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University of Newcastle Australian Wildlife Society Wildlife Ecology Research Scholarship Recipient



Determining Critical Shorebird Habitat and Local Drivers of Shorebird Decline in the Hunter and Port Stephens Estuaries

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Migratory shorebirds are incredible endurance athletes that are in serious trouble. Some species, such as the bar-tailed godwit (*Limosa lapponica*), undertake record-breaking migration flights in excess of thirteen thousand kilometres between their breeding and non-breeding grounds – without stopping. Despite their athletic prowess, migratory shorebirds have suffered severe population declines in recent decades. This decline is attributed to

many factors, including pressures faced by the birds along their migration routes as well as those present at their breeding and non-breeding grounds.

In Australia, the Hunter and Port Stephens estuaries of New South Wales are internationally recognised as critically important habitats for migratory shorebirds. These estuaries host more than one percent of the global population of the endangered

far eastern curlew (*Numenius madagascariensis*), which underpins their Ramsar Convention and Key Biodiversity Area listings. Annually, significant populations of shorebirds spend the austral summer in these estuaries after migrating from their

Top: Louise Williams is a PhD Candidate with the Conservation Science Research Group at the University of Newcastle and has always been passionate about birds and their conservation. Image: A-One Fotomakers.



Bar tailed godwit (*Limosa lapponica*) in the Hunter estuary. Image: Louise Williams.

breeding grounds as far away as Siberian Russia and Alaska. However, shorebirds are declining within the Hunter Region disproportionately faster than other Australian regions, placing its Ramsar Convention listing at risk. The accelerated rates of decline in the Hunter may link directly to habitat loss at other areas of the flyway, but trends in local decline suggest that local-scale factors are also at play. These localised impacts and their effects on shorebird survival are the focus of my PhD research at the University of Newcastle.

This project addresses key questions regarding the conservation of migratory shorebirds in the Hunter and Port Stephens estuaries, intending to reveal local drivers of shorebird decline and determine areas of key conservation significance. Using a variety of methods, including observational studies, stable isotope and environmental DNA analyses, and GPS tracking, the following research questions will be addressed:

1. Which natural (e.g., substrate, vegetation, predator visitations) and human-derived (e.g., disturbance) variables best predict shorebird foraging behaviour and foraging success?
2. What prey species are ingested by different shorebird species and which primary producers lie at the base of the shorebird food web?
3. Do European red foxes (*Vulpes vulpes*) pose a threat to roosting shorebirds?
4. What are the environmental factors driving the prevalence of avian influenza in shorebird and waterfowl populations in the Hunter Region?



Bar tailed godwit (*Limosa lapponica*) landing on a sandbank in the Hunter estuary. Image: Louise Williams.

Given the heavy urban and industrial influences on both estuaries, the pressures facing shorebirds are likely to be substantial. To survive their arduous journey back to their northern hemisphere breeding grounds, the birds must be in optimal health. Their journey can only be achieved if stressors to the shorebirds are minimised within the Hunter Region. Therefore, it is vital to understand human activities and their impacts on shorebirds so management outcomes can be established to minimise their effects. Additionally, it is equally important to characterise and conserve

critical shorebird foraging and roosting sites and habitats that support the shorebird food chain. Achieving this will maximise shorebird health and survival during their Australian non-breeding seasons and assist their successful return migrations to the northern hemisphere.

FUNDS PROVIDED BY THE AUSTRALIAN WILDLIFE SOCIETY will be allocated towards stable isotope and eDNA analyses to gain insight into the flow of nutrition in the shorebird food chain and the organisms directly consumed by shorebirds.



Louise Williams with a flagged bar tailed godwit (*Limosa lapponica*), Roebuck Bay, Western Australia. Image: Tegan Douglas.



Louise Williams and Dr Andrea Griffin surveying shorebirds at Stockton Sandspit. Image: Mattea Taylor.