Progress Report 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

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Project status as of May 15, 2017, 4:05 p.m.

Approved and active

Document endorsements and approvals as of May 15, 2017, 4:05 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

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Context

Aquatic habitats in the south-west of Western Australia are under increasing threat from changes in hydrology, water quality and fire as a result of the drying climate, historical and current land use and water resource development. The south west of Western Australia has had a significant reduction in rainfall since the 1970s and it is predicted that by 2050 there will be little stream inflow into water supply dams. 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 (FMP) area, including the Muir-Byenup Ramsar wetlands.

This project has two components: 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, addressing KPI3 of the 2014-23 Forest management Plan (FMP) and, 2) Periodic monitoring of high condition streams, with a focus on effects of the drying climate and forest management, addressing KPI1 of the 2014-23 FMP.

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 Parks and Wildlife managed wetlands and their response and vulnerability to threats.

Progress

- A journal article is being prepared on how landscape modelling of compositional turnover in aquatic invertebrates informs conservation,
- Conducted summer 2015 sampling of aquatic invertebrates in Muir-Byenup Ramsar wetlands.
- Processing of Muir-Byenup invertebrate samples largely completed.
- Identification and vouchering of Muir-Byenup invertebrates in progress.
- Collaborating with taxonomists to reconcile taxonomic issues between 1996/97, 2003/4 and 2014/15 data for the Muir-Byenup wetlands.

Management implications

- Re-surveying the Muir-Byenup Ramsar and other high value wetlands will provide the region with knowledge of how these wetlands and their fauna have responded to threats over the last 20 years. This, in conjunction with results from the peat wetlands project (SPP2014-24), will help the Warren Region to make decisions about protecting remaining high conservation value wetlands versus taking remedial action at those where condition is declining.
- Forest Management Plan commitments will be 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 addressing these commitments will inform future forest management practices.

Future directions

- Identify and voucher Muir-Byenup invertebrates collected in 2014/2015.
- Consolidate Muir-Byenup invertebrate data from 1996/97, 2003/04 and 2014/15 and produce a report.
- Publish report with summaries of 10 year trends (2005 to 2015) for all stream monitoring sites.
- Re-sample selected streams in 2016, with a focus on those considered to be in reference condition or in minimally disturbed catchments, plus those subject to wildfires, to provide long-term data on the response of aquatic invertebrate communities to declining rainfall and forest management.
- Publish further papers examining impacts of declining rainfall and forest management practices on macroinvertebrate diversity in forest streams.
- Re-survey nationally important Warren Region wetlands previously sampled by Horwtiz in 1997 (e.g. Owingup, Lake Jasper, Doggerup, Marringup, Mt.Soho Swamp) and prioritise these wetlands for the Warren Region Nature Conservation Plan.