

WetMAP – Victoria’s Wetland Monitoring and Assessment Program for environmental water

Bird Monitoring Approach



Demonstrating outcomes from environmental watering of wetlands

WetMAP is a state-wide monitoring program designed to assess ecological responses of vegetation, waterbirds, frogs and fish to the delivery of water for the environment in Victorian wetlands. Monitoring for the current stage of WetMAP (2016–2020) is coordinated by Arthur Rylah Institute (ARI) and funded through the Victorian government’s \$222 million investment over four years to improve catchment and waterway health.

Program Objectives

WetMAP objectives are to:

- identify short-term responses of biota to watering events
- identify water regimes (timing, duration, frequency) needed to support self-sustaining populations of key species, and
- determine if current water regimes and wetland management practices are meeting these needs.

Outcomes of WetMAP will inform the management of environmental water and contribute to Victoria’s reporting requirements for the Murray-Darling Basin Plan. Ultimately, WetMAP seeks to inform the development of a planning tool for Catchment Management Authorities (CMAs) and the Victorian Environmental Water Holder.

Program Design

WetMAP’s design is based on:

- conceptual models of wetland responses to environmental water delivery and natural flooding
- watering objectives defined in state and regional water management plans, and
- Key Evaluation Questions (KEQs) and indicators.

The program includes both watered wetlands and unwatered wetlands with similar characteristics to the watered wetlands. These will provide data on the response of frogs to water regimes that are not supplemented by environmental water – typically drier regimes with less frequent inundation.

Factors that influence the response of birds to environmental water

Key drivers affecting the response of birds to water regimes include factors and processes that operate at the local and continental scale. An improved understanding is required of the relationship between bird species distribution, diversity and abundance and wetland water regimes (particularly the timing and duration of inundation and drawdown). There are also knowledge gaps about the use of wetland habitat and food resources by birds, including lag times between wetland watering and a response in food availability, and the influence this has on bird numbers.

Bird monitoring

This component of WetMAP incorporates three elements:

- a) **Local response monitoring** – specific wetland monitoring program.
- b) **Waterbird model** – a retrospective data assessment to better understand relationships between waterbird numbers (highly variable) and wetland availability in central and eastern Australia.
- c) **Citizen science linkage** – a collaboration to fill gaps in existing monitoring.

Six over-arching key evaluation questions (KEQs) relevant to all three components have been developed to examine responses of waterbirds and woodland birds to water management.

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Key Evaluation Questions

- 1 What are the water regime requirements (timing and duration) for different waterbird species?
- 2 What is the expected lag time between water delivery, zooplankton abundance and waterbird response?
- 3 What are the local wetland habitat preferences for different species of waterbirds for feeding, resting and breeding?
- 4 How does water management influence the abundance of waterbirds?
- 5 How does water management influence waterbird community composition?
- 6 How does water management influence the species richness and abundance of woodland birds adjacent to the wetland?

a) Local response monitoring

This component includes targeted bird monitoring among watered and non-watered wetlands. Surveys will record weather conditions, wetland watering state, bird numbers, habitat information (e.g. type and extent of different vegetation types, open water and mudflats), water quality (temperature, pH, electrical conductivity, dissolved oxygen concentration and turbidity), zooplankton and open water macroinvertebrates. Where wetlands include woody vegetation, additional counts of woodland birds and habitat information will be collected. The bird surveys will record start and end time, proportion of vegetation surveyed, a count or estimate of the number of each species, the habitat type each species resides in and evidence of breeding.

Timing – All wetlands will be surveyed approximately monthly from September to June to capture breeding events and recruitment.

Locations – Sixteen wetlands are being surveyed in 2018/19, in the Goulburn-Broken, North Central, Mallee, Wimmera CMA and Melbourne Water regions. Given the close connections between themes (vegetation, waterbirds, frogs and fish), many of these sites are also monitored for vegetation, frogs and fish, to enable examination of these associations. Waterbirds will also be monitored at some nearby permanently watered reference sites to help distinguish changes in waterbird numbers caused by changes in local habitat conditions, and those

caused by factors that influence waterbird numbers on broader geographic scales.

b) Waterbird model

This component aims to determine the relationship between the distribution and abundance of waterbird species and the inundation of wetlands at a broad scale. There are three KEQs specific to this component.

Models will be developed that incorporates dependent

Key Evaluation Questions

- 1 What is the relationship between water availability in the landscape and waterbird / woodland bird numbers in particular regions?
- 2 How does the duration of inundation affect different species of waterbirds?
- 3 How does timing of inundation affect different species of waterbirds?

variables (e.g. abundance of waterbird species and waterbird guilds), and independent variables (e.g. rainfall, broad-scale flooding and environmental water delivery – timing, extent and duration). Landsat variables will also be used in the model (e.g. reflectance bands and Landsat indices). Existing waterbird and woodland bird datasets from BirdLife Australia will be incorporated along with the Landsat dataset to examine relationships between past distributions of birds and wetting and drying across the landscape. The model will be used for further analyses, including making predictions about waterbird numbers and distribution at broad regional scales, interpreting monitoring data, identifying monitoring gaps and prioritising watering regimes and locations.

c) Citizen science linkage

This component involves a collaboration with BirdLife Australia to gather additional monitoring data across the State, to further develop our understanding of the relationships between wetland watering regimes and waterbird and woodland bird distribution and abundance.

Further information See www.ari.vic.gov.au for further information on WetMAP

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