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## **Submission: Management measures for the 2011-12 squid (SQU6T) fishing season**

Forest & Bird appreciates the opportunity to comment on the proposed management measures for the 2011-12 SQU6T fishing season.

### **Forest & Bird**

Forest & Bird (The Royal Forest & Bird Protection Society of New Zealand Inc.) is New Zealand's largest independent conservation organisation, numbering around 70,000 members and supporters. Our members are people who care passionately about New Zealand's unique and special natural environment and native species, and want to make sure that these natural treasures are protected so that they can continue to be enjoyed by future generations.

Forest & Bird has a long history of advocacy for the protection of New Zealand's marine mammals and has been at the forefront of efforts to protect New Zealand sea lions (*Phocarctos hookeri*).

In much the same way that we do not support an allowable kill of Kiwi or Kakapo, Forest & Bird considers that no New Zealand sea lions or other marine mammals that have full protection under the Marine Mammal Protection Act should be killed in any fishing operation, either accidentally or deliberately.

Forest & Bird considers the management objective for the Ministry of Fisheries in relation to New Zealand sea lions should be:

*Zero mortality of New Zealand sea lions from all fishing activities as soon as reasonably practicable, and in any event by 2013*

### **Key comments:**

- Ministry advice on the management of New Zealand sea lion captures has favoured squid utilisation in recent years.
- Ministry advice ignores likely causes for the decline in New Zealand sea lion population
- The Ministry has failed to respond to the increased threat status of the New Zealand sea lion
- The Ministry has disregarded the best available information in order to come to its conclusion that there is no need for a Fishing Related Mortality Limit (FRML)

- The Ministry has not provided any alternative management options
- The Ministry has set unrealistic management review triggers
- There is no evidence of post exit SLED New Zealand sea lion survival

**For the 2011-12 fishing year, Forest & Bird recommend:**

- All available information be presented to the Minister, including
  - reports on SLED efficacy highlighting the uncertainties
  - published literature on likely causes of New Zealand sea lion population decline that indicate that the impacts of fishing are a significant contributing factor
  - how the precautionary approach should be applied given the high level of uncertainty around some of the new research
- The Breen-Fu-Gilbert model is no longer appropriate to be used as it continues to fail to predict the declining pup trend and thus an **independent review** needs to be immediately carried out and the model evaluated against a range of available modelling techniques used to manage fisheries by-catch, not restricted to, but including the PBR to determine what model (or other another technique) would be more realistic to match what is happening in real life
- Due to the misinterpretation of the data and the large uncertainties associated with the population model, the Ministry should withdraw the management option proposed within the IPP and reverts back to the 2010 – 11 management option (while the issues are addressed), but with the following updates:
  - The strike rate 5.65% should be updated to reflect the best available information. At a minimal 6.1% (the mean for the last ten years) should be used. The 5.65% strike rate does not account for the increase in tow length, and a 10% strike rate would be more appropriate.
  - Due to the large uncertainties and assumptions that led to the increase in the SLED discount rate we propose this should be reverted at a minimum back to the 35% used during the 2010 – 11 season. Forest & Bird does not support the use of a discount rate at all, we therefore support 0%, as post-exit survivability is completely unknown and cryptic mortality is also not accounted for.
  - Application of harvest control rule 308 be applied as an option for the Minister
- Increase observer coverage from 30% target to 100% target for the 2011 – 12 SQU6T season
- An FRML be applied to all fisheries operating in the sub-Antarctic fishing areas.
- Additional management measures include:
  - extension of the no-trawl Marine Mammal Sanctuary around the Auckland Islands to the continental shelf edge (500m contour);
  - promotion and trialling of squid jigging around the Auckland Islands;
  - incentives to transfer quota from 6T in to other fishing areas (1T) or to fishing methods (jigging).
- Continued investment into critical research

## 1. Introduction

Forest & Bird is disappointed the Initial Position Paper (IPP) was delayed, released after the general election, and was released without notifying stakeholders.

Forest & Bird is concerned by the major change in the management measures proposed for the squid fishery (SQU6T), particularly by the proposal that the “*best available information*” leads to the conclusion that there is no need for a Fishing Related Mortality Limit (FRML).

Forest & Bird is disappointed with the manner in which the Ministry of Agriculture and Forestry (the Ministry) has proposed to advise the Minister in relation to the interaction of New Zealand sea lions with the squid fishery. In particular:

- the failure to provide the Minister with all available information;
- the failure to provide the Minister with alternative fisheries management options;
- the failure to present the complex information in a balanced manner;
- the failure to follow a transparent consultation processes
- the withholding of information for relevant stakeholders
- the continued failure to adequately reflect stakeholder submissions, especially those from the environmental and scientific perspectives.

Forest & Bird considers that the last few year’s advice papers have been misleading, selective in the information presented (overstating some of the available information and understating or ignoring other relevant information), framed in a manner that favours the utilisation of squid and fails to adequately reflect the requirements under the Fisheries Act.

## 2. Information underpinning the decision

There are several pieces of information that underpin any decision on management for the 2011-12 squid (6T) fishing year:

### 2.1 Threat status of New Zealand sea lions

New Zealand sea lions (NZ sea lions - hereafter) once bred around mainland New Zealand coasts but now only breed in a few restricted colonies on the sub-Antarctic Islands plus a few individuals on Otago beaches.

The NZ sea lion is classified as “Vulnerable’ and projected in decline by the International Union for the Conservation of Nature<sup>1</sup>.

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<sup>1</sup> IUCN (2008). 2008 IUCN red list of threatened species. Retrieved from <http://www.iucnredlist.org>

In June 2010 the Department of Conservation publically notified the elevated threat status of NZ sea lions.

NZ sea lions now have the Department of Conservation's highest endangered ranking – “nationally critical”, ranking them alongside other iconic threatened species such as kakapo and Maui's dolphins.

NZ sea lions around the Auckland Islands have suffered a 46% decline since 1998 (pup counts: 2518 to 1550 +/- 41). The most recent pup counts (2010-11) also showed a 15% decline from the previous year (2009-10)<sup>2</sup>.

Since the increased threat status in 2010 and the continued decline in pup production there has been no management response to this information by the Ministry. The advice to the Minister on the management option for the upcoming fishing season did not highlight the significance of the latest pup counts or the overall population trend.

The Ministry has also misled the Minister by stating that the most recent research “*demonstrates that fishing is very unlikely to be having a direct effect on the sea lion population*” (IPP, para. 12). Forest & Bird believes the Ministry has been selective in the information provided and has ignored numerous key literature, specifically a recent peer-reviewed article by Robertson & Chilvers<sup>3</sup>. Based on the best available evidence this research investigated what the most plausible hypotheses are for the observed population decline for the NZ sea lion. Of the nine hypotheses tested, the most plausible were:

- a) fisheries-induced resource competition and
- b) fisheries-related by-catch<sup>3</sup>

Additional research currently in press<sup>4</sup> also found that the current levels of fishing related mortality (FRML average of 89) in the SQU6T fishery was the leading cause for the population decline.

Evidence showing the Ministry assertion that fishing is unlikely to be having a direct effect on the New Zealand sea lion population is wrong and will be further discussed within this submission.

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<sup>2</sup> Chilvers, B. L. (2011a). Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands. Contract Number: POP 2010/01. Final Report. Department of Conservation, New Zealand.

<sup>3</sup> Robertson, B.C., & Chilvers, B.L. (2011). The population decline of the New Zealand sea lion *Phocartos hookeri*: a review of possible causes. *Mammal Review*, **41**(4), 253 – 275.

<sup>4</sup> Chilvers, B. L. (2011b). Population viability analysis of New Zealand sea lions, Auckland Islands, New Zealand's sub-Antarctics: assessing relative impacts and uncertainties. *Polar Biology*, DOI 10.1007/s00300-011-1143-6.

## 2.2 Problems with the sea lion exclusion device

Despite being in operation for a number of years, sea lion exclusion devices (SLEDs) are still not yet proven to effectively reduce the impact of the fishery on NZ sea lions. The information we have to date illustrates there is still significant uncertainty about the efficacy of SLEDs<sup>6</sup>:

- **More female sea lion captures**

Since 1992 to 2010 some 249 sea lions have been captured on observed vessels, 56% of these were females<sup>3, 5</sup>. However, since SLEDs were required to be in use (2004 onwards) there has been a large increase in the proportion of female sea lions captured on observed vessels<sup>6</sup>. The most recent reported is 71% are females (up to 2009 data)<sup>3</sup>.

Many of these females have been found to be pregnant and lactating (indicating the NZ sea lion has a dependent pup) at the time of capture. This is of key concern as adult females are the most important in terms of rebuilding the depleted NZ sea lion population.

- **Exit hole may be closed occasionally by the hood**

The SLED exit still uses a hood, which is subject to closure on turns of the vessel or if floats are not adequately attached (this was filmed during the camera trials). This issue was raised by the disestablished SLED working group, and in previous Forest & Bird submissions (2010), but this issue has not yet been addressed.

- **SLED rotation and possible ‘emptying’ of the net and thus underestimation of NZ sea lion observed captures**

On hauling of the trawl net, the SLED has been observed (by camera footage) to rotate, illustrating a risk of captured sea lions being ‘emptied’ from the net. The forward facing cover (kite) was designed to stop dead sea lions from falling out of the net, however there is no evidence to support that this is the case.

The theory that mammals are emptied from the net is supported by the work of Lyle & Wilcox<sup>7</sup> (referenced in necropsy report<sup>8</sup>) which found that “*out of an estimated 170 pinnipeds passing through the net system, none were hauled aboard (i.e. they fell out of the net before or during the hauling)*”. This included three fur seals which were caught in the

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<sup>5</sup> Thompson, F. N., Abraham, E.R., & Berkenbusch, K. (2011). Marine mammal bycatch in New Zealand trawl fisheries, 1995-96 to 2009 -10. Draft Final Research Report for Ministry of Fisheries project PRO2010-01. (Unpublished report held by the Ministry, Wellington).

<sup>6</sup> Chilvers, B. L. (2008). New Zealand sea lions *Phocarcos hookeri* and squid trawl fisheries: bycatch problems and management options. *Endangered Species Reserach*, 5(2-3), 193 – 204.

<sup>7</sup> Lyle, J. M., & Wilcox, S. T. (2008). Dolphin and seal interactions with mid-water trawling in the commonwealth small pelagic fishery, including an assessment of bycatch mitigation. Department of the Environment and Water Resources, Australian Government.

<sup>8</sup> Roe, W.D. (2010). External review of New Zealand sea lion bycatch necropsy data and methods. AEWG report

trawl which had a top exit hole design, similar to that used in the SQU6T fishery. Lyle & Wilcox<sup>7</sup> highlight a critical point that fur seals “*would not have been observed without the camera system and hence the scope of the by-catch issue would have been **understated**, even with a **high level** of observer coverage*”.

Contrary to what the Industry state, this highlights the fact that in the SQU6T fishery NZ sea lions are likely to be drowning in the nets and simply falling out before the nets are hauled on board. Therefore the total observed captures are likely to be a severe underestimation of actual captures.

The external review of NZ sea lion necropsy data states that there is a:

*“very real possibility that NZ sea lions caught in the arrow squid fishery could be drowning in the net and falling out before the nets are hauled on board. If this is the case, the fact that fewer sea lion are being returned since the introduction of SLEDs may be extremely misleading, as there is no way of being sure that dead animals are not being lost from the net and contributing to a hidden mortality”<sup>8</sup>.*

and that:

*“ this loss of dead bodies could explain some of the decomposed animals that have occasionally been hauled up”<sup>8</sup>.*

Forest & Bird, like others have raised this issue numerous times (in Ministry working groups and previous submissions on the IPP), but this issue is yet to be adequately accounted for by the Ministry.

In addition to likely underestimates of the number of sea lions being captured within the SQU6T fishery, it is also likely that the angle of the SLED within the nets (45<sup>0</sup>) increases the chance of sea lions carcasses being lost. The angle of the SLED is more likely to direct a drowned NZ sea lions out of the net through the exit hole.

- **Potentially life-threatening impact on the metal grid**

Life-threatening brain injury to a female sea lion in a 10m/s collision (moderate to high swim speed) with the SLED grid at the stiffest location mechanically tested may be higher than 85%<sup>9</sup>. Even at low swim speeds, the study indicated a risk of sea lions suffering a mild traumatic brain injury, which while not necessarily fatal, may lead to death by drowning. The Ministry has failed to highlight that survivability of sea lions after exiting SLEDs remains unknown as no assessment of the physical health of exited sea lions has ever occurred.

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<sup>9</sup> Ponte, G., van der Berg, A., & Anderson, R.W.G. (2010). Impact characteristics of the New Zealand Fisheries sea lion exclusion device stainless steel grid. *Centre for Automotic Safety Research*, The University of Adelaide, Australia

- **Biomechanical modelling and assumptions**

The Ministry has accepted that “*a significant source of uncertainty has been whether animals that interact with the SLED, and subsequently exit the net, have sustained fatal injuries in that process*” (IPP, para.30). As a result the Ministry commissioned a biomechanical modelling study<sup>10</sup> to estimate the forces involved in collisions and to assess the likelihood that a sea lion would be killed or concussed if it collided with a SLED grid. This study is based on human crash-test dummies trials and inferred information from video footage of Australia fur seals interacting with Seal Exclusion Devices (SEDs)<sup>7, 11</sup>. There are a number of key assumptions made that contribute to significant uncertainties.

SQU6T trawls where sea lion collisions are taking place are on average between 180 – 220m depth, with a significant proportion of tows occurring much deeper. This compares with the shallower trawls involved with the SED interaction study (predominately less than 150 m). At this depth considerable pressure is exerted on NZ sea lions. This pressure could influence the outcome of a collision, but this was not taken into account with the crash test dummies impact force study.

At these depths light can't penetrate, therefore it is highly unlikely NZ sea lions are able to detect the SLED grids and react.

The biometrical modelling only assess the probability of death via a mild traumatic head injury as a result of a head first impact with the metal grid. Analysis of the video footage<sup>11</sup> that was used to determine how many fur seals hit head first as a proxy for sea lions highlighted that 7 out of 12 seals were confirmed dead and did not contact the SED with their head, but instead had hit the grid with their body<sup>7</sup>.

Abraham<sup>10</sup> noted that there are additional uncertainties associated with the scaling of the HIC values from a test-bed situation to values experienced by sea lions.

The Ministry has again misreported the findings of the experts that reviewed the necropsy data. While they concluded that necropsy of frozen sea lions was “*of minimal use in assessing trauma or in estimating survivability*”, the experts nevertheless went on to note that “*an absence of evidence of trauma is not the same as proof that trauma is not occurring*”<sup>8</sup>. Forest & Bird believes that the biomechanical modelling is a good start at looking at the effect of SLED collisions, but that conclusions made need to be used with caution because of the assumptions and reliance on of data from Australian fur seals in a different fishery.

The Ministry states that the Australian fur seal data was a proxy, but have failed to state within the IPP the uncertainties and limitations that were highlighted by Lyle & Wilcox<sup>7, 11</sup>. Forest & Bird believes this has resulted in a biased and incorrect interpretation of the results.

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<sup>10</sup> Abraham, E.R. (2011). Probability of mild traumatic brain injury for sea lions interacting with SLEDs. Final Research report for the Ministry of Fisheries project SRP2011-03 (Unpublished report held by the Ministry, Wellington).

<sup>11</sup> Lyle, J. 2011. Fur seal interactions with SED excluder device. Report SRP2010-03 prepared for the then Ministry of Fisheries, Wellington, New Zealand.

The Ministry has stated that the “*mean probability of a mild traumatic brain injury that could result in the animal drowning after exiting the SLED was estimated as 2.7%*”. The Ministry goes on to say that sea lions “*are very unlikely to sustain any life-threatening injuries during the course of exiting the net via the SLED*”. This conclusion is based on a flawed interpretation of the study and the lack of information on the post-exit survival of NZ sea lions. These uncertainties and key assumptions regarding the fur seal data will be discussed in further detail below regarding the SLED discount rate.

Forest & Bird believes the Australian fur seal data highlights that video footage can be used to resolve some uncertainties, instead of relying on proxies. However we acknowledge that this would likely be difficult due to the depth and lack of light and problems associated with using artificial light in SQU6T fishery.

### **2.3 Problems with the model used to provide FRML options**

Since the 2003-04 fishing season, FRML options have been derived using the Breen-Kim model. In 2008 this was revised into the Breen-Fu-Gilbert model<sup>12</sup> following considerable debate about the previous model’s limitations. The new model has subsequently been further modified to *correct* for some of its limitations.

Forest & Bird have expressed considerable concern about the use of the model in the past and do not support the use of the Breen et al., 2011 model<sup>13</sup> by the Ministry. Our reasons for not supporting the use of this model are quite simple; there are far too many assumptions, uncertainties and problems associated with the model and its use to have any confidence in meeting the legal obligations and management objectives.

Of particular concern is the fact that the population model continues to fail to predict real life, biological conclusions, specifically the decreasing population trend, thus the model is not realistic. Forest & Bird think the Ministry should overlay the model’s predictions on Figure 3 from the IPP which shows pup production estimates from the Auckland Islands based on actual counts.

A major uncertainty associated with the population model is what the carrying capacity of sea lions is. This has significant implications as the assessment of the harvest control rules by the model relies on two criteria, both of which rely heavily on the carrying capacity:

1. A harvest control rule must provide for an increase in the sea lion population to more than 90% of carrying capacity, or to within 10% of the proportion of carrying capacity that would have been attained in the absence of fishing, and that these levels must be attained with 90% certainty, over 20 year and 100 year projections.

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<sup>12</sup> Breen, P.A., Fu, D., Gilbert, D.J. (2008). Sea lion population model projections and rule evaluations for Project IPA200609, Objective 4. National Institute of Water and Atmospheric Research of New Zealand, Research Report

<sup>13</sup> Breen, P.A. (2011). Further management procedure evaluations for sea lion bycatch control rules. Report for Project SRP2011-04. New Zealand Aquatic Environment Working Group.

2. A harvest control rule must attain a mean number of mature mammals that exceeded 90% of carrying capacity in the second 50 years of 100 year projection runs (to allow for build up of numbers in hypothetical depleted populations over time.

The pre-sealing carrying capacity of the Auckland Island sea lions is not known, but is assumed by the Ministry to be not much more than the 10,000 – 12,000 individuals seen today. Forest & Bird suggests the Ministry encourage and support the research currently underway at the University of Otago to determine a best estimate of what the pre-sealing carrying capacity would have been.

Another concern is the fact that the Breen-Fu-Gilbert model's estimation of FRMLs is highly sensitive to any small changes in assumed variables. In other words, a minor tweak in any one parameter may considerably alter the estimated FRML values.

In addition the model also doesn't take into account other factors like; NZ sea lion mortalities in other fisheries, including SQUIT and other deep sea fisheries like southern blue whiting and scampi. The model also doesn't take into account indirect pressures faced by the NZ sea lion population in particular resource competition with the squid fishery. This has been identified as one of the two most likely hypotheses for the declining sea lion population<sup>3</sup>.

Based on these concerns and the more detailed assessment of the Breen et al., 2011 model and issues raised by Dr. Bruce Robertson in his IPP submission, Forest & Bird believes the model is no longer appropriate due to its inherent limitations and hence the model<sup>13</sup> outputs should be treated with extreme caution. An independent review of the Breen et al., 2011 model<sup>13</sup> is urgently needed and will be discussed in section 5.

This recommendation to review the Breen et al., 2011 model is supported by new evidence<sup>4</sup> (in press) which highlights that the Ministry has got it wrong by concluding that the squid fishery is not significantly impacting the NZ sea lion population.

This new research<sup>4</sup> has further investigated the likely causes for the decline observed in the Auckland Island NZ sea lion population using an age-structured model and population viability analysis. The two impacts assessed were:

- 1) direct effects of fisheries through by-catch deaths, and
- 2) effect of bacterial epizootics.

The findings of this new research showed that the current levels of fishing related mortality (FRML average of 89) was the leading cause for the “population decline and possible functional extinction over the modelled time period”<sup>4</sup>. Chilvers<sup>4</sup> research shows that the Auckland Island NZ sea lion population will be “functionally extinct by 2035”, only 24 years away.

Two peer reviewed articles<sup>3,4</sup> now support the same conclusion, therefore Forest & Bird believes the Ministry is simply ignoring key scientific evidence by stating within the IPP that the most recent research “*demonstrates that fishing is very unlikely to be having a direct effect on the sea lion population that could be considered adverse*” (IPP, 2011 para. 12).

This new research also ruled out the effect of bacterial epizootics, “*although naturally occurring epizootics reduce the growth rate of the population, it does not cause a decline in the Auckland Island population*”<sup>4</sup>.

Clearly it is time for the Ministry to take action as the SQU6T fishery is highly likely to be having a significant impact on the New Zealand sea lion decline. The Ministry is required to provide advice to the Minister using the best available information. The Ministry appears to be providing an extremely biased case, choosing to present the evidence that best supports continued exploitation.

## 2.4 Discrepancies in observed and unobserved reporting

Forest & Bird supports the regular monitoring and reporting regime currently being implemented in the SQU6T fishery.

However, we still consider that there are ongoing problems that have yet to be addressed, in particular, the under reporting of NZ sea lion captures when independent observers are not present (Figure 1).

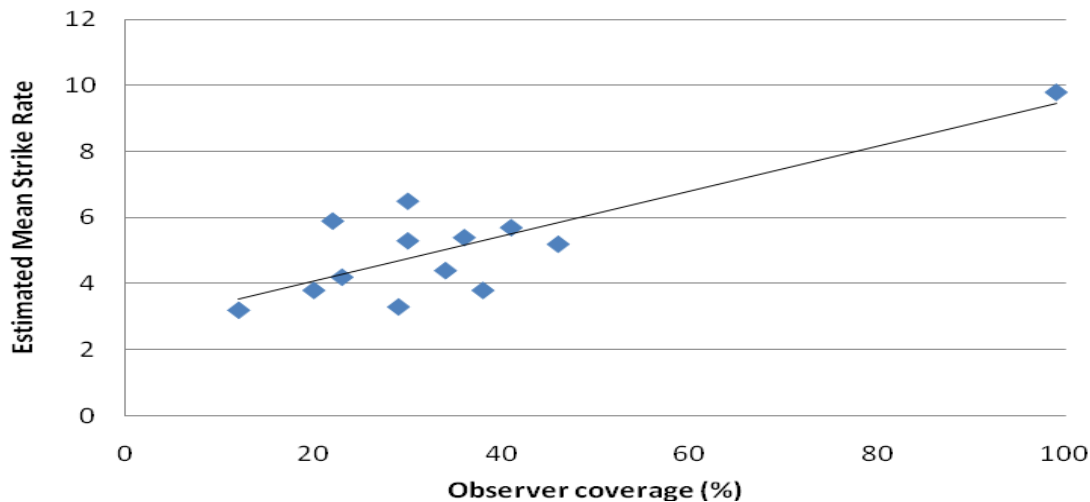


Figure 1. Estimated mean sea lion strike rate (number per 100 tows) relative to observer coverage. (Based on information in the draft Ministry contracted report referenced in footnote 15 of the previous<sup>14</sup>).

We note that even without the high strike rate estimated during SLED trials in 2001, a strong positive correlation exists in this fishery – with higher estimated strike rates with greater observer coverage.

Forest & Birds supports the commitment by the Ministry to increase observer coverage from 26% used in the Auckland Island squid fishery 2009 -10 season<sup>5</sup> to the proposed 50% for the 2011-12

<sup>14</sup> Thompson, F.N., & Abraham, E.R. (2009). Estimation of the capture of New Zealand sea lions (*Phocarctos hookerii*) in trawl fisheries, from 1995-96 to 2007-07. New Zealand Aquatic Environment and Biodiversity Report.

season, but believes this is still not high enough. The target should be 100% observer coverage for SQU6T.

The reason for this is the continued discrepancies between non-Ministry observer reports and Ministry observer reports. Discrepancies are not restricted to the squid fishery. The Ministry found that unobserved hoki vessels on the West Coast of the South Island reported catches “*were significantly different to observed vessels catches*”<sup>15</sup>. The Ministry found there was **clear evidence of misreporting** in the hoki fishery and went on to say “*if reporting is similarly biased in other fisheries, the issue cannot be safely ignored*”<sup>15</sup>. Thus, Forest & Bird believes there are serious concerns over the credibility and compliance of unobserved vessels, particularly regarding reporting of sea lion captures. Forest & Bird believes 100% observer coverage is needed and should be the Ministry’s target.

In addition there appears to be large discrepancies in published reports of NZ sea lion deaths, as noted by Dr Bruce Robertson in his 2011 submission on the IPP (specifically highlighted in table 3, data obtained under the Official Information Act). These discrepancies are large and very significant as observed mortalities are used to model the strike rate and to estimate the total number of sea lions killed in the fishery and thus when the FRML target has been met.

Table 1 (page 4, IPP) only shows the observed mortalities and does not show the estimated mortalities for those years from 1996 – 2011. This is important information as it more accurately shows the likely impact of the fishery. This table also does not show what the observer coverage was, in terms of percentage of tows observed. As highlighted above this is an extremely important factor which influences the number of observed NZ sea lions killed. We recommend that this table is revised before use in the Final Decision Paper to the Minister.

## 2.5 Increased tow duration

The Ministry has failed to highlight the increase in mean tow duration and the impact this has on NZ sea lions in the SQU6T fishery. The management approach of setting an FRML results in restricting the number of tows the squid (6T) fishery conducts in a season, with the intention of managing the impact on NZ sea lions. However, in practice, the fishery has responded to this by simply increasing the length of the tows they conduct. This behaviour has been previously highlighted and discussed in technical working groups, but no management response has been taken.

This increased tow duration has a significant impact on the likely number of sea lions that are killed by the squid fishery.

Ministry data presented in the revised sea lion chapter<sup>16</sup> showed that in 2010, 46.2% of all tows within the SQU6T fishery were **more than 8 hours long**. The strike rate, which determines how many sea lions are killed per 100 tows, was initially based on the standard average tow of **less than**

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<sup>15</sup> Bremner, G., Johnstone, P., Bateson, T., & Clarke, P. (2009). Unreported bycatch in the New Zealand West Coast South Island hoki fishery. *Marine Policy*, **33** 504 – 512.

<sup>16</sup> Draft Aquatic Environment and Biodiversity Annual Review. Revised sea lion chapter, 2011.

**four hours.** Tow length since then has increased and now approximately half of all tows are more than double the original standard four hour tow length. The Ministry has not increased the strike rate to fully adjust for this doubling of tow length.

The strike rate was raised from 5.3% to 5.65%, the 0.35% difference was to account for the increase in average tow length. Forest & Bird does not know how the 0.35% was determined and how it was justified to account for a doubling in tow length. A more logical interpretation is that the strike rate should double, since the tows are in the water double the time. Thus we would expect that the strike rate should have been raised to 10.6% (original 5.3% x2).

This has significant implications on previous FRML's as well as any future FRML's. Effectively, the industry has been able to double the trawling effort by increasing the length of tows, and thus increasing the likelihood of sea lion interactions and deaths.

This issue has been raised numerous times with the industry at working groups and with the Ministry and yet no significant action has been taken.

Specifics regarding the strike rate will be discussed further in section 4.

## **2.6 Sea lion deaths in other fisheries**

The latest Ministry research report on sea lion captures shows that sea lions around the Stewart-Snares shelf and Campbell Island are being caught in addition to sea lions around the Auckland Islands (Figure 2). Fisheries responsible for these captures include the scampi, jack mackerel, orange roughy, hoki and southern blue whiting fisheries.

While most recorded non-squid fishery captures have been in the scampi fishery, the most alarming trend is the increase in captures in the southern blue whiting fishery – showing a steady increase since 2003 and peaking in 2008 – 2009 with a mean estimate of 25 sea lion captures<sup>5</sup>.

Forest & Bird believes the Ministry has failed to highlight the impact and significance of these other NZ sea lion deaths. Whilst NZ sea lion deaths are highest in the SQU6T fishery, the impact of these other fisheries should not be overlooked and are likely to contribute to the declining population trend. An FRML should be applied to all fisheries that kill NZ sea lions, not just SQU6T.

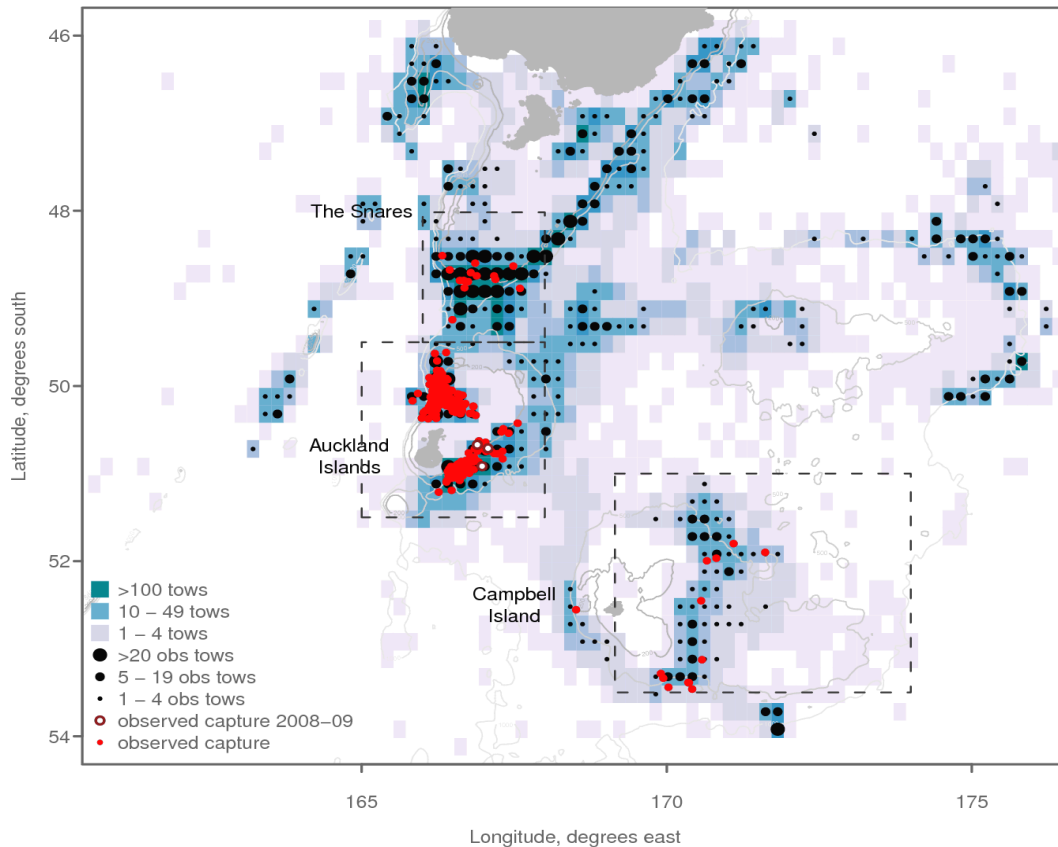


Figure 2: Annual average trawl effort, annual average observer coverage, and observed NZ sea lion captures in the Sub-Antarctic region of New Zealand's EEZ. Data includes all trawl effort, excluding tows targeting inshore species, for the 14 years from 1 October 1995 to 30 September 2009. Dashed lines indicate the areas containing fishing effort that were used for estimating total captures and interactions. Source: AWEG, 2011.

## 2.7 Likely causes for the New Zealand sea lion population decline

Forest & Bird is disappointed that the Ministry has failed to include significant pieces of information it knew about that did not fit with its main advice.

As previously mentioned the NZ sea lion pup production at the Auckland Island has undergone a significant decline by 50% in the last 12 years<sup>2,3,4</sup>.

Robertson & Chilvers<sup>3</sup> reviewed nine potential causes for the decline in the Auckland Island population. These were (i) disease epizootics, (ii) predation, (iii) permanent dispersal or migration, (iv) environmental change and anthropogenic impacts, (v) population 'overshoot', (vi) genetic effects, (vii) effects of contaminants, (viii) indirect effects of fisheries (i.e. resource competition) and (ix) direct effects of fisheries (i.e. by-catch deaths)<sup>3</sup>.

This peer-reviewed work identified that the most plausible hypotheses, based on the best available evidence was (viii) fisheries-induced resource competition and (ix) fisheries-related by-catch.

Robertson & Chilvers<sup>3</sup> found that by-catch from the fisheries was the main anthropogenic cause for the decline observed in the Auckland sea lions. Leaving this crucial piece of information out of the IPP does not provide a balance of scientific viewpoints and is an error the Ministry must rectify by including key research<sup>3,4</sup> in the Final Advice Paper to the Minister.

As mentioned in 2.3, recent work released this month has also highlighted that **the current levels of fishing related mortality was the leading cause for the “population decline and possible functional extinction over the modelled time period”<sup>4</sup>**.

The Ministry has failed to recognise any research which doesn't fit with the Ministry's advice that fishery interactions are not causing any significant impact on NZ sea lion populations. Instead we feel the Ministry has promoted the most likely cause for the decline in pup production is due to disease outbreaks, despite a lack of evidence to support this. The three disease outbreaks in 1998, 2002 & 2003 are likely to have had an impact, but as Chilvers<sup>4</sup> found bacterial epizootics, “*although naturally occurring epizootics reduce the growth rate of the population, it does not cause a decline in the Auckland Island population*”. The major cause of the population decline is the death of adult breeding females<sup>3,4</sup>.

Forest & Bird thus disagrees with the wording used by Ministry within the IPP in paragraph 12  
“*the most recent research, discussed in this paper, demonstrates that fishing is very unlikely to be having a direct effect on the sea lion population that could be considered adverse*”.

“*Demonstrates*” implies certainty, however this is not the case based the ‘most recent research’. There is still good evidence to the contrary and the Ministry should ensure that it is even handed in presenting all the available information in front of the Minister.

## 2.8 Other by-catch associated with the squid (SQU6T) fishery

Forest & Bird feels it is important and appropriate to highlight what additional by-catch is associated with this fishery so that appropriate management decisions can be made.

The SQU6T fishery catches a number of species apart from the NZ sea lion such as NZ fur seals, other fish including globally threatened basking sharks and a significant number of threatened seabirds.

There is concerned over the increase in the number of NZ fur seals being caught and the possibility that sea lions have been misidentified as fur seals. However, no information could be acquired in time to assess if fur seal by-catch was reported from observed vessels with trained reporters or from un-observed vessels.

Of key concern to Forest & Bird is the fact that the squid fishery has the worst record for seabird by-catch of any trawl fishery in New Zealand. Seabirds – particularly albatrosses and petrels are without doubt at some of the highest global concentrations in New Zealand waters and in the southern seas reach their peak.

Recent work on tracking of white-capped albatross (most caught albatross in this fishery<sup>17</sup>) shows the importance of the Auckland and Campbell Region (southern seas) for this species and potential for significant overlap with fisheries<sup>18</sup>. Torres et al.<sup>19</sup> found that in tracking 25 of these birds they associated with fishing vessels in 68% of tracks. A recent report prepared for Ministry of Fisheries indicates that the population of this endemic albatross may be in decline as a result of the level of fishing mortality<sup>20</sup>.

Other species caught in significant numbers are sooty shearwaters and white-chinned petrels. Richard, Abraham & Filippi<sup>17</sup> found that the 95% confidence interval of the risk ratio encompasses one for the white-chinned petrel indicating that the number of fatalities for this species may exceed the Potential Biological Removal (i.e. declining as a result of fishing mortality). This species is listed in the ACAP agreement and the New Zealand threat classification lists it is at Risk: declining. The PBR is also exceeded for white capped albatross, with estimates of between 1850 and 2560 annual fatalities for white-capped albatross across all squid trawls<sup>17</sup>. This species is also listed by ACAP and is also At Risk: declining. Large numbers of sooty shearwaters are also being caught between 973 and 1290. Although on their own the squid trawl fatalities do not exceed the PBR, the combined effect with other fisheries could exceed it for all 3 species.

The vessels operating in the SQU6T fishery are over 28 meters and are required to use a bird scarer of some kind (tori line, warp scarer or bird baffler) and Vessel Management Plans identify the need to manage offal.

It appears from the CSP reports that most birds are caught in the nets, often on the haul when the codend surfaces. It is also apparent from the CSP reports that application of mitigation measures, including offal management is variable, but whether an improvement in this in itself would be sufficient to reduce by-catch significantly is not clear.

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<sup>17</sup> Richard, Y., Abraham, E.R., & Filippi, D. (2011). Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final research Report for the Ministry of Fisheries projects IPA2009/19 and IPA2009/20 (unpublished report held by the Ministry of Fisheries, Wellington).

<sup>18</sup> Thompson, F. N, Abraham, E.R. & Richards, Y. (2011). A population and distributional study of white-capped albatross (Auckland Islands). Report prepared for CSP, DOC

<sup>19</sup> Torres, L.G., Thompson, D.R., Bearhop, S., Votier, S., Taylor, G.A., Sagar, P.M., & Robertson, B.C. (2011). White-capped albatrosses alter fine-scale foraging behaviour patterns when associated with fishing vessels. *Marine Ecology Progress*. **428**, 289-301.

<sup>20</sup> Baker, G. B., Jensz, K., & Cunningham, R. (2011). Data collection of demographic, distributional and trophic information on the white-capped albatross to allow estimation of effects of fishing on population viability – 2010 field season

### 3. Legal obligations

The Minister is required to consider his obligations under the Fisheries Act 1996 in making his decision. In particular section 5 and sections 8 to 14 of the Act.

In the absence of a Population Management Plan, Section 15(2) states the Minister may “*take such measures as he or she considers are necessary to **avoid, remedy, or mitigate** the effect of fishing-related mortality on sea lions*” (IPP 2011, para. 15).

The Minister has the purpose of balancing the utilisation of the squid fishery against the sustainability of the NZ sea lion population, thus it is important that the Minister is aware of the many assumptions and uncertainties associated with the proposed management option so that the Minister can make an appropriate cautionary decision as required by Section 10 of the Fisheries Act:

- a) “*Decisions should be based on the best available information*”;
- b) “*Decisions makers should consider any uncertainty in the information available in any case*”;
- c) “*Decision makers should be cautious where information is uncertain, unreliable or inadequate*”;
- d) “*The absence of, or uncertainty in any information should not be used as a reason for postponing or failing to take any measures.*”

Forest & Bird does not believe that the Ministry has provided “the best available information” in the IPP in relation to the impacts of the squid fishery on NZ sea lion populations. The Ministry’s proposed advice to the Minister is certainly not “*cautious where information is uncertain, unreliable or inadequate*”.

The Minister is also required to consider other obligations. For example:

- The Marine Mammal Protection Act (1978)
- The UN Code of Conduct on Responsible Fisheries (1995)
- The UN Fish Stocks Agreement

The Marine Mammal Protection Act gives particular guidance on setting FRMLs

Section 3F: “*In determining the maximum allowable level of fishing-related mortality for threatened species or any other marine mammals under section 3E(1)(f), the Minister,—*  
*(a) in the case of any **threatened species**, shall determine a level of fishing-related mortality which should **allow the species to achieve non-threatened status as soon as reasonably practicable, and in any event within a period not exceeding 20 years***”

Section 3G(2): “*In setting any area-based limit for a threatened species under section 3E(1)(g) of this Act, the Minister shall determine a level of fishing-related mortality for a discrete population referred to in subsection (1) of this section which should **neither cause a net reduction in the size***

*of the population nor seriously threaten the reproductive capacity of that population”* – section 3G(2).

The UN Code of Conduct outlines obligations to apply a precautionary approach to fisheries management, above that prescribed in s.10 of the Fisheries Act. A recent review of application of the FAO Code of Practice<sup>3</sup> indicates that New Zealand needs to do a lot more to implement the code, particularly in the area of stock management, impacts of fishing, and bycatch and habitat effects<sup>21</sup>.

Forest & Bird would expect this important legislative information to be included in the final advice given to the Minister.

While we disagree with the Ministry’s advice we note that if the Ministry continues to state that the squid SQU6T fishery is now no longer having an impact on the declining NZ sea lion population, then there is no longer any reason for NZ sea lions to be managed under the Fisheries Act. In which case, the NZ sea lions should be managed under the Marine Mammal Protection Act with a Population Management Plan.

## **4. 2011 - 12 Management Option**

Forest & Bird is concerned by the major change in the management measure proposed for the squid fishery (SQU6T). The Ministry has put forward just one option which is to remove the FRML and has stated that this is based on the “best available information”. Forest & Bird considers that there is a lack of scientific evidence to support this significant change in management. There is a complete lack of evidence to support the advice that “*direct effect of fishing-related mortality on the New Zealand sea lion population is minimal*” (IPP 2011, para. 42).

### **4.1 Best available information**

In making any decision on management options for the 2011 -12 SQU6T fishing season, the Minister must take into account the best available information. As outlined earlier in this submission, Forest & Bird are appalled that the Ministry has failed to provide the Minister with the best available information.

### **4.2 Strike rate**

The strike rate is a measure of the number of sea lions killed per tow<sup>5</sup>. Due to the use of SLEDs in trawl nets in the SQU6T fishery, the actual strike rate is not able to be determined. Instead, scientists estimate the strike rate using models.

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<sup>21</sup> Pitcher T, D. Kalikoski, G. Pramod and K.Short (2009) Not honouring the code *Nature* 457, 658-659 (5 February 2009) | doi:10.1038/457658a; Published online 4 February 2009.

For some years the strike rate used to estimate FRMLs has been 5.65%, which represents 5.65 NZ sea lion deaths per 100 tows. Forest & Bird has previously expressed concern about the strike rate on the basis that it smoothes over the data from 2001, when SLEDs were trialled in the fishery with cover nets tied down and vessels had 100% observer coverage. At this time the observed strike rate was 11.65%.

The Ministry has decided to continue to use this strike rate of 5.65% and “*considers*” this “*represents the best available information*” (IPP 2011, para. 36). This statement is hard to justify as earlier in the IPP (para. 23) the Ministry states “*The mean strike rate for the last ten years is 6.1%*”. Clearly if the Ministry wanted to use the “best available information” then 6.1% would have been used over the 2008 modelling which estimated the 5.65% value.

It is also important to point out that the modelling shows that the strike rate could have been as high as 10% (based on the 95% confidence intervals). This upper estimate strike rate is closer to the observed 2001 strike rate mentioned above. Again this raises questions about validity of the proposed 5.65%.

In addition, it is important to reflect on the large discrepancies between the reported number of NZ sea lions observed and the information obtained under an OIA request (Dr Bruce Robertson, 2011 IPP submission). This has significant implications as the number of observed NZ sea lions is used to determine a strike rate. The latest data released by the Ministry shows that for the 2009-10 season the mean estimated strike rate was 7.2% with a very large 95% confidence range (2.5 – 15.8). This highlights the uncertainty in using the predetermined 5.65% rate, and that this rate does not represent the best available information.

Another key factor which has not been accounted for is tow length. The strike rate was originally determined per 100 tows, these 100 tows had a standard tow length of less than four hours. Approximately 50% (46.2) of all tows carried out within the SQU6T fishery are now longer than 8 hours in duration. This has effectively doubled the amount of time the trawl nets are in the water.

The Ministry states “*longer tows are expected to catch somewhat more sea lions than shorter tows*” (IPP 2011, para. 46), yet the Ministry has failed to adequately account for this.

Thus the Ministry has allowed more sea lions to be killed in the SQU6T fishery by underestimating the most likely strike rate. Before the strike rate can be used with any confidence Forest & Bird recommends that a new strike rate is determined which uses the best available information, accounts for the significant increase in tow length and for the discrepancies in observed captures.

#### **4.3 SLED discount rate and population model**

A discount rate is a reduction to the strike rate for tows made using approved SLEDs<sup>5</sup>. The discount rate reflects the assumption that sea lions that would have otherwise drowned in the net, survive if they exit a trawl net via a SLED. A discount rate allows a vessel with a SLED to carry out more tows<sup>5</sup>.

Thus the number of sea lions that are killed = strike rate (5.65%) - SLED discount rate

The current discount rate of 35% means for vessels with approved SLEDs the (questionable) strike rate of 5.65% is reduced to 3.67%.

The management approach of rewarding a discount on the strike rate if a vessel uses a SLED has had a significant influence on the FRML and strike rate decisions in the past.

The Ministry is proposing an increase in the discount rate from 35% to 82%. The Ministry states this is based on “*the best available information*” and “*new research*”. However, the Ministry has failed to highlight that post-exit survivorship of sea lions from SLEDs is still unknown, therefore **any** discount rate is inappropriate.

Forest & Bird believes the proxy fur seal data is too uncertain, inadequate and unreliable for the Ministry to conclude “*the discount rate should be higher than the current value of 35*” (IPP 2011, para. 20).

The Ministry has acknowledged that SLEDs physically add a risk of mortality to sea lions through collisions. The Ministry commissioned biomechanical modelling “*to estimate the forces involved in collisions and to assess the likelihood that a sea lion would be killed or concussed if it collided*” head first “*with a SLED grid*”.

Having acknowledged this additional risk of mortality the Ministry should incorporate this extra risk in to the equation which determines the number of sea lions that can be killed (from Dr Bruce Robertson 2011 IPP submission):

$$\text{The number of sea lions killed} = [\text{strike rate (5.65\%)} + \text{mortality from grid collision}] - \text{SLED discount}$$

As mentioned in section 2.2 of this submission Forest & Bird does not support the results from the biomechanical modelling which concluded that the probability of a mild traumatic brain injury that could result in a sea lion drowning was only 2.7%. We are disappointed the Ministry failed to highlight the large uncertainties and states that “*animals are very unlikely to sustain any life-threatening injuries during the course of exiting the net via the SLED. Consequently, the Ministry’s view is that the probability that animals have not had a life-threatening trauma after exiting a trawl net via a SLED is 97%*” (IPP 2011, para. 31). This statement is based on a complete lack of evidence on post exit survivorship of NZ sea lions and additionally is based on using flawed data.

#### 4.3.1: Data

Section 2.2 of this submission highlighted that there are a number of limitations and uncertainties associated with the biomechanical modelling itself and caution should be used when interpreting the results.

Important data *appears* to have been left out of the IPP. The Australian fur seal data<sup>11</sup> showed that approximately 44.7% of seals did not collide with the SED grid and thus no conclusions could be made on their survivability<sup>7</sup>. Thus if the proxy relationship between the fur seals and NZ sea lions used in the study is applied to the management proposals, the 97% post-SLED exit survivability presented by the Ministry can only apply to those NZ sea lions that have collided with the SLED grid. Based on the proxy data this would represent about half of all NZ sea lion interactions. The Ministry should highlight this in the final advice given to the Minister.

The Australian SED study found that six fur seals had been killed that didn't collide with the SED grid, instead they had drowned within the trawl net (as they were retained for a significant period of time)<sup>7, 11</sup>.

It is important to highlight that no investigation was carried on the condition of the Australian fur seals that exited the SED, thus no conclusions can be made about the level of survival of these animals.

A critical observation from the study was that of the seal mortalities (those from hitting the grid and those that had drowned) eventually all of them fell out of either the bottom escape hole (during bottom trials) or the top escape hole (during top trials – similar to SLED design) prior to the net being landed on-board the vessel.

Lyle & Wilcox<sup>7</sup> therefore made an important conclusion, that many seals would not have been observed (recorded by on board observers) without the camera system and ***“hence the scope of the by-catch issue would have been understated, even with a high level of observer coverage”***.

This information has not been provided by the Ministry in the IPP. Given this information it is doubtful that the Ministry can have any certainty in its statement *“that direct effect of fishing-related mortality on the New Zealand sea lion population is minimal”* (IPP 2011, para. 42).

#### 4.3.2: Cryptic mortalities and sensitivity used

Cryptic mortalities associated with the SQU6T fishery remain unknown and Forest & Bird believes this has not been adequately accounted for in the SLED discount rate being proposed.

*“This approach [the Ministry’s new evidence] assesses risk associated with collisions with the grid of a SLED and cannot be used to assess other sources of mortality resulting, for example, from an animal being retained in a net long enough for them to exceed their dive limit before reaching the surface after escaping from either the SLED or the front of the net. Such sources of cryptic mortality have always existed, are presently unquantified and are not reflected in the estimated overall survival rate of encounters with trawls”*<sup>16</sup>.

Experts that carried out an external review of New Zealand sea lion by-catch necropsy data concluded that “*the energetic cost of swimming from the mouth of the net to the level of the escape hole is high, and could mean that many sea lions that enter the net in the latter part of a dive will die*”<sup>8</sup>. Thus the time taken to negotiate the SLED in deep water with no natural light is an important piece of missing information, and could help determine the survivability if sea lions even if they are able to exit the net, based on known diving limits.

In addition to this NZ sea lions have been shown to have foraging / diving behaviours that are at their physiological limits, with 68% of all their dives being beyond their calculated anaerobic dive limits<sup>22 23</sup>. Thus the possibility of sea lions drowning in the net before they reach the SLED and post-exit has not been adequately taken into account when determining the strike rate and thus discount rate.

It is not clear why the Ministry decided to use a 10% sensitivity analysis “*to assess the possibility that post-exit survivability is lower than 82%, due to the possibility that animals drown on their return swim to the surface*” (IPP 2011, para. 37). We question how realistic this value is.

More research is needed to get a better understanding of cryptic mortality, but without out it the Ministry should have applied a realistic sensitivity trial. Potentially 100% of all NZ sea lions could have drowned post-exit, but this is unknown. Potentially cryptic mortality could be 0%, but again this is unlikely based on the proxy fur seal data and already known NZ sea lion deaths, thus 0% is not likely. It would have been more appropriate for the model to run several, more realistic sensitivity trials. We would have encouraged between 50% - 90% to be used as there is no justification for the 10% that has been used to account for all uncertainties.

What is also surprising is that the Ministry has continued to use the 82% discount rate and has failed to apply its 10% sensitivity to account for the uncertainty. If it had done this the value would have dropped to 72%. This could have a significant impact on the outcome of the management decision as the discount rate of 82% is used in the population model to determine FRML, or lack of in this case.

#### **4.3.3: SLED design and consequences**

The Ministry as well as the Industry have stated that there is no chance that sea lions killed in the net could go undetected, due to the design of the SLEDs.

The Ministry has claimed that the reduction in observed numbers of sea lions is because of design “*improvements*”.

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<sup>22</sup> Chilvers, B. L., Wilkinson, I.S., Duignan, P.J., Gemmill, N. (2006). Diving to extremes: are New Zealand sea lions (*Phocarctos hookeri*) pushing their limits in a marginal habitat. *Journal of Zoology London*. **269**, 233 – 240.

<sup>23</sup> 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), 106 – 113.

Forest & Bird has some serious concerns regarding the effectiveness of SLEDs. Design changes have been made, but without any evidence to support that these changes have resulted in less NZ sea lions being killed or injured, or are more likely to survive once they exit. Post-exit survival of NZ sea lions still remains unknown. Therefore Forest & Bird would strongly encourage the Ministry to either remove such biased assumptions when briefing the Minister, or to be explicit about the uncertainties associated with such assumptions.

The proxy study used to develop this “new research” highlighted the finding that not one single observed (via video footage) dead fur seal was landed on board the vessel<sup>7</sup>. This could potentially be happening in the New Zealand SQU6T fishery. It is possible that the few sea lions that are landed are simply the few that didn’t drop out, or were secured by the kite. There is no evidence to show this is not happening. The angle of the grid could potentially aid this and direct sea lion carcasses out. Absence of evidence of observed landed sea lions is not evidence sea lions are not being killed.

Forest & Bird **does not support** the proposed increase in the SLED discount rate. The Ministry’s failure to present the uncertainties and limitations of the “new research” to the Minister is inappropriate. Forest & Bird recommends that at a minimum the current discount rate of 35% should remain (despite the known uncertainties associated with SLEDs) until further research is conducted to determine post-exit survivability and cryptic mortality accounted, both of which would affect the discount rate.

#### 4.4 Model & Harvest Control Rule

Forest & Bird does not support the use of the Breen-Fu-Gilbert model<sup>13</sup> for reasons stated in section 2.3 of this submission.

Based on the continued demonstrable uncertainty in the Breen-Fu-Gilbert model<sup>13</sup>, and it’s particularly failure to predict the real life population decline, Forest & Bird recommends that the Ministry no longer relies on the outcomes of the model with such certainty. An independent review evaluating the performance of the model used to manage NZ sea lion interactions in the SQU6T fishery is urgently needed.

#### 4.5 Management proposal, Monitoring and Review

The Ministry proposes no FRML be set in the SQU6T fishery. Forest & Bird does not agree with this single management option being put forward as it is not based on the best available information and the information that it is based on has a much greater level of uncertainty, unreliability and inadequacies than the IPP indicates.

Key concerns about the inadequacy of the IPP area:

- the lack of use of the best available information,
- that post-exit survivorship is still unknown,
- proxy data has been optimistically used,
- biomechanical modelling has significant limitations,
- SLED efficiency is still questionable,

- cryptic mortality remains unknown and is not accounted for,
- strike rate is not realistic,
- SLED discount rate increase is flawed,
- population model's uncertainties and assumptions and continual lack of real life prediction,
- the New Zealand sea lion population is still declining and has had a significant reduction since the squid fishery SQU6T was established,
- two peer-reviewed studies have drawn similar conclusions, that the direct effect of the SQU6T fishery through by-catch is the most likely cause for the continued decline of the nationally critical NZ sea lion<sup>3,4</sup>.

#### 4.5.1: Five year review

Based on the large number of uncertainties identified within this submission, Forest & Bird recommends that the proposed five year review should be dropped. Many of the key parameters constantly change thus the most appropriate management decision would be to continue to review the management plan on an annual basis.

#### 4.5.2: Review triggers

The Ministry's proposed triggers for an early review are not acceptable; of particular concern to Forest & Bird are triggers d, e & f.

- Trigger a: "less than 98% of tows undertaken in the SQU6T fishery use a SLED that meets the specification detailed in the SQU6T Operational Plan"  
This management proposed in the IPP is a large change from previous years; it **assumes** SLEDs are working much more efficiently, and there are significant implications if they are not. Therefore, we believe there is no justifiable reason why less than all tows should have approved SLEDs. We therefore recommend that the trigger should be "less than 100% of tows".
- Trigger b: "*less than 95% of tows undertaken in the SQU6T fishery meet the reporting requirements specified in the SQU6T Operational Plan*"  
Again, as above, we believe there is no justification that all reporting shouldn't meet the requirements specified.
- Trigger c: "*More than 15 observed sea lion captures in any one SQU6T season*"  
Forest & Bird finds the wording of this trigger misleading as observed sea lions captures depend on the observer coverage. Fifteen is an unrealistic number. If SLEDs are performing the way the Ministry implies they are, why not make this one, or none.

Ideally a capture limit would be based on any capture, but as we know there are large discrepancies in observed vs. unobserved capture reports. In addition having a capture target of 15 could encourage under-reporting of by-catch, which would have significant impacts.

Observer coverage was less than 30%. The Ministry notes that it will be increasing the observer coverage to 50%, which is not adequate given the proposed change in NZ sea lion management. We believe trigger c should be a rate, and that 100% observer coverage is needed for the 2011-12 season.

- Trigger d: *“More than 4,700 tows”*  
Forest & Bird cannot understand the logic that was used to come up with 4,700 as a maximum number of tows. For the past 14 years less than 4,000 tows a year were carried out in the SQU6T fishery. In the last four years, the total number of tows was less than 2,000. How the Ministry can justify this significant increase in tows is questionable. Only in 1996 did the total number of tows exceed 4,000, with 4,474 tows carried out. The only conclusion we can assume from this proposal is that the Ministry is planning on increasing the TACC for SQU6T. An increase in tows from the 1,190 in 2010 to a max of 4,700 would presumably increase the total amount of squid landed. In 2004 2,598 tows were carried out and the TACC of 32,369 tonnes was exceeded. With no FRML this presents an even greater risk to sea lions.

If the TACC was increased there are considerable concerns over the impact this would have on the ecosystem. Particularly the indirect impact this would have on the declining sea lion population through resource competition<sup>3</sup>.

- Trigger e): *“A pup count of fewer than 1,501 pups on the Auckland Islands”*  
Forest & Bird is pleased there is a pup count trigger, but surely any more of a decline to a nationally critical species is not wanted, therefore we propose that the pup count be any fewer than 1550, which was the count this year<sup>2</sup>.
- Trigger f): *“Any new information that suggests the risk to sea lions posed by fishing in SQU6T is appreciably greater than current information suggests”*.  
There is a real scepticism that the Ministry would pursue any new information, especially when the Ministry has clearly stated that the fishing industry is having a minimal impact, without inadequate scientific evidence to support this.

## 5. Forest & Bird recommendations

Forest & Bird strongly disagrees with the single management proposal put forward in this IPP. We believe this is not based on using the best available information and the information used within the IPP is misleading and based on flawed logic, as discussed throughout this submission.

Forest & Bird has highlighted that the Ministry has only proposed one option for the Minister. Given previous decisions by the Minister based on Ministerial advice which resulted in court cases because of use of the precautionary principle in relation to the best available information, we feel the Ministry has

not adequately provided advice for the Minister. If the Minister decides the one proposed management option is not acceptable, then there are no other options. Referring to the 2004 court case<sup>24</sup>, concerns were raised by the courts about the limited options provided to the Minister.

Another problem Forest & Bird has is the assumption that it is acceptable to allow a percentage kill of NZ sea lions – a threatened species that is in decline and is protected under other Acts.

Forest & Bird recommend the following management objective should be applied in relation to managing the effect of fishing on New Zealand sea lions:

***Zero mortality of New Zealand sea lions from fishing activities as soon as reasonably practicable, and in any event by 2013.***

This management objective is achievable by switching the squid trawl fishery into a squid jig fishery. See below:

## **5.1 Key IPP management recommendation**

Due to the misinterpretation of the data and the large uncertainties associated with the population model (like continued failure to predict the real population trend), the Ministry should withdraw the management option proposed within the IPP which proposes no FRML and a five year management plan.

While the more significant management concerns are addressed Forest & Bird proposes the Ministry **reverts back to 2010 – 11 management option, but with the following updates**. This will still allow quota holders to fish, while the key issues are addressed:

- a. The FRML should be set using the best available information
- b. The strike rate 5.65% should be updated to reflect the best available information. At a minimal 6.1% (the mean for the last ten years) should be used. The 5.65% strike rate does not account for the increase in tow length discussed, and a 10% strike rate would be more appropriate.
- c. Due to the large uncertainties and assumptions that led to the increase in the SLED discount rate we propose this should be reverted at a minimum back to the 35% used during the 2010 – 11 season. Forest & Bird does not support the use of a discount rate at all, as post-exit survivability is completely unknown and cryptic mortality is also not accounted for.
- d. Application of harvest control rule 308 be applied as an option for the Minister

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<sup>24</sup> Where Squid Fishery Management Company Ltd v Minister of Fisheries High Court

## 5.2 Additional IPP recommendations:

1. The Ministry provides the Minister using the **best available information**, which includes highlighting uncertainties and limitations associated with that information.
2. The Breen-Fu-Gilbert model is no longer appropriate to be used and thus an **independent review** is urgently needed and the model evaluated against a range of available modelling techniques used to manage fisheries by-catch, not restricted to, but including the PBR to determine which model (or other another technique) is more realistic to match what is happening in real life.
3. A number of additional fisheries operating around the sub-Antarctic Islands catch sea lions. Forest & Bird proposes that a FRML should be applied to **all fisheries** operating in the sub-Antarctic fishing area. Sections 15(5b) of the Fisheries Act would allow the Minister to do this.
4. Increased observer coverage on all vessels operating in SQU6T from 30% to 100% for the 2011-12 season.
5. If Ministry continues to advocate that there is no need for a FRML then the management of the NZ sea lion decline should no longer be managed under the Fisheries Act. NZ sea lions should be managed under the Marine Mammals Protection Act. This would result in the Minister of Conservation approving the development of a Population Management Plan which would give the Minister statutory power to take the necessary steps to allow the nationally critical NZ sea lions to achieve a **non-threatened status** as soon as reasonably practicable, and in any event within a period not exceeding 20 years.
6. The high environmental impact on associated species suggests that trawling for squid is unsustainable. The SQU6T fishery kills threatened NZ sea lions and other marine mammals and also has one of the highest capture rates of seabirds or any trawl fishery. The Ministry should advise the Minister of alternative management options for the SQU6T fishery, specifically jigging. Jigging would still allow for utilization of squid, but would not kill NZ sea lion, other marine mammals and seabirds during the process. Alternative management options include:
  - a. Jigging trials: The fishing industry once enquired about the possibility of using jig vessels in the Auckland Island region. Forest & Bird recommends that the Minister explores this enquiry and looks at incentives to encourage the promotion and trialling of squid jigging around the Auckland Islands. Jigging could also occur within the marine mammal sanctuary<sup>25</sup>.
  - b. Quota transfer: Forest & Bird encourages the Minister to transfer quota from the SQU6T fishery into other areas within the SQU1T fishery. This would reduce the impact the fishery is having on the declining sea lion population.

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<sup>25</sup> An example of this fishing in a similar environment is the offshore squid jig fishery at the Falkland Islands (Barton, 2002)

- c. Based on the jigging trials Forest & Bird would encourage the Minister to transfer all trawl quota into jig quota within the 6T sub-Antarctic fishery.
7. Forest & Bird also encourages the Ministry and the Minister to work with the Conservation Minister and the Department of Conservation to:
  - a. Implement an extension of the Auckland Island no trawl Marine Mammal Sanctuary past the 12 nautical mile mark to include the 500 m contour. This would protect key foraging areas for the particularly important lactating female sea lions.
  - b. Implement a no trawl marine mammal sanctuary around Campbell Island out to the 12 nautical mile limit (in the area outside of the proposed marine reserve).
8. Forest & Bird encourages the Ministry to work with the Department of Conservation to continue to research the direct and indirect effects likely to be associated with the observed sea lion population decline. These include, but not restricted to:
  - a. A better estimate of cryptic mortality associated with the SQU6T fishery
  - b. Efforts to determine the actual post-exit survivorship of sea lions after exiting a SLED in the SQU6T fishery
  - c. The potential for SLEDs be adopted in other fisheries operating around sub-Antarctic waters that also catch sea lions.
  - d. The impact of squid resource competition
  - e. The impact of the three known bacterial epizootics on the population
  - f. Continued research into pup production and sea lion demographics
9. The limitations of the precautionary principle within the Fisheries Act has been previously highlighted in submissions and is also highlighted in Dr Bruce Robertson's 2011 IPP submission. Forest & Bird encourages that the Ministry and the Minister support a review of the Fisheries Act with respect to the intent of the precautionary principle's environmental protection.

Thank you for taking the time to hear Forest & Bird's key comments on the Ministry's SQU6T operational plan, initial position paper. We hope that a true consultation process occurs. Should you have any queries regarding our comments, please do not hesitate to contact me.

Regards,

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