

SHOREBIRD SURVEYS IN THE HUNTER ESTUARY OF NEW SOUTH WALES 1999-2021 A Summary

In 2021 Alan Stuart and Ann Lindsay wrote a detailed article in Stilt, the Journal of the East Asia – Australasian Flyway.

It is a very thorough analysis of what has been happening in the Hunter Estuary over the past 22 years. The following extracts will give the general reader a taste of what is in their article. The full article can be read [HERE](#), pages 47- 63. This article consists of extracts from the Stilt article. Any editorial content is in italics.



Their introductory summary of the content of the article.

The Hunter River Estuary in New South Wales, Australia, was surveyed at monthly intervals from April 1999 to March 2021. In that time, 46 shorebird species were recorded in the estuary including 33 species that migrate within the East Asian-Australasian Flyway (EAAF). Fifteen migratory species and eight non-migratory ones were recorded regularly; the other species were uncommon visitors or vagrants.

Although the estuary continues to qualify for listing as an internationally significant site within the EAAF, the populations of most of the visiting migratory shorebirds have declined substantially.

Although six species were formerly present in internationally significant numbers only two species currently meet criteria for that designation – Sharp-tailed Sandpiper *Calidris acuminata* and the non-migratory Red-necked Avocet *Recurvirostra novaehollandiae*. Nine species are considered nationally significant.

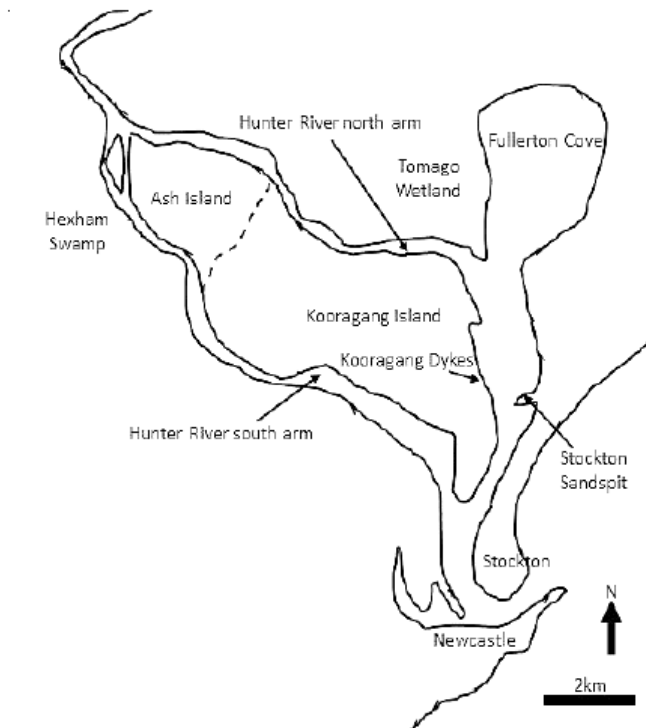
Species in significant decline in the estuary include Far Eastern Curlew *Numenius madagascariensis*, Whimbrel *N. phaeopus*, Bar-tailed Godwit *Limosa lapponica*, Black-tailed Godwit *L. limosa*, Red Knot *Calidris canutus*, Curlew Sandpiper *C. ferruginea*, Marsh Sandpiper *Tringa stagnatilis*, and Common Greenshank *T. nebularia*.

The populations of three migratory species have increased: Pacific Golden Plover *Pluvialis fulva*, Sharp-tailed Sandpiper and Grey-tailed Tattler *T. brevipes*. The Hunter River Estuary now is an internationally significant site for Sharp-tailed Sandpiper, with at times more than 6% of the total population present.

The populations of most of the regularly recorded non-migratory shorebird species were stable or had increased over 1999-2021. For example, the numbers of Masked Lapwing *Vanellus miles* have approximately doubled since around 2010. The estuary is very important for Red-necked Avocet, with 4-6% of the total population often present. There sometimes were nationally significant numbers of Pied Stilt *Himantopus leucocephalus* in the estuary.



The possible reasons for population changes are discussed. Inland rainfall patterns (droughts and heavy rain) may have had an effect for some species. Recent rehabilitation projects in the estuary have reinstated tidal flushing at former estuarine wetlands which has resulted in an increased amount of habitat for shorebirds. Targeted control of Grey Mangrove *Avicennia marina* incursions in the rehabilitated areas has helped create and maintain expanses of salt marsh habitat for foraging and roosting generalist species. Many of the EAAF migratory shorebirds whose populations in the Hunter River Estuary have declined, rely on Yellow Sea tidal mudflats during migration. Much of that ecosystem has been destroyed in recent decades, hence significantly affecting the populations of the species which are Yellow Sea-dependent. However, the declines of those species in the Hunter River Estuary seem to be greater, which suggests some local factors may also be involved. The main feeding area for those species is in Fullerton Cove, which has become contaminated with PFAS/PFOS fire-fighting chemicals used for decades at the nearby Williamstown airport. It is speculated that chronic toxicity effects from the chemical contamination may be affecting the numbers and diversity of benthic organisms in Fullerton Cove, to the detriment of the populations of many coastal obligate shorebirds.



Introduction

In April 1999, members of the Hunter Bird Observers Club Inc. (HBOC) commenced monthly surveys of waterbirds in the Hunter River Estuary of New South Wales (NSW). This report details the results and trends for shorebirds from 22 continuous years of monitoring up to and including March 2021.

The Figure (left) shows the main roosting or foraging sites for shorebirds in the estuary (centred at 32°51' S 151°46' E). The single-most important area is Fullerton Cove, a large shallow embayment with a maximum depth of 2-3m at its centre and where, at low tide, large areas of

mudflats are exposed (Weller *et al.* 2020). Many shorebirds feed in Fullerton Cove at low tide. As the tide rises most of those birds depart to roost at either the Kooragang Dykes or in the Stockton Sandspit/Fern Bay area. Some remain and roost on a narrow beach within the Cove. The three other important areas for shorebirds in the estuary are Ash Island, Hexham Swamp and Tomago Wetland. All three areas provide foraging and roosting habitat for shorebirds. The extent to which birds move from these sites to elsewhere, to forage or roost, is unknown.

The Hunter River Estuary is recognised as the most important shorebird site in NSW. It regularly hosts many migratory species, involving thousands of birds at times, and thus is considered both an internationally and nationally significant site in the East Asian-Australasian Flyway ("the Flyway", EAAF) (Weller *et al.* 2020). Weller *et al.* (2020) rated the estuary as internationally significant for Far Eastern Curlew *Numenius madagascariensis*, Red Knot *Calidris canutus* and Sharp-tailed Sandpiper *C. acuminata*, and nationally significant for Bar-tailed Godwit *Limosa lapponica*, Curlew Sandpiper *C. ferruginea*, Pacific Golden Plover *Pluvialis fulva*, Black-tailed Godwit *L. limosa*, Marsh Sandpiper *Tringa stagnatilis*, Common Greenshank *T. nebularia*, Whimbrel *N. phaeopus*, Latham's Snipe *Gallinago hardwickii* and Double-banded Plover *Charadrius bicinctus*. It also frequently hosts thousands of Red-necked Avocets *Recurvirostra novaehollandiae* (Stuart 2017) as well as seven other non-migratory shorebirds.

Recognition of the importance of the estuary to shorebirds and waterbirds led to the Kooragang Nature Reserve being gazetted in 1983 and designated as a Ramsar site in 1984. The Ramsar site was expanded in November 2002 to include the wetlands at Shortland (Brereton & Taylor-Wood 2010) now known as Hunter Wetlands Centre Australia. However, Ash Island (the name Ash Island is commonly used for the western section of Kooragang Island) and Hexham Swamp were not included in the Ramsar designation despite their meeting Ramsar criteria.

In 2011 Kooragang Nature Reserve, Hexham Swamp and Ash Island were combined to form Hunter Wetlands National Park (Lindsey 2021; Hunter Wetlands National Park Plan of Management 2020). However, the most important shorebird sites on Ash Island were excluded from the National Park. Under NSW State Environmental Planning Policy (State Significant Precincts 2005), the site has been earmarked for an infrastructure corridor which would bisect Ash Island. Currently, this land does not form part of the reserved area of park but is retained as Crown land and is held and managed by NPWS.

The estuary was also designated an Important Bird Area (“Hunter River Estuary IBA”) in 2010. IBAs have since been redesignated as Key Biodiversity Areas (KBAs) in order to extend the concept to non-avian threatened species.

Pre-1999 shorebird counts in the Hunter Estuary

The first documented systematic surveys for shorebirds in the Hunter Estuary occurred in 1967-1970 (Holmes 1970) and there were frequent surveys between 1969 and 1977 by Tom Kendall and Fred van Gessel. The 1967-1977 surveys led to the initial recognition of the estuary’s importance for shorebirds. There were surveys between 1982 and 1985 by the Australasian Wader Study Group. From intermittent survey effort over 1982-1997 the estuary was rated as internationally important for six migratory shorebird species.

History of shorebird habitat changes in the Hunter Estuary

Since European settlement, numerous changes have occurred to shorebird habitat in the estuary. Initially, most of the changes were detrimental for shorebirds. However, more recently various positive developments have partially restored some of the formerly lost habitat.

For a full account of the changes at the lower estuary, Kooragang Island, Ash Island, Tomago, Hexham and Stockton see pages 48 to 50 of the full article.

Major environmental incidents

Two major environmental incidents have occurred in the estuary. On 25 August 2010, 72,000 litres of fuel oil was accidentally discharged with ballast water into Newcastle Harbour from a coal ship. Although booms were placed in the South Channel of the Hunter River, oil was discovered on Stockton Sandspit two days later. Invertebrate animals on mudflats, in saltmarsh and mangroves and several Australian Pelicans *Pelecanus conspicillatus* were affected. Fortunately, there apparently were no long-term impacts.

A potentially more significant incident has resulted from the long-term use (over several decades) of firefighting foams at Williamstown airport to the north of Newcastle. That has resulted in substantial contamination of Fullerton Cove.

METHODS

Survey methodology

The estuary is divided into nine shorebird areas (BirdLife Australia 2021). Data were obtained from structured surveys which commenced in April 1999. They were carried out monthly at high tide using a standard procedure involving multiple teams which visited high tide roost sites at Stockton Sandspit/Fern Bay/Stockton Channel, Fullerton Cove and Ash Island (Stuart *et al.* 2013).

Simultaneous surveys at Hexham Swamp and Tomago Wetland commenced in 2013 and 2014 respectively, when those sites first began to host shorebirds

Data management and data analysis

The data for each individually surveyed site from every survey were entered into BirdLife Australia's Birddata database (www.birddata.birdlife.org.au). Between 1999-2017, we also recorded the data in an MS Excel spreadsheet, updated monthly.

We used standard MS Excel graphing tools for our core analyses. *(The detailed analysis graphs can be seen in the original article).*

RESULTS

Overview

Fifteen migratory and eight non-migratory shorebirds were regularly recorded in the surveys (Table 1). The most commonly recorded species was Masked Lapwing *Vanellus miles*, which was present in every survey, while Common Sandpiper *Actitis hypoleucos* was the least common of the regular



shorebirds, with 87 records.

In addition to the Masked Lapwing, five other species were each recorded in more than 90% of the surveys.

They were: Far Eastern Curlew, Bar-tailed Godwit, Australian Pied Oystercatcher *Haematopus longirostris*, Red-necked Avocet, Pied Stilt *Himantopus leucocephalus*.

Thus, 46 shorebird species were recorded in the Hunter River Estuary over 1999-2021

including 23 regular visitors (with 15 of those being migratory species) and 23 uncommon or vagrant species (with 18 being migratory species). Of the migratory shorebirds, 11 species have undergone substantial declines in their non-breeding season populations while the numbers for three other species have increased. These trends were largely mirrored in the breeding season. For the eight non-migratory shorebirds that were regularly present, many had increasing trends, while others had fluctuating, but overall stable or increasing populations.

Most migratory shorebirds were absent in the May-August period or present only in low numbers. The exceptions were Whimbrel, Far Eastern Curlew and Bar-tailed Godwit

Three species had increasing populations over 1999-2021: Pacific Golden Plover, Sharp-tailed Sandpiper and Grey-tailed Tattler *Tringa brevipes*. *(For more details see the original article)*

Non-migratory shorebirds

Large numbers of Red-necked Avocets often were present in the estuary. The peak count was of 6,753 birds in August 2012 and the mean counts mostly were of more than 1,000 birds. The numbers of Pied Stilt also fluctuated considerably, ranging from a peak count of 1,576 birds in December 2014 to several times there being none found in the estuary. The most reliable site for Red-capped Plover was Stockton Sandspit, where 20+ birds often were recorded and there were many breeding records and attempts (in spring and summer).

The Masked Lapwing population initially was stable, albeit with seasonal changes. However, in recent years the population approximately doubled. There were similar changes for the populations of Red-kneed Dotterel *Erythrogonys cinctus* and Black-fronted Dotterel *Elseyaornis melanops*

DISCUSSION

International and national significance of the Hunter Estuary for shorebirds

The decline in populations of migratory shorebirds in the Hunter River Estuary in general mirrors the trends observed elsewhere (e.g. Studds *et al.* 2017; Hansen 2011). However, some of the local declines have been steeper, such that the estuary is no longer internationally significant for several species, which previously it had been (based on Bamford *et al.* 2008). The estuary is no longer internationally significant for Latham's Snipe, Black-tailed Godwit, Bar-tailed Godwit or Curlew Sandpiper. It continues to be a nationally significant site for those species.

In a recent report (Weller *et al.* 2020), the estuary was listed as internationally significant for Far Eastern Curlew and Red Knot. That was based on counts respectively of 406 birds in February 2007 and 2,172 birds in October 2006. Weller *et al.* (2020) also listed the estuary as internationally significant for Sharp-tailed Sandpiper. That is undoubtedly the case. The peak counts which occurred during 2013-2019 HBOC surveys often were of 3,000-5,000 birds, equivalent to 4-6% of the total population

Winners and losers

Weller *et al.* (2020) also listed the estuary as internationally significant for Sharp-tailed Sandpiper. That is undoubtedly the case. The peak counts which occurred during 2013-2019 HBOC surveys often were of 3,000-5,000 birds, equivalent to 4-6% of the total population. However, the populations of all twelve of the other regularly-visiting migratory shorebirds have decreased. In most cases the declines have been substantial

Yellow-Sea dependency

Most of the migratory shorebirds that have undergone significant population declines in the Hunter River Estuary have a high reliance on Yellow Sea tidal mudflats when they are on migration in the Flyway

CONCLUSIONS

For at least 50 years the Hunter River Estuary has been an important site for resident shorebirds and a significant international staging and destination site for migratory shorebirds. It has become an internationally significant site for Sharp-tailed Sandpiper, with many recent records of several thousand birds, involving 4-6% of the total population at times. However, with two exceptions (Pacific Golden Plover, Grey-tailed Tattler) the numbers of other migratory shorebirds have decreased substantially in the past two decades, continuing the trends first established in the 1980s. In the non-breeding season fewer than 2,000 migratory shorebirds are now usually present, except when there are visiting Sharp-tailed Sandpipers. The estuary is no longer internationally significant for Latham's Snipe, Black-tailed Godwit, Bar-tailed Godwit or Curlew Sandpiper although it continues to be nationally significant for those species. Also, it has been at least 14 years since the estuary has hosted more than 1% of the total populations of Far Eastern Curlew or Red Knot.

The estuary is important for Red-necked Avocet, with thousands of birds usually present, except when conditions inland are favourable for breeding. The peak count was almost 6.5% of the total population. There were also several records of more than 1,000 Pied Stilt.

For much of the Twentieth Century, there were considerable losses of shorebird foraging and roosting habitat in the estuary because of industrial and agricultural development initiatives or for the purpose of mosquito control. However, since the 1990s several positive developments have partially restored lost shorebird habitat. Those developments have favoured generalist shorebirds in particular, most species of which have experienced population growth in the past two decades.

The majority of migratory shorebird species with declining Hunter River Estuary populations rely on Yellow Sea tidal mudflats and adjacent saltpans when they are on migration in the Flyway. Thus, many of the local declines mirror the overall Flyway trends of decreasing populations. However, for many species the local declines exceed the overall Flyway declines. Those declining species mainly forage in Fullerton Cove, which has become contaminated by the fire-fighting chemicals used for decades at the nearby Williamstown Airport. There is an urgent need for a comprehensive study of chemical contamination in Fullerton Cove to assess whether benthic life has been affected thus impacting shorebird populations.

The local populations of Pacific Golden Plover and Sharp-tailed Sandpiper have increased significantly, and the Grey-tailed Tattler population also has risen. These three species have a lower dependency on the Yellow Sea during migration and, locally, a lower dependency on Fullerton Cove for foraging. Both of those points may be important factors for explaining the observed population rises.

ACKNOWLEDGEMENTS

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Photos by Ann Lindsey

These extracts give a brief taste of the wealth of information in Alan and Ann's article. For the full details refer to full article [HERE](#), pages 47- 63.