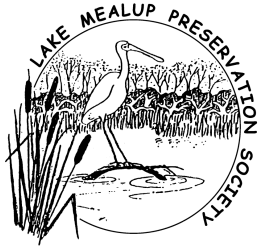




Government of **Western Australia**
Department of **Parks and Wildlife**



Lake Mealup on the road to recovery: an adaptive management approach to acid sulphate soils



Department of **Parks and Wildlife**
Western Australian



South West Aboriginal
Land & Sea Council



Government of **Western Australia**
Department of **Water**



Government of **Western Australia**
Department of **Environment Regulation**



Birds Australia
CONSERVATION THROUGH KNOWLEDGE



Shire of **Murray**



PEEL-HARVEY
CATCHMENT COUNCIL (Inc.)



Mandurah



MANDURAH
BYPASS

FREMANTLE

PINJARRA

FREEMWAY

INDIAN OCEAN

PEEL INLET

OLD

COAST

HARVEY ESTUARY



Lake Mealup
Lake Mealup
Nature Reserve

HIGHWAY

FORREST

Pinjarra

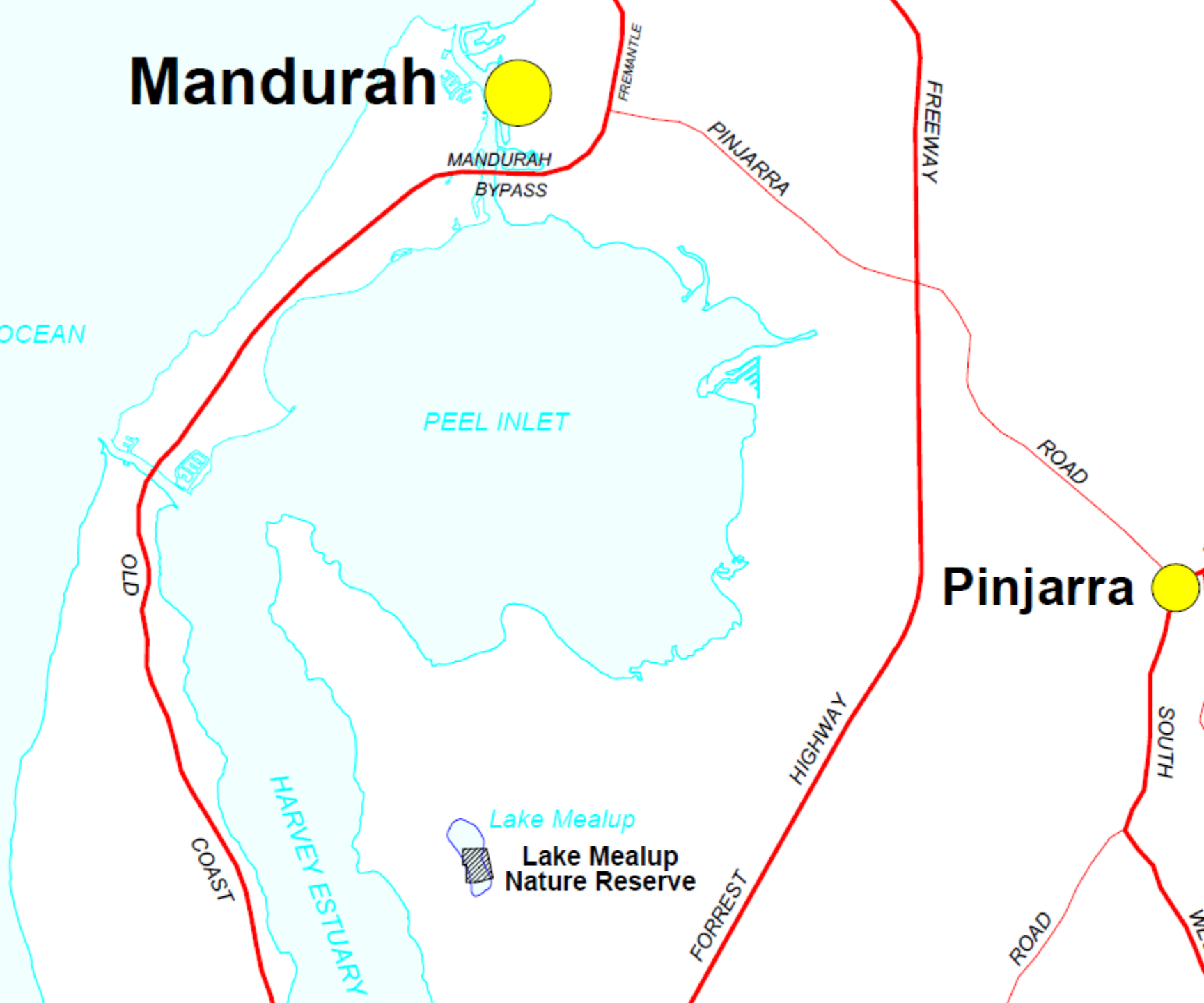


ROAD

SOUTH

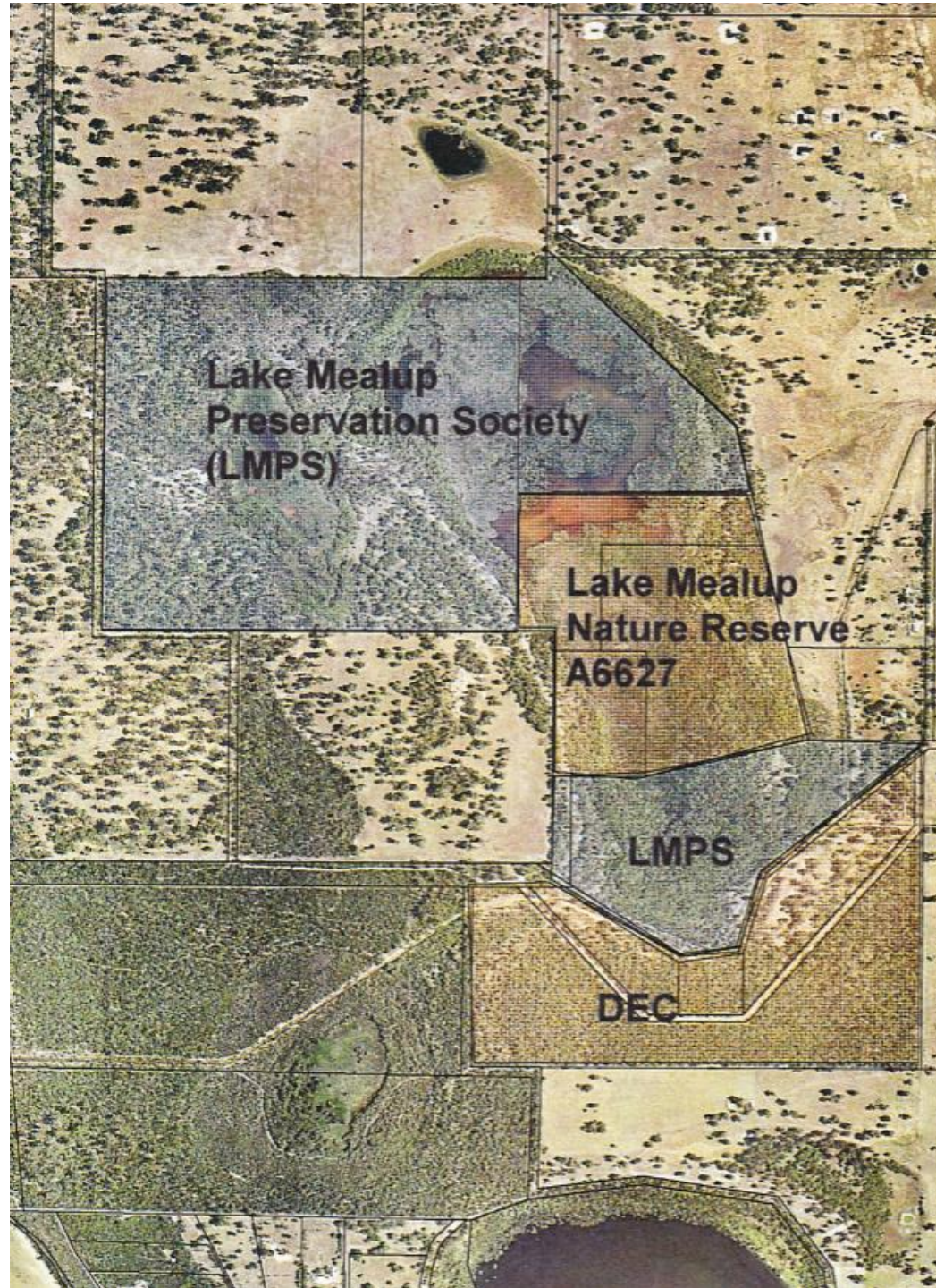
ROAD

W



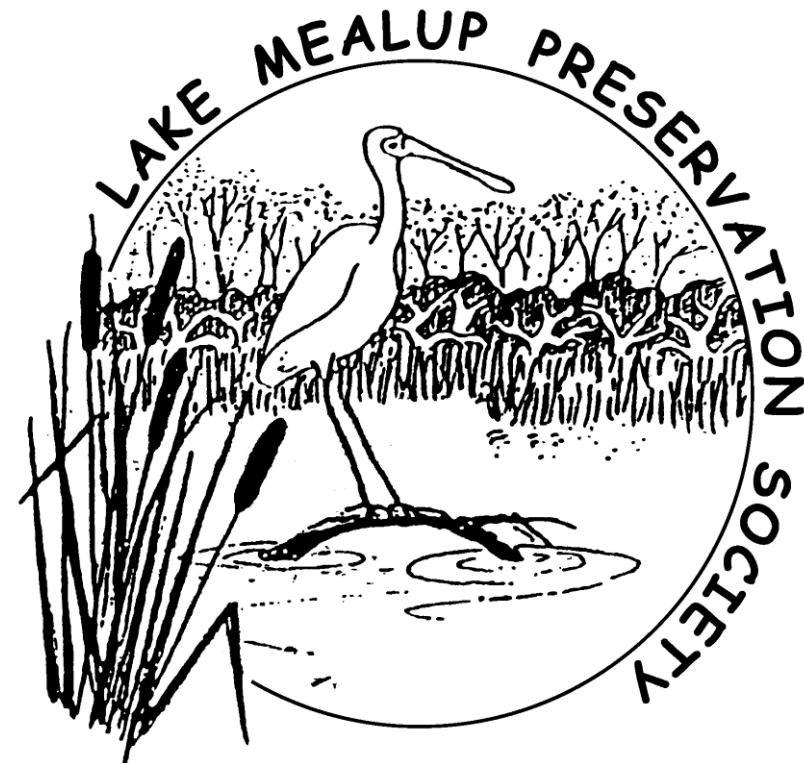
Lake Mealup

- 90 ha freshwater wetland part of the Peel – Yalgorup Ramsar site
- Extensive fringing vegetation and good quality woodland
- Lake Mealup Preservation Society (LMPS) and Parks and Wildlife (80ha) combined
- Total reserved for nature conservation is 203 ha



Lake Mealup Preservation Society

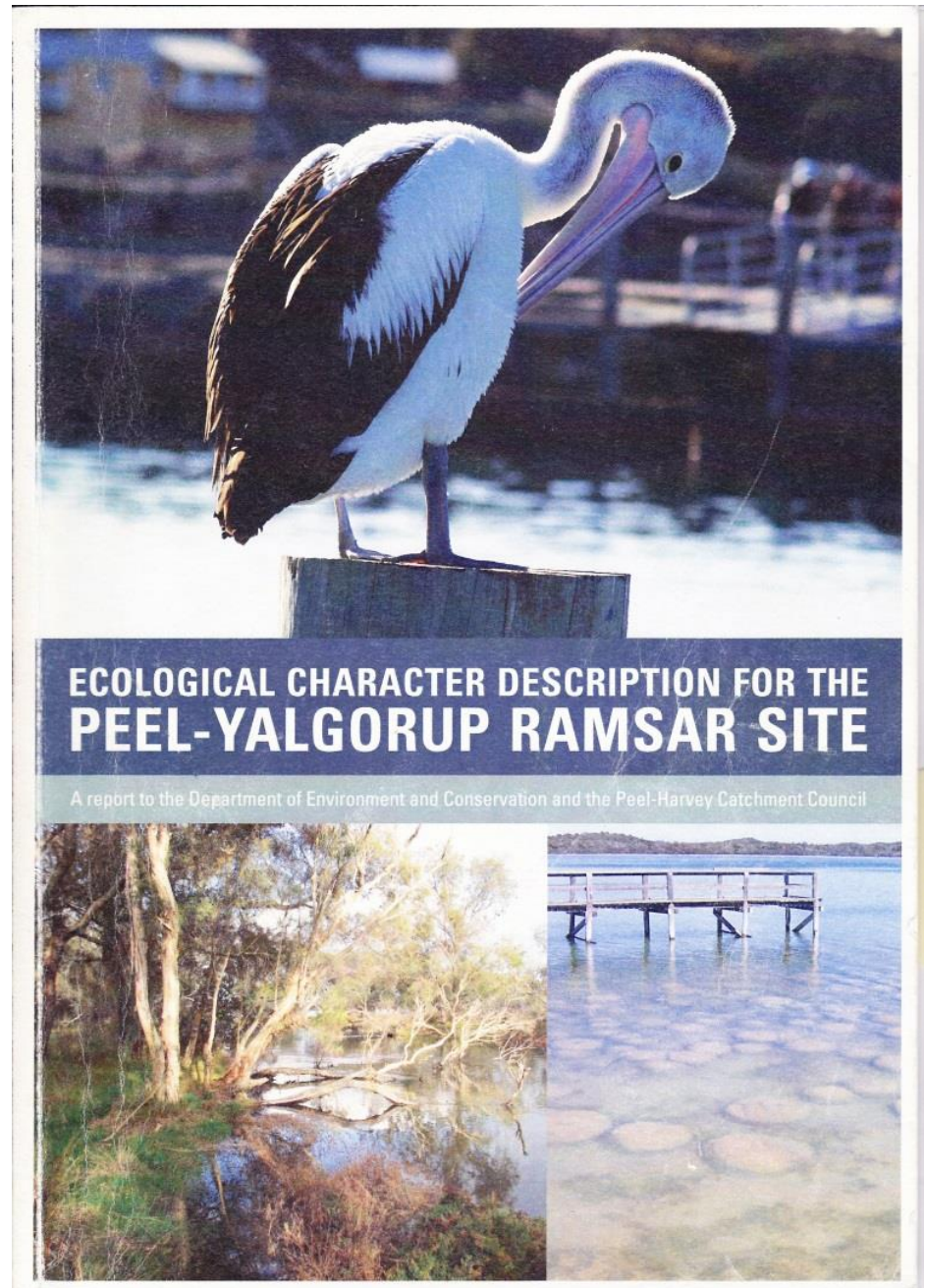
- Lake Mealup Preservation Society (LMPS) is an incorporated, not-for-profit organisation, formed in 1986
- 28 years of active nature conservation management:
 - flora and fauna monitoring;
 - weed and feral animals control;
 - Fencing and revegetation; and hydrology studies.
- Cooperative relationship with Parks and Wildlife



Problems emerge...

- 1994 - 2012, the lake dried out every year
- Reduced rainfall and changes to drainage management, including closing a shallow channel that connected the lake to the Mealup Main Drain (MMD) and its catchment
- Water became acidic (pH 3 to 4); algal blooms
- Waterbird numbers and species declined
- Frogs disappeared & very low macroinvertebrate diversity
- *Typha orientalis* expanded, covering 80% of lake bed by 2000

Ecological Character Description for the Peel- Yalgorup Ramsar Site



The Lake Mealup Recovery Program

State:

- Develop a comprehensive understanding of the current condition of Lake Mealup.



Pressure:

- Develop and implement management strategies to address water quality and typha problems.

Response:

- Monitor the recovery of the lake and adapt management as needed.

Investigations at Lake Mealup

Consolidating facts!

- ASS conditions in lake sediments confirmed
- Poor water quality confirmed
- Decline of ecosystem health confirmed:
 - Birds number
 - Macroinvertebrates
- Sufficient good quality water in the drain to augment Lake Mealup
- Modelling confirmed sufficient drain flows to divert adequate water into the lake and reach target water level - 1,270ML



Lake Mealup Technical Advisory Group (TAG)

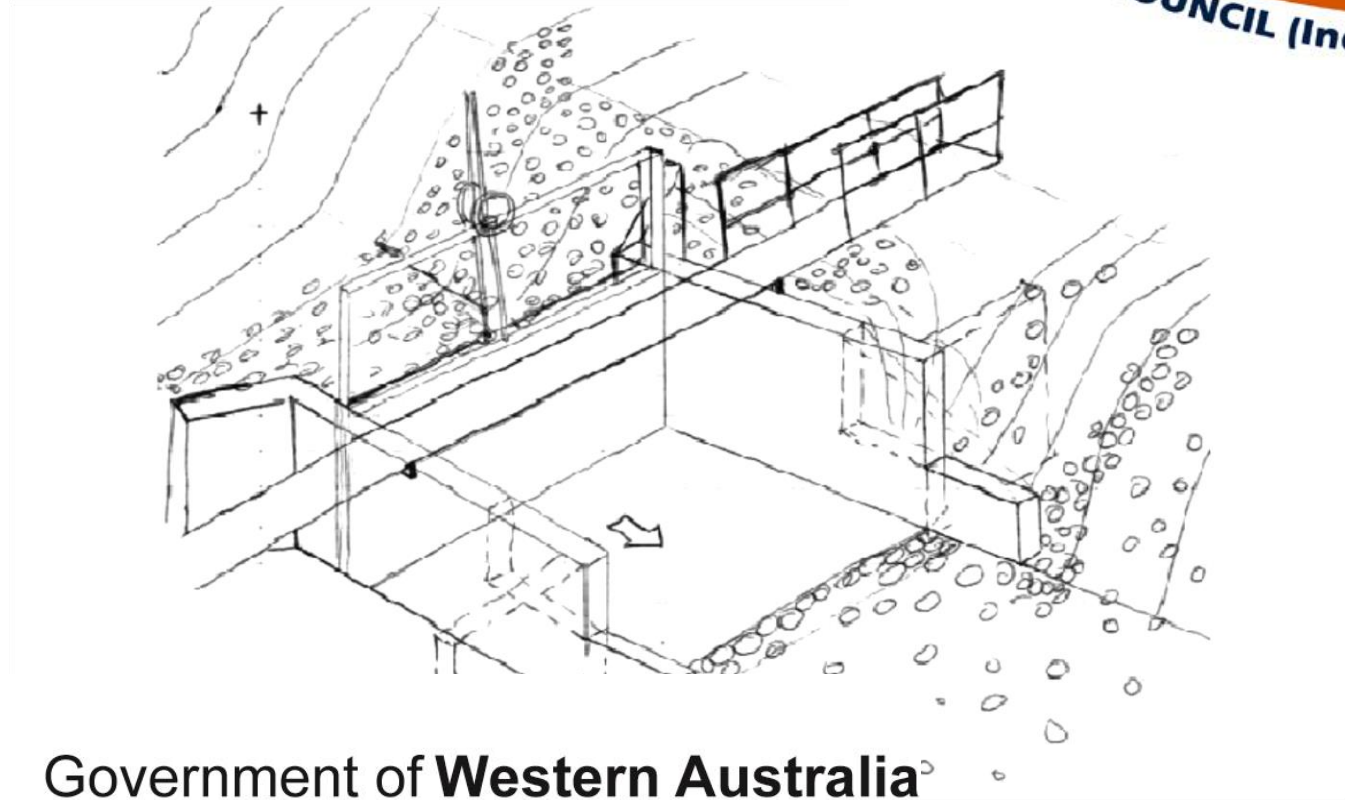




2010 Planning Actions & Monitoring

- February 2010 Lake Mealup TAG agreed following actions:
 - Divert water from Mealup Main Drain
 - Carry out typha control prior to diversion
- Key resources:
 - Peel-Harvey Catchment Council
 - DoW Filtering the Nutrient Storm project, funded by Australian Government
- Federal and state approvals
- Commitment to continue monitoring

Design of the adjustable Height Weir



Government of **Western Australia**
Department of **Water**

Taking Action

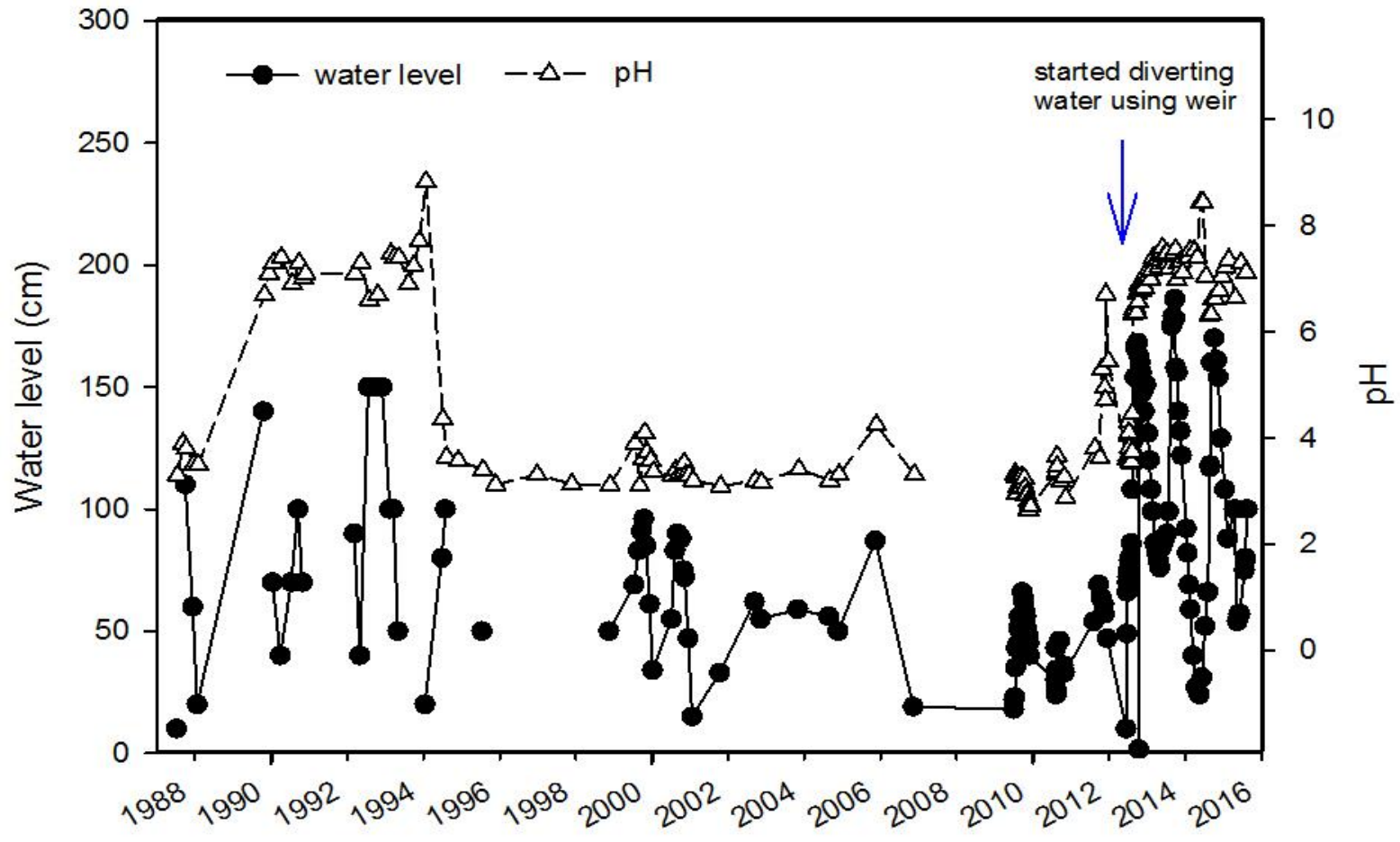
-Typha Control



The Solution



Water levels & pH recorded from 1989 to 2015



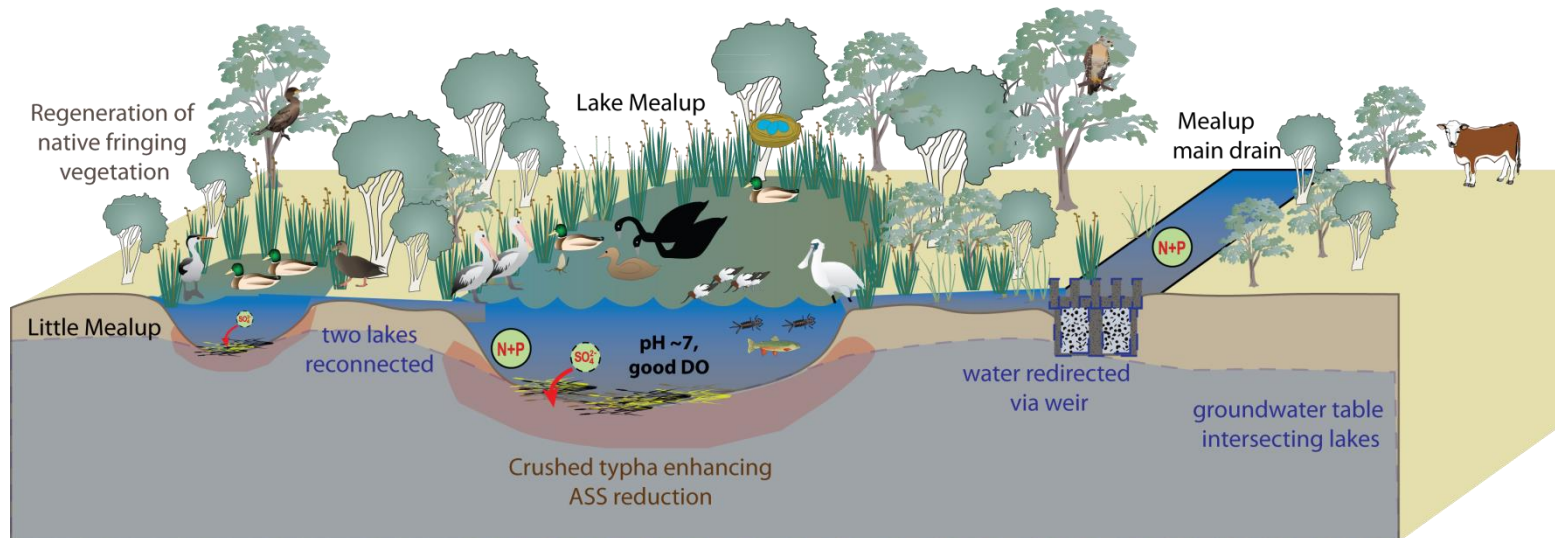
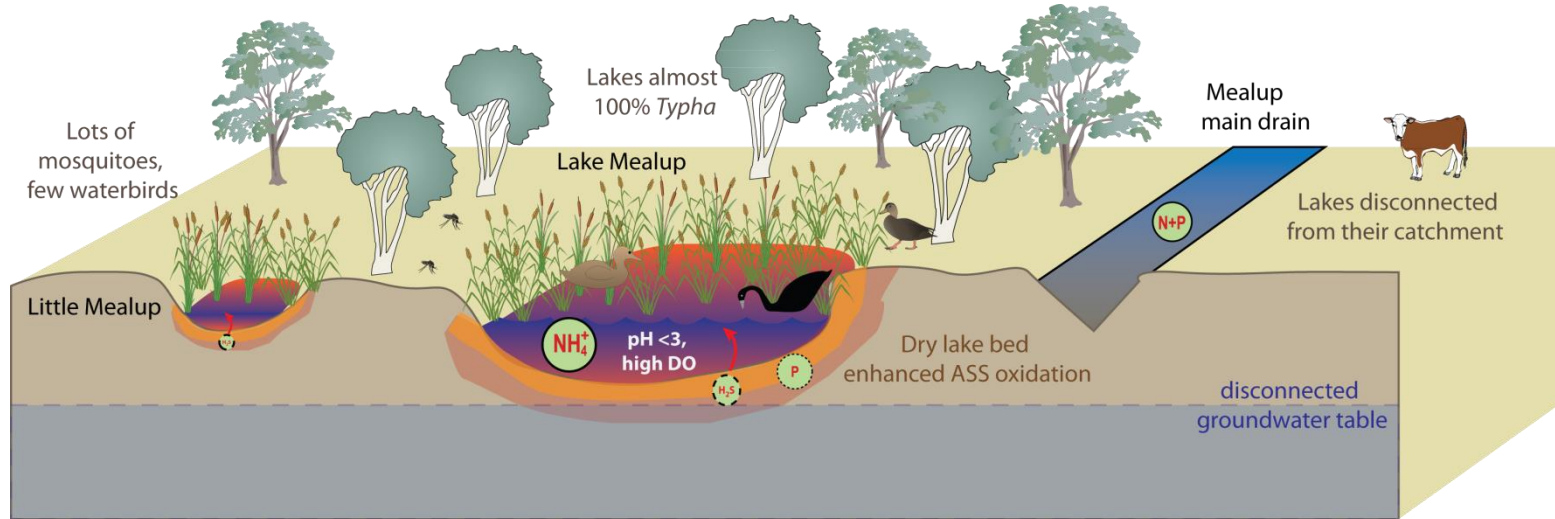
2015 Onwards

Analyse and Adapt

- Finding the Balance: Ongoing monitoring and optimising management
 - AMP identifies targets and triggers for monitoring
 - Monitor water levels and quality, ASS conditions, waterbirds, macroinvertebrates and fringing vegetation, weed control



Conceptual Model



How Did We Succeed?

- **Timing (Ecological Character Description for the Peel-Yalgorup Ramsar Site, and Filtering the Nutrient Storm project)**
- **Right people in right organisations with the right information – Lake Mealup TAG**
- **Adaptive management framework *works*.**
- **Cooperation between volunteers and agencies – sharing the lake & knowledge & success**

Phase 2 Of The Recovery: Fine Tuning The Balance

Aim: to return Lake Mealup back to an ephemeral wetland suitable for migratory water birds

- **Drying for short period allows nitrogen oxidation, but generates ASS**
- **Too wet leads to ‘internal eutrophication’**
- **Management options:**
 - **Phoslock upstream in the catchment**
 - **Streamlining drainage systems with native vegetation**
 - **Lime dusting for alkalinity consumption on re-wetting**



Lake Mealup



Waterbirds that have returned

