CONSERVATION OF NORTH AUSTRALIAN MAGPIE GEESE *ANSERANAS SEMIPALMATA* POPULATIONS UNDER GLOBAL CHANGE

By

Lochran William Traill

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Abstract

The magpie goose (*Anseranas semipalmata*) is a spectacular and unique waterbird from tropical north Australia and southern New Guinea. Due to recent human persecution, the species has been eliminated from most of its former strongholds in southern and south-eastern Australia – reduced to small conservation-dependent populations through habitat loss, exploitation and drought. Yet, genuine conservation opportunity still exists in northern Australia, in the country‟s Northern Territory in particular, to maintain viable populations through evidence-based management of wetlands that support the waterbirds and mitigation of the threats posed by global change. Much has been achieved over the last 50 years to understand the ecology and life history of magpie geese, but little has been done to understand important population-level interactions with wetland habitat and the likely outcomes under climate warming, wetland loss to sea level rise, altered competitive interactions among wetland plants, increased frequency and severity of epizootics, and synergies with over-hunting. My review of pathogens and parasites likely to cause morbidity and mass mortality in magpie geese shows that bacterial diseases such as avian cholera and botulism, as well as pathogenic avian influenza viruses, pose the most serious threats. Bacterial diseases in particular are more likely to occur under warmer and wetter conditions, and geese are susceptible to these given large aggregations at favoured nesting and feeding sites. I use a metapopulation model to demonstrate that increased frequency and severity of epizootics will likely force extirpation of geese under current harvest rates across the Northern Territory. Magpie geese are also vulnerable to climate change through dependency on a favoured food plant – the water chestnut (*Eleocharis dulcis*). As a result of a two-year field programme, I was able to show how birds seasonally migrate and aggregate in response to the availability of this resource and gain body condition following predation on the root tubers of the plants. My geospatial modelling

of ocean level inundation of wetlands that support *E. dulcis* show marginal habitat loss under 1.4 m of sea level rise, and large-scale losses under multi-metre sea level rise, but the current resolution of GIS data do not account for fine-scale saline water intrusion through channel or eroded levees. The population models constructed predict that magpie geese are broadly resilient to change where harvest is tightly regulated, but current harvest rates are unlikely to be sustainable. Given the importance of maintaining viable, connected subpopulations large enough to maintain genetic diversity, and because of the value of magpie geese to Aboriginal Australians as a food source, ongoing monitoring of geese population trends will be essential. Wetland management options include erecting buffers to stop or slow down saltwater intrusion resulting from sea level rise, and implementing a system to monitor annual indigenous harvest. Temporary restrictions on harvest may be necessary following mass mortality events such as epizootics or droughts. Only the careful management of wetlands that support current geese populations, and close monitoring of populations will ensure continued sustainable harvest of geese under global change. Given the cultural and biological significance of this species and the north Australian wetlands that support it, this is a conservation resource we cannot afford to squander.

Statement of Originality

This work contains no material which has been accepted for the award of any other degree or diploma in any University, or any other tertiary institution. To the best of my knowledge, this work contains no material previously published or written by any other person except where due reference has been made in the text.

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Lochran W. Traill Date

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