

# Healthy Coorong, Healthy Basin

Murray-Darling Association | September 2023

**Dr Nadine Kelly | SA Department for Environment and Water**



Find out more at  
[environment.sa.gov.au  
/topics/coorong](https://environment.sa.gov.au/topics/coorong)



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*I would like to acknowledge the traditional owners of the land on which we meet and pay my respects to their Elders past and present and extend that respect to other Aboriginal and Torres Strait Islander people who are present today.*

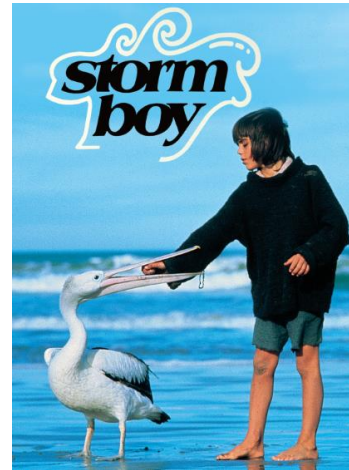


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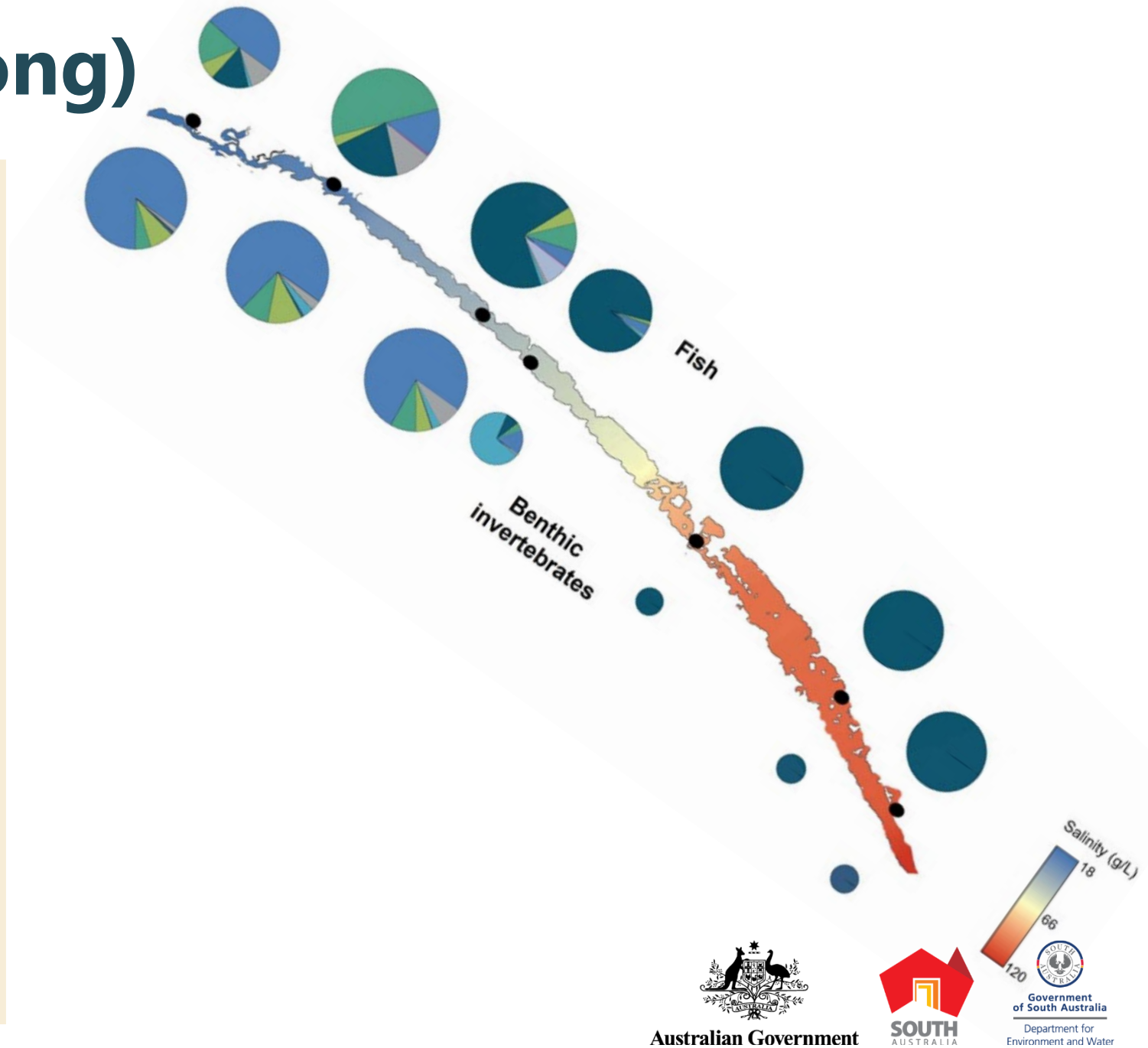
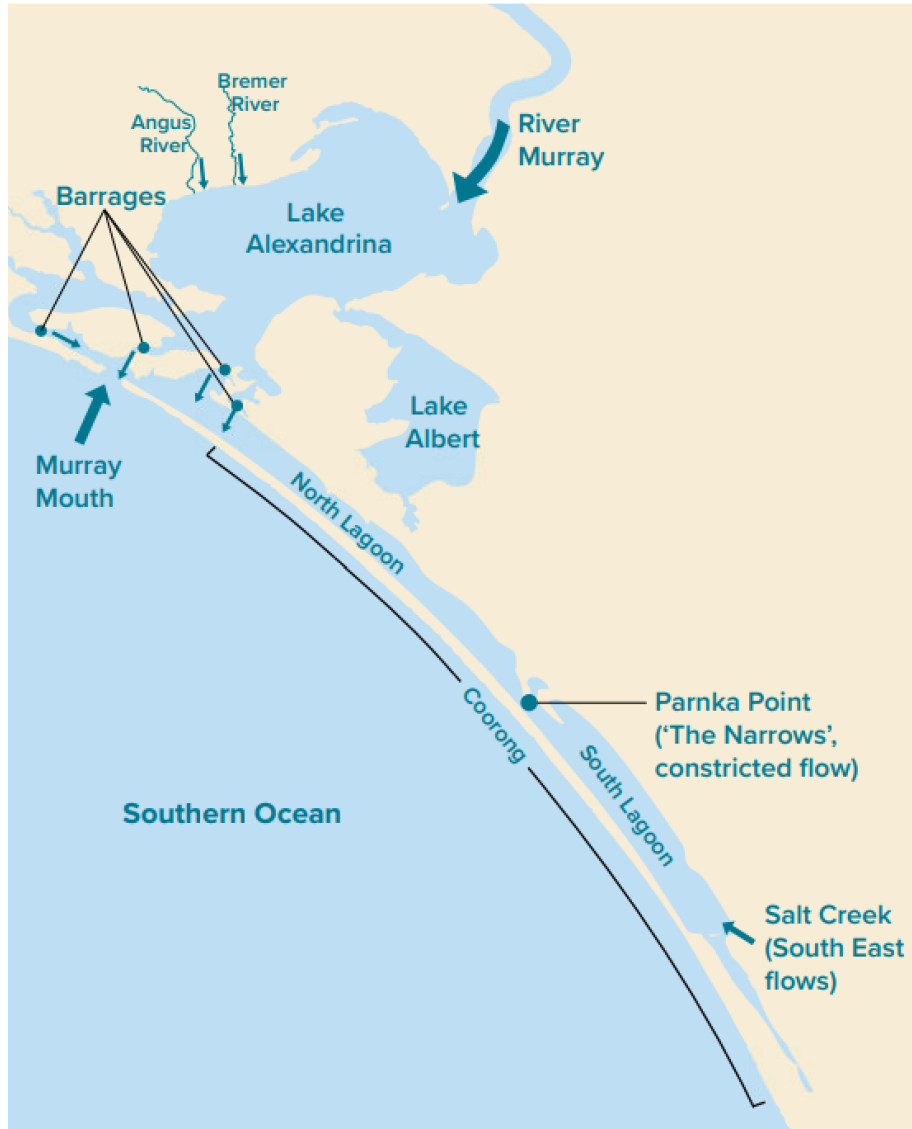
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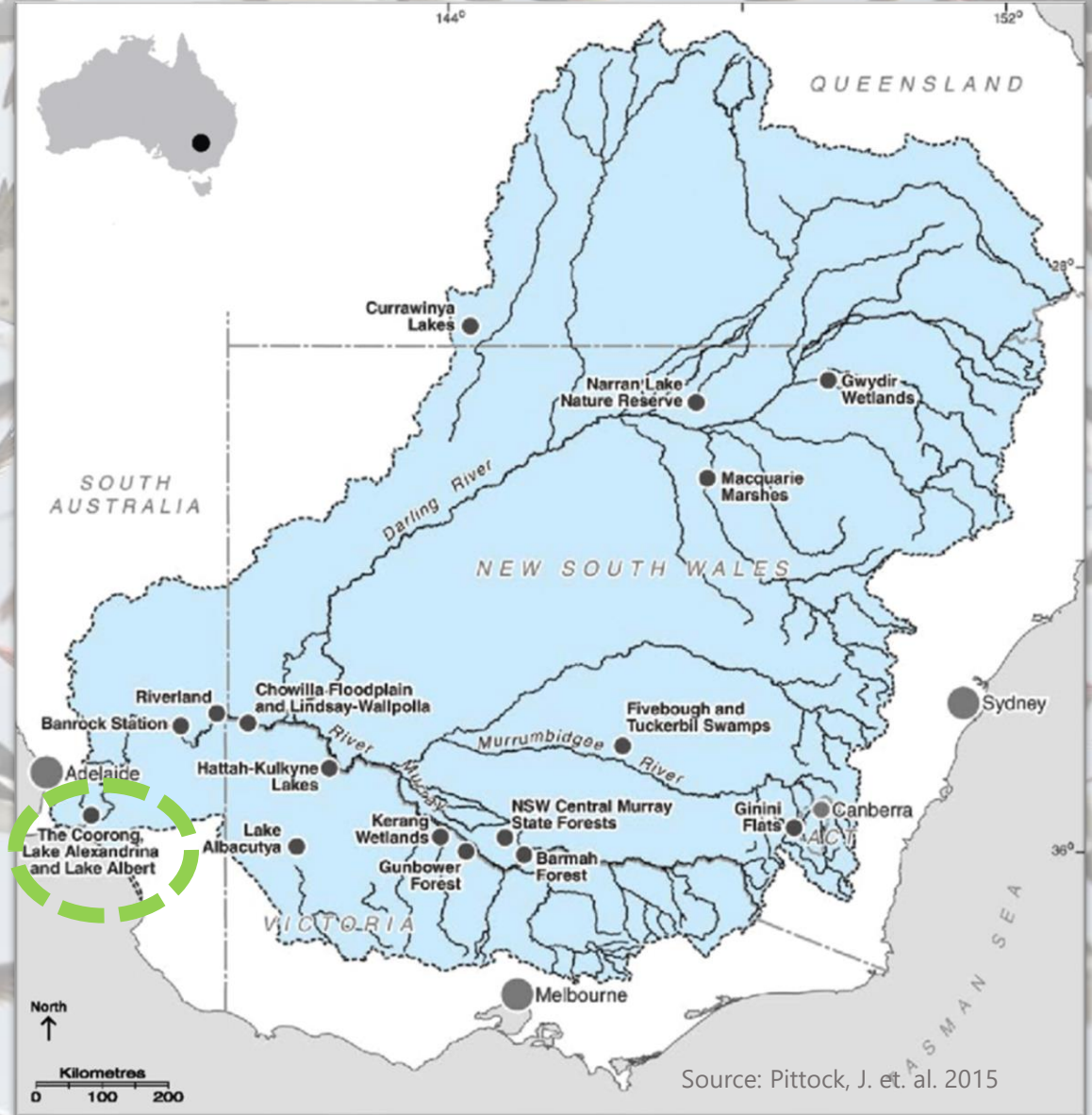
# The Kurangk (Coorong)



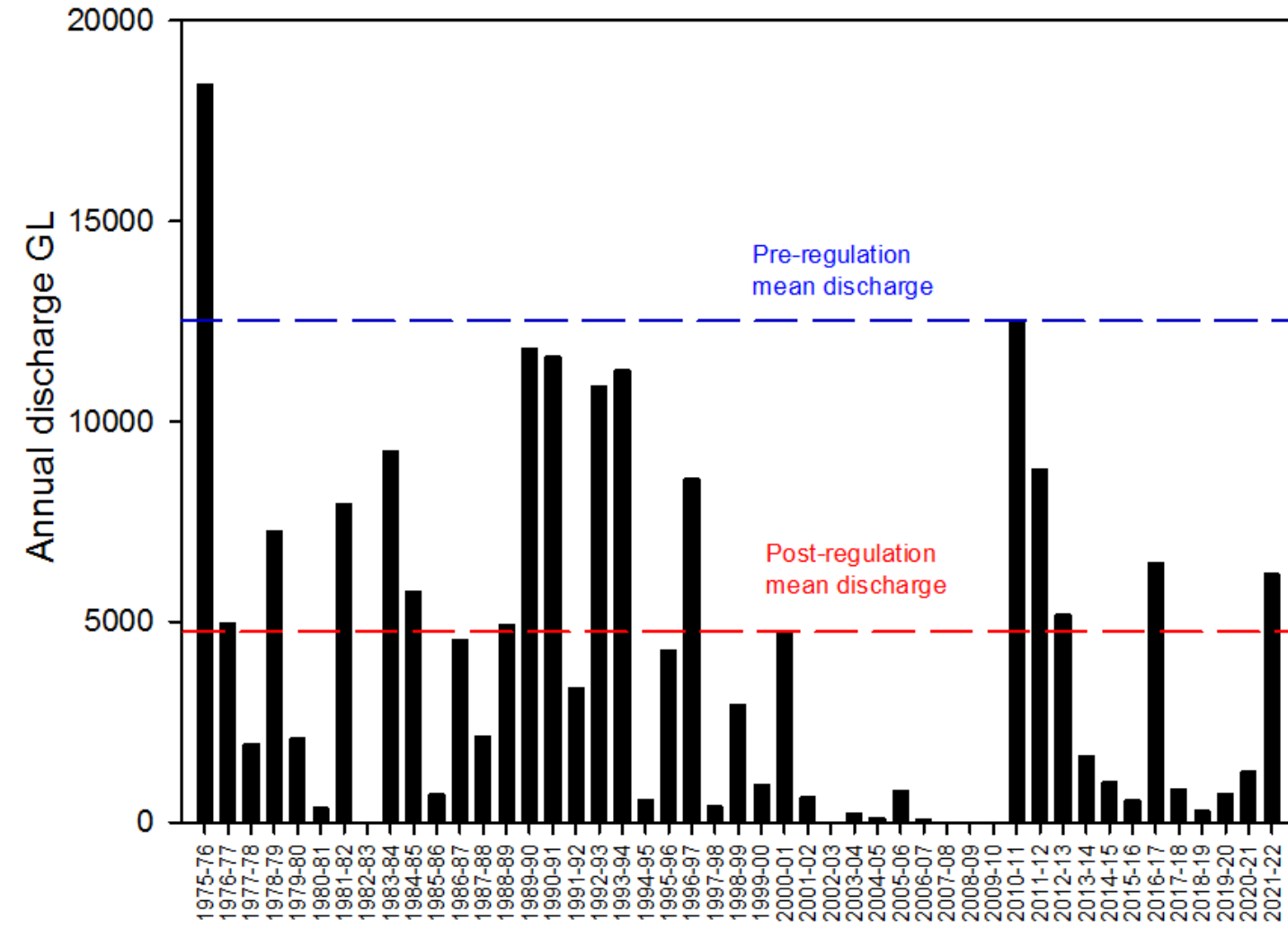
# The Kurangk (Coorong)



Convention  
on Wetlands

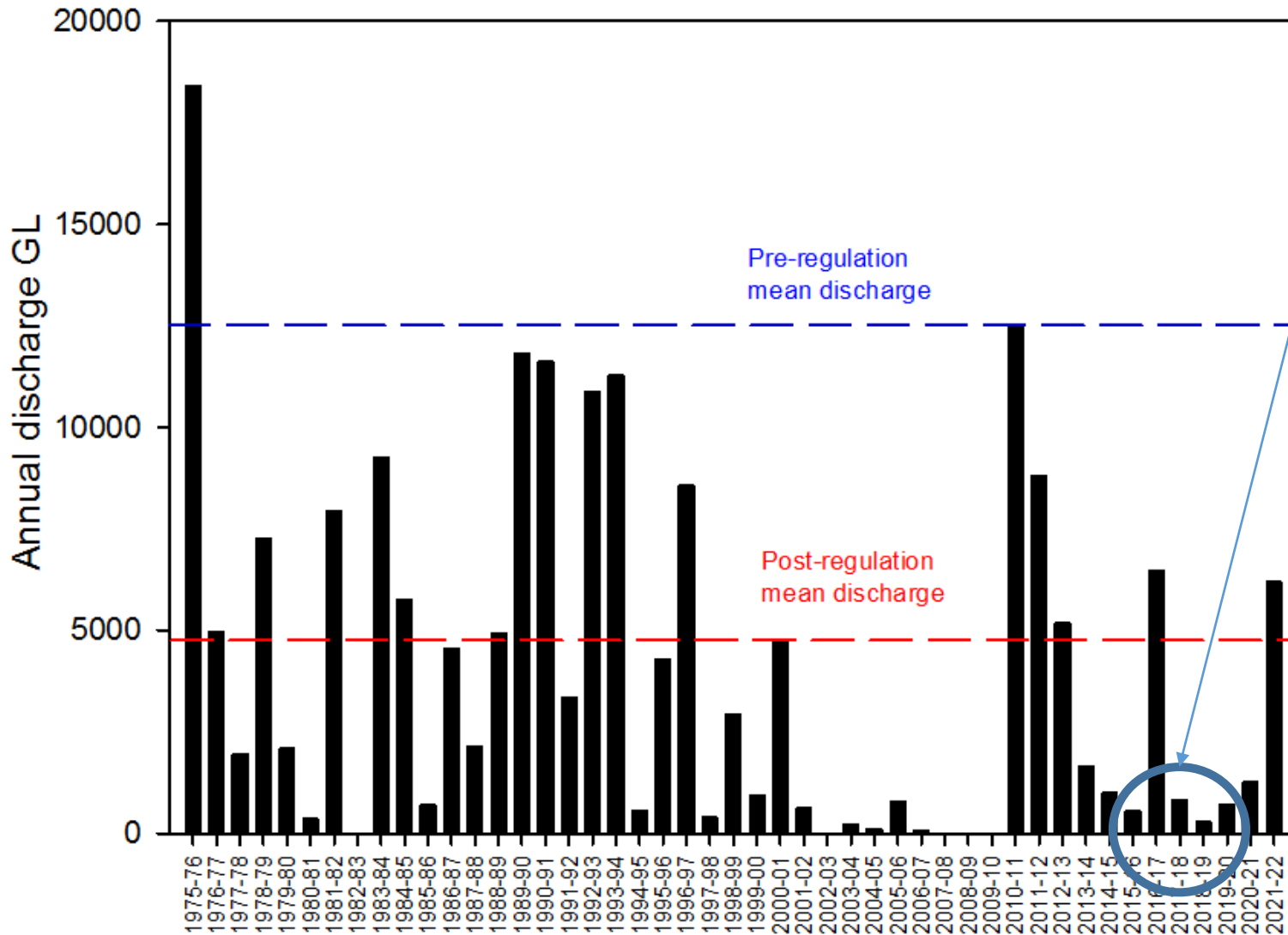


# The Kurangk (Coorong)





# The Living Murray Icon Site



Between 2018-2021, more than 90% of barrage flows was water for the environment



# CLLMM Recovery Project



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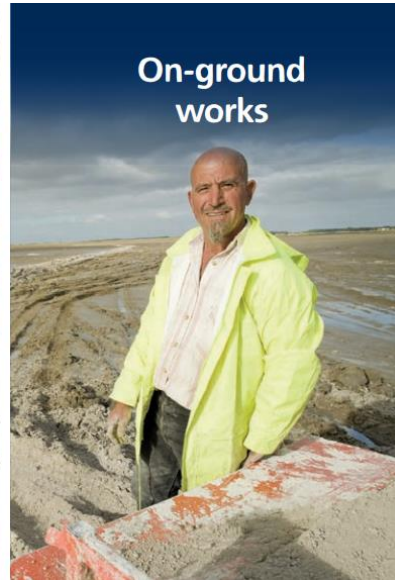


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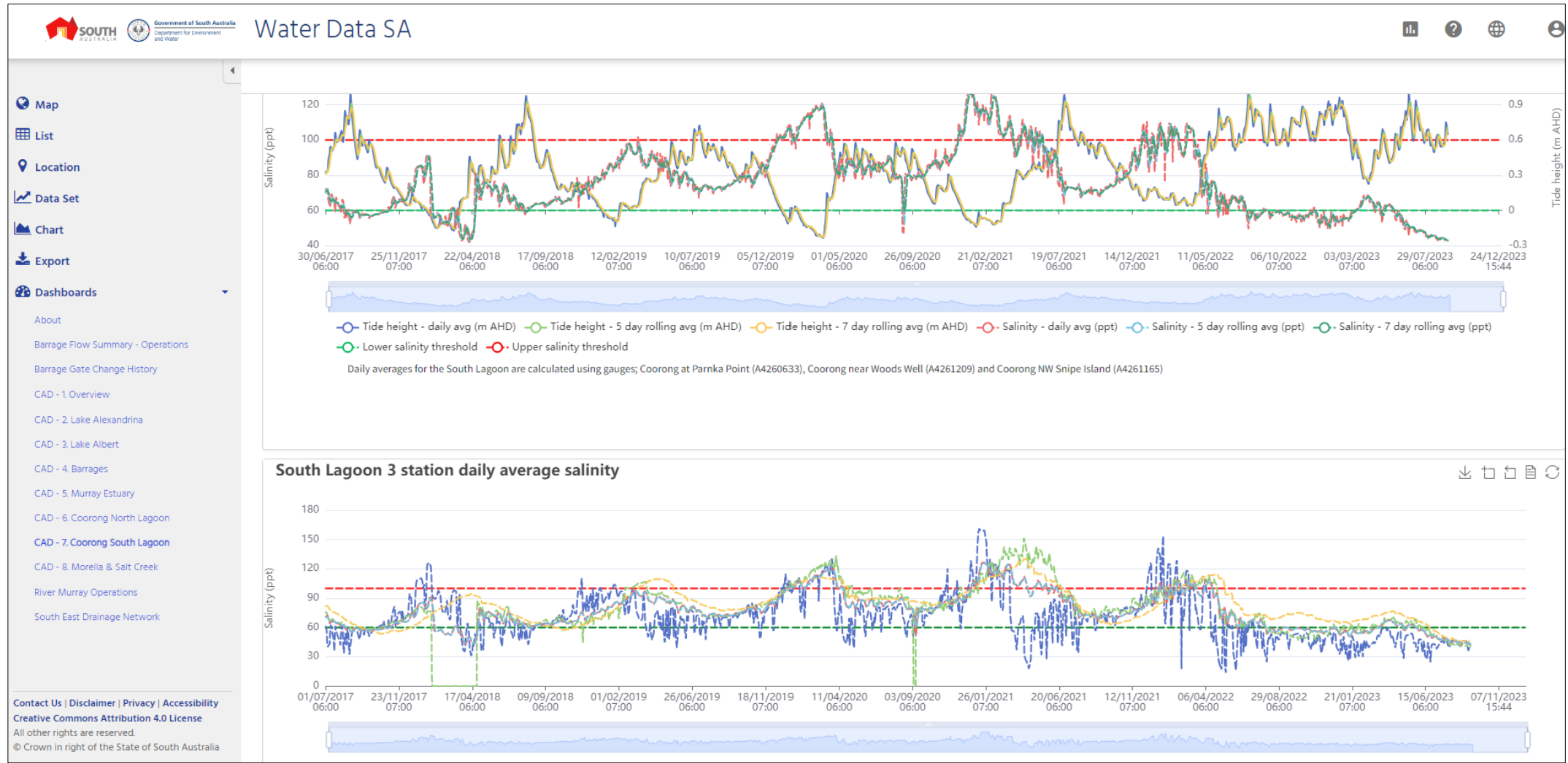
# Healthy Coorong, Healthy Basin (HCHB)

## 2019-2023 Phase 0 + 1

*Healthy Coorong, Healthy Basin* (HCHB) is working to improve the ecology, knowledge and management of the Coorong, with a focus on the south lagoon.



# HCHB – Water Resource Optimisation



<https://water.data.sa.gov.au/>

# HCHB – Scientific Investigations



Unprecedented **\$10.9 million investment** in scientific research to **inform restoration** and future management of the Coorong



**Significant collaboration** across 13 organisations, with **>90 scientists**



**Interdisciplinary expertise** – across hydrology, biogeochemistry, aquatic ecology, quantitative modelling, Indigenous knowledge and social science



Strong focus on early career researchers to **build capacity in SA**



Encourage and facilitate **innovative science** to help solve complex problems



**Managers and policy-makers embedded within the research**





### Scientific Trials and Investigations

- Desired state of the Southern Coorong – discussion paper
- Recommended actions for restoring the ecological character of the South Lagoon of the Coorong
- Coorong Dynamics Model sensitivity tests and gap identification

### Southern Coorong Factsheets

- Nutrient cycling in the Southern Coorong
- The role of sediments in the eutrophication of the Southern Coorong
- Monosulfidic black ooze are anoxic and alter nutrient cycles
- Pathways to reversing the hypereutrophic nutrient state of the Coorong
- Connectivity and flushing
- The aquatic plants of the Southern Coorong
- Why aquatic plants are important
- Aquatic plant lifecycles in the Southern Coorong
- Algae affects recovery of aquatic plants

### HEALTHY COORONG HEALTHY BASIN

(Scientific Trials and Investigations Project)

#### Project Highlights

- Assessing waterbird habitat quality in the Coorong

#### Understanding Coorong nutrient dynamics

- Huang J, Welsh D, Erler D, Ferguson A, Brookes J, Keneally C, Chilton D, Dittmann S, Lam-Gordillo O, Southgate M, Simpson S, Mosley LM (2022) Coorong nutrient cycling and fluxes. Goyder Institute for Water Research Technical Report Series No. 22/07, Adelaide, South Australia. ISSN: 1839-2725
- Mosley LM, Priestley S, Brookes J, Dittmann S, Farkaš J, Farrell M, Ferguson AJ, Gibbs M, Hipsey M, Huang J, Lam-Gordillo O, Simpson SL, Teasdale PR, Tyler JJ, Waycott M, Welsh DT (2020) Coorong water quality synthesis with a focus on the drivers of eutrophication. Goyder Institute for Water Research Technical Report Series No. 20/10, Adelaide, South Australia. ISSN: 1839-2725
- Mosley LM, Brookes J, Dittmann S, Huang L, Lam-Gordillo O, Priestley S, Simpson S, Welsh D, and Waycott M (2022). A scientific evaluation to inform nutrient removal options for the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/06, Adelaide, South Australia. ISSN: 1839-2725
- Mosley L, Farkas J, Shao Y, and Fitzpatrick R (2022). Monosulfidic Black Ooze (MBO) formation. University of Adelaide technical report.
- Priestley S, Mosley L, Farkas J, Tyler J, Shao Y, Shanfield M, Banks E, Wong VW, and Leyde the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/01, Adelaide, South Australia. ISSN: 1839-2725

#### Investigating the drivers and control of filamentous algae and restoration of aquatic plants in the C

- Asanopoulos C and Waycott M (2020) The growth of aquatic macrophytes (Ruppia tuberosa sp filamentous algal community in the southern Coorong. Goyder Institute for Water Research Technical Report Series No. 22/13, Adelaide, South Australia. ISSN: 1839-2725
- Jamieson T, Chitsaz M, Waycott M, and Leterme SC (2022) Microbial community composition o seasonal variation and sediment water column aquatic macrophytes and filamentous algae as for Water Research Technical Report Series No. 22/13, Adelaide, South Australia. ISSN: 1839-2725
- Lewis R, Waycott M, O'Loughlin EJ, Urgl C, van Dijk KJ, Calladine A and Nicol J (2022) Distribu aquatic macrophyte community and filamentous algae in the southern Coorong. Goyder Institute for Water Research Technical Report Series No. 22/09, Adelaide, South Australia. ISSN: 1839-2725
- Waycott M and Lewis R (2022) A restoration strategy for the Ruppia Community of the southern Coorong. Goyder Institute for Water Research Technical Report Series No. 22/19, Adelaide, South Australia. ISSN: 1839-2725

### Restoring a functioning Coorong food web

- A synthesis of current knowledge of the food web and food resources for waterbird and fish populations in the Coorong
- The current state of food resources supporting waterbird and fish populations in the Coorong
- Primary food resources for key waterbirds and benthic fish in the Coorong
- Food resource availability, energy content and nutritional value of major food sources for key fish and waterbird species under varying environmental conditions in the Coorong
- Ecosystem models to inform the development of strategies to restore a functioning South Lagoon food web in the Coorong

### Maintaining viable waterbird populations

- Review of the ecology, status and modelling of waterbird populations of the Coorong South Lagoon
- Assessment of Tolderol Game Reserve in autumn 2019 to support key species of Coorong waterbirds

lial assessment of the potential for wetlands in the South East and Lower Lakes regions of Australia to support key species of Coorong waterbirds  
 nse models for key waterbird species of the Coorong  
 mended habitat quality measures for key waterbird species in the Coorong  
 sing waterbird habitat quality in the Coorong  
 nse models for waterbird species of the south-east of South Australia  
 l and temporal habitat use by key waterbird species in the Coorong

### Integration

ary of Coorong hydrological, biogeochemical and ecological models  
 ation of the Coorong Dynamics Model  
 ng decision-making framework supporting ecosystem based management  
 y Coorong, Healthy Basin Scientific Trials and Investigations data management framework

### Restoring a functioning Coorong food web

- Dittmann S, Ye Q, Furst D, Newbery A, Nitschke J, Bucater L, Pyke W, Kent J, Schroder L, Henkens J, Baring R, Lam-Gordillo O, Brookes J, Short D (2022) Food resource availability, energy content and nutritional value of major food sources for key fish and waterbird species under varying environmental conditions in the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/12, Adelaide, South Australia. ISSN: 1839-2725
- Giatas G, Catalano S, Dittmann S, Ye Q, Jackson M, Mott R and Markos K (2022) Primary food resources for key waterbirds and benthic fish in the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/02, Adelaide, South Australia. ISSN: 1839-2725
- Goldsworthy S, Baring R, Giatas G, Nitschke J, Bucater L, Ye Q (2022) Ecosystem models to inform the development of strategies to restore a functioning South Lagoon food web in the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/11, Adelaide, South Australia. ISSN: 1839-2725
- Ye, Q., Giatas, G., Dittmann, S., Baring, R., Bucater, L., Deane, D., Furst, D., Brookes, J., Rogers, D. and Goldsworthy, S. (2020) A synthesis of current knowledge of the food web and food resources for waterbird and fish populations in the Coorong. Goyder Institute for Water Research Technical Report Series No. 20/11, Adelaide, South Australia. ISSN: 1839-2725

### Maintaining viable waterbird populations

- Jackson MV, Mott R, Prowse TAA, Delean S, Shu Y, Liu L, Hunt BJ, Sanchez-Gomez S, Brookes J, Cassey P (2022) Recommended habitat quality measures for key waterbird species in the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/05
- Mott R, Jackson M, Sanchez-Gomez S, Hunt B, Prowse T, Gopalakrishnan A, Delean S, Brookes J & Cassey P (2022) Spatial and temporal habitat use by key waterbird species in the Coorong. Goyder Institute for Water Research Technical Report Series No. 21/10, Adelaide, South Australia. ISSN: 1839-2725
- Prowse TAA (2020) Review of the ecology, status and modelling of waterbird populations of the Coorong South Lagoon. Goyder Institute for Water Research Technical Report Series No. 20/12, Adelaide, South Australia. ISSN: 1839-2725
- Prowse TAA, Delean S, Mott R, Jackson M, Hunt BJ, Brookes J and Cassey P (2022) Response models for key waterbird species of the Coorong. Goyder Institute for Water Research Technical Report Series No. 22/04, Adelaide, South Australia. ISSN: 1839-2725
- Sánchez-Gómez S, Prowse TAA, Kumar P, Delean S, Moot R, Jackson M, Brookes J and Cassey P (2022) Response models for waterbird species of the south-east of South Australia. Goyder Institute for Water Research Technical Report Series No. 22/08, Adelaide, South Australia. ISSN: 1839-2725



<https://www.environment.sa.gov.au/topics/coorong/publications>  
<http://www.goyderinstitute.org/publications/recent-publications/>



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# HCHB - First Nations Research & Partnerships

## Ngarrindjeri

### Ngarrindjeri vision:

Our Lands, Our Waters, Our People, All Living Things are connected. We implore people to respect our Ruwe (Country) as it was created in the Kaldowinyeri (the Creation). We long for sparkling, clean waters, healthy land and people and all living things. We long for the Yarlular- Ruwe (Sea Country) of our ancestors. Our vision is all people Caring, Sharing, Knowing and Respecting the lands, the waters and all living things.

### Ngarrindjeri goals:

- For our people, children and descendants to be healthy and to enjoy our healthy lands and waters. To see our lands and waters healthy and spiritually alive.
- For all our people to benefit from our equity in our lands and waters.
- To see our closest friends - our Ngartjis (special animals) - healthy and spiritually alive. For our people to continue to occupy and benefit from our lands and waters.
- To see all people respecting our laws and living in harmony with our lands and waters (Ngarrindjeri Nation Yarlular Ruwe Plan 2006).

### Ruwe

Ngarrindjeri speak for, care for and exercise cultural responsibility for Ruwe/Ruwar

### Tapatauwi

Ngarrindjeri cultural values are protected and enhanced in planning and implementation of management actions.

Water is available to support Ngarrindjeri culture and wellbeing

### Ngartjis

Provide a habitat for our Ngartjis to be healthy and spiritually alive

## First Nations of the South East

### First Nations of the South East vision:

In the spirit of our ancestors, with the wisdom of our Elders and the future of our children, the centerpiece of our Reconciliation vision is for the preservation of Country and effective management of our natural resources through the sharing of culture, knowledge and a willingness to achieve our goal. South East Aboriginal people will maintain and respect the natural resources of Mother Earth and surrounding waters to establish sustainable resources for everyone.

### First Nations of the South East goals:

- Cultural connection for First Nations people to improve knowledge and cultural identity
- Culturally safe and appropriate programs for First Nations people to nurture and support their families and community, and to improve educational outcomes.
- Demonstrate effective leadership in the community and to foster unity and empowerment within the community.
- Maintain culture and language; support healing and protect heritage.



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# HCHB – Regional Bird Refugia Project

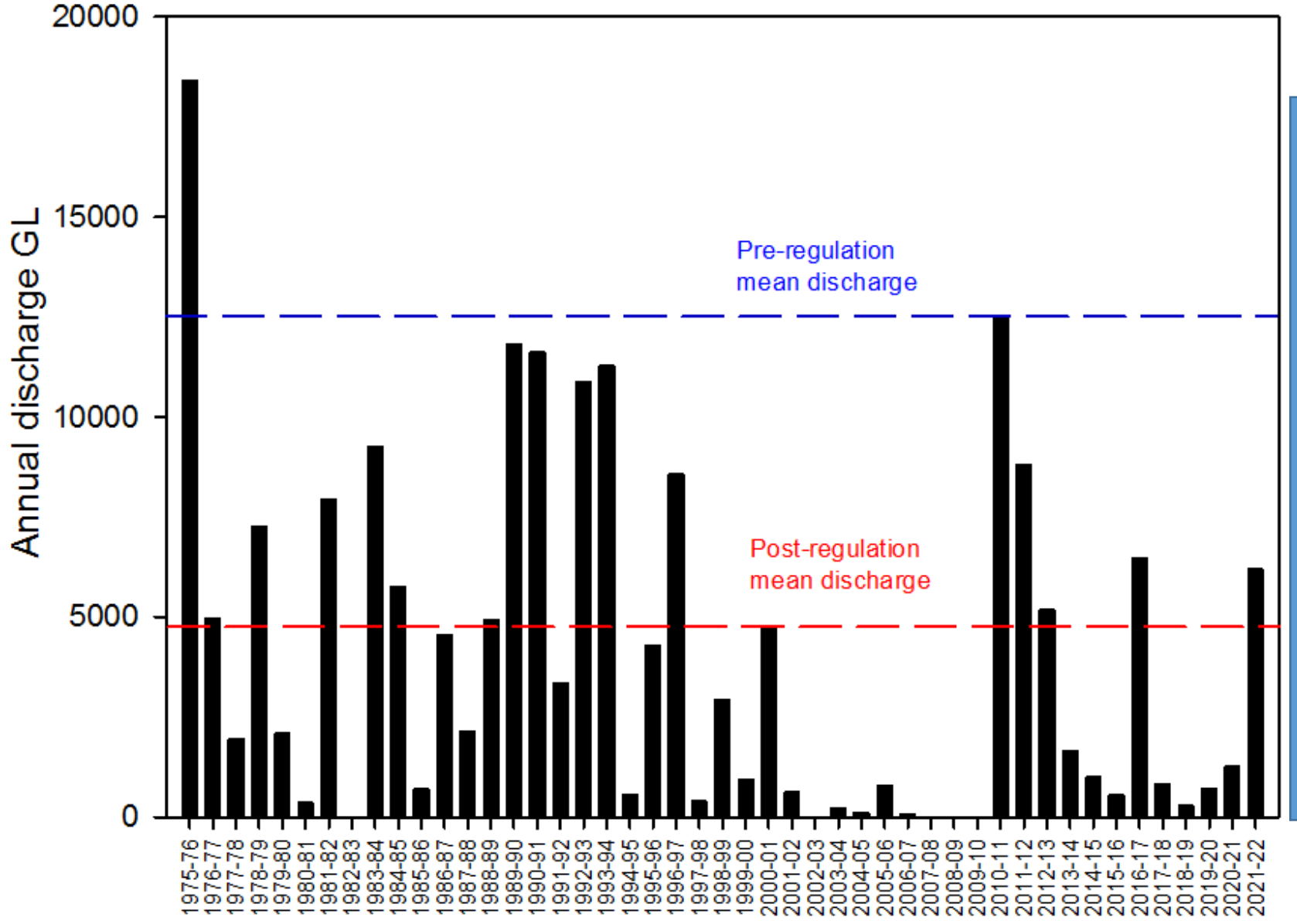
“Undertake works that support critical environmental components and processes of the Coorong, focussing on improving habitat for migratory and resident shorebirds”

Site	Manageable wetland extent
Tolderol	163 ha
Teringie	40 ha
Lake Hawdon North	1,763 ha





# 2022/23 Flood response





Lake Alexandrina, Albert and Nth Coorong January 2023 (sentinel imagery)

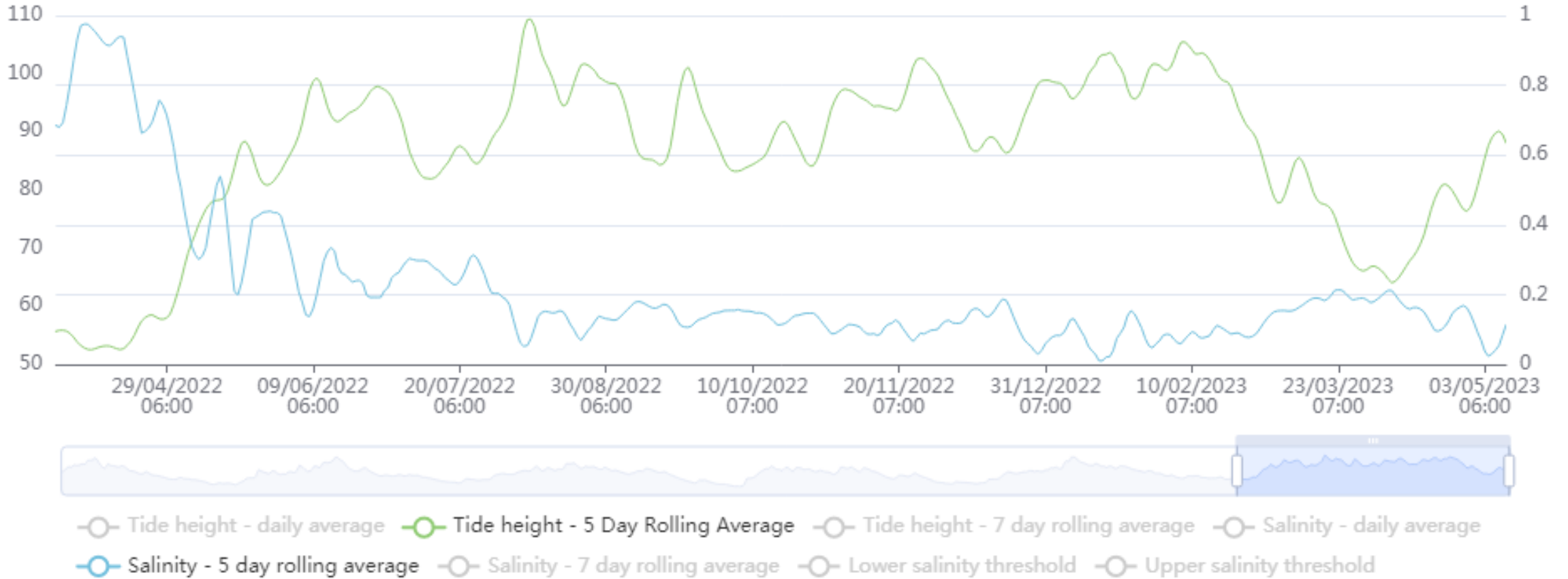
# Murray Mouth



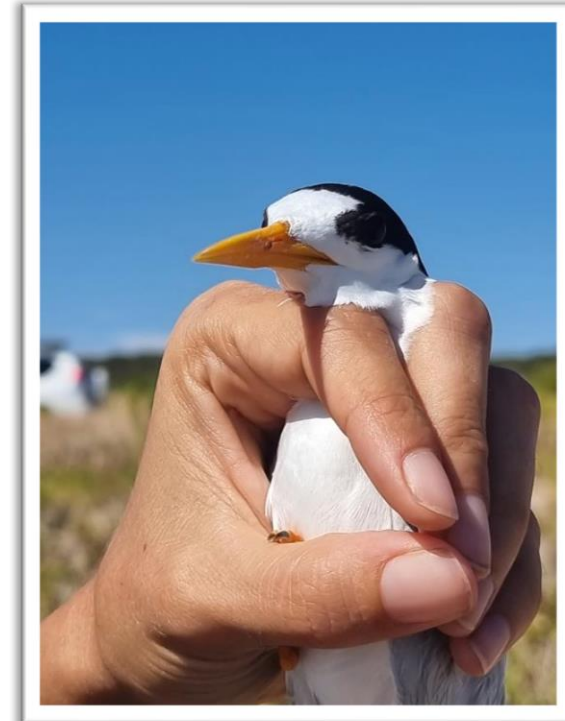
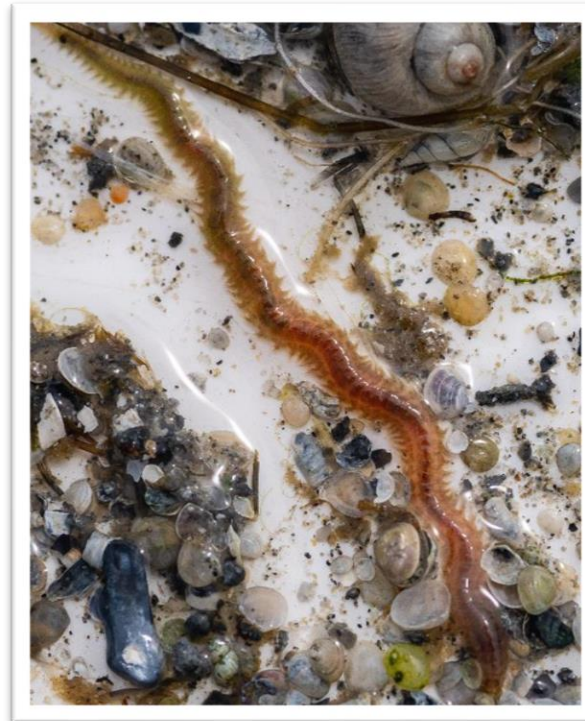
Photo: Geoff Gallasch

# Coorong

## South Lagoon daily average salinity & water level



# Coorong ecological response



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# Where do we want to go to?



## Current State

(last 5-8 years)

- Hyper-eutrophic (nutrient enriched)
- Low connectivity & flushing
- Extended hypersalinity
- Poor habitat quality
  - MBOs, algae, declining populations
- Recent flood: significant flows and short-term positive responses



## Desired State

- Improved connectivity & flushing
- Mesotrophic (moderate nutrients)
- Variable salinity: range of lower maximums
- Habitat quality improved
  - Improved water+sediment=resilient foodwebs
- Increased ability to connect with country, share knowledge and care for *Ngartjis* and *Buartes*



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# Southern Ocean connector



## Circulation

Pump in at one location and out at another, with lower visual impact discharge

Provides the best ecological outcomes for the Coorong South Lagoon

## Bidirectional

Pump in or out at one location, with separate pumping stations

Provide the 'next best' ecological outcome for the Coorong South Lagoon

## Pump Out

Lower visual impact discharge, with dredging

Included in the event that further investigations of the other options prove prohibitive

Proposed infrastructure location

These options will be considered and investigated by the project with and without dredging as a complementary action

# Coorong Restoration Roadmap

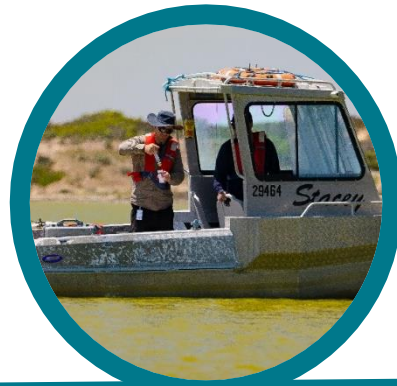
Sets out the overarching principles to restore the Coorong through:



**Restoration  
Actions**



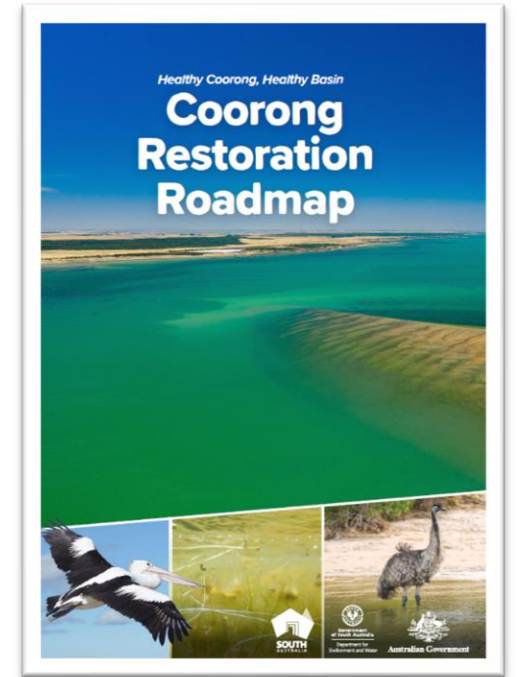
**Engagement**



**Monitoring and  
Evaluation**



**Ongoing adaptive  
management**



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