

# PROJECT COORONG

# Healthy Coorong, Healthy Basin



## Healthy Coorong, Healthy Basin Update

Welcome to the November 2021 edition of the *Healthy Coorong, Healthy Basin* (HCHB) Update. In this edition we focus on the scientific Trials and Investigations project's significant progress towards filling critical knowledge gaps across the nutrient dynamics, aquatic plants and algae research components. We also look at the Coorong Infrastructure Investigation Project's ecological investigations and the concepts proceeding to infrastructure design.

If you would like more information on the HCHB Program or have questions on anything contained in this update please contact the program team at [projectcoorong@sa.gov.au](mailto:projectcoorong@sa.gov.au).

*The Coorong, connected waters and surrounding lands have sustained many unique First Nations cultures and economies since time immemorial. The Healthy Coorong, Healthy Basin program acknowledges the range of First Nations rights, interests and obligations for the Coorong and connected waterways and the cultural connections that exist between Ngarrindjeri and First Nations of the South East peoples across the region and seeks to support their equitable engagement.*

*Aboriginal and Torres Strait Islander readers are advised that the following document may contain images and names of people who have died.*



## **Trials and Investigations: In Focus**

**The HCHB [Trials and Investigations](#) (T&I) project is making significant progress towards filling critical knowledge gaps and building the scientific evidence-base needed to improve the long-term health of the Coorong.**



*Associate Professor Luke Mosley with members of the T&I nutrient dynamics team Photo: T&I Nutrient dynamics team*

More than 60 researchers from CSIRO, Flinders University, the University of Adelaide and the University of South Australia are working collaboratively through the [Goyder Institute for Water Research](#). The researchers have been reviewing international literature, conducting field surveys, processing and analysing samples and developing models as part of the T&I project. This scientific research is being used to inform updates to the [State of the Coorong](#) and Ramsar Management Plan for the site, as well as decisions in the HCHB [Coorong Infrastructure Investigations](#) and [On Ground Works](#) projects, and will be published in a series of technical reports in mid-2022. The Goyder Institute is the delivery partner for five of seven research components of the HCHB T&I project, providing independent research to inform future management decisions for the region.

Highlights of the important scientific investigations being undertaken by the T&I [nutrient dynamics](#) and [aquatic plants and algae](#) research teams have recently been shared through the Goyder Institute's eNews. The Institute's researchers are also working on the [food webs](#), [waterbirds](#) and [climate adaptation](#) components of the T&I project and further research highlights will be presented in the Goyder Institute eNews in the coming months.

### **Nutrient dynamics**

**The T&I nutrient dynamics component aims to inform the development of improved ways to reduce nutrient loads (levels) and algae abundance in the Coorong.**

Nutrients are known to be a key driver of aquatic ecosystem health. While nutrients are essential for all living organisms, high nutrient levels can lead to problems such as excessive algal growth, or 'algal blooms'. Ongoing research by the Goyder Institute has identified that this is the case for the Coorong South Lagoon; the knowledge generated through this important research is being used to support decisions for managing nutrient levels and the health of the system.

The research undertaken by Dr Luke Mosley's team over the past year has led to some significant insights into the nutrient dynamics of the Coorong system and especially within the Coorong South Lagoon.

It was previously unknown whether the South Lagoon sediments, particularly in the deeper channels of the lagoon, are acting as nutrient sources or are a repository for nutrients; and what the pathways are for nutrient cycling.

"Our research is showing that the sediment quality and nutrient cycling processes in the South Lagoon are currently in an unhealthy state," said nutrient dynamics research lead, Dr Mosley. "There are approximately 50 times more nutrients in the top 5 cm of sediment compared to the whole water column in the Coorong. This has significant implications for the future management of nutrients to help return the system to an aquatic plant dominated state. Our investigations are showing that improving the flushing of the South Lagoon would help reduce nutrient levels in the water and sediment, and also salinity."

Read the [full Goyder News article about T&I nutrients research](#).

## Aquatic plants and algae

**The T&I aquatic plants and algae component aims to inform the development of improved ways to switch the South Lagoon back to an aquatic plant dominated system rather than an algal dominated system.**

Plants play a critical role in aquatic ecosystems, providing habitat and food that support the diversity and abundance of invertebrates, fish and birds. This is the case for the Coorong, with the presence and location of aquatic plants (seagrasses) and algae affected by the environmental conditions of the water and sediment. The hypersaline and nutrient-enriched conditions, which have persisted in the South Lagoon of the Coorong over the past two decades have led to a change in dominant plant community composition, from submerged aquatic seagrasses to large areas of filamentous and free-living algae, in turn reducing the biodiversity and resilience of this important ecosystem.



*Filamentous algae smothers aquatic plants in the Coorong, inhibiting plant growth and reproduction Photo: Emma O'Loughlin*

The aquatic plants and algae research team, led by Professor Michelle Waycott, is undertaking intensive field work in the Coorong, sampling over 100 different locations in large-scale seasonal surveys to determine the presence and health of the aquatic plant communities and to gain further understanding of the impacts that the algae is having on these plants.

"The good news is that we have found more of the aquatic plant community at these 100 locations than expected," explained Professor Michelle Waycott. "Unfortunately, the condition of these plants is often poor and the growth of the algae, which starts in late spring and continues over summer, really inhibits plant growth and reproduction. The filamentous algae, a symptom of the excess nutrients, is hampering the long-term recovery of the aquatic plant community following large-scale losses from the Coorong during the 2001-2010 period of the Millennium Drought."

"We are working closely with Dr Mosley and his nutrient dynamics team to further understand how improving the presence and condition of the aquatic plants throughout the Coorong South Lagoon can help improve the nutrient conditions of the region" said Professor Waycott.

Read the [full Goyder News article about T&I aquatic plants and algae research](#).

We'll share more updates from T&I researchers in future editions of the HCHB Community Update. You can also sign up to receive the Goyder Institute's monthly newsletter by [subscribing to their eNews](#). Thanks to the Goyder Institute for contributing to this article.

# Coorong Infrastructure Investigations

**Throughout 2021, the Coorong Infrastructure Investigations Project is investigating the feasibility of long-term infrastructure and management options for improving the ecological health of the Coorong.**

The feasibility investigations into each shortlisted option will include but not be limited to:

- ecological benefit - including salinity, water levels and nutrients;
- environmental impact - to the Coorong Lagoons, Youngusband Peninsula and marine environment;
- cultural heritage impacts and opportunities;
- engineering design; and
- likely socio-economic benefits and impacts.

## Ecological Investigations

There is strong interest from the community and stakeholders in understanding the scope of each infrastructure option being investigated.

Throughout the investigations, there has been a focus on understanding the environmental benefits that can be expected from the potential infrastructure options, and then optimising the functional capacity/requirements of the options to maximise the environmental improvement.

Over the past six months, preliminary hydrodynamic, biogeochemical and habitat suitability modelling provided an indication of the ecological outcomes that might be expected from infrastructure options over a one to three-year time frame. This work was presented at our July 2021 community consultations.

We are now focusing on how to potentially configure the options and their operational regimes to progress the Coorong system towards its [desired state](#).

Hydrodynamic modelling is being extended to a 30-year timeframe. Biogeochemical and habitat modelling is being extended over a six-year timeframe, given a number of technical limitations.

Recent findings from the HCHB Trials and Investigations project, regarding water quality and nutrients dynamics, have been incorporated into the biogeochemical and habitat modelling to take full advantage of the latest science available and improve model accuracy.

The investigations will come together into a semi-quantitative evaluation of changes in ecological benefit/risk within the Coorong (including salinity, water level and nutrients), with infrastructure options compared to a “no infrastructure intervention” scenario.

## Dredging options

The scope of dredging as a stand-alone infrastructure option has now been refined. Investigations into targeted dredging of restrictions near Pelican Point in the North Lagoon indicated any benefit on water level and salinity would be limited. The dredging option is therefore now only considering the narrows from The Needles down through Parnka Point.

Further to this, the ecological investigations have indicated that dredging on its own is unlikely to be viable and should only be considered in combination with another option. For this reason dredging has been removed as a stand-alone option and is now only being considered in combination with other options.

## Design update

Engineering services provider [KBR](#) is working on a range of concept designs with draft concepts (30% design documentation) expected in November 2021. They have facilitated a range of early engineering investigations including the refinement of a subset of 13 concepts (and combinations of options therein).

The list of concepts currently under feasibility assessment are:

Concept	Description
1	<p><i>Passive Lake Albert Connector via open channel</i></p> <p>Passive connection between Lake Albert and Coorong North Lagoon via an open channel with regulator structure.</p>
2	<p><i>Passive Lake Albert Connector via closed conduit(s)</i></p> <p>Passive connection between Lake Albert and Coorong North Lagoon via one or more closed conduits (pipes) with regulator structure.</p>
3	<p><i>Passive Lake Albert Connector via open channel + Dredge Parnka Point</i></p> <p>Passive connection between Lake Albert and Coorong North Lagoon via an open channel with regulator structure and fishway.</p> <p>Dredging 18.5 km long and to -1.2 mAHD centred around Parnka Point (dredge profile and volume of dredgeate to be refined during concept design).</p>
4	<p><i>Passive Lake Albert Connector via closed conduit(s) + Dredge Parnka Point</i></p> <p>Passive connection between Lake Albert and Coorong North Lagoon via one or more closed conduits (pipes) with regulator structure.</p> <p>Dredging 18.5 km long and to -1.2 mAHD centred around Parnka Point (dredge profile and volume of dredgeate for disposal to be refined during concept design).</p>
5	<p><i>Intermittent pumped Southern Ocean connection out of CSL - near shore discharge structure</i></p> <p>Pumped connection out of Coorong South Lagoon via pumps on a lagoon pontoon structure adjacent Younghusband Peninsula to a near shore discharge structure (within Southern Ocean being an overwater jet on a skeletal jetty).</p>
6	<p><i>Intermittent pumped Southern Ocean connection out of CSL - low visual impact discharge structure</i></p> <p>Pumped connection out of Coorong South Lagoon via pumps on a lagoon pontoon structure adjacent Younghusband Peninsula to a low visual impact beach discharge structure (likely within the coastal tidal zone).</p>
7	<p><i>Constant pumped Southern Ocean connection out of CSL - near shore discharge structure + Dredge Parnka Point</i></p> <p>Pumped connection out of Coorong South Lagoon via pumps on a lagoon pontoon structure adjacent Younghusband Peninsula to a near shore discharge structure (within Southern Ocean).</p>
8	<p><i>Constant pumped Southern Ocean connection out of CSL (low visual impact discharge structure) + Dredge Parnka Point</i></p> <p>Pumped connection out of Coorong South Lagoon via pumps on a lagoon pontoon structure adjacent Younghusband Peninsula to a beach discharge structure (likely within coastal tidal zone).</p>
9	<p><i>Bi-directional pumped Southern Ocean connection – one location, separate pumping stations</i></p> <p>Bi-directional pumped connection into and out of Coorong South Lagoon via jetty mounted pumps on an extended jetty in the Southern Ocean and pumps on a lagoon pontoon structure in Coorong South Lagoon. Pumping can only occur in one direction at any one time.</p>

10	<p><i>Bi-directional pumped Southern Ocean connection – one location, one common pumping station, near shore discharge / intake protected by breakwater</i></p> <p>Bi-directional pumped connection into and out of Coorong South Lagoon via a common dry well pumping station positioned within the Younghusband Peninsula with reversible flow pipes and a single set of pumps. Pumping can only occur in one direction at any one time. Nearshore protected coastal discharge / intake provided by a breakwater.</p>
11	<p><i>Bi-directional pumped Southern Ocean connection – two locations, separate pumping stations, pump in location with breakwater. Pump out via overwater jet as per Option 3A</i></p> <p>Bi-directional pumped connection into and out of Coorong South Lagoon via jetty mounted pumps protected by a nearshore breakwater in the Southern Ocean and pumps on a pontoon structure in Coorong South Lagoon with infrastructure positioned at two spatially separate locations allowing circulation of flows within Coorong South Lagoon (e.g. pumping in at Round Island and pumping out at Policeman Point, final locations TBC). Pumping can occur concurrently through each pumping station. Pump out configuration assumed to be identical to option 5 (near shore discharge structure being an overwater jet on a skeletal jetty).</p>
12	<p><i>Bi-directional pumped Southern Ocean connection – two locations, separate pumping stations, pump in location with breakwater: Pump out via low visual impact beach structure as per Option 3B</i></p> <p>Bi-directional pumped connection into and out of Coorong South Lagoon via jetty mounted pumps protected by a nearshore breakwater in the Southern Ocean and pumps on a pontoon structure in Coorong South Lagoon with infrastructure positioned at two separate locations allowing circulation of flows within Coorong South Lagoon (e.g. pumping in at Round Island and pumping out at Policeman Point, final locations TBC). Pumping can occur concurrently through each pumping station. Pump out via low visual impact beach structure as per Option 6.</p>
13	<p><i>Bi-directional Southern Ocean passive piped connection into and out of Coorong South Lagoon, ocean pipework with breakwater</i></p> <p>Bi-directional passive piped connection with flow driven by differing water levels between Coorong South Lagoon and Southern Ocean to a nearshore ocean location. Nearshore protected discharge / intake provided by a breakwater.</p>

## Socio-economic assessment

Binder Dijker Otte has been engaged to provide a preliminary socio-economic assessment of the infrastructure options. This work will help the Coorong Partnership provide a preliminary evaluation of potential socio-economic impacts and/or benefits to inform the draft feasibility assessment.

## Next Steps

Previous updates indicated our intention to engage the community in November 2021 on the draft engineering concepts outlined in the table above. Given the complexity of the investigations, it has taken longer than expected to finalise some of this work. We have therefore made the tough decision to cancel these November sessions and focus on ensuring that the full public consultation on the draft feasibility assessment can be fully informed by revised ecological investigations, engineering concept designs and full life cycle cost estimates. We are entering an important phase of the investigations, where we will be synthesising and evaluating all the findings against specific criteria into a draft prioritisation. This evaluation will form the basis of a draft Feasibility Assessment Report, which will include draft recommendations and be released to the public for consultation in early 2022.

For further information on the CIIP please visit the [Project Coorong website](#).

# Limestone Coast community updated on feasibility investigations for Lake Hawdon North

The Limestone Coast community has attended several meetings and site visits to learn about potential infrastructure and management options to enhance migratory bird habitat at Lake Hawdon North – being investigated under the [On-Ground Works project](#).

Located 90 kilometres from the Coorong South Lagoon, Lake Hawdon North is one of the largest wetlands in the region and is home to many important plant and bird species.

While it is vital that the Coorong continues to provide habitat and food resources for these species, restoration options for alternative habitat in surrounding areas also needs to be considered.



*Mark de Jong (Drainage Operations- South East) explains and demonstrates operation of the Blackford Diversion Weir to key Lake Hawdon North stakeholders.*

Investigations to assess the feasibility of on-ground works to improve the availability and quality of habitat for migratory shorebirds are nearing completion. Currently, the lake is drying much earlier than would have been the case prior to drainage works which date back to 1915. The project is investigating proposals to extend the period of shallow inundation of Lake Hawdon North through to early autumn.

Key engagement activities include:

- A introductory meeting for landholders surrounding Lake Hawdon North. Additional 1:1 meetings with landholders.
- A stakeholder workshop to provide further information on the investigations and design. This also included a visit to the Blackford Diversion Regulator. A similar structure is proposed for the Drain L outlet on Lake Hawdon North. South Eastern Water Conservation Drainage Board staff were on hand to demonstrate how quickly the structure could be mobilised to manage flows.
- A presentation to the South East Aboriginal Focus Group and visit to the site of the proposed regulator.
- A community meeting which was to be held in Robe on 7 October 2021 became an online event due to COVID-19 restrictions in three key Lower Limestone Coast local government areas. This meeting was a general community introduction to the project but also provided detail on hydrological investigations for Lake Hawdon North and the Robe Lakes, which receive water through Drain L downstream of Lake Hawdon North. Engineering design for project infrastructure was also detailed.



*The Blackford Diversion weir, part of the South East Flows Restoration Project infrastructure is similar in design and scale to what is proposed for Lake Hawdon North (Drain L).*

It's important to note that at this stage this is only an investigation into infrastructure options at Lake Hawdon North and they are not guaranteed to be implemented. Implementation will depend on further community engagement and then would still be subject to funding being secured.

Next steps will be the development of an Implementation Proposal by early 2022. Should this receive Commonwealth approval construction could begin from late 2022 to mid-2023.



*Australian Mudfish sampled by Aquasave/NGT.  
Note fish are identified, counted, measured and released.*

## Exciting finds of the fish kind at Lake Hawdon North

Baseline ecological monitoring undertaken at the Lake Hawdon system (Lake Hawdon South and Lake Hawdon North) as part of the HCHB [On-Ground Works project](#), has recorded some exciting finds through October 2021.

Spring fish surveys sampled a total of 920 fish across seven species, all of which were native. Even more exciting is that Australian Mudfish (*Neochanna cleaveri*) were found in Lake Hawdon North for the first time and at each of the five sites sampled. Better still, this was the dominant species, accounting for more than half the catch.

Records of this species are limited, with the first record of Australian Mudfish collected in 1974 at Bool Lagoon in the state's South East. Incorrectly labelled as a Mountain Galaxias (*Galaxias*

*olidus*) it wasn't correctly identified until decades later. One juvenile located near Beachport in the Sutherland Drain in 2008 and the chance discovery of a single dead Australian Mudfish floating in Lake Hawdon South in 2009 were the only other known records for South Australia. Further surveys in 2010 confirmed that Lake Hawdon South was a stronghold for this species.

This species, along with a number of others recorded (Congolli, Common Galaxias and Shortfinned eel) are diadromous, requiring connectivity between ocean and freshwater ecosystems to complete their lifecycle. This emphasises the importance of hydrological connectivity across the catchment. These exciting results will provide vital information for the management of the Lake Hawdon system, in particular, the potential restoration of Lake Hawdon North into the future.

## Coorong Partnership Communique

The fourteenth meeting of the Coorong Partnership was held on 14 October 2021 at the International Visualisation Centre in Adelaide.

The Department for Environment and Water provided an update on the HCHB program with a focus on the Coorong Infrastructure Investigations project, covering Concept Design Presentation, Multi-Criteria Analysis Process and Introduction to Socio-Economic Assessment.

The Communique from this meeting and all other past Coorong Partnership meetings are available on the [Project Coorong Website](#).

If you have any questions on this update, or would like to request a presentation on the project to your stakeholder group, or anything else related to Project Coorong, please contact the project team at [projectcoorong@sa.gov.au](mailto:projectcoorong@sa.gov.au).

*The South Australian Government's Healthy Coorong, Healthy Basin Program is jointly funded by the Australian and South Australian governments.*

