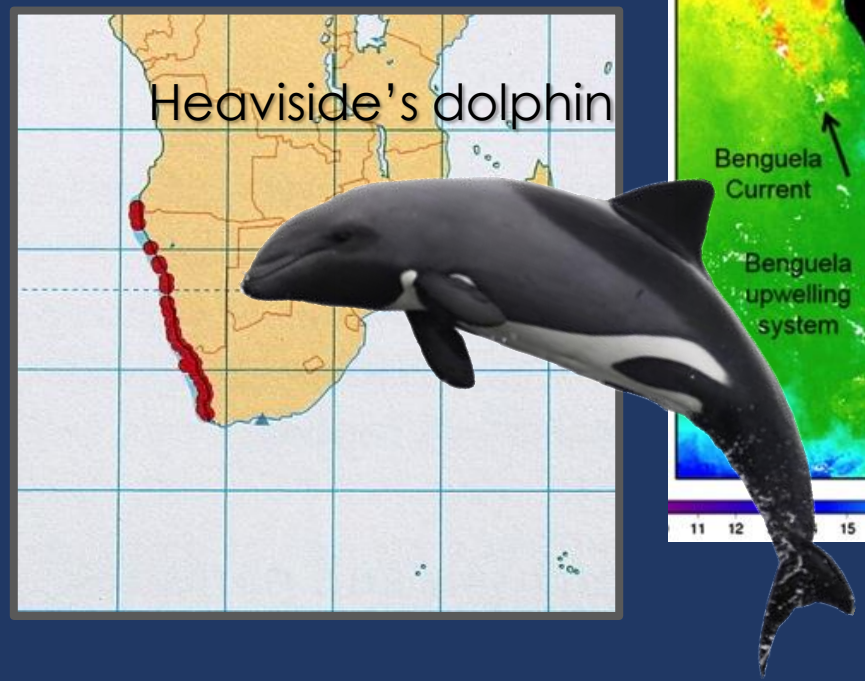
← Two species associated with the cool Benguela

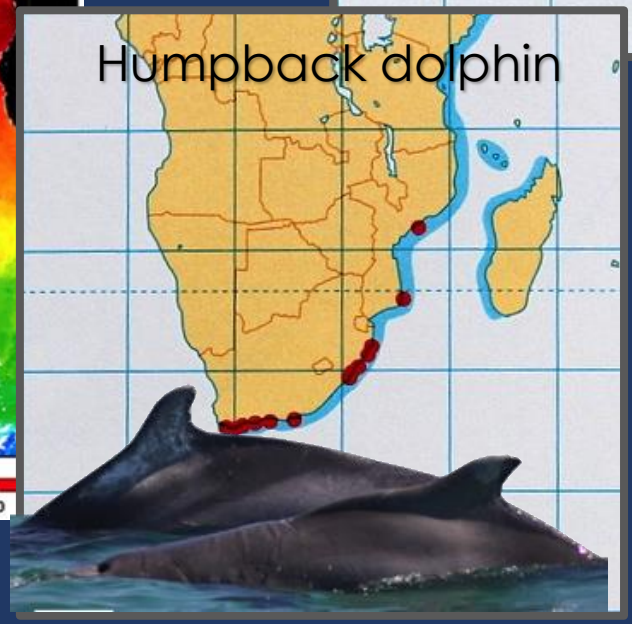
All species ranges end around Cape Point

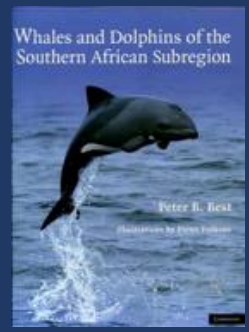
Bottlenose dolphin





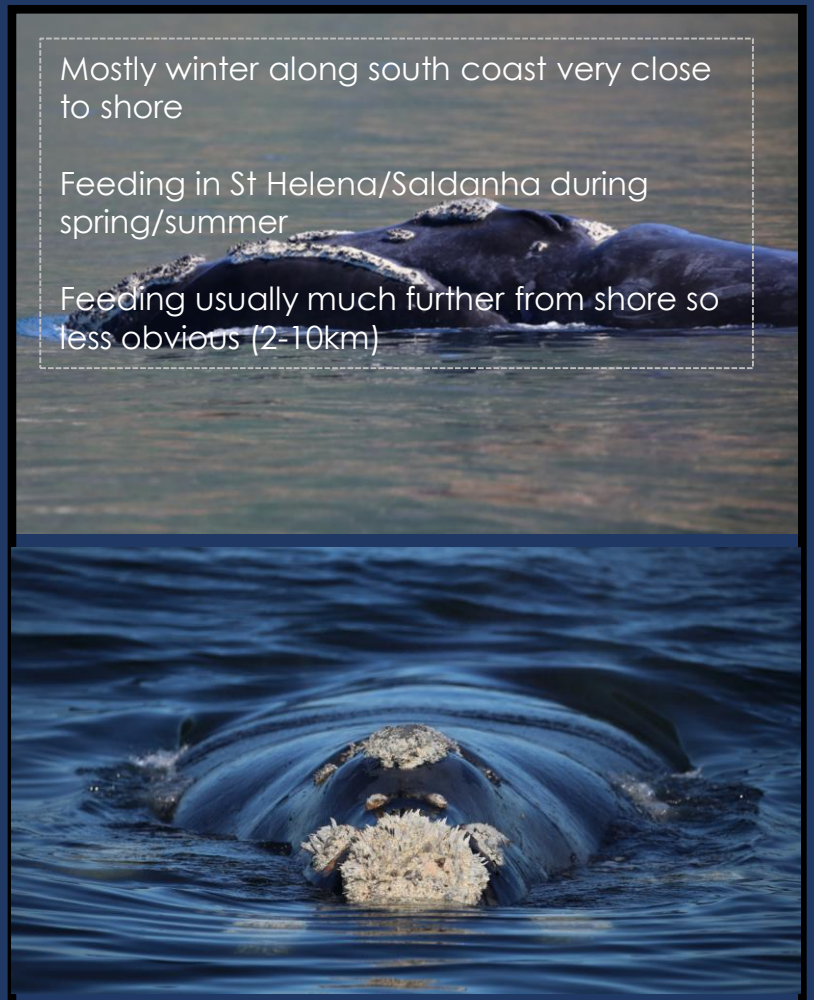






Three species of baleen whale occur regularly around SA. All can be seen in any month of the year these days

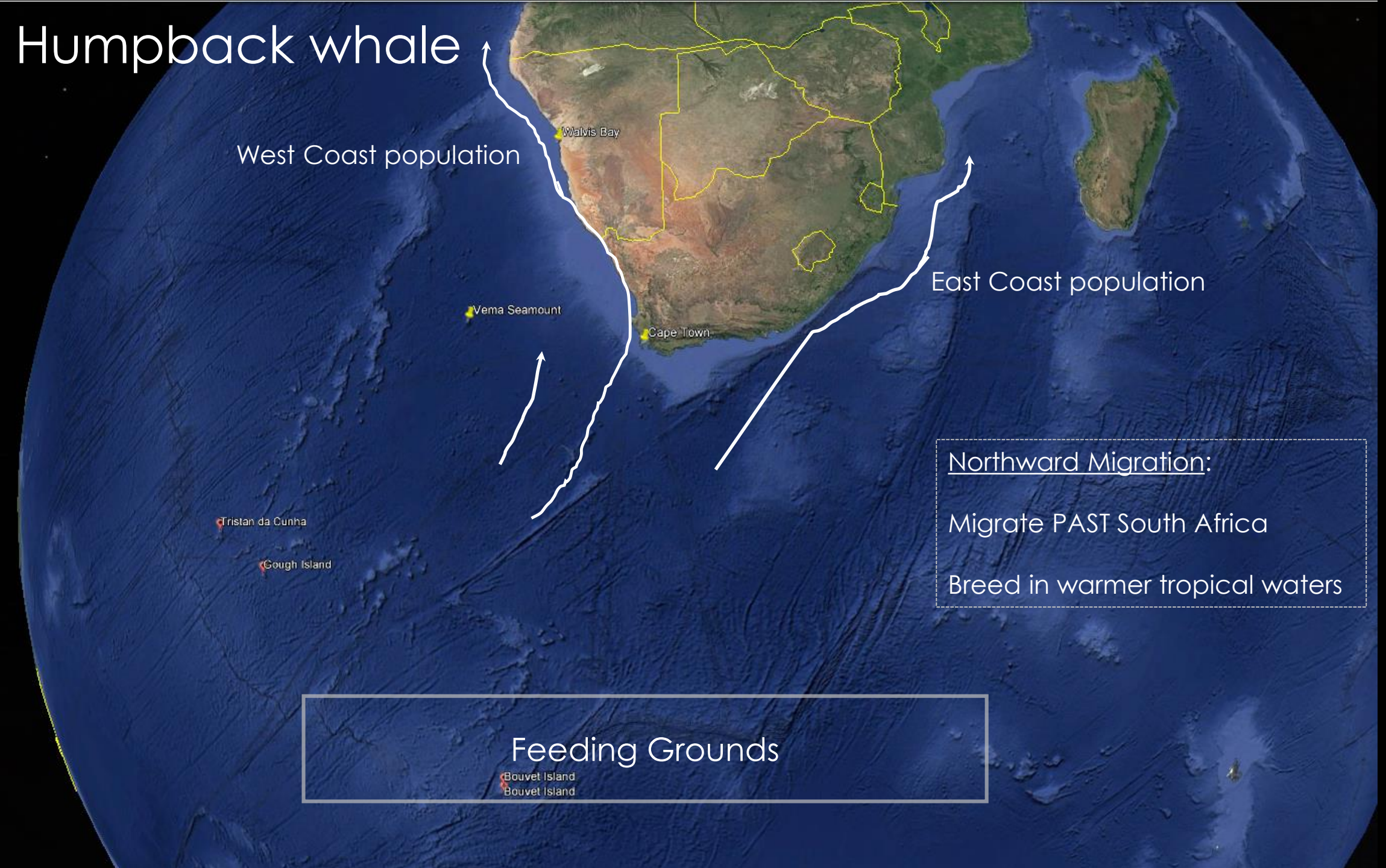
Bryde's Whale
Balaenoptera brydei



Southern Right Whale
Eubalaena australis

Humpback Whale
Megaptera novaeanglia

Humpback whale



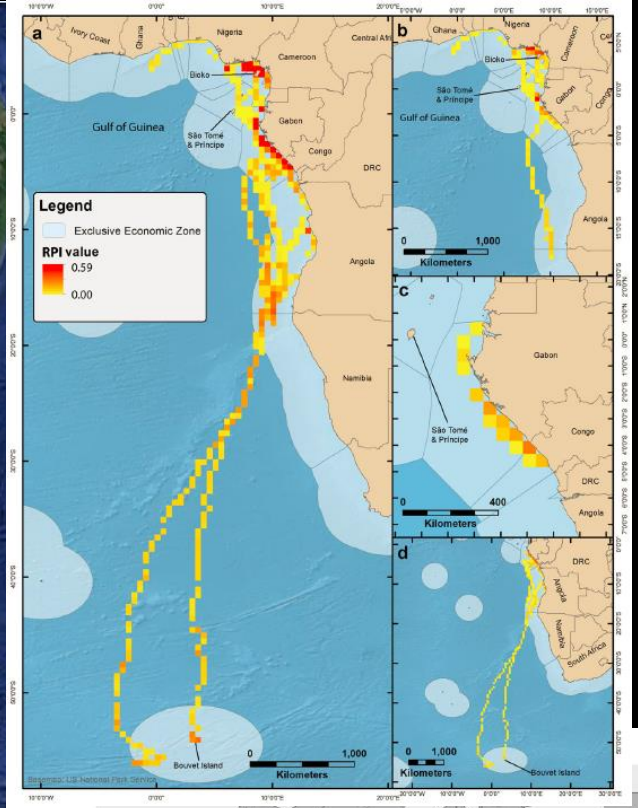
Northward Migration:

Migrate PAST South Africa

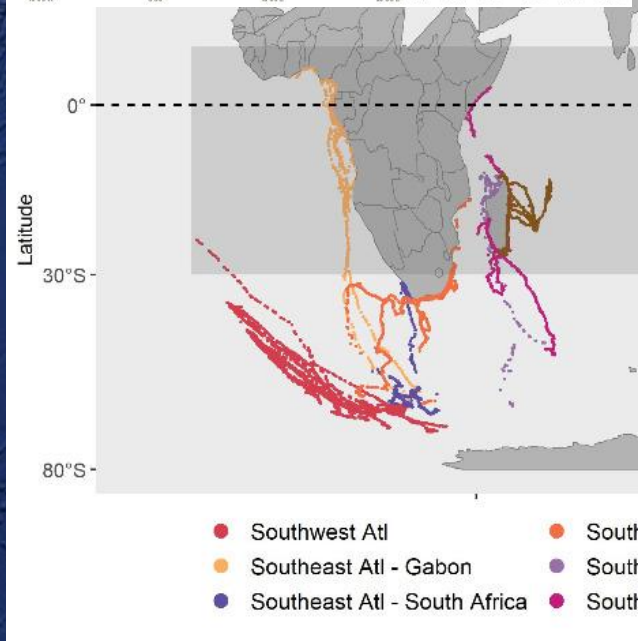
Breed in warmer tropical waters

Humpback whale

Walvis Bay
Vema Seamount
Cape Town
Tristan da Cunha
Gough Island
Bouvet Island
Bouvet Island



Rosenbaum et al. 2014



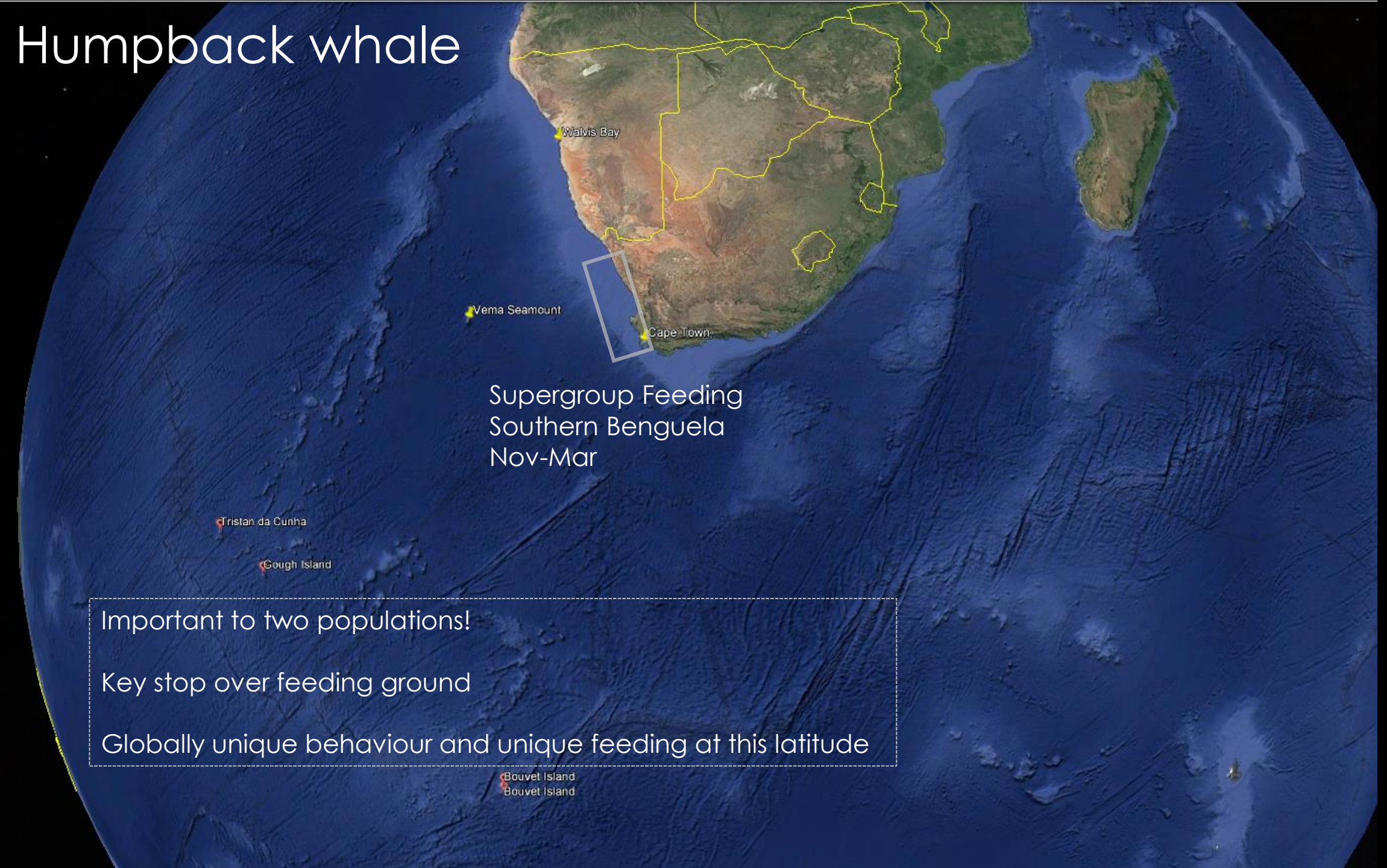
Trudelle et al. in prep
Seakamela et al - DEFF

Southward Migration seems to follow two route on the west coast, with those along the coast often stopping to FEED

Some east coast animals seem to enter the feeding ground as well

Feeding peaks Sep-Dec but continues to March

Humpback whale



Supergroup Feeding
Southern Benguela
Nov-Mar

Important to two populations!

Key stop over feeding ground

Globally unique behaviour and unique feeding at this latitude


"Supergroups" = HUNDREDS of tightly clustered whales feeding on krill
Groups feed for hours at a time for 4-6 months of the year
Sea Search (S Elwen)

Feeding has long been known about (whaling data)

Supergroup behaviour seems quite new (post 2009)

Scale varies between years…hard to predict currently

→ Linked to El Nino/La Nina / Southern Ocean Indices

Sea Search (S Elwen)

Southern right whale

Southern right whale

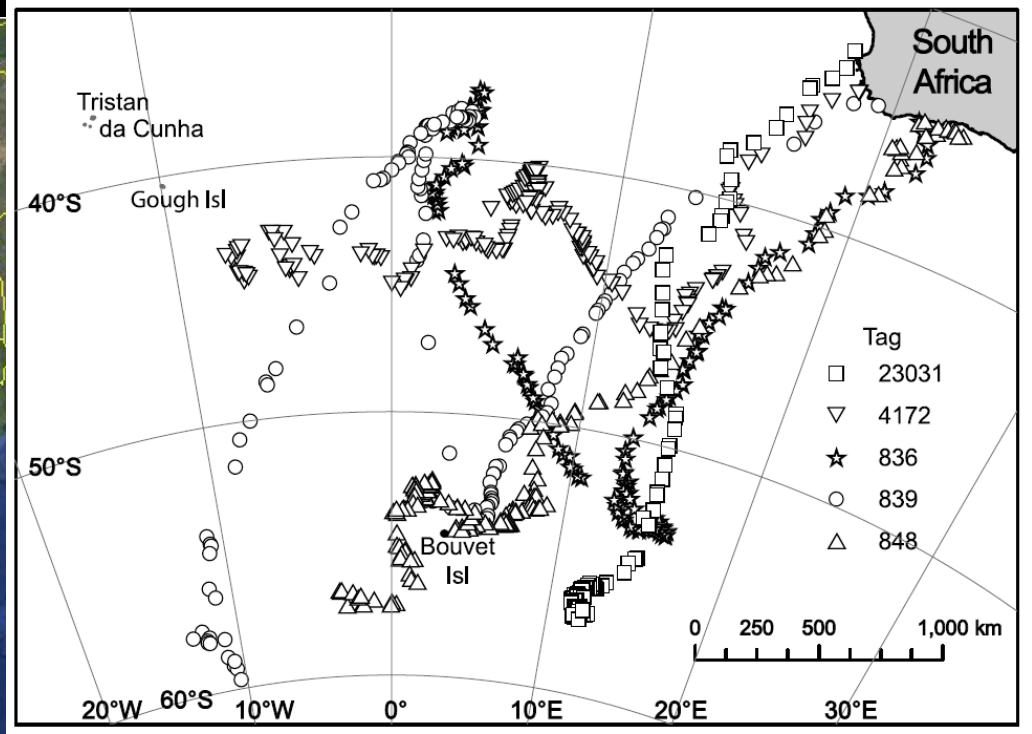


Figure 7. Locations of five tagged right whales, *E. australis*, after leaving the South African coastline, September 2001–March 2002.

Mate et al. 2011

Walvis Bay

Vema Seamount

Cape Town

Tristan da Cunha

Gough Island

Bouvet Island

Bouvet Island

Winter along the Cape South coast where they birth calves and rest in the shallow warmer water

Southern right whale

Walvis Bay

Vema Seamount

Cape Town

Feeding Southern Benguela Nov-Feb

Tristan da Cunha

Gough Island

Bouvet Island

Bouvet Island

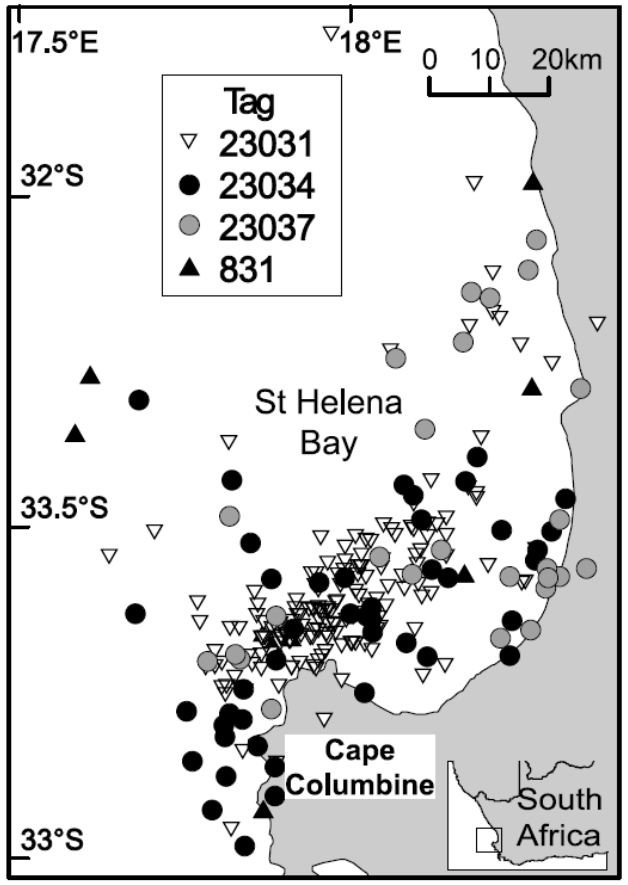


Figure 3. Locations of four satellite-tagged right whales, *E. australis*, in St Helena Bay area of South Africa, September 2001–January 2002.

Mate et al. 2011

But a portion of the population also uses the Benguela feeding ground
Mainly eating Copepods
Numbers were really starting to increase in early 2000s – but the population has undergone some large changes in the last 12 years

Annual survey of Cape South Coast

Run annually since 1969 By U. Pretoria Mammal Research Institute

Numbers increased very predictable until 2009

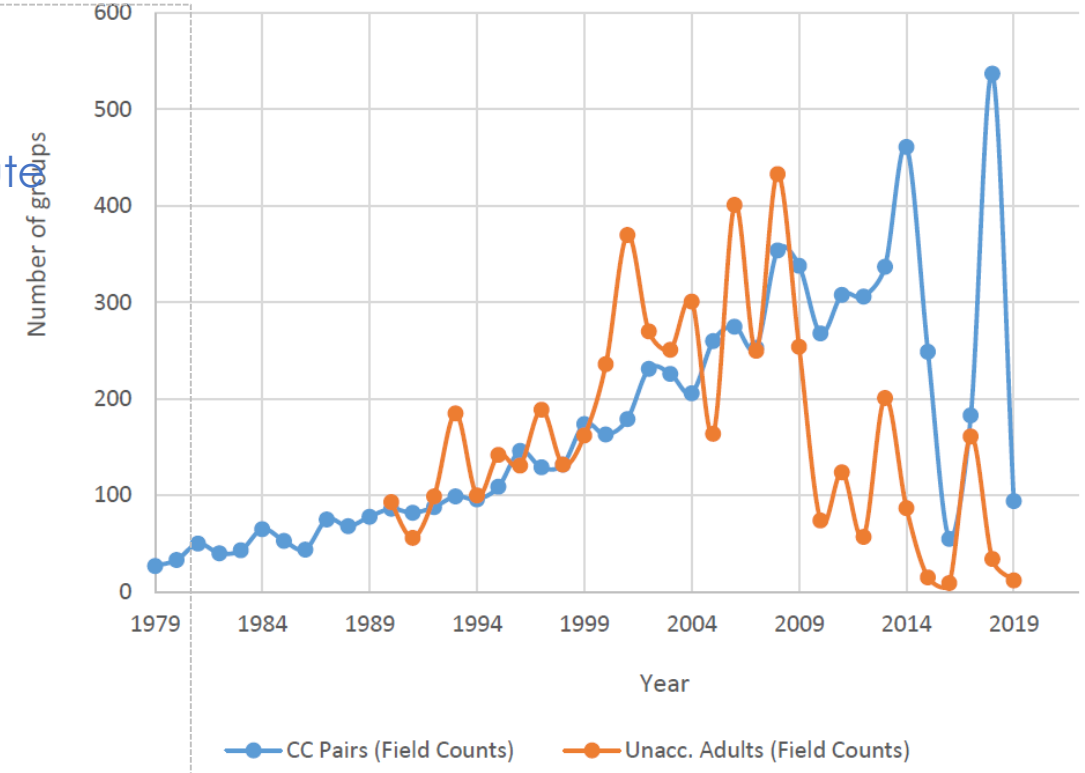
Inter-calf intervals have increased

Numbers less predictable

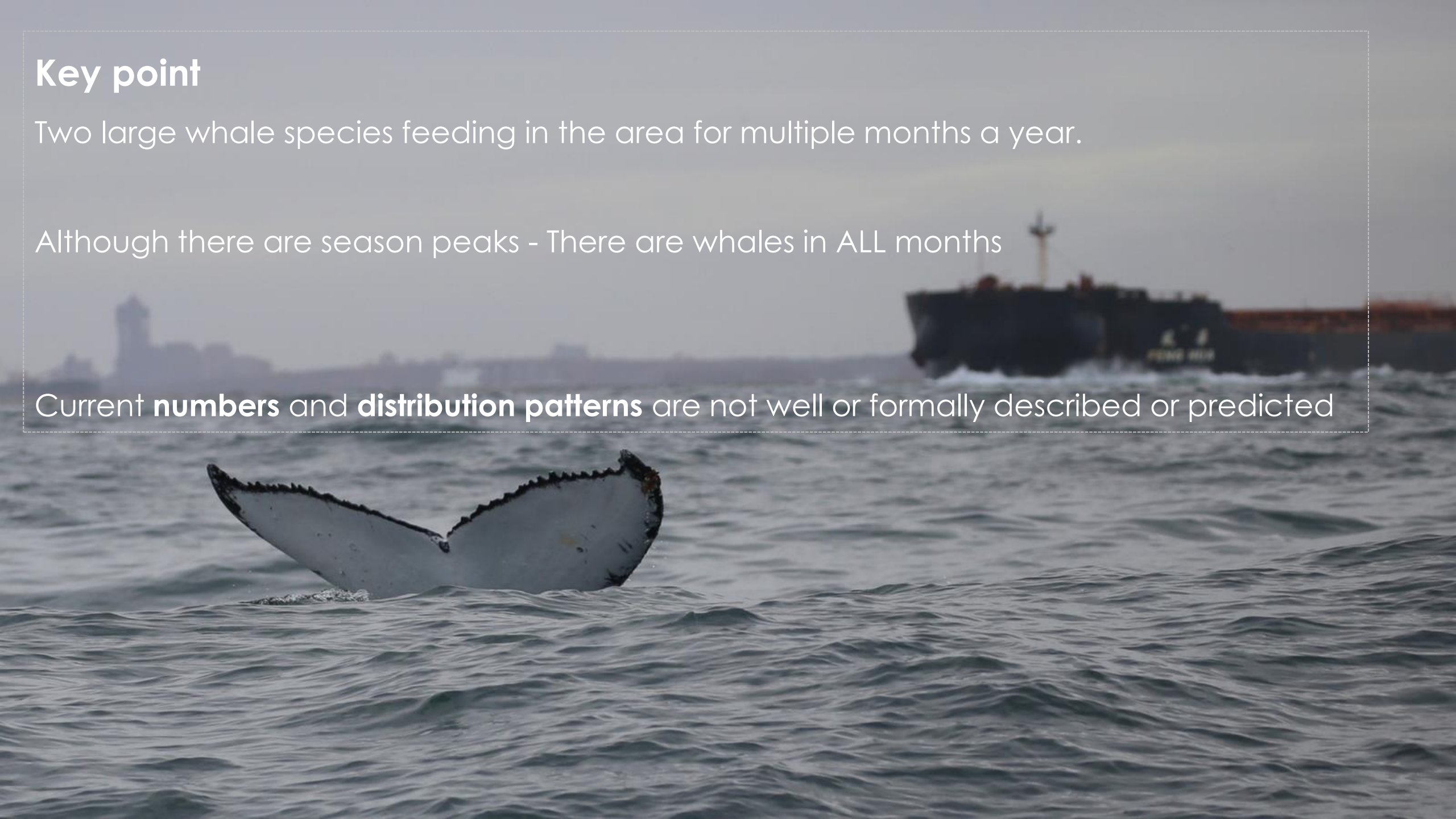
Presence at the coast driven by southern ocean food

Importance of feeding ground currently unknown but potentially very important for a population under stress

→ Population may be approach carrying capacity???



Vermeulen et al. 2020
To International Whaling Comm.



Key point

Two large whale species feeding in the area for multiple months a year.

Although there are season peaks - There are whales in ALL months

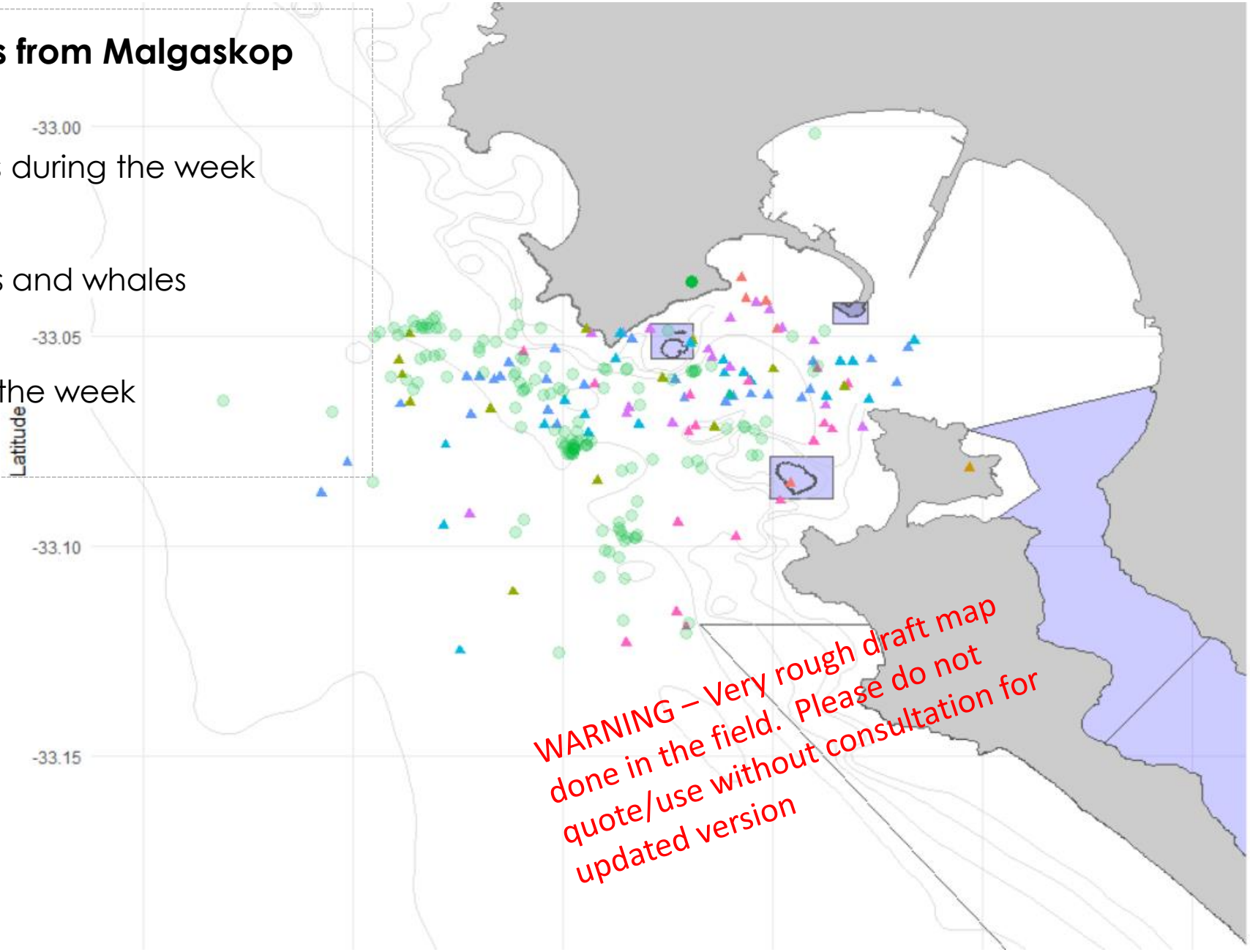
Current **numbers** and **distribution patterns** are not well or formally described or predicted

Four days of whale counts from Malgaskop

>> Almost continuous whales during the week

>> Massive overlap of vessels and whales

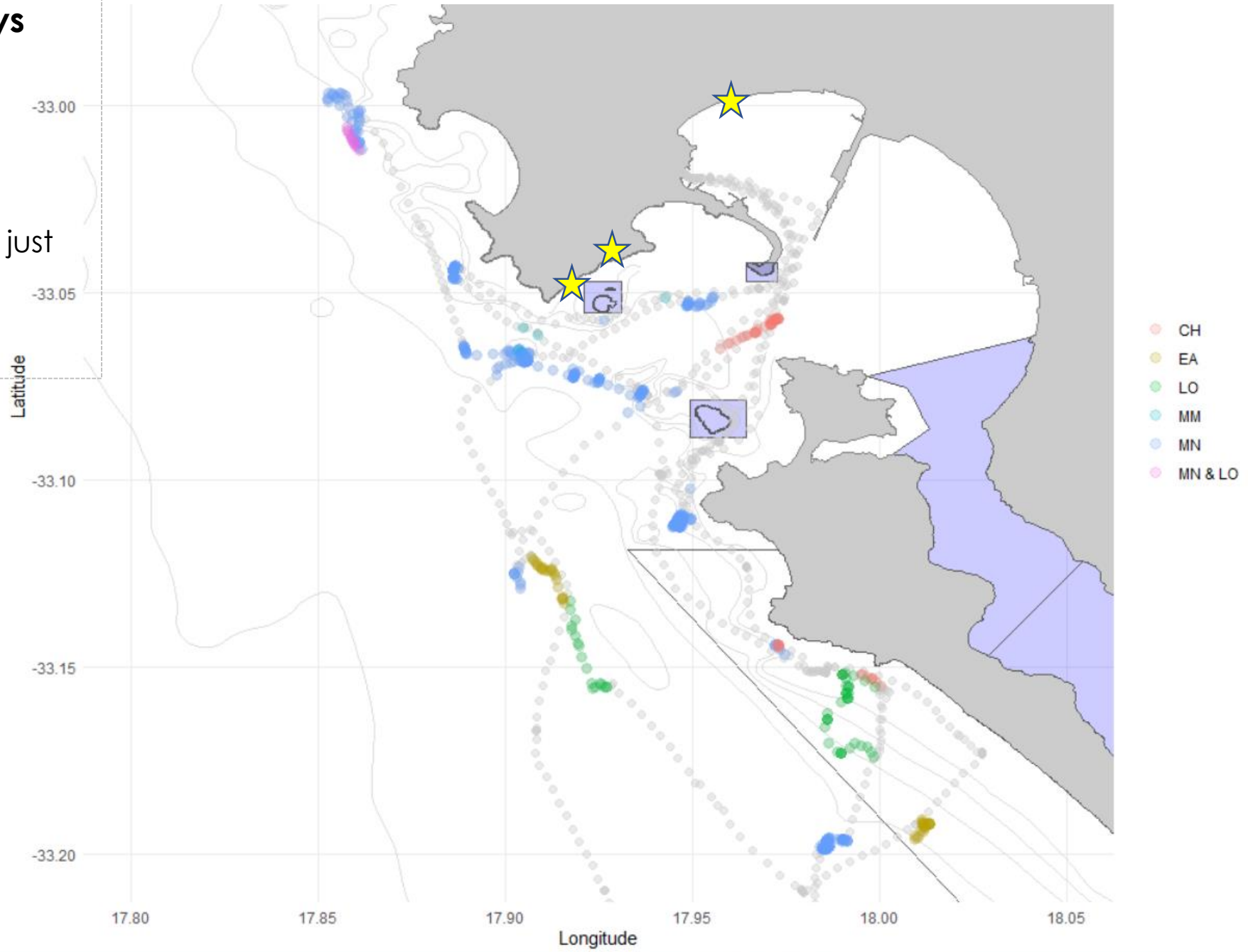
>> Four ‘near miss’ events in the week



Four days of boat-based surveys

>> Wide spread distribution

>> High group presence especially just outside the bay



CH – Heaviside's dolphin
EA – Right whale
LO – Dusky dolphin
MM – Mola mola
MN – Humpback whale

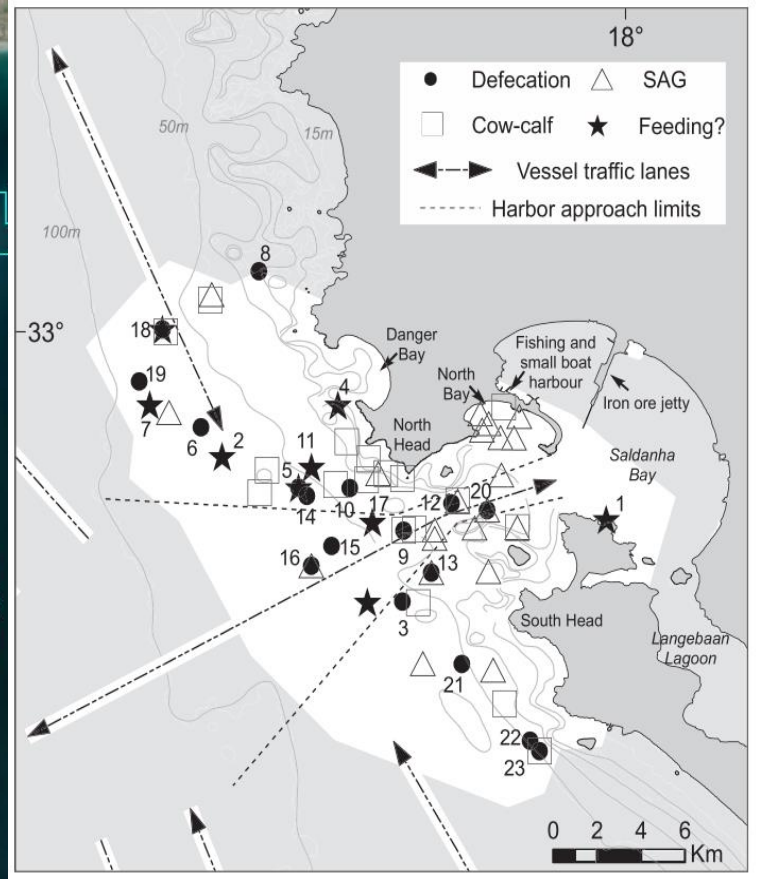


Figure 7. Detail of Saldanha Bay and port showing localities of specific group and behavioral observations. Numbers correspond to those in Table 4, or mentioned in the text. Note that there may be overlap between marker symbols due to more than one type of behavior recorded during a boat encounter. White area in ocean shows spatial extent of all right whale groups tracked or encountered by boat during our study (also see Fig. 1).

Map from Barendse et al. 2010 for right whale movements in 2002-2003

Same boat-survey data, different map

Proximity to aquaculture

Humpback whale – Feb 2019 Table Bay

Photo Keshni Gopal

Humpback whale – Oct 2020 – False Bay

Photo Simon Elwen

Southern right whale – Aug 2020 – Saldanha Bay

Whales are a protected species – killing them is illegal
Dead whales on beaches or at sea are a shipping hazard
Dead whales on land are a health hazard
Removal represents a significant cost in machinery and man-power

Photo Chris Wilkinson

Known interactions with aquaculture

Table from S Elwen 2020 - Guidelines and Standards to mitigate marine mammal entanglement for the Saldanha Bay Aquaculture Development Zone for SRK Consulting.

Whale Species	Country	Year	Farm Type	Interaction type	Source
Fin fish farms					
Minke	Norway		Salmon cage	Broke through net into cage. Released. Report of earlier incident too	https://www.fishfarmermagazine.com/news/whale-of-a-time-for-escaped-salmon/
Humpback	Australia	1993	Tuna feedlot	Broke through net walls, trapped for two days	Kemper et al 2003
"Large whale"	Aus (Tasmania)	<1991	Salmon cage	Collided with walls after entanglement	Kemper et al. 2003
Humpback	Canada	2013-2016	Open net Salmon pens	Research group reports on 5+ whales found dead or entangled in salmon cages. One whale was released alive after being trapped in an empty cage	https://mersociety.wordpress.com/2016/11/22/two-months-and-two-humpbacks-entangled-at-the-same-location/
Shell Fish farms					
Humpback	Namibia	2017	Mussel Rafts	Entangled in surface and vertical lines. Freed.	Simon Elwen - Namibian Dolphin Project data
Humpback	Alaska, USA	2005	Mussel spat collector	Entangled in spat collecting rope. Freed	Young 2015. Groom & Coughran 2012
Humpback	Iceland	2010	Mussel spat collector	Entangled in single dropper 5m long collector rope. Ropes initially at 25m depth.	Young 2015.
N. Pacific right whale	Korea	2015	Mussel grow out ropes	Four grow-out ropes 240mm in diameter wrapped around peduncle. Freed.	Young 2015.
Bryde's whale		Confirm	Mussel spat line	Port Elizabeth area	Mike Meyer – SA Disentanglement Network
Bryde's	New Zealand	1996	Mussel spat collector	Entangled in spat collecting rope. Found dead	Young 2015, Lloyd 2003
Turtles					
Leatherback	Newfoundland, Canada	2015	Mussel spat collector	Entangled at depth in ropes 2-3m long. Around flipper. Died	
Leatherback	Newfoundland, Canada	2015	Mussel spat collector	Entangled at depth in ropes leading to spat collected. Around neck and both flippers. Freed.	
Leatherback	Namibia	~2007	Mussel Rafts	Entangled in surface and vertical lines. Died.	Jean Paul Roux via Simon Elwen - Namibian Dolphin Project data

The problem

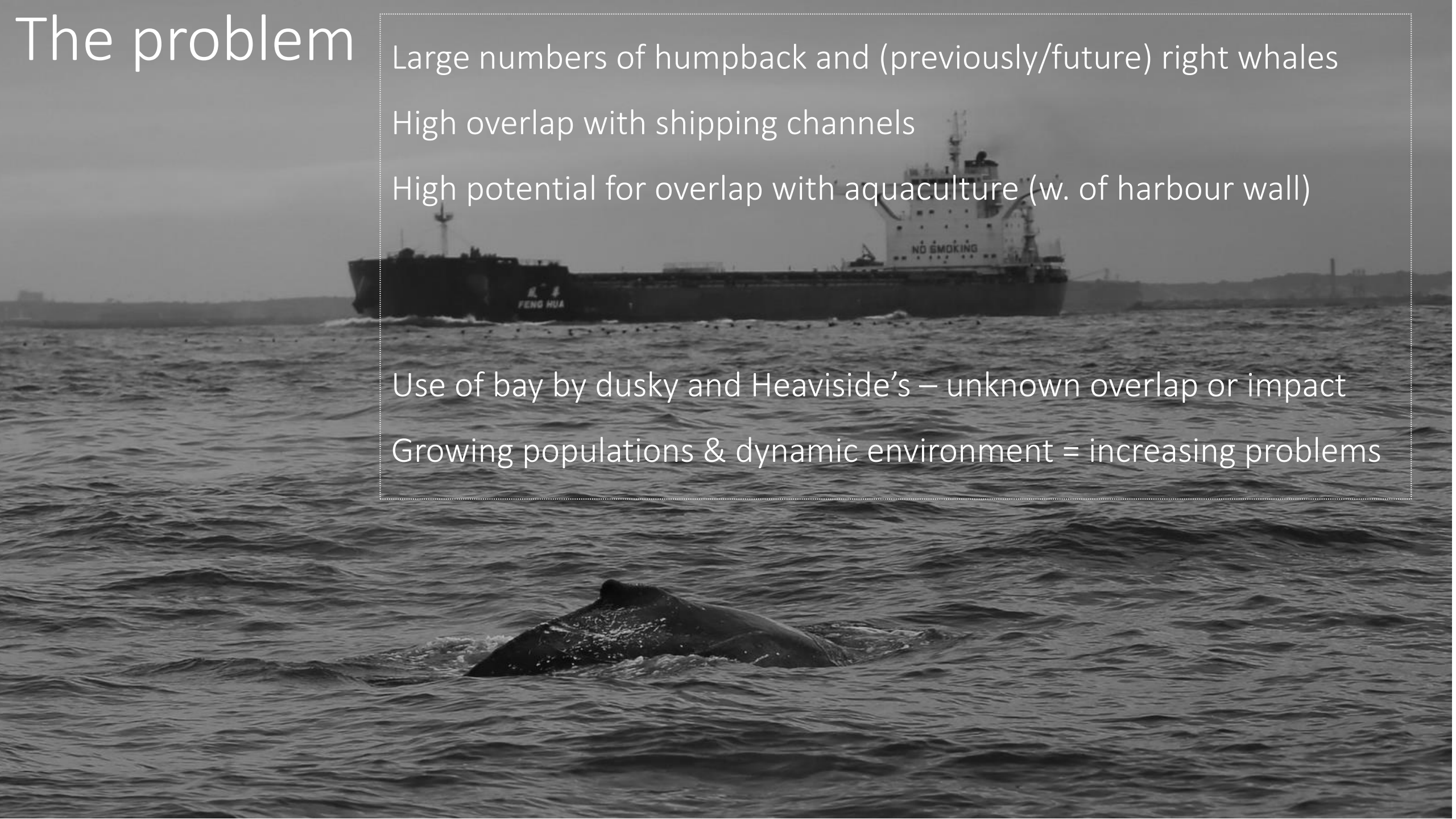
Large numbers of humpback and (previously/future) right whales

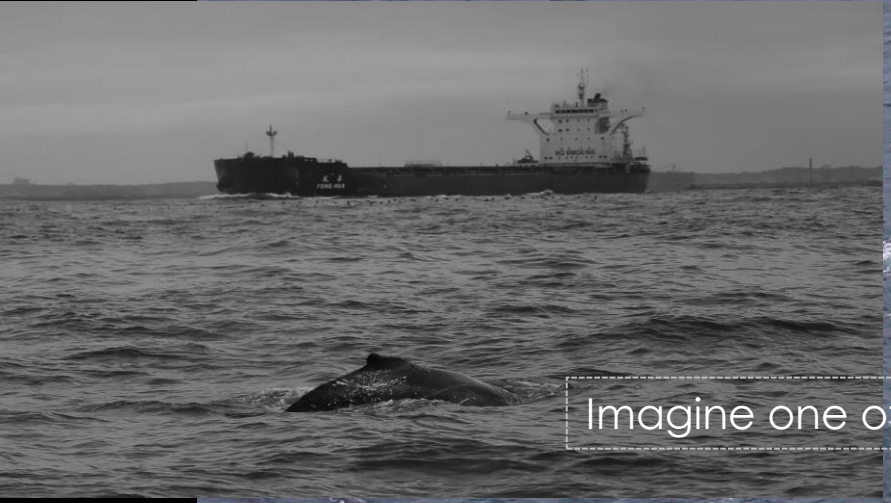
High overlap with shipping channels

High potential for overlap with aquaculture (w. of harbour wall)

Use of bay by dusky and Heaviside's – unknown overlap or impact

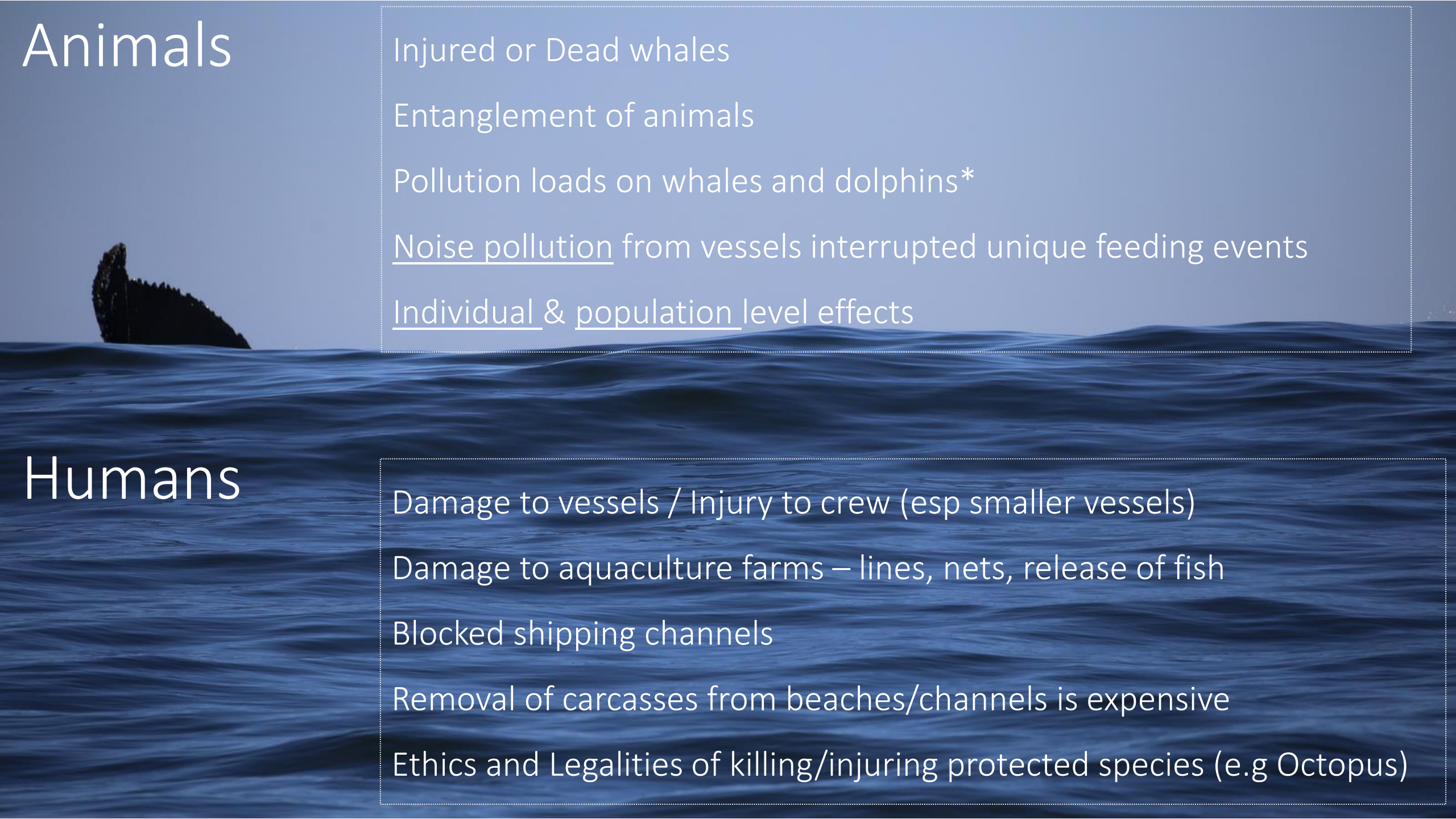
Growing populations & dynamic environment = increasing problems





Imagine one of these ships ploughing through a group of 100s of whales

Sea Search (S Elwen)



Animals

Injured or Dead whales

Entanglement of animals

Pollution loads on whales and dolphins*

Noise pollution from vessels interrupted unique feeding events

Individual & population level effects

Humans

Damage to vessels / Injury to crew (esp smaller vessels)

Damage to aquaculture farms – lines, nets, release of fish

Blocked shipping channels

Removal of carcasses from beaches/channels is expensive

Ethics and Legalities of killing/injuring protected species (e.g Octopus)

But it hardly ever happens - Is this even a problem?

In addition to the right whale in Saldanha during Aug, there are also two other whale stranded on the north shore of the channel (one humpback, one not seen by us – so causes of death unknown).

Much of this coastline is inaccessible and there are likely more strandings not reported as well as many animals sunk at sea.

<u>KEY POINT – What we SEE in terms of entanglement and ship strikes is a massive underestimate of what is actually happening at sea.</u>

Potential solutions

Reduce overlap and interactions

When interactions occur - Reduce impact thereof

Reduce overlap, interaction

- Spatial planning
  - Adjust shipping channels
  - Optimal placement of farms
    - Needs good understanding of habitat use
    - Farm design – being dealt with as part of ADZ
      - Reduced ropes in water
      - Concentrate as far as possible (reduce overall footprint)
      - Untested but potentially useful: rope type, colour, buoy design

Reduce interaction and impact

Active detection & response (Adjustment of speed or course)

- Acoustic detection of whale and dolphin presence from their calls
  - Used in multiple locations e.g. Vancouver & NE. Atlantic, Wood's Hole Institute
  - Reliant on known calling rates and identification
  - Localisation of calls is higher tech

- Acoustic detection of 'blows'
  - Possible but needs testing (whales always blow but wind/sea noise will mask it)

- Visual detection of presence & communication via port Control
  - Human Observers (e.g. Shark Spotters = Job Creation & low tech)
  - Video & Human/AI detection
  - Infrared & Human/AI detection
  - Combination

Needs

Better understanding of scale & nature of impacts

- Data on numbers/distribution of cetaceans
- Reactions to vessels
- → inform options for mitigation
- Longer term monitoring of cetaceans to monitor change

Ensure optimal farm design

- Test improved designs for farms

Not covering seals in this talk but happy to engage further on the matter, our research group is conducting a number of behavioural studies on Cape fur seals

Thank you for your time

One of several humpack whales identified off Saldanha in the last 2 weeks with entanglement wounds

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