Fishes in the CLLMM and foodweb

A/Prof Qifeng Ye, SARDI Aquatic Sciences

Chris Bice, Luciana Bucater, Jason Earl, Greg Ferguson, George Giatas, Scotte Wedderburn and Brenton Zampatti
Fishes in the CLLMM

- Mulloway
- Black bream
- Bony herring
- Sandy sprat
- Yarra pygmy perch
- Sandy flounder
- Yelloweye mullet
- Smallmouthed hardyhead
- Golden perch
- Murray cod
- Murray hardyhead
- Congolli
- Lamprey
- Greenback flounder
- Murray cod
- Southern pygmy perch
- Tamar River goby
- Golden perch
Fish functional groups

Adapted from Whitfield 1999
Terminal lakes and dynamic estuarine–lagoonal system

- River flow

- Lake water levels
- Connectivity

- Salinity
- Productivity
Fish monitoring and studies

*Funded by the MDBA TLM Program & Murray Futures CLLMM Program*

**Lower Lakes**
- Small-bodied fish monitoring (e.g. Bice *et al.* 2013; Wedderburn *et al.* 2014a);
- Investigating the large-bodied fish assemblage – fisheries data (Ferguson and Ye 2016);

**Murray Estuary & Coorong**
- Fish intervention and condition monitoring – research and fisheries data (e.g. Ye *et al.* 2015a, b)
- Fish movement and recruitment – focusing on diadromous species (e.g. Bice and Zampatti 2015);
- Conceptual foodweb models – focusing on fishes (Giatas and Ye 2016).
Annual barrage flow

Flow effects on fish and foodweb?
Highlights for the Coorong
2007–2010 (drought)

Australian salmon

Toad fish

Kelpfish

Australian herring

Australian anchovy

King george whiting

2007

2010

(drought)
Drought Period

Distribution

Recruitment/Abundance

Data: Bice & Zampatti
2010–2013 (flow)

‘Freshwater’
- Australian smelt

‘Diadromous’
- Congolli
- Pouched lamprey

‘Estuarine’
- Lagoon goby

‘Marine estuarine opportunist’
- Bony herring
- Mulloway
Mulloway production – Coorong estuary

Research sampling (*multi-panel gill nets*)
Coorong foodweb model

*Giatas and Ye 2016*

Low flow (2003–2010)

High flow (2010–2013)

pelagic production

benthic production

ME  NL  SL

ME  NL  SL
Foodweb structure *(high vs low flows)*

- Pelagic component of the foodweb dominates in ME and NL during high flows.
- Benthic component dominates during low flows, particularly in NL and SL.
- Decreased foodweb complexity in NL and SL during low flows.

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**High flow**

- Pelagic production
- Benthic production

**Low flow**

- Pelagic production
- Benthic production

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Quantitative data from Coorong

Outside literature or observations
Key Messages

• Diverse fish assemblages in the CLLMM
  – Flow key driver: lake levels, estuarine salinity, productivity & connectivity

• Freshwater flows
  – Promote diversity, abundance, recruitment and distribution of estuarine-dependent fish species
  – Enhance foodweb function and resilience

• High variability of estuarine system
  – Long-term data needed to support management and policy decisions
  – Consider antecedent conditions and population dynamics
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Condition Monitoring of Threatened Fish Populations in Lake Alexandrina and Lake Albert

Scotte Wedderburn
Thomas Barnes
Native fishes of the lakes

**Larger fishes**
- Golden perch (callop)
- Black bream
- Bony bream
- Congolli

**Small-bodied fishes**
- Murray hardyhead
- Southern pygmy perch
- Yarra pygmy perch
- Unspecked hardyhead
- Australian smelt
- Murray rainbowfish
- Southern purple-spotted gudgeon
- Carp gudgeon
- Flathead gudgeon
- Dwarf flathead gudgeon
- Common galaxias
- Smallmouth hardyhead
- Lagoon Goby
- Tamar River goby
- Western blue-spot goby
- Sandy sprat
Lake water level recession
Fish assemblages: March 2009–2016

Proportion of total catch

- Alien
- Diadromous
- Estuarine
- Threatened species
- Freshwater common
Pygmy perches
Extirpated in wild but captive population maintained

- Small home range
- Well-vegetated habitat
- Distributed EMLR & L. Alexandrina
- ‘Endangered’ in SA

Southern pygmy perch

- Distribution in the MDB restricted to Lake Alexandrina
- Genetically distinct population
- ‘Vulnerable’ EPBC Act 1999
- ‘Critically Endangered’ in SA

Yarra pygmy perch
Murray hardyhead
Maintained in drought refugia and captive breeding

- Annual life cycle
- Distributed from Kerang in Victoria to Lakes
- Lakes population is genetically distinct
- ‘Endangered’ EPBC Act 1999
Southern pygmy perch
Southern pygmy perch

Pre-2005

2016

The University of Adelaide
Yarra pygmy perch
Yarra pygmy perch
Murray hardyhead

![Image of Murray hardyhead fish](image)

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Murray hardyhead

Pre-2005

2014–2016
Population recovery

- River flows (volume, timing, duration)
- Water levels in obligate habitats
- Salinity, aquatic plants, alien species
- Zooplankton life cycle (e.g. Rotifera)
- Alien fishes

Photo: Russ Shiel

Eastern gambusia

Photo: Luke Pearce

Redfin perch

Photo: Russ Shiel

5 male eggs

The University of Adelaide
Management of threatened fish populations

• Ongoing monitoring MDBA’s *The Living Murray*

• Acknowledge loss of Yarra pygmy perch? (more reintroductions)

• Investigate factors influencing recovery (water levels, alien fishes)

• Drought preparedness

• Drought refugia crucial (prevent extirpation, seeding for recovery, avoid captivity)
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