


# Frogs in the Lachlan Catchment



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Heritage

# History

- Frog studies in the Lachlan Catchment
  - Most recent around Condobolin in anabranches of the Lachlan River in Mid-Lachlan valley
- Call recorder data ( NSW OEH)



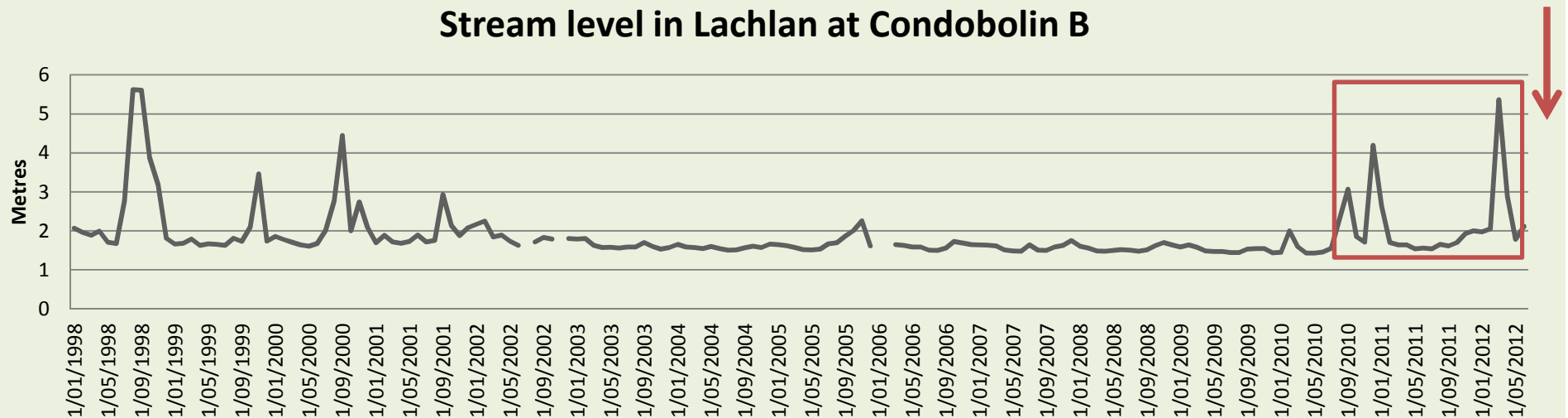




- First large scale comprehensive assessments of frog communities and their habitats in Mid and lower Lachlan since the drought has broken
- Presents opportunities to assess current status of frogs in the catchment
- Frog distribution is often linked to large flows.
- Changing hydrology can impact frogs

# Hydrology

- Extended drought
- Reduction in flow
- Large-scale drying of freshwater habitat
- Recent inflows in 2010-2012



Department of Primary Industries, Office of Water (2012)

Figure 1: Stream levels in Lachlan at Condobolin B from 1998-2012



# Most recent historically recorded species

Mid and Lower Lachlan



## Other Species

- Green Tree Frog
- Crucifix toad
- Sloane's Froglet
- Painted Burrowing Frog
- Southern bell Frog

# Southern Bell Frog



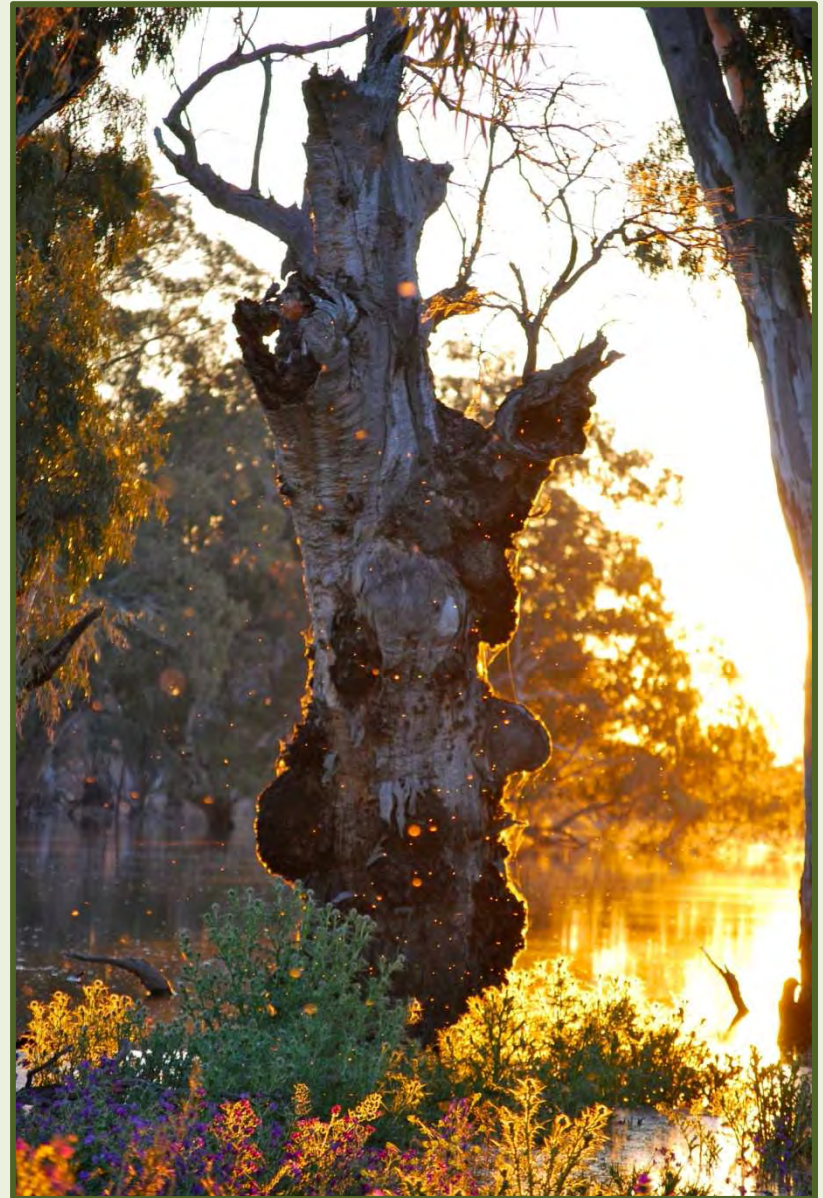
- Historically recorded in the area
  - Willandra National Park 1985
  - Likely to occurred in Great Cumbung Swamp
- Most recent surveys have not detected
- Know to be highly dispersive with extensive inflows, chance of detection now?

Photos by Sascha Healy



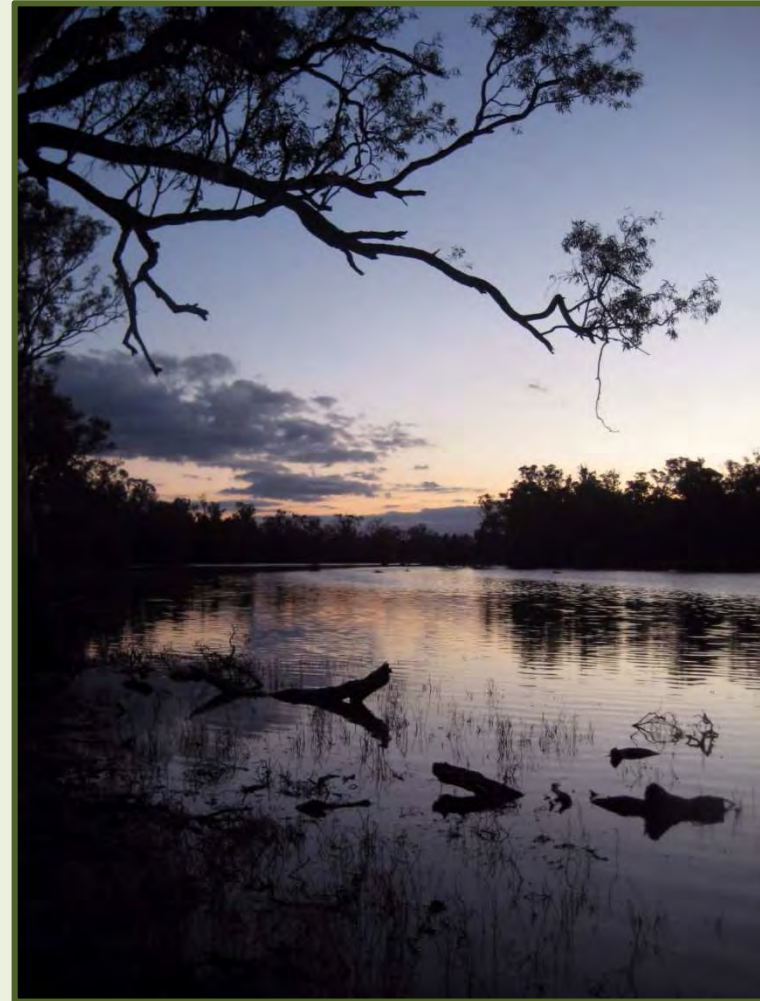
# This Study

- Sites from Condobolin down to Great Cumbung Swamp
- Approximately 30 sites, 3 times between September 2012 and May 2013
- Survey frogs and tadpoles to determine community composition, species richness and distribution
- Identify biophysical and abiotic factors that affect them



# Similar Completed Studies

- Study in the Mid-Murrumbidgee wetlands identified frog communities after extended dry
- Both collect biophysical and abiotic data, including hydrology
- Regions close geographically
- Will there be similar results in Lachlan Catchment?





## Maximum Yearly River heights at Narrandera and Darlington Point

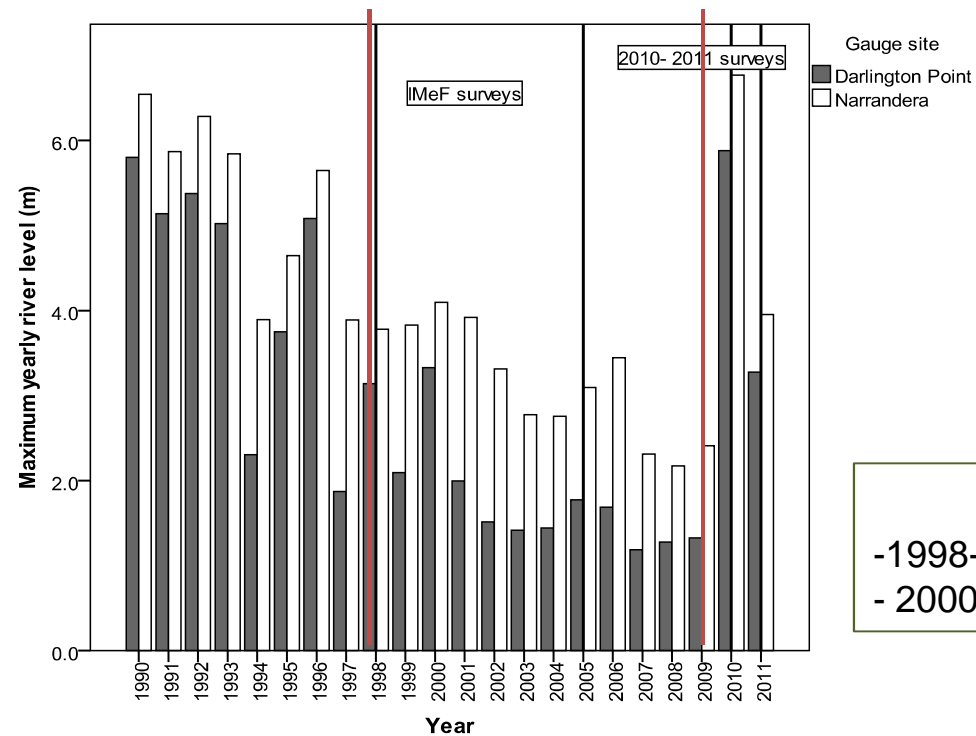


Figure 2: Maximum yearly river heights at Narrandera and Darlington Point gauges 1990-2011(from NSW water)

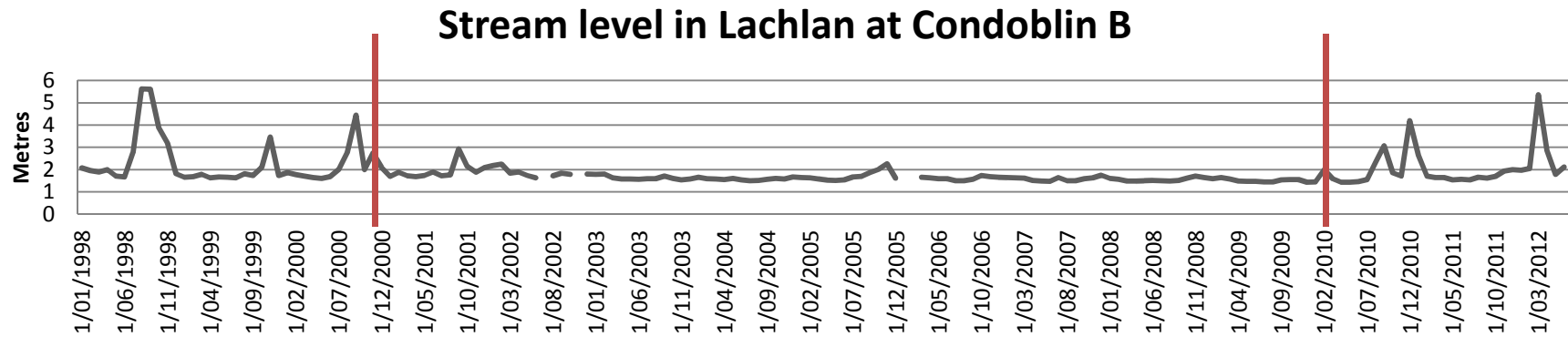


Figure 1: Stream levels in Lachlan at Condoblin B from 1998-2012

# Hydrological Data Murrumbidgee

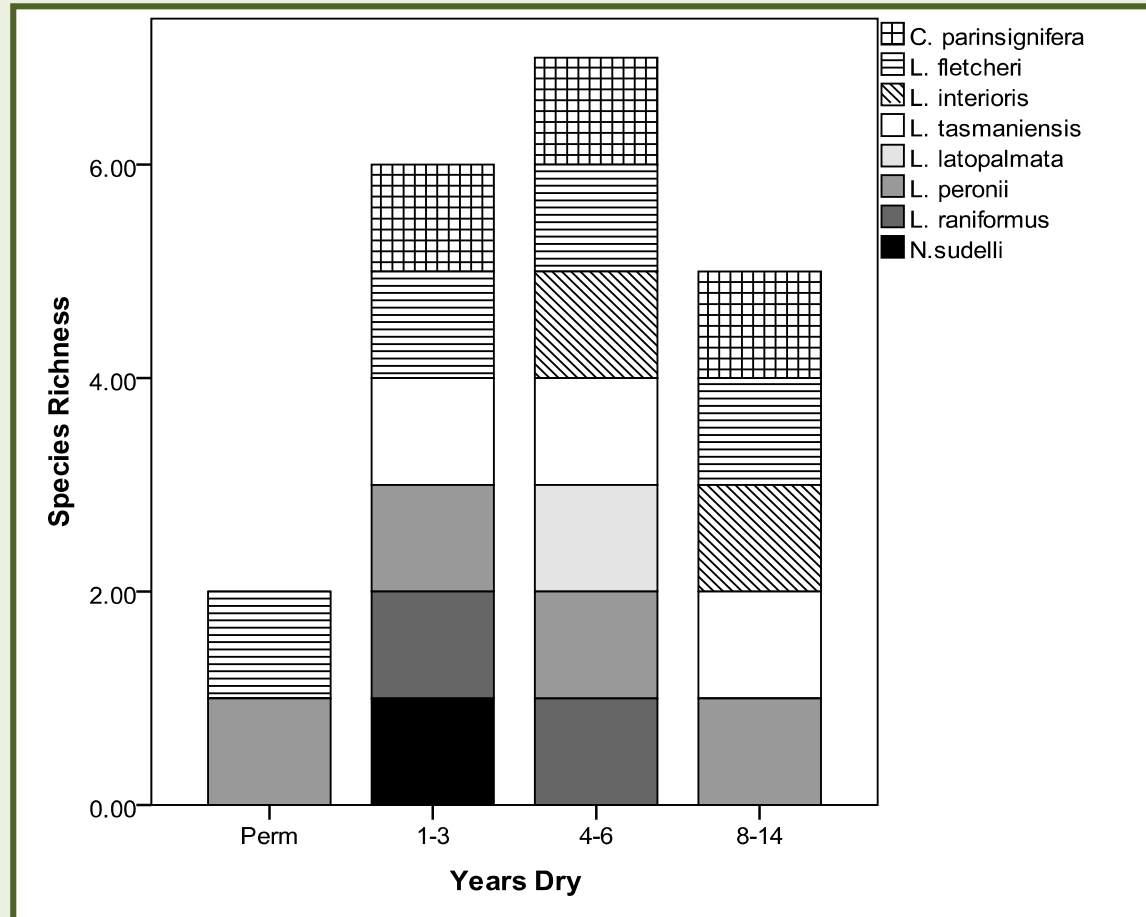


Figure 3: comparison of frog species richness in years dry categories 2010-2011 (perm= permanent wetland)





# Hydrology Lachlan

- Literature indicates that results could be similar
- May be different as there has been a longer period since first large inflow- allow for greater dispersal of species

# *Gambusia holbrooki*

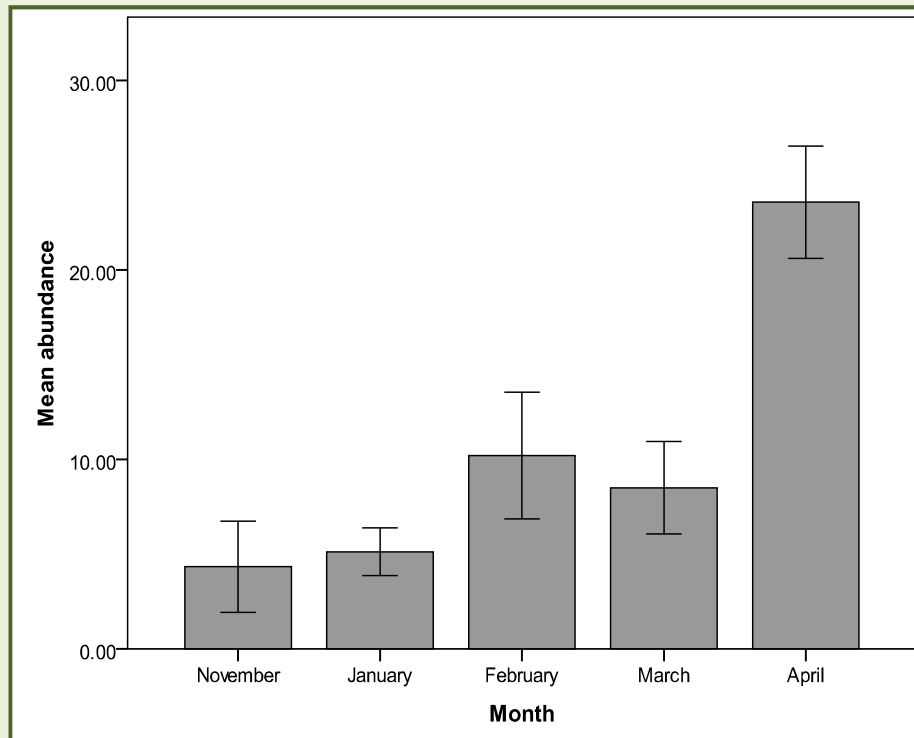


Figure 5: mean of *G. holbrooki* abundance each month

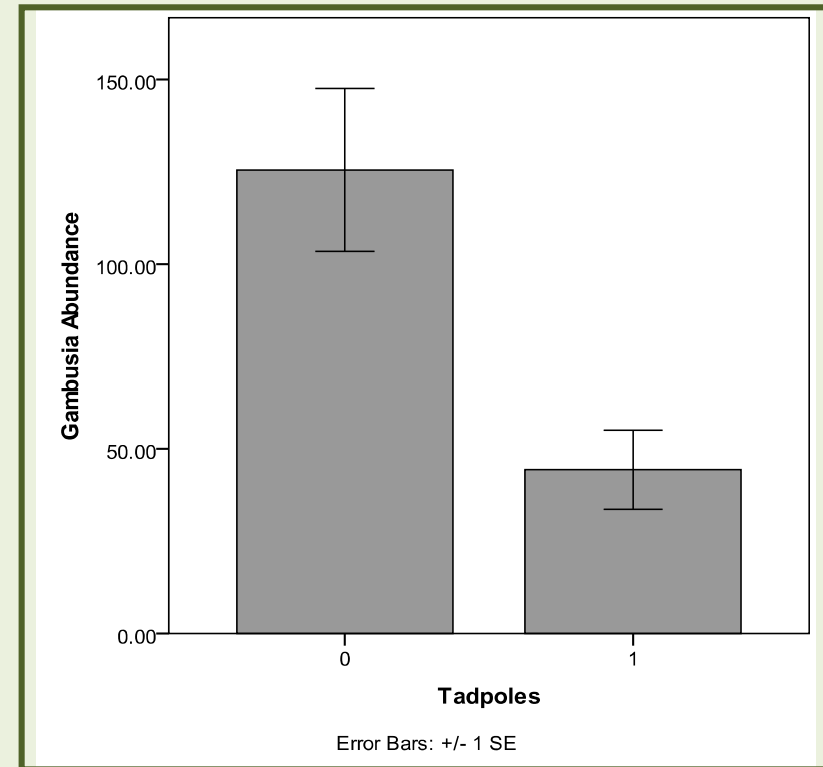


Figure 6: mean abundance of *G. holbrooki* at wetlands where tadpoles were absent (0) and where they were present (1)

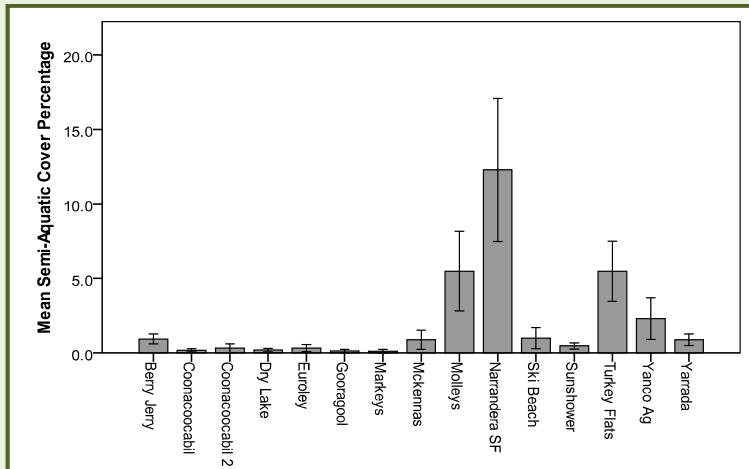
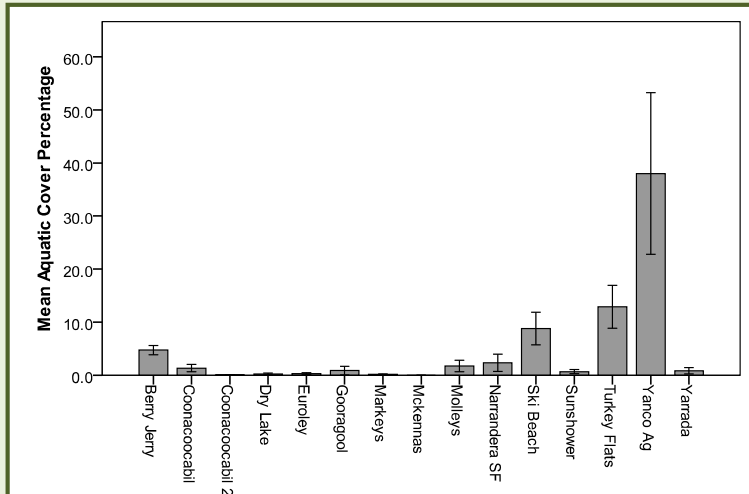


Picture sourced from [http://fi.biology.usgs.gov/projects/tadpole\\_prediction.html](http://fi.biology.usgs.gov/projects/tadpole_prediction.html)

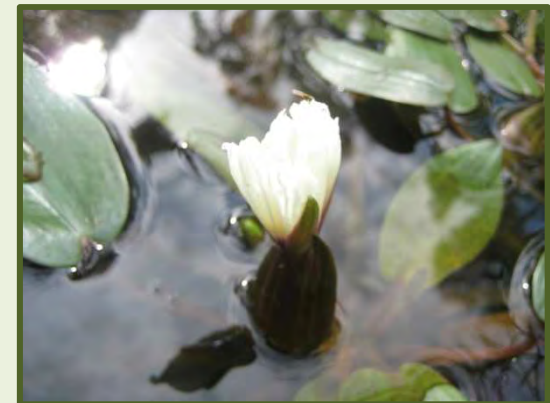
- Tadpole predator
- High numbers throughout the Murray Darling basin
- Impact recruitment
- Expect same numbers and tadpole distribution in Lachlan



# Vegetation



- Low Vegetation cover and complexity in Murrumbidgee therefore no correlation with Frogs
- In literature aquatic vegetation cover is associated with frogs (eg. Jansen & Healy (2003))
- May be greater correlation in Lachlan if a higher percentage of cover is detected



# Species Richness in Murrumbidgee

In difference to Lachlan study, data was available from before the prolonged dry period in the Mid- Murrumbidgee. Allowed a comparison of communities

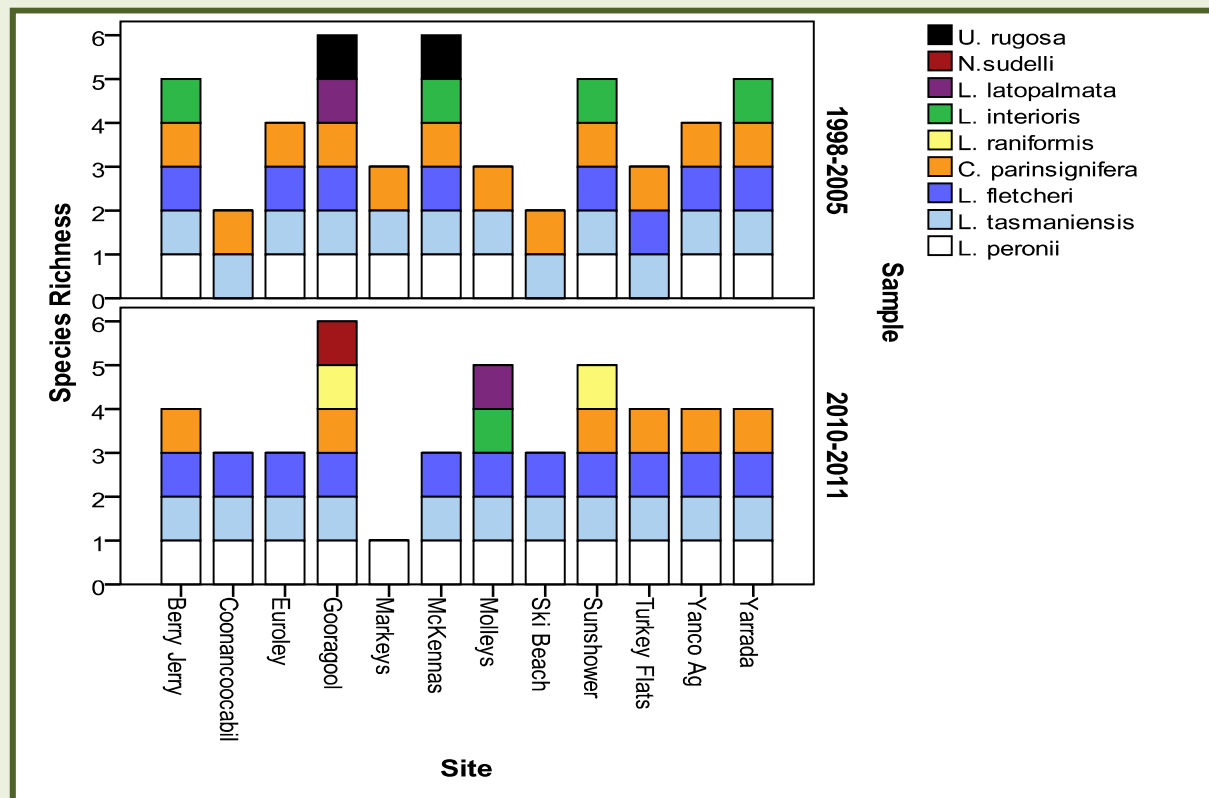


Figure 4: species richness comparison between survey periods 1998-2005 and 2010-2011 (Coonacoocabil 2, Dry Lake and Narrandera SF not surveyed in 1998-2005 period)





# Species Richness in Lachlan

- Will have less comparison data
- Different frog species in Lachlan than in Murrumbidgee
- Most likely see species that are dispersive and generalist
  - Peron's Tree Frog
  - Barking Marsh Frog
  - Spotted Marsh Frog

# Methodology



- Spotlighting in transects along wetland edge
- Sweep netting for tadpoles
- Visual surveys for tadpoles and egg masses
- Fyke nets and bait traps





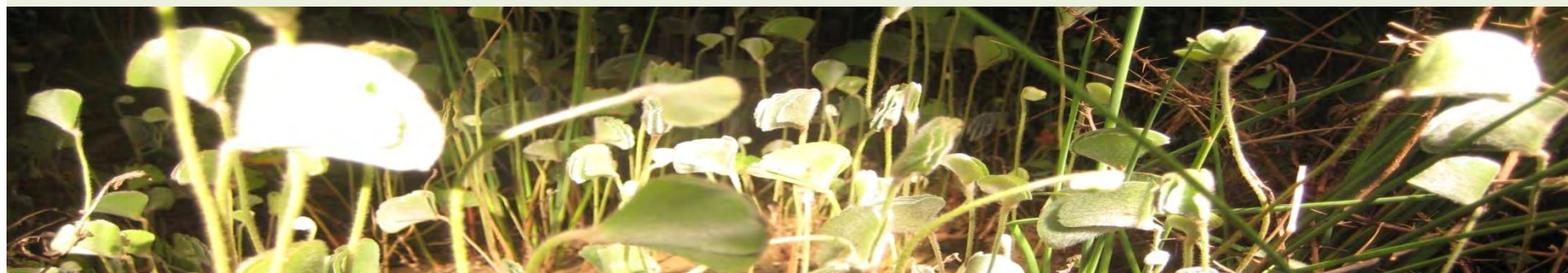
# Analysis

## Data Collected

- Biotic
  - Frog & Tadpole
  - Vegetation
  - Fish
- Abiotic
  - Water quality
- Hydrology data (From the CMA)

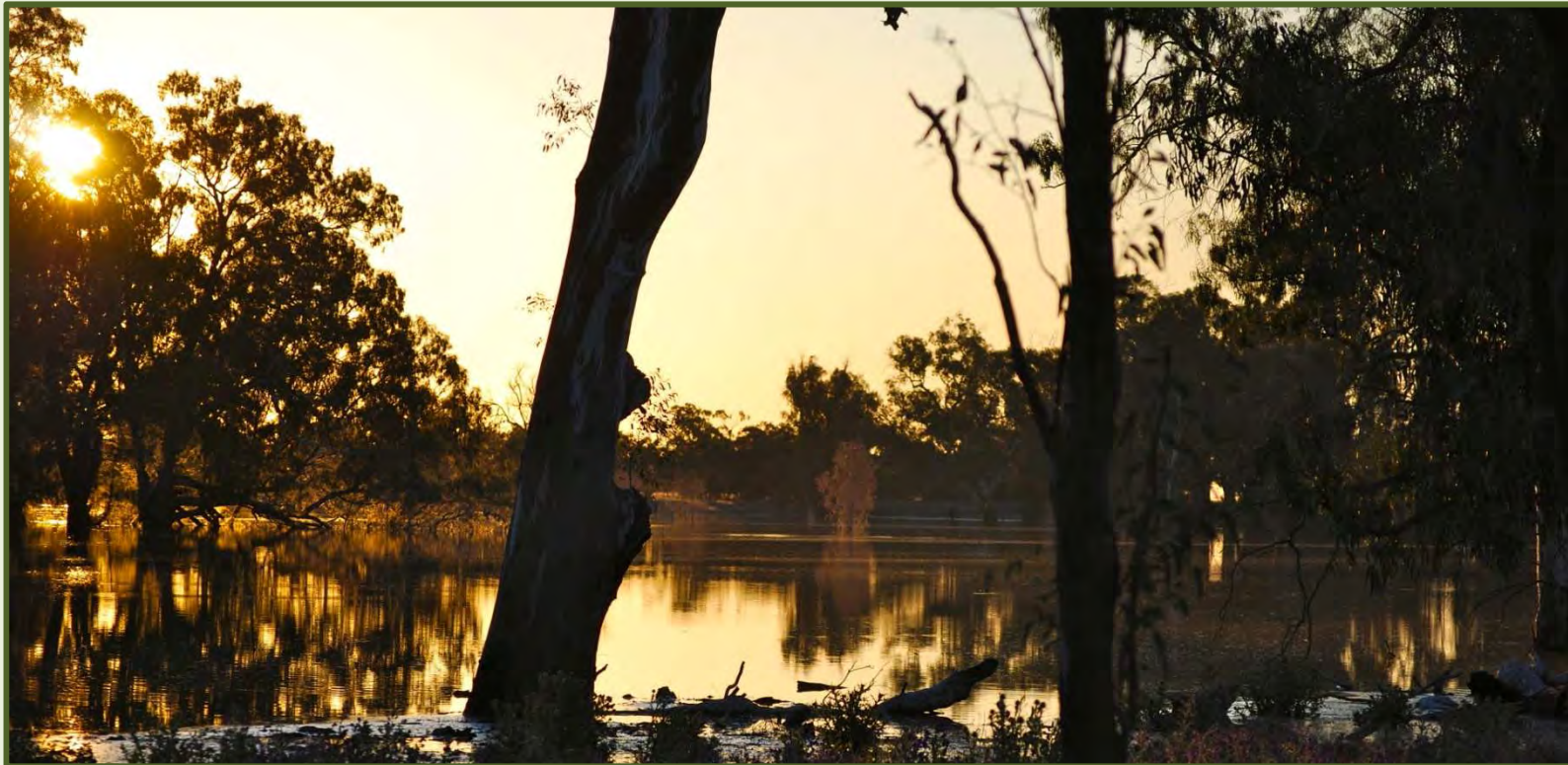
## Analysis

- A modelling approach will be used to determine correlations between frog/tadpole data and other biotic, abiotic and hydrological data
- This helps identify important variables related to frog occupancy



# What's next

Next year (spring-Summer 2013-2014) smaller scale, targeted studies on tadpoles and recruitment



# References

AMOS, C., WASSENS, S., MAGUIRE, J. & HARDWICK, L. Assessing the resilience of frog communities to periods of extreme drought in the River Red Gum forests of the Murrumbidgee River. Response of wetlands to rewetting following extensive drought, 2011 Sydney. Charles Sturt University.

Department of Primary Industries, Office of Water (2012). Real Time Data - Rivers and Streams. Murrumbidgee River Basin. NSW Water Information. N. S. W. Government.

JANSEN, A. & HEALEY, M. 2003. Frog communities and wetland condition: relationships with grazing by domestic livestock along an Australian floodplain river. *Biological Conservation*, **109**, **207-219**.

WASSENS, S. & MAHER, M. 2011. River regulation influences the composition and distribution of inland frog communities. *River Research and Applications*, **27**, **238-246**

Lachlan Environmental Water Management Plan. 2011. *Significant Lachlan Wetlands [Online]*. Available: <http://www.lrwg.com.au/significant-lachlan-wetlands.aspx> [Accessed 26/07/2012].

WASSENS, S. 2008. Review of the past distribution and decline of the Southern Bell Frog\* *Litoria raniformis* in New South Wales. *Australian Zoologist*, **34**, **446-452**.

Wassens, S., R. J. Watts, et al. (2008). "Movement patterns of southern bell frogs *Litoria raniformis* in response to flooding." *Wildlife Research* **35(1): 50-58**.