

Project Plan SP 2011-018

Western Australian wetland fauna surveys

BCS Ecosystem Science

Project Core Team

X X **Supervising Scientist** Adrian Pinder

Data Custodian Adrian Pinder

Project status as of March 12, 2024, 5:35 p.m.

X X Update requested

Document endorsements and approvals as of March 12, 2024, 5:35 p.m.

X X

Project Team granted

Program Leader granted

Directorate granted

Biometrician required

Herbarium Curator not required

Animal Ethics Committee not required

Western Australian wetland fauna surveys

Program

BCS Ecosystem Science

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Project Staff

X X X **Role Person Time allocation (FTE)**

Supervising Scientist Adrian Pinder 0.5

Technical Officer Kirsty Quinlan 0.8

Technical Officer Adrian Barrett 0.4

Technical Officer David Cale 0.1

Related Science Projects

This SPP designed to include small wetland survey projects such as the Hutt Catchments Survey (SPP 2007-010). Larger survey projects with similar methods and objectives are the biological surveys of the Carnarvon Basin, Wheatbelt survey (SPP1998-020) and Pilbara (SPP2004-002 and 2004-004).

Proposed period of the project

None – None

Relevance and Outcomes

Background

There have been several regional scale surveys of aquatic invertebrates in Western Australia, including the Warren region (Horwitz 1994), the Southern Carnarvon Basin (Halse et al. 2000), the Wheatbelt (Pinder et al. 2004) and the Pilbara (Pinder et al. 2010a). While these larger scale surveys provide analyses of biodiversity patterning for regional-scale conservation planning, sites are usually too sparse for more local scale planning. However, the larger surveys can be used to identify subregions of high biodiversity (such as Biodiversity Recovery Catchments in the Wheatbelt), which then require more detailed survey for local conservation planning. In the Wheatbelt smaller scale aquatic invertebrate surveys have been carried out in the Drummond (Pinder et al. 2011), Buntine-Marchagee (Aquatic Research Laboratory 2009), Bryde (Cale et al. 2008) and Muir-Unicup (A. Storey [UWA] and DEC unpublished) Recovery Catchments. Another of the Walshe et al. (2004) potential recovery catchments, the Hutt Lagoon/Hutt River Catchments, was similarly surveyed for aquatic invertebrates by Quinlan et al. (2009). Each of these smaller scale surveys have informed conservation planning, such as setting biodiversity targets (e.g. Drummond Nature Reserve and Lake Toolibin), prioritization of conservation actions (Buntine-Marchagee) and planning and monitoring engineering works (e.g. by providing baseline data, e.g. Bryde and Warden wetlands). There is a strong overlap with some of the smaller aquatic invertebrate monitoring work that has been undertaken where the monitoring is for wetlands with few other data – so the monitoring data also provides information on biodiversity patterning. This is the case for mound springs east of Eneabba (Pinder and Leung 2010) and the Lake Warden wetlands (Pinder et al. 2010b) and I suggest that these small scale (and intermittent) monitoring projects be run under this SPP).

Aims

The aims of the surveys covered by this SPP are:

- To provide understanding of medium scale (catchment/wetland system) aquatic biodiversity patterning to inform local conservation planning and as baselines for future monitoring.
- To provide better data on the distribution, ecological tolerances and conservation status of aquatic fauna species and communities.

Expected outcome

Knowledge of the distribution of species and composition of communities has a myriad of benefits to DEC's core conservation work. Data collected to date has been used as baselines for monitoring management actions, prioritization of wetland conservation actions based on invertebrate community composition, identification of threatened ecological communities and assessment of species conservation status and setting biodiversity targets (see 'background' above). Some of this data has also been used for environmental impact assessment. Much of this data has also been provided to external researchers and students for separate projects that also have direct benefit for DEC.

Knowledge transfer

Primary users of the knowledge coming out of these projects are DEC conservation managers, including those in regional offices, Species and Communities Branch, Natural Resources Management Branch and Environmental Management Branch. This knowledge is primarily transferred to the above users via reports and oral presentations tailored to the needs of particular managers (usually those that provided the funding). Where possible, scientific papers will also be written (e.g. Pinder et al. in review).

Tasks and Milestones

There are no set timelines for this SPP as it covers one or more surveys at a time, each with their own milestones and timelines. Some years there may be no surveys run under this SPP. All previous surveys have been completed on time.

For a current project (Jurien Aquatic Invertebrate Survey 2011-12)

- Mid 2010 to mid 2011 – liaison with funding bodies (DEC Geraldton and Department of Water) re objectives and strategies.
- Aug 2011 – field work planning, site selection and 2 day field trip to sample sites that may dry early Sep
- Sep 2011 – field work
- Nov-Dec 2011 – process samples with priority given to the springs
- Dec 2011 – preliminary report to Dept. Water on conservation values and groundwater dependence of spring invertebrate communities
- Jan-Apr 2011 – process remaining invertebrate samples
- May-June 2011 – write final report.

Primary output will be a report to the DEC Geraldton Office and Dept. Water, but I will aim to write the study up as scientific paper (depending on time available).

References

Aquatic Research Laboratory 2009 Buntine Marchagee Natural Diversity Recovery Catchment (BMNDRC). Wetland Invertebrate Fauna Sampling: 2008. Unpublished report by the Aquatic Research Laboratory, University of Western Australia to the Department of Environment and Conservation, Perth.

Cale D J 2008 Wetland Survey of the Lake Bryde Natural Diversity Recovery Catchment: Waterbirds, Aquatic Invertebrates and Water Chemistry. Department of Environment and Conservation, Perth.

Halse S A, Shiel R J, Storey A W, Edward D H D, Lansbury I, Cale D J & Harvey M S 2000 Aquatic invertebrates and waterbirds of wetlands and rivers of the southern Carnarvon Basin, Western Australia. Records of the Western Australian Museum Supplement 61: 217-265.

Horwitz P 1994 Patterns of endemism in the freshwater fauna of the far southern peatlands and shrublands of southwestern Australia. Report prepared for the Australian Heritage Commission and the Heritage Council of Western Australia. Edith Cowan University, Perth.

Pinder A M, Halse S A, McRae J M & Shiel R J 2004 Aquatic invertebrate assemblages of wetlands and rivers in the Wheatbelt region of Western Australia. Records of the Western Australian Museum Supplement 67: 7-37.

Pinder A M & Leung A E 2010 Report on the August 2008 Sampling of the Aquatic Invertebrate Assemblages of Mound Springs of the Three Springs Area Threatened Ecological Community. Department of Environment and Conservation, Perth.

Pinder A M, Halse S A, Shiel R J & McRae J M 2010a An arid zone awash with diversity: patterns in the distribution of aquatic invertebrates in the Pilbara region of Western Australia. Records of the Western Australian Museum Supplement 78: 205-246.

Pinder A M, Leung A E, Cale D J & Halse S A 2010b Waterbird and Invertebrate Monitoring of the Warden and Gore Wetlands in November 2009 and February 2010. Department of Environment and Conservation, Perth.

Pinder A M 2011 Aquatic Invertebrate Diversity in Drummond Natural Diversity Recovery Catchment Wetlands, 2004-2010. Department of Environment and Conservation, Perth.

Pinder, A.M., Quinlan, K., Cale, D.J. & Leung, A.E. (in review). Aquatic invertebrates of the Hutt River and Hutt Lagoon catchments, Western Australia. Submitted to Journal of the Royal Society of Western Australia.

Quinlan K, Pinder A M & Cale D 2009 Assessment of the aquatic fauna conservation values of wetlands in the Hutt River/Hutt Lagoon catchments. Department of Environment and Conservation, Perth.

Walshe T V, Halse S A, McKenzie N L & Gibson N 2004 Toward identification of an efficient set of conservation recovery catchments for Western Australian wheatbelt biodiversity. Records of the Western Australian Museum Supplement 67: 365-384.

Study design

Methodology

Site selection. This is dependent on the objectives of each survey, but usually involves selecting a suite of wetlands that best represent the diversity of gross physical and chemical wetland types (fresh to saline, ephemeral to permanent, vegetation type etc.), geographical spread and with replication (where possible) within these types. Stakeholders are usually involved in, or review, site selections.

Aquatic invertebrate sampling. Collecting usually involves sweep netting using techniques, mesh sizes and sample sizes that are compatible with all other DEC aquatic invertebrate sampling (which has become a standard outside of DEC for some other research groups).

Physical/chemical habitat descriptions. A variety of water chemistry variables are normally measured. At a minimum, pH, conductivity and temperature are measured in the field. If funds allow, then variables requiring laboratory analysis are performed at NATA registered external laboratories. Such analyses include nutrients, chlorophyll (as a surrogate for planktonic algal biomass) concentrations of major ions, turbidity, alkalinity and hardness). Sediment composition is either estimated by eye (% surface cover of fine sediments, sand+gravel, pebble+cobble etc.) or by taking samples of fine sediments and determining particle size composition in the laboratory. Submerged macrophyte cover is estimated by eye or macrophyte dry biomass is determined from samples taken from quadrats.

Identifications. As far as possible, invertebrates are identified to species/morphospecies level using a reference specimen collection held at Woodvale and largely verified by external taxonomists. External taxonomic assistance is sought where needed.

Waterbird surveys. As a rule, all waterbirds on a wetland are counted and identified using binoculars and spotting scopes from the ground, unless the wetland is very large and then the portion of the wetland surveyed is documented. Aerial surveys from fixed wing aircraft are occasionally performed.

Data analysis. Generally a combination of multivariate analyses including modelling and ordination/classification methods using data from the project in question and comparable pre-existing datasets. Species distributions and conservation assessments are made by comparison with previous records and ecological knowledge.

Biometrician's Endorsement

required

Data management

No. specimens

Specimens of rarer species are incorporated into the reference specimen collection and flagged for confirmation by specialists. Numbers vary considerable but are generally

Herbarium Curator's Endorsement

not required

Animal Ethics Committee's Endorsement

not required

Data management

All data is stored in the wetland fauna group's Aquatic Projects Database. This is strictly a research database using MS Access so is not publicly accessible. However, upon publication, entire datasets are made available within reports and provided to public databases such as NatureMap and WetlandBase. Data is usually made available.

Budget

Consolidated Funds

to | X | X | X | X |

Source Year 1 Year 2 Year 3

FTE Scientist

FTE Technical

Equipment

Vehicle

Travel

Other

Total

External Funds

to | X | X | X | X |

Source Year 1 Year 2 Year 3

Salaries, Wages, Overtime

Overheads

Equipment

Vehicle

Travel

Other

Total