Marine and Coastal

National Environmental Science Program

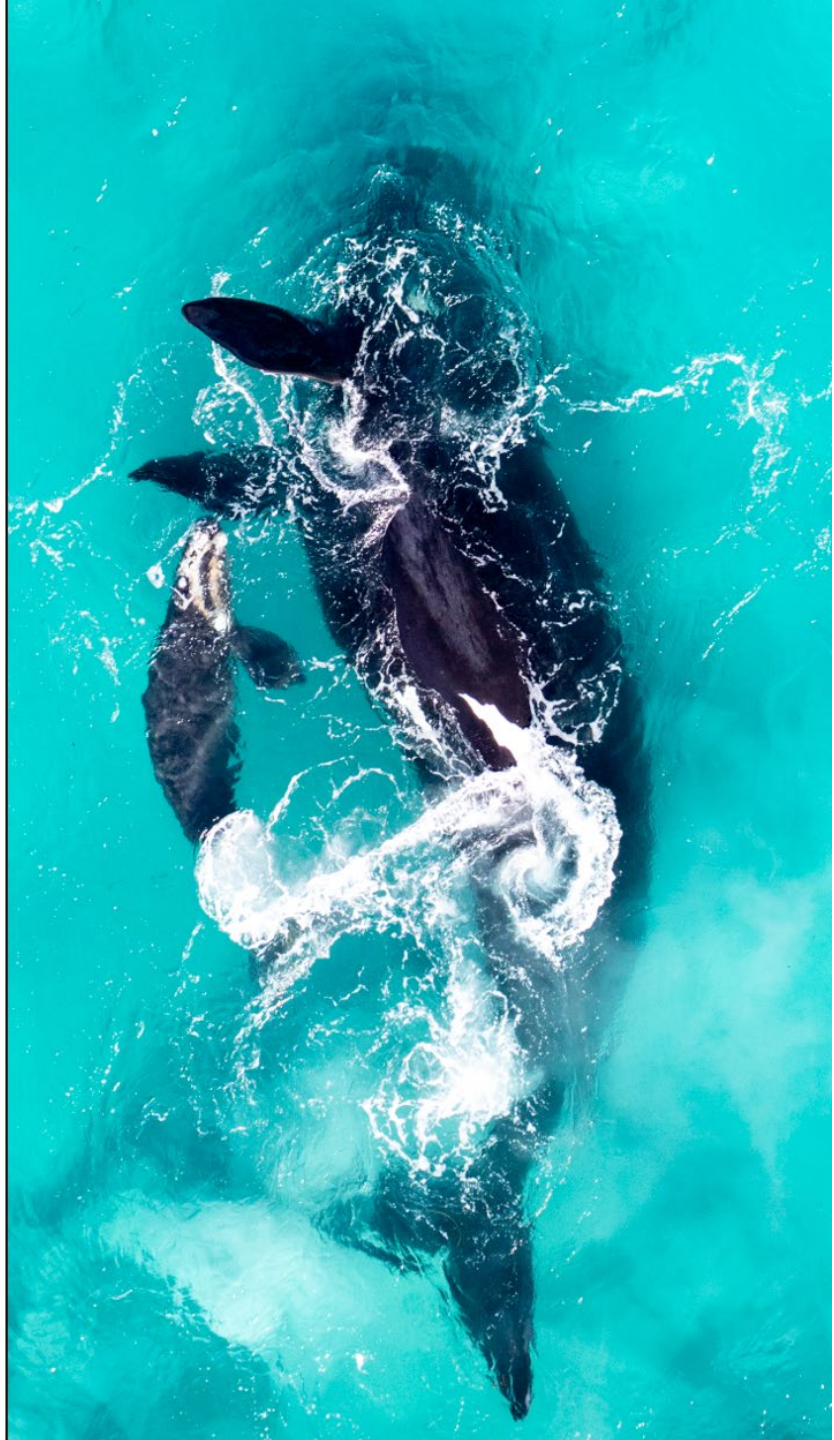
Monitoring aggregation areas, and approaches to improve data effectiveness for southern right whale conservation

Project 3.15

https://www.nespmarinecoastal.edu.au/project/3-15/

Project Contacts: Josh Smith, Chandra Salgado Kent, Karen Evans, & Luciana Möller

Murdoch University, Edith Cowan University, CSIRO, Flinders University



NESP 3.15 Project Sub-Components

Project sub-component contacts

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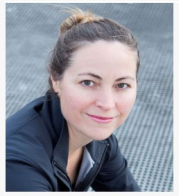

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1. Population monitoring of the western population of southern right whales
2. Southern right whale aggregation area assessment
3. Expanding utilisation of southern right whale datasets to estimate national population parameters
4. Movements, connectivity, and population identity of southern right whales at the boundary of the eastern and western subpopulations

Relative abundance of southern right whale western population from aerial surveys off southern Australia

NESP Project 3.15: Subcomponent 1

John Bannister – Western Australian Museum
Joshua Smith – Murdoch University / AAD
Mike Double, Nat Kelly – AAD
Andy Townsend – AT Design

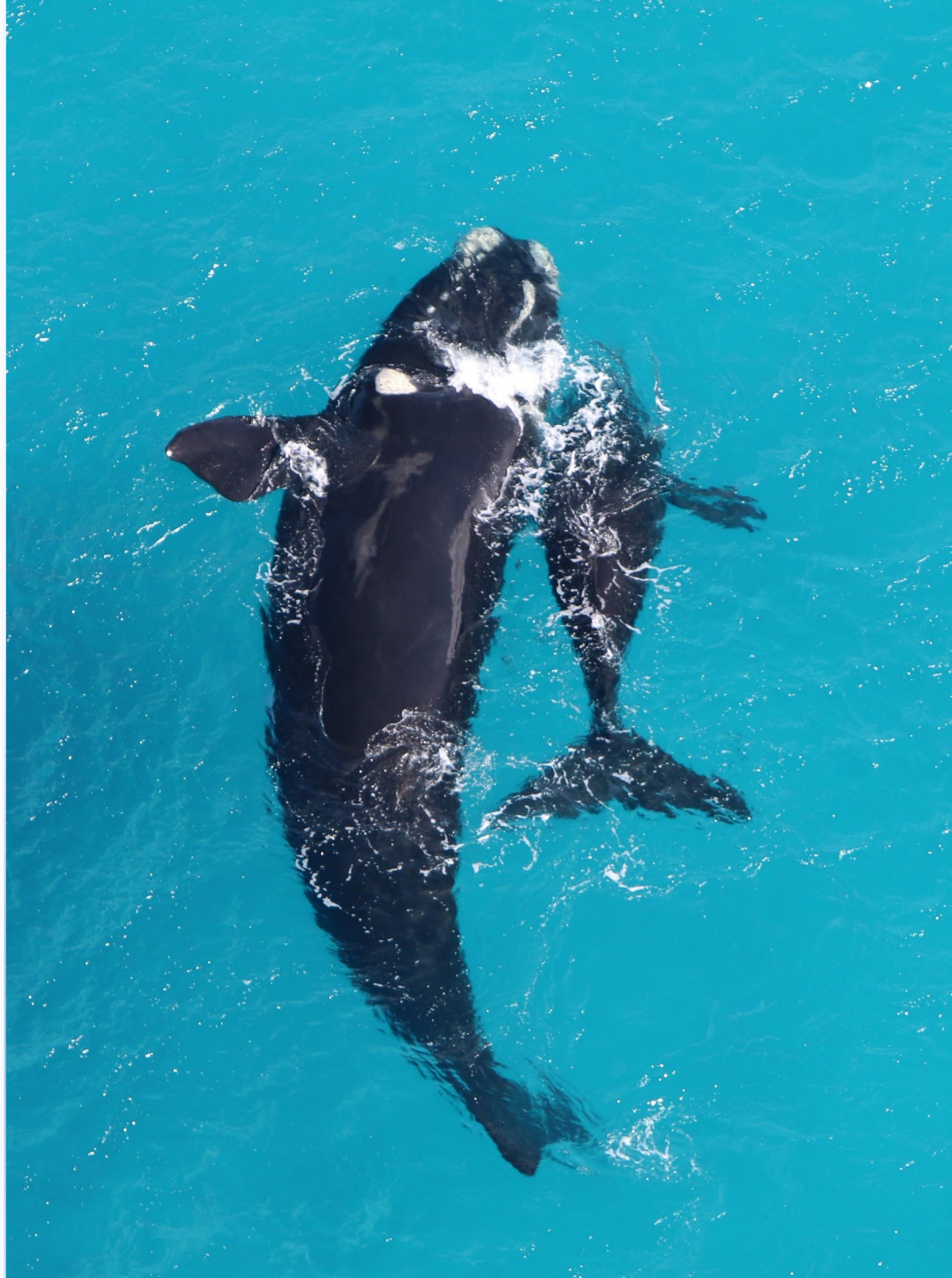
Status of taxon

Commonwealth legislation:
Endangered
Environment Protection and Biodiversity Conservation Act 1999

State legislation:
Endangered
New South Wales, Victoria, Tasmania
Vulnerable
South Australia, Western Australia
Least Concern
Queensland

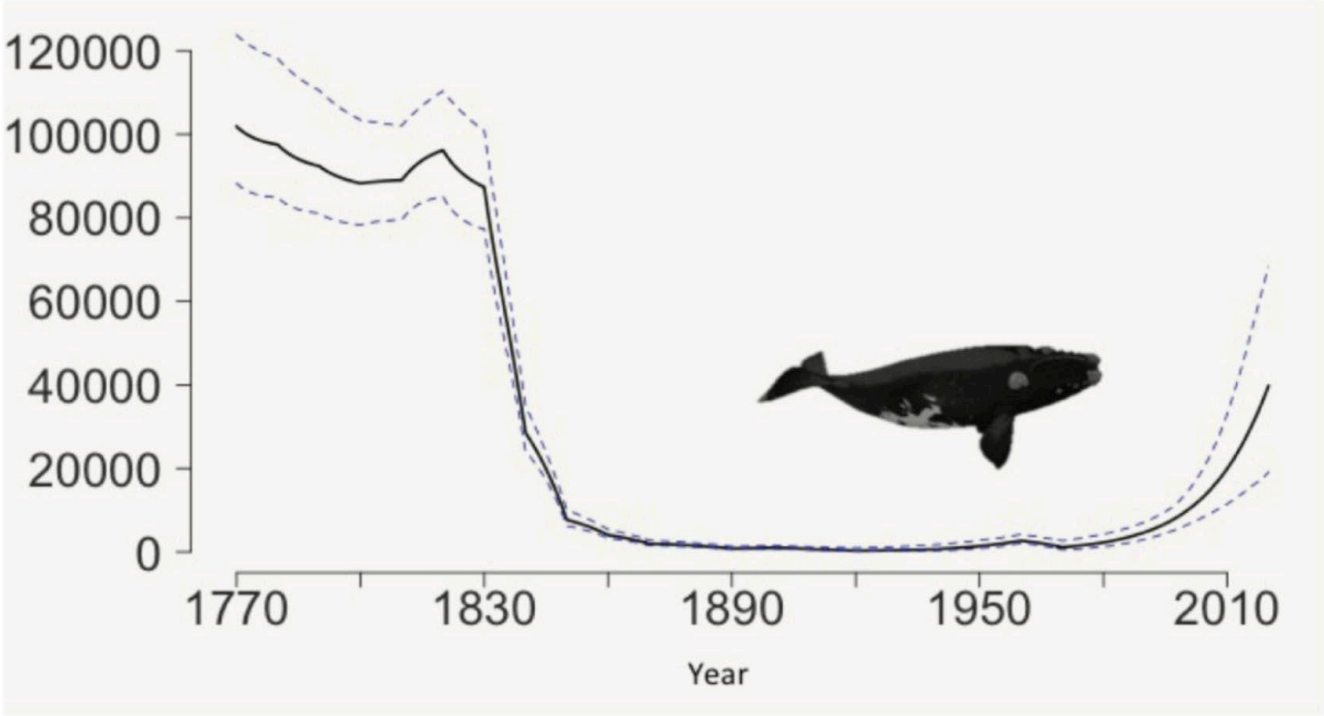
National Recovery Plan for the Southern Right Whale
Eubalaena australis (2024)

Often triggers for environmental assessment
– project referrals



Whaling and species decline

Global population decline from whaling



Intense whaling pressure in eastern States of Australia during 19th Century

Western population	Eastern
N = 2,242	N = 268

Annual aerial surveys – western population

John Bannister WAM aerial surveys

1976 – 1992

1993 – 2017

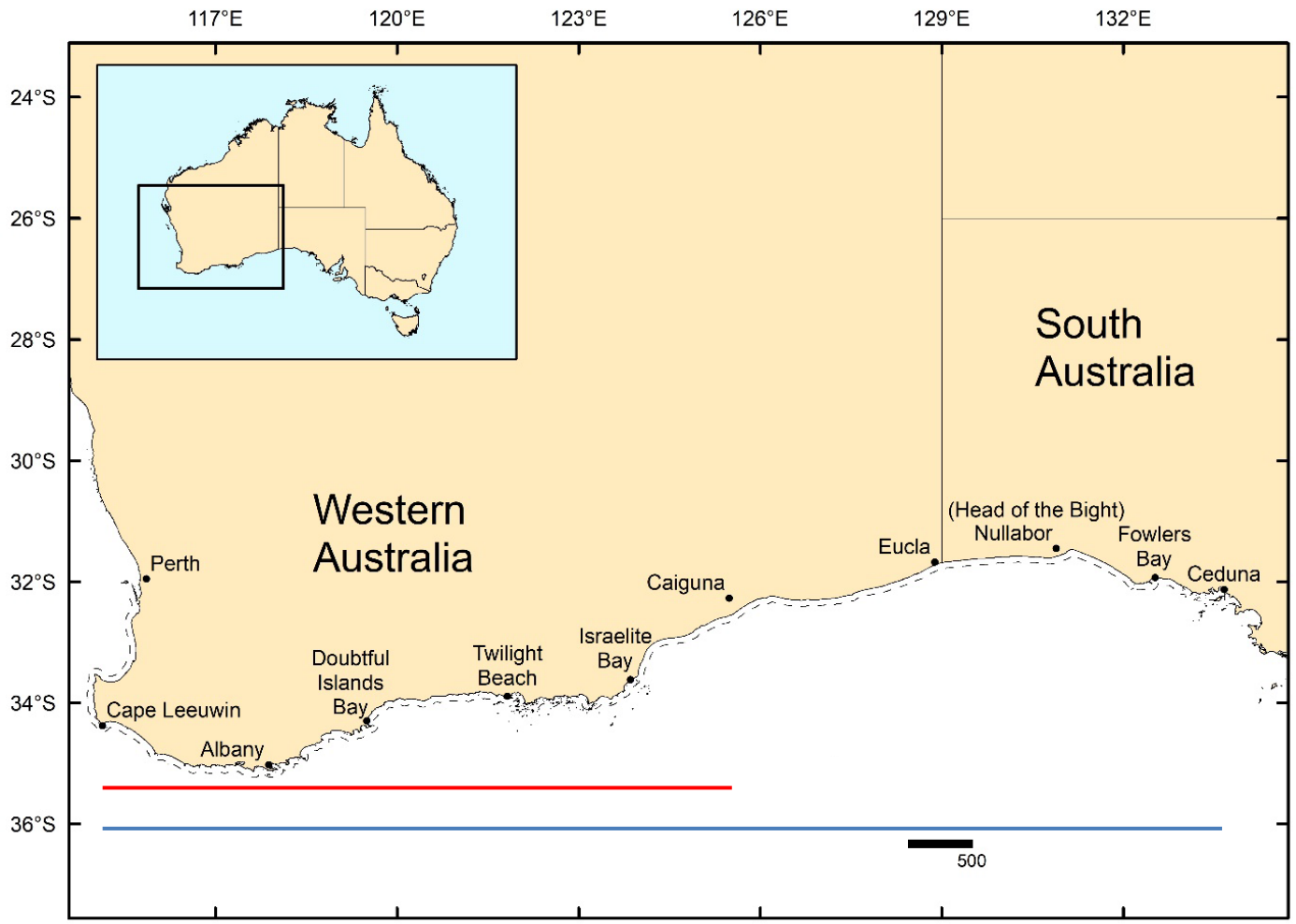
Murdoch university

2018 – 2024

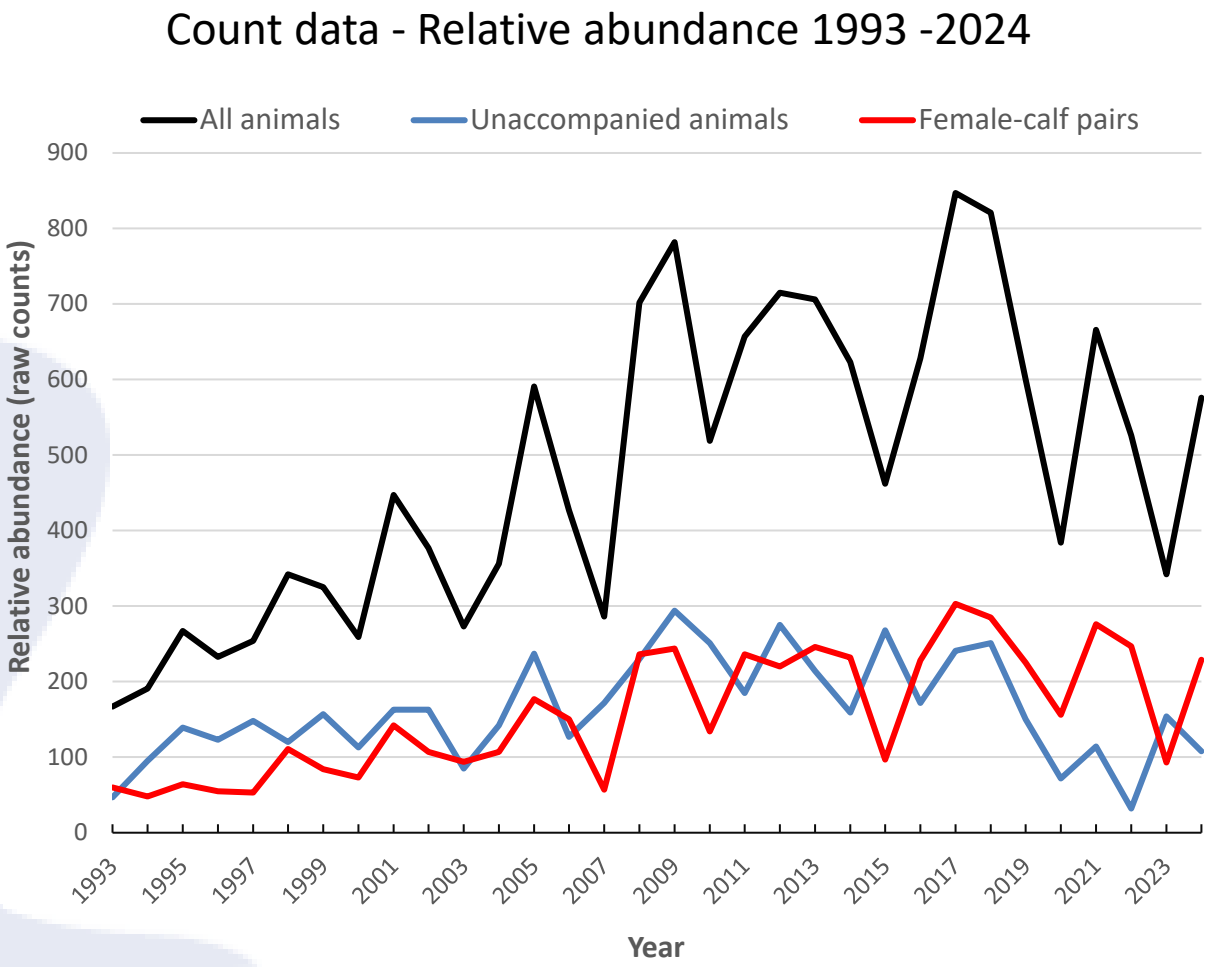
NESP funding

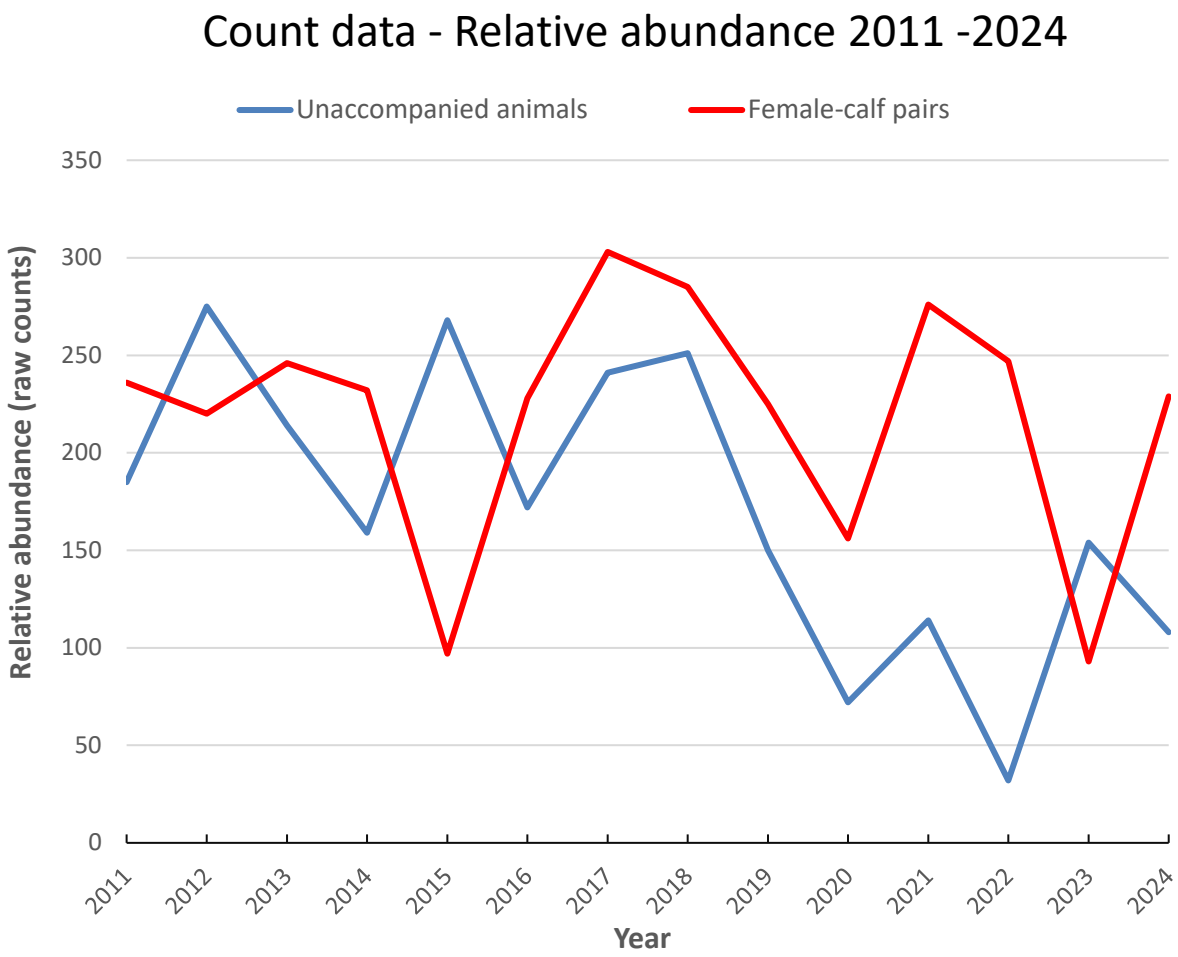
2015 – 2024

Direct counts and photo-identification – cow/calf pairs, unaccompanied adults



Annual aerial surveys – western population

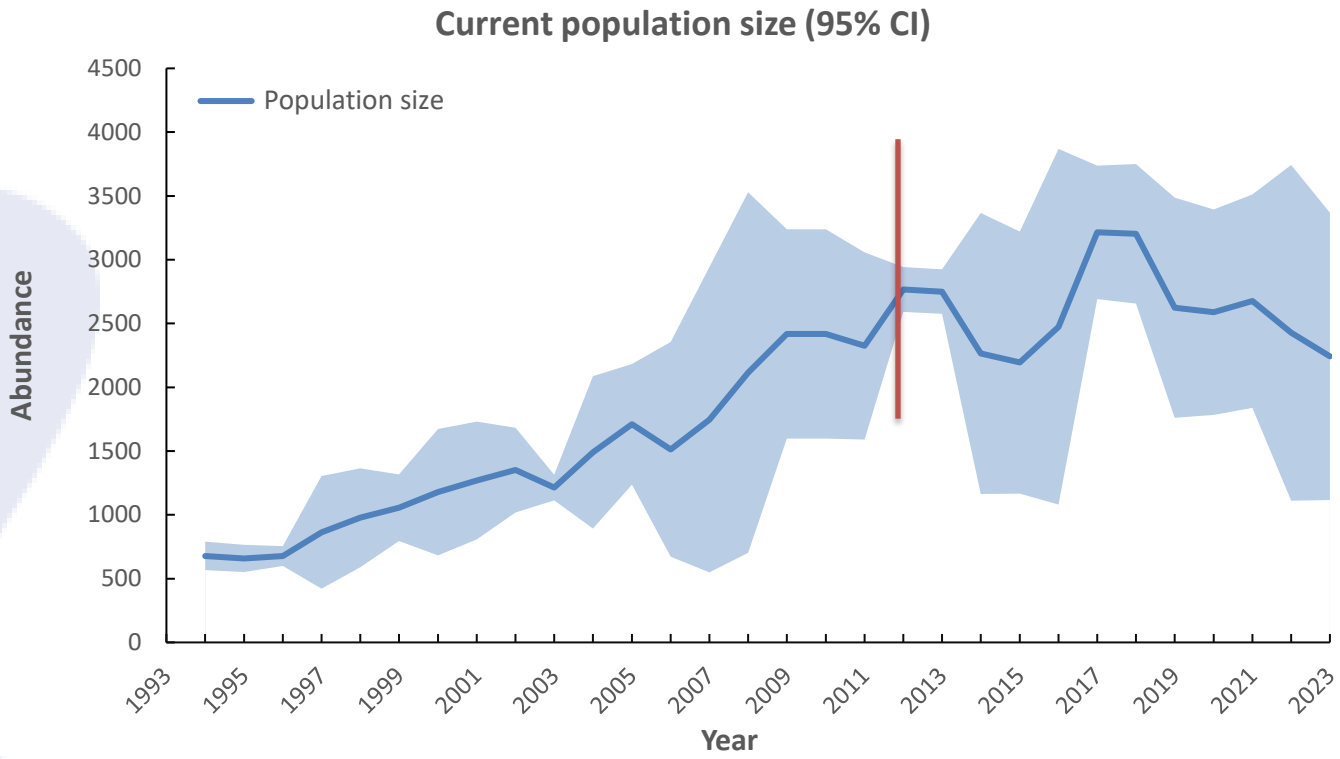




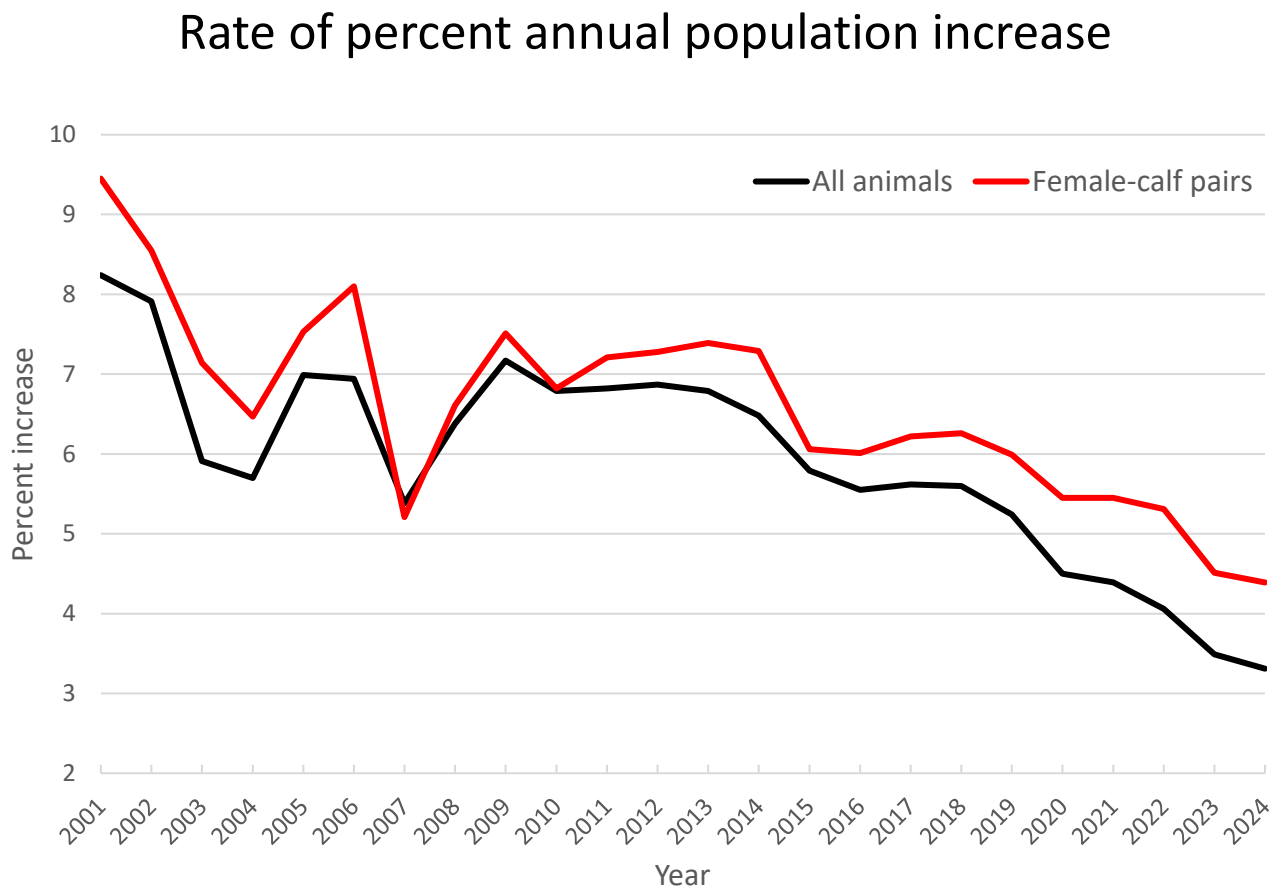
Annual aerial surveys – western population

Population size = 2,242

Initial exponential growth until ~ 2011. Recent plateau in growth rate at only 20% pre-whaling



Annual aerial surveys – western population



Development and application of AI to photo-id

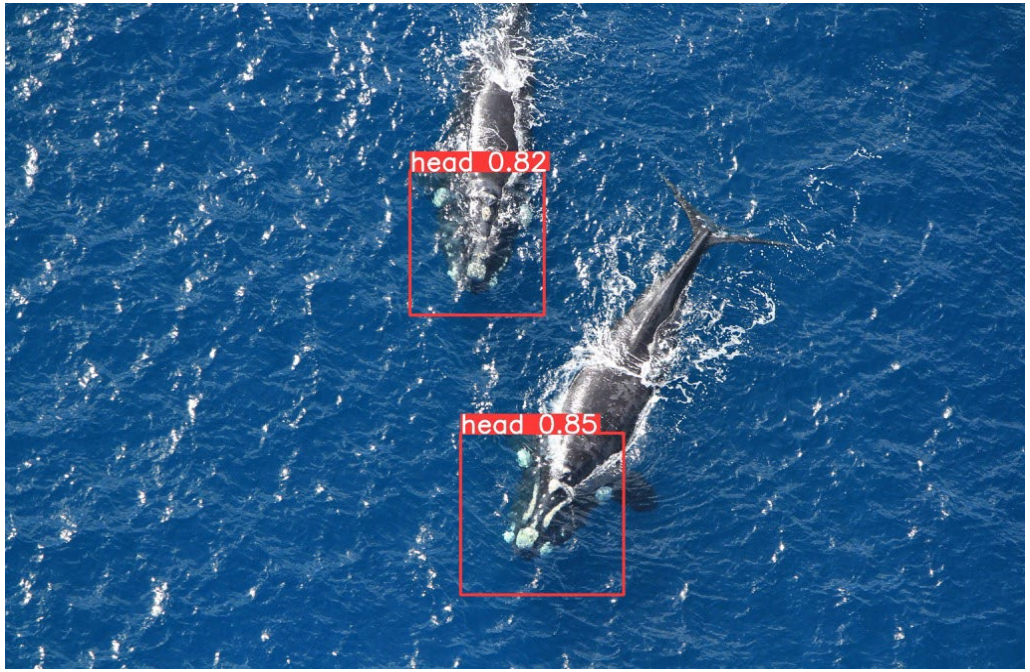
Sightings data and photo-id images submitted to ARWPIC (online database)

Manual matching of photo-id using code-based matching framework (BigFish CodeCompare)

Large bottleneck in data processing due to manual approaches

NESP funded development of AI 2023 and 2024

- AI model development of open source AI algorithm for automating photo-id.
- Develop tools that can interface with ARWPIC to automatically extract image metadata into the ARWPIC database and bulk imports of sightings data.
- Outputs to increase efficiency in processing photo-id images to improve timely derivation of population parameter data (e.g. calving rates).



2. Southern right whale aggregation area assessment

Chandra Salgado Kent (Edith Cowan University)
Mandy Watson
Chris Burton (Western Whale Research)
Kris Carlyon (NRE Tas)
Claire Charlton (Current Environmental; CE)
Andy Townsend (AT Design)
Kirsty Alexander (South Coast Cetaceans)

Jennah Tucker (ECU)
Alex D'Cruz (ECU)
Bridget O'Shannessey (CE)
Laura Bird (South Coast NRM)
Brodie Lowe (Curtin U.)
Sacha Guggenheimer (CE) …

Leveraged and supported by:

Marine and Coastal
National Environmental Science Program

Australian Government
Department of Climate Change, Energy, the Environment and Water

VICTORIA State Government
Environment, Land, Water and Planning

SOUTHCOAST NATURAL RESOURCE MANAGEMENT INC.

natural resource management program

MINDEROO FOUNDATION

OCEANS BLUEPRINT

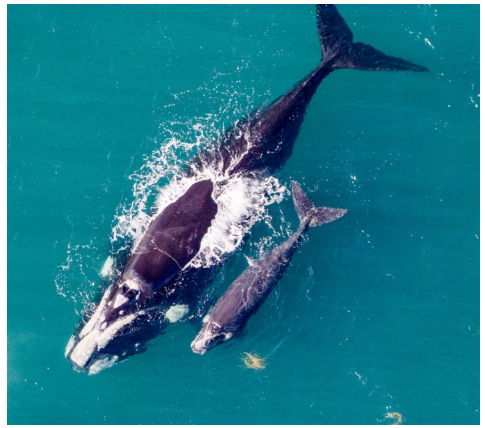
Curtin University

NATIONAL PARKS & WILDLIFE SERVICE NSW

Eco Gecko ENVIRONMENT & DESIGN

Citizen Scientists & Indigenous Rangers

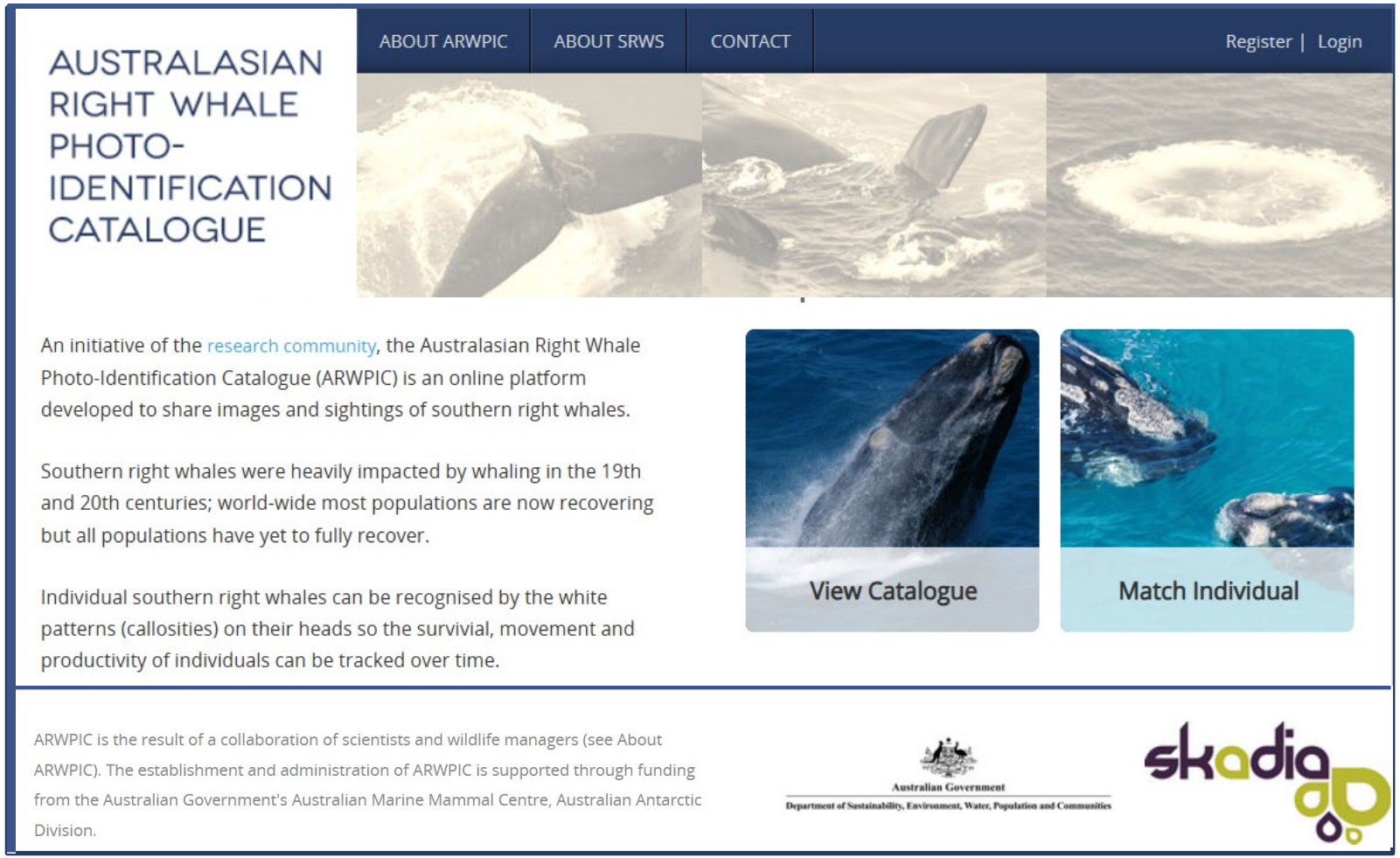
- Major contributors - data collectors
  - >40,000 raw images
  - >25 years
- Training & skills development
- Awareness



Southern right whale aggregation area assessment

Objectives

- Abundance
- Residency
- Movement & connectivity
- Demographic parameters
- Calving & return rates …



AUSTRALASIAN RIGHT WHALE PHOTO-IDENTIFICATION CATALOGUE

Together through our ARWPIC collaboration we have achieved

The Updated National database ARWPIC includes sightings from 1980–2023 across Australia totaling

3,768 events

3,211 individuals

8,601 SIGHTINGS

20,085 IMAGES

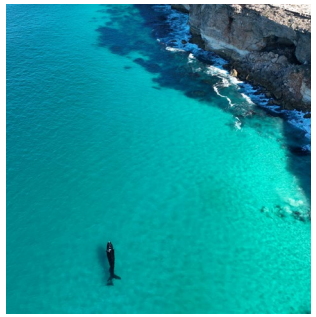
CROSS REGIONAL MOVEMENTS

AUSTRALASIAN RIGHT WHALE PHOTO-IDENTIFICATION CATALOGUE

Generating a wave of larger impacts

ARWPIC for outputs

Through providing robust science, we Inform management and policy and collaborate with expert committees

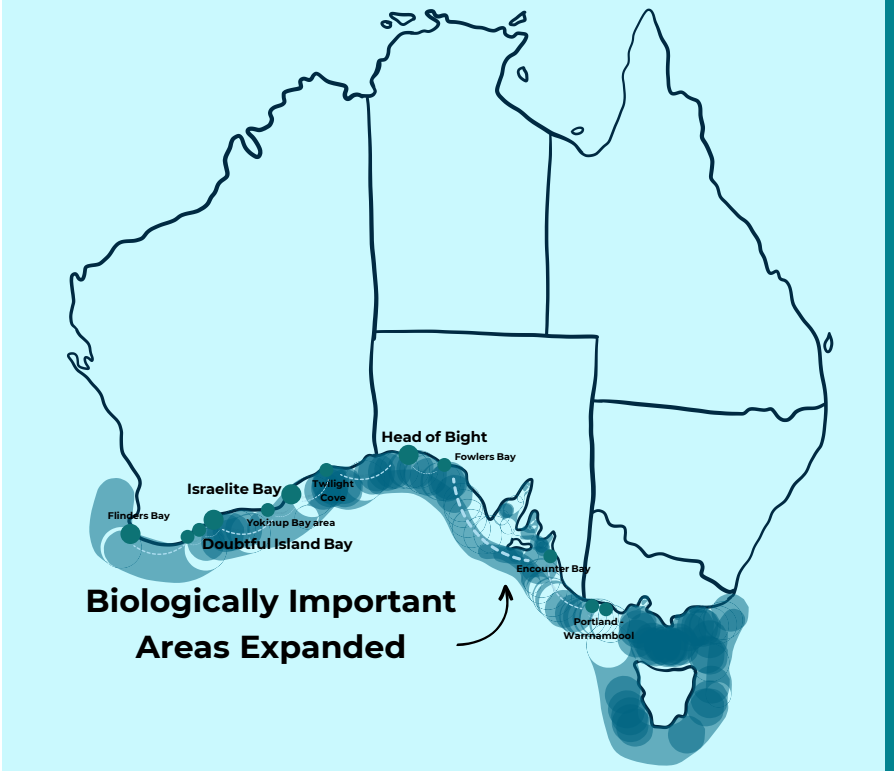


PROJECTS

- NESP
- IWC SORP - THEME 6
- IWC- COMMON MODEL
- SRWC- GLOBAL COLLABORATION
- SRW NRP
- SRW & CLIMATE CHANGE
- HEALTH ASSESSMENTS

ACHIEVEMENTS

- OUTPUTS USED IN NATIONAL RECOVERY PLAN
- BIOLOGICALLY IMPORTANT AREAS DEVELOPMENT
- STATE MARINE PARK PLANNING



KEY MANAGEMENT STAKEHOLDERS

IWC Southern Ocean Research Partnership

Australian Government

Australian Government Department of Climate Change, Energy, the Environment and Water Australian Antarctic Division

AUSTRALIAN ANTARCTIC PROGRAM

National Environmental Science Programme

MARINE MAMMAL PROTECTED AREAS TASK FORCE

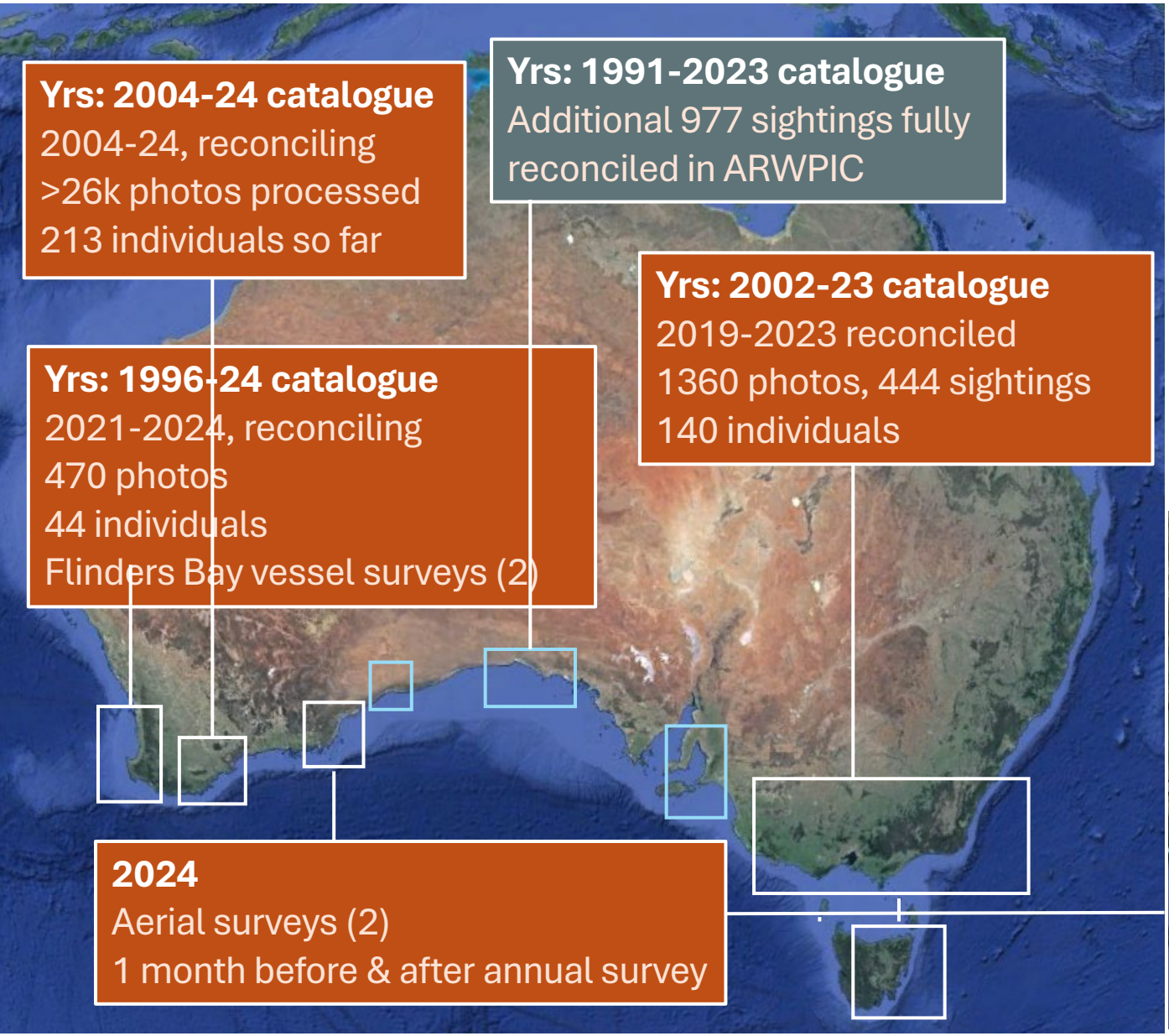
IUCN SSC WCPA

INTERNATIONAL WHALING COMMISSION

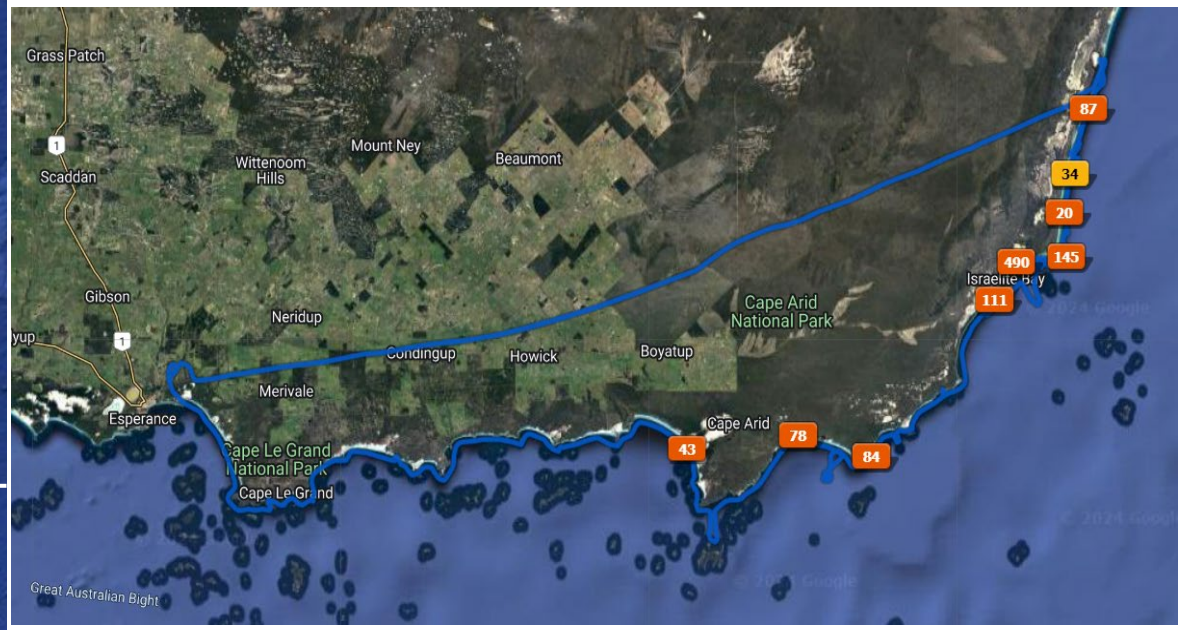
SRWC Southern Right Whale Consortium

State Government Environment & Conservation Departments

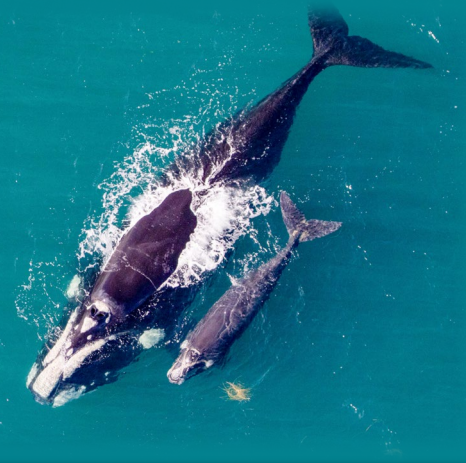
Southern right whale aggregation area assessment



- Processing raw images
- Identifying individuals
- Uploading to ARWPIC (processing time reduced with batch processing & automated steps - AT Design & Current Environmental)
- Matching (within and across regions)
- Curation



Knowledge, outputs & impact



CONSULTATION & TRAINING

22 INDIGENOUS RANGERS

4 WHALE **TOUR OPERATORS**

>240 CITIZEN SCIENTISTS

>75 STAKEHOLDERS

ECOLOGY

AN **ADULT** SEEN IN EXMOUTH GULF 5 YEARS AGO RETURNED THE FOLLOWING YEAR, THE FIRST **TRAVELLING SO FAR NORTH REPORTED RETURNING**

DEMOGRAPHIC PARAMETERS

PINSTRIPE IS ESTIMATED TO BE AT LEAST **48 YEARS OLD**. MAKING HER ONE OF **AUSTRALIA'S OLDEST** KNOWN BREEDING FEMALE

Knowledge, outputs & impact

DEMOGRAPHICS

FB-090 WAS RE-**SIGHTED** LAST YEAR **WITH** HER **NEW CALF AFTER 20 YEARS** IN FLINDERS BAY, WA

MANAGEMENT IMPLICATIONS

CONTINUED **LOW RESIGHTS BETWEEN EAST AND WEST**[2] (5%), & WITH **DIFFERING RECOVERY RATES**[1] AND TRENDS, THIS **HIGHLIGHTS** NEED TO TREAT **SUB-POPULATIONS AS DISTINCT MANAGEMENT UNITS**

[1] Watson et al 2015, Stamation et al. 2020, [2]Watson et al 2021

4. Movements, connectivity, & population identity at the boundary of the eastern and western subpopulations

Luciana Möller
Flinders University
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- Four SRW satellite-tagged in Encounter Bay, South Australia (SA), in June 2024.
- All tagged are new to Encounter Bay photo-ID catalogue.
- Tags provided data for up to 200 days and tracks of up to 11,000 km.

Table 1. Summary of southern right whale satellite tagging in Encounter Bay, SA.

Tag ID	Date deployed	Deployment location (DD)	Track duration (days)	Minimum dist. travelled (km)
261252	17/06/2024	-35.54195, 138.71472	185	9,938
261253	17/06/2024	-35.56272, 138.72401	198	11,626
261255	19/06/2024	-35.58077, 138.69302	150	4,089
261256	22/06/2024	-35.63295, 138.43364	132	6,014

4. Movements, connectivity, & population identity at the boundary of the eastern and western subpopulations

Southern right whale tracks

- Whales moved in westerly or south-then-westerly directions (31° -47°S and 96° - 138°E).
- Preliminary analysis suggests transit and area restricted search behaviours.
- Tracking confirmed significant overlap with marine industry activity.
- Data highlights risks to species & provide information to support conservation under the SRW National Recovery Plan.

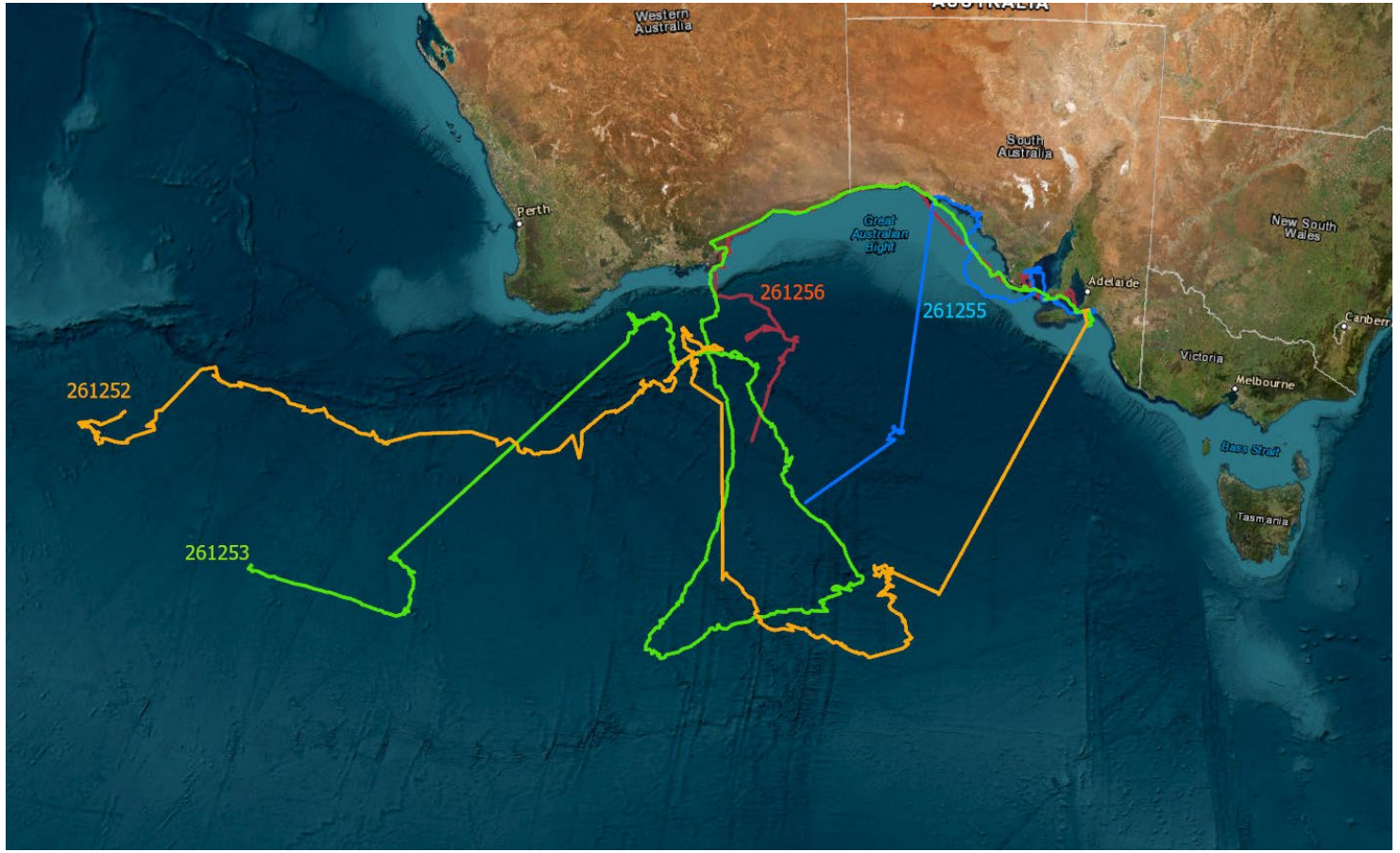

Figure 1. Location tracks for four southern right whales tagged in Encounter Bay, South Australia in June 2024.

Southern right whale dive profiles

- >20,000 dive profiles: average depths from 8.4-20 m (max ~300 m in STC).
- Two whales that travelled very close to shore along GAB made mostly square-shaped dives, suggestive of resting.
- Further dive analysis to be completed in 2025.

Table 2. Diving behaviour of four southern right whales tagged in Encounter Bay, South Australia.

Tag ID	No. dives (excursions >5m)	Ave. dive depth (m)	Max. dive depth (m)	Types of dives recorded		
				Square-shaped	U-shaped	V-shaped
261252	5,310	20.0	307.5	2,826	1,986	498
261253	7,433	16.3	283.5	4,554	2,132	747
261255	2,247	10.0	197.5	1,493	587	167
261256	5,443	8.4	84.5	3,795	1,338	310

First Nations collaboration

- Kondoli Dreamtime Story Lantern Workshops and Community Event Celebration as part of Whale Fest, June 2025, Victor Harbor, SA.
  - Project inspired and led by Festival Director and Cultural Advisor Mark Koolmatrie, Ngarrindjeri Elder, in collaboration with City of Victor Harbor and Flinders University.
- SRW satellite tracks to be uploaded to Tohora Voyages website - Kondoli project.
- Whale sighting app to be developed with SA Whale Centre in collaboration with Ngarrindjeri Elder.

Next steps

- Combine satellite tagging and anthropogenic stressors spatial data to assess risks (spatial risk analysis).
- Continue biopsy sampling in Encounter Bay this season and conduct genomic analysis to identify populations, re-assess stock structure and connectivity across Australia and New Zealand (with University of Auckland).
- Continue working with Ngarrindjeri people on Kondoli project: Whale Fest, Tohora Voyages, and SA whale sightings app.

Marine and Coastal

National Environmental Science Program

Thank you

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Murdoch University

EDITH COWAN UNIVERSITY

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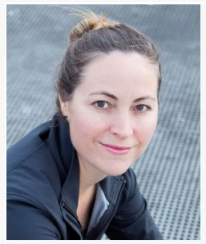

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