

Enhanced Murray Cod recreational fisheries outcomes across the Murray-Darling basin through improved collaboration and alignment of management and research activities



Australian Government

**Fisheries Research and
Development Corporation**

Project No. 2009/060

Fisheries Research House
25 Geils Court, Deakin ACT
Postal address: PO Box 222, Deakin West ACT 2600, Australia
Tel: (02) 6285 0400 International: 61 2 6285 0400 Fax: (02) 62854421 International: 61 2 628
Email: frdc@frdc.com.au

2009/060 Enhanced Murray Cod recreational fisheries outcomes across the Murray-Darling basin through improved collaboration and alignment of management and research activities.

Anthony Forster
Fisheries Victoria
Department of Primary Industries
PO Box 4440
Melbourne 3001
Telephone: 03 96584375
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2009/060 Tactical Research Fund: enhanced Murray cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research activities

PRINCIPAL INVESTIGATOR: Anthony Forster
ADDRESS: Fisheries Victoria
Department of Primary Industries
PO Box 4440
Melbourne 3001
Telephone: 03 96584375

OBJECTIVES:

The objectives of this project are to:

1. Develop a shared understanding of the issues, impediments, information gaps and opportunities to build a stronger recreational Murray cod fishery.
2. Develop an action plan to improve Murray cod recreational fisheries outcomes across the Murray-Darling Basin through partnerships between fisheries, environmental management agencies and recreational fishers.
3. Build a shared commitment by key stakeholders to develop and implement a recreational fishery management and research action plan.

1. NON TECHNICAL SUMMARY:

OUTCOMES ACHIEVED TO DATE

This project will deliver a shared understanding of the issues, impediments, information gaps and opportunities to build on Murray cod fishery management across the Murray-Darling Basin through effective partnerships between resource management agencies and the recreational fishing sector. In doing so it will build greater confidence in the long-term sustainable management of the Murray cod Fishery by highlighting where recovery has occurred in the last decade and how management has contributed to the recovery.

Research directions will be driven by stakeholder and fisheries management needs to address key knowledge gaps. Transparent and logical analysis will drive investment and the outcomes will better inform decision making while facilitating support from the angling community.

More specifically, the workshop and action plan will:

1. Facilitate alignment of policy and research directions between fisheries management jurisdictions across the Murray-Darling Basin,
2. Identify important fisheries management priorities, knowledge gaps and questions to improve Murray cod populations (including long-term monitoring),

3. Develop a fisheries management and research action plan for the Murray cod fishery focussing on fisheries management needs,
4. Promote long-term and representative monitoring of Murray cod populations across the Murray-Darling Basin.
5. Communicate current and recent Murray cod management and research outcomes,
6. Develop a project logic to show the theory of how the required outcomes will be achieved.
7. Identify opportunities for recreational fishing sector to coinvest and participate in relevant research ,
8. Facilitate more efficient and effective use of research, development and extension resources.

The recreational fishing sector will benefit from better and more sustainable management of the Murray cod fishery including more efficient stocking practices, more appropriate management controls leading to long-term improvements in fish population status and associated catch rates.

Murray cod are a threatened Australian iconic species of the Murray Darling basin, particularly valued by recreational fishers. As the Murray cod fishery is managed across five fisheries management jurisdictions, there is a compelling need for fisheries researcher, managers and fishers to work together to avoid duplication, align investment priorities and realise opportunities that come from collaboration.

This project began with a workshop at Lake Mulwala in December 2009. The workshop set out to develop a shared understanding of the key issues impacting the Murray Cod fishery; develop an action plan to improve the Murray Cod recreational fishery through collaborative partnerships; and, build a shared commitment by key stakeholders to implement an Action Plan. The workshop was attended by 53 delegates representing the interests of recreational fishers, fisheries researchers and fisheries managers from four States and one Territory.

The key outcomes of this workshop led to the preparation of Terms of Reference for a Murray cod Fishery Management Group (see appendix 1) and a basin-wide Murray Cod Action Plan (see appendix 2). These two outputs have since been endorsed and part-funded by the Australian Fisheries Management Forum. Membership of the Murray cod Fishery Management Group will include one researcher, one fishery manager and one recreational fisher from each of five state and territory jurisdictions. In addition, the group will include representation from the Murray Darling Basin Authority (Native Fish Strategy) and from the relevant commonwealth Department (Murray cod Recovery Plan).

This project has built on the goodwill established through the Mulwala workshop and developed a basin-wide approach to improve fishery management, research and angler engagement. The outcomes of this project provide a strong collaborative platform to improve recreational and conservation outcomes for the Murray cod fishery. This project is recognised by AFMF as a case study for cross-jurisdictional management of a recreational fishery.

KEYWORDS: Murray cod, Murray Darling Basin, collaboration of research management arrangements

2. Acknowledgements

Fisheries Victoria would like to acknowledge FRDC for the financial support for this project and all agencies that provided staff expertise and associated costs to participate in the workshop. In particular, the authors would like to acknowledge the contribution of those recreational fishers who invested their own time on this project on a voluntary basis.

3. Background

Murray cod is a highly valued freshwater angling species that is also listed as threatened (IUCN: upgraded to Critically Endangered in October 2008). It's historical, cultural and economic heritage resonates with communities across the MDB and its plight is symbolic of many other native species adversely impacted by changed environmental conditions since white settlement.

Recreational fishing is one of the largest non-commercial primary industries in Australia. In Victoria alone, more than 720,000 recreational fishers contribute more than \$820 million to

GVP annually. Murray cod are a highly valued recreational species – the Murray cod fishery in Victoria alone is estimated at \$166 million annually. Recreational fishers as end-users clearly have a major stake in the Murray cod fishery.

In February 2010, a workshop was convened to improved collaboration and alignment of Murray cod management and research. The workshop was co-funded funded by Fisheries Research and Development Corporation (FRDC) and State Fisheries agencies and was organised by a cross jurisdictional steering group.

This report highlights the key outcomes of that workshop and subsequent progress of implementing the actions arising from the workshop.

4. Need

The primary responsibility for managing the Murray cod fishery across the Murray-Darling basin rests with fisheries jurisdictions in Queensland, New South Wales, Australian Capital Territory, Victoria and South Australia. As a listed threatened species, the Murray Darling Basin Authority, conservation agencies and the Commonwealth Government also have a shared responsibility to ensure the fishery is managed sustainably. In this complex regulatory and administrative environment there is a clear need for multiple agencies to work effectively together in managing the resource.

A more collaborative approach is consistent with the Primary Industries Ministerial Council Policy commitment to collaborate nationally and use research, development and extension services more effectively and efficiently.

To achieve the above there is a need to:

1. Improve research deliver i.e. improve information flow between fisheries management and environment management agencies to avoid research duplication, break down jurisdictional silo's (share information), improve cost effectiveness, timeliness and quality of research (peer review),

2. Align fisheries management and policy i.e. there are significant difference in fisheries management approaches between jurisdictions, e.g. stocking policy, population modelling, bag and size limits etc.
3. Better align research directions to meet fisheries management needs,
4. Better coordinate between fisheries management agencies in dealing with illegal take for sale trade (note: declaration of Murray cod as a priority species in Victoria),
5. Address a growing division of opinion about the status of Murray cod populations between anglers, fisheries managers and environmental agencies.

Improved collaboration will ensure research is driven by resource management objectives, reduce the risk of research duplication, drive policy and research alignment and improve the quality, effectiveness and efficiency of applied research and development.

5. Objectives

The objectives of this project are to:

4. Develop a shared understanding of the issues, impediments, information gaps and opportunities to build a stronger recreational Murray cod fishery.
5. Develop an action plan to improve Murray cod recreational fisheries outcomes across the Murray-Darling Basin through partnerships between fisheries, environmental management agencies and recreational fishers.
6. Build a shared commitment by key stakeholders to develop and implement a recreational fishery management and research action plan.

6. Methods

In February 2010, Fisheries Victoria and NSW Industry and Investment convened a workshop on the shores of Lake Mulwala. The aim of the workshop was to enhance Murray cod recreational fisheries outcomes across the Murray-Darling basin through improved collaboration and alignment of management and research. The workshop was co-funded by Fisheries Research and Development Corporation (FRDC) and State Fisheries agencies and was organised by a cross jurisdictional steering group. The workshop was attended by 53 delegates representing the interests of Murray cod recreational fishers, researchers and managers from five fisheries management jurisdictions and other resource management authorities.

The workshop resulted in a cross-jurisdictional steering group preparing a Murray Cod Fishery Management Action Plan. The Action Plan addresses the key themes of the workshop; to look for opportunities and benefits that come from working together across multiple jurisdictions, to avoid duplication of research and management effort, to better engage recreational fishers and to align regulation and policy wherever possible.

The workshop proceedings were developed by the steering group and circulated to all workshop participants and then finalised. Terms of reference for the Murray Cod Fishery Management Group and the Murray Cod Fishery Management Group Action Plan were also developed and endorsed by the Australian Fisheries Management Forum.

To ensure the Action Plan secures appropriate jurisdictional authorisation, it will be implemented by a cross jurisdictional Murray Cod Fishery Management Group (MCFMG) appointed by the Australian Fisheries Management Forum (AFMF). The MCFMG will comprise membership from; researchers, fisheries managers, recreational fishers, MDBA (Native Fish Strategy).

7. Results/Discussion

This project promotes policy, research and regulatory alignment of multi-fisheries jurisdictions for a common Murray cod resource across a wide geographic area of the Murray Darling Basin (over 1 million km²). This is a complex challenge as each fishery jurisdiction has separate and different legislative, policy and resource setting arrangements.

In respect of research collaboration, this project aligns with the National Primary Industries Research Development and Extension Framework. The framework recognises the need for research to be focussed, used efficiently, effectively and collaboratively. The framework provides the structure and institutional arrangements needed to strengthen national research capability and better address cross sectoral research and development.

The composition of the Murray Cod Fishery Management Group will ensure recreational fishers are also brought to the table and empowered to influence fisheries research and management decisions.

FRDC and the Australian Fisheries Management Forum have recognised the need to improve arrangements for fisheries that require cross-jurisdictional management. This project will establish strong governance arrangements at the outset and ensure administrative and management arrangements are open transparent and fair. The formation of a basin-wide Murray cod Fishery Management Group provides a vehicle for the development of a recreational fishery cross-jurisdictional harvest strategy case-study.

Importantly the draft Murray Cod Fishery Management Action Plan is now recognised by and aligns with the draft National Murray Cod Recovery Plan. In particular, the need for a coordinated approach to recreational fishery management is included as a sub set of the Recovery Plan's actions relating to fishery issues (mainly under objective 5).

8. Benefits and Adoption

The benefit flows from this project are shared across all Murray-Darling Basin recreational fisheries. The commonwealth will benefit from coordination of fishery management input to the National Murray cod Recovery Plan.

Flow Of Benefits

<u>Name</u>	<u>Commercial</u>	<u>Recreational</u>	<u>Traditional</u>
ACT	0.00	15.00	0.00
Commonwealth	0.00	20.00	0.00
NSW	0.00	15.00	0.00
QLD	0.00	15.00	0.00
SA	0.00	15.00	0.00
VIC	0.00	20.00	0.00
Sub Total:	0.00	100.00	0.00
		Total:	100.00

9. Further Development

With the finalisation and endorsement of the MCFMG Action Plan and terms of reference, membership of the MCFMG is now being formed. An Executive Officer will be recruited to manage the MCFMG business. The first meeting of the MCFMG is expected to be held early in the new financial year and will:

- Identify priorities actions for implementation within the Action Plan
- Establish an R&D sub-group
- Identify key investment agencies / partnerships

Oversee preparation of applications to attract investment in order to begin implementation of the Action Plan.

10. Planned Outcomes

Through this project, resilient partnerships have been established between fisheries managers, researchers, resource management agencies and the recreational fishing sector. These partnerships will be strengthened by good governance processes and reinforced through formal reporting arrangements through the Australian Fisheries Management Forum.

The Murray cod Fishery Management Action Plan will facilitate targeted future investment in this sector. Implementation of the plan will realise investment leverage and reduce duplication of effort.

More specifically, this project will deliver:

1. Alignment of policy and research directions between fisheries management jurisdictions across the Murray-Darling Basin,
2. Identification of important fisheries management priorities, knowledge gaps and questions to improve Murray cod populations,
3. Long-term and representative monitoring of Murray cod populations across the Murray-Darling Basin,

6.

4. More effective communication of Murray cod management and research outcomes to recreational fishers,
5. New opportunities for recreational fishing sector to co-invest and participate in relevant research,
6. More efficient and effective use of research, development and extension resources.

The recreational fishing sector will benefit from better and more sustainable management of the Murray cod fishery including more efficient stocking practices, more appropriate management controls leading to long-term improvements in fish population status and associated catch rates.

11. Conclusion

The project has been successful in achieving an agreed way forward for the future management of Murray Cod in the Murray-Darling basin. Importantly this project has secured the support from all relevant State and Territory fishery jurisdictions, the Australian Fisheries Management Authority, the Murray Darling Basin Authority, recreational fishers and the Commonwealth Government. With such a wide consensus of support and through the adoption of good governance and reporting arrangements, this project provides an important case-study for cross jurisdictional recreational fisheries management.

Appendix 1- Staff List all staff that have been engaged on the project

Recreational angling interests

(15)

Brenton Schahinger, recreational angler SA
Brian Dare, Glenn Lyon Dam Tourism, QLD
Bruce McInnes, Native Fish Australia, VIC
Deb Lennon, fishing tackle supplier, NSW
Geoff Cramer, Chairman, VRFish, VIC
Les Kowitz, Freshwater Fishing & Stocking Ass. of QLD
Leslie Rava, recreational angler NSW
Malcolm Wilksch, recreational angler SA
Peter Teakle, Murray-Darling Basin Authority, SA
Rob Loats, VRFish, VIC
Ron Lewis, Native Fish Australia, VIC
Ross Winstanley, recreational angler VIC
Terry Maloney, recreational angler, NSW
Tony Bennett, fishing tackle supplier NSW
Will Trueman, Native Fish Australia, VIC

Research (16)

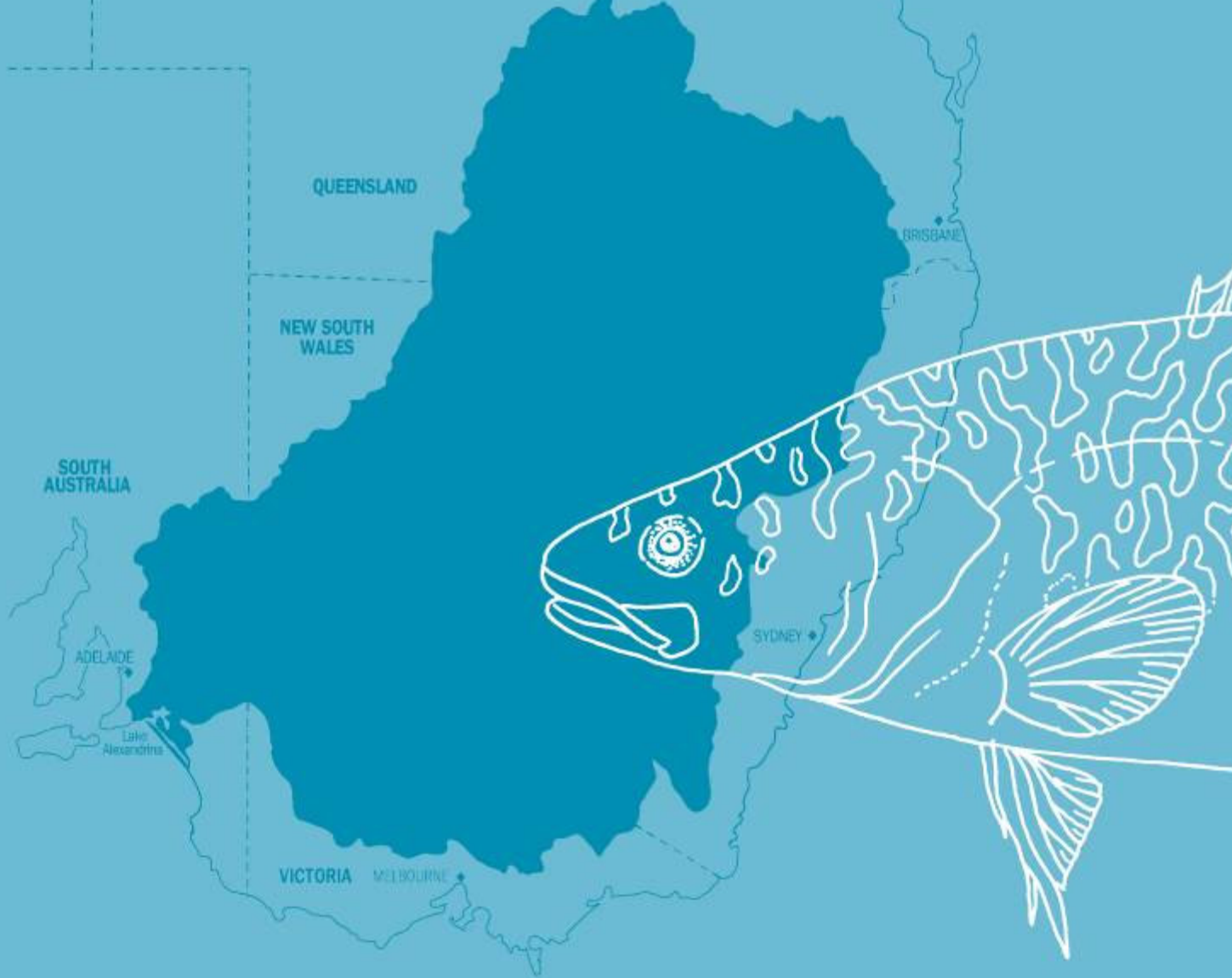
Brenton Zampatti, SARDI, SA
Dr Charles Todd, Arthur Rylah Institute, VIC
Dr David Crook, Arthur Rylah Institute, VIC
Dr Gavin Butler, Industry & Investment, NSW
James Andrews, Fisheries Victoria, VIC
Jarod Lyon, Arthur Rylah Institute, VIC
Dr John Koehn, Arthur Rylah Institute, VIC
Dr Lee Baumgartner, Industry & Investment, NSW
Dr Mark Rogers, University of Florida, USA
Dr Meaghan Rourke, Industry & Investment NSW
Dr Mike Allen, University of Florida, USA
Mike Hutchinson, DEEDI, QLD
Paul Brown, Fisheries Victoria, VIC
Dr Paul Humphries, MDFRC, NSW
Dr Stuart Rowland, Industry & Investment NSW
Taylor Hunt, Fisheries Victoria, VIC

Management (22)

Alice Fistr, PIRSA, SA
Alistair McBurnie, Industry & Investment, NSW
Anthony Forster, Fisheries Victoria, VIC
Ben Doolan, Industry & Investment, NSW
Cameron Westaway, Industry & Investment, NSW
Fern Hames, Native Fish Strategy Coordinator, VIC
Janet Pritchard, MDBA, NSW
John Connallin, Murray CMA, NSW
John Douglas, Fisheries Victoria, VIC
Jonathon McPhail, PIRSA, SA
Joy Sloan, Fisheries Victoria, VIC
Julia Menzies, Fisheries Victoria, VIC
Luke Pearce, Industry & Investment, NSW
Matt Bitzel, Parks, Conservation & Lands, ACT
Matt McLellan, Industry & Investment, NSW
Peter Jackson, Consultant - MDBA, QLD
Peter Kind, DEEDI, QLD
Steve Brooks, DEEDI, QLD
Steve McMonigle, Fisheries Victoria, VIC
Steve Thurstan, Industry & Investment, NSW
Travis Dowling, Fisheries Victoria, VIC
Wayne Tennant, Goulburn Broken CMA, VIC

Abbreviations:

CMA - Catchment Management Authority
DEEDI - Department of Employment, Economic
Development & Investment
MDBA - Murray-Darling Basin Authority
MDFRC - Murray-Darling Freshwater Research Centre
SARDI - South Australian Research and Development
Institute
PIRSA - Primary Industries & Resources South Australia



Terms of Reference

Murray Cod Fishery Management Group

June 2011

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Fisheries Research House
25 Geils Court, Deakin ACT
Postal address: PO Box 222, Deakin West ACT 2600, Australia
Tel: (02) 6285 0400 International: 61 2 6285 0400 Fax: (02) 62854421 International: 61 2 628
Email: frdc@frdc.com.au

Terms of Reference

In February 2010 at Mulwala, Victorian and NSW Fisheries Managers hosted a workshop entitled *“Enhancing the Murray cod recreational fishery – a basin-wide approach to research and management”*. A key outcome of this workshop was a commitment to establish a Murray Cod Fishery Management Group (MCFMG) that would oversee implementation of a basin-wide Action Plan for the Murray cod recreational fishery. The MCFMG will comprise representation from fisheries managers, researchers and the recreational fishing sector.

It was agreed that the workshop steering group develop the terms of reference for the MCFMG and Action Plan.

1 Role

The Murray Cod Fishery Management Group aims to enhance Murray cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research across the basin.

Specifically, the role of the Murray Cod Fishery Management Group (MCFMG) is to:

- Oversee the preparation, implementation and review of the Murray Cod Recreational Fishery Management Action Plan across the Murray-Darling Basin.
- Report to the Australian Fisheries Management Forum on matters relating to Murray cod recreational fishery
- Provide integrated advice in relation to Murray cod research proposals to research sponsor organisations
- Establish effective and collaborative links with relevant agencies and organisations including:
 - State fisheries agencies
 - Murray Darling Basin Authority - Native Fish Strategy Advisory Panel
 - Department of Environment, Water, Heritage and Arts - Murray cod National Recovery Plan / Recovery Team
 - Other commonwealth and state environmental agencies
 - Relevant recreational fishing representative groups (as required)
 - Fisheries Research and Development Corporation
 - Catchment Management Authorities
 - Other potential funders
- Facilitate effective communication between fisheries managers, researchers and representatives of the recreational fishing sector.

2 Membership

2.1 *Members*

Membership of the MCFMG will comprise:

- (a) a Chairperson selected by AFMF
- (b) One researcher and one fisheries manager from each participating fisheries agency within the Murray Darling Basin as nominated by state fishery agencies
- (c) One representative from the National Murray Cod Recovery Team / DEWHA
- (d) One representative from the recreational fishing sector from each participating State / Territory within the Murray Darling Basin
- (e) One representative from the MDBA Native Fish Strategy Advisory Panel
- (f) One representative from DEWHA.

2.2 *Chairperson*

The Chairperson of the MCFMG will be a representative from NSW appointed by AFMF.

The Chair will be a full member of the Murray Cod Fishery Management Group and will be responsible for managing meetings of the Group. The Chair will ensure that the Group fulfils its role as set out above.

The Chair will also report to the AFMF, when requested on the operation of the MCFMG and or the results of its deliberations.

2.3 *Alternate Members*

Each participating body or organisation shall nominate an alternate member for each member nominated to the MCFMG.

2.4 *Appointment*

A person nominated as an alternate member of the MCFMG is not a member of the MCFMG until endorsed by the Chair.

2.5 *Term of Appointment*

Members (or alternate members) remain members of the MCFMG for a term of three years.

2.6 Attendance as an Observer

At the discretion of the Chair after discussion with the MCFMG, the Chair may invite non-members to participate in MCFMG meetings. Observers may only participate in discussions at the invitation of the Chair.

3 Operations

The MCFMG will meet twice each year as a minimum. The frequency of meetings thereafter may be determined by the MCFMG, subject to available budget constraints. The Chair may call special meetings at any time.

Members should anticipate that agendas and papers for meetings will be circulated at least one week prior to the meeting, and that meetings will be run as half-day sessions.

The Chair will manage each meeting and determine the pace and length of deliberations on agenda items. The Chair will seek to ensure that every member has adequate opportunity to participate in the discussions on each item.

Minutes will be kept of every meeting and circulated for comment before being formally adopted at the next meeting.

4 Confidentiality

The deliberations of the MCFMG must be treated confidentially in order to provide a forum for independent advice and debate. Members will be able to discuss with their respective groups or organisations issues before the MCFMG that are not of a confidential nature, but must not discuss any deliberations of the MCFMG or circulate any meeting agendas, minutes, papers or other materials publicly without the consent of the Chair.

5 Funding support

A funding agreement will be developed in collaboration with the AFMF and its fisheries management agencies. The scope of this funding agreement will propose that:

- Government appointed members contribute their time, travel, accommodation and personal expenses as an in-kind contribution by participating fisheries or other agencies.
- Non-government members shall be entitled to receive funding support for travel and accommodation in accordance with a funding agreement established between participating organisations. Funding to support these cost will be sought from FRDC.

6 Operating context

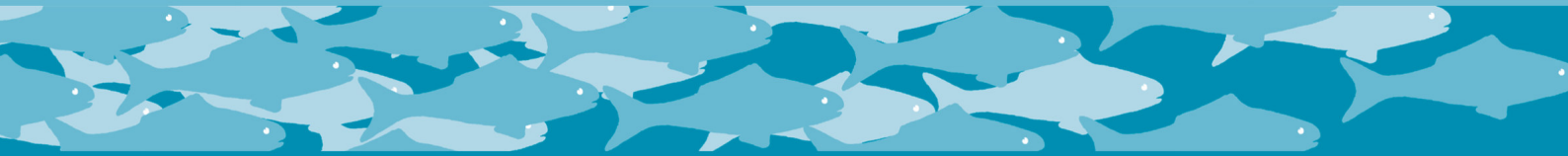
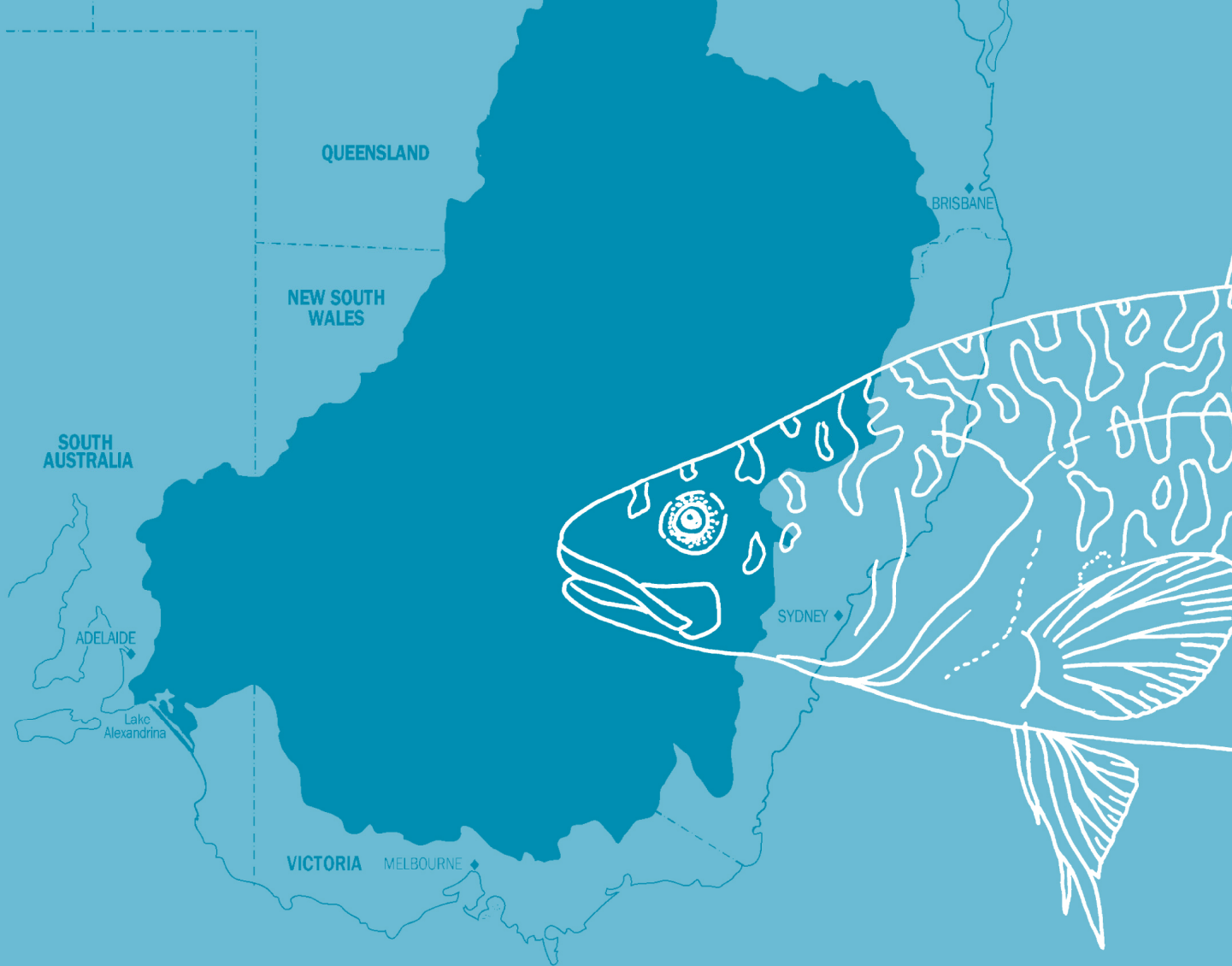
The MCFMG will operate as an expertise based group under the guidance of the AFMF with a clear focus on implementing the Murray Cod Recreational Fishery Management Action Plan.

Strong links will be required between the MCFMG and conservation agencies that have statutory and policy obligations in relation to managing Murray cod as a listed species.

The MCFMG recognises the statutory independence of participating fisheries management agencies and associated legislative and policy difference between jurisdictions. Equally, differences of opinion may arise between recreational fisheries representatives.

Consideration should be given of the need to establish an MOU between participating agencies and organisations.

The MCFMG will recognise and maintain collaborative links with the National Recovery Plan for Murray Cod, Native Fish Strategy and other relevant management plans



Action Plan

Murray Cod Fishery Management Group

June 2011

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Action Plan

Introduction

Murray cod is an iconic Australian freshwater fish of the Murray-Darling Basin (MDB). Although no longer commercially harvested from the wild, the Murray cod fishery is highly valued by recreational fishers whose investment generates significant social and economic benefit to regional areas across the basin.

As the Murray cod fishery is widely distributed, the primary responsibility of managing the fishery falls across fisheries jurisdictions in Queensland, New South Wales, Australian Capital Territory, Victoria and South Australia. As a listed threatened species, other conservation agencies and the Commonwealth Government also have a responsibility and shared commitment to ensure the fishery is managed sustainably into the future. Consequently, there is both a need and opportunity for these agencies to work effectively together to share knowledge and resources.

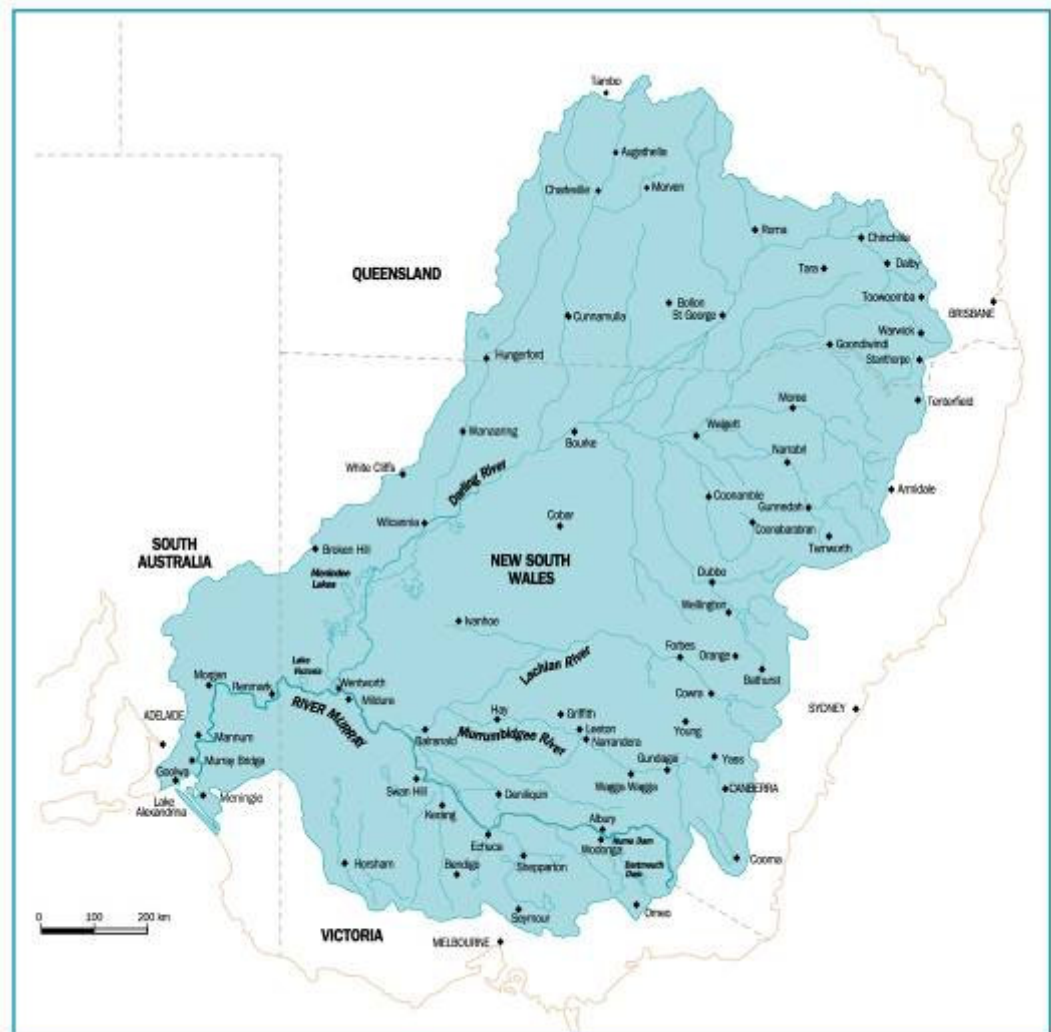
As primary beneficiaries, recreational fishers are well placed to advocate for the development of the Murray cod fishery and their partnership in managing the resource is particularly important



Background

On 23 and 24 of February 2010, Fisheries Victoria, Department of Primary Industries convened a workshop on the shores of Lake Mulwala, near Yarrowonga. The aim of the workshop was to "Enhance Murray cod recreational fisheries outcomes across the Murray-Darling basin through improved collaboration and alignment of management and research". The workshop was co-funded funded by Fisheries Research and Development Corporation (FRDC) and State Fisheries agencies and was organised by a cross jurisdictional steering group. The workshop was attended by 53 delegates representing the interests of Murray cod recreational fishers, researchers and managers from five fisheries management jurisdictions.

The workshop set out to develop a shared understanding of the key issues impacting the Murray cod fishery; develop an action plan to improve Murray cod recreational fishing through collaborative partnerships; and, build a shared commitment by key stakeholders to develop and implement an Action Plan. A key theme of the workshop was to look for opportunities and benefits that come from working together across multiple jurisdictions, to avoid duplication of effort, to better engage recreational fishers and to align policy wherever possible. The desired outcome of the workshop was to build a shared commitment by key stakeholders to work effectively together to develop and implement the Action Plan.



The Murray-Darling Basin

Fisheries Research House
 25 Geils Court, Deakin ACT
 Postal address: PO Box 222, Deakin West ACT 2600, Australia
 Tel: (02) 6285 0400 International: 61 2 6285 0400 Fax: (02) 62854421 International: 61 2 628
 Email: frdc@frdc.com.au

Murray Cod Fishery Management Group (MCFMG)

The Murray Cod Fishery Management Group (MCFMG) is the principle and formal mechanism by which fisheries agencies, managers, researchers and anglers implement the Action Plan.

The objective of the MCFMG is to enhance Murray cod recreational fisheries outcomes across the MDB through improved collaboration and alignment of management and research across the basin. Specifically, the MCFMG is to:

- Oversee the preparation, implementation and review of the Murray cod Recreational Fishery Management Action Plan across the Murray-Darling Basin.
- Report to the Australian Fisheries Management Forum (AFMF) on any matter relating to the Murray cod recreational fishery
- Provide integrated advice in relation to recreational fishing research proposals to research sponsor organisations
- Establish effective and collaborative links with other relevant State and Commonwealth agencies and organisations.
- Facilitate effective communication between fisheries managers, researchers and representatives of the recreational fishing sector.

MCFMG Membership

Membership of the MCFMG will comprise:

- A NSW chairperson, as agreed and nominated by AFMF,
- One researcher and one fisheries manager from each state within the MDB as nominated by the fisheries agency.
- One representative from the recreational fishing sector from each participating State / Territory within the MDB. Advice will be sought from the AFMF to identify key recreational fishing bodies where nominations will be sought.
- One representative from the Murray Darling Basin Authority (MDBA) Native Fish Strategy Advisory Panel.

A copy of the full Terms of Reference for the MCFMG is available on request.



Linkages with existing initiatives and organisations

In addition to those represented on the MCFMG, other organisations and agencies have a responsibility over the sustainability of Murray cod. At the Australian Government level, the draft National Recovery Plan for Murray Cod (the Recovery Plan) identifies a range of fishery management issues, mainly under objective 5. The Recovery Plan also recognises the need for a coordinated approach to recreational fishery management and a sub-set of its recovery actions have been discussed through the preparation of this Action Plan. The Recovery Plan has recently been updated to recognise the development of the Draft Murray Cod Fishery Management Group and its Action Plan. As a consequence there is now alignment between the management objectives and actions of the Recovery Plan and this Action Plan.

- The MCFMG will establish strong links with a range of organisations, including:
- The AFMF – by using this Action Plan as a AFMF Harvest Strategy Case Study;
- Department of Environment, Water, Heritage and the Arts (DEWHA) – particularly in the implementation of the National Recovery Plan for Murray cod (refer above);
- Native Fish Strategy Advisory Panel of the Murray-Darling Basin Authority (MDBA) - particularly through implementation of the Native Fish Strategy;

- The Fisheries Research and Development (FRDC) – particularly through the FRDC Recfishing Research Program;
- Relevant Catchment Management Authorities (CMAs), as required;
- Other Commonwealth and state-based institutions with initiatives or management responsibilities relevant to Murray cod and the MDB (e.g. water corporations).

In particular, this Action Plan promotes a cooperative approach between conservation and fisheries agencies and anglers to the benefit of the sustainability of Murray cod across the Murray-Darling basin.



Implementation of the Action Plan

The Action Plan will be reviewed annually to assess implementation progress and may be amended to ensure project development aligns with its intended outcomes. The Action Plan will be subjected to a review in Year 5.

This Action Plan encompasses the key strategic objectives, actions, outputs, outcomes and context for implementation. The progress of implementing the Action Plan will be influenced by the level of co-funding support from fisheries agencies and research funding organisations.



Fisheries Research House
25 Geils Court, Deakin ACT
Postal address: PO Box 222, Deakin West ACT 2600, Australia
Tel: (02) 6285 0400 International: 61 2 6285 0400 Fax: (02) 62854421 International: 61 2 6285 4421
Email: frdc@frdc.com.au

Enhancing the Murray cod recreational fishery - a basin-wide approach to research and management

Action Plan

Action	Strategic Objective / Action	Outputs	Outcomes	Context
	Governance			
	Objective 1. Establish a governance and administrative process that facilitates the sharing of information between fisheries management agencies across the basin.			
1.1	Establish a Murray Cod Fishery Management Group (MCFMG) that includes an appropriate level of representation of managers, researchers, recreational fishers & MDBA (NFS) under an independent chair.	Formation of the MCFMG.	More efficient, effective and collaborative management of Murray cod recreational fishery across the Murray-Darling Basin.	The formation of a MCFMG is a key outcome of the Murray cod workshop held in Mulwala in February 2010. The MCFMG provides a formal mechanism for fisheries managers, researchers and anglers to collaborate on a common resource fishery across five Government and fisheries jurisdictions.
1.2	Secure endorsement by the Australian Fisheries Management Forum (AFMF) to use the MCFMG model as a harvest strategy case-study.	Nominations for MCFMG membership endorsed by AFMF.	High-level, ongoing support by participating fisheries agencies for the MCFMG and Action Plan.	The AFMF comprises Directors of fisheries agencies and their support will secure appropriate representation of the MCFMG. The AFMF, backed by FRDC is establishing a nationally-consistent approach to developing harvest strategies across fisheries in Australia. The AFMF has shown interest in supporting the MCFMG as a harvest strategy case study.
1.3	Establish a Murray cod research group as an advisory group to the MCFMG.	Formation of a research sub-group of MCFMG.	More effective and efficient collaboration on research project proposals. Research projects targeted to meet fishery management priorities.	A research advisory group will facilitate on-going collaboration rather than competition for funding resources. Sharing of data and expertise will improve the transparency, quality and cost effectiveness of applied research.

Action	Strategic Objective / Action	Outputs	Outcomes	Context
	Communication			
	Objective 2. Develop effective communication strategies to engage recreational fishers and the broader community in management of the Murray cod fishery			
2.1	Prepare and implement a MCFMG communication plan to ensure ongoing engagement and participation of recreational fishing stakeholders.	Communication plan. Annual public report highlighting key MCFMG activities. Periodic (bi-annual) stakeholder workshop.	Informed recreational fisher stakeholders. Effective engagement and support by angling stakeholders.	The communication strategy will develop appropriate messages, tools and products to ensure a high level of stakeholder awareness and participation in the MCFMG. Example communication outputs: <ul style="list-style-type: none"> Website to promote the outcomes of the MCFMG work. Annual report of MCFMG Bi-annual stakeholder workshop Revitalised and expanded distribution of the "Cod-Watch" newsletter
2.2	Promote angler capacity to advocate for habitat improvement and environmental flows.	Establish links with angler habitat programs as appropriate.	Anglers better informed and involved in habitat advocacy.	There is increasing recognition by anglers and agencies that angling is critically dependant on healthy habitat conditions supporting ecological process and fish recruitment. Anglers are driving habitat improvement through direct investment (RFL programs) and by advocating for environmental restoration and appropriate basin-wide habitat regulatory controls to Governments.
	Research			
	Objective 3. Quantify the recreational fishery.			
3.1	Identify priority Murray cod stocks within each genetic population and establish reference sites for on-going monitoring in each population.	List of priority rivers and impoundments. List of representative monitoring sites	Stock assessment targeted at important recreational fisheries. Better understanding of distribution and population structure	Reference sites across the basin will enable more intensive and effective fishery assessment, facilitate comparative analysis (with other sites) and establish a long-term data base for population trend analysis over-time.
3.2	Review and standardise methodologies for Murray cod monitoring appropriate to environmental conditions.	Set of consistent population monitoring methods (fishery dependent & independent).	More reliable, accurate and comparable data on fish population status across the basin.	There is uncertainty about which Murray cod monitoring methods are appropriate for different environmental parameters. This has resulted in some contestability about Murray cod presence / absence results and how they are used and interpreted.

Action	Strategic Objective / Action	Outputs	Outcomes	Context
3.3	Design and implement a program to monitor Murray cod populations at reference sites across the MDB.	Agreed objectives for standardised monitoring program. An agreed monitoring program.	Basin-wide consistent representative data used for stock assessments.	The development of consistent (standardised) fish monitoring objectives (and methodologies) will enable data to be more effectively compared between sites.
3.4	At selected representative sites across the MDB, survey anglers to assess their fishing experience, total annual angling effort, catch, harvest and release.	Multi-state recreational fishing survey.	Long-term data on trends in catch and harvest used for stock assessments.	Recreational fishing influences the structure of Murray cod populations and their recovery. Surveying anglers about their fishing experience and harvest will inform management of the status of the resource and improve our understanding of fishing trends over time.
3.5	Develop an estimate of illegal and unreported Murray cod harvest.	Estimate of illegal harvest.	More accurate assessment of total mortality for stock assessment and compliance purposes.	An understanding of the key risks, including sources of mortality (natural, legal and illegal take) is an important element of fisheries management. The current scale of the risk of illegal harvest of Murray cod is poorly understood. The cross-jurisdiction Task Force has been set up under the National Fisheries Compliance Committee's, Native Freshwater Fish Trade Strategy 2009-2012. The task force collaborates on intelligence sharing and enforcement operations cross-jurisdictionally. This taskforce is therefore well placed to contribute appropriate intelligence on the nature and extent of illegal and unreported take of Murray cod.
3.6	On a regular basis, review fisheries regulations pertaining to the management of key Murray cod recreational fisheries.	Periodic stock assessments reviewed by fisheries management. All regulations, including bag and size limits and closed seasons are reviewed as appropriate.	Sustainable recreational fisheries. Informed and evidence based fishery management decisions.	Recreational fisheries regulations e.g. bag and size limits and closed seasons are important tools in managing the harvest of Murray cod. Fisheries jurisdictions can benefit from sharing fisheries management data and collaborating on bag and size limit reviews. This may involve sharing of data and scenario testing using computer simulation models.

Action	Strategic Objective / Action	Outputs	Outcomes	Context
3.7	Clearly define fisheries management objectives for the Murray cod fishery in different parts of the MDB	Identified stakeholder fishing preferences for Murray cod stocks and develop appropriate management goals	Sustainable and productive stocks that satisfy stakeholder expectations (also refer 3.4). Improved understanding of angler motivation and behaviour	This action links to Action 3.4 and recognises that angler's expectations / fishery management goals may vary between self-sustaining and stocked fisheries or be influenced by productivity of fishing waters e.g. consideration of different regulatory take in rivers, streams and stocked impoundments, lakes & wetlands
3.8	Quantify the socio-economic benefits derived from the Murray cod recreational fishery to anglers and the broader community.	Socio-economic report. Estimated value of Murray cod fishery.	Appropriate recognition of the value of the Murray cod recreational fishery, including social and economic benefits.	Recreational fishing can make a significant contribution to economic and social development, particularly in regional areas. Community recognition of this impact may ensure appropriate resources are invested to support the development of the fishery.
	Objective 4. Identify and quantify the environmental parameters that drive recruitment and population growth, especially age-specific survivorship.			
4.1	Identify spawning habitat preference, parenting behaviours, larval behaviour, habitat preference and critical survival parameters.	Critical habitat preferences and survival parameters identified.	Better informed management decisions.	Understanding the critical habitat needs and drivers of the fishery will ensure fishery development efforts are targeted where they make the most impact. Habitat preferences and behaviours may vary between upland, lowland & northern versus southern regions of the MDB.
4.2	Quantify the effects of habitat degradation and flow alterations on Murray cod stocks.	Data to support advocacy & environmental management.	More targeted and productive investment in habitat restoration by natural resource management agencies.	Identifying and quantifying the impact of environmental degradation on the Murray cod fishery will facilitate and focus restoration efforts by resource management agencies.
	Objective 5. Understand the role of Murray cod in the ecosystem.			
5.1	Describe and quantify the interactions of Murray cod with other species.	Collate information on species composition, diet, stock structure and species structure that promotes a holistic fishery management outcome.	Better informed management decisions that take into account eco-systems based fishery management (EBFM).	Murray cod is a top order predator which has influence within the trophic pyramid, but is also dependant on the availability of a suite of prey. The principles of eco-systems-based fishery management require fisheries managers to take into account the impact on both targeted and non-targeted species in the fishery.

Action	Strategic Objective / Action	Outputs	Outcomes	Context
	Objective 6. Determine the contribution of stocking programs to Murray cod populations and the recreational catch.			
6.1	Investigate, develop and apply methods to mark / differentiate stocked fish from wild fish in Murray cod representative site populations.	Develop and apply viable marking methods to hatchery produced Murray cod. Assessment of application of genetic screening methods.	Standard use of agreed marking techniques in stocking.	Differentiating stocked from wild fish is a key mechanism to assess the contribution of stocking to wild populations. There are a variety of established and developmental methods of marking fish. There is an opportunity to standardise the method and application of marking fish and explore the application of genetic screening techniques which are increasingly reliable and affordable.
6.2	Assess the effectiveness of Murray cod stocking.	Evaluation of stocking success. Gain a better understanding of the effects of stocking Murray cod on other fish species.	Determine the proportion of fish stocked in wild populations. Determination of net outcomes of stocking. Better recreational fishing outcomes from fish stocking.	The recurring question is to what extent does fish stocking add to or replace wild fish in populations i.e. what contribution does stocking make to fish populations? Marking and monitoring of fish through stocking trials will provide valuable insight that will lead to more effective and efficiency stocking outcomes. This will require effective collaboration with the commercial fingerling aquaculture industry to ensure suitability and efficiency.



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Summary of workshop 22-23 February 2010

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- Workshop participants from the Murray-Darling Basin Authority and Catchment Management Authority(s).
- All workshop participants who contributed through their formal presentations, insightful questions and suggestions as well as their willingness to work together (managers, researchers and fishers).

The Workshop Steering Group
Anthony Forster (chair), Cameron Westaway, John Koehn, Lee Baumgartner, Paul Brown, Rob Loats & Ross Winstanley. With technical advice from - Jarod Lyon, James Andrews, Stuart Rowland & John Douglas.

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Editors Note:

Throughout this document the term “Murray Cod” is capitalised as “Murray Cod” in accordance with the new naming convention for common fish names under the Australian Fish Names Standard SSA 5300.
<http://www.seafood.net.au>.

The following acronyms are used throughout this document:

AFMF - Australian Fisheries Management Forum

MCFMG - Murray Cod Fisheries Management Group

MDBA - Murray-Darling Basin Authority (formerly commission)

DPI - Department of Primary Industries

DEWHA - Department of Water, Heritage and Arts (Commonwealth)

Executive Summary

On 23 and 24 of February 2010, Fisheries Victoria, Department of Primary Industries convened a workshop on the shores of Lake Mulwala, near Yarrowonga. The aim of the workshop was to "Enhance Murray Cod Recreational fisheries outcomes across the Murray-Darling basin through improved collaboration and alignment of management and research". The workshop was funded by Fisheries Research and Development Corporation and was organised by a cross jurisdictional steering group.

The workshop also set out to develop a shared understanding of the key issues impacting the Murray Cod fishery; develop an action plan to improve Murray Cod recreational fishing fishery through collaborative partnerships; and, build a shared commitment by key stakeholders to implement an Action Plan.

A key theme of the workshop was to look for opportunities and benefits that come from working together across multiple jurisdictions, to avoid duplication of effort, better engage recreational fishers and align policy wherever possible.

The workshop was attended by 53 delegates representing the interests of recreational fishers, fisheries researchers and fisheries managers from five fisheries management jurisdictions.

Day one of the workshop featured presentations from notable experts in their fields to provide a common base of information relevant to the Murray Cod fishery. Contextual information on day one covered: the fisheries historical distribution; the biological and ecological needs of Murray Cod; recent research outcomes; social and economic characteristics of the Murray Cod recreational fishery; management and policy arrangements for the Murray Cod fishery.

Day two of the workshop featured sessions aimed at responding to four key questions (see below). In summary, the key outcomes of each workshop session are shown under each of four questions below:

1. What are the priority information gaps or needs to be addressed to better manage the Murray Cod recreational fishery?

Key research priorities areas identified through the workshop sessions include; understanding of the contribution of stocking to Murray Cod populations; long-term, reliable and representative monitoring of stocks across the basin; quantifying all harvest including angler impact and assessing illegal and unreported catch; identifying key environmental drivers for recruitment and survival; understanding the influence of prescribed river flows; and a better understanding of angler expectations and needs from the fishery.

2. What mechanisms do we use to integrate this information into management decisions to enhance recreational fishing across the basin?

Workshop participants agreed to establish a Murray Cod Fishery Management Group (MCFMG) representing all fisheries jurisdictions and appropriate angler representation across the basin. The MCFMG would be sanctioned by the Australian Fisheries Management Forum and will require clear terms of reference, a communication plan and an annual reporting framework. The MCFMG would establish close links to other relevant organisations and the MDBA through implementation of the Native Fish Strategy.

3. How can recreational fishers influence research, management and environmental outcomes?

Workshop participants agreed the MCFMG should comprise a significant proportion of angler representation that would help determine research direction and where possible, assist with the delivery of research on the ground.

Workshop participants recognised that by working together, recreational fishers could influence relevant government agencies to get better habitat outcomes for the environment for the Murray Cod fishery. Participants felt there was also an opportunity to build leadership capacity in the recreational fishing sector and to better utilise angler champions to promote key messages to their stakeholders and the broader community.

4. How do we capture the current level of activity and investment in the Murray Cod fishery and habitat management?

The workshop participants referred to the composition and potential role of the MCFMG as a key mechanism to capture the level of activity on Murray Cod research and management and to both gather and disseminate key information to stakeholders and the media. Participants also emphasised the often understated role of science extension including the development of user friendly information products to keep stakeholders informed. There was also some discussion on the need for the MCFMG hosting a broader stakeholder workshop every 2nd or 3rd year.

In the final workshop session it was agreed that the Workshop Steering Group would take charge of producing the workshop outcomes and draft a recreational fishery management and research Action Plan for consideration by the proposed MCFMG and ultimately, for endorsement by the Australian Fishery Management Forum (AFMF).

Background of the Workshop

The concept of convening a Murray Darling-Basin-wide workshop to promote alignment of research and fisheries management for the Murray Cod fishery was first raised at the Recreational Fisheries Managers meeting convened by the Murray Darling Basin Authority (formerly the Commission) in October 2009. It was later discussed at a Fisheries Research and Development Corporation (FRDC) Board meeting at Narrandera in March 2009 which was attended by representatives from New South Wales Fisheries, Fisheries Victoria and the Murray-Darling Basin Authority.

In developing this “Enhancing the Murray Cod Recreational Fishery Workshop – February 2010”, a cross-state Workshop Steering Group (the Steering Group) was established with representation from fisheries management agencies, research organisations and recreational anglers in Victoria, Queensland, Australian Capital territory and New South Wales. A full list of the Steering Group members is listed in Appendix 2.

The need for the workshop stems from recognition that while Murray Cod is an iconic freshwater angling species, the species is now listed as threatened (IUCN: upgraded to Critically Endangered in October 2008) and vulnerable (EPBC Act 1999). Murray Cod is also an iconic recreational fishery that makes important contributions to the social and economic development of regional communities throughout the basin. Hence, there is an opportunity for fisheries agencies whose jurisdiction includes the Murray-Darling Basin to work effectively together to protect, recover the species and enhance recreational fishing opportunities.

To achieve the above there was a perceived need to:

- (a) Enhance research delivery by improving information flow between fisheries management and environmental management agencies (to avoid research duplication) and improving the cost effectiveness, timeliness and quality of research.
- (b) Coordinate fisheries management and policy to reduce, and where possible eliminate, the areas of difference in fisheries management approaches between jurisdictions (e.g. stocking policy, population modelling, bag and size limits).
- (c) Better align research directions to meet fisheries management and stakeholder needs.
- (d) Consult with anglers and develop a better understanding of their desires for the future management of the Murray Cod fishery.
- (e) Address a division of opinion about the status of Murray Cod populations among anglers, fisheries managers and environment agencies.

The workshop steering group firmly believes that improved collaboration will ensure research is driven by resource management objectives, will reduce the risk of research duplication, drive policy and research alignment and improve the quality, effectiveness and efficiency of applied research, development and extension.

The workshop identified and recognised key strategies and research results that have been developed to help manage and improve the status of Murray Cod populations across the Murray Darling Basin, including:

- The Draft National Recovery Plan for Murray Cod 2007 (not publically available yet)
- The Native Fish Strategy for the Murray Darling Basin 2003 – 2013 (Murray Darling Basin Authority).

Workshop Objective

The “Enhancing the Murray Cod Recreational Fishery Workshop – February 2010” is seen by the Workshop Steering Group as the starting point to achieving the broader, long-term goal of:

“Enhanced Murray Cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research.”

In achieving this goal, the workshop objectives are:

- (a) Develop a shared understanding of the issues, impediments, information gaps and opportunities to build a stronger recreational Murray Cod fishery.
- (b) Develop an action plan to improve Murray Cod recreational fisheries outcomes across the Murray-Darling Basin through partnerships between fisheries agencies, environmental management agencies and recreational fishers.
- (c) Build a shared commitment by key stakeholders to develop and implement a recreational fishery management and research action plan.

The workshop forum provides an ideal opportunity for commitment to an across Basin partnership between recreational fishers, researchers and fishery managers, whom were represented in similar numbers at the workshop.

Workshop Approach

In order to maximise the quality of outputs from the workshop, the Workshop Steering Group set aside two full days for the workshop. Prior to the workshop, Fishery Managers from Queensland, New South Wales, Victoria and South Australia met in December 2009 to develop a program logic that clarified objectives, identified knowledge gaps and identified pathways to achieve those objectives. Researchers from across the Murray Darling Basin also held a forum prior to the workshop to review progress against past research commitments and work toward a common set of new R&D priorities (Attachment 3). Researchers also took into account previously established research priorities identified in the Native Fish Strategy and the draft National Recovery Plan for the Murray Cod. The outcomes of both researchers and managers meetings were then tested through the broader audience that the workshop provided.

Day One

Day one of the workshop focused on presentations to inform all workshop participants on a broad range of topical issues relevant to achieving the workshop's objectives. This enabled all participants to work from a common base of knowledge by day two of the workshop by providing them the opportunity to listen to, question and challenge the current state of knowledge of:

- the fisheries historical distribution;
- the biological and ecological needs of Murray Cod;
- outcomes from research relevant to the management of Murray Cod;
- The National Recovery Plan process;
- social and economic characteristics of the Murray Cod recreational fishery;
- management and policy arrangements for the Murray Cod fishery (including fish stocking);and,
- a number of other topics relevant to meeting the workshop's objectives.

A full list of workshop presentations is provided at Attachment 4.

Day Two

Day two of the workshop was structured around "working group" discussions and presentations of ideas and views in answering four (4) pre-determined questions that were relevant to meeting the workshops objectives.

There were six (6) working groups in total – two comprised recreational fishing interests, two on research and two on management. Importantly for this exercise, every effort was made to ensure the participants in each workgroup were representative of the five (5) jurisdictions in the Murray-Darling Basin.

The four questions addressed by each of the workgroups were:

- (a) What are the priority information gaps or needs to be addressed to better manage the Murray Cod recreational fishery?
- (b) What mechanisms do we use to integrate this information into management decisions to enhance recreational fishing across the basin?
- (c) How can recreational fishers influence research, management and environmental outcomes?
- (d) How do we capture and communicate the current level of activity and investment in Murray Cod fishery and habitat management?

Day 1 Outcomes - Setting the Scene

As identified previously, day one of the workshop focused on the presentation of information and views by representatives from recreational angling, research and fisheries management to ensure that all workshop participants would be working from a common base of knowledge.

A number of key messages that arose from day one and that influenced the outcomes from day two included:

- That the workshop was about achieving enhanced Murray Cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research, and that through this, good conservation outcomes will also flow.
- History shows that Murray Cod were prevalent throughout Murray-Darling Basin but the species decline is due to the impact of various anthropogenic factors including; fishing, habitat degradation, changes in river flow management, barriers to migration, introduced species, toxic chemicals etc.,.
- Murray Cod have iconic status and there are signs that the recreational fishery is improving in some locations. However, we still do not fully understand mortality on the fishery (natural, man-made processes, recreational harvest and illegal take).
- There are opportunities for integrating the current approach to managing Murray Cod, by improving opportunities to collaborate research, recognise the benefits to be gained from sharing data and by collaborating (not competing) in R & D funding.
- The need for a commitment from recreational angling, research and fishery management interests to the establishment of long term fish population data and information relevant to the effective management of Murray Cod across the Murray-Darling Basin.
- There remains contestability on the current status of some Murray Cod populations raising questions about the reliability and or application of some sampling methodologies used.
- The South Australian Murray River Cod populations are experiencing poor recruitment attributed to reduced river flows, habitat modification and long-term drought conditions.
- There is an opportunity for anglers to advocate for the rehabilitation of Murray Cod stocks by promoting quality habitat to support recovery through naturally recruiting populations.
- Stocking of hatchery reared fish can play a key role in restoring declining populations – however it is not a panacea. Despite recent advances in fish marking technology, the contribution that stocking makes to populations remains a priority knowledge gap.
- While past research has made significant progress in our understanding of the life-cycle of Murray Cod, there is still a lot we do not fully understand. From a Basin-wide perspective this is a complex fishery with some discrete genetic populations which also need to be considered in a local context.
- Fishery management agencies have a responsibility to conserve fish stocks and promote fishing opportunities. Recreational fishing controls can be administered within a short time-frame if the need is proven through good science and supported by a consultation process with recreational anglers.
- The Murray-Darling Basin Authority (MDBA) now sits under the Water Act which focuses its responsibilities on water and habitat, rather than management of individual fish species. Nonetheless, there is an opportunity to strengthen existing initiatives in the MDBA, through the threatened species driving action of the Native Fish Strategy, with ongoing fish research projects and stakeholder engagement processes.
- It was recognised that workshop outcomes will compliment the objectives of the draft National Recovery Plan for Murray Cod which is “To have self-sustaining Murray Cod populations managed for conservation, fishing and culture”.
- The workshop agreed to recognise the mutual objectives and synergies of combining resources to manage Murray Cod for both fishing and conservation imperatives.
- Recovery and management of Murray Cod across the basin will require active coordination of management and research across five government jurisdictions including a multitude of agencies and institutions.
- Given multiple agencies involved with Murray Cod management and research, a formal management mechanism must be established with clear objectives, deliverables and a reporting framework.
- Overseas experience has demonstrated that multiple agencies can work together to manage the recovery of a fishery. Long-term validated and representative population monitoring across the basin is a foundation stone for assessing populations. Applied experiments / interventions can then be applied to sample locations and

test management decisions to learn from these experiences.

- Anglers need to be engaged, informed and included in key decision-making processes to promote stewardship and attitudinal changes.
- While we have reasonable socio-economic data on the characteristics of recreational fisheries at the macro scale, the contribution of the Murray Cod fishery, while clearly significant, is not well documented. Socio-economic data is critical when seeking support for research funding and management intervention.
- Fishery researchers and managers proposed key research and development priorities and these were tested through the broader audience on Day 2 of the workshop sessions to achieve an agreed priority list.

Day 2 Outcomes - Moving Forward

This section provides a synthesis of the outcomes against the four questions that provided the focus of work group discussions on day two of the workshop. A detailed list of workgroup outcomes is provided at Attachment 4.

What are the priority information gaps or needs to be addressed to better manage the Murray Cod recreational fishery?

Summary of working group outcomes:

Key research priorities

- Understand the contribution that stocking makes to populations, their interaction with native stocks and other species and the impact that stocking makes to recreational catch.
- The need for long-term and reliable monitoring of Murray Cod populations at key life stages at representative sites across the basin.
- Quantify the recreational Murray Cod fishery take across the Murray-Darling Basin. Including assessment of catch, effort, harvest, natural mortality and release mortality. This will include a more accurate assessment of unreported and illegal catch.
- Socio-economic research to determine the economic value of the Murray Cod recreational fishery as well as other socio-economic characteristics relevant to management.
- A better understanding and therefore response to recreational angler expectations and needs of the Murray Cod fishery.

Other research priorities

- Identify and quantify environmental parameters driving the Murray Cod fishery, including the key parameters that drive recruitment and population growth and age-specific survivorship. This includes key habitat requirements for spawning and recruitment.
- Monitor Murray Cod population responses to prescribed flows and incorporate this knowledge into improved flow management practices. This includes documenting the importance of flow in facilitating spawning, recruitment and maintenance of populations.
- In the context of Ecosystem Based Fishery Management – a greater understanding of the role of Murray Cod in Murray-Darling Basin ecosystem.

- Continue to monitor the biosecurity risks associated with stocking and develop appropriate management response strategies.
- Define appropriate spatial management and monitoring units, standardised monitoring and assessment techniques and stock assessment methodologies.
- Understanding Murray cod and ecosystem ecological responses to management – will require both hypothesis testing and active experimental management approaches.

What mechanisms do we use to integrate this information into management decisions to enhance recreational fishing across the Basin?

Summary of working group outcomes:

- Establish a formal group referred to as the Murray Cod Fishery Management Group (MCFMG) that includes an appropriate level of representation of managers, researchers and recreational fishers across jurisdictions under an independent chair.
- Consider representation on the MCFMG from the MDBA (Native Fish Strategy) and establish linkages with National Murray Cod Recovery Team, Department of Environment, Water, Heritage and the Arts and Catchment Management Authorities.
- MCFMG should operate under Australian Fisheries Management Forum (AFMF) due to the fishery management focus and need for cross jurisdictional coordination.
- Develop MCFMG draft terms of reference, frequency of meetings and funding options and then seek endorsement from AFMF.
- MCFMG to develop a communications plan to ensure ongoing engagement of stakeholders and extension of outputs through follow-up seminars and workshops, for example:
 - an annual reporting process on Murray Cod research and management to angler representative organisations, and
 - a larger workshop every 2-3 years to present, compare and discuss data, review priorities and engage
- All members of the MCFMG to relay outcomes and recommendations back to respective management agencies to inform policy and management decision-making processes.

- Please refer to Diagram 1: Proposed MCFMG management and reporting framework in attachment 2.

How can recreational fishers influence research, management and environmental outcomes?

Summary of working group outcomes:

- There needs to be an appropriate level of recreational angler representation on the MCFMG
 - Improved recreational angler involvement and engagement in the development and implementation of research and monitoring projects.
 - User-friendly extension of Research & Development outputs to recreational anglers and the broader community.
 - Research, Development & Extension (RD&E) funding for priority areas could be supported by recreational anglers through the recreational fishing trust programs (where available).
 - By working together, recreational anglers can influence relevant government agencies, particularly in relation to policy setting, habitat improvements, water management, RD&E priority setting and funding commitments.
 - Build leadership capacity of the recreational sector and utilise “champions” to influence government and the broader community.
- Ensure that research and development extension is provided appropriate weighting during the development of R&D projects and related management decisions i.e. extension should be project based and part of the communication budget to extend findings to target audience.
 - Connect with established communication and extension services targeted at the broader community – Codwatch, fish-e-fax, relevant government publications, fishing magazines, websites, fishing TV shows.
 - Promote the outcomes of the MCFMG using appropriate public seminars, workshops, scientific conferences, specialist workshops/publications.

How do we capture the current level of activity and investment in the Murray Cod fishery and habitat management?

Summary of working group outcomes:

- By sharing and promoting information through the proposed Murray Cod Fishery Management Group.
- Collaboration with National Murray Cod Recovery Team, Native Fish Strategy, Murray-Darling Basin Authority, Catchment Management Authorities and DEWHA (refer to response to Question 2).
- Collaborate with above agencies regarding the establishment of a website or weblinks dedicated to Murray Cod initiatives and extension of relevant fishery, Research & Development and management initiatives and outcomes – utilising existing science extension officer networks.

The Future - Where to From Here?

The final component of day two of the workshop was to map out a path forward to ensure that workshop outcomes would be captured in a structured framework (an action plan) and that appropriate structures were put in place to further develop the priority areas into research projects relevant to the management of the fishery.

The workshop participants agreed that the Workshop Steering Group will take carriage in progressing the workshop outcomes.

It was also agreed that the Workshop Steering Group would lead the preparation of a draft action plan which would be provided to the MCFMG for finalisation.

A suggested framework for the development of an Action Plan was tabled, as follows:

Objective

Enhance Murray Cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research activities.

Background

A brief extract of key information gathered during the course of this workshop required in justifying the need for developing the action plan and the structures, funding, etc to drive this initiative forward.

Linkages with existing initiatives

A section on how this action plan links with existing initiatives within the Murray-Darling Basing including those of:

- Murray-Darling Basin Authority (MDBA) – in particular the Native Fish Strategy and the Murray Cod Taskforce which is currently in abeyance;
- Department of Environment, Water, Heritage and the Arts (DEWHA) – in particular the Murray Cod National Recovery Plan;
- The relevant Catchment Management Authorities (CMAs);
- The Australian Fisheries Management Forum (AFMF) – given this is a fisheries management initiative;
- The Fisheries Research and Development (FRDC) Recfishing Research Program; and
- Other Commonwealth and state based institutions with initiatives relevant to Murray Cod and the Murray-Darling Basin.

Research priorities

Refine the research priority themes developed during the workshop into a draft research priorities plan that will be further considered by the formal taskforce/working group once it is established

Establishment of a Murray Cod Fishery Management Group

Highlight the administrative, management and reporting mechanisms to establish the MCFMG, including composition of representation and membership.

The MCFMG will drive the implementation of a Murray Cod Action Plan, make recommendations for management of the fishery and identify changing priorities for R&D.

In addition, effective links be established with representation from institutions with a broader role in managing the Murray-Darling Basin, including the MDBA, CMAs, etc.

Terms of Reference

Develop a draft terms of reference for the taskforce/working group that will include its:

- Purpose – (i.e. the objective identified above);
- How that purpose is to be achieved (the “terms” of reference);
- Composition;
- To whom it reports (AFMF);
- Frequency of meetings; and
- Funding.

In framing the draft terms of reference, the Workshop Steering Group will give due consideration to the terms of reference for other relevant taskforces and working groups to ensure consistency with formal arrangements.

Last but not least:

The Workshop Steering Committee, in its report back to the FRDC advise that it will be seeking further seed funding from the FRDC to implement priority elements of the action plan, support the establishment of the MCFMG and hold a follow-up workshop in the near future in order to maintain the goodwill established through this workshop.

That an agenda paper be prepared for consideration by the AFMF on the above initiatives in the context of its harvest strategy project.

Attachment 1: Workshop Attendees

Recreational angling interests (15)

Brenton Schahinger, recreational angler SA
Brian Dare, Glenn Lyon Dam Tourism, QLD
Bruce McInnes, Native Fish Australia, VIC
Deb Lennon, fishing tackle supplier, NSW
Geoff Cramer, Chairman, VRFish, VIC
Les Kowitz, Freshwater Fishing & Stocking Ass. of QLD
Leslie Rava, recreational angler NSW
Malcolm Wilksch, recreational angler SA
Peter Teakle, Murray-Darling Basin Authority, SA
Rob Loats, VRFish, VIC
Ron Lewis, Native Fish Australia, VIC
Ross Winstanley, recreational angler VIC
Terry Maloney, recreational angler, NSW
Tony Bennett, fishing tackle supplier NSW
Will Trueman, Native Fish Australia, VIC

Peter Jackson, Consultant - MDBA, QLD
Peter Kind, DEEDI, QLD
Steve Brooks, DEEDI, QLD
Steve McMonigle, Fisheries Victoria, VIC
Steve Thurstan, Industry & Investment, NSW
Travis Dowling, Fisheries Victoria, VIC
Wayne Tennant, Goulburn Broken CMA, VIC

Abbreviations:

CMA - Catchment Management Authority

DEEDI - Department of Employment, Economic
Development & Investment

MDBA - Murray-Darling Basin Authority

MDFRC - Murray-Darling Freshwater Research Centre

SARDI - South Australian Research and Development
Institute

PIRSA - Primary Industries & Resources South Australia

Research (16)

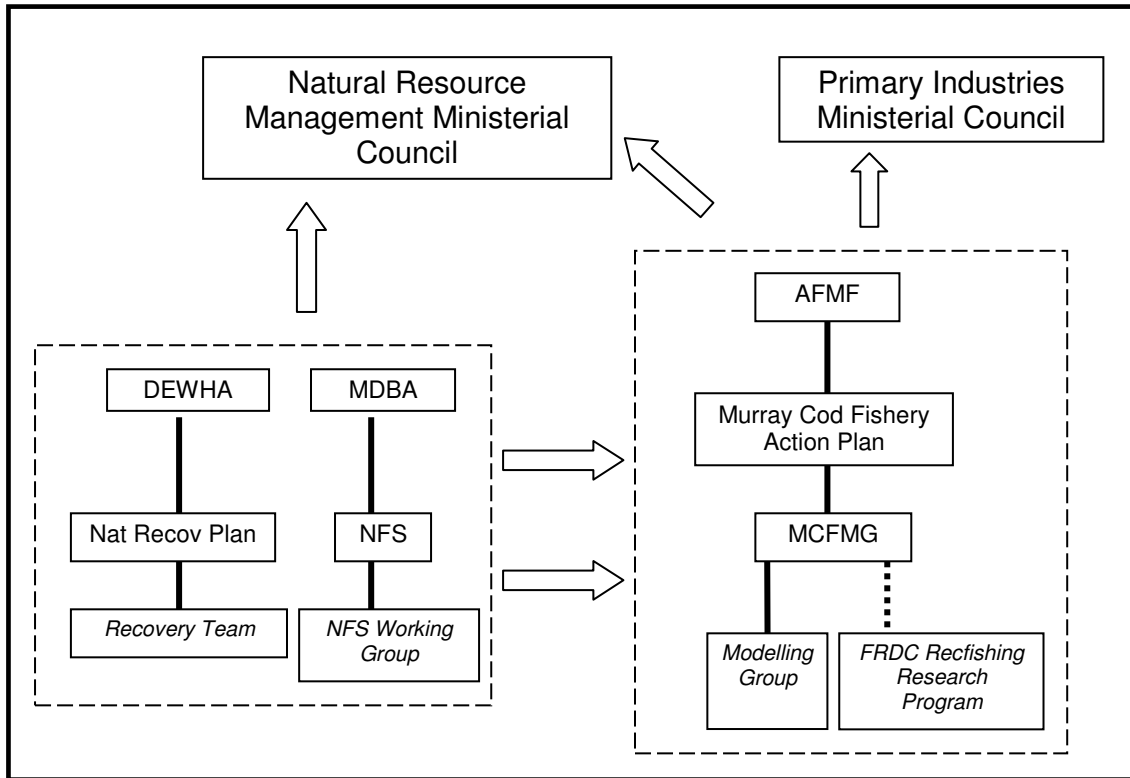
Brenton Zampatti, SARDI, SA
Dr Charles Todd, Arthur Rylah Institute, VIC
Dr David Crook, Arthur Rylah Institute, VIC
Dr Gavin Butler, Industry & Investment, NSW
James Andrews, Fisheries Victoria, VIC
Jarod Lyon, Arthur Rylah Institute, VIC
Dr John Koehn, Arthur Rylah Institute, VIC
Dr Lee Baumgartner, Industry & Investment, NSW
Dr Mark Rogers, University of Florida, USA
Dr Meaghan Rourke, Industry & Investment NSW
Dr Mike Allen, University of Florida, USA
Mike Hutchinson, DEEDI, QLD
Paul Brown, Fisheries Victoria, VIC
Dr Paul Humphries, MDFRC, NSW
Dr Stuart Rowland, Industry & Investment NSW
Taylor Hunt, Fisheries Victoria, VIC

Management (22)

Alice Fistr, PIRSA, SA
Alistair McBurnie, Industry & Investment, NSW
Anthony Forster, Fisheries Victoria, VIC
Ben Doolan, Industry & Investment, NSW
Cameron Westaway, Industry & Investment, NSW
Fern Hames, Native Fish Strategy Coordinator, VIC
Janet Pritchard, MDBA, NSW
John Connallin, Murray CMA, NSW
John Douglas, Fisheries Victoria, VIC
Jonathon McPhail, PIRSA, SA
Joy Sloan, Fisheries Victoria, VIC
Julia Menzies, Fisheries Victoria, VIC
Luke Pearce, Industry & Investment, NSW
Matt Bitzel, Parks, Conservation & Lands, ACT
Matt McLellan, Industry & Investment, NSW

Attachment 2: Management & Reporting Framework

Diagram 1: Proposed effective management and reporting framework.



Abbreviations:

- AFMF - Australian Fishery Management Forum
- DEWHA - Department of Water, Heritage & Arts
- FRDC - Fisheries Research and Development Corporation
- MDBA - Murray-Darling Basin Authority
- NFS - Native Fish Strategy

Attachment 3: Outcomes of Research Priority Workshop

The purpose of this workshop was to bring together Murray cod researchers in order to:

- review research undertaken over the past 5 years;
- rate work against priorities listed under the Murray Cod Recovery Plan;
- nominate future priorities for research; and
- identify ways to improve the effectiveness of research.

The Research Workshop was intended to inform discussion and future decisions about investment in research. In total there were 18 researchers who participated in this workshop.

Future research priorities identified

In summary there were 4 clear areas of research viewed as priorities for future discussion and consideration at the management and stakeholder workshop:

Quantify the recreational fishery

Including total annual effort, catch, harvest and release across the basin and within spatial management units. This needs to include estimates of natural and fishing mortality, unreported and illegal catch.

Identify and quantify the environmental parameters that drive recruitment and population growth

Especially age-specific survivorship. Determine the influence of flows on critical life history components, especially recruitment of larval and juveniles and movement. Monitor population responses to prescribed flows and incorporate this knowledge into improved flow management practices.

Understand the role of Murray cod in the ecosystem.

This recognises that Murray cod is a top order predator, but is also dependant on a suite of prey – including other fisheries (golden perch) and noxious species (carp).

Determine the contribution that stocking makes to Murray cod populations and the recreational catch.

This includes examination of cost/benefit and relationships with wild fish populations.

Attachment 4: Presentations (in order)

Drivers, Purpose and Workshop Expectations

Roger Miles, "Cod Hunter" Fishing Guide

Anthony Forester, Fisheries Victoria

A Brief History of Cod

William Trueman, Native Fish Australia

Murray Cod Research and Fishery management – A Recent History

Dr Stuart Rowland, Industry and Investment NSW

National Murray Cod Recovery Plan

Dr John Koehn, ARI

Murray Cod R&D Investment – A Report Card

James Andrews, Fisheries Victoria

How the Murray-Darling Basin Authority is contributing to Murray Cod Science and Management

Janet Pritchard, Murray-Darling Basin Authority

Recent Murray Cod Recreational Fisheries Research

Paul Brown, Fisheries Victoria

Fisheries Management across the Basin – Outcomes of Fisheries Managers Workshop

Julia Menzies, Fisheries Victoria

Fisheries Management Questions, Information Gaps and Priorities

Cameron Westaway, Industry & Investment, NSW

South Australian Murray Cod Stock assessment and Management Responses

Brenton Zampati, SARDI Aquatic Sciences

Cross Jurisdictional Freshwater Fisheries Management through Stock Assessments – Overseas Experience and Australian Opportunities

Mike Allen, Professor, University of Florida

Social and Economic Impacts of the Inland Recreational Fishery

Geoff Cramer, Chairman, VRFish

Queensland Experiences with Murray Cod Fishing

Brian Dare, Queensland Recreational Angler

Issues and Opportunities – Murray Cod Stocking in the Murray-Darling Basin

Dr Lee Baumgartner, Research Scientist, Industry & Investment, NSW

Murray Cod – An Iconic Recreational Fishing Species

Attachment 5: Day 2 outcomes

Workshop Question 1:

What are the priority information gaps or needs to be addressed to better manage the Murray Cod recreational fishery?

Group Pink (Management)

- Clear objectives – include realistic aspirations of rec fishers
- More effective ways to reach rec fishers and better understand their needs
- \$ value of the fishery
- Key habitat requirements for spawning and recruitment
- flows to benefit fish – best use of environmental flows
- Long-term monitoring data – CPUE and mortality
- Theft

Group Orange (Research)

- Quantify the recreational fishery
- Quantify environmental parameters driving fishery
- Understand role of MC in ecosystem
- Determine contribution of stocking programs
- Long-term monitoring and testing experimental hypotheses – ongoing funding to support this

Group Green (Recreational fishing)

- Food for post hatching stages of recruitment for wild Cod
- Illegal take – how significant is it?
- Economic information on MC fishery – a tool to encourage investment
- How affective are our regulations
- Population assessment – what is the status in relation to carrying capacity, survey techniques adequate and reflect abundance of MC following fish kills, balance of MC in ecosystem, contribution of wild and stocked Cod to population.
- What do recreational fishermen want in MC fisheries?
- What are the best flow regimes for effective spawning.

Group Blue (Management)

- Social research, what do anglers want from fishery, improve understanding and response to stakeholder needs (fishers, landholders, CMAs)
- Long-term dataset for stock assessment, quantify recovery spatially and temporally
- Understand contribution of stocking to MC populations
- Recreational take, illegal take, unlicensed commercial take – total take estimates
- Understanding ecological responses to management decisions
- Total value of recreational fishery - \$\$ amount

Group Yellow (Research)

- Define spatial management units – jurisdictional, habitats, genetics
- Quantify effects of recreational fishery
- Quantify environmental parameters influencing recruitment
- Role of MC in ecosystem
- Effects of stocking

Group Purple (Recreational fishing)

- Trial flows to assess impact on recruitment - Assess adult stocks to determine adult reproduction
- In areas of no recruitment – assess/monitor adult stocks to determine if gonadal maturation is being completed
- Current stock assessment methodology, sampling bias... assess current protocols
- Quantify illegal fishing in MC
- Clarify effectiveness of Murray Cod stocking

Workshop Question 2:

What mechanisms do we use to integrate this information into management decisions to enhance recreational fishing across the Basin?

Group Pink (Management)

- Formal group, not too big, but include relevant agencies/people – research, manager, rec fishers
- Include an independent chair, a knowledge broker or extension officer
- Annual forum in each jurisdiction to engage with anglers to ensure communication
- DEWHA funding with FRDC
- Get paper endorsed by AFMF

Group Orange (Research)

- Murray Cod taskforce – multi-jurisdiction with independent chair – outside political cycle
- Multi-jurisdictional framework for taskforce
- Experimental research
- Effective management framework (App 2)

Group Green (Recreational fishing)

- Basin wide MC working group – research, management and angling representation from all states
- Coordination and reporting role

Group Blue (Management)

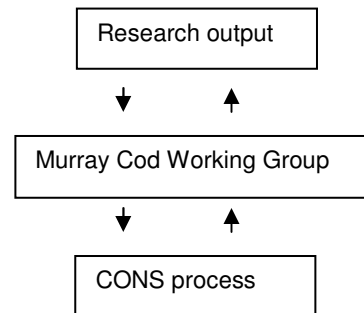
- Murray Co Fishery Management Group to report to AFMF – small size, management, research and angler rep per state, NFS, recovery team
- Reporting to larger Murray Cod workshop (every 3 years)
- Terms of Ref to outline: focus on rec fishing, basin wide strategies
- Include NFS fish info and data from central database

Group Yellow (Research)

- Formal group with coordinator – reps from research, management, angling, recovery team and NFS
- Hold data and modelling workshops every 2-3 years, present compare and discuss data among all.
- Separate modelling workshop, stock assessment report every three years (peer reviewed) reported to AFMF and Recovery forum.

Group Purple (Recreational fishing)

- Two way engagement, communication and feedback between research, MC Fishery Management Group and Vic Fish Stock process



- Require an annual reporting process on Murray Cod research to angling groups and allow for formal response
- Annual meeting of MC working group

Workshop Question 3:

How can recreational fishers influence research, management and environmental outcomes?

Group Pink (Management)

- Use rec fish data to contribute to stock assessments
- Provide opportunity for angler feedback via an annual forum to help shape direction
- Champions – identify, build capacity and connect
- Asking rec fishers what they want – habitat rehabilitation

- Capacity building in rec sector – up to date information to/from sector? Land management practices, Access to FRDC on capacity building (use of new technologies)
- Angling sector to take lead in communicating with managers, researchers etc.

Group Orange (Research)

- Anglers initiate research (stocking groups and fishing clubs, personal communication with managers, researcher etc)
- Expenditure of RFL trust funds – on boards of funding bodies in NSW and Vic. If MC is a priority, will get funded
- representation on MCFMG
- Participation in research projects
- Consult with anglers through making management decisions
- Anglers take responsibility of providing one voice

Group Green (Recreational fishing)

- Regular communication with/from MCFMG
- Involving rec fishers in providing catch and effort data and information from competitions
- Involve anglers at design, operation and extension of research projects
- If rec fishers are informed of current work, they will become more involved and proactive for progress in MC fishery

Group Blue (Management)

- Anglers must have key messages/objectives and have a united approach. This could be done through champions who have support and direction for the MCFMG. These champions could also influence other anglers, feed information to them and get them involved.
- Funds for programs could be supported by anglers through the Rec fishing trust programs and research priorities can be directed.
- They have the ability to lobby government for election commitment funding

- Can influence NRM agencies
- Can push for recreational water (environmental flows)

Group Yellow (Research)

- Angler representation on the MCFMG, contribute to data collection, participate in workshops (data, modelling)
- Communicate results to broader community of anglers
- Anglers must have a united approach that represents all anglers.

Group Purple (Recreational fishing)

- Quantify economic and social values and benefits of the Murray Cod fishery across the whole of the MDB
- Expand on Vic Fish Stock meeting process to incorporate wider issues not just stocking... i.e. habitat

Workshop Question 4:

How do we capture the current level of activity and investment in the Murray Cod fishery and habitat management?

Group Pink (Management)

- Use of knowledge broker or extension officer
- Annual forum to engage with rec fishing sector
- Codwatch magazine/newsletter – communication of research results to public
- Support and invest in extension/communication of outcomes, management decisions, research outcomes
- NFS coordinators
- Connect with existing media forums including TV shows and magazines
- Use respected media champions/writers to communicate correct messages to wider community

Group Orange (Research)

- MCFMG
- Codwatch/Fish-e-Fax and other government publications
- Fishing magazines, websites, fishing TV shows
- NFS coordinators
- MC website operated by taskforce – extension officer to take on project
- Public seminars and workshops
- ASFB, scientific conferences, specialist workshops/publications
- Managers take a lead role in extension of MC work. Perhaps not the role of a researcher (trade off with core tasks)

Group Purple (Recreational fishing)

- Through MCFMG
- Annual report is whole focus showpiece – feature articles and extended to media, peak bodies, regional Vic Fish Stock meetings, NRMAs and CST
- Signage can be applied across MDB.

Group Green (Recreational fishing)

- MCFMG takes responsibility for initiating communication using various media newsletters, publications, Codwatch, seminars etc...
- Use of education in primary schools, allowing wider community to understand MDB and MC. (Kids tell family etc...)

Group Blue (Management)

- NFS annual implementation report used to capture information coming out.
- Add other information that is not currently captured, group related to MCFMG collating information and communicating to NFS

Group Yellow (Research)

- use existing structures and expertise (coordinators from MDBA & NFS) - Scientific publications, annual stock assessment meetings/reports (data and modelling) workshops, Codwatch, media etc
- Extension should be project-based, fit for purpose that costs in communication budget to extend findings to the target audience. Will require significant planning. Target audience, what change is required.