

Protection and enhancement of Murray Cod populations



3 year study initiated in mid 2004, addressing NFS Strategies to:

“Provide adequate passage for native fish”

“ Modifying flow regulation practices”;

Why?

- Icon species
- Murray Cod vulnerable/fragmented (listed under EPBC and FFG)
- Recent fish kills (Goulburn/Broken)
- Location and operation of fishways
- Timing and duration of EWA's

Fills gaps in knowledge gained from research on cod movement in:

- Tributaries (Koehn)
- Murray mainstem
- Murray fishways
- Larval cod

Project objectives

- “Investigate the importance of Murray Cod populations in tributaries, particularly as ‘source’ populations for fish elsewhere in the Murray R.”
- “Develop a management strategy for the operation of weirs and fishways on tributaries , particularly the Broken Ck, to ensure the survival and enhancement of Cod populations in the region”



Steering Committee - Site selection

Short list of 5 sites (incl.anabranches) based on 22 criteria:

- Cod populations
- Quality of habitat
- Water quality and flow regime
- Ability to migrate (barriers/fishways)
- Practicability (access under various conditions/angling/poaching pressure etc)
- Value adding (Wider application for research?/other natives?/Icon sites? etc)



Site relevance to Living Murray assets



- Mullaroo & Wallpolla Cks - Chowilla Floodplain (including Lindsay-Walpolla)- #4
- Ulupna and Broken Creeks - Barmah-Millewa system- #1
- Gunbower Ck - Gunbower, Koondrook-Perricoota Forests - #2

Site selection

Methodology

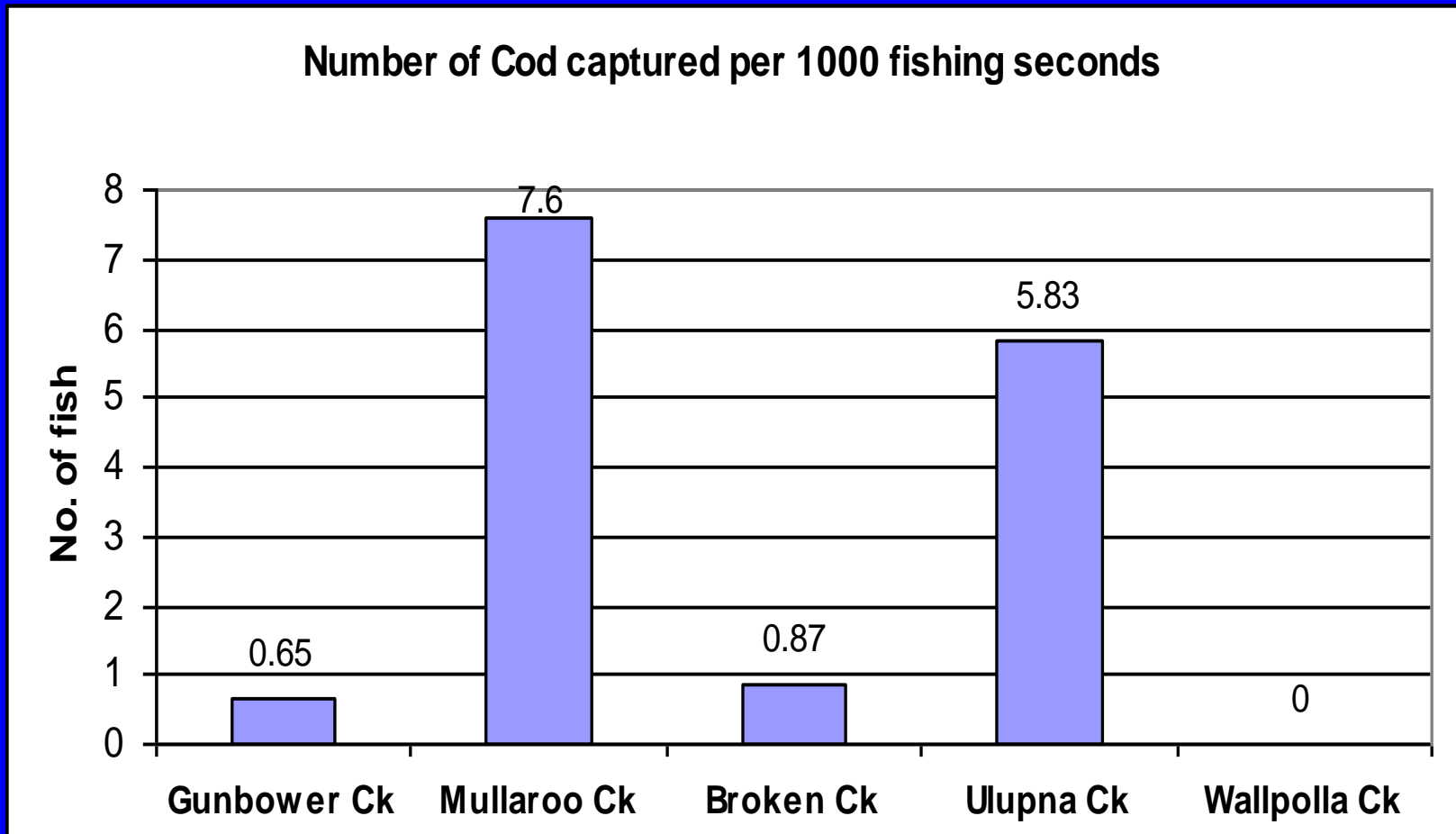
- Cod population assessed on a systematic basis
- Standardised (boat) electrofishing methodology (CPUE)
- Highest ranked sites chosen

Results

- Broken Creek population crashed



CPUE results



Project methodology

- Total of 85 fish implanted with radio-transmitters
 - 23 immature
 - 62 mature (up to 1280mm length)



Project methodology

- 4 Fixed site radio-tracking loggers/site
- Monitor large scale migrations in/out of anabranch
 - At strategic locations (intersecting waters)
 - Directional
 - Log times



- Manual tracking

 - Monitor smaller scale movement using boat

- Water temperatures

 - TidBit temperature loggers deployed at strategic locations at study sites





Lindsay-Murray logger

Murray River

Lock 7

Mullaroo-Murray logger

Lindsay River

Mid-Mullaroo logger

Mullaroo-Lindsay logger

Mullaroo Creek

Value Adding



- Loggers programmed to detect Cod for this project and fish tagged under the Barmah regulator project
- Smaller scale movement close to loggers will provide “home range” movement information
- All fish implanted with PIT tags to ensure that any movement through Murray fishways is recorded (long-term value-adding)
- Mullaroo movements will assist to determine effect of upstream ford as a potential barrier to movement



Progress to date

Establishment

- Logger system completed - September 2004
- Initial sampling - August-September 2004 & again in May 2005



Results

- Late 2004 and 2005 spawning season (Sept-Nov) movement collected
- 2006 spawning season pending



Write-up

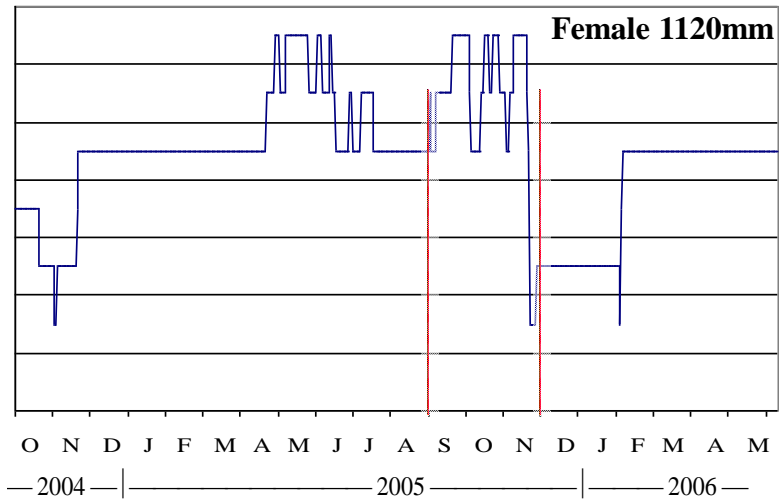
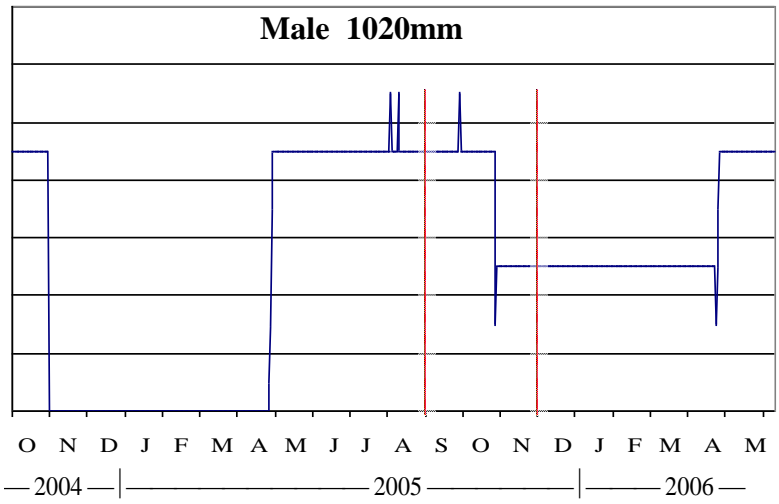
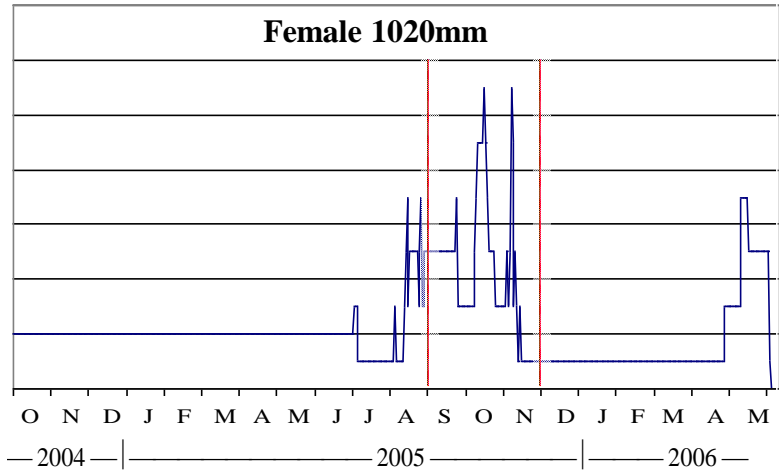
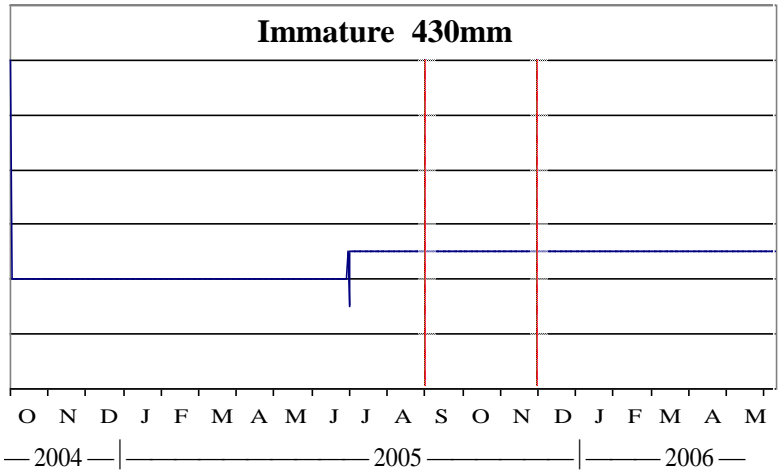
- 2006/7 - Final report on movement and Weir pool guide finalised

Preliminary Movement Results

Upstream

Murray R.
Murray-Mullaroo L
Upr Mullaroo reach
Mid Mullaroo L
Lwr Mullaroo reach
Mullaroo-Lindsay L
Lwr Lindsay R.

Downstream



O N D J F M A M J J A S O N D J F M A M
— 2004 — | — 2005 — | — 2006 —

O N D J F M A M J J A S O N D J F M A M
— 2004 — | — 2005 — | — 2006 —

Preliminary results suggest:

- All 17 immature Cod are using both Mullaroo and Ulupna Creeks as home sites (negligible movement 2004 or 2005)
- Lindsay R. Cod population (26%) using Mullaroo Creek during spawning period (block movement from Mullaroo back into Lindsay River)
- Mature size cod are undergoing medium to large movements within and out of anabranches during spawning season with mature cod generally remaining in the Mullaroo Creek (32 recorded moving past loggers)
- 21% of migrating females travelled into the Murray R. during spawning season
- Mature size cod recorded passing across ‘barrier’ on upper Mullaroo barrier during spawning season
- Legal angling flagged as having a major potential impact upon Mullaroo cod population with 15% of tagged fish taken in 1st year (poaching also occurs)

Results - to come

- 2006 spawning season are expected to clarify movement patterns
- Effect of EWA's on Cod movt. will be assessed & timing recommendations made.
- Weir pool operations guidelines for Broken Creek is anticipated to assist general movement (and recolonisation) of Murray Cod
- Assessment of anabranches as spawning sites and potential “nursery grounds”
- Significance of linkage with Murray mainstem

