



Meeting: Conservation Services Programme Technical Working Group  
Date: 9 July 2026  
Time: 10:00 am – 11:30 am  
Place: Microsoft Teams Meeting  
Chair: Kat Manno (Technical Advisor, Marine Bycatch and Threats Team)

**Attendees:** Kat Manno, Johannes Fischer, Hollie McGovern, Tiffany Fischer, Graeme Taylor, Hendrik Schultz, Igor Debski (DOC) Biz Bell, Simon Lamb (WMIL), Chris Gaskin (Northern NZ Seabird Trust), Peter Frost (Science Support Service), Kalinka Rexter-Huber (Parker Conservation), Olivia Hamilton, Heather Benko (FNZ), Dave Goad (SNZ), Janice Molloy (Southern Seabirds Trust), Johannes Chambon (Independent), David Middleton (Pisces Research for SNZ IC), Gaia Dell'Araccia (Auckland Council), Karen Baird,

**Presentations:**

|          |                                                                           |                         |
|----------|---------------------------------------------------------------------------|-------------------------|
| 10:05 am | POP2025-02 Black petrel and flesh-footed shearwater demographic modelling | Biz Bell and Jo Chambon |
| 10:50 am | POP2025-03 Black petrel monitoring                                        | Biz Bell                |

**1. POP2025-02 Black petrel and flesh-footed shearwater demographic modelling**

Biz Bell and Jo Chambon presented on options for the black petrel and flesh-footed shearwater demographic modelling.

**Discussion:**

*Flesh-footed shearwater*

**DG** What sort of recapture data do you have other than targeted at sea captures and observed captures?

**JF** This is an exercise to estimate flesh-footed shearwater survival, not a SEFRA, so unless they are banded birds, we can't use observed captures from fishing vessels.

**JC** For this model we only used mark-recapture data so if the bird is not marked it doesn't enter the model.

**JF** We are only doing a survival model for flesh-footed shearwaters and a full integrated population model for black petrels. Given the size of the POP2025-02

budget, we are looking to do black petrels first, and see how far we get with flesh-footed shearwaters and look at what steps are needed to turn it into a full integrated population model. We have limited insights into all colonies and their population size for flesh-footed shearwaters which is a major limitation compared to Black Petrels.

**DM** What is the timescale for this project?

**JF** This is a two-year project, year one was collating data from disparate sources and ensuring that there is a dataset to allow for multi-event modelling, and then over the next year modelling will be undertaken.

**KB** - Is there any data on the age of birds which are bycaught i.e. adults vs juveniles.

**JF** As far as I know, we can't really sex and age flesh-footed shearwaters that are being bycaught. To clarify, this survival model is not a SEFRA exercise and it's not a full blown population model. A lot of the data are colony based, and those birds do have a known age associated with them.

**BB** We can age bycaught birds but haven't had any banded flesh-footed shearwaters returned as bycatch, so not useful for this model as we can only use banded birds.

**JC** There is limited explicit data on recovery of dead birds. If such data were available we could explicitly model that information.

### *Black petrel*

**DM** There have been several attempts to build a black petrel population model in the past, it will be important to review previous work and look at the problems encountered and think about what's changed; the main thing that's changed is at-sea resighting data. Regarding the population model, you don't have a data square in your diagram for widescale surveys of abundance on Great Barrier, but will be important to include as one of the data sources in integrated population model.

**JC** All sorts of information can be integrated, as long as they have some parameters in common.

**DM** One of the early lessons from the first model was that just modelling mark-recapture data without population abundance information to constrain it means you can't tell a lot about population trajectory, so having that information in integrated model will be important.

**JC** I was trying to use the at sea capture data as an index for that. There's nothing connecting the multi-event and the productivity on it's own, that would be tricky for just this model to estimate the population, so we will use the at sea capture data to complete the picture.

**DG** For the at-sea capture data, you rely on really good mixing? A plead for some kind of sensitivity of this assumption? As in looking for recapturing tagged birds or using tracking data from those birds to try and find them at sea again? Potential for that assumption to be broken so would like to see when it plays out, how does that blow out uncertainty in the population estimate?

**JC** The at-sea capture definitely relies on equal chances of captures, so a sensitivity test would be useful.

**DG** I was hoping you might be able to get different results from different data sources e.g. ones that crash land in Auckland or get caught on observed vessels, but it sounds like there's not enough numbers of those to do that.

**JC** When I come to that point, I will see what data can be integrated in the abundance model.

**PF** Some individuals returning to island for first time don't necessarily breed on their first occasion, in that instance is there any merit in modelling those individuals or that on land model of birds that are making the transition from sub-adults to fully breeding adults? Wondering if any cost in terms of delayed breeding.

**BB** We do get young birds that visit the colony and are not breeding, but it's not a significant number.

**JC** Quite a few demographic models for larger birds that are biannual breeders mostly do tend to include the breeding status as a state in the models – we didn't split it as we thought it's more useful to have spatially-explicit states rather than breeding states and using both at the same time would present too large challenges for the model to fit.

**BS** This is the same demographic data collected within the long-term study site, so it's important that we are clear when talking about an updated black petrel population estimate, it's the population estimate of the study area and that this may not reflect other areas.

**JC** We are hoping to use the at-sea capture data to reflect birds that could be coming in from other areas. This approach would overcome the bias that would be associated with just using data from the main study area

**BS** You mentioned using at-sea birds which would give less biased sample, does that include doing simple mark-recapture estimate based on the proportion of birds that were banded? I envision that a relatively simple Lincoln-Peterson estimator would be useful in that case.

**JC** Yes will be thinking about doing that.

**JF** All this work comes from having at-sea capture data of banded and unbanded birds available. However, I don't think a Lincoln-Peterson estimator will be as

statistically simple because all the at-sea capture data is done over multiple years so you need to factor in not just the recapture probabilities, but also the different survival probabilities that may differ between the different islands, which is the big challenge. Agree it will be good to further integrate the more traditional abundance data as well, but heavily reliant on at-sea data to get an independent population estimate for this species across the entire breeding area.

**JF** Regarding whether or not sex specific survival can be estimated, if a significant proportion of the birds that have banding data are sexed then yes, but not all of the banded black petrels have been sexed.

**BB** Probably have about 500 sexed black petrels.

**JF** That is still less than 10% of overall data set so don't think it would be wise to see sex specific transition detection and survival probabilities and then infer the sex for the other 90% of the dataset. Can explore it further but we do not have the funding to sex birds under this project.

**DG** Is there a sex bias in observed capture data?

**BB** Bycatch data for black petrels and flesh-footed shearwaters is biased to males.

**JC** Detection probability on the ground is biased towards males

**BB** Night capture biased towards males too.

**GT** When we set up the study, we got DNA sexing and measurements of birds from the breeding sites, so at least breeding birds could be modelled in the future. I think something done with sex data rather than reject it, we've spent money on it and there is evidence from necropsy work there is a bias.

**JC** We'll see if we can incorporate some exploration of sex bias in survival estimates, but it's likely that the proportion of sexed birds will remain too low.

## **2. POP2025-03 Black petrel monitoring**

Biz Bell presented an update on the 2025/26 season of black petrel monitoring.

### **Discussion:**

**RW** Was the plunge in fledging success in 2012 weather related?

**BB** There have been three major weather events. We are looking at trying to compare weather events and breeding success, as well as tracking data and look wind events.

**RW** In terms of burrow occupancy, burrow occupancy in the census grids was higher in the first part of the time series.

**BB** Those first three years are when the grid numbers were increasing from three to nine.

**RW** The average is clearly biased for first few years when there were significantly fewer burrows in the census grid, and are they more favoured over time?

**BB** We can have a look at that and report back.

**DM** The difference between the curves relates to the nature of observation in the census grid vs non-census areas. In census grid, every burrow is known, whereas with non-census burrows, you are more likely to detect high quality burrows because they are in use, so it appears to have a higher occupancy. I do think there is value in looking at individual burrow histories, especially in light of these weather events.

**BB** We did look at that a couple of years ago for census grids, but could look at whether it was done across the whole colony.

**PF** We have an extreme el niño event across the whole of the Pacific which will have a big impact on the areas where these birds would usually go during the non-breeding season. Is there any merit in qualitatively predicting what you might find in the upcoming years?

**BB** We will be looking at body condition. It will be interesting to see what happens at the colony. Have linked weather events previously. Last el niño a lot of our breeders chose to have a year off, and whether that's a body condition thing would be interesting to look into.

**PF** It might be good to get feedback from South American collaborators.

**DG** Could you include the number of breeding pairs per census grid instead of plotting burrow occupancy over time.

**BB** Yes noted we can do that.

Any additional comments should be provided to by 5pm, 23<sup>rd</sup> July 2026. Close of Meeting @ 11:30 am