



National Environmental Science Program

## **PROJECT 4.26**

Modelling shorebird migration to assess disease risk amid global change

#### The challenge

High Pathogenicity Avian Influenza (HPAI) has become a growing threat to livestock, wildlife, and humans since the end of the last millennium. Migratory shorebirds are considered the main carriers of avian influenza viruses into Australia. To manage current and future HPAI risks, ongoing monitoring of these shorebirds' movements along HPAI hotspots in the East-Asian Australasian Flyway (EAAF) is essential. Assessing the risk of HPAI incursion into Australia is complex. Migratory shorebirds face challenges from climate change and habitat loss within the flyway, affecting their migration patterns and distribution. These influences are not yet well understood, which complicates our ability to predict their exposure to and dispersal of HPAI. Monitoring HPAI hotspots along the EAAF should, therefore, consider both shorebirds' current migration routes and the future impact of global changes on their migratory behaviour.

A detailed understanding of migratory timing and connectivity of Australian shorebird populations along the flyway is vital to predicting and mitigating disease incursion risks. This knowledge helps pinpoint critical periods and the geographic pathways through which HPAI may spread and reach Australia. Moreover, understanding how migration timing and routes adapt to global change is critical for the conservation of shorebirds, a group that has experienced severe declines in recent decades.

## The approach

This project will:

- Combine citizen science observations, tracking data, and advanced analysis to examine changes in migration timing and connectivity of Australian shorebird populations along the EAAF.
- ii. Assess how global change processes may alter migration timing, enabling targeted disease response protocols at likely Australian arrival sites during critical periods.
- iii. Identify chains of wetlands along the EAAF and the connectivity of breeding of ranges that migratory shorebirds use to enable more focused monitoring of potential HPAI incursion hotspots in Australia.
- iv. Develop a tool to predict shorebird migrations and potential virus transport into Australia under different climate-, habitat, and socio-economical change scenarios.
- v. Support Australia's international commitments to conserving migratory species.

### **Expected outcomes**

- Strategic insights to guide HPAI disease risk management and species vulnerability assessments.
- Enhanced biosecurity preparedness and a refined response to disease incursions.
- Improved understanding of migration timing and connectivity to support policy development.
- A migration forecasting tool to predict species' responses and vulnerabilities to global change.

# **Project leaders**

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FRONT: Bar-tailed Godwits in Yalu Jiang National Nature Reserve in China, April 2010 by Phil Battley. BACK: (Top) Yalu Jiang National Nature Reserve in China, April 2010 by Phil Battley. (Botttom) Bar-tailed Godwits at sunset in Yalu Jiang National Nature Reserve in China, April 2010 by Phil Battley.