

Variable flows and fish recruitment in an Australian dryland river

- Stephen R Balcombe
- Angela H Arthington

Dryland Rivers

Dryland Rivers and floodplains

Variable hydrology and connections

Unpredictable drying and wetting

How do fish persist in these systems?

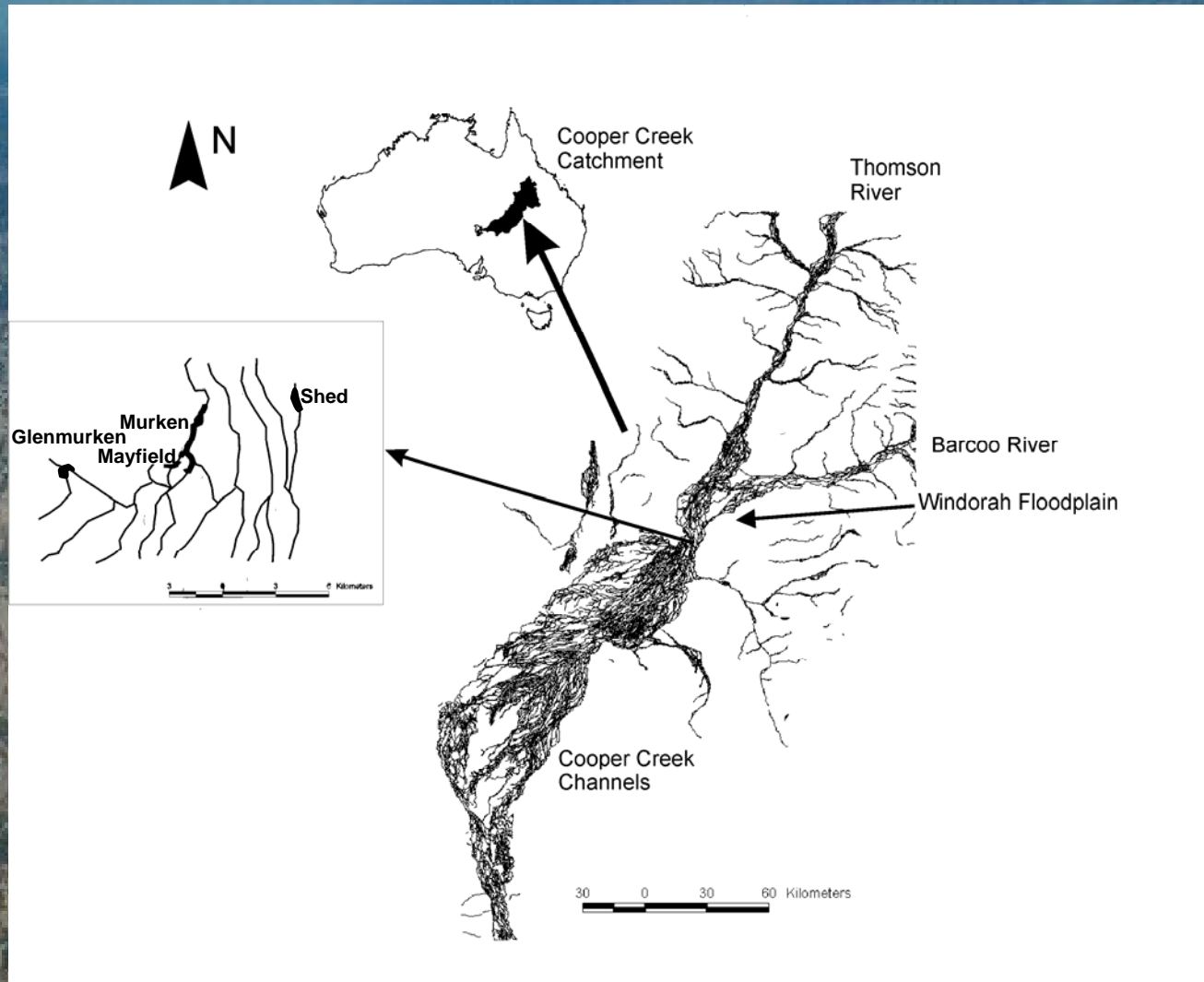
Opportunistic ecologies

feeding

habitat use

life history

Study area and location of waterholes



Glenmurken 2004



March



June



December



Mayfield



March



June

Shed



December



The Cooper Creek fish

12 native species, two exotics

Large -bodied species – Cooper Creek tandan, yellowbelly, Barcoo grunter, bony bream

Medium-sized species - Welch's grunter, Hyrtl's tandan, silver tandan, spangled perch

Small-bodied species rainbowfish, northwest ambassis, carp gudgeons,

Generalist in nature and strategies that allow them to be opportunistic/abundant when conditions are good and bad?

Aim: to examine temporal patterns of abundance and size structure in the Cooper Creek fish assemblage to identify potential recruitment patterns under varying hydrological conditions

GENERAL METHODS:

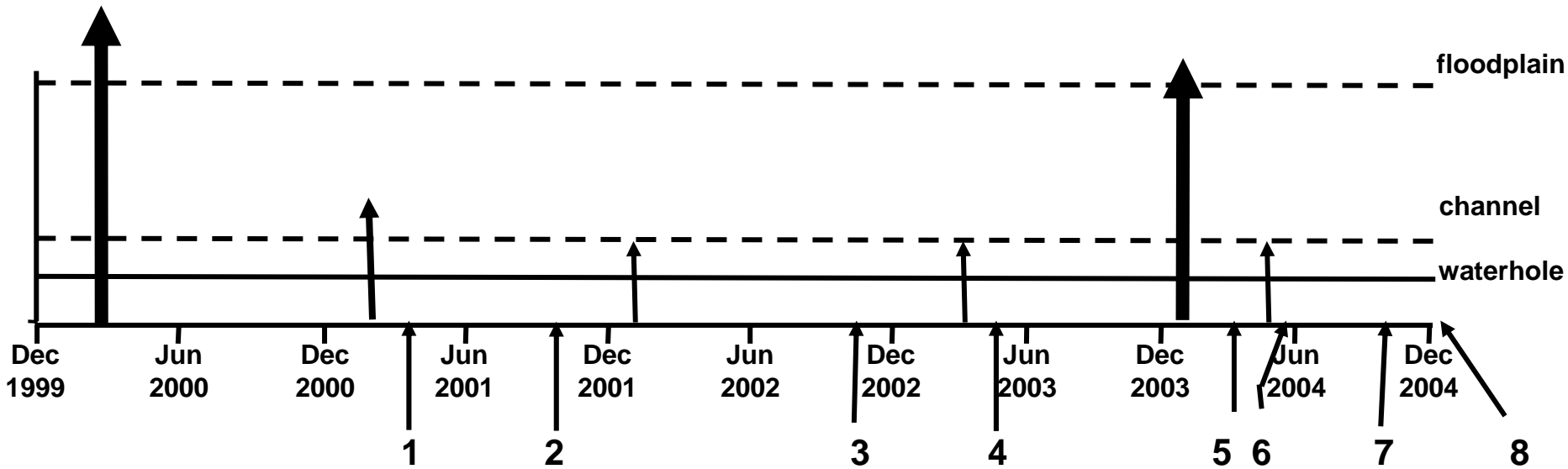
Four waterholes, eight sampling times

Abundance (CPUE)

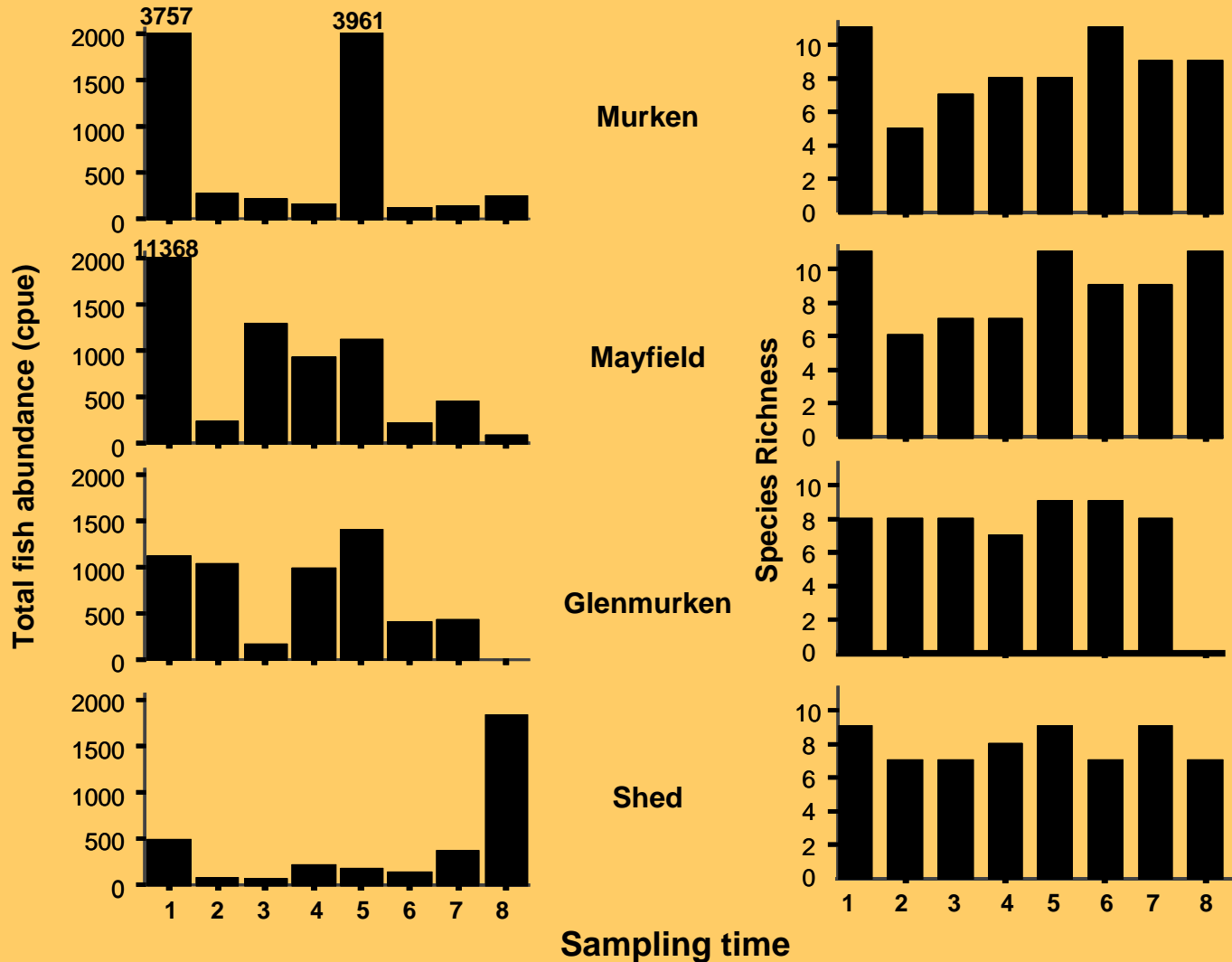
Standard length (mm)

hydrology (flood, flow, post-flow, dry)

Sampling times and Hydrology

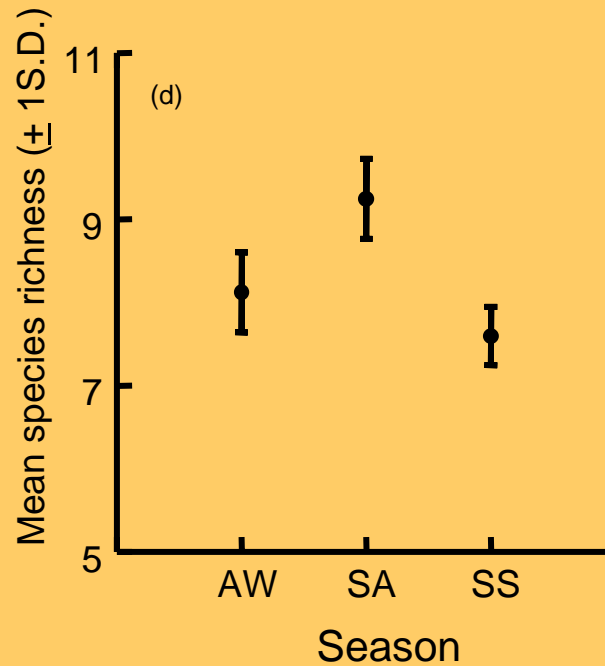
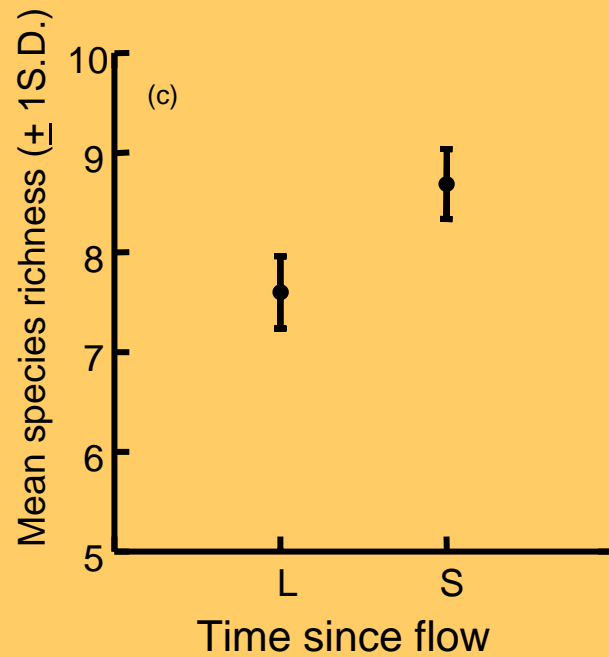
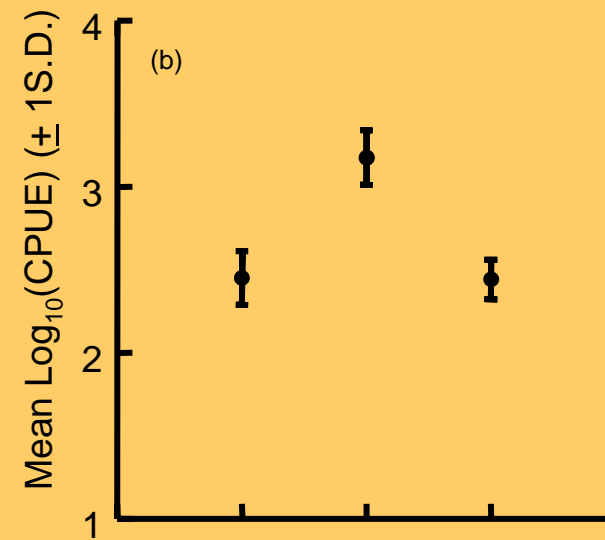
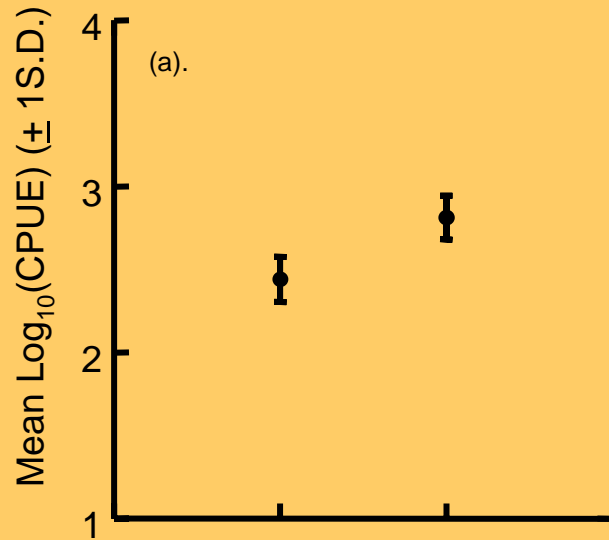


Temporal variation in fish abundance and species richness in four Cooper Creek waterholes

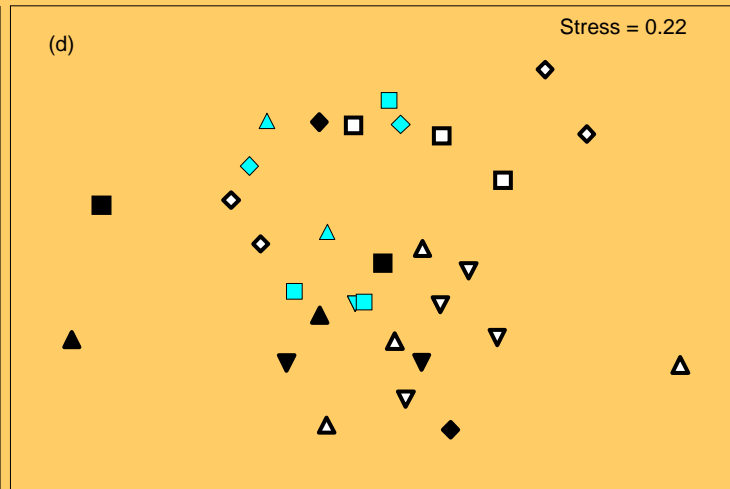
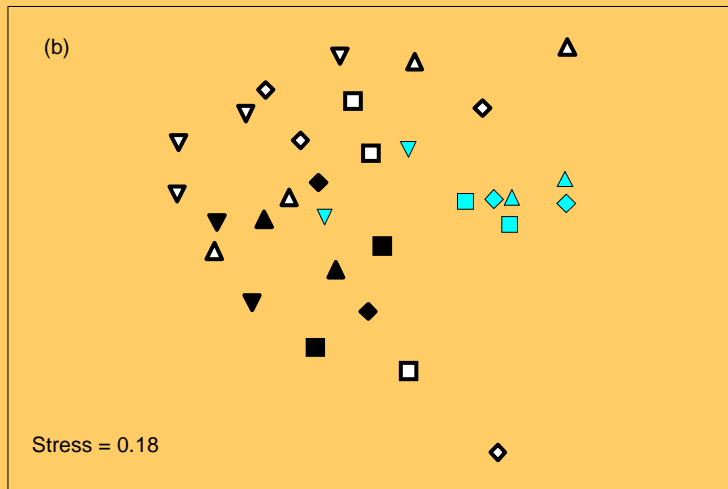
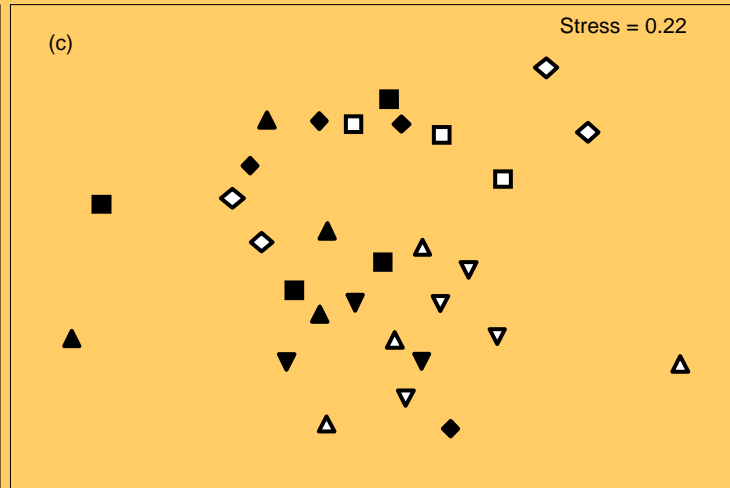
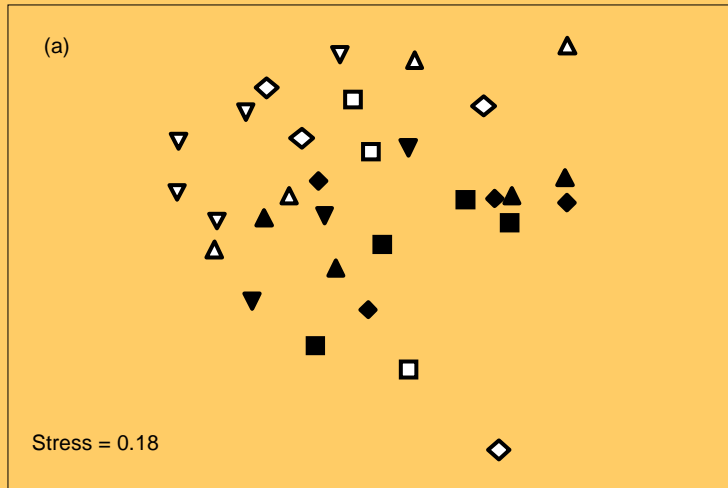


Sampling times: 1=April 2001, 2=September 2001, 3=October 2002, 4=May2003, 5= March 2004, 6=June 2004, 7=October 2004, 8=December 2004

Fish abundance and richness for flow and seasonal groupings



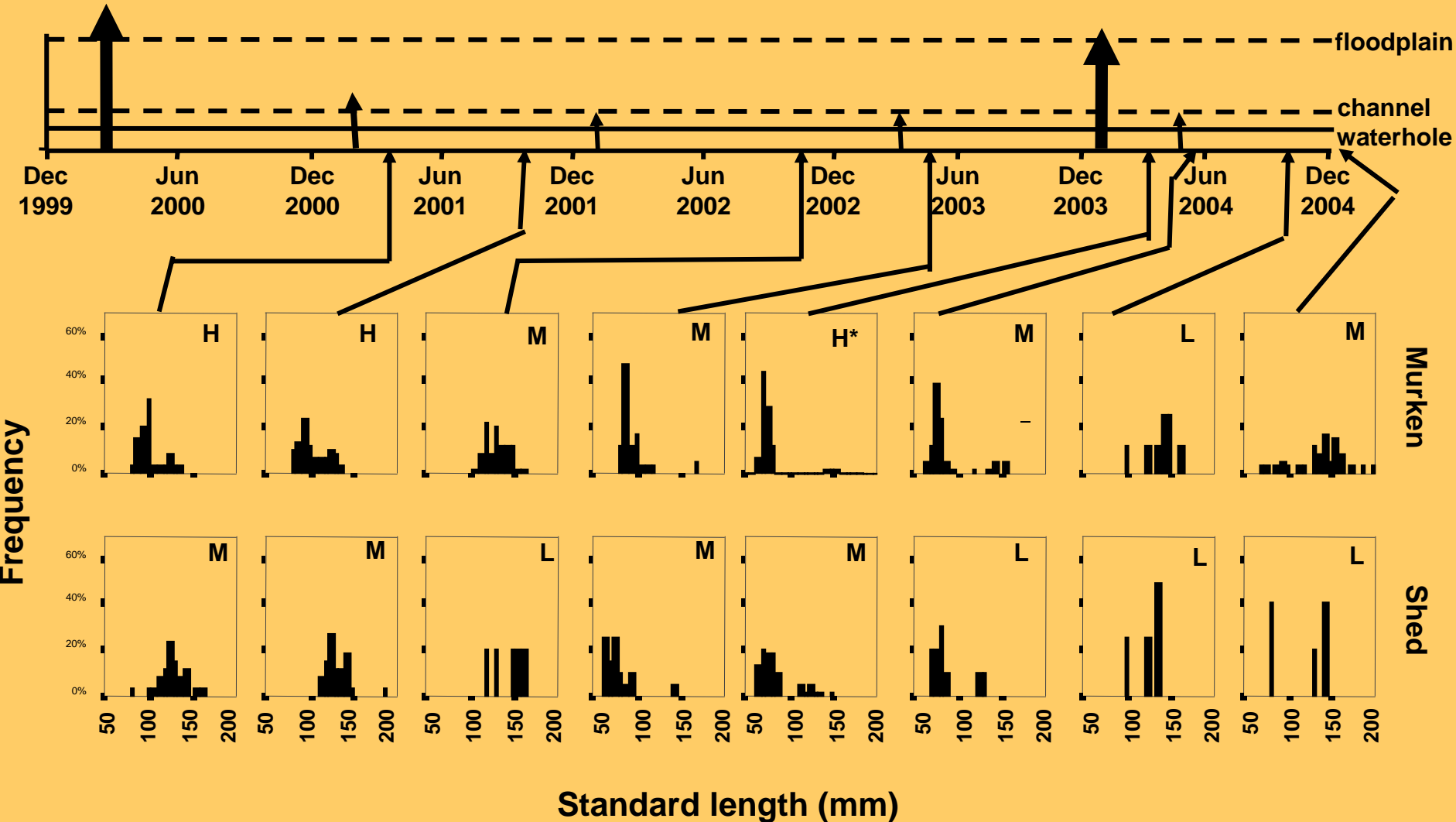
MDS plots for fish assemblage data based on Log_{10} abundance and species presence absence



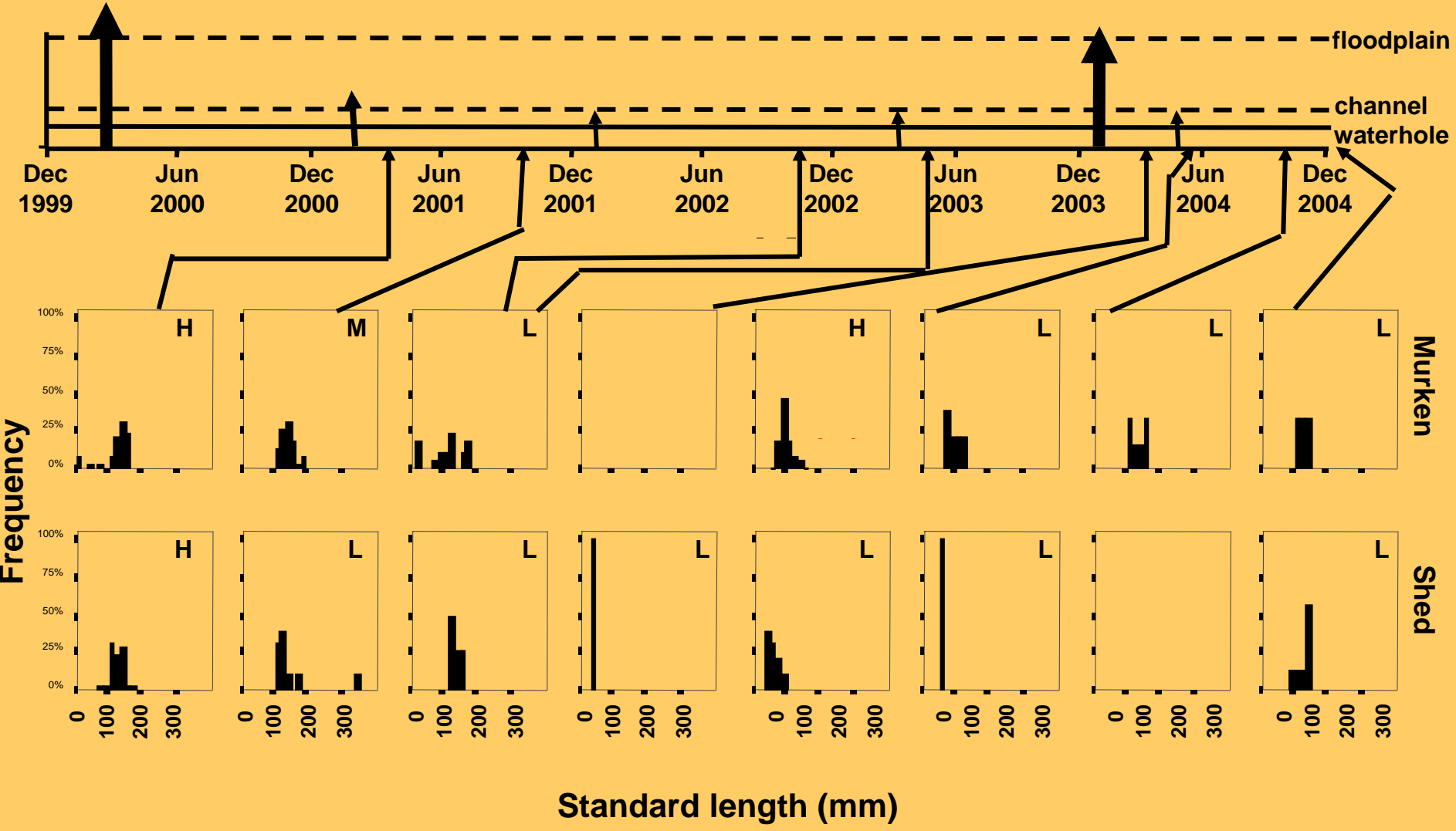
Waterhole: ▲ Murken ▼ Shed ■ Glenmurken ◆ Mayfield

Sampling times: 1=April 2001, 2=September 2001, 3=October 2002, 4=May 2003,
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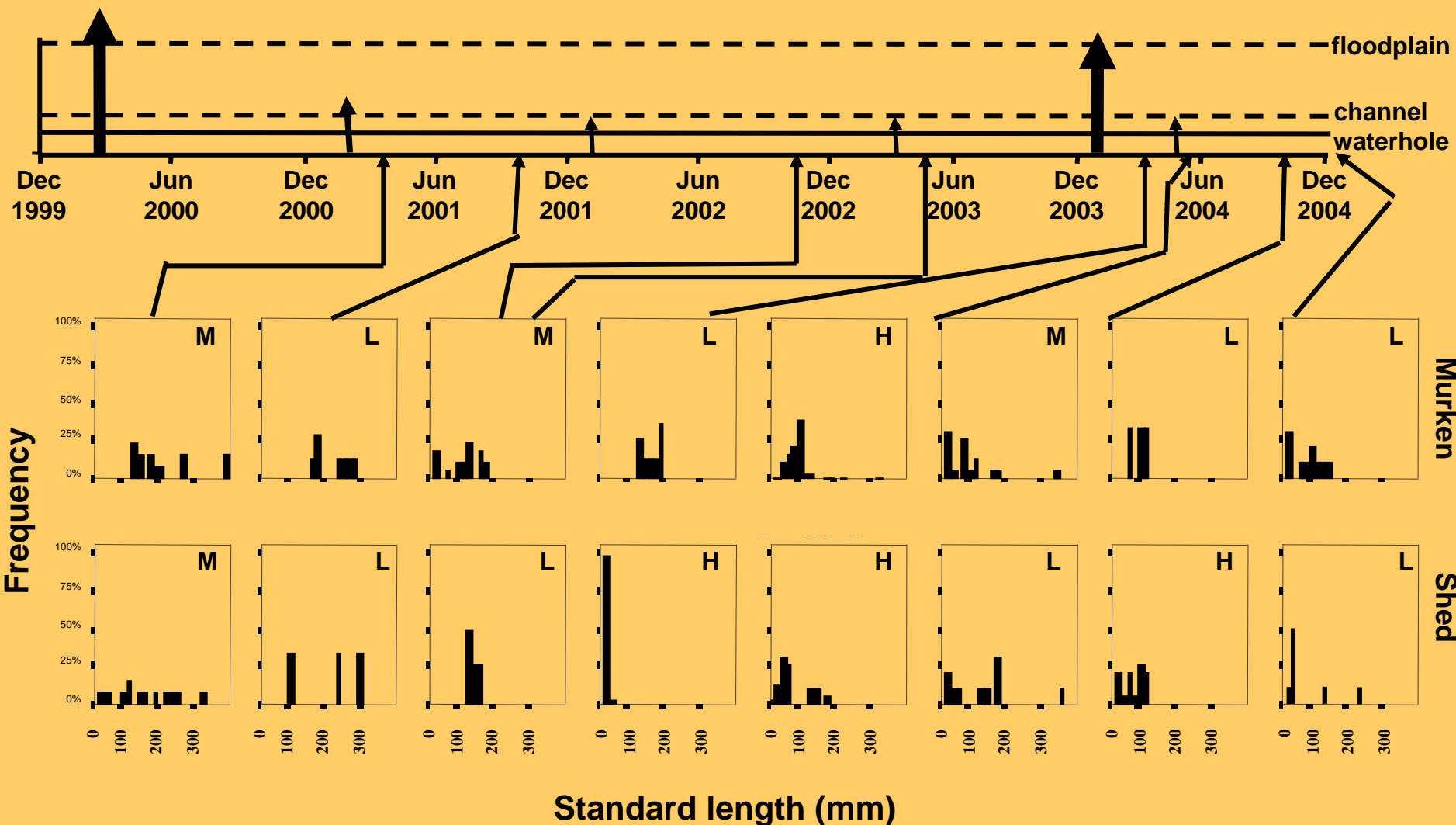
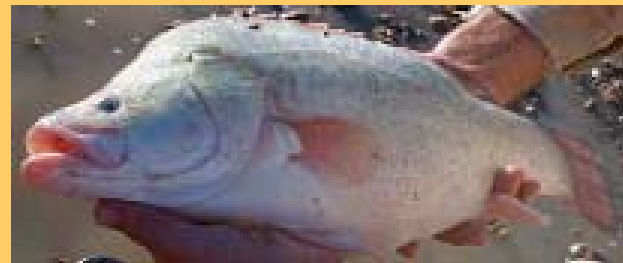
silver tandan (*Porochilus argenteus*) length structure



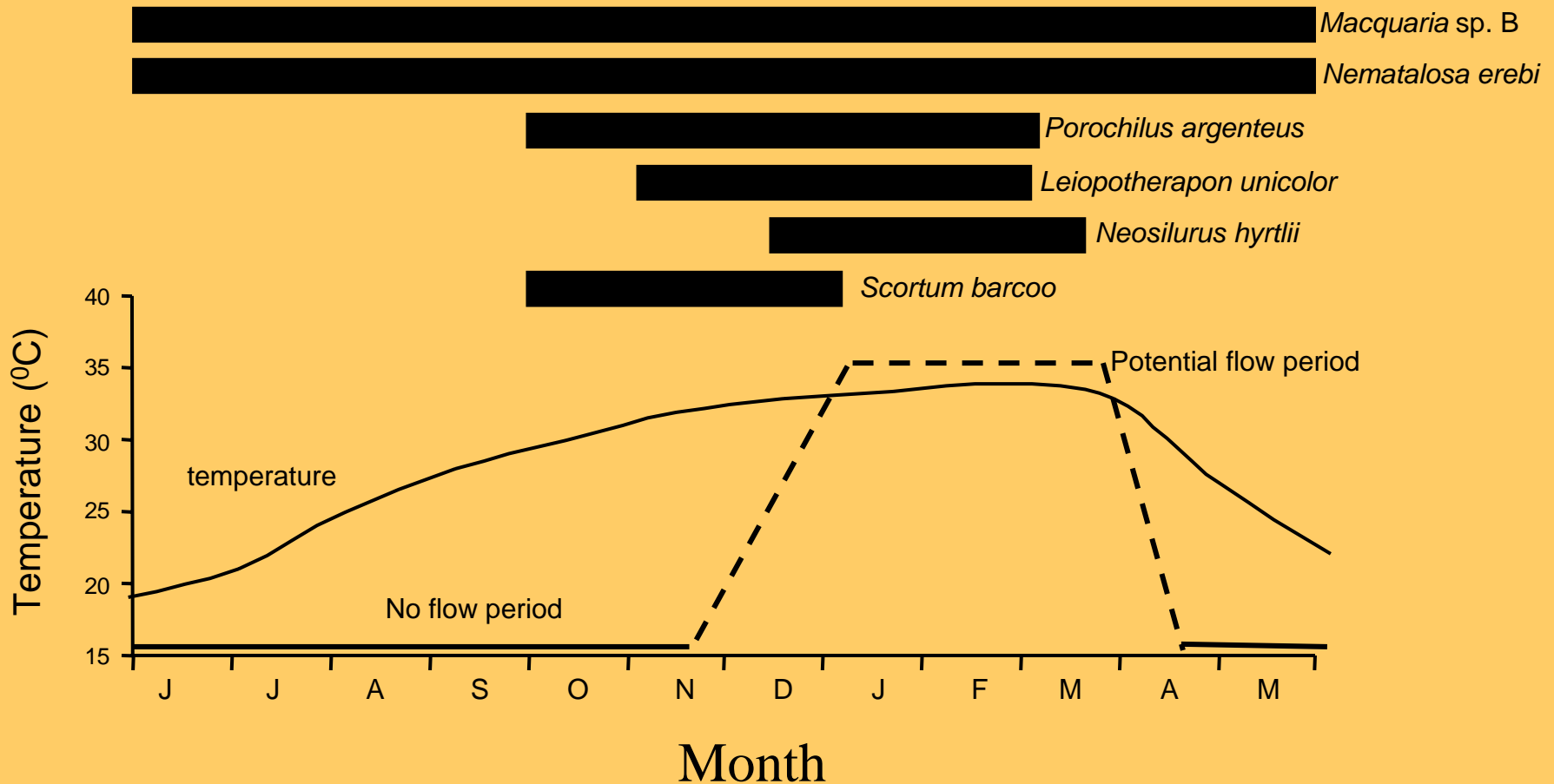
Spangled perch (*L. unicolor*) length structure



yellowbelly (*Macquaria* sp.) length structure



Spawning duration of six fish species in the Windorah reach of Cooper Creek



Summary of recruitment characteristics for Cooper Creek fish species

	season	Season + flow	Non seasonal +flow	Non seasonal no flow
bony bream			✓✓✓ (4)	✓ ✓(4)
silver tandan		✓✓✓ (4)		✓ (2)
Hyrtil's tandan		✓✓✓ (3)		
Barcoo grunter	✓	✓✓✓ (4)		
Welch's grunter	✓	✓✓ (2)		
spangled perch	✓✓ (4)	✓✓✓ (4)		
yellowbelly			✓✓✓ (4)	✓ ✓(2)

✓ = recruitment response, (x) = number of occurrences noted from 4 waterholes

Conclusion and relevance for flow regimes

Seasonal and non-seasonal recruitment – consistent but weak

No flow periods – consistent but small recruitment events (sustaining populations)

Hydrological Influence - very strong (provides conditions for population booms)

Current flow regime – fish adapted to survive through busts and flourish through booms

Altered flow regime (WRD/climate change)– extended busts or weakened booms