Concept Plan 2015-017

Project title

Responses of aquatic invertebrate communities to changing hydrology and water quality in streams and significant wetlands of the south-west forests of Western Australia.

Science and Conservation Division Program

Wetland Conservation

Parks and Wildlife Service

Service 4: Forest Management Plan Implementation

Background and Aims

Aquatic habitats in the south-west of WA are under increasing threat from changes in hydrology, water quality and fire as a result of the drying climate and historical and current land use. At present, there is an inadequate understanding of the responses of aquatic communities to these threats to inform the management of many aquatic systems in the Forest Management Plan area, including the Muir-Byenup Ramsar wetlands.

This project has two components:

Re-surveys of aquatic invertebrates in Muir-Byenup Ramsar wetlands sampled in 1994 and 2004 and suites of wetlands further south sampled in 1993. This addresses KPI3 of the 2014-23 FMP.

The FMP area has many high value wetlands, particularly in the Warren region. Some of these are listed as nationally or internationally significant and some are priorities in regional nature conservation plans. These support numerous priority flora species, priority ecological communities, significant waterbirds, 6 of the 8 species of south-west endemic fish and a very high diversity and endemicity of invertebrates. Threats to many of these wetlands have intensified over the last decade. The available biodiversity data is 10 to 20 year old and up to date information is required to assess responses to threats and inform the allocation of resources to management actions.

Continued monitoring of high condition streams, with a focus on effects of the drying climate and forest management. This addresses KPI1 of the 2014-23 FMP.

KPI20 of the previous FMP scored 24 of 51 monitored stream sites as impaired. This was not clearly related to forestry activities but could, in part, be related to reduced rainfall. This project would see continued monitoring at 'reference condition' streams and those that already affected by reduced rainfall. A focus on these streams aligns with KPI1 of the current FMP which focuses on change in 'currently healthy ecosystems' and will allow us to track condition in relation to the ongoing decline in rainfall combined with forest management. In a region with high climatic variability long-term studies are essential to understand ecosystem responses.

Aims:

- To address KPI1 of the 2014-2023 FMP by monitoring the condition of currently healthy streams in relation to reduced rainfall and forest management practices.
- To address KPI3 of the 2014-2023 FMP by determining responses of faunas of high value Warren region wetlands to changes in hydrology, water chemistry and fire over the last 10 to 20 years.
- Provide baseline data for some internationally significant wetlands, e.g. Lake Muir.
- Use the above information to report on the current conservation significance of key DPaW managed wetlands and their response and vulnerability to threats.

Expected outcome

1. FMP commitments met with regard to measuring and assessing change in condition of 1) currently healthy (reference condition) stream ecosystems (KPI1) and 2) Ramsar and nationally listed wetlands (KPI3).
2. Warren Region conservation managers will have the information needed to address a priority identified in the 2009-14 Warren Region Nature Conservation Plan: Target 5, candidate action 1, including the milestones:

   "*Analyse condition trends* [of 7 nationally listed wetlands] *and update adaptive management targets on the basis of these trends*" and

   "*Establish and consolidate benchmark information for Broke Inlet, Doggerup, Marringup, Mt Soho Swamp, and Byenup to determine condition, identify threats and to determine interim management actions."*
3. DPaW will be able to report on the condition of a significant Ramsar site.

Strategic context

Forest Management Plan 2014-23: Addresses Key Performance Indicators 1 and 3.
DPaW Strategic Directions 2014-17

- **Implementation of the Forest Management Plan**: Key FMP requirements met.
- **Integrated forest and ecosystem management**: Focus resources on highest priority ecosystem management requirements.
- **Integrated science and nature conservation**: Focus conservation science on management priorities: Ensure conservation management is based on best practice science.

Science and Conservation Division Strategic Plan 2014-17

- **Integrated science and conservation**: Ensure that science programs address the gaps in knowledge and reflect the applied nature of advice required by the Department to deliver effective conservation, protection and management of flora, fauna, ecological communities and conservation reserves.
- **Understand management options to enhance biodiversity resilience in a changing climate**: Undertake research and identify external science that provides a basis for informed management of climate change impacts on biodiversity.
- **Monitoring of forest ecosystems**: Undertake research and monitoring to support ecologically sustainable forest management.

Wildlife Management Service Strategic Priorities 2014-2017: WM-4-A (FMP), WM-5-A+B.
Warren Region Nature Conservation Plan (2009-2014): Targets 1,5,6,8.

Expected collaborations

Expert taxonomists, such as Russell Shiel (University of Adelaide) and DPaW Regional and District staff

Proposed period of the project

July 1, 2014 – June 30, 2023

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.5	0.5	0.5
Technical	0.3	0.3	0.3
Volunteer			
Collaborator			

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DPaW)	100,000	100,000	100,000
External Funding	0	0	0

Endorsements

Endorsements and approvals as of Sept. 21, 2015, 11:16 a.m.:

Project Team	granted
Program Leader	granted
Directorate	granted