

# Preliminary Report and Proposal for Monitoring Birds in relation to Proposed Harvesting of Clams by Rainbow Seafoods

## Overseas studies

Overseas work, especially in the Wash in the UK and Wadden Zee in Holland has shown an adverse effect of harvesting on wading birds' food supplies. Most of the work has been done on oystercatchers whose diet can consist of upto 100% cockles or similar shellfish and could well be relevant here as the New Zealand pied oystercatcher is very similar. For basic information on feeding of pied and variable oystercatchers and bar-tailed godwits see *Battley & Brownell 2007*.

A lot of work has also been done on changes in the fauna in disturbed, harvested areas; basically you get an increase in the proportions of more ephemeral, early colonisers as the finer particles in the beds are removed and coarser less aggregated, particles remain, resulting in a less stable sea bed. Some work has been done on the relevance of these changes to food resources and availability for waders including godwits. e.g. *Atkinson et al. 2005, van Gils JA et al, 2006, P. N. Ferns et al, 2000*.

Maintaining a supply of the size of cockle preferred by European oystercatchers has been shown to relate to the minimum size limit for harvesting; a larger minimum size limit appears to be the better option. Partly as a result of this selective feeding and factors affecting prey availability, it appears that the quantity of food resource that should remain after harvesting is upto almost eight times that required to fulfil the birds' demands. *J. D. Goss-Custard et al., 2003*.

Other observations suggest that bird numbers increase immediately after harvesting as birds pick up damaged prey or that revealed by disturbance, but that numbers subsequently fall below pre-harvesting levels and take anything from 80 days to over a year to return to those levels, depending on the bird species involved. *P. N. Ferns et al, 2000*.

Perhaps the most important conclusion to come out of recent overseas literature is that setting aside areas where no harvesting is allowed, does not appear to lead to an overall improvement in survival and condition of oystercatchers because their strong sense of site fidelity means they do not move from harvested to non-harvested areas. *Verhulst, S. et al.2004*.

How many of these issues are relevant to the New Zealand situation is difficult to know, especially as much of the research done overseas is in areas where harvesting has been taking place for hundreds of years and the situation is far from natural.

Frances Schmechel has attempted to look at this in *Potential impacts of mechanical cockle harvesting on shorebirds in Golden and Tasman Bays, New Zealand; DOC SCIENCE INTERNAL SERIES 19*. where she summarizes many of these issues and reviews much of the literature. Her focus is on mechanical harvesting but many of the basic interactions may still apply to less invasive forms of harvesting proposed in this application. Assessments of the effects of hand-harvesting are harder to come by though *McLaughlin, E. et al., 2007*. is helpful and suggests that low level hand-harvesting is sustainable.

**What is missing from Schmechel's review and in fact in New Zealand, is an assessment of the relative size of the resource overseas and in NZ, the relative numbers of birds and consequently the role of density dependant factors in the equation.** A basic bird monitoring regime along with the assessment of cockle densities as is proposed here will help to answer this important question. A cursory look would suggest that densities of clams are higher and oystercatcher numbers are lower in New Zealand but I would not even like to venture a cursory glance at the godwit/ prey situation.

## Otago Harbour Baseline Data

There are very few published accounts of birds in Otago Harbour. The Ornithological Society of New Zealand has organised a biannual, summer & winter, count of waders over most of the country since the 1980's and the earlier counts for Otago Harbour have been summarised by *Sagar P.M. et al 1999*.

Fortunately the local Ornithological Society has an excellent archive which has up to date results for these biannual wader counts, monthly counts of all the bird species in Otago Harbour carried out in 1977/78 and 1988/89 and a collection of incidental observations. Both the wader counts and the Harbour surveys were done over high tide, but combined they give a good idea of the numbers and species present in the harbour and the monthly counts, although somewhat dated, still give a good indication of major seasonal trends. There is a possibility that the Society will carry out another harbour survey next year.

The most numerous species and those that are likely to be present in the proposed harvesting area are South Island Pied Oystercatcher *Haematopus ostralegus*, Bar-tailed Godwit *Limosa lapponica*, Black-backed Gull *Larus dominicanus*, Red-billed Gull *Larus novaehollandiae*, Black-billed Gull *Larus bulleri* and White-fronted Tern *Sterna striata* with smaller numbers of Little Shag *Phalacrocorax melanoleucos*, Black Shag *Phalacrocorax carbo*, Black-fronted Tern *Sterna albobristata*, White-faced Heron *Ardea novaehollandiae* and Variable Oystercatcher *Haematopus unicolor*. Of these species, Pied Oystercatchers and Variable Oystercatchers feed to a large extent on clams, Bar-tailed Godwits feed on other invertebrates living within the clam beds and the three gulls and the heron feed on a wide variety of food found at times within the proposed harvesting area. Red-billed Gulls hang around feeding oystercatchers and steal opened cockles when they are brought to the surface. The terns and shags feed in the shallow water over and around the banks. All species are likely to use the banks for roosting.

Although this information is helpful and the ongoing wader counts could provide an indication of trends throughout the Harbour, there is very little data available for low tide and none on the birds of the proposed harvesting areas. It would therefore appear essential to carry out a baseline survey and I propose that the areas be surveyed over low tide approximately every two weeks for at least a year. It would be useful to time these visits to include neap and spring tides.

The birds would be best observed from a distance, as walking around on the banks and even approaching closely in a boat disturbs them and interferes with feeding patterns and obtaining data on usual feeding areas and patterns is obviously essential for this study. The issue of disturbance by harvesting of wading birds over low tide is unlikely to be important as clam harvesting takes place in water depths of 25-110cm., never over the three hours of low water when the banks are exposed and wading birds, in this case Pied & Variable Oystercatchers and Bar-tailed Godwits are feeding. For a measure of disturbance that impacts upon survival and fitness of wading birds see *J.D. Goss-Custard et al 2005*.

The area to the west of Quarantine Island (1805) can be watched easily through a telescope from Wickcliffe Terrace on Port Chalmers headland, but the eastern bank (1804) is more problematic. I hope to obtain permission to view it from private land on Acheron Point when a similar survey technique as proposed below will be possible but, failing this, less detailed information on the total numbers and species present can be obtained in good viewing conditions from the road.

A method of locating these distant bird observations in relation to the proposed harvesting and sanitary areas is required. For area 1805 Figure 1 shows the proposed initial harvesting and control areas and the bird survey sectors. The boundary lines between the sectors (green) delineate the banks that emerge from the water at neap tides with some adjustment to allow for the inclusion of the proposed harvesting areas (orange) and ease of recognition to prominent features on the far side of the harbour.

Identifying the harvested areas from a distance is also necessary. Some form of small post at the corners of the site is a possibility but the methods have yet to be finalised.

All species occurring over, on or adjacent to the banks exposed at low tide in each sector and in the harvested areas will be counted. Whether the bird is roosting or feeding will be recorded, notes taken on feeding behaviour and as a measure of distribution for oystercatchers, whether they are feeding in the water, at the water's edge or on the dry bank.

A check on the situation at higher stages of the tide should also be made because the area may be used by feeding terns, shags and gulls. Several visits by boat at low tide would be useful to ensure that the observations from the shore are not missing anything.

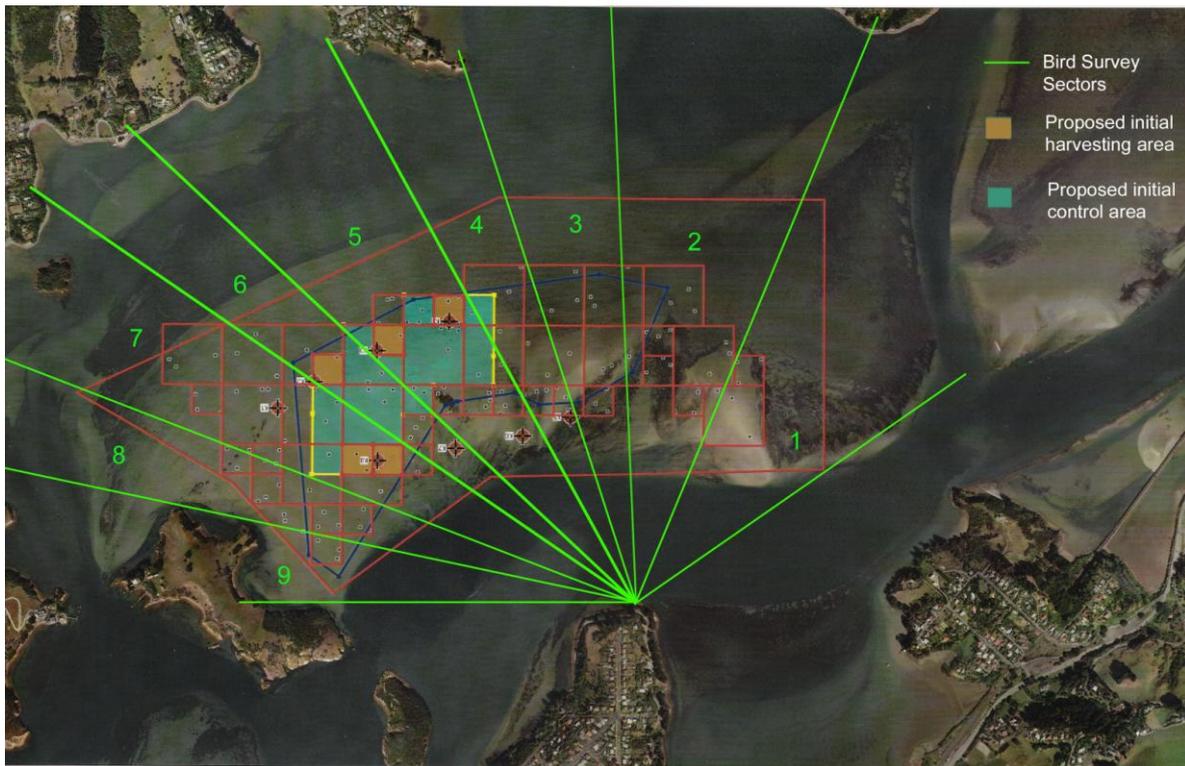


Figure 1 Proposed bird survey technique for area 1805

Ideally, monitoring of at least basic data on the species and numbers of birds using the banks should continue for as long as harvesting is carried out. Due to the paucity of baseline data the monitoring regime should be regularly assessed and adapted if necessary as more information becomes available. The basic monitoring regime may indicate areas where further research is required. For example, an investigation of prey selection and preferences of oystercatchers and godwits may prove useful. However detailed work like this may be better carried out in a more accessible and easily observed population like Blueskin Bay.

#### **Assessment of the effects of harvesting**

Ryder Consulting Ltd intends to survey three of the harvested areas and a control area close by as soon as practicable after the conclusion of harvesting, preferably the same day or next day. They will also carry out a second survey of the same area no more than 40 days after harvesting. It is not clear how often they intend to carry out this work but it would be sensible if the birds were surveyed in the same areas at a similar time.

As it seems likely that harvesting will start before one full year's baseline information has been gathered, the comparison of harvested with un-harvested areas would become a standard part of the fortnightly survey.

For two of the key species, Pied Oystercatcher and Bar-tailed Godwit, the Ornithological Society counts allow comparison of the Otago Harbour trends with national trends. An assessment of the importance of the harvesting areas to these two species would be possible with the proposed survey and, after harvesting begins, any changes in the distribution of the species across the two banks can be monitored. Levels of change that may require re-assessment of harvesting regime will become clearer when variation in baseline counts are apparent.

Assessment of the other species, notably gulls, terns and shags relies on the fortnightly counts and observations of behaviour and numbers in harvested and un-harvested areas.

## Summary of Bird Monitoring

1. Gather base data on total numbers and species using areas 1805 and 1806 over the 3 hours around low tide, initially every week during December 2008, to assess any differences in use over neap and spring lows, then every two weeks at low springs or appropriate tides over 2009 and subsequently for as long as necessary.
2. Gather more detailed base data on the distribution of birds over the exposed banks in area 1805 using divisions shown in Figure 1 by observing from the high vantage point at Wickcliffe Terrace, Port Chalmers. The sectors are aligned with the proposed harvesting areas so that a comparison can be made between numbers and species in sectors including harvested and non-harvested areas. Repeat for 1806 if a suitable observation point can be found.
3. At the start of harvesting:
  - i) Mark the limits of the harvested areas in 1805 with suitable posts/poles that can be seen from Wickcliffe Terrace (technique yet to be agreed upon and trialled)
  - ii) Count numbers and species in marked areas immediately after harvesting and compare with non-harvested areas. The timing of counts will be coordinated with Ryder Consultant's sampling to avoid effects of disturbance. Continue to count marked areas as part of the fortnightly surveys. Repeat for 1806 if a suitable observation point can be found.
4. All observations to be supplemented where possible, by basic information on feeding and roosting behaviour by the most numerous species; South Island pied oystercatcher, variable oystercatcher, bar-tailed godwit, red-billed and black-backed gulls and any other species that are found to occur regularly.

This monitoring regime along with other available local information should allow:

1. A comparison of trends of numbers of waders using Otago Harbour with the national trends as recorded by the biannual Ornithological Society counts.
2. A comparison of trends of numbers of waders using areas 1805 and 1806 with trends of numbers recorded by biannual Ornithological Society counts for Otago harbour.
3. For bird survey sectors 1-9 in area 1805 and for 1806 if data is available, a comparison of numbers and species in sectors including harvested areas with non-harvested sectors.
4. Within bird survey sectors 1-9 in area 1805 and for 1806 if data is available, a comparison of numbers and species using marked harvested areas with non-harvested areas.
5. A comparison of behaviour, especially basic feeding techniques, in harvested and non-harvested areas.
6. An assessment of any correlations between bird numbers and species with data from samples collected by Ryder Consultants.
7. A preliminary assessment of impacts of harvesting upon birds using the banks and the necessity or otherwise for further work.

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