Progress Report SP 2015-002

South West Wetlands Monitoring Program (SWWMP)

Wetlands Conservation

Project Core Team

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Approved and active

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Project Team	granted
Program Leader	granted
Directorate	granted

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Context

Substantial decline in wetland condition has been observed across the south-west of Western Australia over the past 100 years, particularly in the Wheatbelt, almost certainly with ongoing loss of biodiversity. The most pronounced changes to wetlands have been associated with salinisation and altered hydrology following clearing of native vegetation in catchments. Broad-scale clearing has largely ceased but hydrological and fragmentation processes will continue to be expressed for many decades. Changes in rainfall patterns are also resulting in significant changes to wetland hydrology, water chemistry and habitats.

While it is known that altered hydrological regimes and salinisation are major threats to wetland biodiversity, the relationships between physical expression and loss of biodiversity are poorly documented and poorly understood. Monitoring of wetland depth and water chemistry in the south-west began in 1977 to inform duck hunting management. After continuing at a reduced level following the ban on recreational duck hunting in 1992, the program was reinvigorated under the State Salinity Strategy in 1996, supplemented by intensive monitoring of fauna, flora, water chemistry and shallow groundwater at a subset of 25 wetlands. This project is delivering vital information on the long-term trends and variability in key determinants of wetland character and condition and, to a lesser extent, biological attributes.

Aims

- To contribute to improved decision making in wetland biodiversity conservation by 1) providing analyses of long and short-term changes in surface water quantity and quality, shallow groundwater levels and biodiversity at representative south-west wetlands in relation to threatening processes (particularly dryland salinity and reduced rainfall) and 2) assessing the effectiveness of catchment and wetland management.

Progress

- Depth and water quality monitoring was undertaken at 105 wetlands, with data added to the South West Wetlands Monitoring Program (SWWMP) database and supplied to managers and researchers.
- Continuous water level recorders and tipping-bucket rain gauges were maintained on nine southern wetlands with high conservation values, especially for the Australasian bittern.
- The 'Thirty Year (1981-2010) Trends' report (Lane, Winchcombe & Clarke, 2015) was completed, presenting trends in water levels and rainfalls of 113 south-western Australian wetlands monitored under SWWMP.
- A report on 'Water levels and rainfalls of 14 south-western Australian wetlands: continuous recordings from 2009-2015' was prepared to final draft.
- Lake Jasper was salinity-profiled. While still fresh, Lake Jasper has become more saline over the past decade. Long-term monitoring is at a single point. Profiling was undertaken to provide a broader basis for future comparison and understanding.
- Work continued on a report analysing relationships between wetland character and aquatic fauna in 25 representative wetland sites monitored between 1996 and 2012.
- Curating and long-term archiving of the 1996 to 2012 aquatic invertebrate specimen collection was commenced.
- Data analysis for dominant overstorey trees commenced on Wheatbelt wetlands with the production of size class histograms to examine population structure and seedling recruitment over time.
- Groundwater data collection was undertaken in autumn 2016.

Management implications

- Rainfalls and water levels in south-western Australia are declining and these trends have adverse consequences and long term implications for many species of wetland flora and fauna (such as the threatened

Australasian bittern) and for the recreational value of wetlands. Active management is required to ameliorate impacts and conserve threatened species.

- The SWWMP project provides early warnings of changes and helps inform where to focus management. Importantly, the long-term nature of this project provides a unique context against which to assess the significance of contemporary observations during decision-making processes and enables prediction of the effects of future change.

- SWWMP data provides vital information for planning and assessing management interventions, such as the hydrological interventions to reduce water levels in the Warden (Esperance) Ramsar wetlands, increase water levels at Jandabup and Thomsons Lakes, manage salinity at Lake Toolibin, and manage depths for water skiing at Lake Towerinning.

- Analyses of the flora and fauna data from 25 representative wetlands will allow managers to predict future impacts of altered hydrology and assess management responses in similar wetlands and understand the trajectory of Wheatbelt wetland biodiversity more generally.

Future directions

- Complete write-up of the 15 years of fauna and flora monitoring at the 25 intensively monitored wetlands and archive data.
- Re-design and implement a focused Wheatbelt wetland ecological monitoring program to track changes in priority wetlands in relation to threats and management.
- Continue to produce annual reports presenting the latest SWWMP data, trends and issues of concern and interest.
- By interpolation and modelling, fill gaps in the SWWMP water level time series to substantially increase the number of wetlands that can be included in decadal and multi-decadal trend analyses.
- Prepare a 1981-2015 update of the thirty year (1981-2010) trends report on water levels and rainfall of the more than 100 south-west wetlands of SWWMP.
- Complete the 2009-2015 continuous water level and rainfall recordings report.
- Use results of long-term periodic water level, salinity and ph monitoring, continuous on-site rainfall and water level monitoring, and other datasets, to predict likely futures of wetlands important for Australasian bittern and other fauna and flora in different climate scenarios.
- Develop a format to enable upload of vegetation monitoring data, including trends, to NatureMap.