

POP2014-02 Objective 1A

Black petrel population estimation research

This paper aims to generate discussion and input in order to develop a research plan to deliver upon project POP2014-02 Objective 1A of the [Conservation Services Programme Annual Plan 2014/15](#).

Ongoing black petrel monitoring and research has been undertaken at the main colony on Aotea/Great Barrier Island annually since 1995 (e.g. see Bell et al 2011; 2013). Black petrel breeding burrows are known outside the main breeding colony of Hirakimata, but no systematic survey has been conducted.

One key area of uncertainty identified in the recent fisheries risk assessment of Richard & Abraham (2013) was the total population size (i.e. for Aotea/Great Barrier Island and Hauturu/Little Barrier Island).

Recent work by Ed Abraham (Dragonfly Ltd) under contract to MPI in support of updating the seabird risk assessment of Richard & Abraham (2013) has analysed band recovery data from bycaught birds as well as the findings of Spear et al (2005). Initial findings from this work suggest the total population size for the species could be considerably larger than that estimated for the main study colony on Great Barrier Island, which was used in previous risk assessment work.

This project aims to identify a programme of field research, for implementation in 2014/15, and other years if necessary, to estimate the total population size of black petrels.

Note, other areas of related research interest to CSP, included extending current monitoring at the main study colony to better estimate adult survival and GPS tracking to better estimate fisheries overlap are not considered further here.

A number of methodological approaches are outlined below for discussion of relative merit and priority. Ideas for alternative approaches are welcomed.

Key points for consideration include:

- Effectiveness
- Cost
- Logistical / personnel constraints
- Time scale
- Synergies with other work

Methodological approaches include:

1. Ground transect surveys

a) Additional transects within the main colony on Great Barrier Island to reduce the uncertainty of current estimates.

b) Conduct transects outside of the main colony on Great Barrier Island to estimate population size in other sites of potential significance, as identified by Bell et al (2013).

c) Conduct a habitat stratification map across all candidate breeding areas on Great Barrier Island using the classification described by Bell et al (2013) to prioritise areas for ground survey.

d) Conduct transects on Little Barrier Island in order to estimate the size and relative importance of this colony.

e) Assess the current level of use in the known study burrows on Little Barrier Island and compare these data to Imber's earlier estimates (1970's & 1980's) using these burrows.

2. Ground-surveys using seabird-detection dogs

Conduct ground surveys across Great Barrier Island and Little Barrier Island using seabird-detection dogs to determine areas of black petrel habitat and whether burrows in these areas are occupied by black petrels.

3. Acoustic monitoring

This technique has the potential for surveying a much wider area, primarily to identify areas of potential breeding habitat for future ground transects. Potential breeding areas on Great Barrier Island and Little Barrier Island could be monitored using acoustic recorders.

4. At sea tracking

As used recently with New Zealand storm petrels capture and tracking of birds at sea can identify bird movement to breeding colonies, and identify unknown breeding sites. An assessment of the proportion of birds tracked to the main study colony on Great Barrier Island to birds tracked to other colonies could also be used to estimate the proportion of total birds using the main colony.

5. Mark recapture: colony/at sea

a) By visibly marking birds at the colony and then undertaking at sea recapture observations an estimate of total population could be made. While this technique is relatively economical at the marking stage it could potentially be resource intensive for recaptures/observations. Commercial and recreation fishers have expressed interest in assisting with this kind of surveying. Biases due to potentially disproportionate age/sex class marking need to be considered carefully.

b) Capture of birds or detailed observations could be conducted at sea to determine presence or absence of metal bands on birds, providing a larger sample size than that from bycaught birds to apply the mark-recapture methods recently developed by Ed Abraham. As above, commercial fishers have expressed an interest in this type of project.

References

- Bell, E.A., Sim, J.L., Scofield, P., Francis, C. 2011: Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10. Research report for Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/conservation/marine-and-coastal/conservation-services-programme/csp-reports/archive/2009-2010/population-parameters-of-black-petrels-on-great-barrier-aotea-island-2009-10/>
- Bell, E.A., Sim, J.L., Scofield, P., Francis, C., Landers, T. 2013. At-sea distribution and population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2012/13. Research report for Department of Conservation, Wellington. Available for download from <http://www.doc.govt.nz/conservation/marine-and-coastal/conservation-services-programme/csp-reports/2012-13/black-petrel-at-sea-distribution-and-population-estimate-2012-13/>
- Richard, Y.; Abraham, E.R. 2013 Risk of commercial fisheries to New Zealand seabird populations. New Zealand Aquatic Environment and Biodiversity Report No. 109
- Spear, L B; Ainley, D G; Webb, S W (2005). Distribution, abundance, habitat use and behaviour of three *Procellaria* petrels off South America. *Notornis* 52(2): 88-105.