Unitec Research Committee

Final Report

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Project Title:	Status of the spotted shag (*Stictocarbo punctatus*) in the Hauraki Gulf
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Executive Summary

This project studied aspects of the population of spotted shag (*Stictocarbo punctatus*) that is considered to be in decline in the Hauraki Gulf. The aim of the project was to initiate an update of population data, a necessary precursor to future ecological research intended to inform management of this species and Gulf seabirds in general. Population data was gathered through field surveys of islands of the inner Hauraki Gulf. The project has updated aspects of population data for the species, with the general conclusion that the population is stable, although with fewer breeding colonies than when last surveyed in 1970. The need for further field surveys was also identified. The project findings are to be disseminated as "preliminary results" at the 2012 Ornithological Society of NZ conference.

Background

There is a increasing recognition of the importance of the Hauraki Gulf as a habitat for both New Zealand endemic and other more widely distributed seabirds, many of them endemic. However, it is also recognised that there are significant gaps in the knowledge of the detailed ecology of many species (Dr G. Taylor, DOC, pers comm.).

Although not a threatened species, the population of the spotted shag (*Stictocarbo punctatus*) is considered to be declining as a result of its sensitivity to (human) disturbance (Taylor 2000). The Department of Conservation (Taylor 2000) identifies the following research needs for the spotted shag:

1. all breeding colonies be located and recorded on the National Seabird Register;
2. breeding populations of the species be monitored every 5 years.

The Hauraki Gulf is the northern-most population of the spotted shag. Ornithological records and publications on the historical status of this species in the Gulf represent surveys carried out at least 25 years ago. The new knowledge that this project will generate will be an accurate record of the current status of the spotted shag within the Hauraki Gulf. This will allow comparisons with past data, providing a basis to determine regional population trends for the species, and also to provide a baseline upon which regular surveys in the future can be built. This information is essential for authorities with a mandate to manage native species to make informed decisions of appropriate management action. Dr Graeme Taylor has indicated DOC support for this research.

The Department of Conservation identifies further research priorities for the spotted shag - population dynamics, diet, dispersal between breeding zones, social organisation and behaviour. The proposed project gathering population data is a necessary precursor to future ongoing ecological research for this species.

Aims and Objectives (unchanged throughout the project)

1. To record the current distribution of breeding colonies of the spotted shag in the Hauraki Gulf.
2. To estimate the population of the spotted shag in the Hauraki Gulf.
3. To estimate the breeding population of the spotted shag in the Hauraki Gulf.
4. To compare field observation and data gathered with historical records.

Methodology

Spotted shags nest in colonies on steep exposed rock faces, and roost in large groups. For this situation, direct counting from a boat was deemed the most suitable method for surveying to maximise visibility to the flocks while minimising disturbance (Bibby *et al.* 2000). The field surveys visited historical breeding and roost sites (Millener 1970), with adjacent habitat also observed for evidence of the species' presence.

Two surveys were carried out by boat, covering at least 20 islands and stacks of the south-eastern region of the Hauraki Gulf:

- the eastern end of Waiheke and smaller islands in the region, including Rakino Is, Otata Is, Motuhorupapa Is, Maria Is, Tarahiki Is, Horuhoru Is and the David Rocks; accessed from Auckland City.
- the islands off the west coast of the Coromandel Peninsula; accessed from Te Kouma Harbour.

The timing of these surveys was limited by the time availability of researchers and weather conditions. Unfortunately, this limitation resulted in the surveys being carried out at the end of the breeding period of the shags. This was further compounded by the Hauraki Gulf population of the spotted shag appearing to breed earlier than that recorded in the literature (at least for 2011). While this situation was not ideal, there was, nonetheless, useful data collected.

Outcomes/findings

Data gathered through field surveys, has added to knowledge of the species as intended in Aims 1 and 2. Aim 3 was not met as the birds had left their breeding sites at the time of the research. The comparison of field data with historical records (Aim 4) is ongoing.

Two spotted shag flocks were recorded at island roost sites. The number of birds at these sites were:
Otata Island - 143
Horuhoru Rock - 24
A single bird was recorded on the Coromandel islands.

An unexpected observation was a significant mainland roost area stretching along approximately 20km of the rocky coastline on the western side of the Coromandel Peninsula north of Thames. This population was counted at appropriate points along the road. The number of birds at this roost was at least 700.

All groups consisted of post-breeding adults and juveniles, identified by characteristic plumage. This confirmed that breeding had taken place prior to the survey being undertaken. Although the actual nesting sites on Otata and Tarahiki Islands were deserted, recent occupation was evident from the presence of nesting material and guano. These two sites were the only ones of those recorded historically (Millener 1970) that were observed to be still active. No previously unrecorded nesting sites were observed.

Conclusions
Preliminary results indicate that there may be fewer nesting colonies than reported in historical literature (Millener 1970). However, the size of the flocks observed suggests that the Hauraki Gulf population of the spotted shag is viable, and probably stable.

Implications
Recent publications and media releases from the Hauraki Gulf Forum have recognised the national significance of the Gulf's indigenous biodiversity, and acknowledges the pressure on biodiversity from past and present development and use of the Gulf. The Forum also concedes that there is limited knowledge of the biodiversity of the Gulf, and that there is a need for the development a comprehensive knowledge base for all biota (Hauraki Gulf Forum 2008).

The data on numbers of spotted shag at their roost sites contributes to the knowledge for this species in the Hauraki Gulf. Although this could be submitted for publication as a short note, its scientific value could be strengthened through a repeat of this survey. Confirmation of breeding population at the known breeding colonies is important, ideally with the colonies revisited during the 2012 nesting period.

Although spotted shags were known to roost on the mainland Thames coast, the high number of birds recorded was not anticipated. To investigate the significance of this site, historic records of the species observed on this coastline will be researched. For example, such records may be included in part in 'Classified summarised notes' published by the Ornithological Society of NZ (the notes are a complex collation of records, not species- or site-specific papers).

The status of seabirds in the Hauraki Gulf is being research through the Hauraki Gulf Seabird Observation Project, coordinated by Dr Matt Rayner (University of Auckland)and Chris Gaskin (Kiwi Wildlife/Natural Lines Consultancy). The spotted shag data will contribute to this regional project.

Recommendations
The failure to complete this project in its entirety within a single breeding season highlights the need to recognise issues associated with any ecological research that requires field sampling as part of its methodology. Field research can be impacted upon by adverse weather and variations in species' natural cycles. To obtain data that meets the ideals of the scientific method, repeated sampling will be necessary and may not always be achievable within a single season. Ecological research may not always conform to a fiscal year.

Publications and dissemination

- Ornithological Society conference, Tauranga 2-4 June 2012 – presentation of initial findings (roost distribution and numbers) as a poster. ACCEPTED.

Presentation of findings still anticipated for NZ Ecological Society conference (Lincoln 24-29 Nov 2012) and Unitec's Research Symposium and the Australasian Ornithological Conference (Auckland December 2013), though further field data is desirable for all of these. Publication of results certainly requires further field data.

References

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