Progress Report SP 2006-002

Monitoring stream biodiversity (KPI 20 of the Forest Management Plan)

Wetlands Conservation

Project Core Team

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Project Team	granted
Program Leader	granted
Directorate	granted

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Context

Key performance indicator 20 of the Forest Management Plan 2004-2013 was the percentage of water bodies with significant variance of biodiversity from the historic range of variability. This was addressed by monitoring invertebrates in representative stream sites in the south-west forests, particularly in relation to forest management practices.

With the release of Forest Management Plan 2014-2023 a new project is being developed to address:

- KPI1 - "*Measurement and analysis of changes in spatial extent of healthy ecosystems and spatial extent of lower condition ecosystems from a current state*."
- KPI3 - "*Measurement and analysis of changes in spatial extent, vegetation condition, fauna communities and water quality of the (Ramsar) wetlands as a function of time and as defined by the relevant regional nature conservation plans*".

This project will address these KPIs by:

- Continuing to monitor a subset of higher condition streams from the KPI20 project to determine responses to declining rainfall and forest management.
- Re-surveying aquatic invertebrates in suites of important Warren Region wetlands (including the Muir-Byenup Ramsar wetlands) to quantify responses to changes in hydrology, water chemistry and other threats such as fire, over the last 10 to 20 years.

Aims

- Assess the condition of representative south-west forest streams (including in relation to forest management practices) by comparing the richness of aquatic invertebrates to that predicted by a previously constructed model (AusRivAS) developed using data from 'minimally disturbed' reference sites.
- Assess changes in invertebrate communities in key Warren Region wetlands (starting with the Muir-Byenup Ramsar wetlands) as a result of altered hydrology over the last decade and provide advice to regions on where to focus management activities.

Progress

- A journal article is being prepared in collaboration with scientists from CSIRO in Canberra: "Aquatic bioregionalisation derived from generalised dissimilarity models of compositional patterns in aquatic invertebrate fauna: an example from southwest Western Australia."
- Sampled aquatic invertebrates in Muir-Byenup wetlands in spring 2014 and summer 2015 and commenced processing these.

Management implications

- On the whole, there was no evidence that current forest management practices were having a significant effect on stream biodiversity, probably due, in part, to the practice of leaving unharvested buffers around streams.
- Stream sites with greatest divergence in diversity from reference condition were generally in the drier parts of the northern and eastern jarrah forest or were naturally saline or acidic. Part of the reason for these sites being apparently impaired was that the AusRivAS models were produced with few reference sites in such streams, so the model is likely to have overestimated richness.

- A few stream sites were not in these categories and require further monitoring and investigation to examine the cause of the reduced diversity.
- The new work will allow the Warren Region to prioritise conservation efforts within the Muir-Byenup Ramsar wetlands by identifying those with lesser or greater resilience to change and those in higher or lower condition.

Future directions

- Re-sample streams in 2015, with a focus on those considered to be in minimally disturbed catchments, to provide long-term data on the response of aquatic invertebrate communities to declining rainfall (addresses KPI1 of the 2014-2023 FMP)
- Continue to update fire and logging history for catchment areas.
- Publish further papers examining impacts of declining rainfall and forest management practices on macroinvertebrate diversity in forest streams.
- Publish report with summaries of 10 year trends (2005 to 2015) for all stream monitoring sites.
- Develop new SPP to address KPI1 and KPI3 of the 2014-2023 FMP.
- Identify Muir-Byenup invertebrates collected in 2014/2015.
- Re-survey nationally important wetlands from south west previously sampled by Horwtiz in 1997 (e.g.Owingup, Lake Jasper, Doggerup, Marringup, Mt Soho Swamp) and identified as priorities in the Warren Region Nature Conservation Plan.