Progress Report SP 2015-002

South West Wetlands Monitoring Program (SWWMP)

Wetlands Conservation

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Project Team	granted
Program Leader	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.
- Additional monitoring was undertaken following exceptional rains in February.
- Continuous water level and rain gauges were maintained on 10 southern wetlands with high conservation values. A report on such data from 14 wetlands was completed.
- The 1977-2015 SWWMP report was completed and key results communicated to managers.
- The final report on changes in waterbird usage and habitats of 11 mainly south coast wetlands, between the 1980s and 2008-2011, was completed.
- The ‘Salinity profiling of Lake Jasper in November 2015’ report was completed to provide a broader context for recent changes in salinity at the single monitoring point.
- Water level monitoring of the Vasse and Wonnerup estuaries and the Lower Vasse River Wetlands continued.
- Landsat shortwave infrared data was used to model depth to assist in filling gaps in the 40 year SWWMP depth records.
- Analyses of relationships between wetland character and aquatic fauna based on the Wheatbelt monitoring project largely completed.
- Following the first major fill event in more than 20 years, aquatic invertebrates and waterbirds were surveyed at Lake Toolibin.
- Data analysis for dominant overstorey trees commenced on Wheatbelt wetlands.
- Groundwater data collection was undertaken in autumn 2016.

Management implications

- Rainfall and water levels in south-western Australia are declining with adverse implications for wetland flora and fauna (such as the threatened Australasian bittern) and for the recreational value of wetlands.
- The SWWMP project provides early warnings of changes in three critical determinants of wetland ecological character (depth, salinity, pH) and helps inform where to focus management. The long-term nature of this project provides a unique context against which to assess the significance of contemporary observations and enables prediction of the effects of threatening processes and wetland management.
- 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 and depths for water skiing at Lake Towerinning.
- Analyses of flora and fauna from representative wetlands will allow managers to predict future impacts of altered hydrology, assess management responses and understand the trajectory of Wheatbelt wetland biodiversity generally. Communities in representative Wheatbelt wetlands are not undergoing strong directional change at present, but their responses to rainfall predicts that longer-term shifts can be expected.

Future directions

- Complete write-up of the 15 years of fauna and flora monitoring at the intensively monitored wetlands and archive data.
- Re-focus the biological monitoring program to a smaller set of high conservation value south-west wetlands with current or imminent threats and clear management questions.
- 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. Use this information plus an extra five years data to update the 1981-2010 analyses of region-wide trends in rainfall and wetland depths as a journal article.
- Complete preparation of the 1977-2016 annual SWWMP report, presenting routinely recorded depth, salinity and pH measurements.
- Update the 2009-2015 continuous water level and rainfall recordings report to 2016.
- 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 under different climate scenarios.