

## SHORT NOTE

# Distribution and abundance of shags in Abel Tasman National Park

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The number of people living in coastal areas and coastal activities (such as property development, fishing, mining and shipping) are increasing in New Zealand, and with these increases come greater impacts on coastal species. Many coastal bird populations are known to be affected by fisheries interactions and coastal development (including the felling of roosting trees; Bell 2013). Localised impacts, such as the grounding and subsequent oil spill from CV *Rena* on the Astrolabe reef (Battershill *et al.* 2013), also have the potential to significantly affect coastal bird populations. At a larger scale, environmental change has the potential to alter the distribution and abundance of seabirds through its effects on forage fish species and productivity. Therefore, an understanding of the current distribution and abundance of coastal seabirds is valuable for wildlife conservation and threat mitigation planning.

New Zealand has one of the highest numbers of shag species in the world. Of 33 species of shags around the world, 12 species (including 8 endemic species) breed in New Zealand (Marchant & Higgins 1990). Knowledge about the distribution, population size and biology of shags in New Zealand is variable depending on species (Marchant & Higgins 1990). This note describes a survey that

was carried out along the entire length of the Abel Tasman National Park area (Fig. 1) on 19 and 20 November 2012, during which 2 species of shag were surveyed: pied shag (*Phalacrocorax varius*) and spotted shag (*Stictocarbo punctatus*).

The pied shag is a large (1.7–2.2 kg), predominantly black and white species that primarily nests in inshore marine coastal environments, including estuaries (Marchant & Higgins 1990). It has a slightly disjunct distribution across New Zealand, being found predominantly in the northern North Island, the Wellington and Gisborne areas, and throughout the South Island except in the west and along the lower east coast (Bell 2013). The conservation status of the pied shag in New Zealand is “Nationally Vulnerable,” with an estimated 5000 breeding pairs throughout the country (Miskelly *et al.* 2008). Banding studies have indicated that individuals can live to 18 years of age, appear to remain in the area in which they hatched and breed all year round (Powlesland *et al.* 2008).

The spotted shag is a smaller (1–1.2 kg) endemic species that predominantly nests in marine environments with rocky shores (Marchant & Higgins 1990). It also has a patchy distribution across New Zealand. In the North Island, this species is only found in the Hauraki Gulf and the Wellington/Kapiti areas, while in the South Island it occurs down the east coast from the Marlborough

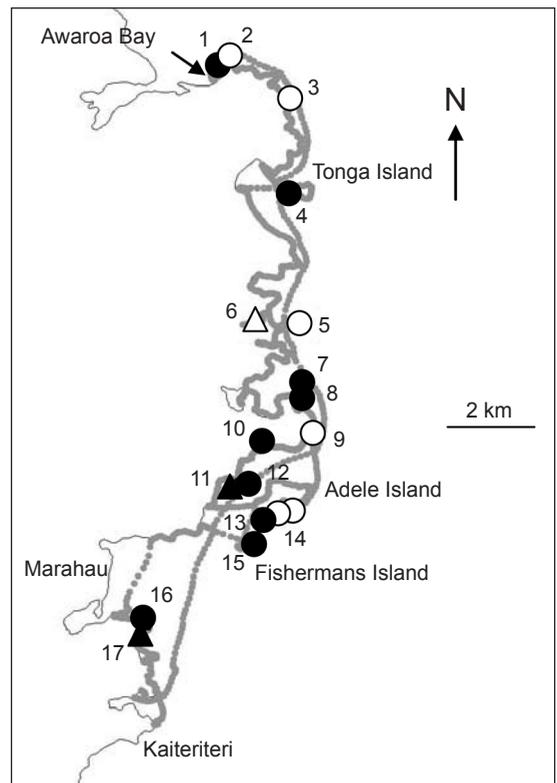
Sounds to Stewart Island/Rakiura, but on the west coast is restricted to areas around Punakaiki and Open Bay Islands. This conservation status of the spotted shag is "Not Threatened" with estimates of >20,000 mature individuals in stable or increasing populations (Miskelly *et al.* 2008). The breeding season for this species varies between years and regions of the country.

The Abel Tasman National Park coast is suitable habitat for both pied and spotted shags, with rocky shorelines and small cliff areas. Extensive mature native forests extend right up to the shoreline. Pied shags nest predominantly in native vegetation (72.6%; Bell 2013), which is abundant in this National Park. Pied shags appear to have only colonised (or re-colonised) this area within the last 10–15 years (Bell 2013), indicating that this population may continue to expand.

There has been no previous survey of shags in the Abel Tasman National Park area. The present survey covered the entire c.150 km length of coastline in the park, from Awaroa Bay to just past Kaiteriteri (Fig. 1). Observations were made from a 6.45 m Stabi Craft boat, which was large enough to provide a good observation platform for the sea conditions, but small enough to manoeuvre around the offshore islands. The 2 survey days were clear and still, with calm sea conditions and no swell. The mainland and islands were circumnavigated at a distance of ~20–75 m from the shore wherever possible. When shags were sighted on land, the boat was stopped and the birds were identified and counted by 2 people independently using binoculars. Where counts differed, they were averaged (the low numbers at most sites meant that only roost numbers 13 and 14 were averaged; table 1).

The survey track, and all observed locations of shag roosting and nesting sites are shown in Fig. 1. For spotted shags, 61 active nests (completed nests with sitting birds or visible chicks and adults), 31 juveniles and 1176 adults (additional to adults on nests) were counted along the survey track line. Pied shags were less common, with a total of 19 active nests and 9 additional adults counted (Table 1).

Although both shag species can have highly variable breeding dates, mid-November is thought to be a prime nesting time for both species (Marchant & Higgins 1990; Powlesland *et al.* 2008). My survey appears to support this for pied shags, as few adult birds were seen that were not nesting. However, for spotted shags, the number of roosting birds was more than 10 times that of nesting birds. This suggests that breeding may occur at other times of the year, or in other areas. Nevertheless, the large number of non-breeding shags observed on the survey suggests the National Park is used extensively for roosting.



**Fig. 1.** Distribution of nesting and roosting sites for spotted and pied shags in Abel Tasman National Park. Grey line indicates survey track line; black dots indicate spotted shag nesting sites and open dots indicate spotted shag roosting sites; black triangles indicate pied shag nesting sites and open triangles indicate pied shag roosting sites. See Table 1 for details of the numbers of birds and nests at each site.

This survey was not designed to estimate population size, as I could not account for the number of birds that had left the area to feed or the movement of non-nesting birds between the 2 days of survey (although there was no overlap in areas surveyed between days). Rather, it was designed to provide a relative estimate of the number of birds in the area, and the numbers and distributions of nests, as baseline information for future monitoring. Both in this area and elsewhere around New Zealand, increasing numbers of shags have led to complaints about noise levels and nesting birds killing trees. This survey and future surveys in this area (which can use the same technique and resurvey GPS locations of the current nesting and roosting sites) could help to quantify population trends, and determine changes in the distribution and abundance of shags in the National Park, as well as investigate whether they are having negative impacts on terrestrial vegetation.

**Table 1.** Number of juveniles, additional adults and active nests counted during the shag survey (see Fig. 1 for area numbers).

Area	Species	Juveniles	Additional adults	Active nests	GPS locations	Comments
1	Spotted	3	19	10	-40.85113479 173.0446723	
2	Spotted	4	16	-	-40.85375505 173.0411817	
3	Spotted	-	4	-	-40.86343138 173.0616653	
4	Spotted	2	6	5	-40.89037165 173.0636413	Tonga Island
5	Spotted	-	8	-	-40.92895355 173.0660666	
6	Pied	-	6	-	-40.92843144 173.0529251	King River
7	Spotted	-	23	3	-40.95034383 173.0678004	
8	Spotted	-	5	2	-40.96108859 173.0697819	
9	Spotted	20	70	-	-40.96533068 173.0552776	
10	Spotted	-	29	10	-40.97432286 173.0477115	
11	Pied	-	3	3	-40.97381492 173.046011	
12	Spotted	-	6	7	-40.98525614 173.0622628	
13	Spotted	-	350	1	-40.9849688 173.0601281	SE Adele Island
14 (2 dots)	Spotted	-	630	-	-40.98674501 173.0580204	East Adele Island
15	Spotted	-	2	3	-40.99376586 173.052902	
16	Spotted	2	8	20	-41.01693981 173.0218975	5 pied shags roosting
17	Pied	-	-	16	-41.01799442 173.0202341	Both small & large chicks

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