Department of Conservation
Te Papa Atawhai

Meeting: **Salvin's albatross Bounty Islands: methodology development workshop report (CSP Project POP2016-06)**

Date: 28 November 2016
Time: 10.00 am - 3:00 pm
Place: Meeting Room 13.3, Nokia House, 13-27 Manners St, Wellington.
Chair: Igor Debski (ph: 027 201 3607; email: idebski@doc.govt.nz)
Support: Freya Hjörvarsdóttir (DOC; fhjorvarsdot@doc.govt.nz)
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BACKGROUND

Salvin's albatross is one of the seabirds identified as at highest risk from commercial fishing in New Zealand. The Conservation Services Programme (CSP) seabird medium term research plan has identified the need for additional population and tracking data for this species to inform fisheries management actions to avoid, remedy, or mitigate the risks posed.

Recent population estimates of Salvin's albatross at the Bounty Islands (part of CSP project POP2012-06) using ground and aerial methods found contrasting evidence in regards population trend. The at-sea foraging distribution of this population is described from only a small sample size of individuals due to device failure in a recent study (also part of POP2012-06).

This workshop formed part of a project (POP2016-06) to develop a methodology to address the key data gaps identified. It is envisaged that the research plan developed will be proposed for delivery as part of CSP in 2017/18.

Objectives

The objective of this workshop was to provide advice on a methodology that can be used to:

- provide an updated population estimate of Salvin's albatross at the Bounty Islands;
- compare the updated estimate to previous estimates to determine population trend; and
- collect a representative sample of at-sea foraging distributional information.

The data collected must be suitable for use in fisheries risk assessments.

The following aspects were also considered by participants during the workshop:

- Methods to address potential future data requirements for the management of fisheries impacts on Salvin's albatross, e.g. allow for routine and comparative population estimates and allow population trend to be monitored.
- Health and Safety issues and cost-effectiveness at this remote and difficult to access site.
- Options to extend a research programme addressing the key objectives above to also provide estimates of key population parameters including adult survival (identified as a priority research area in the CSP seabird plan).

Resources

The following summary documents were compiled as a starting point to assist discussions:

- Summary of previous key research, including recommendations
- Summary of relevant tracking devices available
- Summary of relevant drone studies

WORKSHOP DISCUSSION AND RECOMMENDATIONS

1.1 Population estimate and trend: breeding pairs vs total birds

- Annual breeding pairs is the currency that everyone uses to estimate population size.
- There has been some research considering the behaviour of non-breeders to see if they are coming to colonies daily, when they are coming and any day, time and weather effects.
- Numbers of non-breeders should be relatively low just after the time of egg laying.
- If we survey early in the season and consistently through the years, then total pairs will be a better estimate of breeding pairs compared to a later survey.

Advice: Use breeding pairs as the measure of population, and time surveys to minimise uncertainty into the status (breeding/loafing of birds on the ground.

1.2 Population estimate and trend: full census vs study area, aerial vs ground

- If logistics and cost is put aside, a full count of the total breeding population would be preferable.
- Not feasible to do full census study with ground surveys due to inaccessibility of some islands.
- Difficult to find a suitable aircraft for the Bounty Islands. There are some that could do the survey, but with no passengers, only a mounted camera. The air ambulance is the best option at this stage, most cost effective and the safest.
- An aircraft that has the capability of carrying a vertically mounted high resolution camera that could fly transects would be preferred.
- The biggest problem with the air ambulance is that it can't fly any slower than about 120 knots. Other aircraft such as a DHC-6 Twin Otter or a Cesna 206 can fly as slow as 80 knots, but they don't have the duration that the aircraft currently used by the Flying Doctor Service (Cessna Conquest II).
- Aerial surveys in 3D makes it easier to tell if the bird is on a nest or loafing.

- The availability of suitably high definition cameras is limited across current aerial survey providers in New Zealand.
- Important to look at the area occupied by breeding birds as there is an increasing occurrence of fur seals, which must have changed the breeding area available to Salvin's albatross.
- Would be relatively easy to use satellite images to create a 2 dimensional map of the islands, onto which areas of occupancy as identified from oblique aerial photographs could be mapped. Would require new updated satellite images of the island as the older ones are not particularly good.
- Note there may be considerable waiting time for good satellite images because of cloud cover etc.
- Could do aerial count of all the Bounty Islands and then do ground counts on Proclamation Island, which has been done before.
- If study sites are used there should be consideration of choosing some sites which aren't core areas.
- Proclamation Island has the most data for a very good reason, easiest access. It is possible to land elsewhere but much harder.

Advice:

- **Supporting the aerial survey with ground truthing would be the best approach to estimate population size.**
- **Series of aerial surveys is the best method to determine if there is a multi-year trend in population size and then the question about why the change is happening could be monitored through a study area.**
- **If study sites are used it will be important to select a few sites, could be dangerous just to rely on one.**
- **Map occupancy from aerial photographs on satellite image-derived maps of Bounty Islands. Will allow for future monitoring of any changes.**

1.3 Population estimate and trend: aerial photographic survey vs vessel/ground based drone methods

- Based on experience of panel members, readily available drones are not practical at present. The main issue with drones is that most of them don't have very long flight durations or the capacity to carry heavy high quality cameras. Also, the winds at Bounty Islands are strong, which the drones might not be able to take and if they come down, retrieval will be difficult or impossible.
- The terrain on Bounty Islands is far from flat and it would be hard to control the drones.
- There is a risk of bird collision

Advice: at this stage drones are not feasible, so aerial photographic methods are recommended. Further review of emerging drone options recommended.

1.4 Population estimate and trend: timing and protocols for preferred methodological approach.

Advice: the optimal time for aerial census would be mid to late September (last 10 days).

2.1 At-sea foraging distribution: life stages to describe

- Autopsy work shows that all the birds caught in commercial fisheries are adults.

- Breeding and non-breeding adults are both of interest. If we can track them concurrently that would be interesting. The extent to which such data would improve risk assessments was not quantified.
- Non-breeding birds that aren't tied to a nest could go to areas where different fishing pressure applies compared to breeding adults, previously the only life stage tracked. The extent to which such data would improve risk assessments was not quantified.
- Would be very useful to look at chick survival as juvenile survival is high uncertain for many seabirds and can great influence risk assessment model results (e.g. black petrel).
- If we could get tracking tags that last for long enough, we could look at chick survival and foraging distribution of juveniles (an age not predominant in observed bycatch in New Zealand fisheries).
- A banding programme may be better for estimating juvenile mortality. Planning on collecting GLS tags after many years will probably result in low retrieval percentage.

Advice: both breeding and non-breeding adults are the most important life stages to track to describe and understand New Zealand fisheries impacts.

2.2 At-sea foraging distribution: sample sizes

- Ideally 30 would be a minimum sample size. Sample sizes for cheap GLS devices should be maximised (e.g. 50).
- A lot of field work time should be invested in the year after deployment of the loggers to maximise retrieval of non-transmitting devices - the longer the time from deployment, the more unlikely it is to retrieve them.

Advice: aim for a sample size of 30, with a minimum sample of 20 per age/breeding class.

2.3 At-sea foraging distribution: GLS vs GPS vs PTT

- Retrieval rates of GLS from non-breeders is likely to be low, so transmitting devices are a more suitable option.
- Of transmitting devices, PTT is better proven and we could be fairly confident that they will work, but we might have some problems with transmitting GPS.
- Solar powered tags will be good because if they can stay on for a long time they will collect a longer period of data. If deployed during the September trip, the birds have fresh good quality feathers, so attachment for at least 5-6 months will be possible.
- Transmitting devices could be taped/glued to the tail feathers, might get you data for up to a year compared to 6 months when taped/glued to the back.
- Researchers currently using transmitting devices on seabirds should be consulted to ensure the tags used are adequately proven.
- Any unproven transmitting device could easily be tested on northern royal albatross at Taiaroa Head, with a high chance of retrieval.

Advice:

- **Deploy a relatively large sample size of small cheap GLS tags on both adult breeding and non-breeding birds to obtain year-round foraging data**
- **Deploy a smaller sample of transmitting devices on some of the birds carrying GLS devices to obtain high resolution foraging data during the breeding period when risk from New Zealand fisheries is highest.**

3.1 Other considerations: collection of demographic data

- It would be easier to collect demographic data at the Western Chain, Snares, rather than the Bounty Islands. A helicopter could be used to drop people off at the island, which is effective and reduces the cost a lot.
- Data from Western Chain is unlikely to be representative of the whole population, particularly as they seem to have different foraging areas, and thus exposed to different risks. Data could be used for a Western Chain specific risk assessment.
- Would be hardest to estimate juvenile survival and recruitment on the Bounty Islands. Might be better to estimate these parameters on the Western Chain as it is much more accessible.
- The possibility of using PIT tags and automated readers was considered, but current technology is not suited for deployment at a site as remote as the Bounty Islands.

3.2 Other considerations: remote camera monitoring at nest sites to collect demographic data

- Has the potential to collect very useful demographic data.
- One system that could be used is the Gigapan camera, which is currently being used to monitor shy albatross.
- Camera systems are best suited to collect data on breeding success, which is a limited subset of demographic data.
- From CSP view, the most important information we want is adult survival.
- We could also look at in-season survival by (for example) colour marking the birds. However, a large sample size would be needed as within-season survival rates will be low, thus requiring more statistical power compared to survival over multiple years.
- Should investigate the possibility of using alphanumeric banding on the birds for individual recognition. However, the likelihood of being able to detect bands from the photos was uncertain.
- Would be hard to have the photos sent through satellites because the images would be very big, so systems have to be able to store data and be visited again to retrieve data.
- None of the systems are currently at the stage of development and reliability that it could be deployed at the Bounty Islands in 2017, though Gigapan is close.
- Normally the batteries are not the problem, but the size of the memory cards. However, we can get cards up to 128gb and some cameras have two memory card slots.
- A system that would switch off between breeding periods would be more effective to reduce data storage and power requirements.
- It would be more feasible to install a system on the Western Chain. Easier access and more cost-effective. Trials could also be conducted on other species with easier access, such as Buller's albatross at the Snares.

Advice: Remote cameras are not an immediate solution for sites such as the Bounty Islands as it's an emerging technology. Further development and trials are encouraged.

3.3 Other considerations: Snares Western Chain population monitoring

- An aerial survey of the Western Chain population should also be considered to compare with the Bounty Islands.

- If surveying Western Chain by helicopter extra people could be taken who could be dropped off for some ground work while the helicopter does the aerial survey (cost effective).
- Identify whether space, nest materials, or other factors may be limiting breeding success.

4 Summary recommendations for a research programme to deliver on the CSP Objectives outlined for the workshop:

- Two year project.
- Satellite mapping of island to allow area of occupancy to be quantified.
- Aerial photographic survey in year 1 (and ideally repeated in year 2) to estimate total number of breeding pairs and area of occupancy.
- Aerial survey conducted in late September.
- Ground visit in both years, coinciding with aerial survey to allow ground truthing.
- Focus on GLS deployments in year 1, with trial PPT/GPS transmitting device deployment.
- Focus on GLS retrieval and additional PPT/GP transmitting device deployment in year 2.
- Identify any potential constraints limiting breeding success.
- Band and resight birds with potential to establish a study site area on Proclamation Island (easiest access and most existing data).