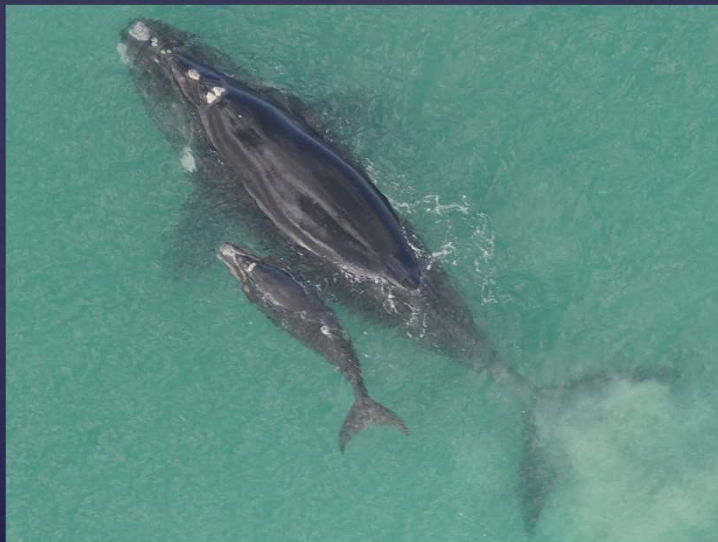


Southern Right Whales in South-East Australia

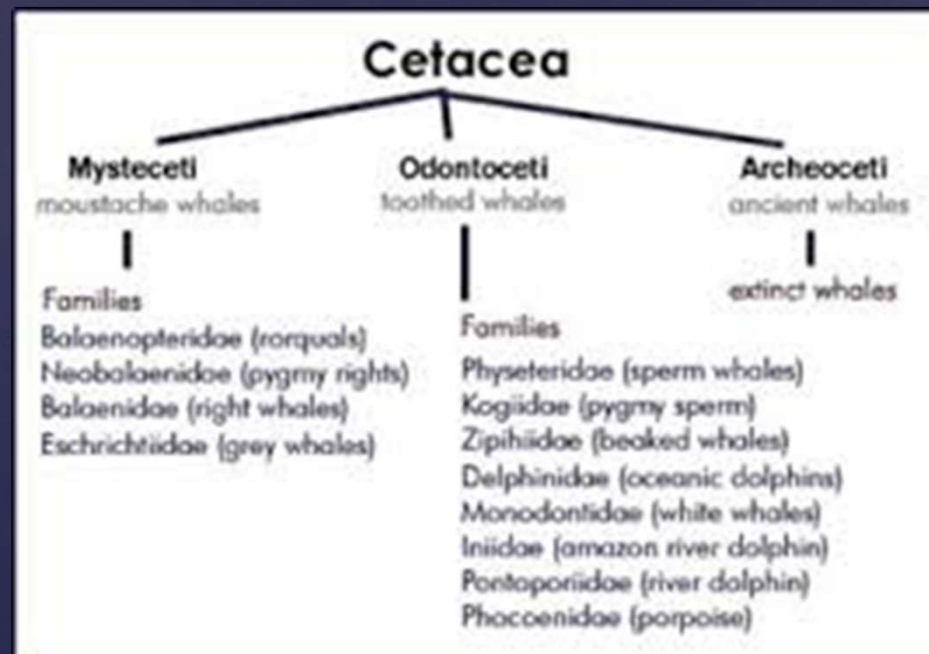
Mandy Watson

Department Environment, Land, Water and Planning
Barwon South West Region



Taxonomic classification of whales

2 sub-orders



Toothed Whales (Odontocetes)



- From the greek odontos (tooth), ketos (whale)
- Hunt and feed on individual prey items
- Use active sonar (echolocation) emitting high frequency sound that reflects from prey



Baleen Whales (Mysticetes)

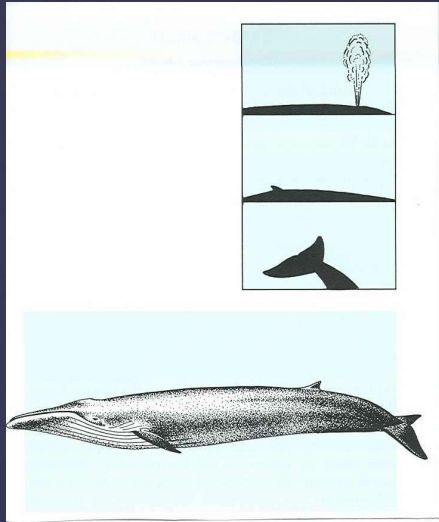


Photo by Austin Reed

2006 Pacific Wildlife Foundation www.pacificwildlife.ca

- From the greek mystax (upper lip – mustache), ketos (whale)
- Feed on large amounts of very small animals
- Not capable of active echolocation

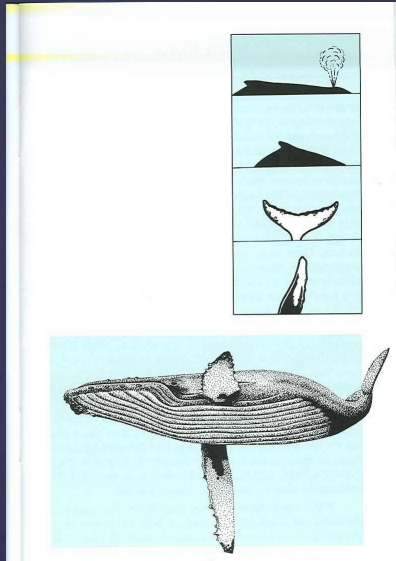
Blue Whale (*Balaenoptera musculus*)



- Largest whale – up to 33m, 160 tonnes
- Small dorsal fin and pectoral flippers
- Appears bright blue through water
- Rorqual – many throat grooves
- Feeds on krill blooms in Bonney up-welling during summer months



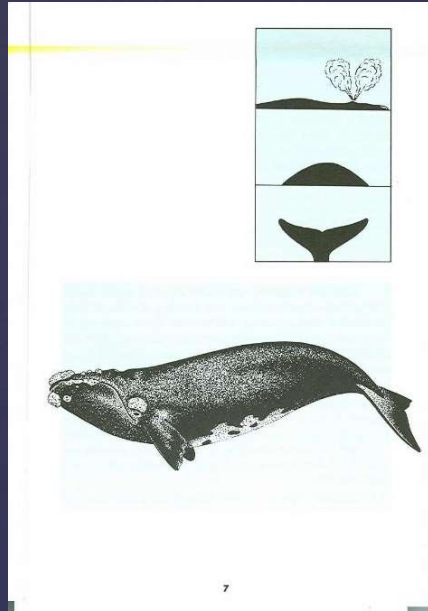
Humpback Whale (*Megaptera novaeangliae*)



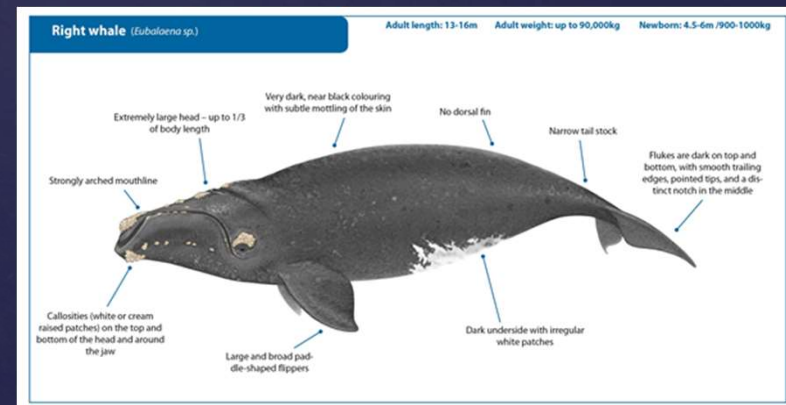
- Up to 18m, 45 tonnes
- Distinctive humped back with dorsal fin and long pectoral flipper
- Migrates through SW Vic from feeding grounds in Antarctica to breeding grounds in Queensland every winter
- Usually seen further offshore travelling east



Southern Right Whale (*Eubalaena australis*)



- Up to 18m, 80 tonnes
- Black skin, sometimes with white belly markings
- Other colours rare – approx 3% mottled dark brown - grey
- No dorsal fin
- Square pectoral flipper
- V shaped blow
- Callosities



Biology

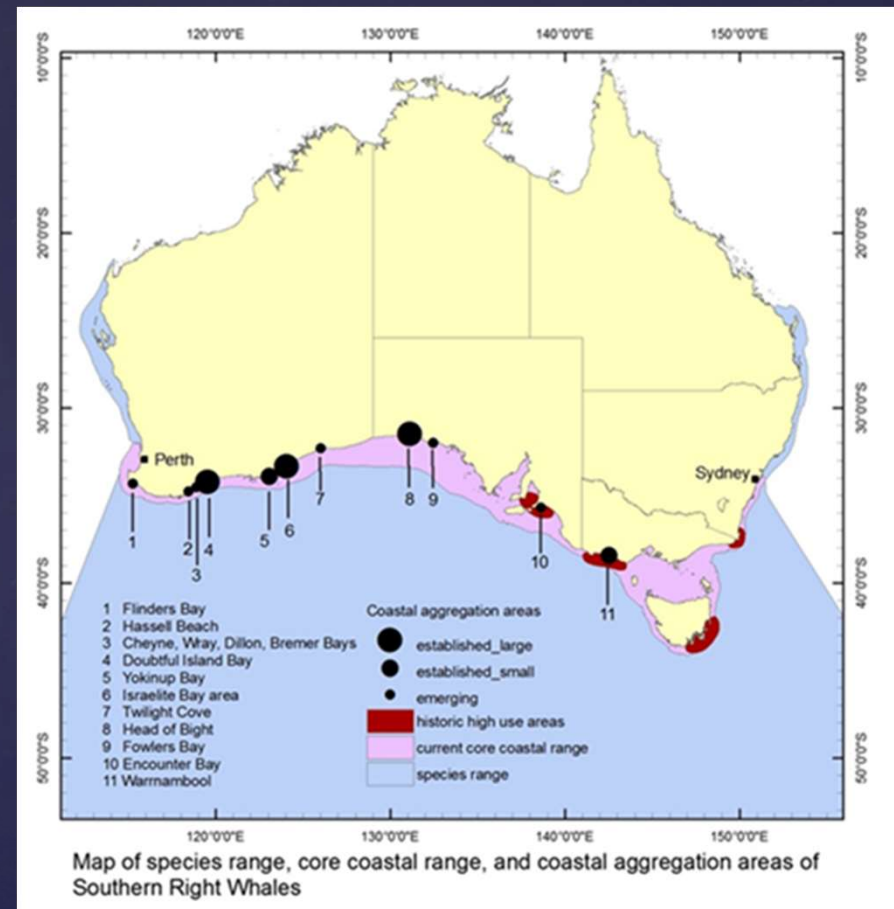
- Migratory species, Foraging grounds between 45 and 50 degrees South
- Feed mainly on copepods
- Calving grounds southern Australian coastline - mostly pregnant females migrate during winter for calving
- Females return to same calving grounds ('cultural memory') & rarely seen in Aust year before calving
- Females sexually mature 6 yrs of age
- Produce one young approx every 3 years
- Gestation 12 months, calves weaned at 1 – 2 years
- Spend most of their time during breeding season in shallow inshore waters



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Conservation Status

- Nationally
 - Endangered under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999
 - Current Aust pop est 3,000
 - 10 calving/aggregation areas
 - 2 populations; SE Aust , SW Aust
- In Victoria
 - Listed under FFG Act
 - Endangered
 - SE Aust pop less than 300 SE Australia
 - Only one established calving ground in SE Australia



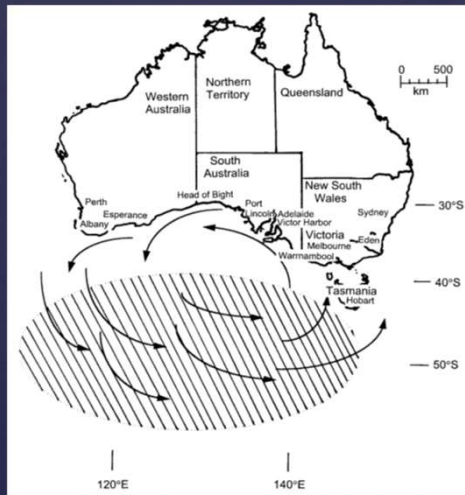
Spot the Difference



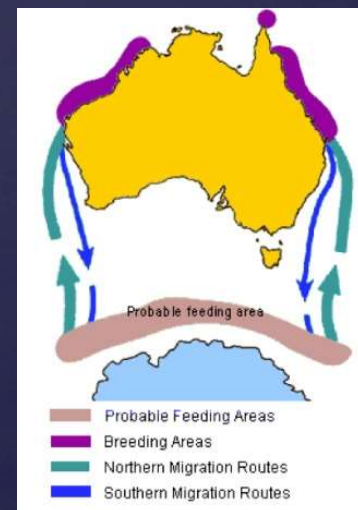
Southern Right Whale



Humpback Whale



SE population less than 300
Increasing 4.7% per annum

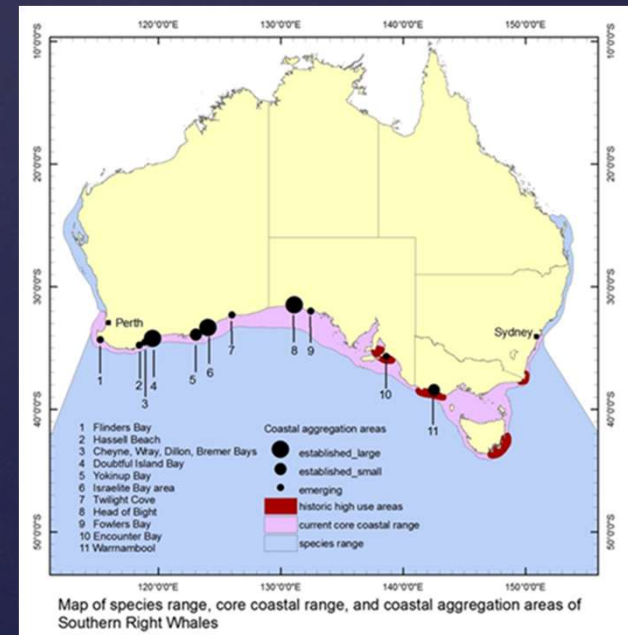


East coast population = 30,000+
increasing 11% per annum

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Population structure

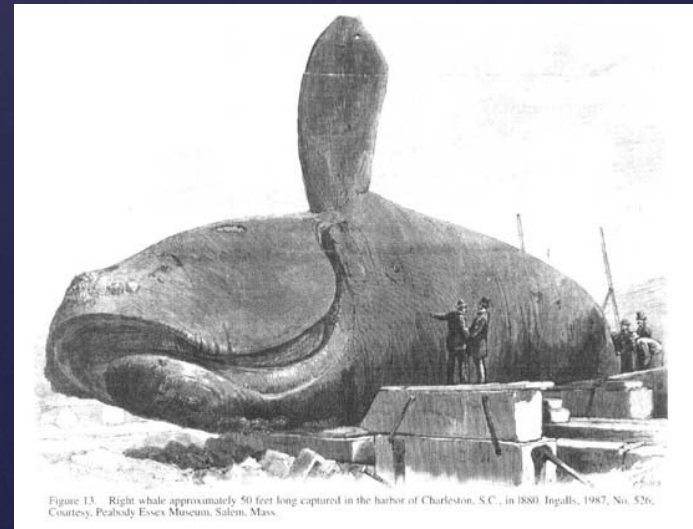
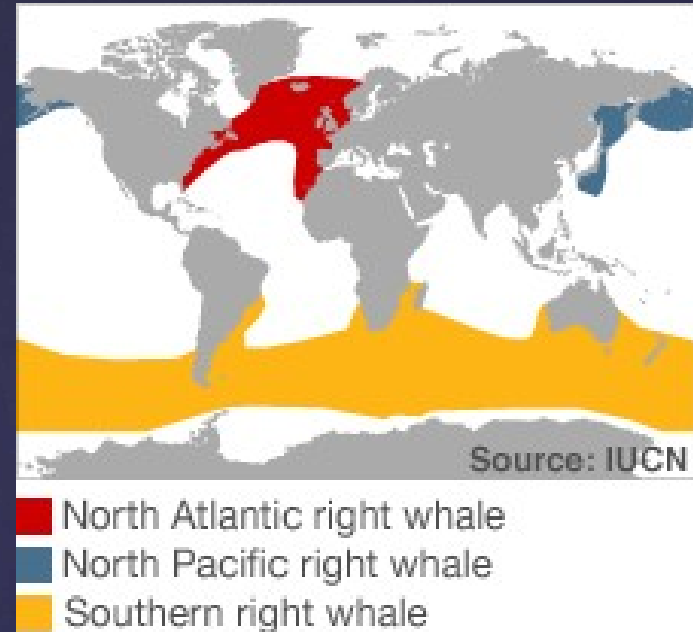
- South-western Australia (SWA) and south-eastern Australia (SEA) populations
- Significant genetic differentiation between the SWA calving grounds and the SEA calving ground - Logans Beach
- Genetic profile at Logan's Beach closer to NZ calving grounds than SWA calving grounds
- When include sampled whales in migratory corridor outside Logans Beach - no sig differentiation
- Population structure driven by migratory culture (site fidelity to breeding and feeding grounds)



Carrol et al. 2011 and 2015

Exploitation

- 3 species worldwide
 - North Atlantic (*E. glacialis*) current pop less than 400 declining
 - North Pacific (*E. japonica*) current pop no reliable estimates prob low hundreds
 - Southern hemisphere (*E. australis*) current pop 12,000
- The 'right' whale to hunt
- Severe stock depletion 1790 – 1980 most taken during early - mid 1800s
- Continued illegal hunting by Russian whalers into the late 1970's
- At least 150,000 SRW killed globally
- 60,000 from Australia and NZ
- 19,000 from SE Australia



Modern Day Threats

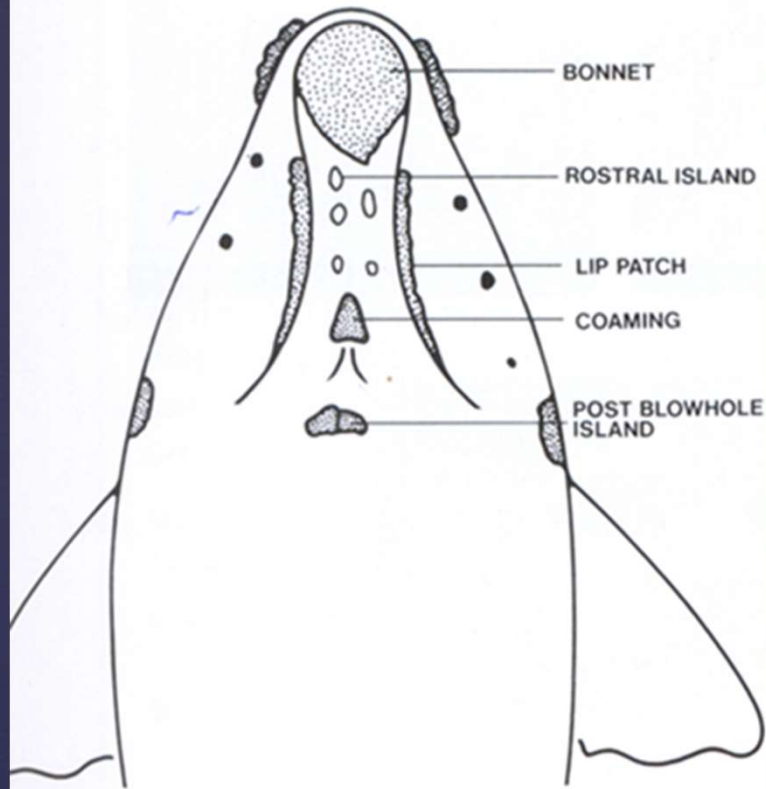
- Vessel strike
- Entanglement
- Noise – vessels, industry, seismic survey
 - Coastal development
 - Climate change
- Overharvesting of prey



Southern Right Whale Callosities



www.sciencedaily.com



The underlying pattern of callosities on a right whale's head, used in identifying individuals.

From Bannister, 1990

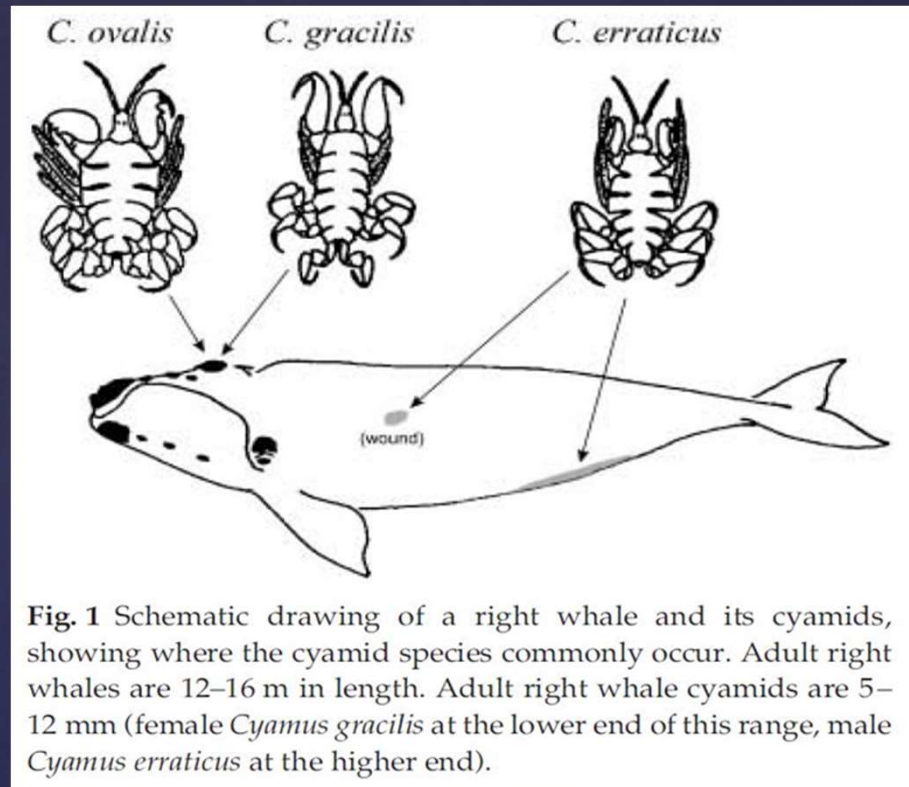


Fig. 1 Schematic drawing of a right whale and its cyamids, showing where the cyamid species commonly occur. Adult right whales are 12–16 m in length. Adult right whale cyamids are 5–12 mm (female *Cyamus gracilis* at the lower end of this range, male *Cyamus erraticus* at the higher end).

Kaliszewska et. al. 2005

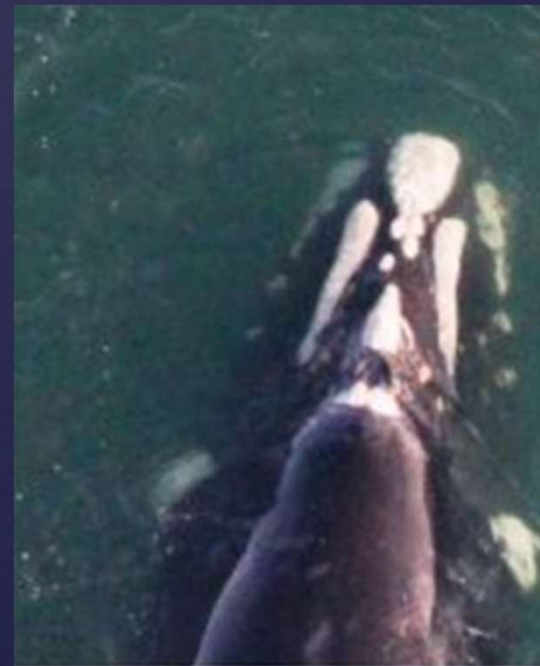


www.whale.org, Iain Kerr

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Photo-identification

- South East Australian Southern Right Whale Photo Identification Catalogue (SEA SRW PIC) est 2002
- IDs from Vic, Tas, SA, NSW, QLD
- ID flights since early 1990s
- Land based images more recently
- Over 3000 images - comprising approx 400 individual whales
- Matching based on coding system to narrow the search minimise number of whales to manually compare



SEASRWPIC

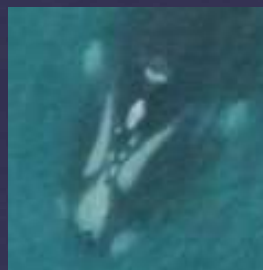
SE9901:
Wilma



SE0201:
Tripod



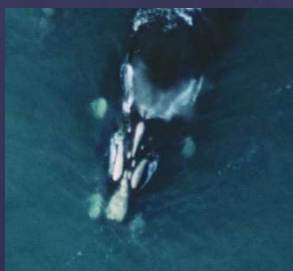
SE0202:
Big Lips



SE0103:
Lotsadots



SE0101: Skinny
Minnie



SE0102: Big
Coaming



SE0203:
Bonnet

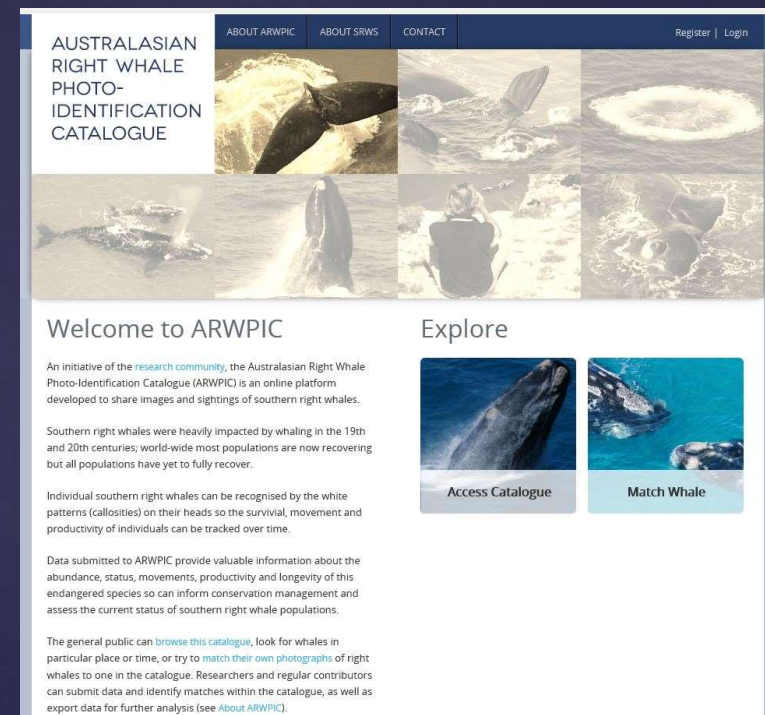


SE0402: Fang



Photo-ID matching

- ARWPIC est 2014 populated with WA Museum data
- SEA SRW PIC cross matched with WAM whales in ARWPIC in 2016
- 25 matches with ARWPIC (approx 10%) mostly unaccompanied adults
- Long distance movements between seasons and within seasons
 - 18 between-season (up to 3,800km b/w Sydney & Israelite Bay, WA)
 - 7 within-season movements (up to 1600 km b/w Cape Nelson & Head of Bight)
- Most (all but 4) involved whales seen outside of Logans Beach, i.e. in migratory corridor
- Stronger structuring on breeding grounds occurring in the calving females
- Evidence of re-selection by breeding female Wilma) to different calving location (Logans beach - HOB)



Wilma shifts to HOB



Logans Beach '82, '85, '88, '90, '93, '96, '97, '99, '02

- Found Wilma at Head of Bight 2005 and 2010 with calf
- Checked Eubalaena (HOB) catalogue - found Wilma in 2005 (no calf), 2007 (with calf), 2010 (with calf), 2013 (with calf), 2017 (with calf)
- No other Warrnambool females matched to ARWPIC or HOB or Fowlers Bay



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Sightings Data Analysis 2016

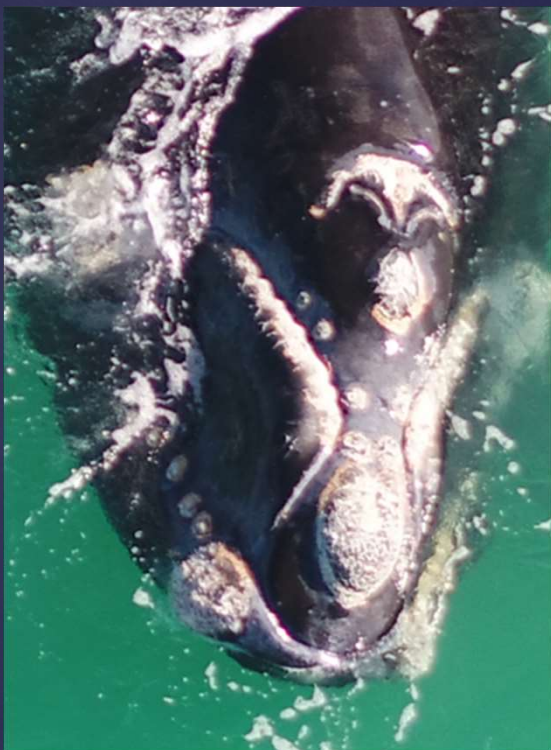
- Two large data sets:
 - DELWP SRW sightings database (30 + years)
 - SEA SRW PIC – South East Australian Southern Right Whale Photo-Identification Catalogue (350 individual whales from SA, Vic, NSW, Tas)
- POPAN mark-recapture model
 - SE population estimate 268 individuals (68 breeding females) in 2017
 - SE pop has increased at a rate of 4.7% p. a. b/w 1996 and 2017 based on breeding females
 - At least 93 calves born at Logans Beach between 1980 and 2018 (an average of 2.6 per year), mean calving interval of 3.5 ± 0.2 years (\pm SE, $n = 34$)
 - No significant change in the annual abundance of CC pairs sighted at Logans Beach over the last 3 decades (Stamation et. al., 2020)

New Technology

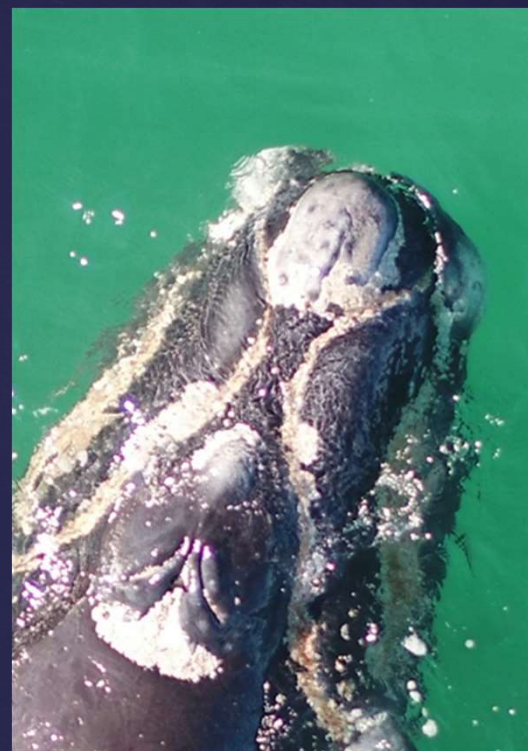
- RPAS - Remotely Piloted Aircraft Systems (drones) 2017 - 2019
- Photo-identifications of calves and investigate calf survivorship
- Understand health
- Conducted with Wildlife Research Permit under strict conditions



Calf ID



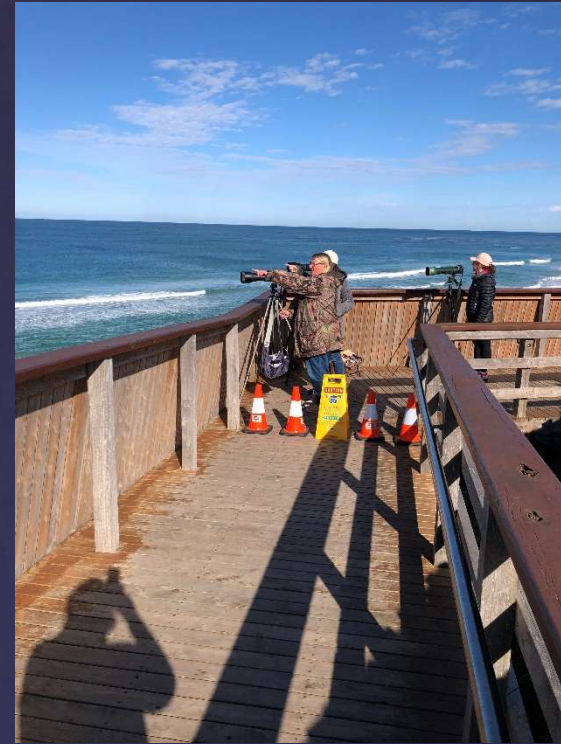
Rostrum of Southern Right Whale calf (SE1803) photographed, showing callosity pattern which could be coded. Photographed from a RPA at Fitzroy river mouth on 4 August 2018.



Rostrum of Southern Right Whale calf that could not be coded due to underdeveloped callosity patterns (calf of SE0402). Photographed from a RPA at Logans Beach Warrnambool on 29 August 2018.

Citizen's Science

- Whale paparazzi!
- SEA SRW PIC 2018 results
- 31 whale IDs obtained (26 new 5 re-sights)
- 24 IDs obtained from citizen scientists (78%)
- Around 60% current IDs contributed by citizen scientists
- Whale photographers assisted with disentangling and monitoring of whale near Portland Aug 2018





SE1724 'Half Moon' Logans Beach Coralee Askew



SE1715 and SE1716 Cape Nelson Mary Hartney

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SE1725 Bridgewater Maureen McDonald

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You can get involved

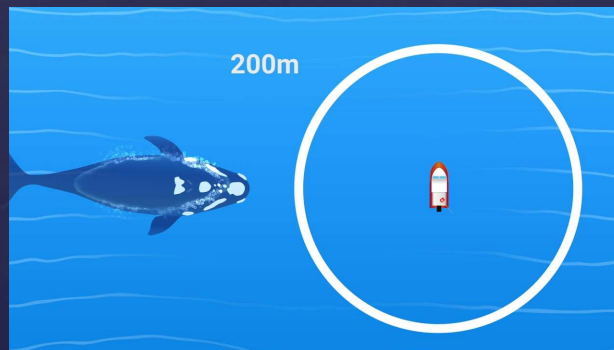


- <https://www.swifft.net.au/whaleface/>
- Register
- Learn how to take ID images
- Enter whale SRW sightings
- Upload images
- Receive updates
- Images and sightings data catalogued and used for
 - Photo-ID matching
 - Updates to population models
 - Health assessments

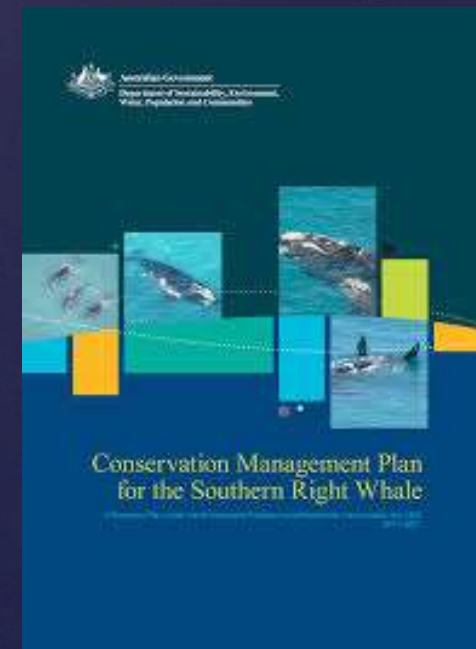


Further Information:

- <https://www.swift.net.au/whaleface/>
- www.environment.gov.au for Conservation Management Plan
- <https://www.wildlife.vic.gov.au/our-wildlife/whales,-dolphins-and-seals/water-safety-around-marine-mammals>
- mandy.watson@delwp.vic.gov.au



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Acknowledgements

- Victorian Government
- Federation University
- SEA SRW PIC data contributors
- ARWPIC data contributors (John Bannister, Claire Charlton (HOB))
- Australian Marine Mammal Centre
- New England Aquarium

