Westland petrel and blue penguin biology and conservation management

RMA Hearing – TiGA mining Barrytown

Presentation Dr Susan Waugh,

on behalf of Coast Road Resilience Group

12 February 2024

Presentation structure (paras referenced)

- Species richness
- NZ and international biodiversity policy and designations
- Westland petrel biology
- Fallout of petrels
- Habitat fragility & climate impacts
- Blue penguin biology and conservation implications
- Summary of statement of evidence
- Response to Dr Bramley's presentation
- Assessment of Avian Management Plan v4
- Questions raised by Commissioners

Species richness at Barrytown (Para 15 – 17)

- 72 native species were identified by the Ecological Assessments
- 26 species at the mine site were identified as being of conservation concern (At Risk or Threatened).
- This represents a high proportion of the total New Zealand native avifauna (215 species).
- 82% of NZ bird species are threatened (80) or at Risk (98)
  - NZ fauna is spread from the Kermadec Islands to the Ross Sea
  - 26 / 178 species represents a high proportion of these At Risk or Threatened species

We can therefore conclude that the mine site has a high diversity of species at a national level. It is important as a habitat for threatened birdlife.

NZ Coastal Policy Statement 2010 (Para 59)

The sections that are particularly relevant sections for blue penguins and Westland petrels conservation are:

Policy 11 Indigenous biological diversity

(a) avoid adverse effects of activities on:

(i) indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists;

(ii) taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;

(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on:

(ii) habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;

Aotearoa New Zealand Biodiversity Strategy 2010 (para 59)

2.2 Scope of Te Mana o te Taiao

"…includes all types of tenure, including public lands, private lands, Maori lands and cover all indigenous and non-indigenous species…"

Outcome 2: Indigenous species and their habitats across Aotearoa New Zealand and beyond are thriving

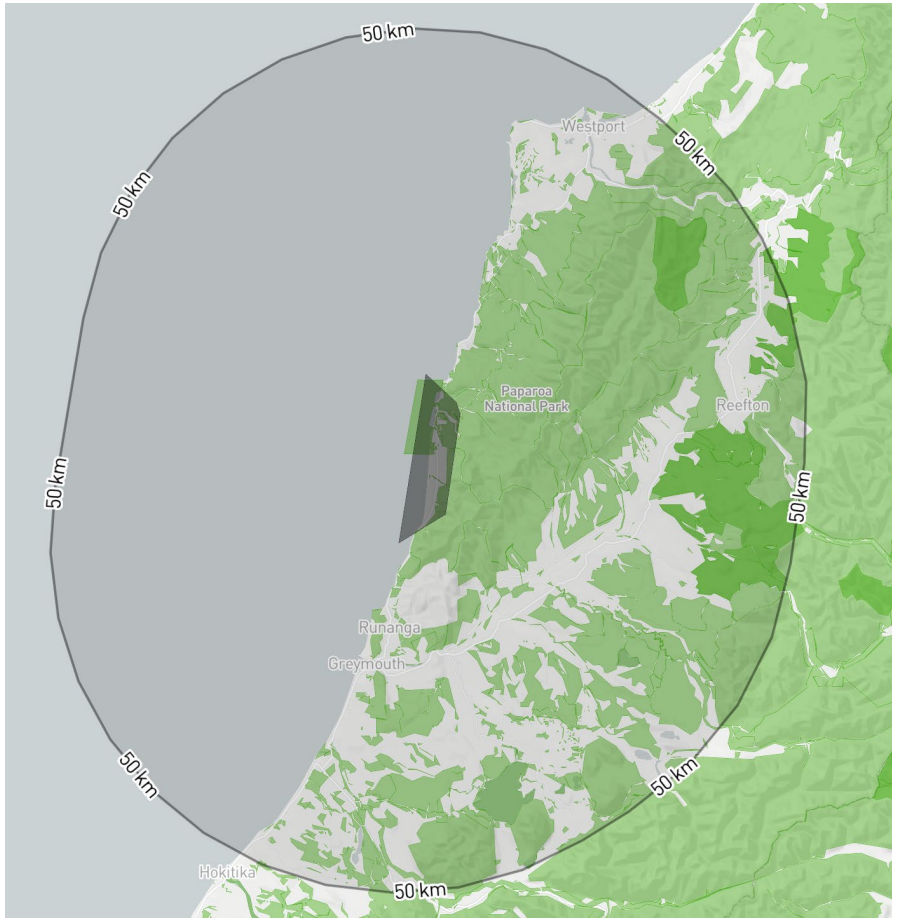
…>All indigenous species are protected and secure, and none are at risk of extinction due to human activities

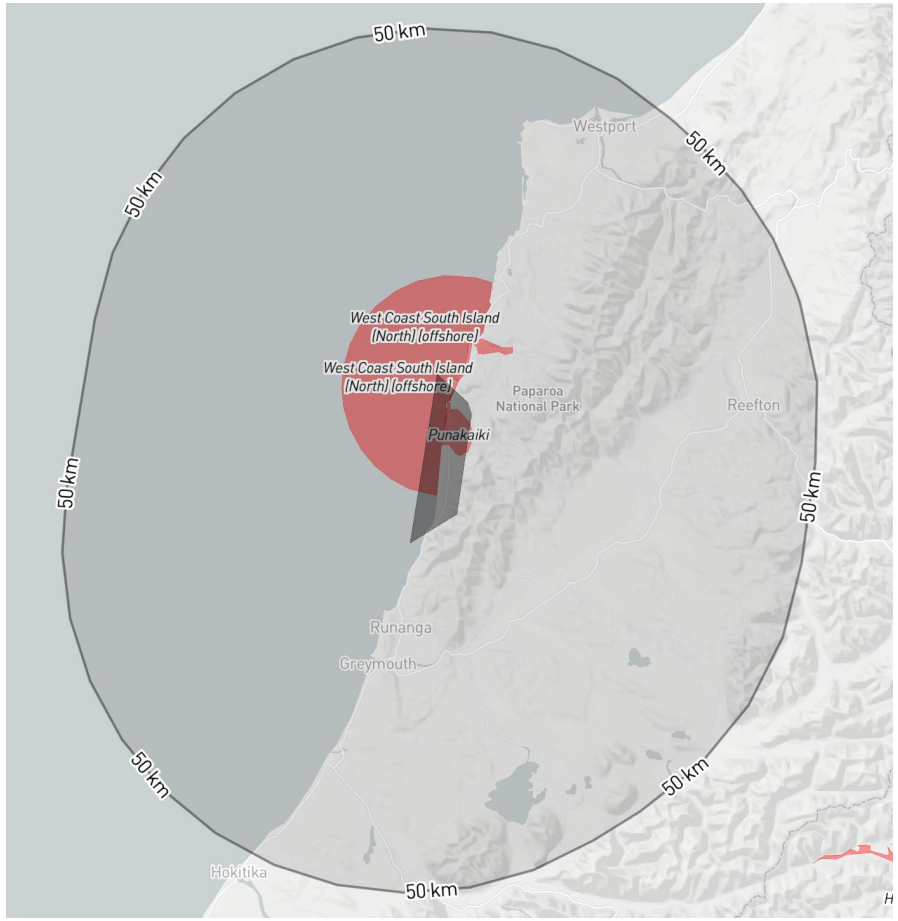
> Species' populations are healthy, genetically diverse and have increased resilience to future threats including climate change."

Other international designations for this area (Paras 53, 58)

- Punakaiki Westland petrel breeding area is listed as a breeding site for species under the Agreement on the Conservation of Albatrosses and Petrels
- Punakaiki is identified an Important Bird Area, under the IBA and Key Biodiversity Area criteria A1 and A4 because it contains the main breeding population of a globally threatened species (Westland Petrel) as well as Spotted Shag with > 1% of its global population using Dolomite Point as a roost site.
- Having IBA status, its possible to conduct an analysis using the Integrated Biodiversity Assessment Tool (IBAT).
- I have provided this assessment, for an area covering the whole Barrytown flats, to provide an indiciative view of the international level of risk assurance that this application should be subjected to, given its proximity to an IBA and several protected areas.

IBAT proximity report outputs (para 57)





Using a 50 km radius around the
area that might be proposed for industrial activities now and in the future.

IBAT report produces lists of known populations of globally threatened species and protected areas

71 species
4 Protected Areas
*lists available in Appendix 1 of SMWaugh evidence

Westland petrel conservation biology (Paras 10, 27-58)

- A slow breeding, species that is long lived with low low fecundity
- Threatened with extinction (IUCN listing Endangered, DoC At-Risk)
- Single-site endemic (16km^2 area including protected area[1], 75% of nests occurring in this area)
- Listed by the ACAP agreement and the Convention on Migratory Species
- Fully protected under the Wildlife Act 1953.
- Strongly susceptible to disturbance and adverse effects of human activity
- Subject to multiple threats documented in the scientific literature:
  - Fishing mortality in NZ and overseas
  - Light attraction especially for juveniles, also known to affect adults
  - Predation potential from dogs, pigs
  - Habitat degradation by browsing introduced species (goats, deer, possums)
  - Habitat instability and increasingly intense & frequent storm events
  - Climate and changes in Sea Surface Temperature

[1] https://www.acap.aq/acap-species/316-westland-petrel/file

Westland petrels cont. (paras 10, 27-58)

- Small breeding population (~6200 pairs per annum)[1]
- Total of 13800 – 17600 birds in 2019 Population growth appears stable (1.022 per annum 0.971-1.076 95% CI) [1], new information from Kate Simisters more recent studies indicates it may be declining.
- Survivorship was high for breeding birds (~95% per annum) but low for non-breeders (91.7 – 92.6% for F and M respectively)[2]
- Low breeding output for the whole population each year [2]
  - 54% of adult birds do not breed in a given year
  - Young birds recruit to the breeding population at 7.7y old
  - 60 – 70% of eggs laid result in a fledged chick.
  - Recruitment is low at 0.359 fledglings (95% CI: 0.300–0.423) surviving to the age of first return.

- ***Implications for management:***
  - any small increases in mortality of adults, fledglings or non-breeders could easily push the population into a negative trajectory.
  - Indeed the 95% CI on population growth rate includes values of <1 (the population may be currently declining slightly).

[1] Waugh et al. 2020. Trends in density abundance and response to storm damage for Westland petrels Marine Ornithology. Marine Ornithology 48: 273–281.

[2] Waugh et al. 2015. Modeling the demography and population dynamics of a subtropical seabird, and the influence of environmental factors. The Condor 14: 141.1

Fallout of petrels and shearwaters (paras 70-72)

- This happens when birds in flight are disoriented or disturbed by lights and crash-land onto the ground.
- Once grounded, due to their wing structure specialised for gliding, petrels cannot take off
- If left on the ground they will eventually die of dehydration, predation, become road-kill.
- Fall out is difficult to avoid or mitigate against for Westland Petrels
- Fall out has been document for Westland petrels over the last years, and continues to occur, despite strong controls on the lighting in housing, street lighting and other buildings at Punakaiki
- The nearest light sources for Westland Petrels from western facing colonies are likely to be the vehicles and buildings associated with the mine activity, as all other lights are already managed
- Additional lighting and/or traffic is likely to lead to increased mortalities of Westland Petrels.
- Avoiding further deaths of Westland petrels is imperative, to avoid putting the population at risk of decline.

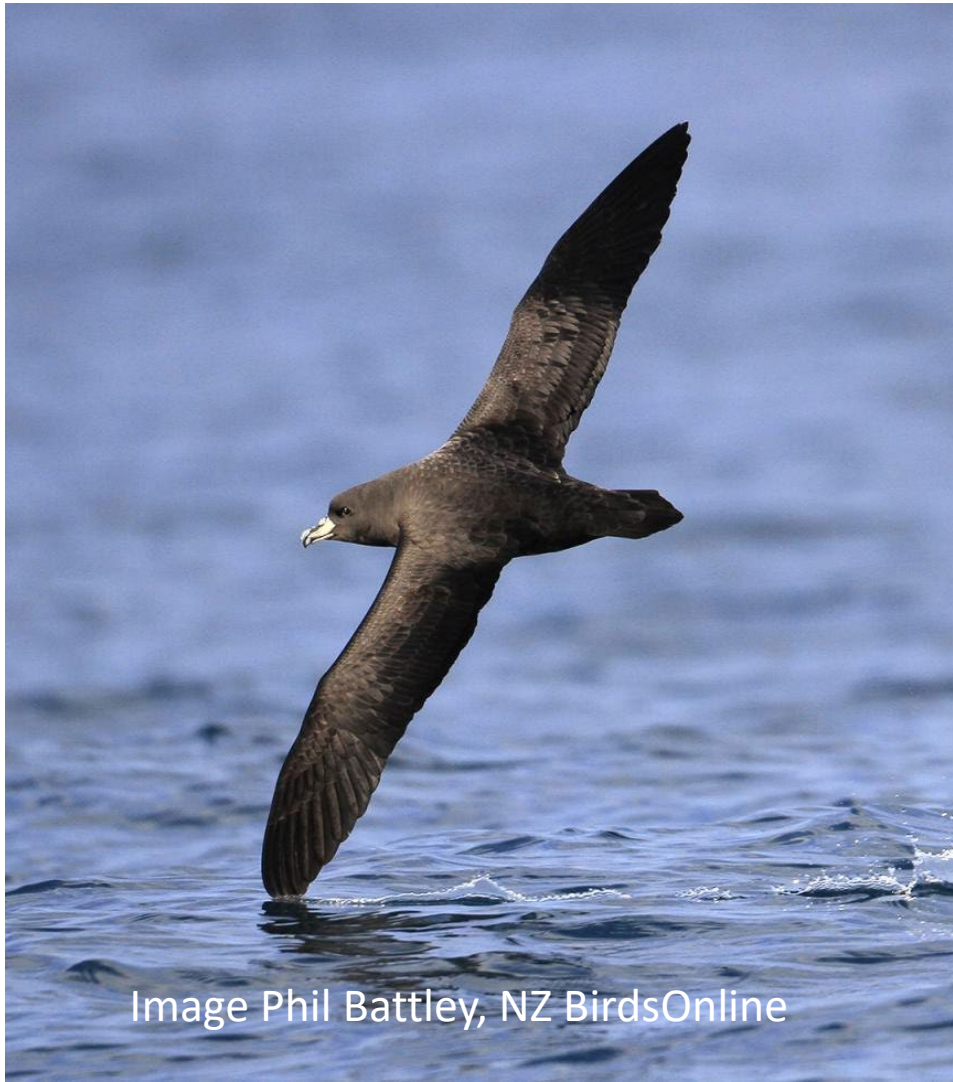
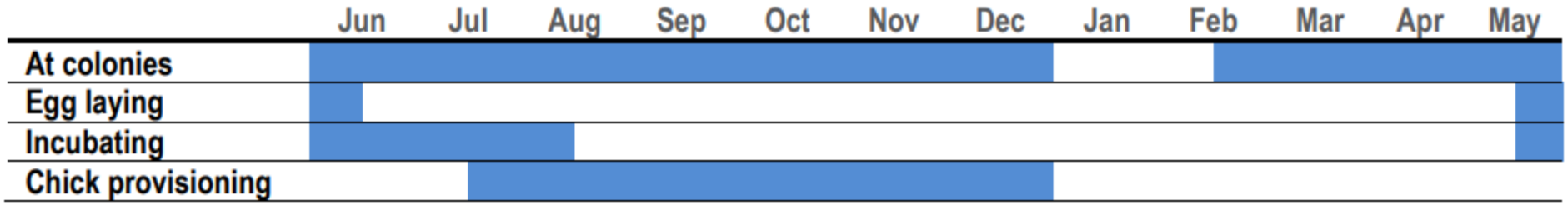


Image Phil Battley, NZ BirdsOnline

Westland petrel breeding season and attendance at colonies (Para 82)

Table 1. *Breeding cycle of* P. westlandica.



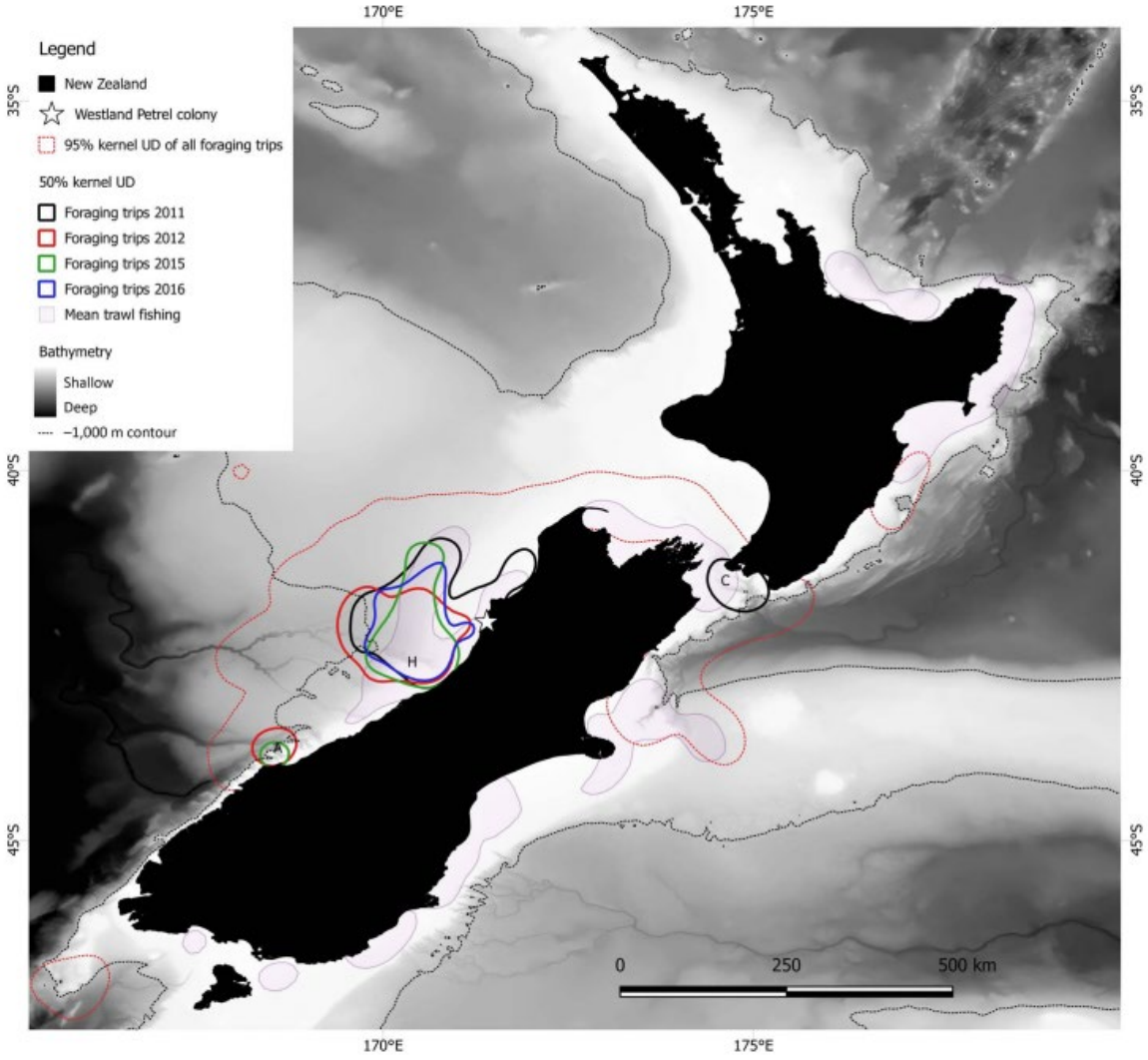
Source: Agreement on the Conservation of Albatrosses and Petrels. 2011. ACAP Species assessment: Westland Petrel Procellaria westlandica. Downloaded from http://www.acap.aq on 9 February 2011.

As noted by Kate Simister Para 24.

“In the last 16 years, groundings have been recorded in all eleven months of the breeding season and fledging period (mid-March to mid-January), with the majority of grounded birds being fledging juveniles, found between November and January (Wilson 2016; DOC 2021a).”

Summary: The risk of petrel fallout occurs throughout the year, and needs to be avoided throughout the year.

Westland petrel at-sea distribution (breeding season)- (para 48)



The principal feeding area for Westland Petrels during the breeding season (ie Feb – Dec) is in close proximity to Punakaiki.

This pattern is stable between years and stages of the breeding cycle.

Implication for management of threats at or near the breeding site:

- the majority of Westland petrels use/traverse the coastline and flyways in proximity to breeding colonies during Feb-Dec.
- Whatever threats exist in this area have potential to influence the whole population of Westland petrels

Source: Waugh et al. 2018. Bathymetry and fisheries influence Westland petrel foraging. *The Condor* 120:371-387

Westland petrel demographic analyses (Para 63-65)

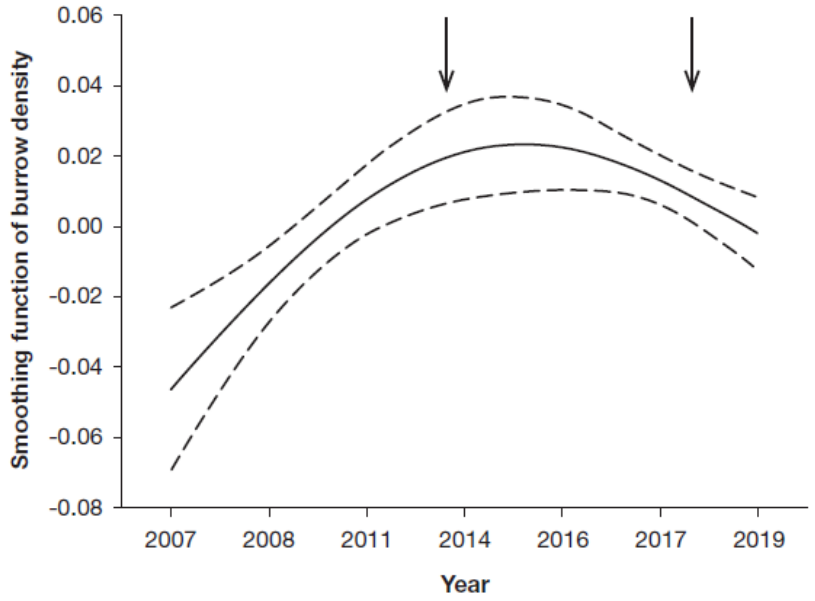


Fig. 2. Westland Petrel burrow density as a function of year. The plot shows the smoothing function of the predicted burrow density (solid line; estimated degrees of freedom of the smoothing function = −1.92) and 95% confidence intervals (dashed lines) from a generalized additive mixed model for the seven years during which data were collected. Arrows indicate approximate timing of storm events.

Data gathering periods

Demographic studies from 1969 – 2019

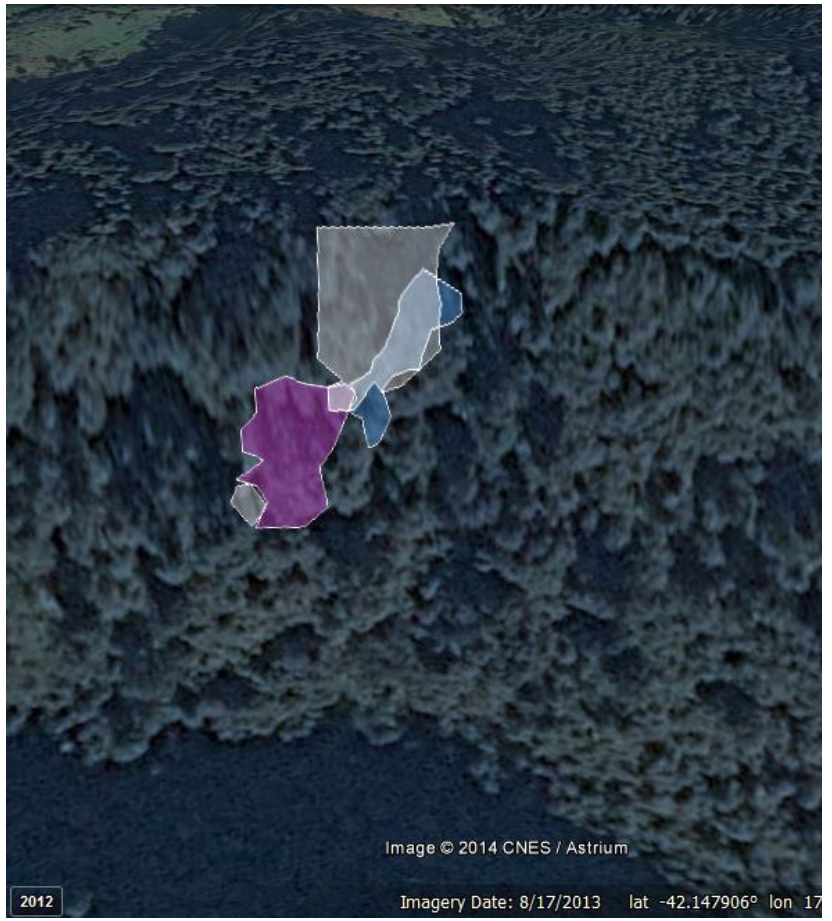
Mark-recapture studies of individuals through time

2002 – 2019 assessments of nest density and occupancy

Key results and implications:

- The population is stable or growing very slowly (~2% per year, but 95% CI is 0.971-1.076)
- Nest density and distribution is continuing to evolve, with new nesting areas being used compared with earliest findings, and overall increase in nest density until 2015, then a decline which has continued in more recent years (Kate Simister's submission).
- Westland petrels have experienced disruption to their colonies through time due to weather events (eg 2014, 2016 storms).
- The population is responding to, and vulnerable to disruptions and external events (e.g. storms) that negatively affect their nesting behaviour.

Petrel habitat fragility (para 61)



143 mm rain in the week of 17 Apr 2014 as part of Cyclone Ita

Major landslips which seriously impacted the colonies,
Up to 50% of marked nests were destroyed.

Landslips and windfall of trees has continued to occur around the lower edges of the Study colony (left) and Rowe Colony (right), and at other colonies.


Approximate position of Rowe Colony before landslips


Study colony

Part of Rowe Colony destroyed by landslips in 2014

Overall assessment of Westland petrel susceptibility to adverse effects

- Westland petrels, listed as Endangered by IUCN and At Risk by Department of Conservation, are in the category where adverse effects must be AVOIDED
- The population stability is tenuous, and the species is currently subject to multiple threats
- Additional mortalities are likely to create significant adverse effects on the population – resulting in decline and worsening threat status.
- Behavioural as well as mortality effects can impact on the population stability, e.g. need to form new pairs, reduction in feeding rate for chicks, lower reduction of recruitment through juvenile mortality
- Fallout risk from sunset on and before sunrise is likely to be highest, and traffic and or activity at the site should be avoided at night as well as during dusk.

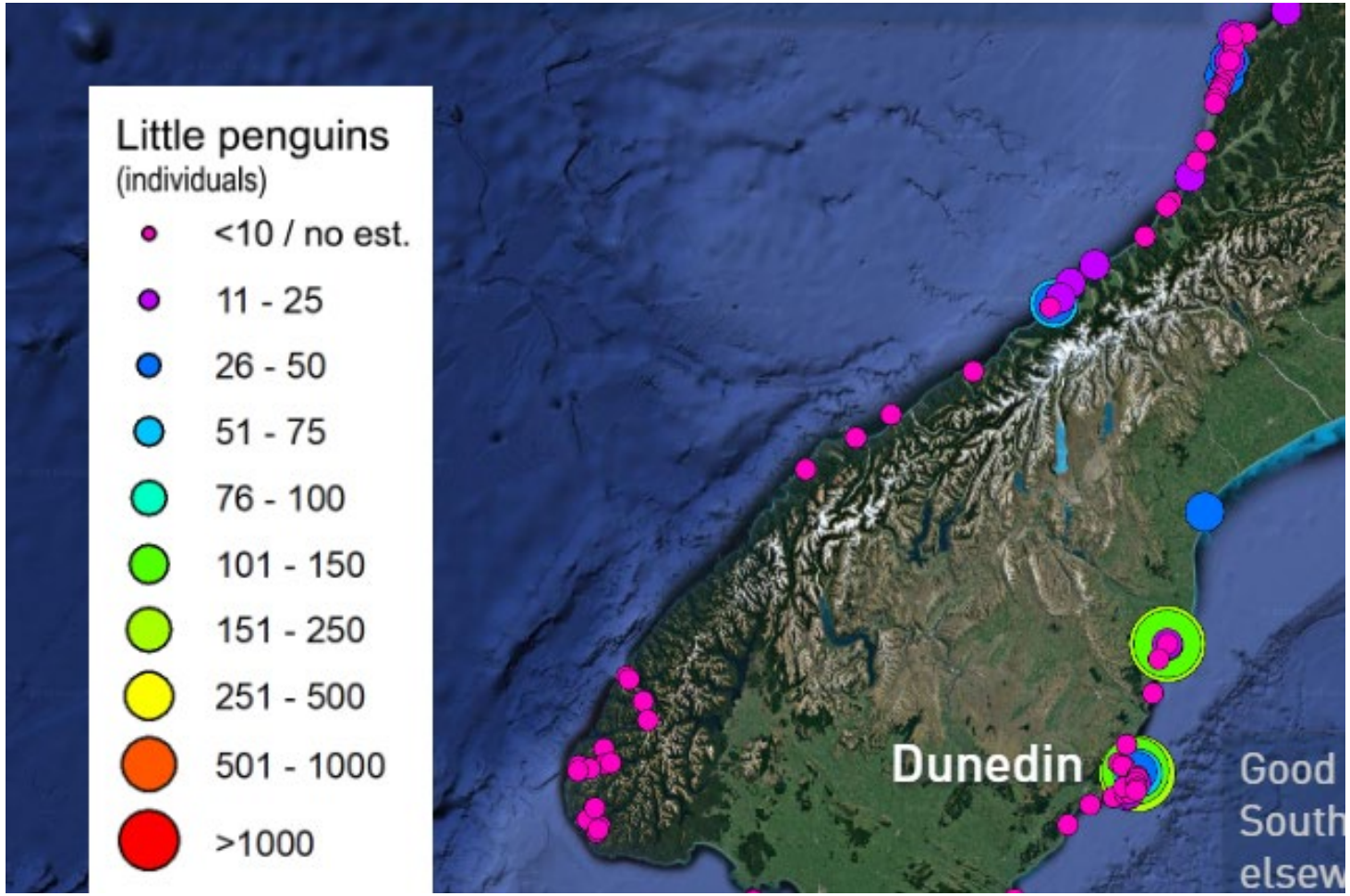
Blue penguin conservation biology (paras 18-21)

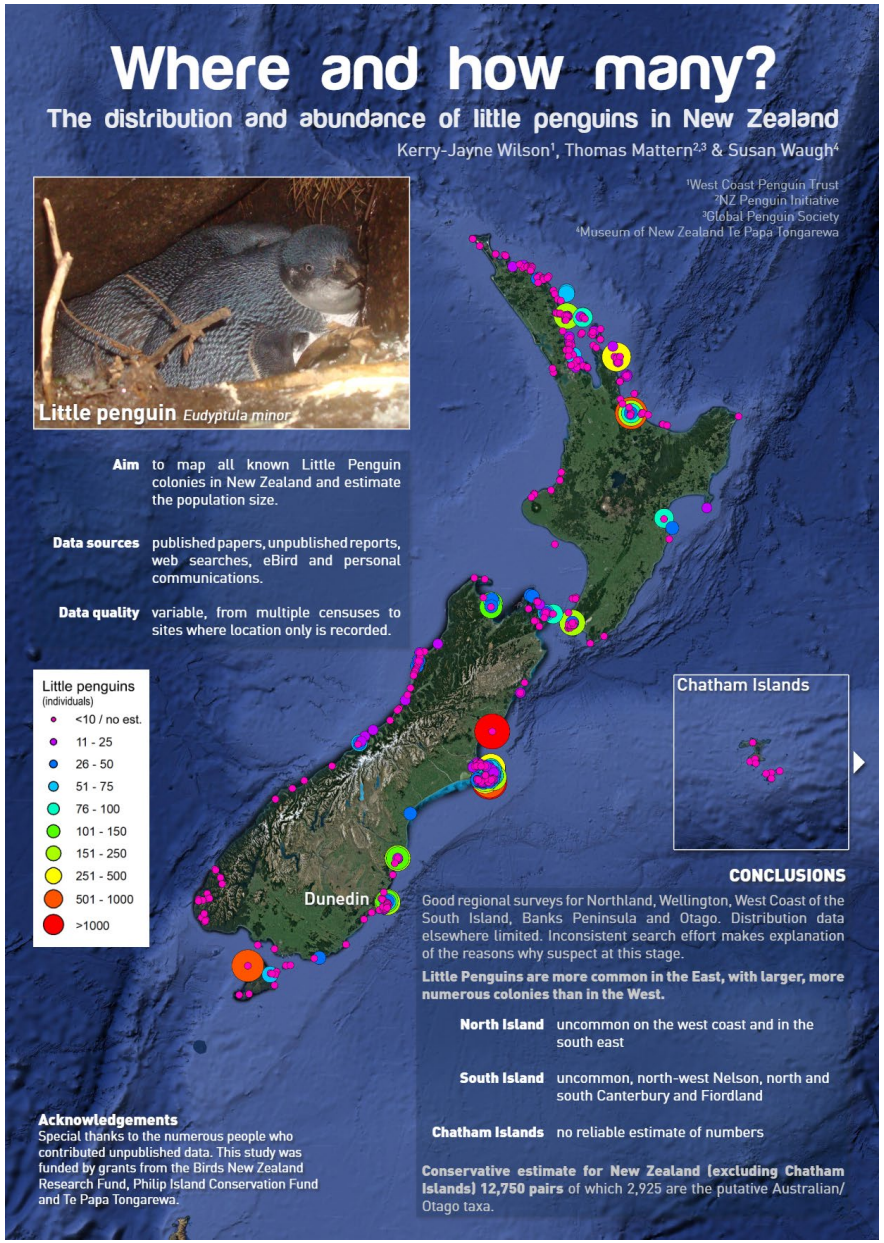
- Fully protected under the Wildlife Act 1953.
- Locally common in New Zealand, but overall have declining populations
- Threats are multiple –
  - Loss of habitat due to urbanisation
  - Predation by introduced and native predators
  - Loss of feeding habitat
  - Fisheries bycatch (eg set-net fishing)
  - Disturbance at nest sites by people, dogs.
  - Mass deaths due to marine pollution incidents (toxic algae etc).
- Particular threats on the West Coast are traffic deaths, dog predation.
- NZ southern sub-species - Overall, listed as At Risk, Declining by Department of Conservation
- Blue Penguins (Australia & New Zealand populations combined) listed by IUCN as Least Concern.

New Zealand little penguins needs for population stability and/or recovery (para 18-22).

- Nocturnal on land
- Rest / breed / moult / maintain their breeding habitat during extensive periods on land
- They must stay ashore continuously for about 2 weeks during the annual moult when all feathers are replaced simultaneously.
- Breed in a dispersed manner – not in dense colonies. They can traverse substantial areas to get to their nests (eg uphill of the coast road).
- Raise 1 – 2 chicks per year, without re-laying
- Feed in association with rivers, and can feed in lagoons / rivers in West Coast habitats
- Require quiet, calm, and undisturbed natural habitats to carry out their vital functions.

Blue penguin abundance around NZ – 2018 (para 20)





Multiple small colonies along the West Coast of South Island.

Blue penguin susceptibility to predation & disturbance (para 22-24)

Figure 1. Citing the Stuff.co.nz caption: *PREDATOR STRIKE: West Coast Blue Penguin Trust ranger Reuben Lane, left, and Scott Freeman of the Conservation Department with 15 penguins killed by dogs at Cape Foulwind on the West Coast.* ***Source: Stuff 2012.***

Example of dog predation of one colony at Cape Foulwind, West Coast in 2012.

Management Implications:

- Blue penguins are defenceless on land, and entire breeding populations can be killed or adversely affected in single predation or disturbance events.
- The populations can take several years to re-establish
- During this time, birds may recruit from adjacent breeding areas, causing a population sink in these areas.

Blue penguin moult (para 21)

- Moult in little penguins occurs during a 2-3 w period each year
- Its called “catastrophic moult” because it requires the birds to loose and regrow all their feathers in a short period.
- During this time the birds can't swim or feed.
- Timing of moult varies but can occur between December and March.
- It uses a large amount of metabolic energy
- Disturbance during moult, or other times of year can affect the energy balance of blue penguins and cause their deaths, particularly following moult
- They need to feed extensively in December to February, to double their body weight to survive moult

Source: Forest&Bird.org.nz

Avoidance of adverse effects on Westland Petrels and Blue Penguins

Management actions need to:

- avoid any additional mortalities, as both Westland petrel and blue penguin populations are protected, At-Risk or Threatened
- enable undisturbed breeding for blue penguins and Westland petrels to ensure breeding output remains at current levels or better. This means unimpeded access to their breeding and resting sites
- Avoid fallout which poses an important risk to the Westland Petrel population and already occurs at Punakaiki despite considerable efforts to avoid it
- Avoid additional sources of stress or mortality to the population of Westland petrels, already subject to multiple threats, it would take only a small number of mortalities to cause population declines.
-- avoid any disturbance to moulting and resting penguins which can create mortality due to stress or energy used to avoid disturbance contributing to post-moult mortality

Avoid reductions in the population of blue penguins - although with an unknown population trend currently on the West Coast, at a national level, they are declining. Reducing population viability of small populations in the West Coast would be detrimental to the national population.

Comments on the Avian Management Plan

In response to the sole email from Gary Bramley received on 17 Jan 2024, on 19th Jan I replied (below in full):

“Hi Gary, thanks for your email. The time differences are a bit challenging to manage a call at the moment. However, i would appreciate hearing (or reading).) About changes to the Avian Management Plan, as I'm still compiling my evidence and I imagine it would be better to respond to the most recent version of the proposal.

Please use my professional email, copied above.

Thanks Susan”

In summary: I have not provided information to the applicant, over and above what was submitted to the hearing, and I do not endorse the approach proposed in the AMP. Indeed, my submission goes into several important shortcomings of the application.

Responses to Dr Bramley's presentation

1. Discussed moving and/or disturbing penguin nests

Comment – this activity is unlikely to be beneficial to the individuals nor the population and could entrain stress and or mortality of penguins. The application must avoid adverse effects on this species (eg disturbance at resting, moulting and breeding sites and egress to those sites) These requirements apply on public and private land.

2. Restricting activities to daylight hours

Comment – this needs to also include the movement of staff on and off the site.

3. Dr Bramley considers there will be "low to negligible effects of the proposal on the ecology" of the area.

Comment – there is a high diversity of species, including several at-risk and threatened species. A number of submissions have set out how adverse effects would be likely to occur. Therefore, this assessment seems to be ill-founded.

4. Dr Bramley states this area "is some of the most modified parts of the Punakaiki Ecological District."

Comment – despite its modified state, it hosts a high diversity of bird species, indicating that it provides a good habitat for many species due to the diverse niches existing there. We can therefore consider that Barrytown Flats is an important area for birdlife, and an important part of New Zealand's coastal environment. In these areas, adverse effects on at risk or threatened species must be avoided.

5. Boundaries were discussed, and the need to manage effects of the activity at these

Comment – an important boundary was not considered – the land-air boundary, and adverse effects of the interaction between mine activities and Westland petrels has not been adequately addressed, as there remains an important risk that individuals will be stressed or killed in the operation. Additional mortalities or changes in bird attendance at the colony would be highly likely to adversely affect the population stability of the Westland petrel.

Responses to questions about fallout (also paras 70-72)

APPROPRIATE MONITORING AND RECOVERY STRATEGIES

- Fledglings on their maiden flight are particularly vulnerable and are attracted to the nearest lights in their flight path. Most petrels recovered are juveniles, but adult birds can also be attracted to lights
- Most chicks of petrels fledge in the first 2 h after sunset.
- Finding birds within the first 1 hr of landing is important for their survival. After this they can hide and be hard to find. They are less likely to survive if not found for 24 h
- They can land some distance from light sources, eg 1-2 km.
- Search dogs are used patrol high risk areas to find fallout birds particularly in the fledging season, and the dogs find 90% of the recovered birds.
- Birds once landed can be come dirty/greasy and need to be retained and checked for waterproofness before release. They can sink directly into the water if not clean.
- Release requires specialist operators, to ensure maximum chances of survival
- Checking for released petrel activities with satellite tagging equipment shows which processes work best and enables an evidence-based approach to correct and species-specific handling.

- Information from Society d'Etudes Ornitholgique de la Reunion (SEOR), who have recovered 42,000 Barau's petrels over the last 27 years. Two small villages 3 and 5 km from petrel colonies

Overall assessment of the AMP as it relates to seabirds:

The AMP has major short-comings, as detailed in my statement of evidence:

- It fails to recognise the importance of the site for NZ native and threatened species of birds

- Measures proposed for the management of interactions with Westland petrels and blue penguins do not provide an assurance that adverse effects will be avoided, nor do they appear to be legal (eg disturbing penguin activity and nests)

- The populations of blue penguins and Westland petrels are fragile, and a few mortalities or behavioural disturbance of individuals is likely to adversely affect their population stability. It's not clear that the adverse effects on Westland petrels and blue penguins can be avoided.

- Proposed monitoring is unlikely to enable independent verification of the effect of activities on these species

- NZ environmental protections for Westland petrels and blue penguins extend to private as well as public land and need to be observed.

- Repeated revisions to the AMP indicate that the applicant does not really understand the adverse effects of the mine on seabirds nor effective means of avoiding them – e.g. dog risk to penguins. The applicants have taken a minimalist approach, which is not appropriate for a site with such high biodiversity values.

- **I consider that the application should be declined**

Specific comments in relation to AMP v4 pt 1

18.8 – Efforts to deter nesting attempts….

- This approach doesn't align to the NZCPS, and cannot be used for species that are Threatened or At Risk

- The AMP it doesn't specify which species it will be applied to.

- Over-monitoring can also lead to nest failures, how will the ensure this doesn't happen?

18.12 Taiko interactions – 2 within a 4-week period

- The AMP appears to assume that there will be a relatively high level of interactions, which is concerning.

- based on information gathered in our exploration of the fate of grounded birds, its is likely that such bids are either stressed or have compromised survival at site or after release

- This level of interaction is likely to have a significant adverse impact on the population,

- We haven't specifically modelled the removals of birds that can be sustained over and above natural mortality, but a small number of removals is likely to negatively affect the population status.

Specific comments in relation to AMP v4 pt 2

3.2 – Discovering a nest

– These provisions of the AMP don't align with obligations under the NZCPS, and are not appropriate for Threatened or At-Risk species

3.3 Manging nests with 50 m buffer

- this is not enough distance…birds will still be disturbed with human activity within 50 m through noise, visual disturbance.

3.4 The AMP states that activity in daytime will avoid adverse effects

This is not a justifiable statement. Activity only during the daytime will reduce the likelihood of mortalities and adverse effects but not avoid it.

Specific comments in relation to AMP v4 pt 3

4.1.1 Westland Petrel breeding season is described in the AMP as March – November

- ACAP information and my / DoC information shows February to December.

4.1.2 Fixed lighting on the inland (eastern) side of the building only proposed in the AMP.

Noting that birds circle around the Barrytown flats for some time before landing it should be noted that lights on any side of the building will be visible and may adversely affect the petrels.

4.1.3 Mobile lights proposed

– I would suggest no lighting would be more secure.

4.1.4. Vehicle headlights

– Its not clear in the AMP that vehicle movements after dark will be avoided.

4.2 The search for birds around buildings:

- This is not consistent with expert advice that grounding can occur within 1-2 km of the light source.

4.3 Assumptions about locations of grounding are untested.

- The threshold of interactions set is not based on appropriate modelling (or logic). This assumes a sort of regime of “harvest” of the birds, which is not appropriate given that adverse effects must be avoided, and these interactions are avoidable.

5.3 references 1.3 which references 5.3

– circular reference about report contents.

Questions from commissioners

Q1. The operation hours of mining and trucking, and staff vehicle movements to avoid adverse effects.

Q2. What issues you may have with outside lighting (fixed & mobile) at the site.

Without prejudice to my view to have consent declined, ...

General comment: I support Kate Simister's analysis.

A1. I support Kate Simister's analysis (para 64) that "To avoid adverse effects on Westland petrel, operations should be finished for the day, with all lights turned off, and staff should have left the site by sunset not when birds begin flying 30 minutes later, otherwise the birds are exposed to higher levels of traffic as they begin to enter or leave the colony. Likewise, staff should not return until after sunrise, i.e. after the birds have returned to the colony."

A2. My assessment is that one needs to ensure that that outside lighting (fixed or mobile) be implemented in such a way that adverse effects on Westland Petrels are avoided, with a high degree of certainty. This may mean that they are never able to be used at the site, including vehicle lights.