Murray Darling Association Inc.

admin@mda.asn.au
www.mda.asn.au
T (03) 5480 3805
ABN: 64 636 490 493

463 High Street
P.O. Box 1268
Echuca, Vic 3564

Region 7 Ordinary Meeting No 109
AGENDA

Indigenous Acknowledgement

"The Murray Darling Association acknowledges the traditional owners of this land and the waters on which we meet"

Location: City of Playford Committee Room, 10 Playford Boulevard, Elizabeth

Time / Date: Commencing immediately after the Annual General Meeting, Thursday 16 May 2019

If you are unable to attend the meeting in person you can join by clicking on the following link:
Join Zoom Meeting
https://zoom.us/j/7555472561

Guest Speaker: **Shaun Fielding**
Urban Infrastructure Planner Specialist, City of Playford

Dr Tariq Laattoe BSc (hons) PhD
Hydrogeologist and Groundwater Modeller at Water Tehnology Pty Ltd

Chair: Cr Andrew Tilley, City of Mitcham

Secretary: Jamie Barrett, City of Mitcham

1. WELCOME
Mayor Glenn Docherty, City of Playford

2. ATTENDANCE
2.1 Present:
2.2 Apologies:

Mayor Erin Thompson	City of Onkaparinga
Mr Peter Bice	Director Infrastructure and Operations Adelaide Hills Council

3. CHAIRMAN'S OPENING AND WELCOME TO NEW MEMBERS

4. DECLARATION OF INTERESTS

5. MINUTES

Recommended that the Minutes of Meeting No 108 of Adelaide Metro Region 7 held on Thursday 28 February 2019 be confirmed (**Attachment 5.1**).

6. MURRAY DARLING ASSOCIATION BOARD MINUTES

Minutes of the Ordinary Meeting of the Board Meeting No 384 held on 25 March 2019 can be viewed by clicking on the following link.

Minutes of the Ordinary Meetings of the MDA Board

7. REPORTS

7.1 Chairman's Report
7.2 Chief Executive Officer's Report March (Emma Bradbury) (**Attachment 7.2**)
7.3 Chief Executive Officer's Report April (Emma Bradbury) (**Attachment 7.3**)

8. GUEST SPEAKER

Dr Tariq Laattoe BSc (hons) PhD
Hydrogeologist and Groundwater Modeller at Water Tehnology Pty Ltd

Murray Water Basin Salinity in SA: Past to Present :- A discussion of the origin of the salt, its impacts and how we have managed it.

9. GUEST SPEAKER

Shaun Fielding
Urban Infrastructure Planner Specialist, City of Playford

Demonstration of the latest developments concerning wetlands and greenfields stormwater treatment.

10. CORRESPONDENCE

10.1 Email dated 27 March 2019 – South East Flows Restoration Project – Natural Resources South East (Attachment 10.1)
10.2 Email dated 26 March 2019 – Carp Virus (Attachment 10.2)
10.3 Email dated 4 April 2019 – Murray Darling Association: Basin Communities Leadership Program (Attachment 10.3)
10.4 Email dated 29 March 2019 – MDA's response to Federal Labor's announcement on the Murray Darling Basin Plan (Attachment 10.4)
10.5 Email dated 18 March 2019 – ABC News: Dams are empty and NSW is drowning in dust (Attachment 10.5)
10.6 Email dated 21 April 2019 – Goyder Institute recommends key actions to secure the future of the Coorong's South Lagoon (Attachment 10.6)
10.7 Email dated 3 April 2019 – MDA Media Release – Reaction to Budget 2019 (Attachment 10.7)
10.8 Email dated 21 April 2019 – Coorong Summit Summary Report (Attachment 10.8)
10.9 Email dated 21 April 2019 – Science advice from the Goyder Institute (Attachment 10.9)
10.10 Email dated 6 May 2019 – Water Buybacks: The Sunday Project (Attachment 10.10)

11. GENERAL BUSINESS

11.1 Refresh, Update and Induction for Members of Region 7 Delegates
For your information, below are links to useful reference documents to understand the MDA and role of Region 7:

MDA Induction and Resource Kit
Murray Darling Association Strategic Plan 2016 - 2019
Murray Darling Association Constitution
Murray Darling Association Fact Sheet 2015
Murray Darling Association Regional Leadership FAQs
Murray Darling Association AGM Resolutions 2018

12. NEXT MEETING

The next meeting of the MDA Region 7 will be held on Thursday 22 August 2019 at the City of Campbelltown, commencing at 6.30 pm.

14. CLOSE

The Murray Darling Association acknowledges and thanks the City of Playford for its support in hosting this meeting of Region 7.

Attachment 5.1

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Minutes of Meeting No 108 of Adelaide Metropolitan Region 7
Thursday 28 February 2019
City of Mitcham
131 Belair Road, Torrens Park

1. WELCOME

Mayor Heather Holmes-Ross, City of Mitcham pledged:

We acknowledge that this land we meet on is the traditional land of the Kaurna people. We respect their spiritual relationship with their country.

The Mayor welcomed those present to the City of Mitcham and then introduced the Acting Chair, Cr Andrew Tilley.

2. The Acting Chair welcomed all present and thanked them for their attendance. The Acting Chair gave a brief overview of the purpose of the Murray Darling Association and the Murray-Darling Basing Authority.

The Acting Chair noted the apologies (listed below).

ATTENDANCE

2.1 Present:

Cr Andrew Tilley	Acting Chair, City of Mitcham
Nita Freer-Cooling	Secretary, City of Mitcham
Mayor Heather Holmes-Ross	City of Mitcham
Cr Darren Kruse	City of Mitcham
Mr Matt Pears	CEO, City of Mitcham
Mr Dan Baker	General Manager Engineering and Horticulture City of Mitcham
Ms Emma Bradbury	CEO, Murray Darling Association
Mr Peter Bice	Director Infrastructure and Operations Adelaide Hills Council
Mayor Anne Monceaux	City of Burnside
Cr Therese Bonomi	City of Campbelltown
Cr Sue Irvine	City of Campbelltown
Cr John Kennedy	City of Campbelltown
Cr Johanna McLuskey	City of Campbelltown
Cr Stephen Coppins	City of Playford
Cr Shirley Halls	City of Playford
Cr Peter Jamieson	City of Port Adelaide Enfield
Cr Robin Coleman	City of Tea Tree Gully

Cr Jessica Lintvelt	City of Tea Tree Gully
Mr Mark Konecny	Acting Director Assets and Environment City of Tea Tree Gully
Mr Ray Najar	Individual Member
Mr Bob Newman	Individual Member
Ms Barbara van der Meer	Individual Member
Mrs Pauline Frost	Life Member
Ms Lynda Yates	Former Secretary – MDA Region 7
Mr Peter Shepherd	Former Executive Director, Weathered Howe / Hyder Consulting
Mr Russell King	Guest Speaker, City of Mitcham
Professor Wayne Meyer	Guest Speaker Adjunct Professor of Natural Resource Science, University of Adelaide
Ms Deana Mildren	Guest Speaker Regional Engagement Officer, Lower Murray (SA) Murray-Darling Basin Authority
Ms Monique White	Guest Speaker Assistant Director, Strategic Community Engagement Murray-Darling Basin Authority

2.2 Apologies:

Cr Luci Blackborough	City of Campbelltown
Mr Adrian Skull	CEO, City of Marion
Mayor Erin Thompson	City of Onkaparinga
Mayor Claire Boan	City of Port Adelaide Enfield
Cr Olivia Savvas	City of Tea Tree Gully
Cr Kym McKay	West Torrens City Council
Mayor Elizabeth Fricker	Corporation of the Town of Walkerville
Ms Kiki Magro	CEO, Corporation of the Town of Walkerville

3. HOUSEKEEPING

The Acting Chair run through the housekeeping procedures.

4. CHAIRMAN'S OPENING AND WELCOME TO NEW MEMBERS

The Acting Chair had welcomed members at the beginning of the meeting so took this opportunity to speak briefly about the following meetings:

- MDA Region 9 Annual General Meeting – November 2018 held in Leeton, New South Wales. The Acting Chair said it was interesting to attend and speak with rice and cotton growers, and he encouraged people to attend these meetings if they get an opportunity.
- MDA Meeting– February 2019 in Echuca / Moama, Victoria: a three day meeting of Local Government leaders from across the Murray Darling Basin saw an historic demonstration of unity and commitment to ensuring Local Government is directly involved in the Basin Plan decision that impact our local communities.
- MDA Region 6 Annual General Meeting – February 2019 held in Goolwa, South Australia.

5. DECLARATION OF INTERESTS

There were no Declarations of Interest declared.

6. MINUTES

MOVED Ms Pauline Frost

That the Minutes of Meeting No 107 of Adelaide Metropolitan Region 7 held on Thursday 25 October 2018 be confirmed (**Attachment A**).

SECONDED Ms Lynda Yates CARRIED

7. MURRAY DARLING ASSOCIATION BOARD MINUTES

Minutes of the Ordinary Meeting of the Board Meeting No 383 held on 1 February 2019 were tabled and can be viewed by clicking on the following link.

Minutes of the Ordinary Meetings of the MDA Board

8. REPORTS

Ms Emma Bradbury, CEO, MDA congratulated the Acting Chair, Cr Andrew Tilley, Mayor Heather Holmes-Ross and the City of Mitcham for its active engagement and collaboration, and is looking forward to working with Region 7. Ms Bradbury spoke to the January 2019 report, tabled the report and took questions from the floor (**Attachment B**).

9. SMART WATER DESIGN – capturing our stormwater where it falls

Russell King, Principal Engineer – Stormwater, City of Mitcham

The City of Mitcham has been at the forefront of water sensitive urban design (WSUD) initiatives and implementing schemes to maximise the amount of stormwater that is captured where it falls and infiltrated into our verges, reserves, and roads rather than washing down the drain to the sea.

Mr King went through the development of a number of these schemes, how they work, how much they capture, and how they can be applied anywhere in the State, demonstrated the process and took questions from the floor (**Attachment – Presentation 1**).

10. WATER IN THE MURRAY DARLING BASIN (MDB)

Professor Wayne Meyer, Adjunct Professor of Natural Resource Science, University of Adelaide

Professor Meyer spoke on water in the MDB - its relevance and lessons for water management and conservation in Adelaide; context of water amounts and uses, it variability, a little on changing governance and management in the MDB and what we should know about water in greater Adelaide in relation to its management and conservation. Professor Meyer took questions from the floor (**Attachment – Presentation 2**).

11. MURRAY DARLING BASIN AUTHORITY – ROLES AND RESPONSIBILITIES

Monique White, Assistant Director – Strategic Community Engagement, Murray-Darling Basin Authority

Deana Mildren, Regional Engagement Officer Lower Murray (SA), Murray-Darling Basin Authority

Ms Monique White and Ms Deana Mildren gave an overview of water management and the Murray-Darling Basin - roles and responsibilities - as well as provided an update on the SA Royal Commission's recent findings (**Attachment – Presentation 3**).

The Acting Chair thanked all guest speakers for their time and most informative presentations.

12. MURRAY DARLING BASIN FUNDING SUPPORT MOTION

The Acting Chair encouraged more metropolitan and regional councils to become members of the MDA. He read the Murray Darling Basin Funding Support Motion (**Attachment C**) and advised the motion will be supported by the City of Mitcham Councillors at the Council Meeting to be held on 12 March 2019. The Acting Chair urged individual councils to raise the motion at their council meeting.

13. NOMINATIONS FOR MDA REGION 7 EXECUTIVE

The Acting Chair advised that the next meeting of Region 7 will be an Annual General Meeting (to elect the Executive) followed immediately by an Ordinary Meeting.

As per the Region AGM Guidelines, the Notice of AGM will be distributed no later than 4 April 2019 and will contain all the relevant information for nominating for the position of Chair and Executive Committee Members, such as a Nomination Form and what to include with your nomination.

14. CORRESPONDENCE

- Letter dated 18 February 2019 - Environment and Communications Legislation Committee re Inquiry into the *Water Amendment (Purchase Limit Repeal) Bill 2019* and Debate was tabled (**Attachment D**).
- Letter dated 19 February 2019 to NSW Premier Gladys Berejiklian MP re Land Development South West NSW was tabled (**Attachment E**).

15. GENERAL BUSINESS

15.1 MDA Inter-regional Forum: Connecting Catchments and Communities – Menindee to the Murray Mouth - Renmark, Friday 22 February 2019 (**Attachment F**).
Ms Emma Bradbury spoke to this item in her CEO's report (Item 8.1).

15.2 Schedule of Proposed Meeting Dates for 2019
MOVED Cr John Kennedy

That Region 7's 2019 meetings be held on:

- Thursday 16 May 2019, commencing at 6.30 pm
- Thursday 22 August 2019, commencing at 6.30 pm
- Thursday 21 November 2019, commencing at 6.30 pm

SECONDED Mrs Pauline Frost CARRIED

MOVED Cr Shirley Halls

That the Annual General Meeting and Ordinary Meeting on Thursday 16 May 2019 be held at the City of Playford, commencing at 6.30 pm.

SECONDED Cr Stephen Coppins CARRIED

MOVED Cr John Kennedy

That the meeting on Thursday 22 August 2019 be held at the City of Campbelltown, commencing at 6.30 pm.

SECONDED Cr Therese Bonomi CARRIED

MOVED Cr Peter Jamieson

That the meeting on Thursday 21 November 2019 be held at the City of Port Adelaide Enfield (to be confirmed by Cr Jamieson), commencing at 6.30 pm.

SECONDED Cr Shirley Halls CARRIED

15.3 Refresh, Update and Induction for Members of Region 7 Delegates
For your information, below are links to useful reference documents to understand the MDA and role of Region 7:
MDA Induction and Resource Kit
Murray Darling Association Strategic Plan 2016 - 2019
Murray Darling Association Constitution
Murray Darling Association Fact Sheet 2015
Murray Darling Association Regional Leadership FAQs
Murray Darling Association AGM Resolutions 2018

15.4 The 75th Jubilee National Conference and Annual General Meeting will be held in Toowoomba, Queensland on 22 – 24 October 2019.

16 NEXT MEETING

The next meeting of the MDA Region 7 (Annual General Meeting followed immediately by an Ordinary Meeting) will be held on Thursday 16 May 2019 at the City of Playford, commencing at 6.30 pm.

17. CLOSE

There being no further business the meeting closed at 9.38 pm.

The Murray Darling Association acknowledges and thanks
City of Mitcham for its support in hosting this meeting of Region 7.

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Albury, NSW 2640

Minutes of Meeting No. 107 of Adelaide Metro Region (7)
On Thursday 25th Oct 2018 at the City of Tea Tree Gully
Civic Centre, 571, Montague Rd, Modbury

1. ATTENDANCE

1.1 Present

Cr Lynda Yates	Secretary, Holdfast Bay Council
Cr David Shetliffe	Region 7 Chair, Walkerville Council
Mayor Simon Brewer	Campbelltown Council
Darren Willis (Speaker)	Team Leader, Floodplains and Wetlands, Natural Resources SA, Dept of Environment and Water
Chris Steer	Community Engagement, NRSA, DEW
Thornton Harfield (Speaker)	Director, Assets and Environment, Tea Tree Gully Council
Cr Robin Coleman	Tea Tree Gully Council
Shane Broadbent	Coordinator Engineering Works, Charles Sturt Council
Cr Andrew Tilley	Mitcham Council
Cr Denis Davey	Playford Council
Pauline Frost	Life Member
Gary Goland	
Frank Verrall	

1.2 Apologies

Peter Tsokas	CEO, Unley Council
Mark Dowd	CEO, Onkaparinga Council
Adrian Skull	CEO, Marion Council
Mayor Kevin Knight	Tea Tree Gully Council
Mayor Lorraine Rosenberg	Onkaparinga Council
Cr Peter Hughes, Acting Mayor	Unley Council
Cr Karen Hockley	Mitcham Council
Cr John Kennedy	Campbelltown Council
Cr Garth Palmer	West Torrens Council
Cr Arthur Mangos	West Torrens Council
Cr Kristina Barnett	Prospect Council
Cr Peter Jamieson	Pt Adelaide Enfield Council
Stephen Smith	LGA
Ray Najar	

2. WELCOME

2.1 Cr David Shetliffe welcomed those attending.

2.2 Cr Robin Coleman thanked David for the marvelous job he has done as Chair and welcomed MDA attendees to Tea Tree Gully.

3. DECLARATION OF INTERESTS None

4. MINUTES OF THE PREVIOUS MEETING

The 106th meeting of the region was held on 23/08/18 at Playford Council.

Motion: That the minutes of the last Adelaide Metro meeting be accepted.
Moved Cr Denis Davey, Seconded Cr Andrew Tilley – Carried

5. PRESENTATIONS

5.1 Murray Darling Basin: Managing Wetlands in a Complex Environment – Darren Willis

The first presentation is provided as an email attachment.

5.2 City of Tea Tree Gully: Street Sweeping and Stormwater Management – Thornton Harfield

Thornton gave a brief outline of how TTG has improved the productivity of street sweeping and stormwater management. Street sweeping is important as it is the first line of defense in reducing pollution of the rain that ends up as stormwater. Originally streets were systematically swept according to an overall plan but that resulted in some areas being over-serviced and others under-serviced. Now staff are provided with data and take responsibility for planning where they will sweep. This has resulted in significant savings for Council and an overall better appearance of TTG's streets.

6 REPORTS

6.1 Report from Region Chair

Motion: That the Chair's report be noted.
Moved Pauline Frost, Seconded Gary Goland - Carried

7 GENERAL BUSINESS

7.1 Annual Conference and AGM

David said the conference had very good speakers and was worthwhile. The Slido app was used to improve audience participation and worked very successfully for asking questions and for getting information. The next conference will be in Toowoomba.

Motion: That the AGM report be noted.
Moved Cr Denis Davey, Seconded Pauline Frost - Carried

7.2 Adelaide Metro AGM

It was decided to ask Emma Bradbury to contact our region's councils to check whether MDA delegates will all be chosen in time for a provisional AGM date of Dec 13th and to hold this meeting at the LGA Adelaide office if possible.

Cr Andrew Tilley is interested in being the new Chair, but we must wait to see if he is re-elected. The Chair's council must also be ready to support him in this role. He will have a seat on the MDA Board. Meetings are mostly held via Zero, a Skype-like app, but there are 2 face-to-face meetings a year, although one of those is held at the Conference, so there is only one meeting to travel to. The Chair may also require other assistance from his Council.

7.3 Other Business

None

8. SCHEDULE OF MEETINGS FOR 2019

4th Thursday in the month – 28 February, 23 May, 22 August, 28 November are provisional dates.

9. CLOSE 9.30pm

Secretary Lynda Yates lyates@holdfast.sa.gov.au ; Mob 0417 484 717

The Murray Darling Association acknowledges and thanks
Tea Tree Gully Council *for arranging and hosting this meeting of Region 7.*

Chief Executive Officer's Report

March 2019

Emma Bradbury
ceo@mda.asn.au

1. Appointments

Date	Event/meeting	Location
01/02/2019	Presentation RAMJO GM's meeting	Moama, NSW
01/02/2019	Board Meeting 383	Moama, NSW
01/02/2019	Strategic Planning Workshop (1-3 Feb)	Moama, NSW
08/02/2019	EMFM Radio – monthly program	Moama, NSW
13/02/2019	Address National Irrigators Council dinner	Swan Hill, Vic
15/02/2019	Region 6 AGM -Goolwa	Zoom
15/02/2019	DoI Water/MDA/LGNSW Re: engagement local gov't – Sydney	Zoom
19/02/2019	Introduction to the Rice Industry – leadership address	Deniliquin, NSW
19/02/2019	Planning Committee Meeting Nat Con - Toowoomba	Zoom
22/02/2019	Connecting Catchments and Communities	Renmark, SA
28/02/2019	Region 7 Ordinary Meeting – Adelaide	Zoom
04/03/2019	MDBA – Finalise draft MOU – Canberra	Zoom
06/03/2019	Buloke Shire Council presentation	Sea Lake, Vic
08/03/2019	EMFM Radio – monthly Program	Echuca, Vic
12/03/2019	Region 11 ordinary meeting – Tenterfield	Zoom
13/03/2019	NRAR Board Meeting – guest: Sydney	Zoom
15/03/2019	Darling Downs and SW Qld Council of Mayors	Dalby, Qld
18/03/2019	River Connections Grant Application consortium meeting	Zoom

2. Engagements

2.1 RAMJO GM's Meeting

Presentation to RAMJO GM's meeting to provide an update on MDA projects and priorities. Welcome new CEO Bridgett Leopold, Executive Officer who replaces Ray Stubbs, Acting EO.

2.2 Strategic Planning Workshop

More than 55 community leaders from 28 councils across all four states, of the Murray Darling Basin met for the 5th annual Murray Darling Association Strategic Planning workshop.
The three-day event saw a gathering of mayors, councillors and senior executives of councils from all 12 MDA regions.

Preliminary notes are attached, with a draft strategic plan to be circulated in advance of the Board Meeting 385.

2.3 National Irrigators Council Dinner – Swan Hill

2.4 DoI Water/MDA/LGNSW Re: engagement local gov't

Meeting with DOI Water and LGNSW on progressing a project in relation to developing a community consultation standard. DoI to present a proposal – but now in caretaker. Discussions will resume post election.

2.5 Introduction to the Rice Industry – Leadership address

Excellent opportunity.

2.6 Connecting Catchments and Communities

Connecting Catchments and Communities – MDA inter-regional workshops
MDA Regions 4-5 held a very successful workshop/forum in Renmark on the 22nd February 2019, with the purpose to facilitate further education and information on the topic of river health and connectivity from Menindee to the Coorong.
Identified as the first in an ongoing series of events that the MDA will run titled ***Connecting Catchments and Communities.*** The workshops will be presented as inter-regional events, aimed at enhancing water literacy and exchanging information across the Basin.
Topics for the coming year include:

- **Albury to Adelaide** - exploring topics of inflows and urban water use, planning, flood management etc.
- **Balonne to Broken Hill** – exploring topics of irrigation in the Northern Basin, Barwon-Darling water sharing plan etc
- **Moira to Mildura** – exploring issues of constraints, management of the Barmah choke, impact of expanding the irrigation footprint to permanent plantings below The Choke, total capacity and supply obligations etc.
- **Naran Lake to Nyngan** – Managing the Macquarie Marshes – exploring the relationship between the irrigation, the SDLs and ephemeral wetlands of the interior.
- Etc…

Feedback from the event was exceptionally positive from both attendees and presenters.

2.7 Buloke Shire Council Presentation

Travelled to Sea Lake to address Buloke Shire Council. Cr David Pollock has represented Buloke Shire Council at a number of MDA events recently. Subsequent to the presentation, Cr Pollock will represent the Bullock Shire at board meeting 384 as a guest,.

2.8 NRAR Board Meeting – guest: Sydney

Attended NRAR Board Meeting. Natural Resources Access Regulator – Provided a presentation seeking feedback on their Approach to regulatory priorities

NRAR's ongoing program of activities and specific projects is based an analysis of the potential impact and likelihood of non-compliance. This means the focus of activities will be on areas where there would be material environmental and hydrological consequences if there was non-compliance, and where there is high likelihood of non-compliance occurring.
NRAR CEO Grant Barnes also provided a brief of the regulator's actions and activities:

- Since 30 April 2018, NRAR has received over 4000 enquiries through their hotline; resulting in 650 alleged breaches reported.
- When coupled with inherited legacy cases, this amounts to over 1200 investigations.
- 600 of these investigations have been finalised and approximately half of these resulted in some form of compliance action (Advisory Letters, PINs, Cautions. etc)
- NRAR has issued ~40 statutory directions, addressing continuing harm, as well as ~40 Penalty Infringement Notices.
- NRAR has commenced 6 prosecutions, with 3 having resulted in guilty verdicts (and 3 continuing).

NRAR were provided with a copy of the letter sent to the NSW DPC regarding economic activation plans as a potential emerging risk of future non-compliance.

2.9 Darling Downs and SW Qld Council of Mayors

Presentation to Darling Downs and SW Qld Council of Mayors in Dalby. That group includes

Mayor John Ferguson	Bulloo Shire Council
Mayor Stuart Mackenzie	Quilpie Shire Council
Mayor Lindsay Godfrey	Paroo Shire Council (Deputy Chair)
Mayor Annie Liston	Murweh Shire Council
Mayor Richard Marsh	Balonne Shire Council
Mayor Tyson Golder	Maranoa Regional Council
Mayor Graeme Scheu	Goondiwindi Regional Council
Mayor Paul McVeigh	Western Downs Regional Council
Mayor Tracy Dobie	Southern Downs Regional Council
Mayor Paul Antonio	Toowoomba Regional Council (TRC) (Chair)

Discussions emerged on the opportunity for region 12 meetings to dovetail with that group, consistent with current strategy.

A briefing at the meeting by ARTC / Inland Rail providing an update on the inland rail project identified a number of synergies and opportunities to partner, particularly in relation to their social performance program. National Conference 2019 **presentation** opportunity. Discussions to continue.

Mayor Richard Marsh presented the MDA Conference Trophy to Toowoomba Mayor Paul Antonio.

2.10 River Connections Grant Application consortium meeting

The MDA is assembling a consortium and preparing an EOI in application for up to $9M over 10 years under the NSW Environmental Trust River Connections contestable grant program. Further information including program guidelines and application form here https://www.environment.nsw.gov.au/grants/river-connections.htm. Applications close on Monday 25th March at 3.00pm

Objectives we need to meet

1. To establish partnerships that align a range of river users with diverse values into a common purpose to improve river health, that will continue beyond the program and its funding.
2. To trial new approaches or combinations of approaches to integrated river management and connectivity that deliver improved health outcomes for inland rivers.
3. To create an incentive for coordinated activities that contribute to improved river health**.**

Identified/prospective consortium partners:

- Murray-Darling Association
- Fisheries Research and Development Corporation
- National Irrigators Council & NSW Irrigators Council
- National Farmers Federation & NSW Farmers Federation
- Landcare?
- Conservation focussed groups? (Invasive Species Council, Australian Conservation Foundation)
- Charles Sturt University – Institute of Land and Water Studies (leading monitoring and evaluation)

3 Update on AGM Resolutions

Little progress on any resolutions across the Christmas, early new year period.

4 National Conference

Regular planning meetings of the National Conference planning committee will resume in February.

5 Staffing

James Marshall commences an internship 3 days a week with the MDA on 25/03/2019. James is currently studying Bachelor of Commerce with Latrobe University. James also has a particular interest in Ag Science.

Applications for the position of Executive Assistant to the CEO have been called on Seek. So far the posting has attracted 18871 search views, 883 Job views and 12 applications. Applications close Friday 29th March 2019.

Emma Bradbury

Chief Executive Officer

Chief Executive Officer's Report

April 2019

Emma Bradbury
ceo@mda.asn.au

1. Appointments

Date	Event/meeting	Location
26/03/2019	Office of Hon Bill Shorten: Guy Ragen	Canberra
26/03/2019	Office of Hon Scott Morrison: Paula Svarcas	Canberra
26/03/2019	Office of Hon David Littleproud: Nektarios Tsirbas	Canberra
28/03/2019	ABC Landline Coverage – Barmah Choke	Barmah
08/04/2019	Meeting Mayor Phyllis Miller and GM Steve Sloan – Forbes	Zoom
10/04/2019	Interviews – recruitment	Echuca
12/04/2019	EMFM Radio – Out and About	Echuca
23/04/2019	GV Grammar School – Yr 12 presentation	Echuca
24/04/2019	Harry McAnulty – Social Justice and Leadership	Echuca

2. Engagements

2.1 Canberra meetings

Cr Thurley and I met with the Senior advisors to the Prime Minister, Minister Littleproud, and Opposition Leader respectively to present the business case for funding of the MDA. Proposal was well received, although not funded. Some guidance and advice offered as tt how the proposal may be more likely to attract funding. Will develop the proposal to reflect that advice.

2.2 ABC Landline coverage

Took ABC Landline reporter and journalist Clint Jasper and a film crew up the narrows. Discussed challenges faced by Basin communities and the authorities in delivery and allocation of water, and total water availability under a range of development, drought and allocation scenarios.

3 National Conference

We have encountered significant challenges getting the 2019 Conference landing page finalised. Extensive work with Cvent is proving time consuming and difficult. Event registration page is expected to be launched this week.

4 Staffing

Cathy Keegan has been appointed to the position of EA to the CEO. Cathy brings with her extensive experience in managing and developing regional relationships across local government and complex community needs, having come from the role of Adviser: Indigenous Affairs Network - Department of Premier and Cabinet in the Northern Territory. Cathy will commence 1 May, with a primary focus of building membership and engagement through membership services.

5.

Emma Bradbury

Chief Executive Officer

From: Cr Andrew Tilley <atilley@mitchamcouncil.sa.gov.au>
Sent: Wednesday, 27 March 2019 8:14 AM
To: Emma Bradbury <e.bradbury@mda.asn.au>; City of Tea Tree Gully Cr Robin Coleman <robin.coleman@cttg.sa.gov.au>; Cr Darren Kruse <dkruse@mitchamcouncil.sa.gov.au>; Cr Stephen Fisher <sfisher@mitchamcouncil.sa.gov.au>; Ron Bellechambers <rde.bell@bigpond.net.au>
Cc: Nita Freer-Cooling <nfreer-cooling@mitchamcouncil.sa.gov.au>; Matthew Pears <mpears@mitchamcouncil.sa.gov.au>; Peter Hunter <crhunter@rePeter Hunter <crhunter@renmarkparinga.sa.gov.au>nmarkparinga.sa.gov.au> <crhunter@renmarkparinga.sa.gov.au>; Denis Clark <Denis.Clark@NACouncil.sa.gov.au>; Acting General Manager Des Bilske <dbilske@murrayriver.nsw.gov.au>
Subject: South East Flows Restoration Project - Natural Resources South East

South East Flows Restoration Project - Natural Resources South East
Improving the health of wetlands and the Coorong.

https://www.naturalresources.sa.gov.au/southeast/projects/se-flows
Sent from Mail for Windows 10

Hi All,

This is such an exciting project, sent to me by Vern Lang from Coorong and Region 6 of the MDA. It represents a very positive investment in improving the health of the Southern Pool of the Coorong. It speaks for itself, it is a restoration of a natural flow that had been interrupted for 150 years by well meaning developers and it supports environmental Murray flows from the northern end of the Coorong and the Mouth.

Regards Andrew Tilley

From: Vern leng <Vleng@coorong.sa.gov.au>
Sent: Tuesday, 26 March 2019 1:59 PM
Subject: CARP VIRUS

Fellow members of the Murray Darling Association...

The following information on the proposed Carp Virus was recently released through Neil MacDonald, fisheries consultant and chair of the Lower Lakes & Coorong Consultative Committee, who are a collective group of assorted SA government agencies including PIRSA, SARDI, DEW, SA Water; assorted lower river Murray councils and commercial fishery groups.

Biol Invasions
https://doi.org/10.1007/s10530-019-01967-1

PERSPECTIVES AND PARADIGMS

Biocontrol in Australia: Can a carp herpesvirus (CyHV-3) deliver safe and effective ecological restoration?

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Received: 7 September 2018 / Accepted: 13 March 2019
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Abstract The Australian Government is considering Cyprinid herpesvirus 3 (CyHV-3) for biocontrol of invasive common carp (*Cyprinus carpio* L.). We review the evidence-base for its potential ecological risks, benefits and effectiveness. Lower carp abundance may boost native fish biomass and improve water clarity, but there is little evidence available to suggest that the virus, alone or used in combination with other methods, can deliver effective or safe biocontrol. Further, the virus may already be present in Australia. Overseas, the virus has caused sporadic and localized mortalities of carp in lakes and rivers, but has generally had no long-term measurable effect on wild carp or native fish populations. The temperature range of disease (18–28 °C), unknown co-factors causing outbreaks, and predictable re-colonization and recruitment boom of immune and virus-resistant carp, following a biocontrol release, remain formidable and unmitigated barriers to success. CyHV-3 infection trials on Australian biota have unexplained high mortality rates of recreationally-important and threatened fishes, and the role of asymptomatic carriers remains uncertain. Finally, Australia has national and international obligations to ensure that there are no

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10530-019-01967-1) contains supplementary material, which is available to authorized users.

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Published online: 18 March 2019

perverse outcomes from biocontrol actions. Despite political pressure, there is no environmental justification to rush the release of this virus. To achieve the Government goals of restoring native biodiversity we advocate that key uncertainties, risks and efficacy barriers first need to be addressed. It is only then that viral biocontrol could be considered a viable tool to complement broader ecological restoration strategies for Australia's waterways.

Keywords Biological control · Cyprinid herpesvirus 3 (CyH-3) · Risks · Invasive alien species · River restoration · Ramsar · Murray–Darling Basin

Introduction

Biocontrol is one of few environmental management actions that can transform ecosystems. Australia has a long history of biocontrol successes, such as the reduction of previously super-abundant prickly pear (*Opuntia* spp.) by releasing a cactus moth (*Cactoblastis cactorum*) during the 1930's (Dodd 1936), or the decline of European rabbit (*Oryctolagus cuniculus*), caused by releases of myxoma virus in the 1950's and rabbit haemorrhagic disease virus in 1996 (Pedler et al. 2016). However, Australia's biodiversity has also been damaged following what with hindsight were reckless biocontrol releases. For example, the introduction of cane toads (*Rhinella marina*) to control cane beetles (*Dermolepida albohirtum* and *Lepidiota frenchi*) and eastern gambusia (*Gambusia holbrooki*) to control mosquitos, not only failed to reduce pest populations but the biocontrol agents subsequently became environmentally destructive invasive species themselves (Shine 2010; Hinchliffe et al. 2017). These releases were driven in large part by a zealous focus on anecdotal benefits and political expediency, without rigorous testing of their likely effectiveness or risks (Pyke 2008; Turvey 2013). Perverse outcomes often arise from well-intentioned environmental management interventions (Hobbs et al. 2011), and therefore invasive species control decisions should not be assumed safe without a substantial evidence-base (Simberloff and Stiling 1996; Doherty and Ritchie 2017; Kopf et al. 2017).

Cyprinid herpesvirus 3 (CyHV-3), previously referred to as Koi herpesvirus, is being considered as Australia's next major biocontrol agent. The virus has never been applied as a biocontrol but it is being evaluated as a potential tool to control invasive common carp (*Cyprinus carpio* L.), hereafter 'carp' (McColl et al. 2016a, b; McColl et al. 2017). The potential release of CyHV-3 is a key focus of Australia's National Carp Control Plan (NCCP 2017) which is a project intended to help restore native biodiversity. As far as we are aware, the potential release of CyHV-3 would represent the first large-scale attempt at viral biocontrol in an aquatic ecosystem. CyHV-3 was first detected in aquaculture operations in Germany, Israel and the United States in the 1990's, subsequently spread to over 33 countries, and caused widespread mortality events of carp in fish farms, and to a much lesser extent in lakes and rivers (Boutier et al. 2015).

Although carp is one of the most widely cultured fish produced for food world-wide, it is also one of the most prolific invasive species (Lowe et al. 2000), often causing ecological changes that adversely affect biodiversity and ecosystem functioning (Koehn 2004; Weber and Brown 2009; Kulhanek et al. 2011; Vilizzi et al. 2015). Originally from the Black, Caspian and Aral Sea basins (Balon 1995), carp was first introduced into Australia for aquaculture in the mid-1800s, but only became abundant and widespread in the wild following floods in the 1970's (Koehn 2004). In 1964 a new genetic strain spread from fish farms, and had expanded to most of the Murray-Darling Basin (MDB) by 1977 (Shearer and Mulley 1978). Carp are now widely distributed in Queensland, New South Wales, Victoria, and South Australia and are also found in two lakes in Tasmania. Carp is currently one of the most prolific freshwater fishes in Australia, and where it occurs it makes-up approximately 60–90% of all fish biomass (Harris and Gehrke 1997; Koehn 2004; Kopf et al. 2018). In Australia, the effects of carp are ecosystem-dependent, but high densities have been associated with elevated turbidity and pelagic algae (King et al. 1997; Robertson et al. 1997) and declines in macrophytes (Fletcher et al. 1985) and native fish biomass (Kopf et al. 2018).

Here, we provide an independent perspective on the risks, benefits and effectiveness of CyHV-3 as a biocontrol agent for carp in Australian waterways. We address four questions relevant to scientists, managers and policy-makers: (1) Can native species be infected

by or transmit CyHV-3?; (2) What are the broad ecological risks of unintended and perverse outcomes from biocontrol with CyHV-3?; (3) Is there evidence of CyHV-3 delivering effective control of wild carp populations? and (4) What are the potential ecological restoration benefits of carp control? This is not an exhaustive list of potential benefits, efficacy or safety issues, but provides a synthesis of the epidemiological and ecological evidence-base for considering CyHV-3 as a biocontrol agent. The viability of carp biocontrol, like any natural resource management initiative, ultimately depends on social acceptability and whether benefits exceed costs. Socio-economic and human health issues, such as the cost of a clean-up, effects on drinking water, tourism, infrastructure, food security and aquaculture industries, although important, are not considered here.

1. Can native species be infected by or transmit CyHV-3?

Knowledge of the species-specificity of a potential biocontrol agent is fundamental to avoid perverse outcomes for non-target species. Herpesviruses are generally host-specific and host-stable and CyHV-3 is not reported to have caused disease in any species other than carp, koi and related hybrids (Boutier et al. 2015). McColl et al. (2016b) reported on the susceptibility of 22 Australian non-target species to CyHV-3 and concluded there were no clinical signs of disease or molecular evidence of viral infection. However, Australian non-target fish species suffered high rates of mortality in both virus treatments and controls (Fig. 1). Species with unusually high mortality rates in the virus treatments included, but were not limited to, non-native but recreationally important rainbow trout (*Oncorhynchus mykiss*; 45–100% mortality) and a native fish, silver perch (*Bidyanus bidyanus*; 27–46% mortality). Silver perch are listed as threatened by the Australian Environmental Protection and Biodiversity Conservation Act 1999 (EPBC 1999). For both species, the percent mortality in the controls (no virus present) was less than 10%. High mortalities (up to 91% in Common Galaxias *Galaxias maculatus* and Olive perchlet *Ambassis agassizii*) in the controls of other Australian species tested indicated that laboratory conditions were inadequate for reliable experimentation. Given the unexplained mortalities, we recommend additional susceptibility and transmission trials for non-target fish species (Table 1), focusing especially on taxa that suffered high (e.g. $> 20\%$) rates of mortality in controls or treatments (Fig. 1).

Based on existing evidence of herpes virus epidemiology (Boutier et al. 2015) and absence of clinical disease symptoms (McColl et al. 2016b), it is highly unlikely that the CyHV-3 can cause disease in native species. Although CyHV-3 exposure adversely affecting native species is highly improbable, these potentially catastrophic risks and unquestionably high rates of mortality in experiments should not be ignored. Native species may have never been in contact with the virus, and the large geographic area of carp in Australia represents a novel opportunity for virus evolution (Lighten and van Oosterhout 2017).

A related issue of uncertainty in the literature is which species act as asymptomatic carriers or vectors that could carry and transmit a viral infection. Piscivorous waterbirds are potential vectors via physically transporting water or infected fish (Ilouze et al. 2010). Over 29 potential asymptomatic carrier species of fish in nine families, and two species of invertebrates have tested positive for CyHV-3 DNA (Kempter et al. 2012; Boutier et al. 2015; Fabian et al. 2013, 2016; Gaede et al. 2017). Importantly, some of the non-target species which tested positive also effectively transmitted the virus to naïve cohabitant carp (Kempter et al. 2012; Fabian et al. 2013, 2016). Despite claims by McColl et al. (2016b), effective transmissions by non-target species in several independent studies suggests that some non-target species carry and transmit the virus. However, several of these previous trials were performed using highly sensitive 'nested PCR', prone to lab contaminations (OIE 2012), which may have falsely detected viral DNA. McColl et al. (2016b) found no molecular evidence of any non-target Australian species replicating CyHV-3, but did not conduct studies to determine whether non-target species could effectively transmit the virus. McColl et al. (2016b) used RT-PCR and a qPCR method initially designed by Gilad et al. (2004), which is considered to be one of the international reference methods for testing CyHV-3 (OIE 2012). Research is needed to identify non-target species that may effectively transmit the virus, or act as potential asymptomatic carriers (Table 1). Furthermore, no previous research has evaluated the potential for sub-lethal effects (e.g. compromised immune function, stress,

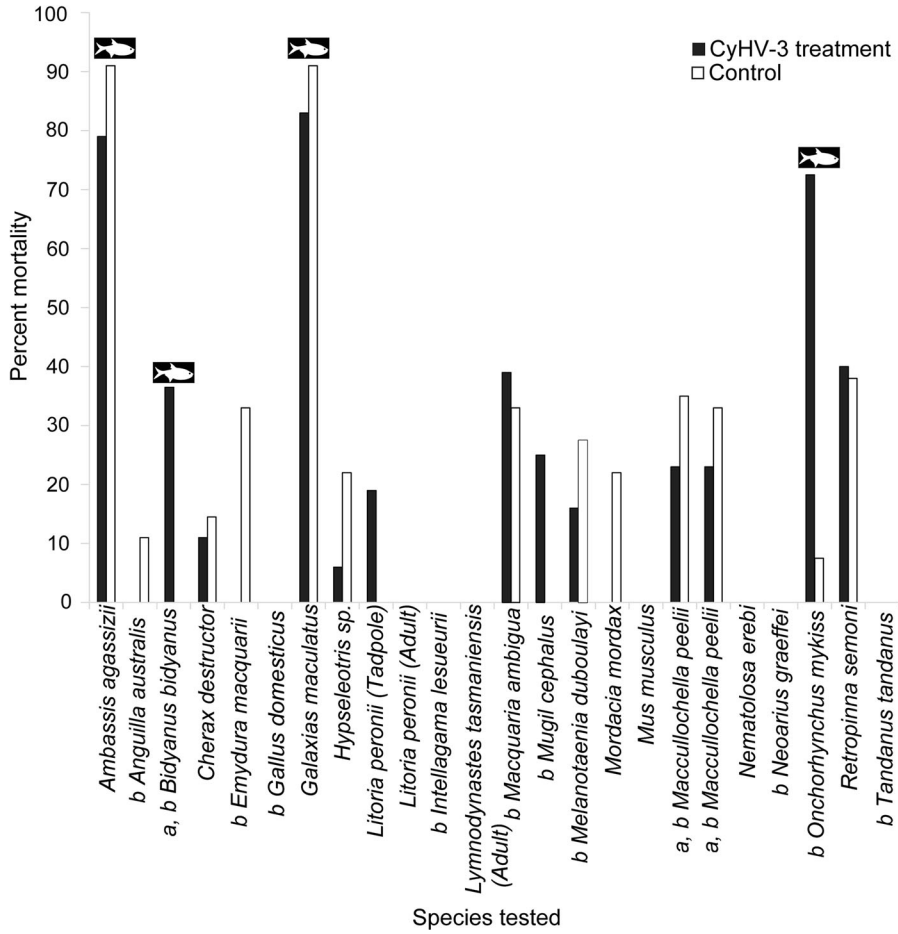

Fig. 1 Median percent mortality of non-target species in Australia exposed to CyHV-3 (black-virus treatments), compared to controls (white-no virus present) by McColl et al. (2016b). Values represent the median of bath immersion and injection procedures by McColl et al. (2016b; Table 1). Species denoted (a) are listed as threatened by the Australian Environmental Protection and Biodiversity Conservation Act 1999 (EPBC 1999) and by the International Union for the Conservation of Nature (IUCN) Red List and species denoted (b) are considered recreationally or commercially important. Statistical comparisons and error bars could not be calculated because replicate exposure trials were either not conducted or not reported for all but one non-target species (*M. peelii*). Fish silhouettes highlight species discussed in the text

growth, reproduction) of low-level viral infections on potential carriers. Better knowledge of the species-specificity of CyHV-3 asymptomatic carriers and transmission is likely to serve the dual purpose of mitigating risks and improving the accuracy of epidemiological models needed to predict the spread of disease.

2. What are the broad ecological risks of unintended and perverse outcomes from biocontrol with CyHV-3?

The removal of invasive species requires a whole-ecosystem perspective (Zavaleta et al. 2001; Simberloff et al. 2013), with rigorous assessment of the risks of removing widespread and established species from environments (Kopf et al. 2017). Unlike the low-likelihood lethal or sub-lethal risks of CyHV-3 infection of non-target species (Question 1), other ecological risks following mortality events of dense carp populations are highly likely and include changes in water quality, food webs, consumer populations and the spread of other diseases (Lighten and van Oosterhout 2017; McColl et al. 2017; Paton and McGinness 2018). The severity and duration of these impacts will depend heavily on highly uncertain CyHV-3 disease efficacy, timing, and the mortality rates of carp in a range of environments.

Even a carp mortality rate of only 10–20%, with compounding effects at the landscape scale in warm months, is likely to result in high concentrations of dead carp. Carp carcass decomposition and associated increases in biological oxygen demand from the organic matter and nutrients released in these environments are likely to cause localized hypoxia or anoxia and increases in the prevalence of toxic cyanobacteria blooms. The likelihood and severity of

Attachment 10.2

Table 1 Ecological safety and efficacy research recommendations to address before releasing CyHV-3 in comparison to research underway by Australia's National Carp Control Plan (NCCP 2017)

Research recommendations	Addressed by NCCP
Non-target disease and mortality experiments, including additional experiments on taxa that suffered high (e.g. > 20%) rates of mortality in controls or treatments (Fig. 1).	Partially (see text)
Cross-reactivity of CyHV-3 with other viruses and salinities	Yes
Sub-lethal effects of non-target CyHV-3 exposure and additional transmission studies to confirm species-specificity of asymptomatic carriers and vectors	No
Test whether CyHV-3 is present in Australian waterways	Proposed
Experimental field trials of CyHV-3-induced common carp mortality rates	No
Experimental field and laboratory trials of common carp removal and complementary restoration actions required for the ecological recovery of Australian biodiversity	No
Quantify common carp biomass density in Australian waterways	Yes
Determine the distribution of genetic CyHV-3 disease resistance in wild common carp	Proposed
Epidemiological modelling of disease efficacy and long-term carp population responses	Yes
Quantitative food web modelling of the short and long-term impacts of common carp removal	Partially (see text)
Nutrient, cyanobacteria and hypoxia field experiments and modelling of carp decay	Yes
Plan for complementary carp biocontrol and restoration activities	No
Design fish-kill clean-up and management strategy	Yes

these problems increases with warm water temperatures (Kerr et al. 2013, Whitworth and Baldwin, 2016, Whitworth et al. 2012), which are required for CyHV-3 disease activity. Eutrophication, deoxygenation, and fish carcasses may promote outbreaks of other diseases (Paton and McGinness 2018). Botulism (*Clostridium botulinum*) in particular is widespread in wetlands of the MDB (WHA 2013). Warm temperatures, high organic matter concentrations, eutrophication, hypoxia and carcasses promote outbreaks of toxins that can cause botulism (Evelsizer et al. 2010). This disease has led to the deaths of hundreds to thousands of birds and is a risk to other vertebrates (Paton and McGinness 2018), potentially including humans, domestic live-stock and native species. Effects of botulism on fish species in Australia are not well understood, but hypoxia is an increasingly common cause of native fish kills in the MDB (King et al. 2012; Small et al. 2014). Native fishes generally suffer high mortality rates when dissolved oxygen concentrations drop below 2–3 mg/L (Small et al. 2014) and susceptibility is likely to increase with other toxic compounds released from dead carp and high temperatures.

Wetlands, dry-land river waterholes and shallow lake ecosystems will be particularly vulnerable to hypoxia, poor water quality and the ensuing ecological risks resulting from mass, or minor, carp mortality events. These environments with slow or no water current, higher water temperatures and often high densities of carp are likely hot-spots for unwanted ecological change. Physical removal of carp carcasses, following a potential biocontrol release, could mitigate these risks, but we are skeptical that this can be achieved quickly at large spatial scales in complex river-floodplain networks. In the MDB alone, there are approximately 5.7 million hectares of wetlands and 16 Ramsar wetlands of international importance (Pittock and Finlayson 2011) protected under the Australian Environmental Protection and Biodiversity Conservation Act 1999 (EPBC 1999). Warm temperatures, shallow wetlands and high carp densities often coincide with the breeding seasons and sites of a range of fauna (Paton and McGinness 2018). These fauna include threatened waterbirds, fishes, frogs, turtles and mammals protected under the EPBC Act 1999 and are the subjects of significant investments in environmental flows and other conservation management actions.

Several potential environmental risk modelling approaches are useful to explore the plausible ecological outcomes and uncertainties of releasing CyHV-3 to control carp. First, computational extensions of qualitative modelling based on expert elicitation workshop assessments may be used to translate uncertain interactions of carp removal into quantitative predictive ecosystem ensemble models (Baker et al. 2017). Conceptual ecosystem and food web models are being developed by Australia's National Carp Control Plan and we recommend that these be developed into quantitative assessment tools (Table 1). This approach has offered valuable insight into the unexpected consequences of past non-native species interventions (Raymond et al. 2011) and could be a useful forecasting tool to predict the plausible ecological consequences of carp removal. Lastly, decision theory may be used to distinguish between critical and irrelevant sources of uncertainty and therefore risk, allowing managers to prioritize mitigation activities, and ensure that the chosen actions are robust to limited information (McDonald-Madden et al. 2010).

3. Is there evidence of CyHV-3 delivering effective control of wild carp populations?

CyHV-3 has decimated carp farming operations globally (Boutier et al. 2015) but, despite spreading to over 33 countries world-wide, there is little evidence that the virus has suppressed wild populations in lakes, rivers or wetlands. The 50–100% rates of CyHV-3-induced carp mortality, observed in high-density aquaculture ponds (Haenen et al. 2004) and optimal laboratory conditions (McColl et al. 2016b), cannot be used to infer biocontrol efficacy in open ecosystems such as rivers, wetlands or lakes. In natural aquatic ecosystems, fish are mobile, have a higher genetic diversity, patchier density, and the environment is more dynamic and heterogeneous (e.g., water temperature) than aquaculture ponds or laboratory conditions. The realized mortality rate of carp, following CyHV-3 biocontrol application in the wild, is likely to be much lower and more variable than in laboratory trials and aquaculture ponds.

Of the few CyHV-3 confirmed carp fish-kills in rivers or lakes world-wide, most have had little or no long-term detectable effect on carp abundance. Thresher et al. (2018) synthesized and reviewed the available information on CyHV-3-induced carp mortalities in North American lakes. The available information, though coarse grained, suggested that even large and very conspicuous CyHV-3-induced carp mortality events generally had little or no detectable effect on carp abundance (Fig. 2). In fact, carp relative abundance was on average 11.5% higher after the CyHV-3-induced carp mortality events reviewed by Thresher et al. (2018). Data in Fig. 2 spans as much as 16 years prior to the mortality event (median 6 years), and 7 years afterwards (median 5 years).

There have been only two confirmed instances where CyHV-3-induced mortality rates were high and population suppression may have occurred: Lake Biwa, Japan (Uchii et al. 2013) and Blue Springs Lake in the United States (Thresher et al. 2018). In Lake Biwa, CyHV-3 disproportionately infected and killed approximately 60–80% of a Japanese strain of common carp (Uchii et al. 2013), while the Eurasian genetic lineages, from which most invasive carp in Australia have descended (Haynes et al. 2009), were

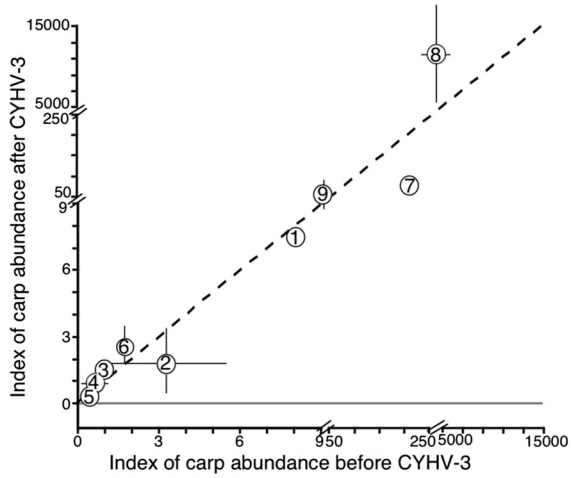

Fig. 2 Indices of common carp relative abundance for individual North American lakes (Thresher et al. 2018) before and after CyHV-3 mortality events. Sampling methods vary among lakes, and include gill netting, trapping, electrofishing and seine netting. Numbers indicate lakes: 1. Twin Buttes Reservoir, Texas; 2. Lake Scugong, Ontario; 3. Rice Lake, Ontario; 4. Buckhorn Lake, Ontario; 5. Balsam Lake, Ontario; 6. Lake Mohave, Nevada; 7. Blue Springs Lake, Missouri; 8. Lake Sinnissipi, Wisconsin; 9. Cheyenne Pond, Nebraska. The dashed line (slope of 1 and an intercept of 0) illustrates no change in carp relative abundance. Error bars were calculated as 2 × SE for lakes where pre- and post-event carp data were available

largely unaffected. Data on the long-term impacts of mortality on carp abundance in Lake Biwa following the disease outbreak were not available for analysis. In Blue Springs Lake, however, adult abundance and recruitment of carp in the lake has remained low up for up to five years after the 2012 fish-kill event (Thresher et al. 2018). There have been no reports of recurrent CyHV-3 mortality events following the initial out-break in either lake. We suspect that the high mortality rate of carp in Blue Springs Lake reflects the very small size of the lake, close connectivity of fish and hence the rapid dissemination of the virus throughout the water body, whereas long-term population suppression appears to be maintained by egg predators and piscivorous fish that increased in abundance following the disease out-break (Thresher et al. 2018).

Lake Biwa and Blue Springs Lake are not good models for Australian conditions if the virus was released. Although Lake Biwa is Japan's largest lake, at 670 km^2, both it and Blue Springs Lake (3 km^2) are dwarfed by the 1 million km^2 area of the MDB, let alone the entire continent. Furthermore, the vast network of river channels, warm dry-land floodplains, wetlands and in- and off-channel storages, that comprise the Australian carp distribution, contrasts starkly with the single-lake ecosystems in Japan and the United States. In contrast to lakes, we are aware of no published pre-and-post outbreak evaluation of how CyHV-3 affected carp densities in river ecosystems. CyHV-3 is now present in most rivers in Japan and, despite significant declines in Japanese genetic strains, invasive Eurasian genetic strains have remained widespread and likely carry latent infections (Uchii et al. 2014; Minamoto et al. 2012). Gibson-Reinemer et al. (2017) speculated that a long-term decline in carp abundance throughout the Mississippi River Basin could have been from CyHV-3 disease-induced recruitment failure. They speculate that CyHV-3 was the causative agent, but present no data to establish a causal link. Most of the carp decline reported by Gibson-Reinemer et al. (2017) pre-dates by decades the discovery of CyHV-3 in North America, or the onset of mortality events attributable to the virus. Further research testing whether CyHV-3 is limiting carp recruitment or adult populations in North America is needed.

Mortality events in wild carp populations have been sporadic in time and space, and appear infrequently, or never, after the initial disease outbreak (Uchii et al. 2013; Thresher et al. 2018). Low rates of mortality and once-off outbreaks of disease in wild populations contrast with assumptions made to model potential CyHV-3 impacts on Australian carp. Brown and Gilligan (2014) used a meta-population model of the MDB to predict impacts of CyHV-3 on resident carp populations. They reported that substantial reductions in carp required a minimum of 30% mortality of the total population every 2–3 years. These assumed parameter values greatly exceed the mortality rates, spatial extent and the frequency of fish-kills, observed in the wild outside of Australia, potentially yielding overly optimistic estimates of the impacts of a carp biocontrol, based on CyHV-3.

Given the high uncertainty in CyHV-3-induced carp mortality rates and frequency of outbreaks in rivers, lakes and wetlands, we recommend that carefully contained field experimental trials be conducted to help refine the wide-ranging estimates (Table 1). Because of the difficulty of containing the virus in natural environments, experiments should first be conducted in quarantined mesocosms or overseas in countries already affected by the virus. Pending the results of experimental field trials, experiments could be scaled up to progressively larger (e.g. 20 km^2) and more complex natural ecosystems whereby carp and virus density, temperature and interactions with native species could be examined.

Temperature is a key factor influencing carp mortality from CyHV-3 (Minamoto et al. 2012; Marshall et al. 2018). CyHV-3 can cause disease (i.e. clinical signs and mortalities) between the 'permissive' water temperatures of 18–28 °C. Above 30 °C the virus ceases to replicate and is innocuous to carp. This property has been used to immunize carp against the virus, with temperatures above 30 °C effectively inhibiting viral replication and allowing the development of a protective adaptive immune response in fish (Ronen et al. 2003). Furthermore, CyHV-3-infected carp can express 'behavioural fever', when they actively seek warm water (Rakus et al. 2017) to stimulate both healing and immunization. In the northern MDB, surface water temperatures in summer can be above 30 °C for 3–4 months per year, whereas permissive temperatures occur for short periods during spring and autumn (Queensland Government, unpublished data). The thermal profile of river-floodplain ecosystems is also spatially heterogeneous (Li et al. 2017), such that the water

temperature of shallow lakes and wetlands can be over 10 °C warmer than the connected river channel environment. It seems unlikely that the virus will be an effective biocontrol agent in warm months during the Australian summer, particularly in shallow floodplain environments where carp aggregate in waterholes and wetlands. Virus release during certain seasons or in warm floodplain ecosystems could cause population-level immunization, rather than mass mortality. Given the dispersal capability and behavioural fever expressed by carp, individuals may seek-out warm floodplain environments, and we expect immunized individuals to re-colonize regions where the virus was previously effective. Epidemiological modelling currently underway by Australia's National Carp Control Program (Table 1) will address some aspects of these knowledge gaps, but critical uncertainties may remain regarding virus ecology and its interaction with carp behaviour, movement, river-floodplain flows and temperature.

In other Australian settings, cold-water pollution, downstream of major dams, is likely to provide CyHV-3 disease refuge habitat for carp. Water temperatures downstream of large dams in the MDB are often lower than 15 °C (Lugg and Copeland 2014), outside the permissive temperature range for CyHV-3 disease (Marshall et al. 2018). Infection with CyHV-3 at low temperature (< 15 °C) is incompatible with efficient virus replication and is usually associated with no detectable clinical signs (Sunarto et al. 2014). Compared to warm water temperatures, active immunization at temperatures below 15 °C is less likely, since the immune response of fish is reduced (Abram et al. 2017). In addition, CyHV-3-infected fish, maintained at low temperatures, frequently develop disease when returned to permissive temperatures (Sunarto et al. 2014). Management options do exist for reducing cold-water pollution (Lugg and Copeland 2014) and should be considered in modelling and pre-release mitigation measures (Table 1) to improve disease efficacy.

In addition to the temperature limitations on biocontrol efficacy, innate genetic resistance of carp to CyHV-3 disease occurs (Rakus et al. 2009; Ito et al. 2014; Piackova et al. 2013). Genetic resistance will be strongly selected for following CyHV-3 release, thereby further reducing the efficacy of biocontrol. Ancestors of CyHV-3 may have infected carp populations, long before the initial outbreaks of the disease were first reported in the late 1990s (Gao et al. 2018). Assuming that the evolutionary rate of CyHV-3 is constant and similar to mammalian alphaherpesviruses, genetic analyses suggest that the virus has co-evolved with carp for tens of thousands of years (Gao et al. 2018). This co-evolution occurred before carp was introduced to Australia in the mid-1800's (Koehn 2004) and even before the species was first cultured by humans (Balon 1995). The exact causes of the recent disease re-emergence are unclear. However, implications of the long co-evolutionary history of CyHV-3 and carp suggests that the virus could already be present in wild Australian populations (Marshall et al. 2018). Japan conducted a nation-wide survey in 2008, which revealed that CyHV-3 had unexpectedly spread to 90% of rivers tested, without disease outbreaks reported in most rivers (Minamoto et al. 2012). Similar surveys should be conducted in Australia to test for the assumed absence of the virus (Table 1).

Wild carp in Australia are susceptible to CyHV-3 disease (McColl et al. 2016b), but the extent to which genetic variability and resistance-conferring genes (Rakus et al. 2009) will facilitate resistance to the disease remain unknown (Table 1). Reproductively viable hybrids between carp and goldfish (*Carassius auratus*) occur in Australian wild carp populations (Haynes et al. 2012). Goldfish are resistant to disease caused by CyHV-3 and experimental infections of goldfish x carp hybrids have revealed moderate-high resistance to CyHV-3 (Hedrick et al. 2006; Bergmann et al. 2010). Hybridization may introduce resistance alleles into carp populations (McColl et al. 2016b), conferring a strong selective advantage to individuals carrying these genes if the virus was introduced. More research is needed to understand the prevalence and spatial distribution of goldfish x carp hybridization in Australia and resultant resistance to the CyHV-3 (Table 1).

In additional to temperature and genetic constraints on biocontrol efficacy, the extremely high fecundity and short generation time of carp increases the speed at which wild populations are expected to recover. Recovery is likely to occur following large-scale flooding events, which are known to enhance carp recruitment in Australian river-floodplain ecosystems (King et al. 2003; Stuart and Jones 2006; MacDonald and Crook 2014). Effective population control would therefore require the implementation of an effective

mitigation strategy (Table 1) to limit a recruitment boom of virus-resistant carp in years following release of CyHV-3. This constraint has previously been recognized (McColl et al. 2016a, b), but there is currently no technology or plan in Australia to effectively prevent a recruitment boom of virus-resistant carp following a biocontrol release. Other than aligning a potential biocontrol release to coincide with a long-term drought, there is currently no feasible method of preventing or minimising carp recruitment at large spatial scales. Spawning site sabotage, barriers that exclude carp from spawning sites (Weber and Brown 2009; Koehn et al. 2018) and 'Judas-male' approaches (Bajer et al. 2011), though useful in small-scale applications, are unlikely to be effective over large scales in Australia. Similarly, the logistics of increasing the abundance of predatory fish or other taxa that consume carp eggs to the level required for effective population control (Bajer et al. 2012) are daunting.

Thresher et al. (2012, 2014) suggested that CyHV-3 release, followed by stocking large numbers of carp that are both immune to CyHV-3 and produce male-only offspring ('daughterless technology'), constituted a theoretically feasible option for recruitment suppression. Options for producing daughterless offspring include a Mendelian system (Thresher et al. 2014), chromosomal manipulation (Trojan Y; Teem et al. 2014; Schill et al. 2017), or gene drives (e.g. Beaghton et al. 2016). None of these approaches has been tested in the field. Their genetic feasibility when applied to carp is uncertain and most methods would require substantial lead-in time and logistical effort, even if CyHV-3 was used first to depress carp populations. Gene drives potentially avoid logistical challenges. In theory, even the release of a small number of gene-drive-altered daughterless carp could permanently alter or suppress a targeted population (Esvelt et al. 2014). However, this desirable feature of gene drives also significantly increases the risk to non-target species (Webber et al. 2015). The ethics and uncertainty associated with gene drives and other genetic biocontrol approaches are currently being debated, with a recommendation that use be highly restricted and not yet applied in widespread biocontrol (National Academies Press 2016; Esvelt and Gemmell 2017).

4. What are the potential ecological restoration benefits of carp control?

The goal of Australia's National Carp Control Plan is to "restore native biodiversity". We suggest that this goal is not achievable by carp control alone, and advocate strongly for the implementation of broader ecological restoration principles (Palmer et al. 2005; McDonald et al. 2016). Ecological restoration includes assisting the recovery of a degraded, damaged or destroyed ecosystem. Successful programs include: (1) setting a target for native biodiversity recovery, based on a clearly defined reference site or model of a dynamic and healthy ecosystem; (2) publically available assessments of pre- and post-ecological condition; (3) improvement in ecological condition and resilience with minimal follow-up maintenance; and (4) causing no lasting harm to the ecosystem (Palmer et al. 2005; McDonald et al. 2016).

There is strong evidence of benefits to biodiversity in freshwater ecosystems, following effective reductions of carp from lakes (Kulhanek et al. 2011; Vilizzi et al. 2015). However, unexpected results are common, and ecological recovery is highly context-dependent, with little data available from river ecosystems (Weber and Brown 2009). There is also little evidence available to evaluate whether CyHV-3 application can facilitate ecological restoration, since the virus has never been intentionally applied as a biocontrol and no field experiments have tested ecological responses (Table 1). With the exceptions of Blue Springs Lake and Lake Biwa (Uchii et al. 2013; Thresher et al. 2018), long-term ecological changes following disease out-breaks have not been documented and remain poorly studied. Carp may increase water turbidity and algal densities (King et al. 1997), decrease benthic algae and macrophyte densities (Robertson et al. 1997; Zambrano and Hinojosa 1999) and negatively affect native fish and benthic invertebrate abundance (Zambrano et al. 2001; Kulhanek et al. 2011; Vilizzi et al. 2015; Kopf et al. 2018). Nevertheless, uncertainty remains about the generality of the impacts of carp across habitats, and especially whether these impacts in river-floodplain ecosystems can be reversed if carp abundance is reduced.

Historical estimates of native species abundance and biomass in Australia are unavailable, but conceptual historical food webs and modelling of biomass can help set recovery baselines for native fish

communities (Kopf et al. 2018). To help inform native fish restoration targets, an expert panel suggested that native fish abundance in the MDB may have declined by ~ 90% since Europeans colonized Australia (Koehn et al. 2014). Effective control of carp and environmental flows in the MDB could more than double native fish biomass, via bottom-up release and production of basal food resources (Kopf et al. 2018). It remains unknown whether there is a threshold density of carp which could promote the recovery of river ecosystems, if this varies among habitats, or if other invasive species (e.g. tench *Tinca tinca*) would fill the ecological role of carp. We therefore recommend the development of quantitative food web models to better understand the likely responses of native and invasive species (Table 1). Where experimental removal has reduced carp densities to less than 100–450 kg/ha, lakes have been more likely to shift from a turbid eutrophic state to a clearer macrophyte-dominated state, sometimes with benefits for nutrient cycling and food webs linking plankton, macroinvertebrates and native fish (Zambrano et al. 2001; Weber and Brown 2009). Turbidity, phytoplankton biomass and benthic biofilm development have been significantly altered in Australian floodplain wetlands by manipulating densities of carp ranging from 101 to 1180 kg/ha (King et al. 1997; Robertson et al. 1997).

The biomass density of carp in rivers, lakes and wetlands is heterogeneous and dynamic, commonly ranging from 5 kg/ha to over 1000 kg/ha (Weber and Brown 2009). Assessments of the density of carp in Australian systems are poor, with current work by Australia's National Carp Control Plan expected to yield more precise estimates (Table 1). Previous estimates from lakes and billabongs range from 150 to 690 kg/ha (Fletcher et al. 1985), and 176 kg/ha was estimated for the Lachlan River (Brown and Gilligan 2014).

Given the uncertainties in carp reduction necessary to achieve goals of biodiversity recovery in diverse habitats in Australia, we emphasize the need for field experiments and mesocosm studies, which manipulate carp biomass densities, to understand ecosystem responses (Table 1). The estimated carp biomass threshold densities could then serve as quantitative reference targets for comparison with pre-release mortality experiments to determine whether CyHV-3 has the potential to achieve the desired goals.

Complementary restoration and management actions would be essential to achieve ecological restoration targets, including: improving land-use practices to reduce sediment run-off; restoring natural patterns of connectivity; mitigating cold-water pollution from dams; managing environmental flows; complementary carp biocontrol technology to prevent a recruitment boom; and the development of re-introduction and rehabilitation programs for key functional groups (e.g. macrophytes; mussels; predatory fish) (Table 1).

Conclusion

There is currently insufficient evidence regarding the efficacy, benefits and ecological safety of CyHV-3, to responsibly engage in a continental-scale biocontrol release. Greater understanding of the effectiveness of the virus in Australian rivers and wetlands and the potential ecosystem-level outcomes of suddenly reducing carp biomass densities will be required, even after the completion of Australia's National Carp Control Plan research (Table 1).

The release of a novel virus may unpredictably and irreversibly change ecosystems. Though unexpected outcomes may be unavoidable, rigorously addressing the research gaps and undertaking complementary restoration measures (Table 1) will help reduce uncertainty and maximize potential ecological benefits. Despite the powerful potential of contemporary modelling approaches, our limited knowledge of both CyHV-3 disease efficacy and the response of Australian ecosystems to sudden reductions in carp densities severely restricts our current confidence in assessing ecological responses to biocontrol. Wide-ranging mortality rates in the wild, poorly described ecological and biological co-factors contributing to CyHV-3 disease out-breaks and the lack of information regarding the biomass density and genetic resistance of carp in Australian waterways (Table 1) contribute to extremely high uncertainty. The current range of plausible ecological risks therefore ranges from little-to-no adverse effects on native species, to catastrophic reductions in water quality that cause severe and widespread fish-kills, potentially with lasting effects on biodiversity. Similarly, the high uncertainty in CyHV-3 efficacy in the wild limits our ability to estimate the likely range of potential benefits

for native species, which is necessary to rationally justify this biocontrol.

Despite political pressure, there is no environmental justification to rush the release of this viral biocontrol without the necessary evidence. It is important to recognize that the impacts of carp on Australian native biodiversity are relatively static. Carp expanded to their major current range and relative abundance decades ago (Shearer and Mulley 1978; Koehn 2004). Likewise, the potential of CyHV-3 to provide a biocontrol solution would not diminish if the research and decision time-frames were extended to reduce key uncertainties and to ensure maximum biocontrol effectiveness.

Acknowledgements Thanks to Matt Barwick formerly of Australia's National Carp Control Plan (NCCP) for comments on a previous version of Table 1. Jon Marshall acknowledges his membership on the Science Advisory Group of the NCCP, representing the Queensland Government.

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From: Emma Bradbury <e.bradbury@mda.asn.au>
Sent: Thursday, 4 April 2019 1:24 PM

Subject: Murray Darling Association: Basin Communities Leadership Program

Dear MDA Region Chairs and Executives

I am absolutely delighted to advise that the Murray Darling Association has been successful in our application for funding under the Murray-Darling Basin Economic Development Program to create and deliver the **Murray Darling Association: *Basin Communities Leadership Program.*** I have attached here a copy of both the **Murray Darling Association: *Basin Communities Leadership Program*** project outline, and a copy of the letter received from Minister Littleproud for your reference.

I would like to acknowledge the support of every one of you and your councils in achieving this success. Many of you provided letters of support from your councils, and encouraged your local MPs to add their support of the initiative. And every one of you has, and continues to work incredibly hard at board level and across your regions to achieve the objectives of the MDA, demonstrating the highest commitment to regional leadership for your area in the face of constantly changing water availability, seemingly endless legislative reform and regular community hardship.

As you are all aware, I am deeply committed to the belief that the growth of our regional economies, the health of our inland rivers and landscape at a Basin scale, and the wellbeing of our communities requires investment in innovation, diversification in the agriculture sector and most importantly leadership at the local level. It is my view that this project will deliver transformative change not only for the eligible communities in which we are funded to deliver the program, but to other impacted Basin communities where the program can also be rolled out. I am very proud to be part of a team putting all those beliefs into practice.

I will schedule an extra-ordinary meeting to brief you on the details, and to get your feedback, ideas and input as I start to prepare content and delivery schedules. I will also prepare a media release for distribution early next week, following clarification of a number of details with the Department.

Congratulations again!

Kind regards

Emma

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Murray-Darling Basin Economic Development Program
Project Proposal

March 2019

Murray Darling Association

Basin Communities Leadership Program

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Project

Applicant name / organisation:	Murray Darling Association
Project Title:	Murray Darling Association ***Basin Communities Leadership Program***

Project background

Section instruction: Your introduction can include information such as the purpose of your organisation, a description of its activities, a description of its target population, and evidence to show that it is a healthy organisation.

The Murray Darling Association provides a voice for local government and communities, with a focus on informing sound policy and the management of Murray Darling Basin resources. Established in 1944, the MDA serves as an effective conduit, completing the circle between local and Commonwealth governments, ensuring all three levels of government work together on what has always been the highly complex matter of inter-jurisdictional water sharing.

There are 172 councils that sit within the Basin and whose communities rely on the water within it. The management of both town and rural water is a matter of significant interest to local government.

The MDA is the only inter-jurisdictional Association of Local Government, covering all 4 states. Offering membership councils representation, support and expertise on Murray Darling Basin related issues.

Strictly non-partisan, operation of the MDA is parliamentary in nature having the executive power vested in a board composed of members of the regions, individually and collectively responsible to the membership and each of whom are democratically elected.

The MDA is built on strong foundations of good governance and operates with high standards of trust, accountability and integrity.

Performance of the MDA is well regarded and highly respected by State and Federal Departments as well as the Murray Darling Basin Authority.

Local government's representation through the Murray Darling Association, contributes actively to developing unity at community level, facilitating informed debate and informing decisions made in the implementation of the Murray Darling Basin Plan.

Our reputation for balanced and accountable community engagement and representation is well established and evident in the following engagement, activities and submissions:

Recent submissions

- Submission to the Review of the Murray-Darling Basin Joint Governance Arrangements
- Submission to the Murray-Darling Basin Water Infrastructure Program
- Submission to the Productivity Commission Murray-Darling Basin Plan: Five-year assessment - Draft report
- Submission to the South Australian Royal Commission of Inquiry into the Murray-Daring Basin
- Submission to the South Australian Royal Commission of Inquiry into the Murray Darling Basin - Region 7
- Submission to the Productivity Commission's Basin Plan Inquiry
- Submission to the NSW Government's Water Reform Action Plan
- Agreement on 'socio-economic neutrality' key to Basin Plan success: report to members
- Submission to the Standing Committee on the Environment and Energy's Inquiry into the Management and Use of Environmental Water
- Murray-Darling Basin Plan Socio-Economic Impacts Evaluation Framework and Neutrality Test project proposal - March 2018
- Murray-Darling Basin Plan Impacts Evaluation Framework Project Proposal August 2016 - PDF
- Submission to the Victorian Parliament's Inquiry into the Management, Use and Governance of Environmental Water - PDF
- Appearance at the Senate Public Hearing on the social, economic and environmental impacts of the Murray-Darling Basin Plan on Regional Communities - PDF (Hansard)
- Submission to the Select Committee on the Murray-Darling Basin Plan 2015 - PDF
- Report on the Social and Economic Impacts of the Basin Plan Local Government Data Collection Project 2015 - PDF
- Submission to the 2014 Review of the Water Act 2007 - PDF

Regional and national events

- 74 Annual National Conferences 1944 - 2018
- Regional meetings
- Connecting Catchments and Communities

Current memberships

- National Carp Control Plan Communications Working Group
- New South Wales Environmental Trust Aquatic Subcommittee
- Productivity Commission's Murray-Darling Basin Plan: Five-Year assessment – stakeholder working group

Project outcomes and outputs

Selection criteria - additional information

- ***Criterion 1 Economic Benefits***
  - ***a. Describe the project in detail***
  - ***b. Identify which eligible community or communities your project relates to and specify the location of the activities***
  - ***c. Describe how your project will deliver economic benefits that address the impacts of water recovery on the community***

The Murray Darling Association will facilitate a high-level leadership program delivered across the 15 eligible MDBED communities.

Over 225 participants will participate in the ***Basin Communities Leadership Program***. This is made up of 15 participants from each region, across the 15 communities. Participants will include local government and community representative identified as aspiring to lead social and economic development initiatives and able to respond to changes in their communities.

Each region will receive its own tailored ***Basin Communities Leadership Program***, with the framework and methodology consistent in addressing **s**kills development, community knowledge & awareness, network expansion, water literacy and practical economic development solutions.

A combination of face to face workshops, online mentoring and group project work will be rolled out over a 12 months' time frame.

Recognising that Basin communities are already rich in knowledge and capability, the ***Basin Communities Leadership Program*** will focus on giving communities the tools and the leadership capacity to manage change, support community resilience and guide future economic development opportunities.

Key outcomes of the ***Basin Communities Leadership Program*** will be to:

- Understand leadership and build the skills required to lead the community through challenges and change
- Generate a high level of water literacy among participants to enable thought, debate and informed discussions central to the Murray Darling Basin Plan
- Create a network of community leaders focused on driving social and economic development within communities and across the Basin
- Build community capacity and future leadership that will help communities to transition to a future with less water
- Identify key projects that will stimulate economic activity and growth to mitigate the effects of Basin Plan water recovery activities.

MDA has recognised the importance of embracing and facilitating leadership development across Basin communities focusing particularly on those 15 communities identified as most being at risk from continuing drought and changes to economic drivers as a direct result of water reforms.

The MDA recognises these communities are in an unprecedented era of change. Some communities are adapting their economies and their social cohesion more easily in response to these changes while others are struggling to keep pace.

Some communities are finding difficulty in navigating the complex landscape of water reform, many feel that they are not being heard, and that they are being left behind in consultation and community participation processes.

In many rural communities, outcomes are critically shaped by gender, stage of the life cycle, reliance on irrigation, longevity in farming and experience and other factors. Frustration is expressed by local government and community representatives at the lack of community understanding, community engagement and at not being heard by those in positions of power.

The MDA ***Basin Communities Leadership Program*** will empower communities to make transformative change. This can only occur within communities when they have strong leadership. Without leadership communities are not able to join the conversation, make informed decisions and create a vision and framework to determine the success of their own future.

Good community leaders have a deep understanding of their local issues; of the context in which their community operates (ie: the broader Basin community); leadership skills to bring community members together; broad networks to draw on for input and support and the self-confidence to engage in critical thinking and lead informed discussions.

These leaders help build a community's capacity to contribute to its own development; they provide important input during the development of solutions, help galvanise community support for economic transition and shepherd through their effective implementation.

A lack of investment in building this capacity and limited opportunities for leaders can create a leadership void which in turn limits community capacity for adaptation. It has also proved costly to Basin governments and agencies seeking to work with local and regional communities in the implementation of the Murray Darling Basin Plan.

Research conducted by Michael M. Lombardo and Robert W. Eichinger for the Centre for Creative Leadership identified the 70:20:10 learning model, now widely accepted as best practice for leadership development programs. This formula describes how individuals internalise and apply what they learn based on how they acquire the knowledge.

The framework for the ***Basin Communities Leadership Program*** is based on this 70:20:10 leadership model.

Accordingly, the program will be broken into the following core components delivered over a 12 month timeframe appropriate to the community needs:

- On-line participant pre-work (research, community evaluation and self reflection)
- 2-day intensive workshop – skill development and community specific initiative scoping session to set participants up to deliver a project that will utilise their newly development skills to deliver local economic and/or community benefit
- On-line panel discussion
- 2 x 30 min individual coaching sessions
- 2 x online project review sessions
- On-going whole-of-program community support through online platform
- 1-day workshop following project delivery to review and finalise learning and outcomes

The MDA has a significant network of contacts and influential reach across all 172 Basin LGA's and has specific connectivity with the 15 participating communities. A range of local community elected, inspirational and representative leaders will be identified and invited to apply. Participants will be selected through a recruitment and application process and mentored throughout the program. Participants will be selected according to a comprehensive list of criteria including a demonstrated capacity for leadership, active engagement in water reform, community or economic development, intelligent curiosity and the potential to drive transformative change within the community.

The MD Basin Leadership Program will cover 15 key eligible communities as identified in the MDBED Program guidelines. Specific locations are as follows :

Dirranbandi	QLD
St George	QLD
Cunnamulla	QLD
Collarenebri	NSW
Warren	NSW
Wakool	NSW
Colignan	NSW/VIC
Red Cliffs	VIC
Merbein	VIC
Rochester	VIC
Berri	SA
Loxton	SA
Cobdogla-Barmera	SA
Swan Reach	SA
Lower Lakes	SA

DIVERSIFY AND STRENGTHEN AN IDENTIFIED COMMUNITY'S ECONOMY

The ***Basin Communities Leadership Program*** will support initiatives that develop and facilitate the emergence of local leaders, strengthen existing community leadership's understanding of the Murray Darling Basin Plan and develop stronger connections between local leaders and economic development initiatives.

The ***Basin Communities Leadership Program*** will play a key role in strengthening and diversifying the rural economies of 15 Basin communities. We will help participants understand the Murray Darling Basin Plan's 'big picture' and help them understand the role they can play in determining the future for their communities.

The Murray Darling Association is committed to increasing community and regional capacity building. The ***Basin Communities Leadership Program*** facilitated sessions and group project will identify local projects, develop strategies, and participants will be guided to implement local solutions to enhance community economic health, social wellbeing, diversity and prosperity.

The ***Basin Communities Leadership Program*** will nurture partnerships, inspire innovative thinking, develop best practice leadership initiatives and promote a healthy, vibrant economic future for communities impacted by changing water availability.

The reallocation of water discussed in the MDB Plan will have significant social consequences and will impact disproportionately on smaller, agriculturally dependent communities. This project will create new leadership and community support networks required to enhance positive adaptation and community resilience.

The benefits of a funding partnership with the Murray Darling Association provides the Department with the following outcomes:

1. Create genuine and shared understanding of the goals and objectives of the Murray-Darling Basin Plan.
2. Provide communities with clarity about roles and responsibilities of Basin governments and agencies.
3. Provide more effective processes for collaboration and idea generation that will then translate into economic development activities.
4. Harness a commitment across communities to share goals and co-operate for inter-connected benefits.
5. Establish coordinated community engagement processes that provide stakeholders with information, analysis and time to enable them to meaningfully contribute, and enough time to enable their issues and concerns to be understood and properly considered by decision makers

ENHANCE RESILIENCE OF THE COMMUNITY TO MANAGE CURRENT AND FUTURE ECONOMIC CHALLENGES AND CHANGES

Strong, vibrant and sustainable communities need great leaders and contributors to build the resilience required to managed current and future economic challenges and changes required.
The ***Basin Communities Leadership Program*** will bring established community and elected leaders together, to collaborate, pool resources and increase their understanding of key issues driving the implementation of the Murray Darling Basin Plan, so they have the skills, motivation and expertise to help their communities adapt to a future with less water.

Basin Communities Leadership Program participants' goal is to develop leaders to be catalysts for positive change in Basin communities impacted by a future with less water.

The ***Basin Communities Leadership Program*** participants from across the 15 Basin communities will embark on the experience of a lifetime. They will :

- ☑ build their skills and confidence;
- ☑ learn about regional issues, understand the MDB Plan and identify innovative ideas for action;
- ☑ meet leaders from all walks of life;
- ☑ expand their networks;
- ☑ learn more about themselves and increasing their effectiveness; and
- ☑ discover ways they can – as community leaders – make a difference in their community and industries that they are passionate about.

OBJECTIVES of the ***Basin Communities Leadership Program*** are to:

- Support the development of emerging leaders across government, business and community sectors to effect change in their local communities and region
- Generate a high level of water literacy among participants to enable thought, informed debate, intelligent inquiry and critical thinking
- Increase the diversity of local leaders in Local Government drawing out those that identify as indigenous, disabled, culturally and linguistically diverse (CALD) or disadvantaged (from a low socio-economic background)
- Increase participation by community leaders in significant regional projects, processes and planning
- Increase collaboration between networks of community leaders to effect change in local communities and regions as they relate to the Murray Darling Basin Plan
- Develop a sound evidence base on the impact and effectiveness of leadership development activities across the Basin.

The outcome will be the creation of a pool of leaders who are passionate, informed and connected and are ready to make a difference in their 15 communities across Victoria, NSW, Queensland and South Australia.

INCREASE OPPORTUNITIES WITHIN THE COMMUNITY FOR EMPLOYMENT

We have consulted widely with Local Government in the 15 selected communities, referenced other leadership programs, and engaged key people in the MDA to make sure that the program we design and deliver is relevant and enhances future leadership across the Murray Darling Basin.

Evidence in Australia and oversees identifies that future job creation and economic growth will rely on local, business and industry leadership. The development of a culture of entrepreneurship and micro businesses will underline regional communities continued success. Micro-businesses are especially important in rural communities and community leaders are becoming increasingly aware of entrepreneurship and its potential to improve local economies.

The MDA ***Basin Communities Leadership Program*** outcomes will increase the opportunities for employment through :

- Giving community and elected leaders the skills required to lead the community through challenges and change.
- Create a network of community leaders focused on driving social and economic development.
- Create community capacity to adapt to changing conditions
- Provide participants with training and competencies such as board governance, public speaking, and media skills
- Design a framework and consultation platform for MDA Leaders to connect with Government to help stimulate economic transition.

- ***Criterion 2 Community support and benefit***
  - ***a. Describe how your project will provide support for and benefit to the community, as opposed to only individuals or enterprises within the community***
  - ***b. Describe how your project is supported by the community***

The MDA ***Basin Communities Leadership Program*** will bring bright, intelligent, informed and motivated leaders to the table. Supporting the capacity of leaders to apply new skills and knowledge to effect positive change in their local community will drive reform and create resilience.

Through the MDA, the growth and development of leadership capacity and the resultant initiatives will strengthen the connection between Basin communities, creating inter-regional benefit and economic development opportunities. The ***Basin Communities Leadership Program*** will provide benefit to Basin communities by identifying and developing local economic development projects and initiatives.

Investment in leadership capabilities within Basin communities will enhance the investment and the outcomes of community consultation by Basin governments.

> *The way that governments have approached implementation of the Plan have caused considerable concern in many Basin communities. This has left a legacy of community distrust, which the [Productivity] Commission considers is a risk to effectively implementing the next phase of the Plan.*
>
> *There is a widely held view in the community that governments have failed to provide clear and decisive direction-setting leadership.*
>
> *Communities are uncertain about who is responsible, and this has made it difficult for them to navigate the institutional landscape for implementing the Plan.*
>
> Productivity Commission 2018
>
> *Murray-Darling Basin Plan: Five-year assessment*, Final Report

Development and delivery of the ***Basin Communities Leadership Program*** through the MDA will by highly regarded as a trusted platform based in community perspectives clearly aligned with long term express support for the Murray-Darling Basin Plan.

The Murray Darling Association is built on the strong foundation of good governance and operates with high standards of trust, accountability and integrity. Performance of the MDA is well regarded and highly respected by State and Federal Departments as well as the Murray Darling Basin Authority for being a true representation for Local Government and their communities.

Local government's representation through the Murray Darling Association, contributes actively to developing unity at the community level, facilitating informed debate and informing decisions made in the implementation of the Murray Darling Basin Plan.

The success and progress of the Basin Plan and its substantial investments, including recovery of water for the environment and the establishment of sustainable diversion limits depends on the support and understanding of local Basin communities.

> *If major shortcomings in current arrangements are not addressed, projects are likely to fail or be implemented poorly meaning the future cost of resetting the balance*

could be in excess of $564 million higher (the cost of having to make good by acquiring water entitlements plus any cost of wasted expenditure on failed projects)[1]

Rural and regional communities that have strong local leaders from a range of groups, and a local voice that is able to influence decision makers, including government is important for the future of the Basin Plan and community sustainability.

Through the ***Basin Communities Leadership Program*** emerging leaders across all 15 communities will gain the skills and confidence to mobilise their community on issues of importance. Communities will be able to take action on their own to address issues that affect them, and to provide leadership on consultation with Basin governments on other Basin projects.

Giving community leaders access and connectivity to other regions and communities will enable local support networks aimed to leveraging regional opportunities, foresee challenges and devise local solutions.

Basin Communities Leadership Program participants will have the skills and capacity to adapt to changing environments and the knowledge and links to resources they need to achieve a community vision.

The program will increase in the breadth and representation of local leaders making leadership activities more sustainable in the 15 Basin communities, and enabling the realisation of community assets and economic change.

This program will provide support for and benefit to community leadership as a whole and will not favour individuals or enterprises within the community.

SUPPORTED BY THE COMMUNITY

The Murray Darling Association represents Local Government across the Basin and covers the 15 communities identified in the MDBED program. Consultation has been undertaken in the development and design of the ***Basin Communities Leadership Program***.

It is worth noting that within 40 minutes of the invitation being issued to provide letters of support for this initiative more than a dozen written and verbal responses were received from communities that are eligible and that are ineligible for MDBED funding. A selection of those letters accompanies this application, with more available upon request.

Support has also been received from MP's , from industry groups and irrigation companies and even from non-member councils.

The Murray Darling Association in partnership with member councils state and federal Local Government Associations is deeply attuned to the issues impacting our rural and regional communities and environments and has tremendous value to add.

One of the most significant challenges to delivering the Murray-Darling Basin Plan on-time and in-full is the social and political conflict over the social and economic impact of water recovery and the rate of environmental recovery.

For communities across the Murray Darling Basin to adapt effectively to changing water allocations, the impacts of those variations, including those occurring under the implementation of the Basin Plan must be properly understood, and communities must see investment in their leadership capabilities.

[1] *Source: Productivity Commission, Murray-Darling Basin Plan: Five-year assessment, Inquiry Report.*

Ministers, MDA members and stakeholders alike have identified a need to assist communities and governments to quantify and respond to the social and economic impacts of changing water allocations.

Our goal is to support local leaders understand the Murray-Darling Basin Plan and assist them create viable, vibrant and adaptive communities.

The ***Basin Communities Leadership Program*** will ;

- Build local leadership capacity. We have designed a program suitable for anyone involved in their local community, their industry or the region.
- Improve the effectiveness of Local Government in Basin conversations
- Provide communities with clarity about roles and responsibilities of Basin governments and agencies
- Provide more effective processes for collaboration on implementation, generating among all parties a genuine commitment to shared goals and co-operative working arrangements
- Provide transparency and enhance accountability for decisions and actions, and the costs and benefits of decisions are clearly articulated
- Establish coordinated community engagement processes that provide stakeholders with information, analysis and time to enable them to meaningfully contribute, and enough time to enable their issues and concerns to be understood and properly considered by decision makers
- Restore community confidence in the Basin Plan and trust in the responsible governments and agencies.
- Provide a co-ordinated framework for consultation and assessment of the SDL projects.
- Amplify enhanced social infrastructure and contribute to rigorous socio-economic modelling.
- Stabilise the debate and depoliticise the commentary.

Local leaders within a community care deeply about helping the community and have the ability to influence the people living there. Potential leaders include mayors, council staff, school principals, agricultural business leaders, town business leaders and other well-known community figures.

These leaders are ideally positioned to improve community preparedness because they can effectively use their influence and connections as a means of motivating direct action.

In addition, local leaders have the deepest understanding of their respective localities and community culture. Therefore, they have a tremendous opportunity to bridge the gap between their communities and Government to devise the most appropriate way to deploy resources during time of change. Involving local leaders in the Basin Plan process allows them to relay information on the Basin Plan to the people, and these efforts ultimately result in a more resilient community.

While governments have different plans in place, local communities should use existing social infrastructure to tackle the issues resulting from the Basin Plan implementation.

Acting as a catalyst for positive change, leaders can help establish and implement community economic development plans and manage the transition to future with less water.

- ***Criterion 3 Organisational capability***

a. Describe the details of your proposed governance arrangements and how you will manage the project

b. Provide a summary of your plant to deliver the project/s, including subcontracting arrangements, if any

c. Describe the experience of the personnel who will be delivering and managing the project/s.

ORGANISATIONAL CAPABILITIES

The MDA is built on strong foundations of good governance and high standards of accountability and integrity. Performance of the MDA is well regarded and compares favourably with our LGA peers across the sector, and with other levels of government.

The MDA executive team has strong business, project and financial management and reporting capabilities.

Operation of the MDA at the executive level is highly regulated, and the organisation has a long history of delivering significant and substantial projects. Detailed progress and financial reports are provided monthly to the board and are released for public appraisal. Project finances and financial contributions are routinely acquitted in accordance with the provisions under which they are provided.

All financial performance by the MDA is subject to quarterly internal audit, and annual independent audit processes.

Operation of the MDA at the representative level is parliamentary in nature, having the executive power vested in a board composed of members of the regions, individually and collectively responsible to the membership, and each of whom are democratically elected.

MDA is Incorporated under the Association's Incorporation Act 1984 NSW, is currently listed on the Register of Environmental Organisations, and operates under the provisions of its Constitution.

The following individuals comprise the regional leadership of association. They are responsible for the coordination of communications, activities and lead engagement across their region. Each regional chair holds a seat on the national board of the MDA.

Role	Description	Name/Title
Emma Bradbury	Murray Darling Assocaition	Chief Executive Officer
Cr David Thurley	Albury City Council	Region 1 – National President
Cr Peter Mansfield	Moira Shire Council	Region 2
Vacant		Region 3
Cr Jane MacAllister	Wentworth Shire Council	Region 4
Cr Peter Hunter	Renmark Paringa Council	Region 5
Cr Melissa Rebbeck	Alexandrian Council	Region 6
Cr Andrew Tilley	City of Mitcham	Region 7
Cr Denis Clark	Northern Areas Council	Region 8
Cr Paul Maytom	Leeton Shire Council	Region 9

Role	Description	Name/Title
Cr Craig Davies	Narromine Shire Council	Region 10
Cr John Campbell	Gunnedah Shire Council	Region 11
Cr Richard Marsh	Balonne Shire Council	Region 12
Pete George	M&S Group	Treasurer

The Murray Darling Association will :

- Manage resources and provide project management for the implementation of the ***Basin Communities Leadership Program***, including program design, participant recruitment and contractor management arrangements

- Manage the program funding and employ good governance in the implementation of the ***Basin Communities Leadership Program***

- Recruit, manage and monitor all subcontractors and consultants in line with the Department's purchasing policies and procurement procedures

- Support the 15 participating communities and MDA regions so that strong communications processes and marketing is deployed to engage and excite the community and leadership participation

- Integrate governance arrangements to support the process :

    1) MDA policy and procedures are within a quality system framework

    2) Monitoring, reports and budgets will be provided to MDA Board and the Department as required.

The MDA ***Basin Communities Leadership Program*** will be sectioned into the following core components delivered over a 12 month timeframe appropriate to community needs.

These include:

- On-line participant pre-work (research, community evaluation and self reflection)
- 2-day intensive workshop – skill development and community specific initiative scoping session to set participants up to deliver a project that will utilise their newly development skills to deliver local economic and/or community benefit
- On-line panel discussion
- 2 x 30 min individual coaching sessions
- 2 x online project review sessions
- On-going whole-of-program community support through online platform
- 1-day workshop following project delivery to review and finalise learning and outcomes

Subcontracting arrangements will be allocated to Lead Diversity a rural based leadership consultancy firm based near Deniliquin NSW. Jane Harris and Angela Hussey have extensive experience in the Human Resources and Leadership Development environment across a variety of industry sectors and implement best practice methodologies in the programs they design and deliver. Both Jane and Angela have an in-depth working knowledge around community capacity building in the context of rural communities.

EXPERIENCE OF THE PERSONNEL WHO WILL BE DELIVERING AND MANAGING THE PROJECT

Chief Executive Officer of the Murray Darling Association, Emma Bradbury will lead and manage the MDA ***Basin Communities Leadership Program***.

Joining the Murray Darling Association in May 2014, Emma Bradbury has extensive experience in business management, strategic planning, financial control and organisational reform.

Emma's commitment to enhancing outcomes for local government through education, innovation, collaboration and effective peak representation is unwavering.

20 years a company director and business manager, Emma also has a background in mixed farming and involvement in local government. She has felt the effects of policy decisions on local communities first hand. Emma is committed to the principals of good governance, leadership development and public participation.

Project deliverables and timeframe

MDA *Basin Communities Leadership Program* Program overview	
Pre-Workshop: Online session and pre-work	
Topics	**Learning outcomes**
• Community context • Self-awareness • Research	• Define community challenges and opportunities and interrogate priorities through a guided methodology • Complete pre-program personality profiling (for use in program) • Understand community perspective on water and Conduct independent research through a guided methodology • Establish a shared understanding of the Murray-Darling Basin Plan and its context in the community
Workshop 1: 2 days (face to face)	
Topics	**Learning outcomes**
• Community context and transformational leadership • Self awareness • Intelligent inquiry and critical thinking • Resilience • Innovation and adaptability • Entrepreneurship	• Define community challenges and opportunities and the role of transformational leadership in the context of community • Use the Myers Briggs Type Indicator (MBTI) to identify your own preferences, and the preferences of others • Demonstrate skills in strategic thinking, innovation • Project identification and scoping

Online panel discussion	
Topics	**Learning outcomes**
• Community Leadership	• Insight in to real life experience • Problem solving for project hurdles that community teams may have encountered

2 x 30 min individual coaching sessions	
Topics	**Learning outcomes**
• Personal reflection and development	• Overcoming hurdles and implementing sustainable personal change

2 x online review sessions	
Topics	**Learning outcomes**
• Project planning and implementation	• Project implementation methodology and experience

Ongoing forum support	
Topics	**Learning outcomes**
• On-demand support from network of participants	• Network learning and support

1-day workshop – 'Graduation' project completion	
Topics	**Learning outcomes**
• Review and celebrate success	• Personal reflection and future development planning • Ongoing engagement with other Basin communities through established MDA networks.

Project resourcing and governance

Section instruction: List the types of resources needed to complete the proposed project, including personnel in the table below. Describe how the project is to be managed addressing the following items:

- *proposed governance structure*
- *accountability for delivery of outcomes under the governance arrangements (noting the lead organisation will be accountable to the Australian Government)*
- *key personnel and their skills and capabilities (enter in table below)*
- *project management capability and systems*
- *any physical requirements*
- *continuation of collaborative structure post grant funding.*

PROPOSED G0VERNANCE STRUCTURE

The Murray Darling Association will :

- Manage resources and provide project management for the implementation of the ***Basin Communities Leadership Program***, including program design, participant recruitment and contractor management arrangements
- Manage the program funding and employ good governance in the implementation of the ***Basin Communities Leadership Program***
- Recruit, manage and monitor all subcontractors and consultants in line with the Department's purchasing policies and procurement procedures
- Support the 15 participating communities and MDA regions so that strong communications processes and marketing is deployed to engage and excite the community and leadership participation.
- Integrate governance arrangements to support the process
    - MDA policy and procedures are within a quality system framework
    - Monitoring, reports and budgets will be provided to MDA Board and the Department as required.

KEY PERSONNEL

Name	Organisation	Project role and responsibilities	Previous and relevant experience, skills & attributes
Emma Bradbury CEO MDA	MDA	Program Director LGA communications, Marketing, Recruitment, Accounts, Contract reports, Project Management	Refer to CV attached
Jane Harris CEO Lead Diversity	Lead Diversity	Program design, tools developed, Implementation Coordinator, Lead facilitator, Group online Facilitation sessions, Communications with participants, Reporting back to RDA	Refer to CV attached

Attachment 10.3

Project risks

RISK RATING MATRIX

RISK PROBABILITY	RISK IMPACT				
	INSIGNIFICANT	MINOR	MODERATE	MAJOR	SEVERE
ALMOST CERTAIN Is expected to occur (up to 90% chance)	LOW	MEDIUM	HIGH	EXTREME	EXTREME
LIKELY Will probably occur in most circumstances (up to 70% chance)	LOW	MEDIUM	HIGH	HIGH	EXTREME
POSSIBLE Might occur at some point (up to 40% chance)	LOW	MEDIUM	MEDIUM	HIGH	EXTREME
UNLIKELY Could occur at some time (up to 20% chance)	LOW	LOW	MEDIUM	HIGH	HIGH
RARE May occur only in exceptional circumstances (up to 5% chance)	LOW	LOW	LOW	MEDIUM	HIGH

Risk Item and its effect on the objective of the proposed project	Risk level before treatment			Treatment strategies	Treated Risk Level		
	Likelihood (Almost Certain / Likely / Possible / Unlikely / Rare)	**Consequence** (insignificant / minor / moderate / major / severe)	**Risk Rating** (low / medium / high / extreme)		**Likelihood** (Almost Certain / Likely / Possible / Unlikely / Rare)	**Consequence** (insignificant / minor / moderate / major / severe)	**Risk Rating** (low / medium / high / extreme)
Participant turnover/quality of recruits	Possible	Moderate	Medium	Clear description about time, commitment and inputs required Good interview processes Readvertise and recruit again	Unlikely	Minor	Low
Scope creep on Leadership Program	Unlikely	Moderate	Medium	Clear definitions Clear scope and objectives	Unlikely	Minor	Low
Code of Conduct or Grievance issues	Possible	Major	Medium	Good training and information exchange, contractor management and organisational culture	Unlikely	Minor	Low
Unable to secure ongoing funding once project funding is complete	Unlikely	Moderate	Medium	Leverage future government funding from States Provision of training as fee for service	Unlikely	Minor	Low
Inconsistent or conflicting information of core MDBP content	Possible	Major	High	Partner with primary agencies incl MDBA, CEWO, responsible governments and agencies in the development of MDBP specific content.	Unlikely	Minor	Low

Arrangements post funding

Funding sought for the MDA ***Basin Communities Leadership Program*** is only a fraction of the GDP for the region, however this investment has the potential to considerably multiply the socio-economic benefits across the whole Basin and provides a legacy for structural adaptation and economic sustainability into the future.

The MDA ***Basin Communities Leadership Program*** will create enduring benefits for the community in the form of more community leaders, new connections, improved community capabilities, and timely access to new technologies.

The MDA ***Basin Communities Leadership Program*** will ;

- Build local leadership capacity. We have designed a program suitable for anyone involved in their local community, their industry or the region.
- Improve the effectiveness of Local Government in Basin conversations
- Provide communities with clarity about roles and responsibilities of Basin governments and agencies
- Provide more effective processes for collaboration on implementation, generating among all parties a genuine commitment to shared goals and co-operative working arrangements
- Provide transparency and enhance accountability for decisions and actions, and the costs and benefits of decisions are clearly articulated
- Establish coordinated community engagement processes that provide stakeholders with information, analysis and time to enable them to meaningfully contribute, and enough time to enable their issues and concerns to be understood and properly considered by decision makers
- Restore community confidence in the Basin Plan and trust in the responsible governments and agencies.
- Provide a co-ordinated framework for consultation and assessment of the SDL projects.
- Amplify enhanced social infrastructure and contribute to rigorous socio-economic modelling.
- Stabilise the debate and depoliticise the commentary.

Post funding the MDA ***Basin Communities Leadership Program*** will be available to communities across the Basin on a fee for service basis, providing enduring value in the funding provided. The MDA ***Basin Communities Leadership Program*** will continue to build leadership capabilities for rural and regional communities and deliver economic benefit to Basin communities and governments alike.

The MDA ***Basin Communities Leadership Program*** will build community capabilities and capacity, create economic development and ultimately, increase employment.

Attachment 10.3

The Hon. David Littleproud MP

Minister for Agriculture and Water Resources
Federal Member for Maranoa

Ref: MS19-000544

- 3 APR 2019

Ms Emma Bradbury
Chief Executive Officer
Murray Darling Association Incorporated
PO Box 1268
Echuca VIC 3564
via email: e.bradbury@mda.asn.au
dthurley@alburycity.nsw.gov.au

Dear Ms Bradbury

Murray-Darling Basin Economic Development Program

I would like to thank you for submitting the Murray Darling Association Incorporated's application 'Murray Darling Association Basin Communities Leadership Program' for funding under the Murray-Darling Basin Economic Development Program (the program).

It is my pleasure to advise you that I have given approval to support your project in all 15 communities with funding of up to $500,000 (GST exclusive).

The government is committed to supporting communities in the Murray-Darling Basin and I am pleased to support economic development projects in your area through this program as part of the Murray-Darling Basin Plan Commitments Package. It is important that you make the most of this opportunity as the communities the government is supporting through this measure are in genuine need of the economic activity discussed in your application.

Officers from my department will be in contact with you to discuss this opportunity. When the department is satisfied that the conditions have been met, the Australian Government will enter into a negotiated funding agreement with you. Until the agreement is executed, you will not be able to use grant funding to deliver your project.

Any enquiries you have on this grant offer can be made via the contact officer in the department - Andrew Weavers via email: MDBEDP@agriculture.gov.au or phone: (02) 6272 5081.

I wish you every success with your project and trust that you will be able to deliver economic development opportunities for your community with this funding.

Yours sincerely

DAVID LITTLEPROUD MP

Parliament House, Canberra ACT 2600 Telephone: 02 6277 7630 Email: minister@agriculture.gov.au

From: Emma Bradbury <e.bradbury@mda.asn.au>
Sent: Friday, 29 March 2019 10:29 AM
Subject: MDA's response the Federal Labor's announcement this morning

MDA response to Federal Labor's announcement on the Murray Darling Basin Plan

https://www.abc.net.au/news/2019-03-29/murray-darling-baisn-plan-labor-to-review/10951882

- We encourage all Basin governments to recognise the social and the economic impacts of the Basin Plan. Supporting communities to adjust to changing water availability is key to achieving the core environmental objectives of the Plan.
- Maintaining the basic bipartisanship of the Plan is essential to the stability of our Basin communities and of the Basin Plan.
- Basin governments must work together, and with local Basin communities to get the best outcomes on a region by region basis.
- A responsible social performance program to shepherd in this legislation is an investment in the future of the Murray Darling Basin, and in governments' capacity to implement the Plan with the trust and confidence of the Australian community.
- Any method of water recovery must be carefully considered to avoid adverse impacts on our farming communities already under significant pressure.

Kind regards

Emma

Emma Bradbury B.Soc Sci, Grad.Dip Ed, GAICD
Chief Executive Officer
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From: Greenwood Holdings <raysabka@cobweb.com.au>
Sent: Monday, 18 March 2019 4:00 AM
Subject: ABC News: Dams are empty and NSW is drowning in dust

https://www.abc.net.au/news/2019-03-12/dams-are-empty-and-nsw-is-drowning-in-dust/10890960

As the hot summer abates attention is returning to the drought. So where are we at?

Ladies and Gentlemen all,

As we approach winter we are also approaching an unprecedented period of low storage and no flows in the Northern Basin Connected Rivers System.

For a fortunate few over the top of the great artesian basin there is some assurance of having enough water until it rains again.

Now to add even more pressure, the NSW Govt have put the onus on the un-metered irrigators to get their facilities in place by December 30th 2019.

These works and measures should have been helped through the basin plan infrastructure fund in place since 2006/7 (Refer attached)

The Buyback working group visited such installations in the Barwon Darling system in

There has been a major oversight by those who were responsible for a lack of co-ordination between;

1/. The water byback programmers;

2/. The Office of the Environmental Water holder,

3/. The Department of Water in NSW who is responsible for setting the trigger points for pumping and

4/. Ignoring the need to complete the Menindee lakes scheme up grades.

There are other factors in play, but mother nature is signalling, that with all the best intentions of policy and planning the planners are missing mark when it comes down to

all the delays in infrastructure investment, where it is going to tighten up on the unmeasured losses in the system.

The South Australian Royal Commission was looking for a scapegoat and what it it got in the end was goat without a head, as it completely missed the target on fixes.

Anyone with a proper understanding of the entire system could have saved the tax payers a monty of money that could have been put to overdue works and measures, in South Australia.

Once again political bastardry won out and we are still no closer to solving the problems which we have always known about, and the Canberra penny pinchers are slowing down the process.

If Canberra needs a bridge it will get one, If Canberra needs anything that makes life softer for its residents, full time or part time, it just goes ahead without any kind of economic justification,

a justification that it puts upon everyone and everything else.

Hindsight is a very valuable tool, but it seems that we never use the experience to insure the future is less of a disaster for those venerable communities who,

feed our nation, provide work for many who support decentralization, lift our export capability, help to lessen congestion in our major cities, that places a greater load on our health system, etc, etc.

It has been proven that Cloud seeding over the Murrumbidgee and Murray Catchments is one of many lifelines and Dr Roger Stone has done some interesting work over

the Southern Qld Great divide as well the upper New England Ranges. (Refer attached)

Commonsense must overcome the emotional hysteria of the value of the upper Clarence Tributaries and how that project does not have to spell doom for the likes of Grafton.

We are looking at flood mitigation and sharing not river diversion.

Can we please get some clear heads in the room to help with progressing the Plan, not hindering its progress.

Yours Sincerely

Ray Najar.

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Former GM/ CEO of the Murray Darling Association. (2003- 2014)
Note the views expressed are those of the writer and not necesarily those of the Association.

A Lack of Understanding & Denial

To Whom It May Concern: August 2008

Why is it we in SA just want to continually blame others for the situation we often find ourselves in.

Yes we do have a water shortage problem, and yes we are running hard to do a catch up ! or are we really running hard too little too late?

Yes there were some storms in the upper Darling river catchments from Dec to March last summer and yes Menindee lakes went from 26 gigs to 603gigs by end of April.

SA actually got a bonus out of that event and was able to store some water (in Lake Victoria) that would have evaporated if Lake Menindee, the third cell was used and NSW managers had tried to go past the 640gig stage. This is where responsible management gets overlooked by the media.(or they just don't know)

Yes there were some diversions by communities at the top end of the system, but they had not seen water for 3 and in some cases 5 to 6 years.

How much went past their pumps and how much made it to the Murray? There are some pretty reliable numbers on record, too much to quote here, but cast your mind back to the Catalyst & Land Line programs of late April 2008 and try to remember the amount of water that crossed the border from Queensland to NSW (Document attached) and then view the Paroo and Warrego systems such as the Cuttaburra outflows and where that water ended up.

Almost 3,000gigs crossed the border, nothing from the Paroo even reaching the Darling and about 10% of the Warrego flow reaching Menindee lakes.

There needs to be a full understanding of the many flood escapes down those tributaries that actually goes almost 100% to the environment, for example the Talywalka outflow above Tilpa and again Wilcania, will absorb approx 300 gls just to create a run through before it gets back into the Darling below Lake Wetherell.

Most of the Water that reached the Lakes originated out of northern NSW and south eastern Queensland. Approx just over 400 gls, and this is water that made it past the pumps we are accusing of taking it all.

Has anyone visited these sites to view how what is taken, is measured at the point of extraction, based on their current license laws, and any delivery or evaporation losses are borne by the customer. (photo attached)

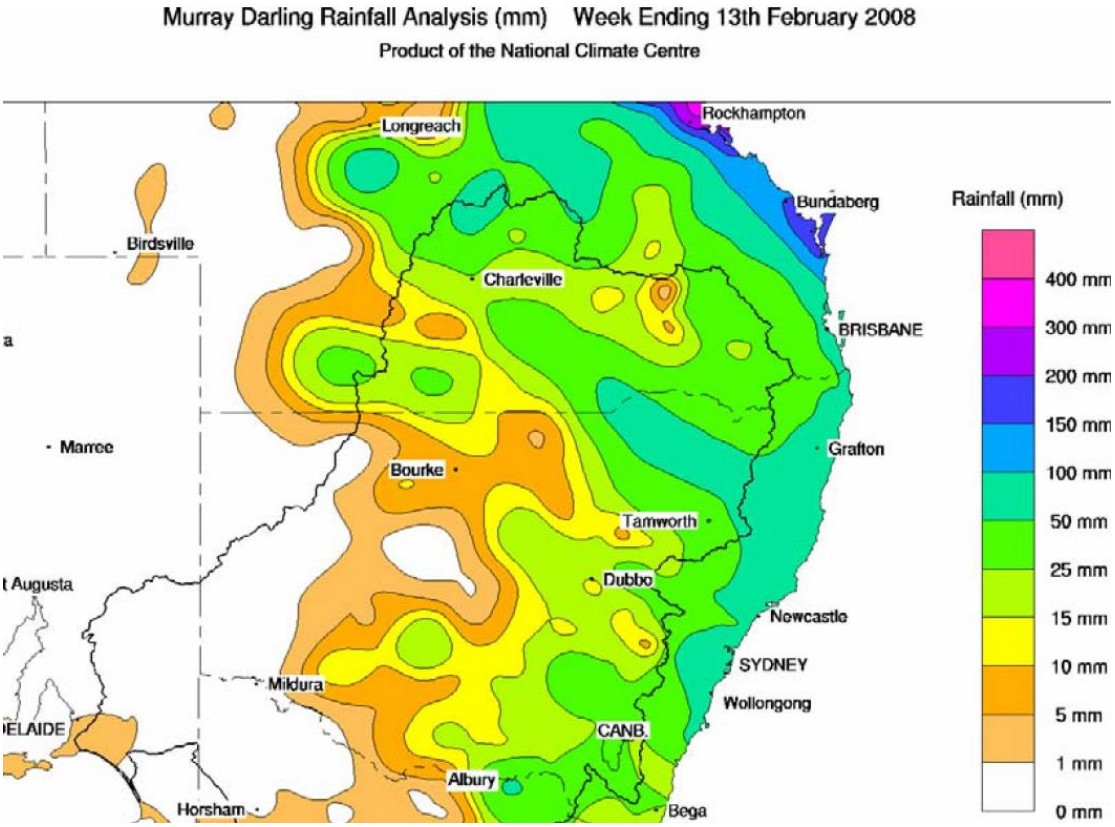
Much more can be said and quoted, but at the end of the day unless we are prepared to change how we manage our own system to avoid the major losses we incur, no one in the North or East are going to feel sorry for the plight that SA finds itself in.

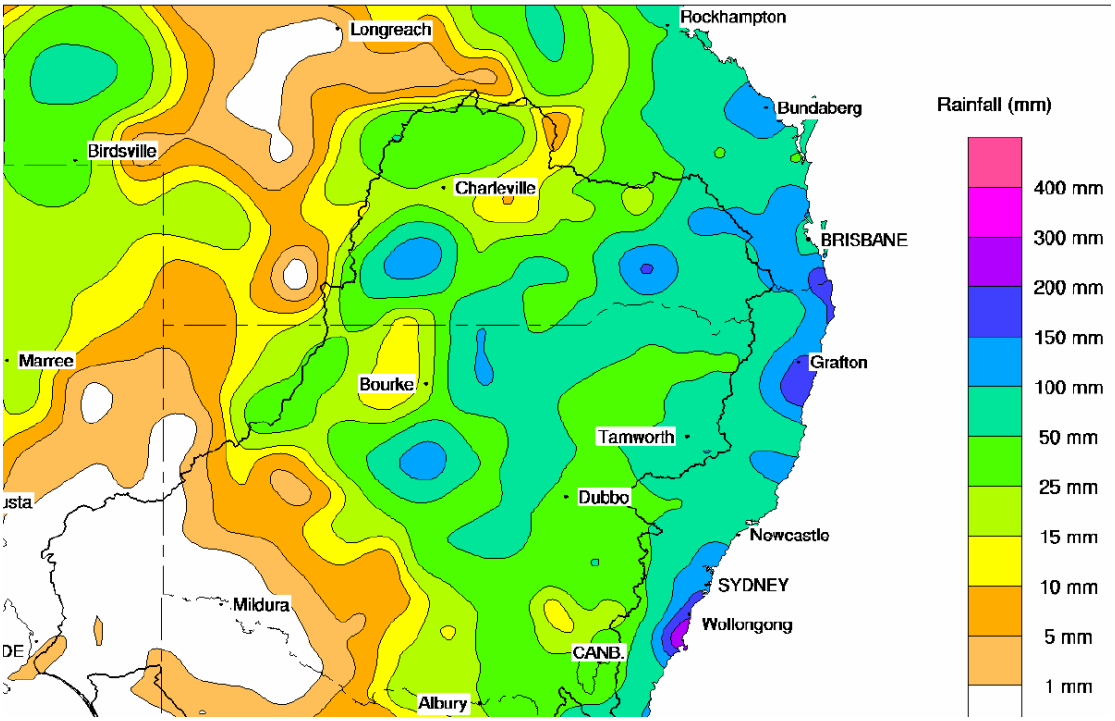
Ray Najar
General Manager – Murray Darling Association August 7, 2008

Discussion on Private diverter's property where metering is transmitted to base station for NSW DNR records and license monitoring.

The Murray Darling Basin Catchments Map; the big events were on the Paroo and the Warrego, with lesser events east and south to the Castlereagh.

The Weather Maps to follow while showing reasonable falls in Qld and NSW had no effect on flows below Wentworth until well into Dec 2009 / Jan 2010





Flow at Lock one (Blanchetown) was only 1,180 megs per day. It dropped to 840 megs per by mid 2009.

Clarence River diversion still on the agenda

Australia Thursday, 14 June 2007

The Federal Government's heavily criticised plan to divert Clarence River water to help drought-plagued southern Queensland still appeals to many in western NSW.

At last week's NSW Shires Association annual conference, Bourke and Cobar councils called for water from the Clarence to be diverted to ease shortages facing inland communities.

While the motion was lost, nevertheless the association will lobby the Federal Government to investigate the coastal river diversion issue as part of its National Water Initiative plan.

The river diversion issue split inland and coastal councils at the conference, with opponents fearing a devastating environmental impact. Clarence Valley Council Mayor, Ian Tiley, who opposed the original motion, said any diversion would fly in the face of numerous environmental and shires association policies.

"The river's a very complex ecology and should not be subject to blocking of water - it needs flushing," Mr Tiley said. (This is where the problem lies it is not blocking nor a full diversion it is Flood mitigation works for Hydro electric power and Western NSW back up) RRN

"It (diverting water) could cause all sorts of problems and it's not the way to go or a sustainable solution." Mr Tiley, whose council also opposes piping Clarence water into Queensland, doubted attempts to divert water from the river had gone away.

"If all options are to be looked at for water sources, river diversion will come back on the agenda," he said.

Bourke Mayor, Wayne O'Mally, who suggested surplus water from the river could be diverted into the Murray-Darling river system, said people in rural NSW had to have water and he was pleased the issue was at least being talked about at the conference.

"We can't just sit back and do nothing. The Clarence River is just one of a few proposals around at the moment," he said.

Shires Association president, Bruce Miller, from Cowra, said opinion might be divided but communities were in a desperate situation because of the continuing drought.

An extract from The Land's coverage of the NSW Shires Association's conference.

Roger Stone to lead national cloud seeding research

Australia Monday, 14 May 2007

Leading Australian climatologist and University of Southern Queensland academic, Professor Roger Stone, has been appointed chair of the new National Task Group for Precipitation Enhancement Research.

Dr Stone was appointed to run and coordinate the cutting-edge national research program while attending the Australian Cloud Seeding Research Symposium in Melbourne last week.

Dr Stone is the Director of the Australian Centre for Sustainable Catchments at USQ and said the creation of the research group was an important development in the area of cloud-seeding science.

"The development of this important group has been driven by aspects of climate change and our enormous shortfall in water availability in many parts of Australia," Dr Stone said.

"We need to move quickly on making sure we have some practical science in this controversial area."

Over the next four years the task group will implement and research warm cloud precipitation enhancement science, focussing on the South East Queensland region.

USQ senior lecturer in physics, Dr Jeff Sabburg, also attended the symposium and will be involved in the task group, especially relating to cloud physics.
He said while research had previously been done into the technique in Australia, never before had it been explored on such a large scale.

"**Australia broke the ground in cloud seeding science many years ago," Dr Sabburg said.**

"Now the water shortage crisis and the development of technology means we need to re-evaluate the science.
"Never before has this type of collaborative project occurred in Australia, and I think it's probably the biggest thing nationally to come out of the ACSC.

"The development of the task group brings the whole science community involved in precipitation enhancement research together for the first time."

USQ will collaborate with Hydro Tasmania, Snowy Mountain Hydro, the Bureau of Meteorology Research Centre, the CSIRO and Monash University on the task group.

Catchment-wide benefits hold cloud seeding key

By GRAHAM FULLER – Australia Tuesday, 15 May 2007

AN Australian Cloud Seeding Research Symposium in Melbourne last week has delivered tangible results in the shape of a new appointment for one of this country's most noted climatologists. University of Southern Queensland (USQ) academic, Professor Roger Stone, now heads up the National Task Group for Precipitation Enhancement Research.

It's in response to the nation's debilitating drought which continues to linger despite the breakdown of the recent devastating El Nino weather pattern.
With the economy increasingly being impacted by the run of dry seasons, both new and existing climate-related sciences are being re-visited by researchers, as is the case with cloud seeding.
"The technology we can use to measure the impact of cloud seeding has markedly improved during the past 20 years or so," Dr Stone said.

Expect more sophisticated CP2 Doppler radar systems to be directed towards "interrogating" the internal workings of every cloud that passes by them, plus greater reliance on the latest satellite imagery.
"Both these advancements can help tell us whether it (cloud seeding) does have value in this part of the world," Dr Stone said.

That aside, the technique requires aircraft to release minute quantities of silver iodide or even urea when flying through clouds.
Provided conditions are ideal, that's all that's needed to "kick start" a chain reaction able to "grow" taller clouds into the atmosphere in a timescale as short as 15 minutes.

Thailand reportedly has 30 aircraft dedicated over five regions, demonstrating their government is taking the issue seriously. Since not every area of Australia's land mass is suitable for cloud seeding, the suggestion is we don't need to have a second air force dedicated to the task.

"While the technique doesn't work in every type of cloud, there's great potential on, or near hills and higher ground, and where cloud temperatures are between minus five C to minus 20 in the upper atmosphere," Professor Stone said.

> "What we are keen to find out is whether this could be beneficial over a catchment, or region where it could help farmers and water resource planners," he said

From: Peter Shepherd <peter_nshepherd@yahoo.com.au>
Sent: Sunday, 21 April 2019, 3:29:31 pm ACST
Subject: Goyder Institute recommends key actions to secure the future of the Coorong's South Lagoon

Goyder Institute for Water Research - Goyder Institute recommends key actions to secure the future of the Coorong's South Lagoon

Goyder Institute for Water Research - Goyder Institute recommends key ac...

In a report released by the South Australian Minister for Environment and Water, David Speirs MP, the Goyder I...

Goyder Institute recommends key actions to secure the future of the Coorong's South Lagoon

Nov 22, 2018
Author: Goyder Institute

In a report released by the South Australian Minister for Environment and Water, David Speirs MP, the Goyder Institute recommended a series of short, medium and long-term actions to restore the ecological character of the South Lagoon of the Coorong. The Coorong has been severely degraded through water extraction and the Millennium Drought, but as inflows of water have recovered, the system is still struggling, with waterbird abundance remaining low.

"*This is an area we just do not know enough about. That's why we commissioned this report – to try and get some consensus around the scientific community in South Australia and broader…what we should be concentrating on to either find out more about or get some quick wins to try and get things happening*," said the Minister for Environment and Water, David Speirs MP.

Historically, the Coorong has supported up to 20% of the global non-breeding population of some shorebirds and it's an important refuge for

migratory and non-migratory waterbirds across the Murray-Darling Basin – during the Millennium Drought it hosted 90% of the Basin's waterbirds. Along with Lake Alexandrina and Lake Albert, it is recognised as a Ramsar wetland of International Importance.

The Minister sought advice from the Goyder Institute, who assembled a multidisciplinary team to establish the current ecological state of the Coorong's South Lagoon and recommend actions for its restoration. Led by Professor Justin Brookes, The University of Adelaide, the team was drawn from experts within The University of Adelaide, SARDI, Flinders University, CSIRO and DEW.

"*The Coorong is a National Treasure and needs a management plan that can ensure protection of this vital habitat in the water constrained world we now face. The Coorong expert panel drew upon expertise from a range of Goyder Institute partners to provide a set of recommended actions for restoring the ecological health of the Coorong*," said Professor Brookes.

"*Drawing upon a diverse skill set is critical to understand the needs of the diverse suite of organisms in the Coorong and the interactions between them*."

The decrease in waterbird abundance has been associated with a recent shift from an aquatic plant-dominated to an algal-dominated system. The algae is preventing crucial aquatic plants, like *Ruppia tuberosa*, from completing their lifecycle and is interfering with the waterbirds' ability to feed. Managers have some tools available to manipulate water, salinity and algal levels to help manage the system, but they can't confidently predict how it will respond, because of significant knowledge gaps.

"*Part of the issue is trying to find the balance between creating conditions that are ideal for one group of species like fish, but also trying to find the right conditions for waterbirds. We need to find a way to create conditions that are suitable for both groups*" said Goyder Institute Director Dr Kane Aldridge.

South Australian Minister for Environment and Water, David Speirs MP and Goyder Institute Director Kane Aldridge discussing the report's release on ABC 891.

The Institute's expert panel recommended four key actions to address the immediate threats to the South Lagoon and help managers use the tools available to them without causing long-term harm. In addition to environmental water recovery, the recommendations were:

1. Protect and increase waterbird populations by creating nurseries for aquatic plants within the South Lagoon and increasing habitat and food resources in the broader landscape.
2. Undertake trials to shift the system from an algal-dominated to an aquatic plant-dominated system.
3. Improve our knowledge on nutrient cycling and how to maximise nutrient turnover into productive elements such as plants, invertebrates, fish and birds and incorporate knowledge into a response strategy.
4. Undertake a climate change vulnerability assessment and implement climate change adaptation activities.

The Institute presented their findings to the Minister, with the recommendation that these actions be implemented immediately so that the Coorong can continue to: serve as a local, national and international refuge for wildlife; support associated industries that are vital to the economy; and enrich the lives of locals and visitors alike.

The Minister released the report on 9 November 2018 in conjunction with the Coorong Summit Summary Report. The Minister said the reports build a working vision to help restore the health of the Coorong, characterised by healthy vegetation and with abundant and diverse populations of waterbirds, fish and plants.

You can find out more about the research findings in the Institute's report: Recommended actions for restoring the ecological character of the South Lagoon of the Coorong or contact Goyder Institute Director Dr Kane Aldridge to discuss the Institute's collaborative research programs and capabilities.

From: Emma Bradbury <e.bradbury@mda.asn.au>
Sent: Wednesday, 3 April 2019 1:01 PM
Subject: MDA Media Release - Reaction to Budget 2019

Dear all

Please see attached the MD's reaction to last night's budget. Please feel free to distribute to your networks. You may also like to add to the statement with a quote from your region chair to generate relevance for your members councils and communities.

Kind regards

Emma Bradbury B.Soc Sci, Grad.Dip Ed, GAICD
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MEDIA RELEASE

Wednesday 3 April 2019

MDA reaction to Budget

Last night's budget commitment of $34.0 million over four years to grow stewardship and biodiversity practices in the agriculture sector has been welcomed by the Murray Darling Association (MDA), Australia's peak body for local government in the Murray-Darling Basin.

"Improved health outcomes for our inland rivers at a Basin scale requires investment in innovation and diversification in the agriculture sector," MDA National President Cr David Thurley said.

Investment in natural disaster response and drought support has been welcomed, with Basin councils seeking further initiatives that assist agricultural industries and primary producers to improve their capacity to manage business risks and prepare for climate change and variability.

A $2.9m commitment over 2 years to drive national leadership for agricultural innovation has also been welcomed.

"While this budget provides a range of spending measures that will benefit our regional communities the MDA would like to see greater investment in a coordinated response to climate change, and additional strategies that will assist local government to support regional communities to respond to changing water availability," CEO Emma Bradbury said.

Background

https://www.budget.gov.au/2019-20/content/documents.htm
https://www.abc.net.au/news/rural/2019-04-02/drought-trade-disaster-priorities-for-farmers-in-20169-budget/10958900
https://www.theguardian.com/australia-news/2019/apr/03/the-2019-australian-budget-verdict-what-the-papers-and-websites-say

ENDS *For more information, contact Murray Darling Association Chief Executive Officer, Emma Bradbury on 0429 905 017 or Cr David Thurley on 0419 510 274.*

From: Peter Shepherd <peter_nshepherd@yahoo.com.au>
Sent: Sunday, 21 April 2019 3:36 PM
To: Cr Andrew Tilley <atilley@mitchamcouncil.sa.gov.au>; Cr Darren Kruse <dkruse@mitchamcouncil.sa.gov.au>; Prof Wayne Meyer <wayne.meyer@adelaide.edu.au>; Jo Podoliak <jpodoliak@rdamr.com.au>; Ray Najar <raynajar@australiabusinessconnect.com.au>; Damien Cooke <damienc@rdahc.com.au>; Deana Mildren <deana.mildren@mdba.gov.au>
Subject: Coorong Summit Summary Report 5 June 2018

Coorong Summit Summary Report

A Coorong Summit was held in 2018 for key stakeholders to discuss the health and management of the Coorong, particularly for the South Lagoon. The stakeholders included traditional owners, community groups, scientists and water resource managers. A report has been developed on the current conditions and issues affecting the Coorong, as well as a vision and recommendations for its future health and management.

Download the Coorong Summit Summary Report.

Coorong Summit
Summary Report
5 June 2018

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.

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.

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.

Recommended actions arising from the Summit

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
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.

Longer term actions
• Improve our understanding of the role and management options for salinity levels in the south lagoon of the Coorong:
o 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
o Embrace variability and allow the system to have lower and higher salinity levels across years – monitor the result
o Explore the idea of exporting salt to the ocean
o Manage nutrients across the Coorong ecosystem so they do not accumulate in one area – look at options for exporting nutrients through potential engineering options.
o Lower the extreme salinity levels back to hypo-saline conditions
• Have a long term plan for the Ramsar site that accounts for climate change:
o Revisit the ecological description in the Ramsar listing. Is this what we want in the long term?
o 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:

o Remove constraints in the Southern Connected Basin
o Rewrite the Water Act.
• Governance reform:
o Develop objectives and targets
o 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:
o Lake Albert Connector
o What would the system look like without the barrages: with different River Murray flows, with climate change, for short term drought responses.

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:
  - o Variable salinity that supports Ruppia, fish and invertebrates = Food for birds
  - o Hypersaline environment is a unique habitat for some species – buffer for impacts eg carp virus and black water
  - o Think through consequences of 80 ppt to other components
  - o Increase salinities in past has not solved problem of algae
  - o Allow more flexibility to use SE drainage water in SE wetland and Coorong
  - o 60 ppt ≤ (upper limit) – managing salinity via wetlands storage

Major infrastructure

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

Improvements to governance and management

- 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

- Must consider climate change and sea level rise (vision timeframe?).

Knowledge gaps that need to be addressed

- 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

- 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

From: Peter Shepherd <peter_nshepherd@yahoo.com.au>
Sent: Sunday, 21 April 2019 3:25 PM
To: Cr Andrew Tilley <atilley@mitchamcouncil.sa.gov.au>; Cr Darren Kruse <dkruse@mitchamcouncil.sa.gov.au>; Professor Wayne Meyer <wayne.meyer@adelaide.edu.au>; Jo Podoliak <jpodoliak@rdamr.com.au>; Ray Najar <raynajar@australiabusinessconnect.com.au>; Damien Cooke <damienc@rdahc.com.au>; Deana Mildren <Deana.Mildren@mdba.gov.au>
Subject: Science advice from the Goyder Institute provides foundation for a new agreement to restore the Coorong's health

Goyder Institute for Water Research - Science advice from the Goyder Institute provides foundation for a new agreement to restore the Coorong's health

Goyder Institute for Water Research - Science advice from the Goyder Ins...

On Friday December 14th the Minister for Environment and Water, Hon. David Speirs MP, announced a new agreement ...

Science advice from the Goyder Institute provides foundation for a new agreement to restore the Coorong's health

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Dec 19, 2018
Author: Goyder Institute

On Friday December 14th the Minister for Environment and Water, Hon. David Speirs MP, announced a new agreement between the Murray-Darling Basin Ministers to help get the iconic Coorong back on track and restore the health of the South Lagoon.

The agreement follows recommendations within the Coorong Summit Summary Report and the Goyder Expert Panel Report which outlined a series of short, medium and long-term actions to restore the South Lagoon. These reports will form the basis for new *Healthy Coorong, Healthy Basin Action Plan* which is expected to be finalised before mid-2019.

The Minister announced that:

- $70 million of unallocated South Australian State Priority Project (SPP) funds will be made available for measures to support the

long-term health of the Coorong identified in the *Healthy Coorong, Healthy Basin Action Plan*.

- Of the $70 million, up to $2 million is being released immediately to support the Commonwealth and South Australian Governments to develop the *Healthy Coorong, Healthy Basin Action Plan*.
- Subject to the evaluation of the *Healthy Coorong, Healthy Basin Action Plan*, $25 million will be made available to deliver phase 1 of the Action Plan.

In addition, Murray-Darling Basin Ministers agreed to on-farm projects being included as part of a suite of efficiency measures to deliver the 450 GL environmental water, with additional socio-economic criteria agreed to ensure that communities benefit from this investment as well as the environment. This is another important step for improving the health of the Coorong and other important ecosystems in the Basin. As part of this, the Commonwealth will fund a study to look at the use of Adelaide's desalination plant.

The Goyder Institute welcomes the fast action on its recommendations and looks forward to continuing to work with State and Federal governments to help restore and protect this national treasure.

From: Craig Davies <cr.cdavies@narromine.nsw.gov.au>
Sent: Monday, 6 May 2019 8:09 PM
To: Emma Bradbury <e.bradbury@mda.asn.au>
Cc: Forbes Shire Council delegate - Cr Phyllis Miller <phyllisjmiller@gmail.com>; Cr Andrew Tilley <atilley@mitchamcouncil.sa.gov.au>; Cr David Thurley - R1 <DThurley@alburycity.nsw.gov.au>; Cr Denis Clark - R8 <Denis.Clark@nacouncil.sa.gov.au>; Cr Jane MacAllister - R4 <crmacallister@wentworth.nsw.gov.au>; Cr John Campbell - R11 <johncampbell@infogunnedah.com.au>; Cr Melissa Rebbeck <Melissa.Rebbeck@alexandrina.sa.gov.au>; Cr Paul Maytom - R9 <paulm@leeton.nsw.gov.au>; Cr Peter Hunter - R5 <Crhunter@renmarkparinga.sa.gov.au>; Cr Peter Hunter - R5 <hunterps11@bigpond.com>; Cr Peter Mansfield <pmansfield@moira.vic.gov.au>; Cr Richard Marsh - R12 <richard.marsh@balonne.qld.gov.au>; Pete George - Treasurer <Pete.George@msgroup.net.au>; Alexandra O'Keefe <alexandraokeefe@infogunnedah.com.au>; Executive Assistant General Manager <gmea@wentworth.nsw.gov.au>; Gunnedah Council <council@infogunnedah.com.au>; James Marshall <admin@mda.asn.au>; Johns - Andrew <andrewjohns@infogunnedah.com.au>; Matthew Magin <Matthew.Magin@balonne.qld.gov.au>; Region 2 Secretariat, Bobby Brook <bbrook@moira.vic.gov.au>; Region 6 Secretariat, Tracey Strugnell <tstrugnell@coorong.sa.gov.au>; Region 9 Secretariat <melissas@leeton.nsw.gov.au>; Tony Siviour <ceo@renmarkparinga.sa.gov.au>; Catherine Keegan <ea@mda.asn.au>; steve.loane@forbes.nsw.gov.au
Subject: Re: Water Buybacks: The Sunday Project - The Project Took A Plane Over The Property At The Heart Of The Water Buyback Scandal

Hi Emma,

On the face of it you can only assume that what has been reported is true. They are serous allegations and the details need to be brought to light. Did the government really pay $80 mill for irregular overland flows? Did the QLD government really investigate the supposed demolition of the earthen infrastructure designed to hold back water? Did Penny Wong really pay Twynam Past Co $303 mill and over recover 92,000 megs on the Macquarie?

What I think all this proves is that the major parties are equally useless when it comes to putting together a coherent , efficient and productive water policy. I have grave fears about any wrong doing and acts of criminality or nepotism need to be exposed and dealt with in accordance with the law. I think it is more than just the misguided inner city experts who are sick to death of the very poor management that has been the one constant of this MD Plan and whilst we can't start again I would desperately hope that before they completely stuff the whole system common sense sneaks into the act and sanity prevails.

I believe that the use of less than 20% of available water being used for productive agriculture needs to advertised until the inner city experts realise they really are the mushrooms in the room.

What odds would that be.

Cheers

Craig

Kind Regards

Craig Davies

Mayor
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On 6 May 2019, at 4:55 pm, Emma Bradbury <e.bradbury@mda.asn.au> wrote:

Hi All

As mentioned at this morning's discussion, The Sunday Project last night ran a story on the $80m purchase of overland flows. In essence the story reveals that the purchase committed the owner to remove levees that divert overland flows to Kia-Ora – and allow them to flow back into the Balonne. The Project reveals that while the Qld Govt affirmed that the works had been undertaken, it would appear that the levees are still in place, with only one breech reported to have occurred during the last flood event. No further remediation works appear to have been done.

This is an 11 minute story – and essential viewing.

https://tenplay.com.au/channel-ten/the-project/extra/season-10/hamish-took-a-plane-over-the-property-at-the-heart-of-the-water-buyback-scandal

Regardless of the election process, my view is that this is an issue that the MDA should reasonably be expected to have a position on – and at the very least should have some consistent words ready in response, and on the record for anyone who asks.

I would be happy to put a few lines together tomorrow for your approval – but would appreciate your feedback on the story before I do.

Kind regards

Emma

<image002.png> <image003.png> **Emma Bradbury** B.Soc Sci, Grad.Dip Ed, GAICD
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