



# **Seabird Behaviour**

Part Two

A Biology Programme for  
Secondary Students  
at the **Royal Albatross Centre**

**Student Worksheet 2011**

## Human Effects on Breeding Behaviour

### ***Issue #1: Does tourism affect breeding behaviour?***

Managed viewing of the Royal Albatross by the public began in 1972 and although not directly affecting albatross productivity there have been some impacts.

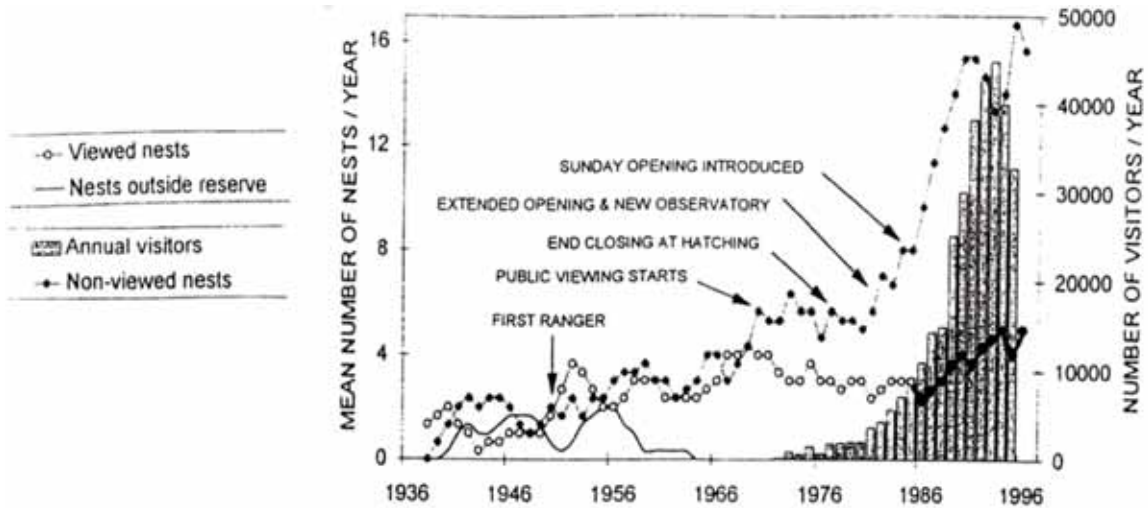


Fig. 1. Location of Royal Albatross nests (3-year running mean) in relation to the public observatory site and visitor numbers at Taiaroa Head Nature Reserve, 1936–1996.

1. Based on the graph above, comment on how the nest numbers have changed over time?
2. How has the proportional distribution of nests in view and nests out of view of the observatory changed?



**Issue #2: When should the public viewing be restricted?**

**In order to reduce the impact of human interference with the birds' breeding attempts – access to the observatory is restricted during certain times of the year.**

Pair bonding and egg laying are most sensitive to human interference.



**Based on the annual cycle, when would you recommend that the Observatory be closed for public viewing to avoid the period when the birds are most sensitive to human interference?**

**There is up to a two week variability in egg laying dates from year to year. What environmental conditions might affect the timing of egg laying?**

**What impact would that have on your recommended opening and closing dates for the observatory?**

**How might the public disturb the birds? Who else might disturb the birds?**

***Background Information:***

***Effect of natural disasters on breeding birds.***

**The reduction in soil and vegetation cover (up to 80%) at the Chatham Island colonies has resulted in a rocky, desert-like landscape with poor water retention and little soil or vegetation for nest construction. Although the exact causes of the habitat changes are unknown there is evidence that weather events may have been primarily responsible.**

The 1994 storm (gusts of 188 km/h) caused loss of eggs (9%) and incubating albatross were blown off nests. The storm in 1985 destroyed the albatross's nesting habitat. Following these storm events egg losses of over 50% have been recorded and the percentage of nests producing fledglings has been as low as 3% in some years.

Higher nesting densities have been recorded in the breeding seasons following storm events.

**Issue #3: How does climate affect breeding behaviour?**

**Since 1970 the climate both at Taiaroa Head and at the Chatham Islands has become warmer and drier, consistent with the warming trend in NZ**



Fig. 3. Mean annual surface temperature anomaly (variation from the mean) and trend for New Zealand, 1853–1995 (10-year running mean). Information supplied by National Institute of Water and Atmospheric Research Ltd.

How do you think an increase in temperature might affect the following:

- Building of nests (with soft vegetation):
- Chick hatching:
- Adults sitting on nest incubating /guarding eggs:

**What might happen to Albatross at Taiaroa Head if temperatures continue to increase?**

**What is the main vegetation at Taiaroa Head and is it natural?**

**What would happen if it was restored to the original vegetation?**

**What could be planted on the headland to help nesting albatross during high temperatures and to reduce moisture loss?**

**Issue #4: What is causing egg shell thinning at the Chatham Islands?**

**Egg shell thickness measured at the Chatham Island (1993-95) was 20% less than the same location in the 1970's, No similar change has occurred at Taiaroa Head where the density of nesting birds is much lower.**

Albatross are predatory/scavenging birds who feed at the top of the marine food chains and therefore can be expected to accumulate relatively high concentrations of organochlorines. In North Pacific albatrosses, high concentrations of PCB's and PCDDs have been recorded, which have been suggested to be sufficient to cause reproductive impairment. The observation of reproductive deficiencies (including egg shell thinning) in albatrosses at the Chatham Islands, resulted in a study being undertaken examining the levels of organochlorine pollutants in these birds.

**Table 3.** Comparison of the levels of PCDD/F, PCB and selected organochlorine pesticides in Northern Royal Albatross from Taiaroa Head and Chatham Islands vs. Northern Pacific Albatrosses.

	Northern Royal Taiaroa Head <sup>1</sup> /g wet weight	Northern Royal Chatham Is. <sup>2</sup> /g wet weight	Laysan alb. Midway Is. <sup>3</sup> /g wet weight	Black-footed alb. Midway Is. <sup>3</sup> /g wet weight
PCDD/F I-TEQ	1.12 pg	1.02 pg	19.4 pg	37.4 pg
PCB I-TEQ	7.78 pg	5.03 pg	30.7 pg	86.6 pg
PCBs total	49.5 ng	33.7 ng	198.5 ng	688 ng

**How do the levels of PCBs and PCDDs compare between the Taiaroa Head population and the Chatham Islands population?**

**And how do they compare with the levels of PCE's and PCDD's with the North Pacific Albatross?**



**No egg shell thinning was reported at Taiaroa Head. Do you think organochlorine contaminants are responsible for egg shell thinning in albatross from the Chatham Islands?**

**What factors might have caused the egg shell thinning in the Chatham Islands albatross population?  
(Think about what has changed at the Chatham Islands since the 1970's)**