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Squid 6T Operational Plan Consultation
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**Forest
& Bird**
TE REO O TE TAI AO
Giving Nature a Voice

Squid 6T Operational Plan Consultation

Introduction to Forest & Bird

1. The Royal Forest & Bird Protection Society (Forest & Bird) is New Zealand's largest and longest-serving independent conservation organisation. Our mission is to be a voice for nature – on land, in the sea, and in our fresh waters.
2. For over 95 years Forest & Bird and its members have been working to fulfil our constitutional purpose, which is to *“take all reasonable steps within the power of the Society for the preservation and protection of the indigenous flora and fauna and the natural features of New Zealand.”*
3. Forest & Bird is the New Zealand partner of the Global BirdLife International network of NGOs with partners in 120 countries.

Why New Zealand Sea lion/ rāpoka matter to Forest & Bird

4. The New Zealand (NZ) sea lion / rāpoka (*Phocarctos hookeri*) is New Zealand's only endemic pinniped. New Zealanders value NZ sea lions, they are a taonga species for tangata whenua, especially Ngāi Tahu¹. Despite being a protected species NZ sea lions are endangered and have undergone a significant population decline. The New Zealand public expects the Government to protect and recover the NZ sea lion towards their

¹ Ngāi Tahu taonga animal species from <https://www.doc.govt.nz/globalassets/documents/about-doc/concessions-and-permits/conservation-revealed/ngai-tahu-taonga-animals-lowres.pdf>

pre-colonisation population, just as we do for endemic threatened birds like kiwi or kakapo.

5. Forest & Bird has a long history of advocacy for the protection of New Zealand' marine mammals and has been at the forefront of efforts to protect NZ sea lions including the establishment of the Auckland Island marine mammal sanctuary and marine reserve.
6. It is legal in NZ for commercial fishers to accidentally kill our endangered NZ sea lions whilst trawling for squid (or other fish); provided they report it and the total number killed annually doesn't exceed a limit set by the Fisheries Minister. The government doesn't allow a kill quota for kiwi or kakapo, so why is it ok to kill sea lions? Why are commercial fishers not required to continually improve and reduce the number of NZ sea lion being killed annually? Forest & Bird considers that no NZ sea lions that have full protection under the Marine Mammal Protection Act 1978 should be killed in any fishing operation, either accidentally or deliberately and that the Government must adopt an ambitious Zero Bycatch Policy to drive meaningful bycatch reduction and recover the population.

Summary

7. Forest & Bird supports the vision of the NZ sea lion Threat Management Plan (TMP) to *"promote recovery and ensure the long-term viability of New Zealand sea lions"* and lead to a *"non-threatened"* status for the species ². The Squid Operational Plan must align to the TMP vision and goal.
8. Forest & Bird wants a new way of thinking about bycatch of endangered, threatened, and protected species that is consistent with the goal signalled in the proposed New Zealand Biodiversity Strategy and the principle that 'we only catch what we eat'³.
9. NZ sea lions are threatened and the population is declining. Forest & Bird recommends the Government adopt a zero bycatch goal for NZ sea lions. Whilst a zero bycatch goal is aspiration, the purpose is to drive continued improvement in a fishery so that human impacts, like bycatch, decline towards zero as fast as possible.
10. Forest & Bird does not support any of the three Options put forward by Fisheries New Zealand as they all allow the NZ sea lion population to continue to decline over time.

² Department of Conservation & Ministry for Primary Industries. (2017). New Zealand sea lion / Rapoka Threat Management Plan. <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/nz-sea-lion-tmp/nz-sea-lion-threat-management-plan.pdf>

³ Department of Conservation. (2019). Te Koiroa O Te Koiroa – our shared vision for living with nature August 2019. A discussion document on proposals for a biodiversity strategy for Aotearoa New Zealand. The New Zealand Government <https://www.doc.govt.nz/globalassets/documents/conservation/protecting-and-restoring/biodiversity-discussion-document.pdf>

11. Forest & Bird is proposing Option 4 as an alternative interim management measure to establish a temporal trawl exclusion zone at the Auckland Islands. Option 4 would significantly remove the threat squid trawl has on the vital foraging grounds of breeding female NZ sea lions. Breeding female sea lions are restricted in the area and duration they can forage by their need to return to their dependent pup at shore. Option 4 would seasonally restrict trawling from 17% of the 6T fishing area. Option 4 would not impact on the overall commercial catch of squid from within the 6T fishing area. Option 4 is a win-win for conservation and utilisation.
12. Forest & Bird recommends the Minister implements Option 4 as an interim measure until the TMP is reviewed in 2022 and a holistic and coordinated management plan of all fisheries and threats that kill NZ sea lions has been developed.
13. Forest & Bird wants to progress discussions of Option 4 with officials, industry, tangata whenua particularly Ngāi Tahu and other stakeholders.

1.1: NZ sea lion / rāpoka population trend & threat status

14. NZ sea lions / rāpoka were once found all around mainland New Zealand and likely numbered up to 68,000 individuals⁴. Today they are one of the rarest and most highly localised sea lions in the world, with fewer than 12,000 individuals. NZ sea lions have had a 48% decline in pup production since 1998 and scientists link this to a decline in the adult population, particularly breeding females at the Auckland Islands^{5,6,7}.

15. The majority of the population (98% of all breeding) are found around New Zealand's Sub-Antarctic Islands – Auckland Islands and Campbell Island. A smaller proportion, ~2% of NZ sea lions breed around Rakiura / Stewart Island and Otago and Southland regions. The Auckland Islands are a vital breeding stronghold

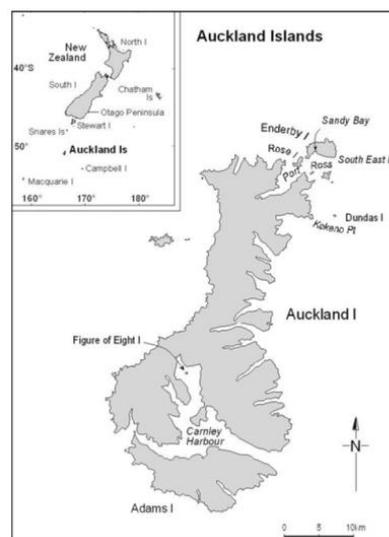


Figure 1: Map showing location of Auckland Island and breeding locations from Chilvers et al., 2011

⁴ Collins, C.J., Chilvers, B. L., Taylor, M., & Robertson, B. (2016). Historic population size of the threatened New Zealand sea lion *Phocarctos hookeri*. *Journal of Mammalogy* 97(2): 436-443.

⁵ Robertson, B.C & Chilvers, B.L. (2011). The population decline of New Zealand sea lion *Phocarctos hookeri*: a review of possible causes. *Mammal Review* 41:253-275

⁶ Chilvers, B.L & Meyer, S. (2017). Conservation needs for the endangered New Zealand sea lion. *Aquatic Conservation* 27:846-855

⁷ Meyer, S., Robertson, B. C., Chilvers, B. L., & Krkošek, M. (2015). Population dynamics reveal conservation priorities of the threatened New Zealand sea lion *Phocarctos hookeri*. *Marine Biology*, 162, 1587-1596

for the species with ~ 69% of NZ sea lion breeding occurring there^{2,6}. Figure 1 shows the location of the Auckland Islands.

16. The Auckland Island sea lion population has been regularly monitored through pup counts and resighting effort. Figure 2 shows the total pup counts for the Auckland Islands from 1994 to 2019. Since 1998 (the highest pup counts during this period) NZ sea lions pup production (proxy for population) has declined by ~55% (1998 to 2019⁸). While the substantial population decline of NZ sea lions has slowed in more recent years, the overall trend (linear trend line in Figure 2) shows the Auckland Island pup production (population proxy) is still declining. Population models show that NZ sea lions will continue to decline without effective intervention⁷.

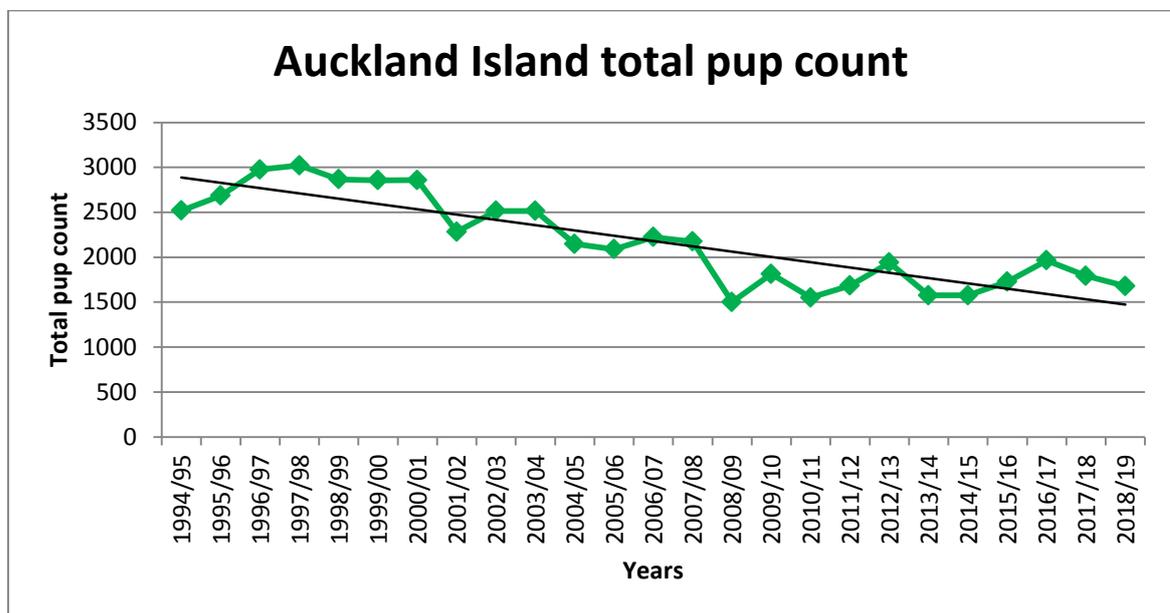


Figure 2: Auckland Island total pup count over time from 1994/95 to 2018/19. Source of the data CSP, 2019 report⁸

17. NZ sea lion is listed as Endangered by the IUCN⁹. The Department of Conservation (DOC) uses the NZ Threat Classification System to define threat status. In 2019 DOC downgraded the threat status of NZ sea lion from “*Nationally Critical*” to “*Nationally vulnerable*”¹⁰ based on an “*actual improvement*” and “*an apparent stabilisation in population size at the Auckland Islands since 2009 and increases in other breeding*”

⁸ Department of Conservation. (2019). New Zealand sea lion monitoring and pup production at the Auckland Islands 2018/2019 Research Report, June 2019

<https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/reports/pop2018-03-sea-lion-pup-count-2018-19.pdf>

⁹ Chilvers, L. (2015). *Phocarctos hookeri*. In: IUCN Red List of Threatened Species, version 2015.2.

www.iucnredlist.org

¹⁰ Baker, C.S., Boren, L., Childerhouse, S., Constantine, R., Van Helden, A., Lundquist, D., Rayment, W., and J.R. Rolfe. (2019). Conservation status of New Zealand marine mammals, 2019. *New Zealand Threat Classification Series* 29. 18 p. <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs29entire.pdf>

locations – Moutere Ihupuku / Campbell Island, Rakiura/Stewart Island and the mainland – during this time”¹¹.

18. Forest & Bird does not support this downgrade in threat status as the actual data does not support this *“improvement”*. Figure 2 shows since the late 90’s a decline in the overall population at the Auckland Island and DOC’s own data across all locations shows a similar decline⁷. Furthermore, this latest breeding season found that across all locations there was a decline in the number of NZ sea lion pups born⁷.
19. Forest & Bird does not support the selective use of available NZ sea lion pup data in the latest threat review as this has resulted in a ‘shifting baseline’. By selectively removing the 1998 year data it reduces the decline in sea lion numbers (from ~40% to 29% decline), thereby supporting the Department’s narrative that the sea lion population is now *“stable”*⁹.
20. The New Zealand sea lion Threat Management Plan (TMP) was released in 2017 and is in place until 2022. The TMP’s vision is to *“promote recovery and ensure the long-term viability of New Zealand sea lions”* and to recover the species to a *“non-threatened”* status². It’s five year objective is to *“halt the decline of the New Zealand sea lion population within 5 years”* and one of its measures of success is for the Auckland Islands population to produce pup counts that are consistently above 1,575 (2014 pup count) and ideally over 1,965 (2017 pup count)². The pup numbers at the Auckland Islands for the last three years are as follows⁷:

Year	2016/2017	2017/2018	2018/2019
Auckland Island pup count ⁷	1965	1729	1679

21. The TMP has been in place since 2017 and is past the halfway mark. The 2018/2019 pup count for the Auckland Islands is **15% lower** than when the TMP started. The numbers don’t support an *“apparent stabilisation”* and definitely not an improvement.
22. NZ sea lions are an endangered and protected species and the long-term population trend is declining⁷. Forest & Bird strongly supports the recovery of NZ sea lions towards their pre-colonisation population, just as we do for endemic threatened birds like kiwi and kakapo.

¹¹Department of Conservation. (2019). Media release 26th May 2019. <https://www.doc.govt.nz/news/media-releases/2019/matariki-whale-signposts-resurgence-of-tohora-southern-right-whale/?fbclid=IwAR2DZYJNjzbeyumiscKZHwag1pyRF8iU7j-hKGVyM41cKZz07-FUHOLQBF4>

1.2: Zero Bycatch Goal for NZ sea lion / rāpoka

23. In much the same way that Forest & Bird would not support an allowable kill of Kiwi or Kakapo, Forest & Bird considers that no NZ sea lions or other marine mammals that are vulnerable and or declining and have full protection should be killed in any fishing operation, either accidentally or deliberately. Whilst a zero bycatch goal is an aspiration goal, the purpose is to drive continued improvement in a fishery so that protected species bycatch rates decline towards zero as fast as possible. The options put forward by Fisheries New Zealand all allow the NZ sea lion population to continue to decline over time, this does not align with the Threat Management Plan vision and goals of recovery.
24. At the 2019 New Zealand Marine Sciences Society annual conference the Minister of Conservation, Eugenie Sage said she supported a zero bycatch policy for NZ sea lions¹². Forest & Bird welcomes this and recommends the Government develops a zero bycatch policy as soon as possible. Whilst Fisheries NZ model shows removing fishing bycatch towards zero alone will not likely stop the NZ sea lion decline¹³ it would give the population the best chance of recovering naturally. Forest & Bird has produced a Pathway to Zero Bycatch to highlight short and medium long term goals¹⁴.
25. Having a zero bycatch goal for NZ sea lions would require the entire fishing industry, not just squid trawlers around the Auckland Islands, to look at where and how they fish. It would require the development of a holistic and coordinated management plan of all fisheries and threats that kill NZ sea lions. A holistic zero bycatch goal linked to the TMP recovery vision would drive innovation and continual improvements to reduce bycatch as much as possible towards zero. Until such policy is developed there is no incentive or requirement for commercial fishers to improve or change from the status quo.
26. Zero bycatch goal is not a new concept. There are international recommendations, such as those by the Internationally Whaling Commission and examples, such as the Hawaiian monk seal, where managers have effectively adopted a zero bycatch goal by setting the PBR (level of bycatch) to zero, in this case for a population that is small, endangered and declining.
27. New Zealanders care passionately about the recovery of this endemic species. A survey carried out by WWF NZ and Colmar Brunton highlights New Zealanders support a zero bycatch goal. Colmar Brunton found that *“84% of New Zealanders think the Government*

¹² <https://www.odt.co.nz/news/dunedin/sage-backs-zero-bycatch-policy-sea-lions>

¹³ Roberts, J. (2019). Population effects of New Zealand sea lion mortality scenarios relating to the southern arrow squid fishery at the Auckland Islands New Zealand Aquatic Environment and Biodiversity Report No. 223

¹⁴ https://www.forestandbird.org.nz/sites/default/files/201908/a%20pathway%20to%20zero%20bycatch_final.pdf

*should adopt a zero-bycatch goal – meaning that while there will always be some accidental bycatch in commercial fisheries, we should work to reduce that impact towards zero*¹⁵. When asked about NZ sea lions specifically “84% of New Zealanders agreed or strongly agreed that the number of NZ sea lions being killed in commercial fisheries should be further reduced”¹⁶.

1.3: Fisheries threats to NZ sea lion / rāpoka & consultation options

28. Fisheries NZ’s Quantitative Multi-Risk Threat Assessment showed that NZ sea lions are impacted by multiple and cumulative threats, particularly from fisheries bycatch, disease and nutritional stress (potentially due to fishing pressure and climate change impacts on prey availability)¹⁷. Fisheries bycatch is identified as the most significant human threat to NZ sea lions^{5,7,17}, and is the only threat that can be actively managed.
29. More long-term research is needed to assess climate change impacts on prey availability and what impact spatiotemporal fluctuations in environmental conditions could potentially have and management options to mitigate these. There is a Government funded project looking at wider spatiotemporal fluctuations in environmental conditions and fish. There is Government funded work looking at disease and mitigation options. There is no government funded work looking at reducing direct fisheries impact.
30. The squid trawl fishery operates around the Auckland Islands and overlaps with the NZ sea lion foraging grounds. NZ sea lions are killed despite the use of sea lion exclusion devices (SLEDs) on nets. Forest & Bird acknowledges Fisheries NZ’s work to attempt to reduce uncertainty around the effectiveness of SLEDs which found that the risk from fishing is now low^{13,18}. Other models suggest fishing risk is much higher and a driving factor behind the decline of NZ sea lions⁷. Regardless of the level, NZ sea lions are being killed by the squid trawl fishery and the NZ sea lion population is

¹⁵ Source: from WWF NZ - Colmar Brunton, (2017a). Attitudes towards a Zero Bycatch Goal.

http://awsassets.wwfnz.panda.org/dow84nloads/report___attitudes_towards_a_zero_bycatch_goal.pptx

¹⁶ Source: from WWF NZ - Colmar Brunton, (2017b). Attitudes towards Sea lions and the threats they face.

¹⁷ Roberts and Doonan, (2016) *Quantitative Risk Assessment of Threats to New Zealand Sea Lions*, New Zealand Aquatic Environment and Biodiversity Report No. 166. Ministry for Primary Industries, Wellington.

¹⁸ A few years ago the ‘best’ model and approach used by Fisheries NZ estimated that the squid trawl bycatch of sea lions was over 500 individuals a year, now a different model and approach has been adopted and it estimates an average of six sea lions are killed per year. There were seven observed deaths for this latest fishing year 2018/2019, which equates to 9 estimated deaths using Fisheries NZ latest approach. Models can be useful but are only as good as hypothetical probabilities and data informing them. Forest & Bird has become increasingly frustrated with the Fisheries NZ science peer review and consultative processes. A key concern is that these processes lack fisheries independent subject experts and are therefore rarely adequately peer reviewed. Forest & Bird is also frustrated with the selective use of science by Fisheries NZ. If a published paper (often internationally peer reviewed) doesn’t go through Fisheries NZ science working group – AEWG then it is rarely considered useful or used.

declining. We must reduce all human impacts as close to zero as possible to achieve population recovery.

31. Fisheries NZ manages the squid fishing threat in isolation from other fisheries, through the SQU6T Operational Plan. The Operational Plan which sets out an annual allowable kill quota of NZ sea lions by the commercial fishing industry referred to as the fishing related mortality limit (FRML).
32. The FRML is set under section 15(2) of the Fisheries Act¹⁹ by the Minister of Fisheries *“In the absence of a population management plan, the Minister may, after consultation with the Minister of Conservation, take such measures as he or she considers are necessary to avoid, remedy, or mitigate the effect of fishing-related mortality on any protected species, and such measures may include setting a limit on fishing-related mortality”*¹⁹.
33. Fisheries NZ is currently consulting on the new Operational Plan which is proposed to be in place for 5 years. Fisheries NZ has put forward Options of how many Auckland Island NZ sea lions can be killed each year during the squid fishing season, refer to Table 1. It’s important to note that the squid trawl fishery is not the only fishery that kills NZ sea lions. It is the only fishery to have a FRML. Southern blue whiting and scampi also kill NZ sea lions, but are managed in isolation. Forest & Bird continues to recommend the Government adopts a holistic zero bycatch goal and manages all these fisheries and threats in a more inclusive way.

Table 1: Proposals for the 2019/2020 squid trawl fishery (6T) compared to current settings. Source Consultation document²⁰

	Achieved by:		Sea Lion Exclusion Device					
	Maximum impact on population	PST (Annual)	FRML (Annual)	Tow “limit”	Observed captures “limit”	Use/ Expected Use	Regulatory status	(Proposed) Minimum observer coverage
Current	5%	46	38	2,397	N/A	100%	No	70%
Option 1	2.5%	26	26	N/A	20	100%	Possible	90%
Option 2	5%	52	52	N/A	40	100%	Possible	90%
Option 3 (not preferred)	10%	104	104	N/A	80	100%	Possible	90%

¹⁹The Fisheries Act 1996 - <http://www.legislation.govt.nz/act/public/1996/0088/latest/DLM394192.html>

²⁰ Fisheries New Zealand. (2019). Consultation on the Squid 6T Operational Plan. Fisheries New Zealand Discussion Paper 2019/17. August 2019. New Zealand Government, from <https://www.fisheries.govt.nz/dmsdocument/36435-consultation-on-the-squid-6t-operational-plan>

34. The current approach (current season officially closes September 30th²¹) is that the FRML set produces a tow limit (maximum number of tows the industry can make). If the FRML is reached (that number of sea lions observed dead) or tow limit reached the fishery would be closed. Fisheries NZ is proposing a new approach which will be based on the number of NZ sea lions observed or reported killed in the fishery, rather than a limit to the number of tows the industry can do in the 6T fishing area (Auckland Island area).
35. Fisheries NZ incorrectly state that the proposed FRML provides a “*high degree of certainty that the sea lion population will be maintained at a level that ensures their long-term viability*”²⁰. In theory this would only be true if the population is growing at an optimal rate. In reality any fisheries impact will contribute to further decline the population, unless the population trend is moving in a positive direction. Roberts (2019) shows the NZ sea lion population is not moving in a positive direction, and is likely to continue to decline¹³. This declining population projection is supported by fisheries independent models⁷.
36. The Options put forward by Fisheries New Zealand in the Squid 6T Operational Plan will not achieve the TMP vision and objectives for population recovery. The three proposed Options all allow fishing to continue killing NZ sea lions. Option 1 would allow the population to be reduced by an additional 2% above the existing non-fisheries related decline by 2025, Option 2 would allow a 5% population reduction, and Option 3 would allow a 10% population reduction²⁰. Increased population decline cannot logically be seen as a way to achieve population recovery which, by the Department of Conservation’s own definition, requires the population to be increasing¹⁰.
37. The level of observed bycatch required before the fishery would be constrained for Options 1, 2 & 3 are significantly higher than the latest observed bycatch of seven NZ sea lions. Option 1 would require 20 NZ sea lions to be observed, Option 2 40 to be observed and Option 3 a massive 80 individual to be observed²⁰. These values are based on a target of 90% observer coverage, which Forest & Bird does not think is realistic given the limited observer coverage available (observer days), the last seasons coverage and competing fisheries observer coverage needs. The unwillingness of the industry to adopt electronic digital monitoring as an alternative doesn’t help.
38. Effectively Fisheries NZ are proposing arbitrary (but informed by their new model and approach) FRML Options which **all result in an unconstrained squid trawl fishery** while allowing the NZ sea lion population to be reduced.

²¹ Note that the fishing season for 2018/2019 (current) is already closed as boats have withdrawn from the area so bycatch values used are unlikely to change.

39. Fisheries NZ have based the Options above by applying a Population Sustainability Threshold (PST). The PST represents the maximum number of NZ sea lions that can be killed to allow the population to achieve a certain outcome. A concern with the PST approach is that it assumes there is always a 'sustainable' level of impact because the models that inform the PST assume the population is growing. As highlighted in Figure 2 and by researchers^{7,13}, the NZ sea lion population is not a growing population or projected to be. Fisheries NZ doesn't describe this in the consultation document instead it describe the PST as "*the population outcome is defined in terms of how much impact (reduction in population size) that the fishery can have*"²⁰, relative to if there was no fishing impact on that population. The PST is a management setting and has not been informed by the Technical Advisory Group or stakeholders. The PST proposals do not link to the TMP vision and objectives and will not enable NZ sea lions to recover. The assumptions made by Fisheries NZ that the PST is both 'sustainable' and 'acceptable' are misleading. Forest & Bird does not believe these assumptions hold true for a declining and protected species such as NZ sea lions. Forest & Bird and others have consistently pushed for a process to discuss these management settings and decisions but have been denied.
40. Fisheries NZ has not put forward any direct mitigation options to reduce the impact the squid trawl fishery is having on the Auckland Island NZ sea lion population alongside a FRML. The approved TMP stated that during the first 5 years there would be a focus on direct mitigation of NZ sea lion deaths. This was to initially focus on reducing pup mortality in natural holes at main breeding sites and then "*mitigating interactions with commercial fisheries*"². There is no incentive or requirement for commercial fishers to change their status quo fishing or improve. Fisheries NZ has only put forward options that allow the Auckland Island NZ sea lion population to decline over time. Given this and Forest & Bird's constitutional purpose, which is to "*take all reasonable steps within the power of the Society for the preservation and protection of the indigenous flora and fauna and the natural features of New Zealand*", **we do not support** any of the three Options put forward by Fisheries NZ alone.
41. Forest & Bird is proposing an Option 4 to be presented to the Ministers, agency staff, tangata whenua (particularly Ngāi Tahu), industry and other stakeholders. Option 4 would reduce the impact the 6T squid fishery has on the endangered NZ sea lion population, particularly the breeding females at the Auckland Island, whilst still allowing the 6T squid trawl fishery to operate. Option 4 would not reduce bycatch to zero, the ambitious goal, but it would significantly reduce current levels and is proposed as an interim temporary measure until the review of the TMP in 2022. Refer to section 1.5 for more information.

1.4: NZ sea lion / rāpoka foraging grounds and squid 6T fishing effort

42. Fisheries NZ have not highlighted the importance of the Auckland Island waters to NZ sea lions in the public consultation document. It is essential to understand spatially where NZ sea lions forage and what drives this, alongside where squid trawling occurs.
43. Until recently Fisheries NZ has failed to use the extensive published literature on foraging utilisation distributions of lactating female NZ sea lions to support management decisions. However, in order to inform this new approach being taken, the PST, Fisheries NZ developed a spatially-explicit fisheries risk assessment (SEFRA) model and commissioned a review of all historic telemetry data of lactating females from the Auckland Island²².
44. Prior to the Fisheries NZ work, scientists had shown where Auckland Island lactating females (the most important population demographic⁷) foraged^{23,24,25,26,27,28,29,30,31,32} (refer to Figures 3 and 4 as examples of this). Figure 3 and 4 show that individuals tagged at different locations display a similar foraging preference to the 250m depth contour – referred to as the Auckland Island shelf. Breeding females at the Auckland Islands have been shown to be central place foragers, which mean they have a restricted foraging range during the breeding season²³⁻³².

²² Large, K., Roberts, J., Francis, M., & Webber, D.N. (2019). Spatial assessment of fisheries risk for New Zealand sea lions at the Auckland Islands. *New Zealand Aquatic Environment and Biodiversity Report* No. 224 85p. Fisheries New Zealand <https://www.mpi.govt.nz/dmsdocument/36375-aebr-224-spatial-assessment-of-fisheries-risk-for-new-zealand-sea-lions-at-the-auckland-islands>

²³ Chilvers, B.L. (2010). Final Report: Research to assess the demographic parameters and at sea distribution of New Zealand sea lions, Auckland Islands. Report prepared for the Conservation Services Programme, Department of Conservation POP 2007:01

²⁴ Chilvers, B.L. (2008a). New Zealand sea lions (*Phocarctos hookeri*) and squid trawl fisheries: bycatch problems and management options. *Endangered Species Research* 5:193 – 204.

²⁵ Chilvers, B.L. (2008b). Foraging site fidelity of lactating New Zealand sea lions. *Journal of Zoology* 276:28 –36.

²⁶ Chilvers, B.L. & Wilkinson, I.S. (2008c). Philopatry and site fidelity of New Zealand sea lions, *Phocarctos hookeri*. *Wildlife Research* 35: 463-470.

²⁷ Chilvers, B.L. & Wilkinson, I.S. (2009). Divers foraging strategies in lactating New Zealand sea lions. *Marine Ecology Progress Series* 378: 299 - 308.

²⁸ Chilvers, B.L., Wilkinson, I.S., Duignan, P.J., & Gemmell, N. (2006). Diving extremes: are New Zealand sea lions (*Phocarctos hookeri*) pushing their limits in a marginal habitat? *Journal of Zoology* 269:233-241.

²⁹ Chilvers, B.L., Wilkinson, I.S., Duignan, P.J., & Gemmell, N. (2005). Identifying the distribution of summer foraging areas for lactating New Zealand sea lions *Phocarctos hookeri*. *Marine Ecology Progress Series* 304:235-247.

³⁰ Chilvers, B.L., Amey, J.M., Huckstadt, L.A., & Costa, D.P. (2011). Investigating foraging utilisation distribution of female New Zealand sea lions, Auckland Islands. *Polar Biology* 34:565-574

³¹ Chilvers, B.L., Childerhouse, S.J & Gales, N.J. (2013) Winter foraging behaviour of lactating New Zealand sea lions *Phocarctos hookeri*. *New Zealand Journal Marine and Freshwater Research* 47:125-138

³² Chilvers, B.L. (2009). Foraging locations of female New Zealand sea lions (*Phocarctos hookeri*) from a declining colony. *New Zealand Journal of Ecology*. 33(2):1106 – 113.

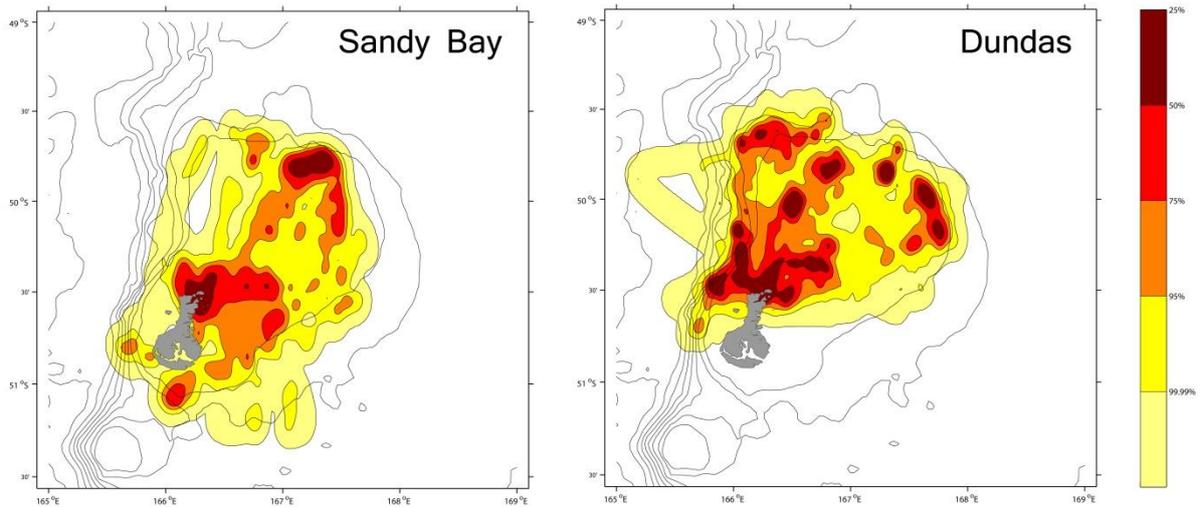


Figure 3: Utilisation distribution of lactating NZ sea lions during January and February summers from 2005 to 2007 from Dundas and Sandy Bay breeding sites. Source³⁰

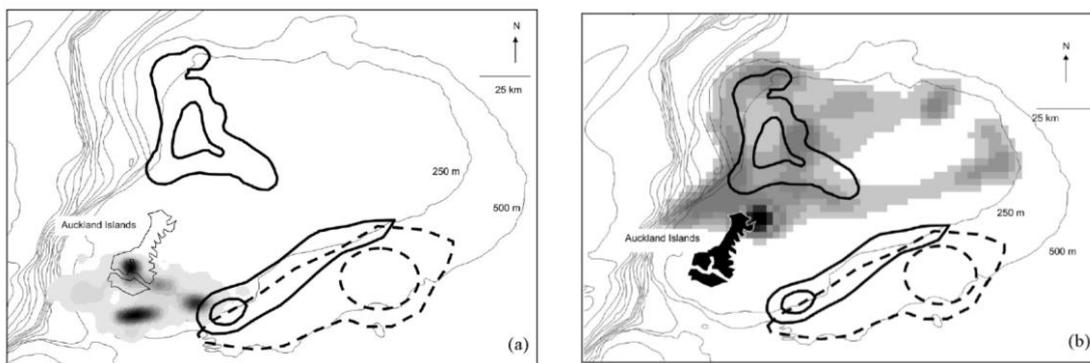
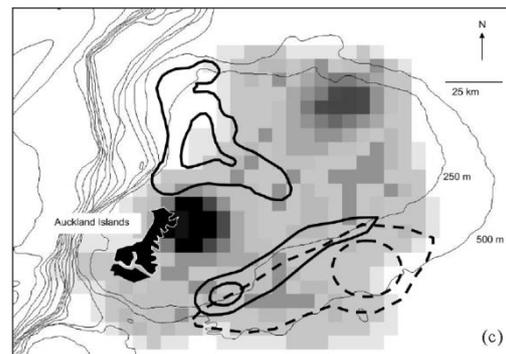


Figure 4: Utilisation distribution of lactating NZ sea lions from (a) Figure of Eight Island, January and February 2007 and 2008 ($n = 4$); (b) Enderby Island, January and February 2001–2004 ($n = 26$); (c) Dundas Island January and February 2005–2007 ($n = 29$) and '01-'07 fishing effort (black lines – squid dashed lines - scampi). Source³¹



45. The extensive published research²³⁻³² on foraging behaviour of lactating female NZ sea lions at the Auckland Islands all show they forage over the entire Auckland Island shelf, right out to the 500m depth contour but have denser utilisation of the 250m depth contour. Lactating female NZ sea lions are **restricted in area and duration they forage by their need to return to their dependent pup at shore**²³⁻³². Researchers have also shown that these breeding females are foraging and diving at their physiological limits. Chilvers et al.^{29,32} found 68% of all dives assessed were

beyond NZ sea lions calculated anaerobic dive limits, meaning they are working incredibly hard to get enough food at the Auckland Islands²³⁻³².

46. Lactation is extremely energy demanding and therefore female NZ sea lions must optimise their foraging behaviour to maximise energy intake so they can successfully raise their dependent pups³⁰.
47. Stable isotope analysis of NZ sea lion whiskers can indicate long-term foraging strategies. Recent published research confirmed that female NZ sea lions have one of two distinct foraging strategies (benthic – foraging on the seafloor or mesopelagic – forage at various depth in the water column) that are “*habitual within and between year*”³³ furthermore highlighting the importance of understanding foraging distributions. This study also supports that the restricted foraging grounds of NZ lactating sea lions is unlikely to have changed significantly over time as sea lions display these habitual within and between year strategies³³, so while the telemetry data available for analysis is dated (1996 to 2012²²) it still represents the best estimate of utilisation and foraging distributions for lactating NZ sea lions at the Auckland Islands.
48. Forest & Bird, and others, have been pushing for this research to be used to inform management decisions for years. NZ sea lions at the Auckland Islands are living in extreme conditions and are reliant on restricted unprotected waters outside the existing marine reserve to successfully forage and raise dependent pups.
49. Fisheries NZ commissioned Large et al.²² to process for the first time all available spatial tracking data from the Auckland Islands between 1996 -2012. Figure 5 shows the groomed data from three breeding locations and Figure 6 shows a comparison of the data used in the analysis of individual tagged sea lions. Figure 5 visually displays that depending on tagged location lactating NZ sea lions tend to forage in slightly different locations but the majority of positions are from on the Auckland Island shelf. This is the first summary of all available telemetry data and it clearly supports earlier results that a significant proportion of the habitual foraging distributions of Auckland Island lactating females occur outside the exiting marine reserve in unprotected waters where these NZ sea lions are exposed to the squid trawl fishery (6T). The dependency on the shelf links with NZ sea lion prey availability.

³³ Chilvers, B.L. (2019). Whisker stable isotope values indicate long-term foraging strategies for female New Zealand sea lions. *Endangered Species Research* 38: 55-66.

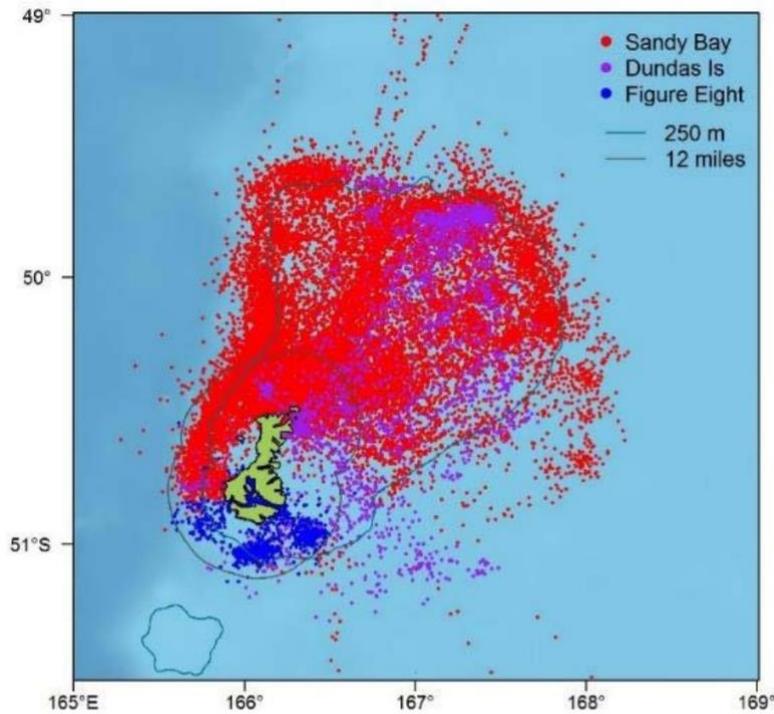


Figure 5: Groomed and filtered fix locations for NZ sea lions tagged at three different colonies at the Auckland Island. Source²¹

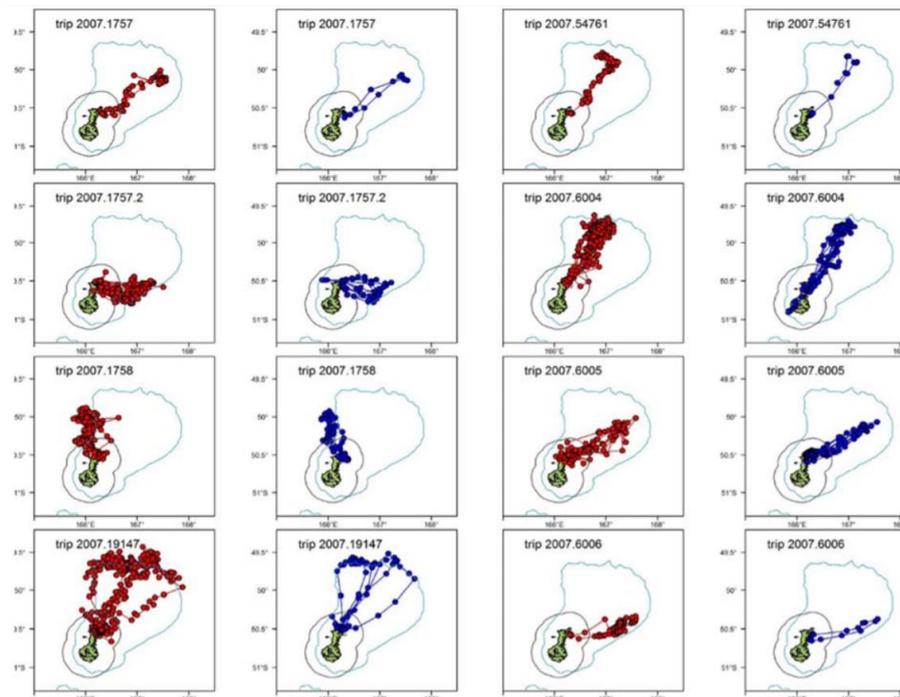


Figure 6: Comparison of groomed telemetry data for 8 tagged sea lions showing filtered fixes (red symbols) and fitted locations (blue symbols). The 250 m depth contour (light blue line) and 12 nautical mile marine reserve boundary (grey line) are also shown. Source²¹.

50. Fisheries NZ map squid fishing effort over time (Figures 7a-c²²)³⁴. Over time the area squid is caught in varies, but primarily there are two distinct areas: one towards the north / north-eastern Auckland shelf boundary and one towards the south-eastern boundary of the Auckland shelf. Figure 7a-c also show the locations of where NZ sea lion have been observed killed. As part of the public consultation on Fisheries NZ should have updated fishing effort maps and overlaid where the latest NZ sea lions were killed.

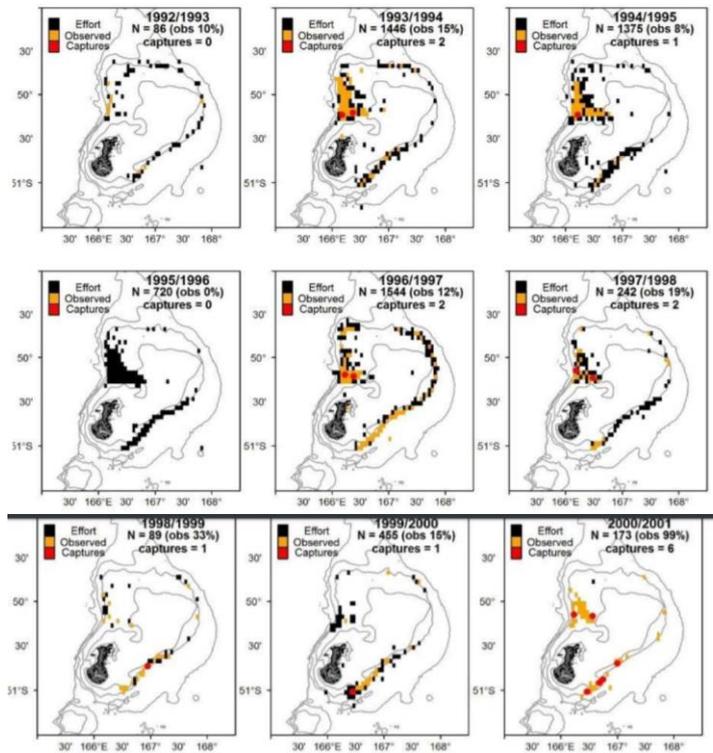


Figure 7a: Spatial distribution of fishing effort from 1992 to 2001. Source²¹

³⁴ Unfortunately Forest & Bird wasn't able to get access to adequate effort data to better assess how it has changed through time and was reliant on these maps. We also do not know where in the 6T fishery the seven observed sea lions were killed.

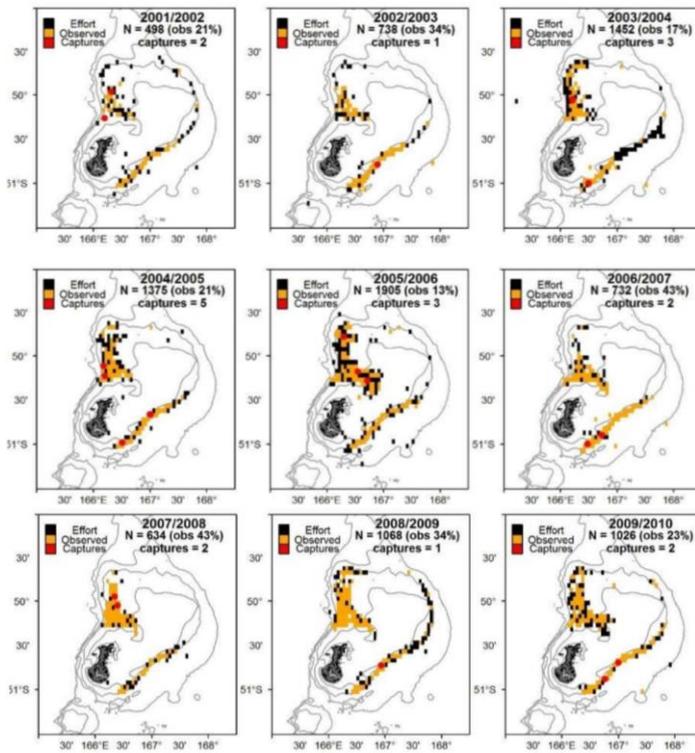


Figure 7b: Spatial distribution of fishing effort from 2001 to 2010. Source²¹

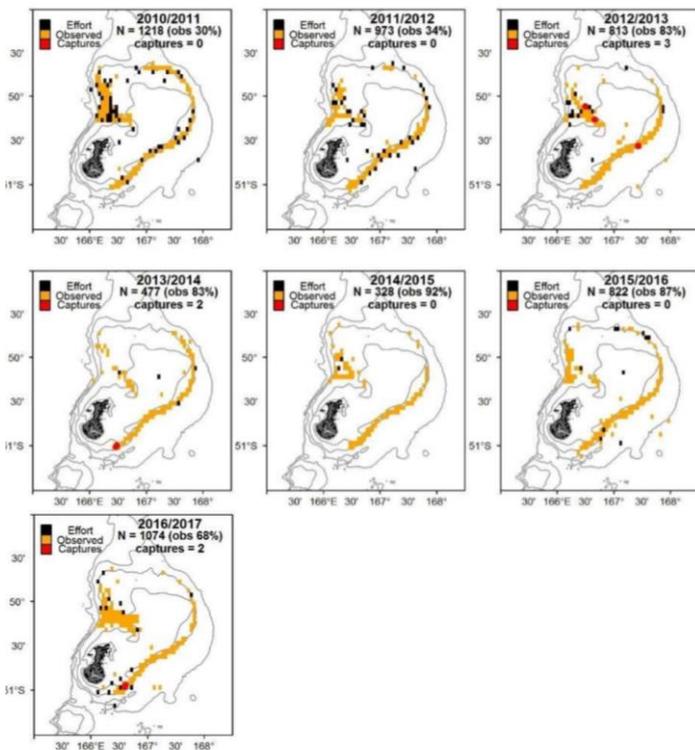


Figure 7c: Spatial distribution of fishing effort from 2010 to 2017. Source²¹

1.5: Option 4 – temporal Auckland Island trawl exclusion zone

51. The Auckland Island NZ sea lion population remains an important breeding stronghold for this species. Telemetry data²²⁻³² highlights that lactating female NZ sea lions are central place foragers which mean they are restricted in the area they forage as they have to return to the same location at the end of each foraging trip to their dependent pup. Lactating females tend to prefer foraging on the Auckland Island shelf (within the 250m depth contour) and the shelf edge. Not only is lactation the most energy demanding period for a female sea lion, but this means these sea lions need to optimise their foraging behaviour to maximise energy intake to rear their dependent pups successfully³⁰.
52. Lactating NZ sea lion foraging grounds overlaps with the Auckland Island squid fishery (6T). NZ sea lions are killed accidentally despite the use of sea lion exclusion devices (SLEDs) on all squid trawl nets. This season seven NZ sea lions were observed killed, whilst this number may seem low it is likely to be higher as observed sea lion deaths only represent a proportion of those killed.
53. Squid makes up a proportion of NZ sea lion diet. This overlap between foraging grounds and fishing also highlights a potential for ecological resource competition^{5,7,23-28}. Comparisons of NZ sea lion pup 'health' between the Auckland Islands and the mainland Otago/ Southland show that nutritional stress could be a factor at the Auckland Islands^{5,22-31,35}. Forest & Bird supports further research into resource competition and nutritional stress.
54. Fisheries NZ is proposing varying options of an acceptable level of FRML as the primary tool for managing squid fishing impacts. These options will not drive continual improvement, innovation or any reduction in bycatch rates. Forest & Bird does not support this approach especially for a declining population and have in consultation with other eNGOs and scientists developed Option 4.
55. Forest & Bird is proposing as an interim measure the Minister of Fisheries creates a temporary trawl exclusion zone to be implemented for the 2019/2020 fishing season until the TMP is reviewed in 2022 and a holistic approach to mitigate and reduce direct fisheries bycatch can occur across all fisheries, alongside management of other threats.
56. Option 4 is a temporal trawl exclusion zone designed as an interim measure to significantly reduce the threat and overlap the Auckland Island squid trawl fishery has on the important foraging grounds of breeding female NZ sea lions. The

³⁵Department of Conservation CSP reports.

temporal nature of the trawl exclusion zone is to reflect that it is needed during the known breeding season when females have dependent pups on shore. The interim nature of the proposal is that a Ministerial decision is needed before the 2019/2020 fishing season starts and there is a lack of time to adequately progress an official assessment of essential areas for all foraging lactating NZ sea lions. Option 4 is designed to give the Minister a realistic and implementable option to be in place for two fishing season while the TMP is updated. Option 4 could provide valuable adaptive fisheries management data when reviewing direct fisheries impacts. Option 4 only restricts trawling seasonally.

57. Forest & Bird has used the best available telemetry information for Auckland Island lactating NZ sea lions which includes over 9,200 positions, with individuals tagged from Sandy, Dundas and Figure 8 locations. Telemetry data was provided by Fisheries NZ under the Official Information Act and is the same data used by Large et al., 2019²². This data (orange dots in Figure 8 & 9) clearly displays preferential foraging grounds. The fisheries data provided by Fisheries NZ was given at grid level for the last five fishing years (2013/2014 to 2017/2018). Whist 'effort' isn't shown the data provided shows there are distinct fishing areas which overlap with foraging grounds but commercial fishing doesn't operate over the entire 250m depth contour and shelf edge.
58. Given lactating NZ sea lions have no alternative foraging grounds Forest & Bird's primary recommendation would be to apply a temporary trawl exclusion zone to protect the entire 250m depth contour (Auckland Shelf) refer to Figure 8. This version of 'Option 4' would not reduce all the risk, as there are breeding female sea lion positions outside of the 250m depth contour. However, if applied it would significantly reduce the threat from the squid trawling. Spatially this option represents seasonally closing 24% of the 6T fishing area.
59. If this Option was implemented, there would likely be an impact to the commercial fishing industry. The squid trawl quota in area 1T (waters outside of the 6T fishing box) is consistently under caught. To date commercial fishers have failed to move outside of the 6T fishing area to catch available quota. Available quota is therefore not what is restricting where the commercial fishers operate. An abundance of squid associated with the 250m depth contour / Auckland Island shelf is more likely to be what is driving this commercial fishing behaviour and area preference. Forest & Bird has acknowledged this impact and while our preference is for fishers to move outside of the important foraging ground of all lactating NZ sea lions we have put forward an alternative option – again as an interim measure and a win-win for both conservation and fisheries, refer to Figure 9.

60. **Option 4 (Figure 9) would not restrict the 6T squid trawl fishery** as it still allows the fishery to fully operate. But, **Option 4 would significantly reduce the threat squid trawl poses** by closing 17% of the 6T fishery during the known breeding season. Option 4 should reduce the bycatch of NZ sea lions. This is an interim step to reduce direct fisheries bycatch until the TMP can be updated and a more holistic and coordinated approach can be taken to reduce direct fisheries bycatch across all fisheries.

61. Option 4 (Figure 9) allows for fishing. The south-eastern area of the 250 m depth contour has been excluded. It was selected based on; published fishing 'effort' information and it having slightly less overlap with known preference of the 250m depth contour based on the telemetry data used and in consultation with fisheries independent sea lion scientists and other eNGOs.

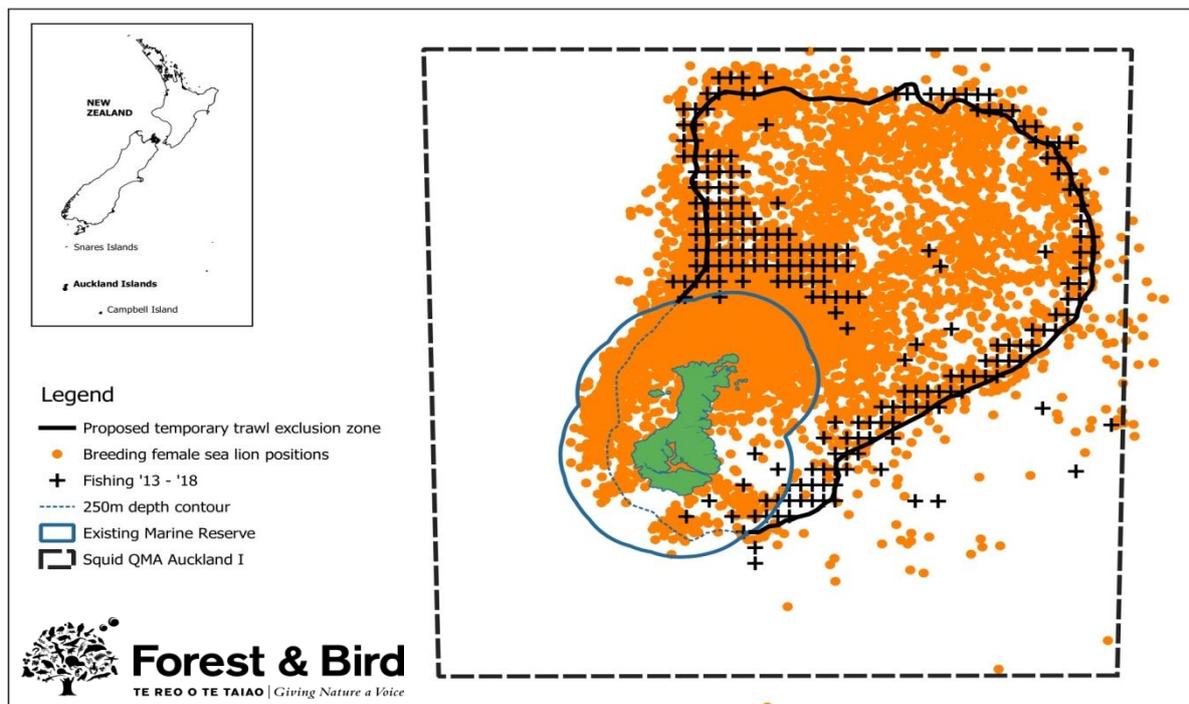


Figure 8: Utilisation distribution of all lactating NZ sea lions tagged from 1996 to 2012 and proposed Auckland Island temporal trawl exclusion zone (Forest & Bird preferred management option). Data provided by Fisheries NZ.

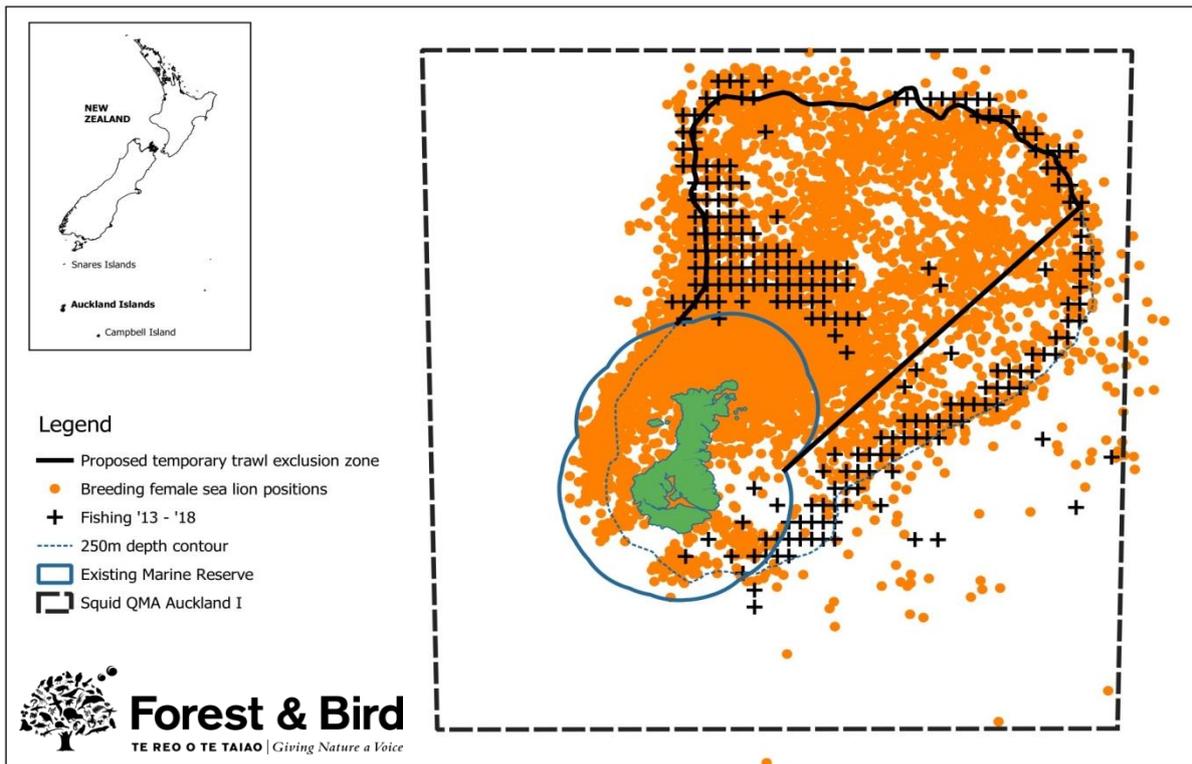


Figure 9: Option 4 – Forest & Bird’s proposed Auckland Island temporal trawl exclusion zone and utilisation distribution of all lactating NZ sea lions tagged from 1996 to 2012. Data provided by Fisheries NZ.

62. Forest & Bird acknowledges a zero bycatch goal isn’t going to be achieved overnight, nor if Option 4 was implemented, but this interim temporal measure represents the intention to continually strive to reduce direct fishing impacts in the areas of highest risk to lactating NZ sea lions while still enabling the squid trawl fishery to operate. As Roberts & Doonan (2016)¹⁶ showed, fishing bycatch is the most significant threat to NZ sea lions that we can actively manage.

63. Forest & Bird wants to discuss Option 4 in more detail with the Minister, Fisheries NZ officials, industry, tangata whenua (particularly Ngāi Tahu) and other stakeholders. Currently there is no process to look at innovation, mitigation, spatial management and how to actively reduce direct fisheries impacts from the squid 6T fishery (or any other fishery). Forest & Bird is proposing that the Minister implement Option 4 as an interim measure for this 2019/2020 fishing season and establish a working group with all key parties to further progress this Option.

Thank you for the opportunity to comment. For any questions please don't hesitate to contact Forest & Bird.

Sincerely,

Katrina Goddard

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