



Conservation Council  
of South Australia Inc

## CCSA Fish Forum 3 – Notes - Murray Cod (MC)

6<sup>th</sup> May 2009, Berri

10<sup>th</sup> June 2009, Adelaide

### Attendance

Approximately 20 people came to Berri, and approximately 10 people came to the Adelaide forum, including representatives of:

- CCSA
- SARDI
- DEH
- PIRSA Fisheries
- Native Fish Australia
- Murray Darling Association

### Presentations

**Brenton Zampatti, SARDI, Fish ecologist**

*Murray Cod research*

Murray Cod:

- Freshwater
- Iconic fish; culturally significant to indigenous and white Australians
- Grow to 1.8 m and approximately 100 kg; usually 1.4 m & 40 kg
- Long-lived, > 40 years; have been aged to 45 years
- Distribution & abundance have significantly decreased since European settlement
- Catch declined significantly in late 1950s – early 1960s
- More than 100 tons was caught in the 1950s, which declined to less than 20 tons in the 1960s
- Listed as Vulnerable under the EPBC Act

Reasons for decline:

- Habitat degradation (desnagging – MC need snags for habitat)
- Reduced water quality (salinity, hard to find evidence but pesticides maybe)
- Exploitation (recreational & commercial)
- Flow regulation:
  - o Changes in magnitude, timing and frequency
  - o Cold water pollution
  - o Hydrodynamics

- o Barriers to fish movement

Most biology and ecology of MC studied in NSW & VIC where the river is very different to SA. This talk covered the lower Murray region.

Fish data from stock assessments prior to 2003; fishery independent investigations done after 2003. These found:

- Found MC in over 2000 km of river, in lots of different habitats, including the lower lakes
- Flowing anabranch systems showed an increased abundance & broader size range than main river.
- Snags very important.

Life history:

- Sexually mature at 500-600 mm, about 4 years old
- Old, large fish (> 30 kg) continue to be reproductively fit (lots of viable eggs). Potentially megaspawners.
- MC may undertake pre-spawn migration up or downstream or into anabranch systems.
- Males & females pair up in July/August.
- Spawning in September/October
  
- Implanted radio transmitters into ~44 MC (1.5 – 30 kg) in 2007-08; all have survived so far
- Large MC, large tags track for ~10 years; tracked with radio antennas.
- Integrating movement with flow manipulation trials
- Tracked both remotely or manually
  
- Some tagged fish moved more than 100 km up and down the river
- At least 6 large fish (>15 kg) moved extensively.
- Smaller fish (<700 mm) tended to stay put.
  
- Spawn 10,000 – 100,000 eggs on hard substrate, e.g. snags, guarded by male, incubation 3-8 days.
- Fry spend ~7 days in the nest after hatching.
- Fry move out of nest into the water column and actively feed on zooplankton
  
- >4 years of larval sampling from Chowilla system and Murray River.
- Larvae collected in fast flowing creeks and Murray River in November/December
- MC do spawn every year, regardless of flow conditions.
- Use otoliths to calculate spawning date; spawning is around first week in October.
  
- Extensive surveys of fish communities over last 6 years.
- Broad size distribution in Chowilla anabranch system.
- In main channel of Murray River, mostly large fish >700 mm.
- Last strong recruitment in 1990s and in 2000.
  
- Other areas in Murray-Darling Basin (MDB) mostly smaller size groups.
- Sites with consistent recruitment have flowing water environments.

- Pre-regulation Murray River was very different to now: "series of rapids" "rocky bars"; now is a series of lakes.
- Flow velocity affects MC larvae.
- In variety of velocities larval dispersal happens.
- Larval dispersal reduces competition for food and reduces chance of predation all at once
- In weir pools, very slow water movement, no larval dispersal and therefore, increased cannibalism.
- Strong recruitment with floods; low flows, no recruitment
- Decreased recruitment may be caused by lack of flowing water habitats.
- MC need floods.
- Protect and restore flowing anabranch systems and flowing water habitats in the main stem of the lower Murray River.

#### *Research needs*

- Primary biological information.
- Effective long-term monitoring.
- Investigate annual deaths of large MC
- Potential impacts of new regulatory structures.

#### **Jonathon McPhail, PIRSA Fisheries, Inland fisheries manager**

##### *Management of Murray Cod*

Under the *Fisheries Management Act 2007* PIRSA Fisheries has a mandate to manage state fisheries for ecologically sustainability.

#### Why manage MC?

- MC are vulnerable because they are slow-growing and long-lived
- Large number of stakeholders – government, recreational and commercial fishers, conservation sector, tackle shops, etc.
- Largest freshwater fish in Australia, and second largest in the world
- High trophic level; top predator in the River Murray
- MC are bioindicators for the status of River Murray

#### What information do we use?

- Stock reports
- Biological information
- Native fish monitoring program
- Recreational fishing survey
- MDBC fishway monitoring and other programs
- First signs of decline in early 1900s
- 1936 interstate conference – decision on minimum size limit
- 140 tonnes in 1958/59 to two tonnes in 1975/76
- Average 10 tonnes until moratorium in 1990
- Moratorium 1990-1994; good flow events and recruitment during this time
- In 1994 new size, bag and boat limits introduced

- Stock status report 2000 – stock fully fished; size limit changed and new seasonal closure around spawning season
- Restructure of commercial fishery to non-native fishery in 2003
- Stock status report 2007 – little recruitment since 1994; continuous low flows since 2007, and predictions of continuing drought
- Minimum size limit and take changes
- Full closure in 2009

Other known risks to MC:

- Lower water quality
- Introduced species
- Disease
- Habitat degradation
- Flow regulation
- Barriers to fish movement

Translocation & stocking, potential impacts:

- Stocking is seen as a 'band aid' approach
- Health of MC population, especially genetic health
- Difficulty evaluating success of stocking programs
- The SA population is the last remaining wild stocking in MDB
- PIRSA policy not to stock
- Need to focus on rehabilitation and increased flows

Future management of MC

- Recreational survey review
- MC discussion paper out later in 2009
- Public comment welcomed; please contact PIRSA if interested
- No decision regarding next year or when the ban is to be lifted

**Jason Higham, DEH**

- Native Fish Strategy important for cross-agency management
- What's good for MC is good for the ecosystem
- 2003 review native fish in SA
- Action Plan for SA freshwater fishes; being finalised
- First document of its kind in SA
- Overview of issues and actions to protect & restore freshwater fish populations
- Discussion ~2004
- PIRSA & DEH progressing protection status collaboratively
- Collaborative management to improve and protect

Drought Action Plan

- Targets five threatened fish species (not MC)
- Summarises known information
- Co-ordinate cross-agency actions
- Raise awareness with all key stakeholders
- Avoid loss of species; some freshwater fish species only surviving in captivity for future reintroduction

- EPBC listing means actions that have potential impact must be referred to the Commonwealth Environment Minister (e.g. Wellington Weir, or desnagging).
- Recreational fishing deemed not to be a significant impact across the whole of the MDB (even though Victorian statistics show the opposite)
- DEH has no formal or legislative role.
- DEH assists voluntarily, works with PIRSA and other agencies to protect native fish.
- DEH assist with monitoring, get funds, and provide advice.
- DEH can influence management of species.
- Katarapko demonstration/restoration site
- Seeking to implement National Recovery Strategy for MC across and between states; co-management approach.
- Seeking to implement Native Fish Strategy.
- At the core of management and recovery is healthy rivers.

## Discussion

Q: Are MC present around lock eleven, where there is a free flowing river?

A: Not currently known.

Q: Will MC survive in the increased salinity of Lake Bonney?

A: Adult MC can tolerate salinity up to 28,000 EC. Larvae can tolerate up to 14,000 EC (13,200 – 15,700 in laboratories). So adults are quite tolerant, but there may be problems for the larvae and juveniles.

Q: Lots of illegal catch in Victoria?

A: Data from Yarrawonga shows not many fish getting to large size. Lots of fishers there.

Q: What damage might aggressive boating activity do to larvae? Would the wake be pushing larvae around?

A: Other impacts would be more significant. May have impact but would be difficult to study. In European canals, there is an impact on juveniles from barges.

Q: Is there any modelling of the SA population?

A: Victorian modelling has been done, based on Victorian data, but could probably be adapted to SA. Currently MC are well-protected, lots of mature fish are spawning. SA has the strictest limits in the MDB. Looked at the model about 12 months ago in the technical group. No recruitment in SA.

Q: How many fingerlings survive restocking in other states?

A: Very few and it is very expensive. Very complex issue. Difficult to tell stocked fish from wild fish. Some new marking method is being developed and may be taken up in near future.

Q: What about genetic problems with restocking?

A: There is enough genetic differentiation, but it is an issue. The risks of restocking outweigh potential benefits. Apart from genetics, what will they eat? Where will they live? Is there enough habitat? SA is in a good situation with large MC. If we can protect them long enough, they will enable replenishment.

Q: What happens when rain comes? How many trees will fall into river for snags? Can snags be moved parallel with the bank?

A: Having snags parallel to the bank does not provide good habitat. They must be at an angle to the bank, but obviously dangerous snags need to be moved.

General discussion covered the following:

- Acknowledged by everyone that floods are urgently needed to encourage recruitment of MC. Floods encourage the zooplankton that juvenile MC eat.
- Much concern for MC expressed.
- Recreational fishers expressed desire to see even 3 month fishing season. Recreational fishers could play a part in management, but need funds. SARFAC allocates funds to RFCs and their participation is encouraged.