Project Plan SP 2015-017

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

Wetlands Conservation

Project Core Team

Supervising Scientist	Melita Pennifold
Data Custodian	Melita Pennifold
Site Custodian	

Project status as of Feb. 28, 2017, 10:55 a.m.

	Approved and active

Document endorsements and approvals as of Feb. 28, 2017, 10:55 a.m.

Project Team	granted
Program Leader	granted
Directorate	granted
Biometrician	granted
Herbarium Curator	not required
Animal Ethics Committee	not required

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Science and Conservation Division Program

Wetlands Conservation

Parks and Wildlife Service

Service 4: Forest Management Plan Implementation

Project Staff

Role	Person	Time allocation (FTE)
Supervising Scientist	Melita Pennifold	0.5
Supervising Scientist	Adrian Pinder	0.1

Related Science Projects

None

Proposed period of the project

July 1, 2014 – June 30, 2023

Relevance and Outcomes

Background

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. Priority will be given to component 1, component 2 will be dependent on funding.

1) 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 many 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.

2) 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 are 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 KPI3 of the 2014-2023 FMP by determining responses of fauna of high value Warren region wetlands to changes in hydrology, water chemistry and fire over the last 10 to 20 years.
- 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.
- 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). Results will provide information on the effectiveness of forest management practices in protecting stream and wetland biodiversity.

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*."

Indications from Warren Region staff are that these wetlands will be a priority in the new 2015-20 Regional Nature Conservation Plan.

Using the above information on knowledge of the biodiversity trajectories of wetlands in the Muir-Byenup Ramsar system and other wetlands Warren Region staff will be better placed to prioritise conservation actions.

3) DPaW will be able to report on the condition of a significant Ramsar site.

Knowledge transfer

The main users of the knowledge gained in this project will be DPaW Warren Region staff and other DPaW staff working in areas which require them to understand and manage streams and wetlands, especially those in the conservation estate.

Results will also be used by Forest and Ecosystems Management Division and the Conservation Commission to assess compliance with the FMP 2014-2023.

Project results will be disseminated by:

- Reports on the aquatic invertebrates of the Muir-Byenup and South Coast wetlands (KPI3 component)
- Reports on condition of selected streams in the FMP area (KPI1 component)
- Science Information Sheets and scientific publications as appropriate.
- Presentations at workshops etc.

Tasks and Milestones

Below is a timeline for a five year project including sampling the Muir-Byenup Ramsar wetlands and significant wetlands along the south coast, plus an additional sampling of a selection of the KPI20 streams. Further sampling of these streams would be dependant on continued funding.

Time	Task
Spring 2014 and Summer 2015:	Sample Muir-Byenup wetlands
Autumn 2015 to Summer 2015/16	Process Muir-Byenup samples
Spring 2015 to Autumn 2016	Identification and vouchering of Muir-Byenup invertebrates
Autumn/Winter 2016	Data analysis and reporting on Muir-Byenup wetlands
Spring 2016	Sample KPI1 streams
Spring 2016 to Summer 2016/17	Identification of stream invertebrate samples from 2013 and 2016

Autumn 2017 to Winter 2017	Analysis and reporting of KPI20 and KPI1 stream invertebrate data
Spring 2017 and Summer 2017/18	Sampling south coast wetlands previously sampled by Pierre Horwitz
Autumn 2018 to Summer 2018/19	Process south coast samples
Spring 2018 to Autumn 2019	Identification and vouchering of south coast invertebrates
Autumn/Winter 2019	Data analysis and reporting on south coast wetlands
2019 onwards	Optional further stream sampling

References

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Storey A. (1998) Assessment of the nature conservation values of the Byenup-Muir peat swamp system, south-western Australia: physico-chemistry, aquatic macroinvertebrates and fishes.

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Study design

Methodology

Biometrician's Endorsement

granted

Data management

No. specimens

Herbarium Curator's Endorsement

not required

Animal Ethics Committee's Endorsement

not required

Data management

Data will be entered into the Wetlands Conservation Program aquatic database.

Data will also be uploaded to Naturemap where biological and physichemical data will be described in the catalogue.

Specimen vouchers will be lodged with the Western Australin Museum and the Wetlands Conservation Program aquatic invertebrate voucher collection.

Budget

Consolidated Funds

Source	Year 1 (14/15)	Year 2	Year 3
FTE Scientist	70000	50000	50000
FTE Technical	3500	32000	21000
Equipment	10000	5000	5000
Vehicle	5000	1000	5000
Travel	3000	1000	4000
Other	12500	11000	15000
Total	104000	100000	100000

External Funds

Source	Year 1	Year 2	Year 3
Salaries, Wages, Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
Total			