Coorong Summit

Summary Report
5 June 2018

Government of South Australia
Department for Environment and Water

1 Introduction

The Coorong is an internationally important wetland with a complex ecology and hydrology. The Coorong South Lagoon (CSL) in particular is in a highly degraded state. The Coorong Summit provides an opportunity to collectively evaluate the site's management and develop a new approach for the future.

The Coorong is an important ecological site recognised by its Ramsar listing as a wetland of international significance. It is also an important icon site under The Murray-Darling Basin's – The Living Murray Program. The CSL has suffered extensive degradation from a legacy of reduced River Murray flows and impacts from the Millennium Drought.

With the recovery of environmental water under the Basin Plan and the imminent completion of the South East Flows Restoration (SEFR) Project, an opportunity exists to review and change how the CSL is managed. Consequently there is a need to discuss its management, its current condition and local site drivers. There also needs to be a discussion on what a healthy and productive CSL looks like and how this state can be achieved.

The Department for Environment and Water (DEW) organised a Summit on the 5th of June to bring together key stakeholders with an interest in the Coorong including local council, local residents/industries, State Government agency staff and scientific researchers. Over 70 individuals attended the Summit, and their names are listed in Appendix B.

2 Purpose

The purpose of the Summit was to consolidate our current understanding of the site and the key processes driving its condition. This includes investigating the current drivers for water quality including nutrification, hyper-salinity and the processes driving the ecological condition of iconic species; such as *Ruppia*, benthic macroinvertebrates and migratory bird species.

The Summit is also an opportunity to scope a vision for the site's potential future. This is necessary to help develop objectives and targets for future management as well as identify challenges to achieving this vision.

The Summit will bring together a broad range of perspectives and interests including from the scientific community, Traditional Owners, the regional CLLMM community and industries. State and Commonwealth Government departments will also be present to listen to the perspectives of Summit attendees.

3 Objectives

1. Develop a common vision for the Coorong
2. Propose actions to achieve the vision.

4 Process

The workshop was attended by over 70 people. They were broken up into ten groups and each group provided advice on a vision for the Coorong, the key steps to achieve these and known knowledge gaps that need to be addressed to improve the health of the Coorong. They were asked to summarise this information and collectively agree to a number of recommendations. The feedback that had consensus is presented below first, followed by a list of all proposed recommendations in Appendix A.

5 A vision for the Southern Lagoon of the Coorong

The participants of the Summit were asked to provide a collective vision for what they want the Coorong to look like, this vision has been collated below:

> *We want the Coorong to return to being a beautiful landscape teeming with abundant and diverse populations of waterbirds, fish and plants. We want the Coorong to support the values of the Traditional Ngarrindjeri Owners and be an icon for South Australia and its visitors through supporting a strong tourism industry. We want management of the Coorong to not be rigid and must allow for variability in environmental and river operations conditions. It must also be managed at an ecosystem scale including the Murray Mouth, Lower Lakes and surrounding wetlands and more broadly and importantly within the Murray Darling Basin.*

6 Recommended actions arising from the Summit

More than four of the ten groups independently suggested the following and all groups agreed that these actions were desirable.

Short term actions

- Promote the value and ownership of the Coorong through extensive consultation and engagement with local and indigenous (Ngarrindjeri) communities
- Undertake investigations and targeted experiments to understand nutrient sources, accumulation in sediments, cycling and options for removing algae from within the Coorong South Lagoon. Importantly as part of this is understanding the impact of water delivery operations on nutrient sources and composition
- Undertake investigations to determine the likely impacts of climate change on the Coorong ecosystem
- Promote the value of the Coorong through community education – it is the 'Kakadu of the South'
- Monitor the impact of management actions including from the South East for key attributes and components of the Coorong
- Undertake trials on the impact of water from the SE Drainage network system into the Coorong to lower salinity to see if this encourages a greater diversity and abundance of native species
- Develop an approach that integrates the management of flows using inflows from the River Murray, South East and Southern Ocean to export nutrients, maintain optimum conditions and assist rehabilitation of the southern Coorong
- Investigate and trial options for alternative refugia habitat to support waterbirds (including migratory waders) in particular and other key biota.

Long term actions

- Develop an adaptive management approach to export nutrients, maintain optimum conditions and rehabilitate the southern Coorong
- Take a 'whole of ecosystem', not just southern Coorong approach to rehabilitation
- Investigate the feasibility of various infrastructure to manage water levels in the Coorong in line with current and future ecosystem needs that take into account likely changes as a result of climate change
- Fully implement the Basin Plan water savings and remove constraints across the Murray-Darling Basin to allow greater volumes of flows to reach the Coorong
- Implement appropriate management actions in line with recommendations from scientific investigations/trialled experiments.

Key knowledge gaps

- Investigate how to export nutrients and better understand the relationship between nutrient dynamics, salinity and turbidity
- Investigate the likely impacts of climate change and sea-level rise on the Coorong and Murray Mouth
- Understand the ecosystem dynamics/relationships between different biota and environmental processes and how they relate and affect one another.

The following additional suggestions were put forward by one or more groups and considered desirable actions by some of the representatives present.

Short term actions

- Actions to improve habitat:
    - Freshen the Southern Coorong and provide spatial and temporal salinity level variations to maximise the needs of different biota and of their associated habitat
    - Remove accumulated sand at the Murray Mouth through increased dredging
    - Control feral predators in key areas within the Coorong
    - Translocate macrophytes and invertebrates into the southern Coorong
    - Create alternative habitat (refugia) around the Lower Lakes and South East to increase waterbird abundance and maintain diversity; to mitigate against the risk of total ecosystem collapse in the southern Coorong
    - Hydrological optimisation: Improve effectiveness of barrage flows through increased water deliveries resulting in increased water level heights in the South Lagoon, especially to maintain water levels over spring and early summer when *Ruppia* is reproducing
    - Get movement of water into South Lagoon – pulse when hypoxic to shift high nutrient water out and to understand the impacts of this action
    - Remove anoxic, high nutrient, high carbon sediments from the system.
- Actions to improve governance and management:
    - Develop an agreed vision for the Coorong in the short and long-term
    - Adopt the principles of science first and policy second
    - Appoint a Coorong Commissioner (or a person with a single responsibility for protecting the Coorong) to get better coordination
    - Undertake a climate vulnerability assessment for the Coorong
    - Establish a think-tank to explore high risk strategies that might dramatically improve the health of the Coorong
    - Take politicians to Lake Cantarra so they can see what a healthy *Ruppia* population looks like.

Longer term actions

- Improve our understanding of the role and management options for salinity levels in the south lagoon of the Coorong:
    - Investigate the role of the salinity in providing wide variety of habitats within the Coorong system that support the diverse needs of birds, plants, fish and invertebrates
    - Embrace variability and allow the system to have lower and higher salinity levels across years – monitor the result
    - Explore the idea of exporting salt to the ocean
    - Manage nutrients across the Coorong ecosystem so they do not accumulate in one area – look at options for exporting nutrients through potential engineering options.
    - Lower the extreme salinity levels back to hypo-saline conditions
- Have a long term plan for the Ramsar site that accounts for climate change:
    - Revisit the ecological description in the Ramsar listing. Is this what we want in the long term?
    - Explore the idea of turning the Coorong into a Salt Lake in the long term if Basin inflows reduce due to climate change.
- Basin scale reform:
    - Remove constraints in the Southern Connected Basin
    - Rewrite the Water Act.
- Governance reform:
    - Develop objectives and targets
    - Refine governance arrangements: advocate, virtual organisation and improve information exchange.
- Focus on improving aquatic vegetation and invertebrates, which are the food source for fish and birds
- Enhance indigenous values in the Coorong
- Improve socio economic outcomes for local residents and indigenous owners
- Control feral animals
- Invest in long term monitoring
- Have patience and allow the system to re-balance – it has only been eight years since the drought and the system has improved significantly
- Build a system that doesn't kill fish – currently young black bream get trapped in the South Lagoon over summer and die as the salinity increases past their physiological ability to cope
- Allow shorter time scales for manipulating barrages: optimise gate management to simulate more natural conditions, considers all user needs
- Increase Ngarrindjeri involvement in Coorong management.

Key knowledge gaps

- Investigate options for major engineering works and consider:
    - Lake Albert Connector
    - What would the system look like without the barrages: with different River Murray flows, with climate change, for short term drought responses.
- Invest in better understanding the history of the site:
    - Collate indigenous and European history
- Investigate the impact of climate change on the condition of the system and alternative options for maintaining high value bird and fish habitat:
    - Alternative habitat assessment including refugia
- Investigate intervention options
- Economic Impact Study on options for next 30 years – eg give vehicle access on next version of barrages
- How recoverable is the system?
- Survey *Ruppia* and macroalgal distribution.

7 Appendix A. Collation of all discussion points recorded

Vision: A description of what people want to see in the Coorong (duplicate descriptions removed)

Amenity and biodiversity

- The Coorong is a beautiful landscape, teeming with waterbirds (measured in 100,000s) and fish (large enough to support recreational and commercial fishing)
- Traditional owners camp along the southern Coorong, enjoying the plentiful food resources and supporting Ngarrindjeri values (all values, not just cultural)
- The Coorong is a major tourism attraction for South Australia, because of the vast numbers of birds, great camping and fishing
- The water is clear and full of aquatic plants
- The condition is better than the Ramsar baseline
- The system has minimal engineering solutions imposed.

Measures of success

- Increased species diversity
- Migratory birds – gaining weight (present and thriving)
- Reduce the time birds spend foraging due to poor food resources
- Colonial nesting birds – successfully breeding
- Re-establish *Ruppia* community to pre drought conditions
- Healthy populations of southern bell frogs and small bodied native fish
- Increased smallmouth Hardyhead population
- Fish use the southern lagoon as a nursery
- Commercial and non-commercial fish able to use southern lagoon
- Healthy populations of benthic macroinvertebrates:
    - Greater diversity
    - High abundances
- Phased approach:
    - X% increase in fish population by 2030 pre drought conditions
    - Y% increase in migratory birds by 2030 pre drought conditions
    - Z% increase in water quality by 2030.

What needs to happen to achieve the vision?

Improve water management

- More water in the Southern Lagoon and SE Wetlands, and more connectivity between the Coorong and SE Wetlands
- Salinity and water levels vary within and between years
- Maintain an open Murray Mouth
- Allow for more natural variability and fluctuations in water inflows (delivery pattern)
- Increased flow volumes delivered to Lower Lakes and Coorong during Spring and Summer
- Stop upstream irrigation, give the system a rest
- Better management of water out of the barrages to force water down past the Narrows
- Explore a connector from Lake Albert
- Lift constraints to water flow.

Improve water quality

- Salinity and water levels vary within and between years:
    - Variable salinity that supports *Ruppia*, fish and invertebrates = Food for birds
    - Hypersaline environment is a unique habitat for some species – buffer for impacts eg carp virus and black water
    - Think through consequences of 80 ppt to other components
    - Increase salinities in past has not solved problem of algae
    - Allow more flexibility to use SE drainage water in SE wetland and Coorong
    - 60 ppt ≤ (upper limit) – managing salinity via wetlands storage
- Good oxygen saturation in water column all year round:
    - Increase water clarity (no longer yellow colour water) turbidity
    - No algae – reduced nutrient store – shorebird foraging habitat – clear water
- Water quality to consider risk of contaminants (metals) from acid sulfate soils
- Develop habitats for threatened species and frogs in the Lower Lakes.

Major infrastructure

- Explore the concept of a Lake Albert connector to freshen the Coorong.

Social and economic results

- Maximise environmental, economic and cultural benefits
- Recognise people and livelihoods eg tourism/socio economic

- Create industries and jobs around an improved habitat condition (tourism, fishing).

Community education and recruitment

- Whatever it takes to make passing motorists as champions for Coorong (increase bird numbers) visible and rec and com activities also drives this action
- Promote it's value and recognise around all of Australia for migratory birds
- A greater appreciation of the uniqueness of the Coorong nationally and internationally.

Improvements to governance and management

- Informed and on-going adaptive management to achieve agreed goals from local/micro to national/international macro scales
- A Plan for the Coorong should be 5 to 10 years
- Embrace a complex, messy and dynamic system – yet aim to constantly improve our understanding of how it functions through monitoring and research and take an adaptive management approach aligned to specific goals
- A clear and effective adaptive barrage operating strategy that delivery outcomes under a range of water availability scenarios
- Integrated Coorong management – quality/climate (diversity) – water – sediment
- Utilise cultural heritage and knowledge in management
- Establish refuge sites and additional habitat within/adjacent to the site
- Must consider climate change and sea level rise (vision timeframe?).

Knowledge gaps that need to be addressed

- Test methods to re-establish vegetation and invertebrate communities in selected sites
- Will the Basin Plan deliver enough water for the Coorong?
- Assess conditions on seaward side of the Coorong to identify where there may be healthier patches of *Ruppia* and gain an understanding of what is working
- What are the groundwater inputs to Coorong? Providing freshwater refugia? Nutrients?
- Think about hypersaline invertebrates as species that colonise the southern lagoon
- Colonise and established macrophytes again – in higher density – think of habitat in context across peninsula of landscape
- Harvest algae – removal, also remove the sediment
- Could sea water be pumped into the South Lagoon to promote flow into northern lagoon to freshen the system?
- Explore the potential to use inflow water at the mouth coupled with "water pump to enhance sand mobilisation" to get outflows of sand from the mouth rather than dredge

- To have a better knowledge about the past climate conditions

8 Appendix B. List of Coorong Summit invitees

Surname	Given Name	Organisation
Aldridge	Kane	Goyder Institute
Bagley	Chris	CLLMM Community Advisory Panel
Baring	Ryan	Flinders University
Barnett	Liz	Department for Environment and Water
Barrie	Julie	CLLMM Community Advisory Panel
Beal	Andrew	Department for Environment and Water
Brookes	Justin	University of Adelaide
Brown	Richard	Department for Environment and Water
Campbell	Michelle	Commonwealth Environmental Water Office
Carruthers	Sandy	Department for Environment and Water
Chamberlayne	Briony	University of Adelaide
Collins	Tim	Department for Environment and Water
Copus	Andrew	Department for Environment and Water
Dittmann	Sabine	Flinders University
Eaton	Jarrod	Department for Environment and Water
England	Rob	Landowner- South East
Evans	Tia	Department for Agriculture and Water Resources
Fairweather	Peter	Flinders University
Fluin	Jennie	Department for Environment and Water
Fyfe	Garry	SA Water
Gallasch	Geoff	CLLMM Community Advisory Panel
Ganf	George	University of Adelaide
Geddes	Mike	University of Adelaide
Gibbs	Matt	Department for Environment and Water
Harden	Trevor	CLLMM Community Advisory Panel

Surname	Given Name	Organisation
Hartman	Tim	Department for Environment and Water
Harvey	Paul	CLLMM Community Advisory Panel
Haynes	Deb	University of Adelaide
Hedges	Sheryl	Department for Agriculture and Water Resources
Hera-Singh	Garry	CLLMM Community Advisory Panel
Herbert	Tony	Department for Environment and Water
Higham	Jason	Department for Environment and Water
Hill	Heather	Department for Environment and Water
Hipsey	Matt	University of Western Australia
Jaensch	Neville	Coorong District Council
Johnson	Hilary	Commonwealth Environmental Water Office
Kaplan	Josh	Department for Environment and Water
Kneeboone	Jo	Murray Darling Basin Authority
Kumar	Anupama	CSRIO
Leese	Lorraine	CLLMM Community Advisory Panel
Leggett	Bronwyn	Department for Environment and Water
Leng	Vern	Coorong District Council
Love	Candice	Department for Environment and Water
MacGregor	Angus	Department for Environment and Water
Mann	Shen	Murray Darling Association
Mason	Clem	CLLMM Community Advisory Panel
Mason	Kate	Department for Environment and Water
Meehan	Alex	Murray Darling Basin Authority
Mettam	Peter	Department for Environment and Water
Mosley	Luke	University of Adelaide
Muller	Kerri	LLCMM Scientific Advisory Panel
Nicol	Jason	SARDI
O'Connor	Jody	Department for Environment and Water
Oke	Ross	CLLMM Community Advisory Panel
Palmer	David	Environment Protection Authority
Parkes	Keith	CLLMM Community Advisory Panel

Surname	Given Name	Organisation
Pendlebury	Brett	Department for Environment and Water
Quin	Rebecca	Department for Environment and Water
Rumbelow	Adrienne	Department for Environment and Water
Schillabeer	Neil	CLLMM Community Advisory Panel
Shao	Yuexiao	University of Adelaide
Shelton	Mick	SA Water
Shepherd	Ben	Department for Environment and Water
Starick	Sharon	SAMDB NRM board
Sumner	Ken	Ngarrindjeri Regional Authority
Swirepek	Jody	Commonwealth Environmental Water Office
Taylor	Hilton	Commonwealth Environmental Water Office
Taylor	Ben	Glenelg Nature Trust
Thorne	Rachel	Department for Agriculture and Water Resources
Tibby	John	University of Adelaide
Tracey	Steggles,	Department for Environment and Water
Turner	Rebecca	Department for Environment and Water
Waycott	Michelle	University of Adelaide
Wedge	Kirsty	Department for Environment and Water
White	Monique	Murray Darling Basin Authority
Wilkes	Alana	Commonwealth Environmental Water Office
Williams	Mike	Department for Environment and Water
Ye	Qifeng	SARDI
Zampatti	Brenton	SARDI

Government of South Australia
Department for Environment and Water