Murray hardyhead – Long term prospects

Iain Ellis
Leigh Pyke, Lauren Carr
Outline

1. Murray hardyhead status
2. New stuff we are finding
3. Future prospects for MHH
Murray hardyhead

- nationally threatened
- salty lakes, creeks and rivers of lower MDB
- associated with vegetation (eggs)
Murray hardyhead distribution

- Formerly widespread
- Reduced range, generally isolated locations.

New population located
Three (four) genetic management units:

1. Lower Lakes

2. Mallee (VIC) / Riverland (SA)

3. Kerang Lakes / Swan Hill (actually 2 units within this region)
Conservation Management:

- Water delivery to secure 3 VIC sites, and 3 SA sites
- Captive populations from 4 VIC and 4 SA sites
- Translocation to 1 VIC and 1 SA site
- SA Restoration Genetics project (ARC Linkage project)
- Recovery team established
<table>
<thead>
<tr>
<th>VIC Kerang</th>
<th>Round Lake</th>
<th>Lake Kelly</th>
<th>Woorinen North</th>
<th>Lake Elizabeth</th>
<th>Golf Course Lake</th>
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<tbody>
<tr>
<td>VIC Mallee</td>
<td>Cardross Basin 1 East/West</td>
<td>Cardross Basin 3</td>
<td>Cardross Basin E</td>
<td>Lake Hawthorn</td>
<td>Koorlong Lake</td>
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<td>SA Riverland</td>
<td>Berri Evap Basin</td>
<td>Disher Creek</td>
<td>Gurra Gurra</td>
<td>Causeway Lagoon</td>
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<tr>
<td>SA Lower Lakes</td>
<td>Rocky Gulley</td>
<td>Boggy Creek</td>
<td>Goolwa Channel</td>
<td>Dog Creek</td>
<td>Riverglades</td>
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</tbody>
</table>

presumed present
present
Translocated
precarious
Undetermined after flood – possibly gone
extinct
Cardross Basin 1 East

Cardross Basin 1 East CPUE and EC
- Murray hardyhead
- EC

Cardross Basin 1 East CPUE and Water level
- Murray hardyhead
- Level mAHD

Water level mAHD
Cardross Basin 1 West Murray hardyhead CPUE

- Catch per net (per 18 hours)
- Water level (mAHD)

Graph showing Murray hardyhead CPUE and water level (AHD) over time.
Some other things we have learnt...
Diet

- Diet can be highly variable (size – location)
- eat zooplankton and microinvertebrates
- larvae seem to like rotifers and artemia in captivity

Longevity

- Less than 2 years
- Vulnerable to local extinction
Life history - largely annual

Spring spawning

Autumn spawning

adults replaced by young
Conceptual fluctuation in a population

Murray hardyhead

Spring spawning

Autumn spawning
Salinity Tolerance

- recorded as high as 71,000 uS.cm⁻¹
- can survive/breed in fresh water (< 500 uS.cm⁻¹)
- attracted to freshwater – will swim upstream
- will move into newly flooded habitat
- different populations have different salinity preferences
Eggs survival out of water

Eggs can last an hour or so out of water – that's long enough to be ‘flown’ to new places......

.........maybe?

Diurnal activity

• Murray hardyhead more active during day

• prefer the bottom of the water column
Habitat use

Cardross Basin 1 East
percentage habitat use by Murray hardyhead
- Deep: 36%
- Edge: 35%
- Mid: 29%

Koorlong Lake
percentage habitat use by Murray hardyhead
- Deep: 24%
- Edge: 41%
- Mid: 35%

Cardross Basin 1 West
percentage habitat use by Murray hardyhead
- Deep: 41%
- Mid: 10%
- Edge: 48%

Cardross Basin 1 East
percentage habitat use by Gambusia
- Deep: 9%
- Edge: 58%
- Mid: 35%

Koorlong Lake
percentage habitat use by Gambusia
- Deep: 12%
- Edge: 69%
- Mid: 23%

Cardross Basin 1 East
percentage habitat use by Gambusia
- Deep: 5%
- Edge: 82%
- Mid: 16%
Gambusia occupy the edge zone .... the same habitat larval Murray hardyhead are often recorded in.
Murray hardyhead push up in to the edge zone when gambusia numbers crash (autumn).
Gambusia can grossly outnumber MHH
Interaction with Gambusia – tank trials

• Gambusia do attack MHH, and also eat the larvae !!

• MHH preferred “position” altered by introduction of Gambusia
we would expect there would be a direct impact of Gambusia on MHH.

Particularly when Gambo’s are super-abundant.
Impact of Gambusia on breeding success

Reduced reproductive success
Gambusia pump.....

Skimmer – slow flow

Heated water

Pumped out to filter
Long term Prospects

- Flooding has been good in VIC – filled wetlands, new population etc
- Status since flooding in SA undetermined – few recorded
- Water availability - now is the time for recovery (i.e. translocation)
- Identify additional remnant or post-flood populations.
Long term prospects

Conservation - building on a wobbly platform

Prospects for recovery in SA potentially grim ...

Prospects for recovery in VIC heaps better than 12 months ago ...

As its wet, there is scope for some positive outcomes

So long as we don't relax!
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• SA Museum
• SA Murray-Darling Basin Natural Resource Management Board
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