

Envirolink Medium Advice Grant NLRC33

Outcomes from a Workshop on the Environmental Issues

Associated with Black Swan (*Cygnus atratus*) Populations on

the Aupouri Peninsula in Northland

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1. Introduction

The critical environmental issues arising from the presence and activities of black swan (*Cygnus atratus*) on the Aupouri Peninsula in Northland and the research needed to better understand these issues were gleaned from local land managers, farmers, and aquaculturalists in a workshop run by Northland Regional Council in Kaitaia in April 2007.

2. Background

The impact of black swan (*Cygnus atratus*) on terrestrial and aquatic ecosystems in Northland was reviewed by Landcare Research (JD Coleman) in 2006 for Northland Regional Council (NRC). The project was funded by the Foundation for Research, Science and Technology via its Envirolink programme for small advice grants (No. NLRC28). The report is now publicly accessible on the Web (<http://www.envirolink.govt.nz/reports/documents/218-Nlrc28ReviewOfBlackSwan.pdf>)

It concludes that:

- While much anecdotal information existed on the role of black swan in the environment, little research relevant to the species had been undertaken in New Zealand.
- The effects of black swan on aquaculture and agriculture in Northland and on the local natural environment should be further investigated before management plans are developed for the species.
- The nutrient input from black swan into lakes and estuaries should be assessed on a case-by-case basis.
- The impact of black swan on pasture should be assessed in a similar manner to that undertaken for Canada geese (*Branta canadensis*) in Canterbury high country (and recently reviewed by Landcare Research; Spurr & Coleman 2005).
- A research project to determine key research gaps in understanding the environmental impacts of black swan in Northland should be the subject of a medium-level Envirolink grant. Such a project should be based on a workshop involving key stakeholders in Northland and aim to document their perspectives of black swan in the region, and to rank future research needs and management options, including the social acceptability of these.

An application by NRC to the Foundation for an Envirolink medium advice grant to support a project to determine the views of local stakeholders on the research needs for black swan followed the completion of the initial review. This application was successful, and a workshop involving key local stakeholders interested in the activities and management of black swan in Northland was organised by NRC and held at Kaitaia on 18 April 2007.

3. Objective

To canvass the opinion of local stakeholders on the impact of black swan in Northland and identify areas of research likely to improve our understanding and management of the environmental impacts of black swan there.

4. Methods

The workshop was organised by NRC and attended by 27 people from the Northland Region, including NRC and Northland Fish and Game Council (Fish & Game) staff, aquaculture farmers, graziers, and game bird hunters. At the request of NRC, the characteristics of black swan and of Canada goose (*Branta canadensis*, see below) populations in Northland and their impact on local natural and managed ecosystems were prepared and summarised in PowerPoint presentations, to provide attendees with up-to-date information on both species, and a platform on which to develop their ideas for future research. The presentations included:

1. Black swan characteristics, population size and location, biology, damage, and management (Landcare Research – Jim Coleman)
2. Canada goose population trends, damage, and management (Landcare Research – Jim Coleman)
3. Black swan and Canada goose population trend data and management options (Fish & Game – Rudi Hoetjes).

The general discussion that followed dealt with issues strongly felt by attendees, arising from the presentations and from their knowledge of the numbers, distribution, impact, and management of both species in Northland.

The inclusion of comment on Canada geese in the presentations and in the discussion that followed arose from NRC's belief that both waterfowl species have recently colonised Northland, are seen as occupying the same or adjacent habitats and similar niches, are game bird species highly rated by hunters, and impact adversely and similarly on local terrestrial and aquatic environments.

This report summarises the topics discussed and lists the key research needs identified by those attending the meeting.

Such needs may, however, be affected by the recent change in status of black swan (declared a native bird and thus no longer an 'introduced' species), and the ongoing review of the game bird status of Canada geese. The first change is likely to result in changes in the way black swan are managed (M Gee, Department of Conservation, Head Office, pers. comm.), particularly their full protection when in national parks and reserves. However, Mr Gee believes they will continue to be listed in Schedule 1 of the Wildlife Act 1953 (and thus be able to be shot under licence by hunters on other Crown and private land), and be shot under special permit by landowners or authorised pest managers where they are deemed to be a nuisance. The second change may result in the Minister of Conservation removing Canada

geese from Schedule 1 (of the Wildlife Act), thus providing more options/opportunities for the management (and destruction) of the species throughout New Zealand.

Following the meeting, Jim Coleman, Don McKenzie (NRC), and Mike Knight (NRC) undertook an aerial inspection of the location and numbers of black swan and Canada geese on the farmland, lake, and estuarine areas of Aupouri Peninsula, and later Jim Coleman and Doug Foster (NRC) undertook a ground inspection of Mount Camel farm near Houhora, which was known to harbour large numbers of Canada geese.

5. Main Issues Raised by Attendees and Research Topics Identified

5.1 Issues raised by attendees

The validity of existing population ‘trend-count’ surveys and alternative methods of estimating population trends and total numbers of black swan and Canada geese

Northland Fish and Game have gathered trend-count data and used them to estimate crudely the number of black swan located north of Kaitaia (c. 2000 birds) and Canada geese north of the Mangamuka Range (c. 2000 birds). These data were disputed by several landowners (and not supported by our observations about Mount Camel) as bearing little relationship to populations of both species seen on or about their own properties, and are likely to seriously underestimate the numbers of both species present throughout the area¹. The consensus view amongst landowners and those involved in aquaculture seemed to be that counts of the entire populations of both species (as distinct from trend-counts) for the Aupouri Peninsula are both achievable and desirable. Population counts could be used to validate or refute trend-count data currently used in setting bag limits (currently 10 per day for both black swan and Canada geese) for recreational hunters of both species and justify the issuing of ‘special’ shooting permits to landowners and pest managers where birds of either species are deemed a nuisance. Count data would enable a better understanding of the birds’ current and likely future impact on managed ecosystems.

Faecal contamination of marine and freshwater

Faecal contamination of estuaries arising from large numbers of feeding or ‘loafing’ black swan and Canada geese, or from runoff from nearby bird-contaminated pasture, was argued to be a major source of contamination likely to put at risk future harvesting from commercial oyster farms and the harvesting by recreational fishers (particularly Māori) of other shellfish. In particular, high levels of *Escherichia coli* (faecal coliform bacteria), thought to be derived primarily but not necessarily solely from waterfowl, have in past years led to the temporary cessation of harvesting of oysters in Parengarenga Harbour. Any prolonged increase in faecal coliforms in estuarine waters was argued to be likely to jeopardise the future of aquaculture in the region, and the need to identify the source of such contamination was emphasised².

¹ This concern is understandable. Trend counts indicate population trends only, not total populations, and should not be used to indicate the latter. Trend counts record the numbers counted on count lines, which cover only a proportion of the available habitat.

² Harvesting of farmed oysters at several locations on the Aupouri Peninsula has recently (and once again) been curtailed due to high levels of coliform bacteria identified during the processing of the shellfish. The large number of black swan in the vicinity of the affected oyster beds is considered the likely source of the

Similar concerns were expressed over the contamination of pasture by faecal coliform bacteria (and ultimately of livestock) in areas frequented by large numbers of both species of waterfowl.

Based on periodic high faecal coliform counts in estuarine areas containing large populations of black swan and Canada geese, faecal contamination of dune lake systems also frequented by large numbers of the same waterfowl was predicted, and argued to be a growing conservation issue.

Overgrazing of pasture and aquatic vegetation

Social feeding by large and increasing flocks of black swan on the iconic (and until recently, largely intact) estuarine eel-grass communities and on adjacent terrestrial pasture, in line with tidal cycles, local flooding, and pasture flushing, is apparently now a feature of many coastal habitats. The example of the Paua Flats farmland where 1100 black swan regularly fed in 2006 is apparently replicated elsewhere, if at lower levels. Social feeding by Canada geese provides similar concern, and was substantiated by a visit by the authors to Mount Camel that revealed 600 geese grazing on pasture close to a dune lake. However, the direct consequences of overgrazing and the resulting degradation of eel-grass communities and loss of pasturage (concerns to conservation managers and farmers respectively) are unknown but widely speculated on, although Northland Fish and Game report some concomitant local declines in black swan populations. Similarly, the indirect consequences of such overgrazing (e.g. heavy fouling, loss of native species, and encouragement of adventive species) are unknown.

Management options for black swan and Canada geese

Recreational hunters of waterfowl argued both black swan and Canada geese are important local recreational resources, and that where numbers of either species were deemed by land managers to be too high, recreational hunters should be given the opportunity to reduce the bird populations to targeted levels prior to any 'official control'. This position was held despite the recent change in status of black swan and the ongoing review of the protected status of Canada geese, and the involvement of local recreational hunters in the release of Canada geese (70–80 birds, W. Waters pers. comm.) onto Aupouri Peninsula in the late 1980s. To increase their hunting effectiveness, recreational hunters argued for special out-of-season and if necessary year-round permits to increase hunting pressure; for the return in availability of lead shot, which apparently provides for greater kills of waterfowl; for increases in game bag limits (see above); and for easier access to hunting sites on private land. Similarly, landowners sought to continue to qualify for 'special shooting permits' available to control black swan and Canada geese when numbers of either species on their land are thought to be reducing farm productivity. A similar case was made by landowners for the improved management of paradise shelduck (*Tadorna variegata*), which also reach high numbers and are thought to adversely affect farm productivity in some areas of Northland.

Other issues

Several other issues likely to affect the future impact of black swan and Canada geese in Northland were raised in the formal presentations. They included the productivity, longevity, and dispersal potential of both species, eutrophication of aquatic areas arising from overgrazing and nutrient enrichment (defaecation) by both species, the ability of both species

contamination. The ban on harvesting is expected to impact significantly and adversely on the local aquaculture industry.

to carry and disseminate a range of diseases transmissible to livestock and humans, the consequences for other native waterfowl of large numbers of black swan and Canada geese in aquatic habitats, and alternative methods of control of both species and their acceptability to the general public. None of these issues were raised in the discussion that followed the presentations.

5.2 Research topics identified

Population estimation

- Determine the factors likely to influence local aerial counts of black swan and Canada geese, including the use of seasonally preferred habitat (i.e. mangrove, eel-grass flats, pasture, and dune lakes), vegetation cover, weather, time of day, and observer variability.
- Develop a protocol involving local stakeholders and agencies for achieving robust, regular, total counts of black swan and Canada geese across the Aupouri Peninsula, based on ‘best practice’ identified above to:
 - (i) Provide count data complementary to that obtained by Northland Fish and Game for the same species
 - (ii) Rebuild ‘local credibility’ in trend-count data
 - (iii) Provide data for use in modelling population growth trends and population size of both species.

Impacts on water quality

- Establish/upgrade/extend existing monitoring systems undertaken by NRC and the National Institute of Water and Atmospheric Research (NIWA) for faecal coliform bacteria counts and their ‘typing’ about aquaculture sites, and relate this to total counts of black swan and Canada geese in the same area to establish the birds’ role in such contamination.
- Confirm the suitability of NIWA water quality monitoring programmes for faecal contamination by black swan and Canada geese in dune lakes in the light of growing populations of black swan and Canada geese.

Overgrazing of pasture

- Document the patterns of use and diet of black swan and Canada geese on grazing lands.
- Using this information, data from exclosures, and local bird-trend-count data, determine the intake of pasture species and biomass by grazing black swan and Canada geese to predict both current and future losses in farm productivity.

Overgrazing of eel-grass sites

- Document the patterns of use and diet of black swan and Canada geese on eel-grass in local estuaries.
- Using this information, data from exclosures, and local bird-trend-count data, determine the intake from eel-grass communities by grazing black swan and Canada geese, and predict both current and future losses in biomass and biodiversity.

Recreational hunting of waterfowl

- Provided recent and proposed changes in the legislation permit it, establish replicated field trials to document the effectiveness of recreational hunting as a control option for the successful management of both black swan and Canada geese.

- Assuming Canada geese are removed from the game bird listing, review the effectiveness of moult culls as a means of controlling local populations, and review the likely acceptability of the practice to the public.

6. References

Coleman JD 2006. Review of information relevant to the impact of black swan in Northland. Landcare Research letter report. 6 p. (<http://www.envirolink.govt.nz/reports/documents/218-Nlrc28ReviewOfBlackSwan.pdf>)

Spurr EB, Coleman JD 2005. Review of Canada goose population trends, damage, and control in New Zealand. Landcare Research Science Series No. 30. 31 p.