Using PIT tags to assess fish passage in the Murray River

MURRAY-DARLING BASIN COMMISSION

NSW DEPARTMENT OF PRIMARY INDUSTRIES

SARDI R&D SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Victoria The Place To Be


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Why tag?

- To investigate spatial behaviour in freshwater fishes

  –Small scale (within fishways)

  To investigate if fishways are effective and efficient

  –Large scale (between fishways)

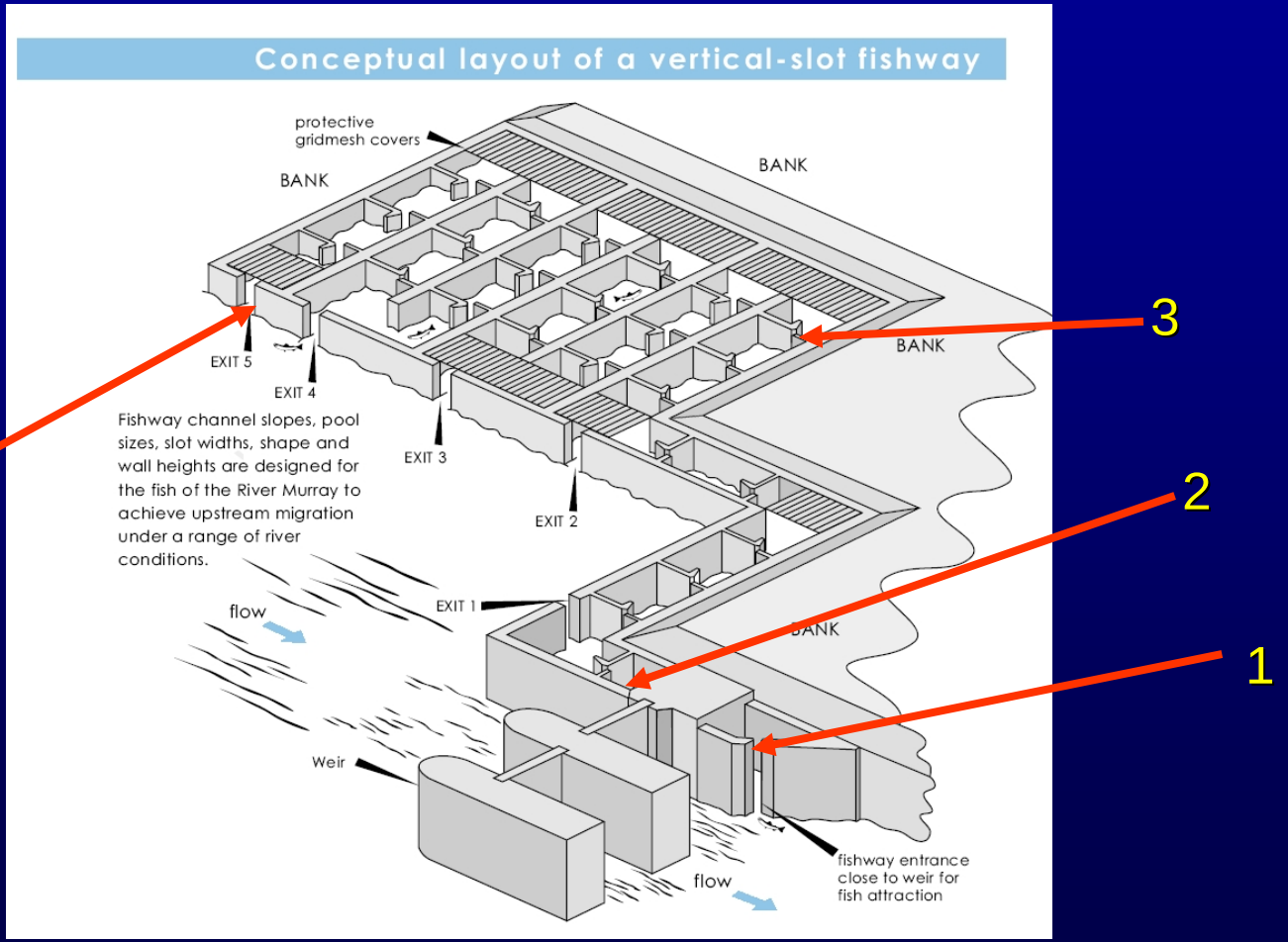
  Provide new information on the movement ecology of native and exotic fishes

Passive Integrated Transponder (PIT) Tags

- Small glass cylinder comprising a coil and integrated circuit
- Programmed to transmit a unique code
- No battery, energised by induction coil
- Read range up to ~ 1 m

PIT monitoring of fishways

- Four reader automated system installed



Four reader automated system

- Loop antenna at 4 locations within the fishway
- Antennas energised 4x/second
- Data (fish, antenna and date/time) stored on hard drive, automatically zipped and emailed weekly to researchers

Tagging program

- 11,800 fish implanted with PIT tags (Lock 7-10 and Locks 1-3)
  - 4,875 golden perch
  - 5,077 carp
  - 405 Murray cod
  - 325 silver perch

- Data recorded from Lock 8 since November 2003, Lock 7 August 2004, Lock 9 February 2005 and Lock 10 July 2006.

General Results

- Over 2,333 individual fish have been recorded at the Lock 7-10 fishways

- Species have included golden perch (68%), carp (24%), silver perch (2%), Murray cod (2%) and bony herring and goldfish (< 1%)

Movement within fishways

- Fishway efficiency

  ⇨ measured by ascent success (i.e. fish that entered the fishway and exited the top)

Species	Success
Golden perch	> 80%
Carp	> 85%
Murray cod*	33-81%
Silver perch*	50-100%

*low sample size

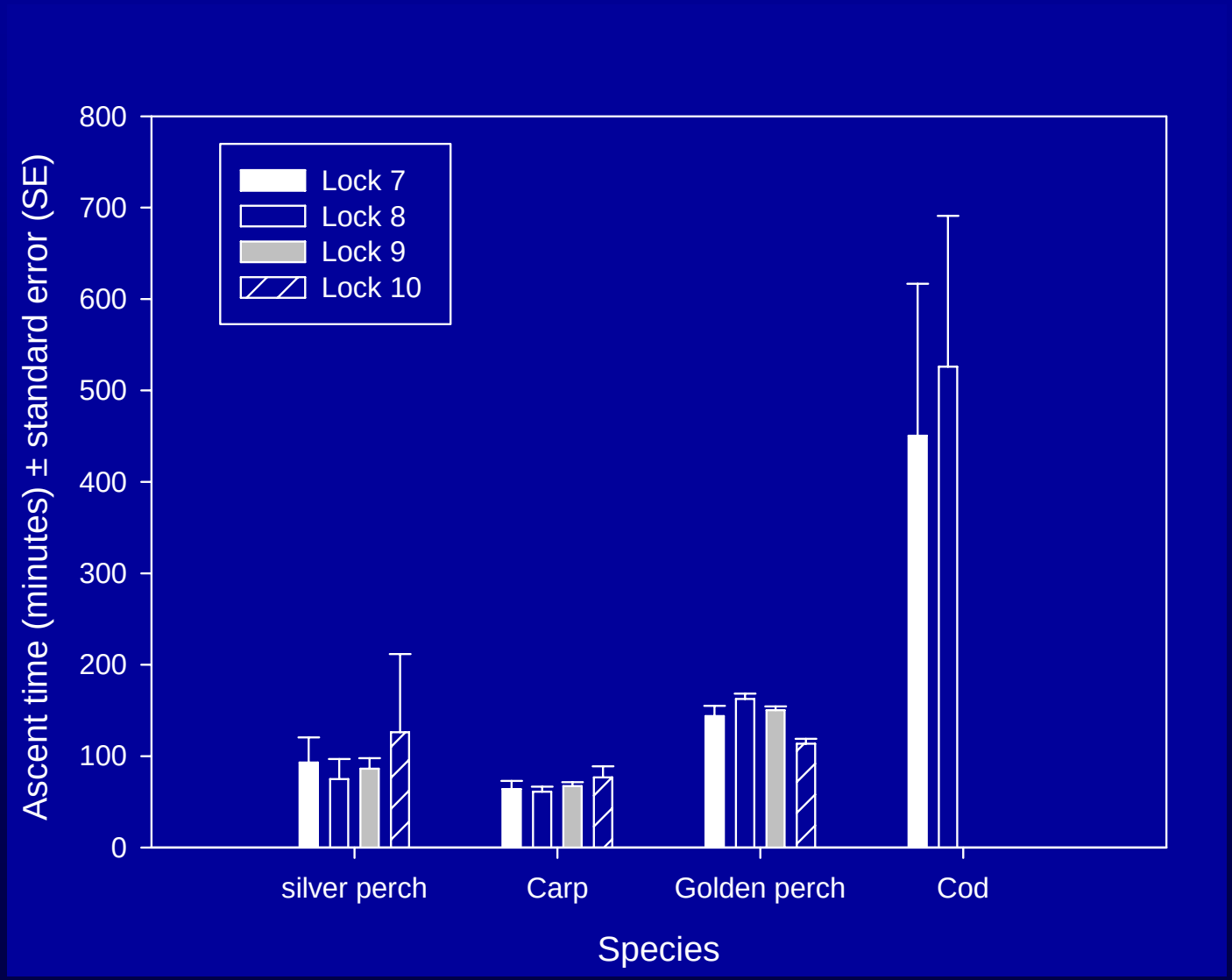
Movement within fishways

- Descents of the fishway are less common

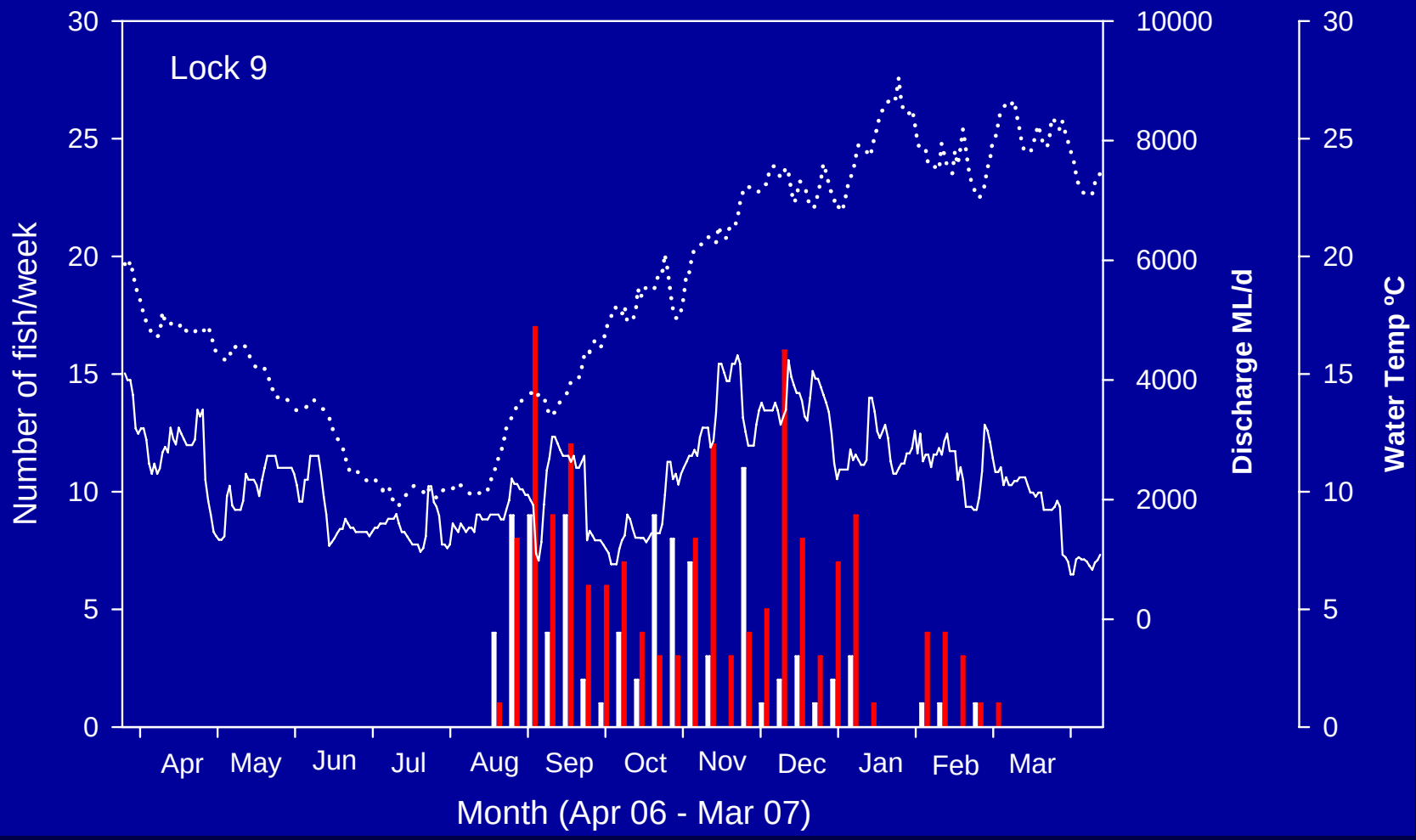
  ⇨ Golden perch and carp ~ 10%

- Data indicate that golden perch and carp are also moving downstream over the weir (multiple ascents recorded with no descents)

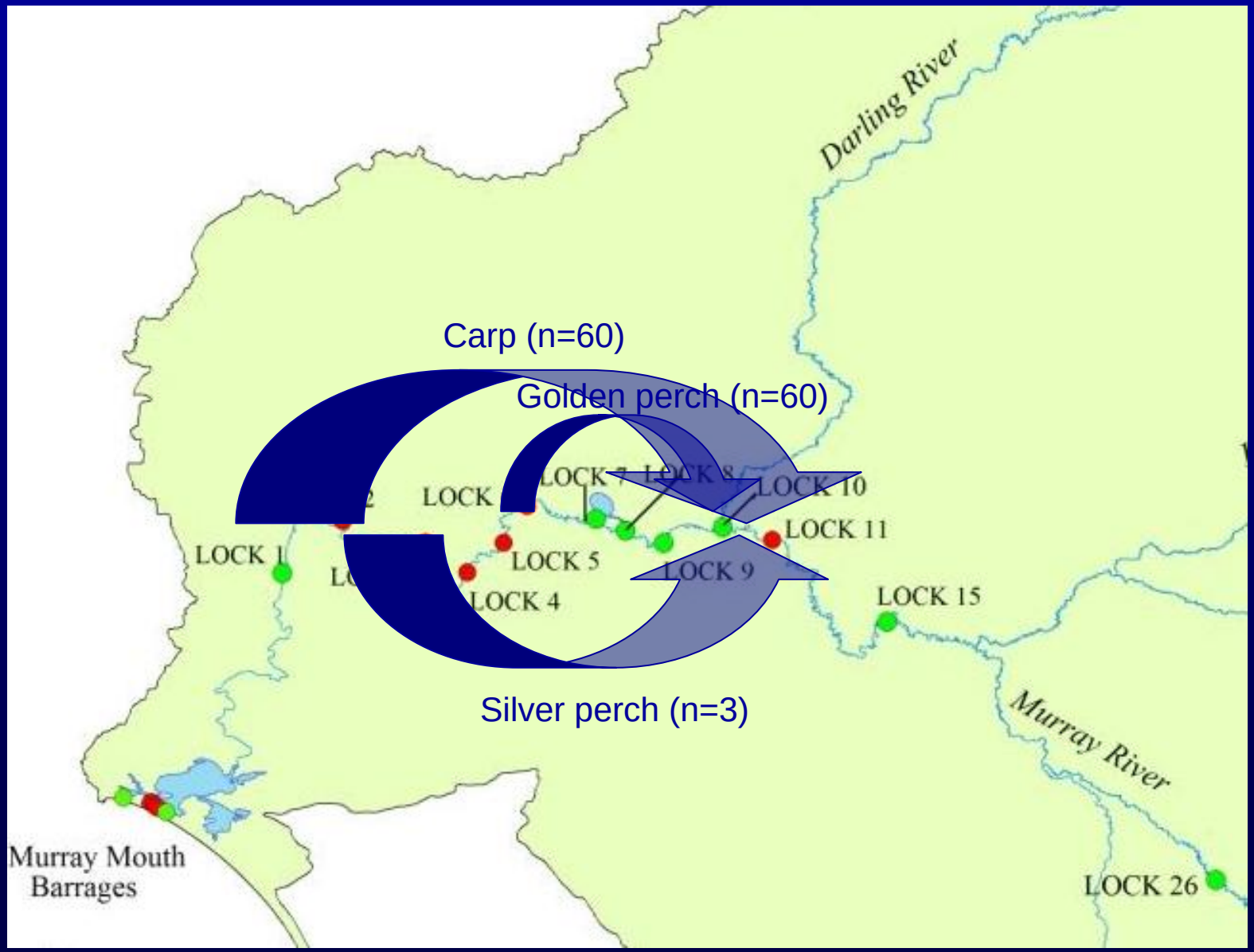
Ascent rates



Seasonality of Movement



Large scale movements



What next?

- Use data to improve fishway function
- Utilise temporal movement data to efficiently deploy carp separation infrastructure
- PIT reader maintenance
- Upgrade CDMA data transmission to 3G or radio (where no 3G coverage)
- Upgrade PC hardware to heavy duty PLC/RTU hardware
- Remote installation (in the absence of mains power)
- PIT data management (centralised database project)