

# Why has the Whistling Kite population in Port Stephens plummeted?

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Twice-yearly surveys in Port Stephens New South Wales have revealed a statistically significant decline in the local population of Whistling Kite *Haliastur sphenurus*. Birddata records support that conclusion. The decline seems to be linked with increases in the numbers of White-bellied Sea-Eagle *Haliaeetus leucogaster*, Osprey *Pandion haliaetus* and Brahminy Kite *Haliastur indus* in Port Stephens. It is speculated that the Whistling Kite is being out-competed by those three other species.

## INTRODUCTION

In 2016 when I analysed data for raptors from the 2004-2016 Port Stephens waterbirds surveys, the Whistling Kite *Haliastur sphenurus* population had been fluctuating but possibly had begun to decline (Stuart 2016). However, because there were only 13 years of data available at that time and the change was recent, that was a tentative conclusion. After another eight years of surveying, there can be no doubt that the Whistling Kite population in Port Stephens has plummeted. In this note I present evidence for the population decline and speculate about possible reasons for it.

## METHODS

All birds of prey are counted when teams do the summer and winter boat-based surveys of Port Stephens. The methods used for those surveys are described elsewhere (Stuart 2011; Stuart 2020). I maintained a database of

survey records in MS Excel and used standard Excel graphing and statistical packages to analyse the data and calculate Reporting Rates (number of records divided by number of surveys, expressed as a percentage). When comparing data from differing time periods, I used two-tailed t-tests, assuming unequal variance, to test the significance of differences in the means for the two time periods.

There was a summer survey every year over 2004-2024 (total of 21 surveys), while twelve winter surveys were conducted over 2008-2024 (winter surveys in all seven years spanning 2008-2014; five surveys during 2015-2024). For reader convenience, a map of Port Stephens (reproduced from Stuart 2020) is included in this report (Figure 1).

For additional insights, I interrogated the Birddata archives (<https://birddata.birdlife.org.au/home>) for records of Whistling Kite and other raptors from within the boundaries of the Port Stephens Council LGA. I then calculated the annual ratios of the number of records of Whistling Kite and the comparison raptor species e.g. White-bellied Sea-Eagle.

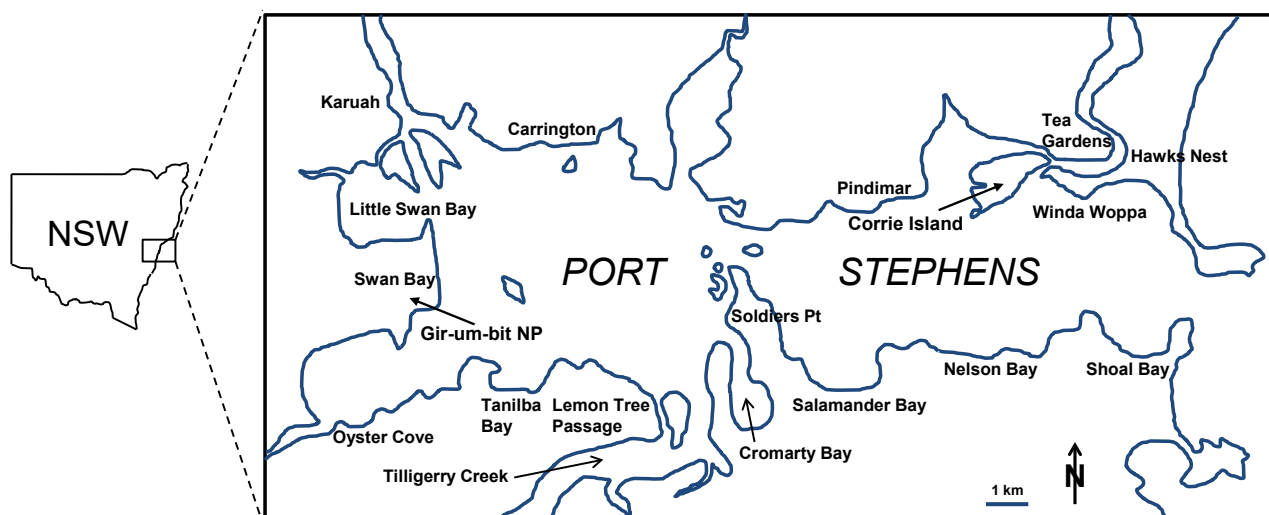
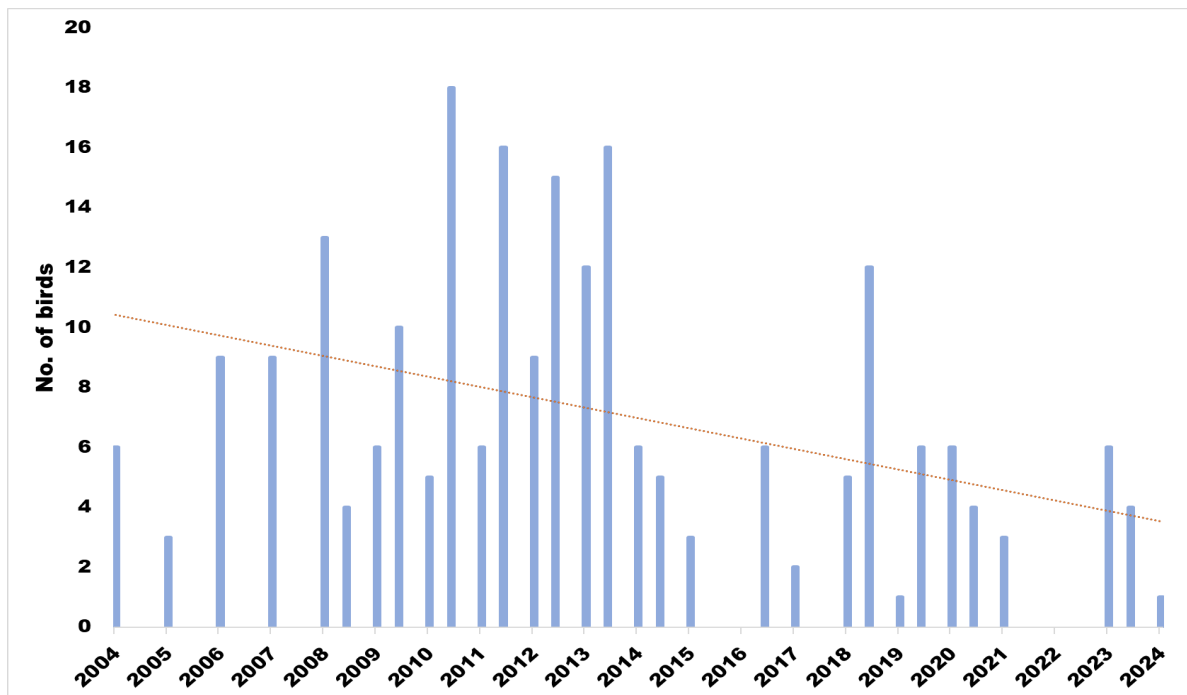


Figure 1. Port Stephens in New South Wales, showing the main towns and topographic features (source: Stuart 2020)

## PORT STEPHENS WHISTLING KITE POPULATION



**Figure 2.** Whistling Kite numbers from every Port Stephens survey since the surveys started in summer 2004.

**Figure 2** shows the results for Whistling Kite from every survey since the surveys started in summer 2004. There was a count of 12 birds in July 2018 but all the other counts after 2013 were of six birds or fewer. Therefore, for some of the subsequent analyses, I treated the pre-2014 and post-2014 results separately. I also analysed the summer and winter counts separately.

**Table 1** summarises the results from the pre-2014 and post-2014 surveys. The average summer count dropped from eight birds to three and the change was statistically highly significant (two-tailed t-test,  $p = 0.001$ ). Notably, there were two post-2014 summer surveys where no Whistling Kites were recorded, and their Reporting Rate for summer dropped from 100% to 80%. Whistling Kites were recorded in every winter survey, but their average count dropped from twelve birds to seven. The change was near-significant (two-tailed t-test,  $p = 0.058$ ).

**Table 1** shows that there were more Whistling Kites in Port Stephens in the winter surveys than the summer ones. Using the counts from every summer and winter survey, the difference was statistically significant (two-tailed t-test,  $p = 0.029$ ).

**Table 1.** Mean counts, standard deviations (SD), and Reporting Rates (RR), for Whistling Kite in Port Stephens 2004-2024.

		Mean (SD)	RR (%)
Summer only	All years	6 (4)	90.0
	2004-2013	8 (3)	100
	2014-2024	3 (2)	80.0
Winter only	All years	10 (6)	100
	2008-2013	12 (6)	100
	2014-2023	7 (5)	100

In the 21 years of Port Stephens surveys, nine other raptor species were recorded. However, six of those species were present infrequently – in most cases they only had single records during the surveys. Three species were regularly present: White-bellied Sea-Eagle *Haliaeetus leucogaster*, Osprey *Pandion haliaetus* and Brahminy Kite *Haliastur indus*. As will be demonstrated later, the boat-based surveys indicate that the populations of all three of those species have increased in Port Stephens. After looking closely at the annual data, it seemed that population trends began to change from about 2010. There had only been three winter surveys to that time, making comparisons of pre- and post-2010

winter data of little value. However, there had been seven summer surveys (and 14 summer ones since 2010). In **Table 2** I present the relevant summer data for all four species. The “Whistling Kite ratio” is the

mean of the yearly summer ratio of Whistling Kite numbers to the total numbers for all four species.

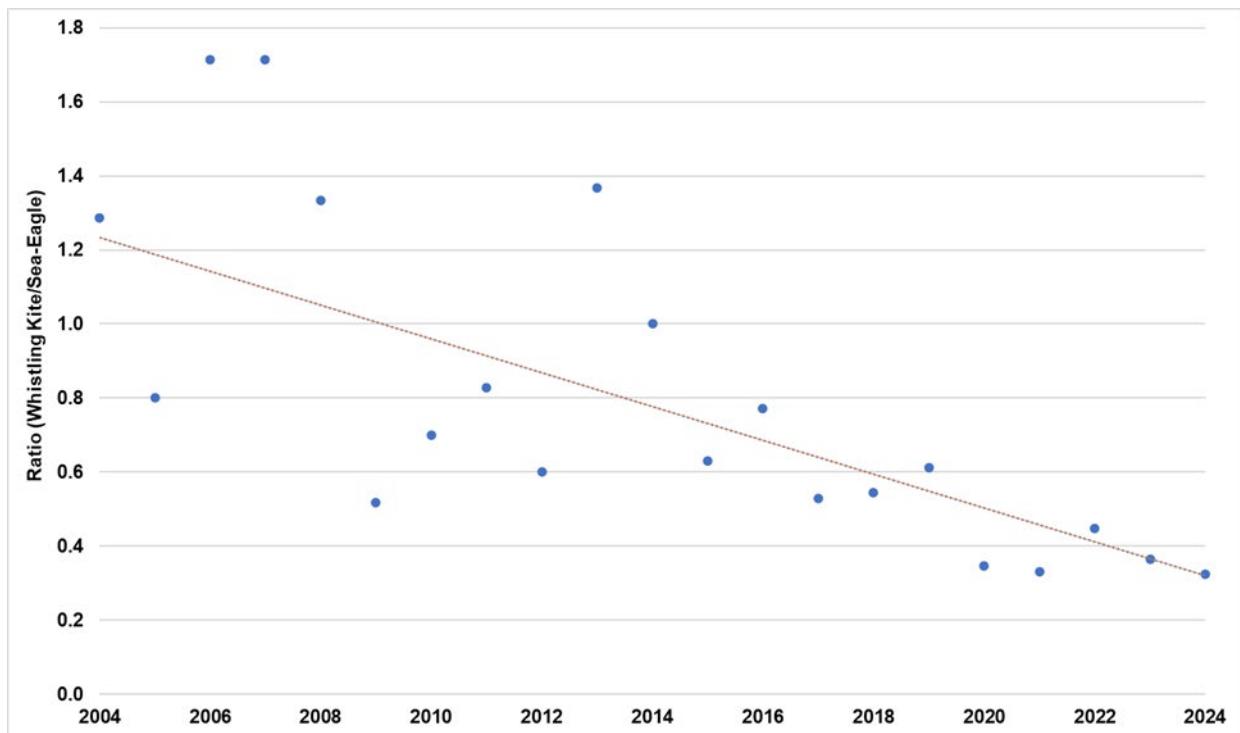
**Table 2.** Mean counts, standard deviations (SD), and Reporting Rates (RR), for four raptor species in Port Stephens from the summer surveys for 2004-2010 and 2011-2024, and *p* values from t-tests of the two means.

Species	2004-2010			2011-2024			<i>p</i> of means (t-test)
	Mean	SD	RR (%)	Mean	SD	RR (%)	
Whistling Kite	7	3	100	4	4	85.7	0.077
White-bellied Sea-Eagle	11	5	100	19	7	100	0.001
Osprey	2	1	85.7	8	2	100	<<0.001
Brahminy Kite	0	0	0	1	1	42.9	0.022
Total birds	20	9	-	32	9	-	0.018
Whistling Kite ratio (%)	41	13	-	13	11	-	0.003

The change in Whistling Kite numbers was near-significant ( $p > 0.05$ ). The changes for Brahminy Kite and for the total number of birds were statistically significant ( $0.01 < p < 0.05$ ), as was the change in Whistling Kite ratio. The changes for White-bellied Sea-Eagle and Osprey over the two time periods were statistically highly significant ( $p < 0.001$ ). Brahminy Kites were not recorded in summer surveys until 2011. The majority of summer records were of single birds. I also note that the winter Reporting Rate for Brahminy Kite from

2014 onwards was 100%, with an increasing frequency of records of 2-3 birds.

Similar trends (decline in Whistling Kites, rise in numbers of the other species) were apparent from the Birdata records for the Port Stephens LGA. For example, **Figure 3** shows the ratios, since 2004, of the number of records each year for Whistling Kite and White-bellied Sea-Eagle. Prior to 2004 there were not enough records for those species in Birdata to warrant analysis.



**Figure 3.** Annual ratios of the numbers of Birdata records for Whistling Kite and White-bellied Sea-Eagle for the Port Stephens LGA, with trend line.

## DISCUSSION

The high count of 12 Whistling Kites in July 2018 (**Figure 2**) is anomalous for the post-2014 surveys. In that survey, two of the six survey vessels had mechanical issues and the surveys took longer than usual. Perhaps that was a factor in the high count, as those two survey sectors recorded the most Whistling Kites (five and four birds respectively). The possibility of some double-counting cannot be excluded. If the July 2018 result is disregarded, the change after 2014 become further magnified.

Across its range, which spans Australia (including coastal islands), New Caledonia and much of New Guinea, the Whistling Kite is a species in decline (Planet of Birds 2011; Cooper *et al.* 2014; Animalia 2023). Although the population trend is a decreasing one, the decline is not believed to be sufficiently rapid to approach the thresholds for classification as Vulnerable. Factors suggested for the general population decline include loss of wetland habitat and loss of suitable nest sites (Cooper *et al.* 2014).

Those factors seem not to apply in any direct way for Port Stephens, which mostly is an undeveloped and largely pristine estuary bordered by several national parks. What may be of greater relevance is that the populations of the other three main raptor species have increased in Port Stephens. Osprey numbers have increased statistically significantly, Brahminy Kite numbers have risen, as has their Reporting Rate, and there are more White-bellied Sea-Eagles as well. Those three species are prospering in Port Stephens whereas the Whistling Kite population has plummeted. For example, the boat-based waterbirds surveys and the Birdata records both indicate that White-bellied Sea-Eagles are now 3-5 times as common as Whistling Kites in Port Stephens.

Possibly these population changes may be the result of Whistling Kites being out-competed by the three other species. An alternative explanation is that the habitat and/or general conditions in Port Stephens have changed, detrimentally for Whistling Kites and positively for the other species.

The extent of inter-species competition for food may be a factor. Whistling Kites eat fish, small animals and carrion, as do Brahminy Kites and White-bellied Sea-Eagles (Cooper *et al.* 2014). Mammal carrion is a higher proportion of the diet of Whistling Kites, and conversely waterbirds in sea-eagle diets (Olsen *et al.* 2013); however, all three species probably will eat whatever they find. The diet of Ospreys primarily is fish and they are not

reported to take carrion (Marchant & Higgins 1993). All four species potentially will compete for fish (Thomson *et al.* 2016), and the two kite species and sea-eagles will compete for most other food items.

Competition for nesting sites may also be a factor. All four species build large stick nests near the top of an emergent tree, although Ospreys will often choose artificial nest structures instead (Clancy 2009; Moffatt 2009; Thomson *et al.* 2019). There seems to be no shortage of suitable nest trees around Port Stephens, given the many surrounding national parks and similar reserves. There have been few studies of either the inter-species or intra-species spacing requirements for nest sites for these four raptor species. Lutter *et al.* (2006) reported Brahminy Kites successfully defending a nest against a Whistling Kite, although the latter initiated the aggression. White-bellied Sea-Eagles and Brahminy Kites were found to have different habitat preferences for their nest trees, and they had differing intra-species spacing requirements (Khaleghizadeh & Anuar 2014). Those authors did not investigate the inter-species spacing requirements. It seems plausible that a dominant raptor species at a nest tree would chase away other raptor species attempting to nest in a nearby tree. What is unclear is how Whistling Kites would fare in such a contest, nor is it known what is the minimum required inter-species nest spacing distance.

Have conditions in Port Stephens changed, to the detriment of Whistling Kites? There seems to be no strong evidence to support that conclusion. Most of Port Stephens is a marine park, and a considerable amount of its surrounds are national parks and similar conservation reserves. However, the human population has increased (Port Stephens Council 2024) and presumably therefore, so has the amount of disturbance by humans. A related effect from human population change in Port Stephens is that Whistling Kites are the most likely of the four species to scavenge roadkill and thus get killed on roads.

One other factor might be contributing to the Whistling Kite's decline, although not exclusive of the other factors suggested. Being more of a scavenger of mammal carrion and a predator of rodents than the other three species, Whistling Kites might also be subject to secondary poisoning from scavenging or catching dead and dying rats and mice in or near urban areas where people poison rodents. The highly toxic second-generation anticoagulant rodenticides are readily available and commonly used (Australian Pesticides and

Veterinary Medicines Authority 2024). There are many reports about their acute toxicity to apex avian predators (BirdLife Australia 2024).

### Status of competitor raptor species in Port Stephens

The first records in Birddata for Brahminy Kite in the Port Stephens LGA were in 1999 and the first Annual Bird Report record was in 2000 (Stuart 2001). The species was uncommon in Port Stephens until about 2015, but now it is a breeding resident (Wooding 2017; Wooding 2019). Their range in New South Wales contracted northwards after European settlement, and they also were impacted by egg-shell thinning caused by the ingestion of DDT (Cooper *et al.* 2014). However, now their population and range are rebounding – which are reflected in the increasing numbers and Reporting Rate in the Port Stephens surveys.

In the decades before 1980 there were no known active Osprey nests in NSW (Cooper *et al.* 2014). By 2009 there were at least 140 nesting pairs in the state (Clancy 2009; Moffatt 2009). The first records in Birddata for Osprey in the Port Stephens LGA were in 1999. However, a pair was seen at a nest tree at Tanilba Bay in 1996 (Stuart 1997). In 2017 there were at least five active nests in Port Stephens (Stuart 2018) and the number of pairs probably has increased since then (pers. obs.). The dramatic recovery of the species in NSW has been suggested to be due to a combination of the new protective status (it is now classified as Vulnerable in NSW), cessation of hunting, efforts to improve nesting options, and heightened public awareness (Cooper *et al.* 2014).

The White-bellied Sea-Eagle is also classified as Vulnerable in NSW, with the loss of suitable breeding sites from habitat clearance being a factor in that listing decision (NSW Department of Environment 2016). It also is sensitive to disturbance around its nest site and its populations around heavily industrialised or urbanised areas have declined (NSW Department of Environment 2016). The species was one of the more affected by DDT egg-shell thinning, probably due to its feeding in areas heavily treated with pesticide such as swamps (Wikipedia 2024). The population in Port Stephens has increased – from a mean of 11 birds in summer surveys over 2004-2010 to a mean of 19 birds in the post-2011 surveys.

### The timing of the changes

As presented earlier, the populations of White-bellied Sea-Eagle, Osprey and Brahminy Kite in Port Stephens began to rise from about 2010 and the changes for all three species were statistically significant or highly significant. The decline in the Whistling Kite population did not begin to manifest until a few years later. The differences between 2004-2010 and 2011-2024 summer counts were statistically near-significant but the differences between 2004-2013 and 2014-2024 were statistically highly significant.

The 2-3-year lag period, before Whistling Kite numbers began to decline, might indicate lack of breeding success for the species, i.e. older birds not being replaced. Lack of breeding success could result from competition for breeding sites or competition for food for young birds, or a combination of those two issues.

### CONCLUSIONS

The Whistling Kite population in Port Stephens has plummeted. In 2004, the local populations of Whistling Kite and White-bellied Sea-Eagle were about equal. Now, sea-eagles out-number Whistling Kites by a factor of about five, from a combination of kite population decline and sea-eagle population rise. The populations of Ospreys and Brahminy Kites have also risen significantly.

The Whistling Kite decline in Port Stephens is most likely because of their being out-competed by the three other main raptor species. Whether that is a result from competition for food or from competition for nest sites is unclear.

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