

# SEABIRD MITIGATION MEASURES FOR TRAWL AND LONGLINE VESSELS – INITIAL POSITION PAPER

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## Purpose

- 1 This document outlines proposals for seabird mitigation measures for trawl and longline vessels.
- 2 It is proposed that any measures approved by the Minister following consultation are implemented via Gazette Notice, coming in to force 28 days after publication.
- 3 MFish requests your comment on the proposals by Friday 23 November.

## Desired outcome

- 4 All vessels using the methods of trawl and longline within New Zealand's EEZ will be fishing using effective seabird mitigation measures.

## Executive summary

- 5 Currently, regulated or voluntary seabird mitigation measures are in place for only a proportion of the New Zealand fishing fleet. A significant proportion of vessels are not covered by these formal arrangements and may not be deploying effective mitigation measures.
- 6 MFish will shortly be releasing for consultation a comprehensive framework for managing the effects of fishing-related mortality on seabirds across all trawl, longline and set net fisheries. Where necessary, management measures are likely to be implemented in late 2008.
- 7 Nonetheless, recent significant incidents of seabird incidental mortality in the bottom longline and surface longline fleets have highlighted the risk that fishing without effective mitigation can pose to threatened species of seabirds.
- 8 The Minister of Fisheries has signalled his strong concern that some vessels are fishing without effective mitigation measures and has instructed MFish to identify best practice measures, to be considered for regulation.
- 9 MFish considers that there is sufficient immediate and ongoing risk to seabirds from vessels that do not deploy effective mitigation measures on a voluntary basis that urgent introduction of some mandatory mitigation measures may be necessary, ahead of the implementation of a comprehensive management framework

- 10 MFish therefore proposes to introduce best practice mitigation measures for all trawl and longline vessels. Should the Minister consider these measures necessary, they would be implemented initially by Gazette Notice and superseded by changes to commercial fishing regulations in 2008.
- 11 Information on the nature and extent of seabird incidental mortality in most inshore fisheries is limited, due to low levels of historical observer coverage. This paper also proposes the introduction of notification procedures for all bottom longline and inshore trawl vessels to facilitate improved levels of observer coverage.

## **Background**

### ***Why is seabird incidental mortality a problem?***

- 12 New Zealand is an important breeding ground for approximately eighty seabird species and has the greatest variety of albatross and petrel species in the world. These species range in IUCN threat ranking from critically endangered (e.g. Chatham Albatross), to least concern (e.g. Flesh-footed shearwaters).
- 13 Seabird species globally are facing a number of threats to their long term viability, both at the sites where they breed and while they are foraging at sea. One of the key threats is the incidental mortality of seabirds in the course of fishing activity.
- 14 In longline fisheries, the baited hooks float on, or just below, the surface for a short time before they start sinking. During this period, the hooks can be attacked by foraging seabirds which become hooked and drown. In some fisheries the hooks can remain within reach of diving seabirds for a considerable length of time.
- 15 In trawl fisheries, collisions with the warp cables causes significant levels of seabird mortality as seabirds forage on offal and discards from the vessel. Mortalities can also occur when birds dive into the trawl net or become entangled in the meshes when they are trying to seize fish in the net. In set net fisheries, seabirds become entangled in the net while diving for food.
- 16 More information on the risk to seabirds from longline, trawl and set net fisheries in New Zealand can be found in Appendix A.
- 17 Several population characteristics of albatrosses and petrels make them susceptible to long-term population decline from fishing-related mortalities. Albatrosses and petrels typically have late maturity (3–15 years old), low productivity (maximum of one nestling per year), and take a long time to form pairbonds if a partner is killed. If the death of a breeding individual occurs, the chick almost always dies and the remaining partner may take several years to start nesting again with a new partner.
- 18 The intrinsic rate of population increase for these species is very low (around 1% per year), meaning that birds may not be able to reproduce sufficiently

rapidly to compensate for fishing related removals at the population level. As a result, decreases in population sizes and an associated increase in threat status are likely to occur.

### **How is seabird incidental mortality managed in New Zealand?**

- 19 Two key pieces of legislation in New Zealand are relevant to the impact of fishing activity on seabirds. These are the Wildlife Act 1953 and the Fisheries Act 1996 (“The Act”).
- a) The Wildlife Act absolutely protects all but seven seabird species and partially protects two other species<sup>1</sup>. However, the Wildlife Act recognises and allows for the fact that fishing activity can result in the death of protected seabirds.
  - b) The purpose of the Fisheries Act is to provide for the utilisation of fisheries resources while ensuring sustainability. The meaning of sustainability includes ensuring that the adverse effects of fishing on the aquatic environment is avoided, remedied or mitigated. The Act also contains specific provisions relating to managing the effects of fishing-related mortality on protected species.
- 20 A number of international obligations are also relevant. The principal international obligations stem from the Convention on Migratory Species (CMS), the Agreement for the Conservation of Albatrosses and Petrels (ACAP) and the FAO International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA Seabirds). In addition, New Zealand has international obligations stemming from vessels fishing under the auspices of Regional Fishery Management Organisations (RFMOs) and the Antarctic Treaty system.
- 21 The National Plan of Action to reduce the Incidental Catch of Seabirds in New Zealand Fisheries (NPOA Seabirds) is the main policy framework for delivering on MFish’s obligations under the Fisheries Act.
- 22 The NPOA Seabirds sets out a long term, strategic approach to reducing the incidental catch of seabirds that includes goals, objectives, management measures and supporting services such as monitoring and research.
- 23 In 2005, the Minister of Fisheries directed officials to review the NPOA Seabirds to increase the effectiveness of the strategy, with a particular focus on the management framework.
- 24 In addition to the NPOA Seabirds, in 2005, the Ministry of Fisheries launched its Strategy for Managing the Environmental Effects of Fishing (SMEEF). The SMEEF set out how MFish proposed to meet its environmental obligations under the Fisheries Act and other international legislation, as well as

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<sup>1</sup> Black-backed gull *Larus dominicanus* - not protected; black shag *Phalacrocorax carbo* and sea hawk *Catharacta lonnbergi* - partially protected; and mutton bird *Puffinus griseus*, grey-faced petrel *Pterodroma maroptera*, little shag *Phalacrocorax melanoleucos brevirostris* and pied shag *Phalacrocorax varius* - may be hunted or killed subject to Minister’s notification.

delivering on the key environmental policy objectives set by its Statement of Intent.

- 25 The SMEEF proposed the development of a set of standards for defining acceptable limits of the effects of fishing on the aquatic environment, including the effects of fishing on seabirds.
- 26 In line with this approach, MFish has recently developed a seabird standard that sets out more explicitly the point at which the Minister considers it necessary to avoid, remedy or mitigate the effects of fishing on seabirds and, hence, provide certainty about the level of utilisation that can be provided for under the provisions of the Act.
- 27 The seabird standard also contains minimum requirements for monitoring that the standard is being met. Setting a required level of certainty will give comfort to government that the seabird standard is not being exceeded, particularly as observer coverage has historically been low in many fisheries.
- 28 The seabird standard is not a statutory instrument such as a maximum allowable limit on fishing-related mortality (MALFiRM) or a fishing-related mortality limit (FRML) and does not contain automatic sanctions or penalties such as the closure of a fishery if it is exceeded.
- 29 In summary, proposals for a revised seabird management framework consist of:
  - i) High-level goals taken from the NPOA Seabirds
  - ii) A maximum annual seabird mortality limit (or standard) that more explicitly defines the point at which the Minister considers it necessary to avoid, remedy or mitigate the effects of fishing-related mortality on seabirds<sup>2</sup>; and
  - iii) A revised NPOA Seabirds, designed to ensure that the seabird standard is met and provide a robust management framework at a fishery-specific level
- 30 The seabird standard and revised NPOA Seabirds management framework will shortly be released for consultation.

### ***Why is MFish proposing to introduce seabird mitigation measures now?***

- 31 The Minister of Fisheries has recently signalled his strong concern that vessels are fishing without effective mitigation measures and has instructed MFish to identify best practice measures, to be considered for regulation.

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<sup>2</sup> It should be noted that the seabird standard is not a statutory instrument such as a maximum allowable limit on fishing-related mortality (MALFiRM) or a fishing-related mortality limit (FRML) and does not contain automatic sanctions or penalties such as the closure of a fishery if it is exceeded

- 32 As a consequence, MFish has developed a range of best practice seabird mitigation measures for all vessels fishing using the methods of trawl and longline.
- 33 MFish considers that the proposed measures have three key advantages in that they:
- i) manage the immediate risk to seabirds from vessels not currently fishing using effective mitigation measures;
  - ii) allow fishers failing to use specified measures to be prosecuted; and
  - iii) reduce the likelihood that the reputation of the fishing industry will be damaged by the behaviour of a minority of fishing vessels that do not apply voluntary mitigation measures
- 34 Finally, MFish notes that the revised NPOA management framework and the seabird standard will be the main policy frameworks for determining what measures are required in a fishery and when management action will be recommended. However, seabird mitigation measures driven by these frameworks are not likely to be implemented until towards the end of 2008. In the interim period, MFish considers that the proposals contained in this paper will serve to mitigate the immediate and ongoing risk to seabirds from vessels not using effective mitigation measures.

### *Immediate and ongoing risk to seabirds*

- 35 Currently, seabird mitigation measures are only required on trawl vessels greater than 28 metres in length and on surface longline vessels, although a number of other groupings of vessels have initiated effective voluntary measures, often through Codes of Practice.
- 36 Despite these initiatives by Industry and government, a significant proportion of the New Zealand fishing fleet are not required to use seabird mitigation measures and have not initiated effective seabird mitigation measures voluntarily. In addition, observers report that mitigation measures are not always deployed by vessels fishing under voluntary Codes of Practice.
- 37 The risk posed by vessels not using effective mitigation measures was recently highlighted by a vessel fishing using the method of bottom longline on the Chatham Rise, where a large number of albatross, including 12 of the critically endangered Chatham Island albatross, were caught over the course of a few days of fishing. Similar incidents have also been recorded by observers in recent years for both trawl and surface longline fisheries.
- 38 It is difficult to quantify current levels of seabird incidental mortality. Modelling of observer data from 2004/05 suggest that, across the whole of New Zealand's EEZ, fishing-related mortalities from trawl and longline vessels were between 3,000 and 11,500 birds, with a mean of 5,500. The large variation in estimates is predominantly due to uncertainty over captures in inshore fisheries due to low levels of observer coverage.

- 39 Modelled estimates for 2004/05 for each method of fishing are as follows:
- |    |                  |       |
|----|------------------|-------|
| a) | Trawl            | 2,650 |
| b) | Bottom longline  | 947   |
| c) | Surface longline | 1,870 |
- 40 Although seabird incidental mortality estimates are highly uncertain, and are likely to have reduced from these levels in some fisheries since then, MFish considers that all trawl and longline vessels pose some level of risk to seabirds and that the cumulative effect of this risk may be significant, particularly for more vulnerable species of seabird.
- 41 MFish also considers that set netting is a potential risk to seabirds. The Ministry of Fisheries and Department of Conservation are currently in the process of consulting on the Hector's Dolphin Draft Threat Management Plan. As part of the Threat Management Plan, a number of possible measures are included for set net fisheries to protect these dolphins.
- 42 These measures range from mandatory net attendance and a ban on overnight setting in certain harbours through to a full prohibition on set nets in certain harbours. Possible changes in set net effort following the implementation of some or all of the proposed measures may have the effect of reducing risk to seabirds.
- 43 The need for additional mitigation measures to protect seabirds from set nets will be reviewed once the threat management plan has been finalised, and the extent of any additional restrictions (if necessary) can be assessed. MFish is therefore not proposing to Gazette measures to mitigate seabird bycatch in set nets at the current time.
- 44 More information on the nature of the risk from trawl, longline and set net vessels can be found in Appendix A.
- 45 In conclusion, MFish considers that vessels fishing without adequate mitigation measures pose sufficient immediate and ongoing risk that some measures may need to be introduced sooner than would be possible through the revised NPOA and seabird standard processes.

### *Measures to mitigate risk*

- 46 As noted above, the seabird standard and revised NPOA framework will be the principal drivers of measures to mitigate seabird incidental mortality. The primary purpose of the current proposals is to ensure that all vessels are at least deploying a minimum level of effective mitigation, based around best practice for each fishing method.
- 47 In developing proposals, MFish has brought together information from observer data, published mitigation research, Industry Codes of Practice and the expertise of individual fishermen.

- 48 As far as possible, the measures proposed are intended to only have a significant impact on those fishers who are not currently deploying best practice mitigation. However, because the measures are proposed for a wide range of vessel types and target fisheries, they are likely to affect some fishers more than others, including those who may already be taking steps to mitigate against seabird incidental mortality.
- 49 Costs are likely to fall into two areas:
- i) Purchase of seabird mitigation measures; or
  - ii) Changes in fishing practice that may affect fishing efficiency
- 50 MFish does not consider that the purchase of seabird mitigation measures as proposed will be a significant cost. Typically, measures proposed are low-cost such as streamer lines, line weighting and fish storage bins. However, measures may be more expensive for storage and possible reconfiguration of offal management practices for some trawl vessels.
- 51 Based on available information from observers on fishing practice, MFish does not consider that the proposals will lead to significant costs due to the need to change fishing practices. However, MFish is conscious of the possibility that some vessels or fisheries may need to make significant changes to meet the proposed requirements.
- 52 MFish therefore requests that, in particular, fishers who already deploy effective mitigation measures give detailed feedback on how the proposed measures will affect their fishing operations and to make recommendations as to how measures can effectively mitigate against seabird incidental mortality while being least cost to their fishing operation.
- 53 Further information on the range of mitigation measures available for trawl, longline and set net fisheries can be found in Appendix B.
- 54 The remainder of the paper is split into sections that discuss each of these issues in more detail as follows:
- i) Mitigation measures for longline vessels
  - ii) Mitigation measures for trawl vessels
  - iii) Mitigation measures for set net fisheries
  - iv) Implementation of mitigation measures
  - v) Monitoring and reporting requirements

## **Mitigation measures for longline vessels**

- 55 The Fisheries (Commercial Fishing) Regulations 2001 defines a longline as a line with any number of hooks attached to it. This would therefore include bottom longlining, surface longlining, trot lining, drop/dahn lining, trolling, hand lining, and pole and line fishing.

- 56 All longline fishing methods could potentially catch seabirds. In the discussion that follows, the focus is on the bottom (or demersal) longline fishing method, in which fishers aim to place their gear on, or close to, the sea floor, and the surface (or pelagic) longline fishing method, in which fishers aim to place their gear in the water column and away from the bottom.
- 57 Bottom longline fisheries operate throughout New Zealand and are generally segregated by target fish stock(s) and area, such as the northern inshore snapper fishery.
- 58 Surface longline fisheries operate throughout New Zealand and are generally based on seasonal target fisheries for southern bluefin tuna, bigeye tuna and for swordfish.

### ***Measures currently in place for New Zealand bottom longline vessels***

- 59 There are currently no regulations in place for bottom longline vessels relating to the use of seabird bycatch mitigation measures. Nonetheless, a number of vessels have used, or are currently using, a range of mitigation measures on a voluntary basis. These measures are best documented in the ling autoline fishery.
- 60 New Zealand vessels fishing in the CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) convention area are also required to implement a suite of effective, well documented and monitored mitigation measures.
- 61 Some of the measures currently in use in CCAMLR or on a voluntary basis in New Zealand are described below.

### ***Streamer lines***

- 62 Streamer lines (also known as tori lines) consist of a line stretching out to sea from a high point at the stern of the vessel, with streamers attached at regular intervals designed to scare away birds. Streamer lines are sometimes used in the New Zealand bottom longline fleet, although there is currently no standard specification for these across all vessels. Consequently, the performance of these streamer lines is likely to vary considerably.
- 63 Streamer lines vary between vessels in characteristics such as length, construction materials, proximity of streamers to water level, spacings between streamers, height of streamer lines at the vessel stern, and how streamer lines are positioned to protect the baited hooks as they enter the water. Currently, fishers also choose whether or not to deploy streamer lines at all.
- 64 A range of streamer line-type devices has been reported by observers at sea. For example:

- a) a string with a polystyrene buoy at the end attached to the vessel with a shark clip and deployed from approximately 2 m above water level; through to
  - b) a boom-and-bridle system where the streamer line is deployed 7 – 8 m above water level, achieves 100 m aerial extent, and is 240 m long, with rubber streamers that jiggle in the wind and with the movement of the streamer line backbone.
- 65 The Ling Autoline Code of Practice (developed by the Ling Autoline Working Group in 2004, and currently under revision), includes a detailed specification of a streamer line. CCAMLR also specifies streamer lines of a particular design for use in all bottom longline operations in the convention area<sup>3</sup>, including New Zealand vessels.
- 66 For vessels outside of CCAMLR waters not fishing under the Ling Autoline Code of Practice, there is currently no required or recommended streamer line design or deployment strategy.

### *Line-weighting*

- 67 Line-weighting patterns are variable across the fishery. Current information on at sea practice is derived from observer comments and the Ling Autoline Code of Practice (mentioned above). CCAMLR fisheries have prescribed line-weighting regimes and gear sink rates which are audited by observers.
- 68 In New Zealand bottom longline fisheries, observer information shows that where they are documented, external line-weighting and float attachment regimes are generally:
- i) 5 – 7 kg weights attached approximately every 40 - 60 hooks
  - ii) One float attached approximately every 15 - 30 hooks
- 69 However, deviations from these general patterns have also been reported by observers.
- 70 During the recent substantial bycatch event by a bottom longline vessel fishing in FMA 4, weights were located approximately every 240 hooks with up to five floats between weights.
- 71 Similarly, on a vessel that captured 317 seabirds when using the bottom longline method in FMA 4 in 2001, weights were positioned approximately every 100 hooks. In both cases, the use of fewer weights and more distance between weights were likely to be significant contributing factors in the mortality events.
- 72 The Ling Autoline Code of Practice recommends adding 5 kg of weight every 30–50 m on externally weighted lines. For vessels using Integrated Weighted Line (IWL), lead core of 50 grams per metre is recommended.

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<sup>3</sup> CCAMLR Conservation Measure 25-02 (Note throughout that this Conservation Measure does not apply to waters adjacent to Kerguelen, Crozet and the Prince Edward Islands).

- 73 In CCAMLR fisheries, operators are required to ensure the longlines sink beyond the reach of seabirds as soon as possible after they are put in the water. Vessels using autoline systems are recommended to add weights to the longline or use IWL to meet specified sink rates. For externally weighted lines, the addition of 5 kg weights every 50 to 60 m intervals is recommended. For IWL, 50 grams of lead core per metre of line is recommended.
- 74 Some vessels fishing in CCAMLR waters use the so-called ‘Spanish system’ of longline fishing. These vessels are recommended to release the attached weights before line tension occurs, and must use weights of at least 8.5 kg spaced at intervals of no more than 40 m, or, weights of at least 6 kg mass spaced at intervals of no more than 20 m<sup>4</sup>.

### *Night-setting*

- 75 In New Zealand waters, some bottom longline vessels set their gear at night some of the time, although there is currently no requirement to night-set in these fisheries. The Ling Autoline Code of Practice recommends night-setting as a measure to reduce seabird bycatch. In CCAMLR fisheries, night-setting is required. However, vessels can circumvent night-setting requirements by demonstrating a line sink rate of at least 0.3 metres per second (for externally weighted longlines) and at least 0.2 metres per second (for IWL gear)<sup>5</sup>.

### *Fish waste retention*

- 76 Fish waste is a significant attractant to seabirds. Bottom longline vessels fishing in New Zealand waters practice varying degrees of fish waste management. Discharge during setting and hauling has been noted on smaller vessels. However, retention of offal and discards during hauling has also been reported.
- 77 The Ling Autoline Code of Practice restricts offal discharge. No offal is to be discharged at setting, and at that time, unhooked baits must also be retained. Discharge at hauling is only allowed on the opposite side of the vessel to the line hauling station.
- 78 In CCAMLR waters, offal dumping is prohibited while longlines are being set. Also, dumping of offal during the haul is to be avoided. If discharging occurs during the haul, it must be only on the opposite side of the vessel to where longlines are hauled.

### *Haul mitigation*

- 79 There are no observer reports of smaller vessels using haul mitigation measures, although such measures have been reported from large vessels. However, the Ling Autoline Code of Practice suggests the application of such measures when seabirds are being captured during the hauling process.

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<sup>4</sup> CCAMLR Conservation Measure 25-02.

<sup>5</sup> CCAMLR Conservation Measures 24-02 and 25-02

### *Other measures*

80 Other measures are deployed to varying degrees by smaller vessels. For example, in the snapper fishery in the Hauraki Gulf, several operators have been using fish oil to deter seabirds from attending their vessels during setting. The use of gas cannons has also been reported on larger vessels. Typically, baits are not completely frozen when deployed which increases bait sink rates, reducing seabird access to them.

### ***Recommendations for new measures for bottom longline vessels***

81 MFish recommends all vessels fishing using the method of bottom longline (BLL) be required to **either**:

- a) Deploy their lines using an approved line weighting regime **and** use a streamer line to an approved specification; **or**
- b) Set their lines at night **and** use a streamer line to an approved specification

82 In addition, MFish proposes that all vessels fishing using the method of bottom longline (BLL) are required to retain all offal and fish<sup>6</sup> onboard during line setting and hauling.

83 Specifications relating to these recommended measures can be found in Appendix C.

84 MFish encourages stakeholders to submit their views on these measures, including providing as much detail as possible on the likely impact, if any, on their fishing operations. If the proposals are likely to have a significant impact, MFish encourages stakeholders to propose alternative best practice seabird mitigation strategies.

85 MFish is particularly interested in stakeholders' views on the most appropriate line weighting regime for vessels using lighter backbone and also the most appropriate aerial extent for streamer lines.

86 MFish is also interested in stakeholders' views on the merits of attaching floats to the hook bearing line using a rope or line of at least 5 metres in length, to mitigate against the effects of floats reducing sink rates.

### ***Measures currently in place for New Zealand surface longline vessels***

87 Seabird mitigation measures for pelagic longliners were revised in January 2007, after an incident in which a single vessel targeting swordfish and tuna in the Kermadec Fisheries Management Area caught a large number of birds.

88 Until recently, while seabird bycatch mitigation methods used on large vessels targeting tuna had developed to the point that reports of large scale captures

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<sup>6</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

were rare, levels of captures on smaller vessels were largely unknown and unreported due to a paucity of observer coverage on these vessels.

- 89 Measures introduced following the significant capture event were to the effect that:
- a) Commercial fishers set surface longlines in New Zealand's Exclusive Economic Zone only at night (0.5 hours after nautical dusk to 0.5 hours before nautical dawn<sup>7</sup>);
  - b) Commercial fishers using the method of surface longlining in New Zealand's Exclusive Economic Zone must deploy a streamer line consistent with existing regulations at all times whilst setting; and
  - c) Commercial fishers intending to use the method of surface longlining in New Zealand's Exclusive Economic Zone must provide at least five days' notice of departure on a fishing trip to the Ministry of Fisheries.
- 90 MFish has also recently revised the specifications for bird scaring devices (streamer or tori lines) that must be used at all times when setting surface longlines
- 91 The requirement for two mandatory seabird mitigation measures for the pelagic longline fishery (currently night setting and streamer lines) is consistent with current best practice internationally (refer to the Western and Central Pacific Fisheries Commission Conservation and Management Measure 2006-02).

### ***Recommendations for new measures for surface longline vessels***

- 92 Despite the introduction of interim mitigation measures of night-setting and the use of a specified streamer line while surface longline fishing, further seabird captures have been recorded by observers. For example, in approximately two months in early 2007, one tuna vessel captured 28 seabirds, including 26 albatrosses. Over approximately three months, another captured 55 seabirds, including 53 albatrosses. The period around the full moon is considered to be a particularly high risk time for seabird bycatch.
- 93 Nevertheless, MFish considers that sufficient mitigation measures are already in place to ensure all surface longline fishers are using at least a minimum level of seabird mitigation. As noted above, fishers are required under regulations to use a streamer line at all times while setting and are required by a s 11 sustainability measure, implemented by Gazette Notice, to only set at night. Fishers are also encouraged to use a variety of voluntary practices in the New Zealand fishery to further assist with seabird mitigation.
- 94 However, the current mitigation measures are restrictive in that fishers are unable to set during daylight hours. The Fisheries (Seabird Sustainability Measures) Notice 2007 that was gazetted on 26 January 2007 were intended as interim measures pending the development of a comprehensive seabird

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<sup>7</sup> "Nautical dusk" means the time in the evening when the sun is 12 degrees below the horizon. "Nautical dawn" means the time in the morning when the sun is 12 degrees below the horizon.

mitigation strategy for the fishery which would include documenting mitigation strategies to inform both existing fishers and potential new entrants. MFish will be working with pelagic longline stakeholders over the coming months to achieve this.

- 95 Initial discussions with pelagic long line fishers during 2007 identified line weighting as a potential alternative mitigation measure to be used in combination with streamer lines and/or night setting.
- 96 Line weighting as a mitigation technique has been the subject of intensive research and development in recent years. This technique is based on reducing the distance behind the vessel that baits can be taken by seabirds by increasing the hook sink rate. Crew safety has been a significant consideration in the use of weights placed near the hooks of a pelagic longline. However, new weights are currently being trialled that reduce the risks associated with the use of this method and this risk can be further managed by hauling arrangements on board the vessel.
- 97 The use of line weighting as an alternative measure would be on the basis of its proven success overseas and prior to conducting New Zealand based trials. This measure is accepted in Australian and US fisheries and, if introduced, its effectiveness under New Zealand conditions would need to be monitored on an ongoing basis.
- 98 MFish concludes that the use of line weighting as a seabird mitigation technique in combination with streamer lines offers the potential to be as, or more, effective than current requirements and may also provide for greater utilisation of the fisheries resource.
- 99 Line weighting may also be a more effective combination with night setting than streamer lines are, particularly during certain periods of the lunar cycle when the moon is not a significant source of illumination. However, where the moon is a significant source of illumination, streamer lines are likely to still be the best available measure.
- 100 MFish therefore recommends that the choice of mitigation measures that fishers are permitted to use be expanded, either by amending the current Gazette Notice requiring night setting<sup>8</sup>, or by issuing a revised circular specifying allowable seabird scaring devices<sup>9</sup>.
- 101 MFish proposes the following options:
- i) night setting plus streamer lines (the status quo); or
  - ii) line weighting plus streamer lines; or
  - iii) line weighting plus night setting (only between the third and first quarter of the moon)

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<sup>8</sup> The Fisheries (Seabird Sustainability Measures) Notice 2007

<sup>9</sup> Issued pursuant to the Fisheries (Commercial Fishing) Regulations 2001

- 102 MFish notes that best practice would be to use night setting, streamer lines *and* line weighting during the periods of the lunar cycle where the moon is a significant source of illumination (especially between the first and third quarters).
- 103 Specifications relating to these recommended measures can be found in Appendix C, including revised specifications for streamer lines.
- 104 MFish encourages stakeholders to submit their views on these measures. In particular, the proposal to introduce line weighting as an option and the proposal to allow night setting with line weighting instead of a streamer line during certain phases of the moon.

### **Mitigation measures for trawl vessels**

- 105 Trawling is defined in the Fisheries (Commercial Fishing) Regulations 2001 as the use of a trawl net. A trawl net has a buoyancy system on the top edge, is weighted on the bottom edge and is drawn through the water by one or more vessels. The use of a Danish seine net is specifically excluded from this definition.
- 106 Vessels operating in deepwater trawl fisheries are typically larger than inshore vessels with the majority processing their catch while at sea. In the discussion that follows, deepwater trawling is considered to be trawling undertaken by vessels 28 metres or greater in length.
- 107 Vessels operating in inshore trawl fisheries are typically smaller than deepwater vessels and typically do not process at sea. In the discussion that follows, inshore trawling is considered to be trawling undertaken by vessels less than 28 metres in length.

### ***Measures currently in place for deepwater trawl vessels***

- 108 Regulation 58A of the Fisheries (Commercial Fishing) Amendment Regulations 2006 requires all New Zealand vessels 28 metres or more in overall length that use a trawl net in New Zealand fisheries waters to:
- i) Carry a seabird scaring device authorised by the Chief Executive of the Ministry of Fisheries at all times when fishing; and
  - ii) Use the device, subject to any requirements issued by the Chief Executive relating to the use of the device, when the vessel's trawl net is in the water.
- 109 Regulation 58B empowers the Chief Executive to issue, amend or revoke circulars authorising seabird scaring devices in relation to any specified class of vessel and to set the standards or requirements applying to the seabird scaring devices.
- 110 The following seabird scaring devices have been authorised by the Chief Executive for all vessels 28 metres or more in overall length:

- i) Bird baffler
- ii) Paired streamer lines
- iii) Warp deflector

- 111 In addition to these regulations, the Deepwater Group (DWG) have developed a voluntary vessel management plan (VMP) template for deepwater trawlers. VMPs are now in place for most of the deepwater trawl fleet operated by DWG members, although the success of implementation of VMPs has been variable between vessels.
- 112 Each VMP describes the offal and discard management plan, the deterrent devices employed and additional vessel management procedures used by each vessel to mitigate their impacts on seabirds.
- 113 The measures currently understood to be in operation as part of these VMPs are summarised as follows:
- a) In line with current regulations, all vessels employ at least one deterrent device and 80% of vessels maintain the capacity to use two or more. The most common devices used are streamer lines (97%), followed by bird bafflers (60%) and warp deflectors (29%).
  - b) All of the vessels discharge offal and unwanted bycatch in batches. As far as practicable vessels endeavour not to discard when the trawl net is in the water and in particular when shooting, hauling or when the net is on the surface. The success of these endeavours is largely constrained by the capacity of the vessel to temporarily retain offal and bycatch onboard. This capacity is dictated by vessel and factory design, utilisation of available holding capacity and hardware fitted for discharge management. In addition, active management is required to ensure that batching does not occur during shooting and hauling, as has sometimes occurred during the 2006/07 SQU fishing season.
  - c) Temporary storage capacity ranges from vessels able to store up to four tonnes of offal in large storage tanks to those only able to store 200-300 kg either by filling up their offal discard conveyors or in fish bins.
  - d) Meal plants are available on 51% of the vessels and 49% are able to mince offal before it is discarded. For safety reasons many of the vessels are unable to stop the operation of factory sump pumps while fishing. However, efforts to reduce the flow of solids into sumps have been reported from a small number of vessels in the southern squid trawl fishery.
  - e) Other operational procedures to minimise interactions with seabirds include removal of stickers (>26%), efforts to minimise the time the net is on the surface (>20%), reduction of stern lighting (>20%) and acoustic cannons (>17%).

### ***Recommendations for new measures for deepwater trawl vessels***

- 114 Measures to mitigate against seabird bycatch are already in place through Regulation 58B requiring the use of either a paired streamer line, bird baffler or warp scarer.
- 115 A large proportion of the fleet have also specified plans to achieve improved operational practice for offal and discard management, subject to the constraints of the size and current set up of their vessel.
- 116 However, offal management practices vary between vessels and across time and may not always meet best practice standards. MFish considers that poor offal management practices may cause a significant risk to seabirds and that there is merit in formalising minimum standards for the management of solid offal and discards through the Gazette Notice process.
- 117 MFish therefore recommends that all vessels 28 metres and over in overall length fishing using the method of trawl be required to retain all offal and fish<sup>10</sup> onboard:
- a) during shooting and hauling; **and**
  - b) in the 20 minutes prior to shooting the trawl net, **unless** the vessel has steamed one nautical mile from where the last discharge of offal or discard (or return to sea) of fish occurred; **and**
  - c) while the trawl net is in the water, **unless** discharging offal and fish in accordance with a relevant batch discharge regime (detailed in Appendix C)
- 118 MFish does not consider the Gazette Notice proposals to negate the need for comprehensive Vessel Management Plans. Rather, that the proposals formalise minimum standards for one key aspect of the VMPs. Stakeholders are encouraged to go above and beyond these requirements, including implementing a suite of effective mitigation measures on their vessels.
- 119 Processing of offal and discards into fish meal and therefore not discharging any offal or discards is considered to be best practice, but is not possible currently for many vessels which lack the necessary hardware. Consequently, there is a wide range of capabilities for offal and discard management between vessels. MFish therefore proposes to differentiate between different classes of vessel and require minimum standards for holding offal and discards and batch discarding.
- 120 For operational purposes, MFish proposes that liquid discharge still be permitted, to allow discharge of sump pumps and other inbuilt vessel safety mechanisms. However, MFish recognises that these discharge types contain components attractive to seabirds.
- 121 MFish also recommends that it is best practice for new entrants to the deepwater trawl fishery be able to manage their fish waste to ensure that

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<sup>10</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

batches of solid waste are discharged no more frequently than every 60 minutes.

- 122 Specifications relating to these recommended measures can be found in Appendix C.
- 123 Stakeholders are particularly encouraged to submit their views on whether the proposed measures are consistent with the aims and objectives of the VMP programme and represent a suitable minimum standard for the management of offal and fish discards.
- 124 MFish notes that a number of vessels have fitted devices that mince offal before (usually continuously) discharging. While mincing has the potential to effectively mitigate against seabird incidental mortality by rendering offal unattractive to seabirds, mincing technology currently on board vessels has not been shown to be broadly effective to date<sup>11</sup>. MFish has not therefore recommend the inclusion of mincing as a best practice mitigation strategy in the current proposals.
- 125 Nonetheless, if the proposed measures are considered necessary by the Minister, because mincing is a promising technology, MFish will support applications for permit exemptions to allow appropriately designed at-sea trials of new mincing devices.

### ***Measures currently in place for inshore trawl vessels***

- 126 No regulations specifically relate to management of seabird incidental mortality for trawl vessels less than 28 metres in length.
- 127 Furthermore, observer coverage on these vessels has been almost nil prior to this year, precluding a robust understanding of their operations including waste management practices and levels of seabird incidental mortality. Coverage this year has, however, detected seabird mortality events and waste discharge during towing.
- 128 A number of companies and vessels are now aware of the risk that trawl vessels can pose to seabirds and may operate in a way that minimises the risk to seabirds voluntarily, or as part of normal operations.
- 129 For example, some vessels do not generate large quantities of offal and will tend to discard unwanted fish when the net is out of the water. Other vessels, however, will discard during trawling and may head and gut some species on the deck, also during trawling.

### ***Recommendations for new measures for inshore trawl vessels***

- 130 MFish considers that while some vessels may fish in such a way as to minimise offal and discards while the trawl warps are in the water, others may

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<sup>11</sup> Abraham, E. 2007. Mincing and mealing: a test of offal management strategies to reduce interactions between seabirds and trawl vessels. Report prepared for the Department of Conservation.

still pose a significant risk to seabirds due to warp strike as birds attempt to feed on fish parts and discards discharged during various stages of the fishing cycle. Net captures are also likely to occur when the trawl net is hauled.

- 131 MFish therefore proposes to prohibit the discharge of solid offal and discards at all times while the net is in the water and immediately prior to shooting the net. MFish considers that this will significantly reduce the risk of warp strikes as well as the risk of birds being attracted to the vessel when shooting or hauling the net.
- 132 Specifications relating to these recommended measures can be found in Appendix C.
- 133 Stakeholders are encouraged to provide detailed feedback on the operational implications of the proposals and, where these may be significant, propose alternative best practice mitigation strategies.

## **Mitigation measures for set net fisheries**

- 134 Set netting involves the placing of a net, either in midwater, or on or near the sea floor. Set nets are made from fine nylon, and may be up to 10 m high and several kilometres long. These nets catch marine life that swim into them and become tangled.
- 135 Set nets are frequently used by commercial and recreational fishers, usually in shallow waters within a few miles of the coast or close to the coastline.

## ***Measures currently in place through regulations or voluntary arrangements***

- 136 Other than localised restrictions, there are no measures currently in place through regulations or large-scale voluntary arrangements that specifically relate to seabird mitigation in set net fisheries. However, some fishermen are aware of the risk that set netting can pose to seabirds and take steps to mitigate this risk as much as possible when using this fishing method.
- 137 Additionally, there are a number of fisheries regulations governing the use of commercial set nets that may serve to reduce the risk to seabirds from this method. For example:
  - i) Set net lengths are restricted, particularly for nets that are set within two metres of the surface of the water or set in estuaries or rivers<sup>12</sup>
  - ii) Soak times are restricted to 18 hours<sup>13</sup>
  - iii) A range of restriction on set nets apply in areas that overlap with Hector's and Maui's dolphins<sup>14</sup>

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<sup>12</sup> Fisheries (Commercial Fishing) Regulations 2001

<sup>13</sup> Ibid

<sup>14</sup> See Hector's and Maui's Dolphin Draft Threat Management Plan for details

- 138 MFish has developed a set net code of practice (posted on the MFish website) to complement these regulations by encouraging fishers to fish safely and competently.

### ***Recommendations for new measures for set net fisheries***

- 139 The Ministry of Fisheries and Department of Conservation are currently in the process of consulting on the Hector's Dolphin Draft Threat Management Plan. As part of the Threat Management Plan, a number of possible measures are included for set net fisheries to protect these dolphins.
- 140 These measures range from mandatory net attendance and a ban on overnight setting in certain harbours through to a full prohibition on set nets in certain harbours.
- 141 These measures may also help mitigate seabird bycatch. The need for additional mitigation measures to protect seabirds from set nets will be reviewed once the threat management plan has been finalised, and the extent of any additional restrictions (if necessary) can be assessed. MFish is therefore not proposing to Gazette measures to mitigate seabird bycatch at the current time.

### **Implementation of mitigation measures**

- 142 Under section 11(4)(b)(i) of the Act, the Minister may implement or vary any sustainability measure, by notice in the Gazette. Before doing so he is required to consult in accordance with section 12 of the Act.
- 143 Publication of a Gazette Notice is the quickest available regulatory instrument and would allow seabird mitigation measures to potentially be introduced by the end of the calendar year. MFish is therefore proposing to implement seabird mitigation measures by Gazette Notice.
- 144 Should the Minister choose to introduce measures by Gazette Notice, it should be viewed as an interim measure only, until such time as regulations that would substantially mirror the Gazette Notice can be implemented. The Gazette notice would then be revoked.
- 145 Amendments to the Fisheries (Commercial Fishing) Regulations 2001 would allow a more flexible framework to be implemented, including the ability to easily modify specifications and measures, and to allow for the possibility of different offence and penalty regimes for technical and material breaches of the required mitigation measures.
- 146 MFish will therefore initiate a separate process to amend the Fisheries (Commercial Fishing) Regulations 2001, if measures are introduced by Gazette Notice following this consultation.

## **Monitoring and reporting requirements**

### ***Why is monitoring of inshore fisheries currently problematic?***

- 147 In inshore fisheries, smaller vessels typically operate without the organisational infrastructure offered by a large company. Vessels are run by smaller companies, or are owner-operated. Smaller vessels tend to have more changeable fishing schedules than larger vessels, for example, due to greater operational sensitivity to weather. In addition, smaller vessels have fewer crew, and skippers may be reluctant to provide space for an observer especially if that means crew space is reduced.
- 148 These factors combine to make placing observers on inshore vessels significantly more difficult than in the deepwater fisheries. Consequently, low observer coverage has been achieved in all inshore fisheries in the past – set net, inshore trawl, domestic surface longline, and inshore bottom longline.
- 149 Observer coverage in inshore fisheries has been extremely low in relation to number of fishing days as well as other measures of effort. Over the last three years, coverage in inshore longline fisheries has ranged from 0-10%, with 0–2.5% being in inshore fisheries dominated by smaller vessels. 2006/07 is the first year that any inshore trawl coverage has been sought and achieved (Table 1).
- 150 As a result of the extremely low levels of observer coverage in inshore fisheries, our understanding of the nature and extent of protected species captures and interactions in inshore fisheries is very poor. Despite this, seabird capture events have still been detected (Table 2).
- 151 However, the current lack of information has made it difficult to assess the frequency and representativeness of detected capture events, including large captures, in inshore fisheries. The paucity of coverage also renders it impossible to assess impacts of incidental mortalities on protected species populations.

**Table 1: Observer coverage achieved by inshore fishery for the period July 2004 until June 2007**

**(a) Inshore longline fisheries**

Fishery	Year*	No. Fishing Days	No. of Hooks	No. observer days achieved	% fishing days observed
Inshore LIN, BNS, HPB	2004/05	5,048	12,249,135	13	0.26%
	2005/06	4,888	12,941,291	33	0.68%
	2006/07	5,078	14,940,876	68	1.34%
SNA bottom longline	2004/05	6,022	11,209,201	149	2.47%
	2005/06	5,426	11,783,617	58	1.07%
	2006/07	5,312	11028,176	0	0.00%
Domestic tuna and swordfish	2004/05	2,897	3,229,717	260	8.97%
	2005/06	2,970	3,302,594	221	7.44%
	2006/07	2,305	2,467,969	242	10.50%

**(b) Setnet fisheries**

Fishery	Year*	No. Fishing Days	Total Length of Nets (m)	No. observer days achieved	% fishing days observed
Setnet	2004/05	23,066	26,285,957	0	0.000%
	2005/06	21,922	24,537,098	83	0.379%
	2006/07	21,310	23,474,623	116	0.544%

**(c) Inshore trawl fisheries**

Fishery	Year*	No. Fishing Days	Number of tows	No. observer days achieved	% fishing days observed
Inshore trawl	2004/05	39,571	103,251	0	0.000%
	2005/06	37,878	98,077	0	0.000%
	2006/07	35,064	90,214	106	0.302%

\* 1 July - 30 June

**Table 2: Protected species captures reported in inshore fisheries, given coverage levels in Table 1 (D=dead, A = released alive)**

**(a) Inshore bottom longline fisheries.**

Species	Inshore Bottom Longline (except Snapper target)						Snapper						Total Captures
	2004/05		2005/06		2006/07		2004/05		2005/06		2006/07		
	D	A	D	A	D	A	D	A	D	A	D	A	
Salvin's albatross ( <i>Thalassarche salvini</i> )			1										1
White-chinned petrel ( <i>Procellaria aequinoctialis</i> )			8	2		1							11
Black petrel ( <i>Procellaria parkinsoni</i> )						1	1		2				4
Buller's shearwater ( <i>Puffinus bulleri</i> )										4			4
Australasian gannet ( <i>Morus serrator</i> )								1					1
Flesh-footed shearwater ( <i>Puffinus carneipes</i> )							4	5					9
White-faced storm petrel ( <i>Pelagodroma marina</i> )	1							3					4
Wandering albatross ( <i>Diomedea spp.</i> )		1											1
Unidentified petrel										6			6
Green turtle ( <i>Chelonia mydas</i> )										1			1
Total	1	1	9	2	0	2	5	9	2	11	-	-	42

**(b) Domestic surface longline fisheries, targeting tuna and swordfish**

Species	Domestic surface longline						Total Captures
	2004/05		2005/06		2006/07		
	D	A	D	A	D	A	
Antipodean albatross ( <i>Diomedea antipodensis</i> )				1			1
Black-browed albatross ( <i>Thalassarche melanophrys</i> )				2		2	4
Buller's albatross ( <i>Thalassarche bulleri</i> )	2	1	2	1	1		7
Campbell albatross ( <i>Thalassarche impavida</i> )				4			4
Flesh-footed shearwater ( <i>Puffinus carneipes</i> )		1			4	3	8
Grey petrel ( <i>Procellaria cinerea</i> )				6		3	9
Grey-faced petrel ( <i>Pterodroma macroptera</i> )	1					1	2
Sooty shearwater ( <i>Puffinus griseus</i> )						1	1
Wandering albatross ( <i>Diomedea exulans</i> )	1				2	7	17
White-capped albatross ( <i>Thalassarche steadi</i> )				1		1	2
White-chinned petrel ( <i>Procellaria aequinoctialis</i> )	1					2	3
Unidentified albatross						37	2
Unidentified petrel						4	4
Green turtle			1				1
Leatherback turtle ( <i>Dermochelys coriacea</i> )			2				4
Pilot whale ( <i>Globicephala spp.</i> )			1				1
Fur seal	1	10			3		2

<b>Total</b>	<b>6</b>	<b>16</b>	<b>16</b>	<b>10</b>	<b>59</b>	<b>28</b>	<b>135</b>
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**(c) Inshore trawl and setnet fisheries**

Species	Setnet						Inshore trawl						Total Captures	
	2004/05		2005/06		2006/07		2004/05		2005/06		2006/07			
	D	A	D	A	D	A	D	A	D	A	D	A		
Spotted shag ( <i>Stictocarbo punctatus</i> )			2											2
Pied shag ( <i>Phalacrocorax varius</i> )			1											1
Yellow-eyed penguin ( <i>Megadyptes antipodes</i> )					2									2
Fluttering shearwater ( <i>Puffinus gavia</i> )					1									1
Hector's dolphin ( <i>Cephalorhynchus hectori</i> )					1									1
Dusky dolphin ( <i>Lagenorhynchus obscurus</i> )					1									1
Fur seal ( <i>Arctocephalus forsteri</i> )			3		1									4
White-capped albatross ( <i>Thalassarche steadi</i> )												4		4
Unidentified petrel											2	1		3
Cape petrel ( <i>Daption capense</i> )						3								3
Sooty shearwater ( <i>Puffinus griseus</i> )						1								1
Seagull ( <i>Larus</i> spp.)						1								1
Unidentified shag						6								6
<b>Total</b>			<b>6</b>		<b>6</b>	<b>11</b>						<b>6</b>	<b>1</b>	<b>30</b>

### **What steps have been taken to date to improve monitoring?**

- 152 In January of this year, the Minister of Fisheries required fishers targeting tuna and swordfish by surface longline to notify the Chief Executive of the Ministry of Fisheries of their intention to fish at least 5 days in advance of taking these species<sup>15</sup>.
- 153 The intent of this notice was to facilitate observer placement on surface longline vessels. This requirement has already enabled effective placement of observers and achievement of better coverage in the surface longline fishery than in the past.
- 154 Already, surface longline coverage in 2007/08 is predicted to capture approximately 20% of expected national fishing effort using this method. In contrast, in inshore fisheries where the notification requirement does not apply, expected coverage is 0–5% of national fishing effort (Table 3). It should be noted, however, that some inshore fisheries have such significant effort that notification alone will not improve observer coverage to the levels achieved recently in the surface longline fishery.

Table 3: Planned and predicted observer coverage, by inshore fishery, in 2007/08

<b>Fishery</b>	<b>Observer days planned</b>	<b>Effort in 2006/07*</b>	<b>Predicted coverage in 2007/08</b>
<i>Domestic tuna and swordfish</i>	457	2305	19.83%
Inshore LIN, BNS, HPB	251	5078	4.94%
Setnet	233	21,310	1.09%
Inshore trawl	258	35064	0.74%
SNA bottom longline	0	5312	0.00%
<b>Total observer days</b>	<b>1364</b>		

\* Note that expected effort in 2007/08 is derived from 2006/07

### **Recommendations for new measures relating to monitoring requirements**

- 155 To achieve appropriate levels of observer placement and coverage in other inshore fisheries (specifically, bottom longline and inshore trawl) it would be extremely valuable to enact a notification requirement similar to that which applies in the surface longline fisheries.
- 156 MFish therefore proposes that fishers be required to notify the Chief Executive of their intentions to fish from a vessel <46m in length, using bottom longline, or trawl gear, at least 5 days prior to that fishing activity occurring.
- 157 MFish is particularly keen to hear from fishers with experience of reporting procedures in the surface longline fleet to ensure that reporting requirements are both effective for the placement of observers and practical for fishermen to meet.

<sup>15</sup> New Zealand Gazette, Issue 8, Friday 26 January 2007

## Summary of recommendations

### ***Recommendations for new measures for bottom longline vessels***

158 MFish recommends all vessels fishing using the method of bottom longline (BLL) be required to either:

- a) Deploy their lines using an approved line weighting regime **and** use a streamer line to an approved specification; or
- b) Set their lines at night **and** use a streamer line to an approved specification

159 In addition, MFish proposes that all vessels fishing using the method of bottom longline (BLL) are required to retain all offal and fish<sup>16</sup> onboard during line setting and hauling.

### ***Recommendations for new measures for surface longline vessels***

160 MFish recommends that the choice of mitigation measures that fishers are permitted to use be expanded, either by amending the current Gazette Notice requiring night setting<sup>17</sup>, or by issuing a revised circular specifying allowable seabird scaring devices<sup>18</sup>.

161 MFish proposes the following options:

- i) night setting plus streamer lines (the status quo); or
- ii) line weighting plus streamer lines; or
- iii) line weighting plus night setting (only between the third and first quarter of the moon)

### ***Recommendations for new measures for deepwater trawl vessels***

162 MFish recommends that all vessels 28 metres and over in overall length fishing using the method of trawl be required to retain all offal and fish<sup>19</sup> onboard:

- a) during shooting and hauling; **and**
- b) in the 20 minutes prior to shooting the trawl net, **unless** the vessel has steamed one nautical mile from where the last discharge of offal or discard (or return to sea) of fish occurred; **and**
- c) while the trawl net is in the water, **unless** discharging offal and fish in accordance with a relevant batch discharge regime

### ***Recommendations for new measures for inshore trawl vessels***

163 MFish recommends that all vessels less than 28 metres in overall length fishing using the method of trawl are required to retain all offal and fish<sup>20</sup> onboard:

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<sup>16</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

<sup>17</sup> The Fisheries (Seabird Sustainability Measures) Notice 2007

<sup>18</sup> Issued pursuant to the Fisheries (Commercial Fishing) Regulations 2001

<sup>19</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

<sup>20</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

- a) during shooting and hauling; **and**
- b) in the 20 minutes prior to shooting the trawl net, **unless** the vessel has steamed one nautical mile from where the last discharge of offal or discard (or return to sea) of fish occurred; **and**
- c) while the trawl net is in the water

### ***Recommendations for new measures for set net fisheries***

- 164 The Ministry of Fisheries and Department of Conservation are currently in the process of consulting on the Hector's Dolphin Draft Threat Management Plan. As part of the Threat Management Plan, a number of possible measures are included for set net fisheries to protect these dolphins.
- 165 The need for additional mitigation measures to protect seabirds from set nets will be reviewed once the threat management plan has been finalised, and the extent of any additional restrictions (if necessary) can be assessed. MFish is therefore not proposing to Gazette measures to mitigate seabird bycatch at the current time.

### ***Recommendations for new measures relating to monitoring requirements***

- 166 MFish proposes that fishers be required to notify the Chief Executive of their intentions to fish from a vessel <46m in length, using bottom longline, or trawl gear, at least 5 days prior to that fishing activity occurring.

## Appendix A: risk to seabirds from longline, trawl and set net fisheries

### **Risk to seabirds from longline vessels**

- 167 Longline fishing gear captures seabirds when they dive around lines set in the water, and pursue baited hooks. Birds can be caught in lines, hooked by their beaks when they attempt to consume hooked bait, or hooked through another part of the body as they collide with hooks in the water. These types of capture can all lead to injury and death<sup>21</sup>.
- 168 The longline method presents most risk to seabirds during line setting and hauling. At setting, birds are attracted to the baits deployed. At hauling, they are attracted to unused baits and captured fish on longline hooks. At any time, discarding baits and processing waste attracts seabirds to longline vessels, and can lead to their incidental capture.
- 169 So-called ‘surface’ longline gear is intended to fish at relatively shallow depths. This gear typically has long snoods, little (if any) extra weighting, and can present a risk to seabirds for extended periods during its deployment.
- 170 While appropriately weighted bottom longline gear should sink to fishing depth fairly rapidly, during setting, the longline can rise up out of the water (or be pulled up to shallow depths), exposing baited hooks and increasing risk of seabird captures.
- 171 The extent of risk that longline fishing gear presents to seabirds depends on the characteristics of the fishing gear as well as seabird foraging patterns and behaviour<sup>22</sup>. Albatrosses, for example, tend to forage through the top few metres of the ocean and so are not likely to be threatened by longline gear at depth. However, these ‘surface’ foragers are still at risk when longlines are set and hauled.
- 172 Species with strong diving capabilities are vulnerable to longline gear close to the surface (e.g. on setting and hauling) as well as when gear is deeper in the water. For example, amongst the species frequently caught in bottom longline fishing, white-chinned petrels can dive to more than 10 m<sup>23</sup>, and sooty shearwaters (*Puffinus griseus*) to depths well in excess of 50 m. These species are therefore able to pursue baited hooks or get caught in lines at significant depths, and may also bring hooks closer to the surface, allowing less proficient divers to access them.
- 173 Since 1996, 21 seabird species have been reported captured during bottom longline fishing operations. The captured seabirds range in IUCN threat status<sup>24</sup> from critically endangered to of least concern (see Table 4).

**Table 4. Seabird species captured in New Zealand longline fisheries (1 October 1996 – 27 August 2007).**  
\* denotes seabirds captured but released alive at sea. (Identifications of these species could not be

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<sup>21</sup> Brothers, N., and Foster, A.B., 1997. Seabird catch rates: an assessment of causes and solutions in Australia's domestic tuna longline fishery. *Marine Ornithology* 25, 37-42.

<sup>22</sup> Schreiber, E.A. and Burger, J. 2002. *Biology of Marine Birds*. CRC Press, Boca Raton; Warham, J. 1996. *The Behaviour, Population Biology and Physiology of the Petrels*. Academic Press, London.

<sup>23</sup> Huin, N. 1994. Diving depths of white-chinned petrels (*Procellaria aequinoctialis*). *Condor* 96: 1111-1113.

<sup>24</sup> [www.iucnredlist.org](http://www.iucnredlist.org), accessed 1 October 2007

confirmed through the return of a specimen).

Species		IUCN threat status
Common name	Scientific name	
Chatham albatross	<i>Thalassarche eremita</i>	Critically endangered
Black-browed albatross	<i>Thalassarche melanophrys</i>	Endangered
Northern royal albatross	<i>Diomedea sanfordi</i>	Endangered
Antipodean albatross	<i>Diomedea antipodensis</i>	Vulnerable
Salvin's albatross	<i>Thalassarche salvini</i>	Vulnerable
Campbell albatross	<i>Thalassarche impavida</i>	Vulnerable
Buller's albatross	<i>Thalassarche bulleri</i>	Vulnerable
Wandering albatross	<i>Diomedea exulans</i>	Vulnerable
Southern royal albatross	<i>Diomedea epomophora</i>	Vulnerable
White-chinned petrel	<i>Procellaria aequinoctialis</i>	Vulnerable
Black petrel	<i>Procellaria parkinsoni</i>	Vulnerable
Westland petrel	<i>Procellaria westlandica</i>	Vulnerable
Buller's shearwater	<i>Puffinus bulleri</i>	Vulnerable
White-capped albatross	<i>Thalassarche steadi</i>	Near threatened
Light-mantled sooty albatross	<i>Phoebetria palpebrata</i>	Near threatened
Grey petrel	<i>Procellaria cinerea</i>	Near threatened
Sooty shearwater	<i>Puffinus griseus</i>	Near threatened
Northern giant petrel	<i>Macronectes hallii</i>	Near threatened
Southern giant petrel	<i>Macronectes giganteus</i>	Near threatened
White-headed petrel	<i>Pterodroma lessonii</i>	Least concern
Broad-billed prion	<i>Pachyptila vittata</i>	Least concern
Australasian gannet	<i>Morus serrator</i>	Least concern
Diving petrel	<i>Pelecanoides urinatrix</i>	Least concern
Cape petrel	<i>Daption capense</i>	Least concern
Grey-faced petrel	<i>Pterodroma</i>	Least concern

	<i>macroptera</i>	
Pied shag	<i>Phalacrocorax varius</i>	Least concern
Fluttering shearwater	<i>Puffinus gavia</i>	Least concern
Flesh-footed shearwater	<i>Puffinus carneipes</i>	Least concern
White-faced storm petrel	<i>Pelagodroma marina</i>	Least concern

### **Risk to seabirds from trawl vessels**

- 174 In trawl fisheries, seabirds are attracted to vessels by the discharge of offal and discarded bycatch, or through the availability of catch when the net is brought to the surface. Whilst attempting to feed seabirds become distracted and may be killed or injured by contacting the trawl warps. Mortalities can also occur when birds dive into the trawl net or become entangled in the meshes when they are trying to seize fish.
- 175 Based on reports of seabird bycatch by observers on trawl vessels, the highest recorded seabird mortalities are occurring in the major established trawl fishery grounds around the South Island, the sub-Antarctic islands, Snares-Stewart Shelf, Chatham Rise, Puysegur and the Hokitika canyon area ( FMA's 3-7).
- 176 For trawl vessels within these areas, the best available information suggests that the highest levels of interactions are occurring amongst vessels that are fishing for middle depth species such as squid and hoki. However, mortalities are known to occur in a wide range of other trawl fisheries including orange roughy, southern blue whiting and scampi.

### **Risk to seabirds from set net fisheries**

- 177 Set nets are a risk to birds because birds can become entangled and drown in the nets while diving for food.
- 178 While all set nets pose a potential threat to seabirds, nets placed overnight close to seabird colonies are likely to greatly increase the risk of seabird bycatch. Similarly, penguins returning to breeding colonies or landing beaches at dusk are especially vulnerable to set nets.
- 179 Due to the difficulties with achieving MFish Observer coverage on set net vessels, there are no estimates for the incidental mortality from the very large amount of set net effort in New Zealand's exclusive economic zone (EEZ).
- 180 However, limited coverage of set net vessels has been achieved in the waters around the South Island in recent years (2005-06 and 2006-07) and the seabird mortality rate from 2006-07 was found to be 1.78 seabirds per million metre hours of set net effort.
- 181 The following species were observed caught: seagulls, petrels (including cape pigeons), shags (including pied shags), sooty shearwaters and yellow-eyed penguins. Previous researchers such as Taylor (1992) reported significant catches of similar species, along with Hutton's shearwaters, fluttering shearwaters and a range of diving petrels.

182 While it is not possible to estimate the magnitude of the total seabird incidental mortality from set net fisheries in any area from the currently available information, there is sufficient information to indicate that the large amount of set net effort could be resulting in high levels of seabird mortality.

## **Appendix B: Measures available to avoid or mitigate seabird incidental mortality**

### ***Measures available for longline vessels***

183 There are several proven measures available to reduce seabird bycatch in longline fisheries. The best tested of these are streamer lines, line-weighting, night-setting, haul mitigation, and fish waste retention. These measures are discussed in more detail below.

#### ***Line-weighting***

184 The rate at which baited hooks and longlines sink is the single most important factor that determines how accessible hooks are to seabirds, and consequently, what level of risk hooks represent to seabirds. Weighting gear increases the speed with which lines and hooks sink, which in turn reduces seabird access to them.

185 In bottom longline fisheries, gear is always weighted to some degree to increase the rate at which it sinks to fishing depth. Clearly, the faster the sink rate, the more rapidly the gear will reach fishing depth in bottom fisheries.

186 In surface longline fisheries, target fishing depth is much shallower than for bottom fisheries. Little or no weight can be added to surface longline gear, rendering lines light and hooks relatively mobile in the water. Snoods are typically longer in surface longline gear than for bottom longline gear, again, giving hooks more mobility.

187 The configuration of weights can affect the sink rate as well as the way the longline falls through the water column or over the ocean floor, and so the way it fishes. As well as differences caused by longline weighting, oceanic and operational conditions (e.g. propeller turbulence) can affect line sink speed. For example, if the longline is taut on deployment, it will not sink as readily as if it is slack.

188 There are two approaches to line-weighting used in New Zealand bottom longline fisheries. First, external weights can be attached at various points along longlines. Second, integrated weight line (IWL) can be deployed. IWL includes a lead core which provides weight to the gear without the attachment of (external) weights. IWL is not generally used by smaller vessel operations. Externally weighted line can be used in all bottom longline fishing operations, and external weights may be added to IWL.

189 A substantial body of research describes the efficacy of various line weighting regimes in achieving sink rates in bottom longline fisheries<sup>25</sup>. Line sink rates and commensurate reductions in seabird bycatch vary depending on the weights used, and weight placement on the longlines. The sinking speed is fastest closest to weights. The further apart weights are, the slower sinking speeds become<sup>26</sup>.

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<sup>25</sup> Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

<sup>26</sup> Smith, N. W. McL. 2001. Longline sink rates on an autoline vessel, and notes on seabird interactions. *Science for Conservation* 183. Department of Conservation; Robertson, G. 2000. Effect of line sink rate on

- 190 Trials in New Zealand have shown that gear intended for bottom longline fishing that is unweighted, except for one large anchoring weight at each end of the line, sinks to 20 m depth at rates of around 0.11 metres per second. Sink rates also vary along the length of the longline, and have been shown to range from around 0.16 metres per second to around 0.29 metres per second on the same line. For IWL, sink rates are more consistent because the weight is spread throughout the line, and on average range from around 0.24 – 0.25 metres per second, down to 20 m depth<sup>27</sup>.
- 191 As with streamer lines, internationally recognised best practice for line-weighting in bottom longline fisheries is set by CCAMLR<sup>28</sup>. Weighting regimes implemented by vessels can deviate from those required for CCAMLR waters only if sink rates can be proven to meet a separate specification<sup>29</sup>.
- 192 Analogous to the concept of integrated weight line, surface longline gear can include some relatively heavy components, e.g. ‘sekiyama’. Alternatives to this include the attachment of external weights of various sizes to snoods at various distances from the hooks. Weighted swivels are also used.
- 193 Considerable research has also been done to identify optimal line-weighting regimes for surface longline fisheries for reducing seabird bycatch (sometimes with coincident examination of effects on fish catch). For example, in the Hawaiian swordfish fishery, contact rates between seabirds and fishing gear reduced by 92% when 60 g weights were added adjacent to the baited hooks<sup>30</sup>. In New Zealand, the addition of a 60 g weighted swivel to surface longline hooks more than doubled their sink rates (hooks sank to average depths of ~6 m compared with ~13 m, 30 seconds after gear was deployed)<sup>31</sup>.
- 194 In addition to line-weighting, the attachment of floats affects the location of the longline in the water. No research has been published on the effects of floats used on longline gear. However, floats decrease the sink rate of gear to some degree, in accordance with their size and configuration on the longline. In bottom longline operations, floats also lift the longline off the ocean floor, which is preferred by operators when targeting certain fish species, e.g. bluenose (*Hyperoglyphe antarctica*) or when avoiding rough ground.
- 195 The costs and benefits of line-weighting are as follows:
- i) Demonstrated efficacy in reducing seabird bycatch

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albatross mortality in the Patagonian toothfish longline fishery. *CCAMLR Science* 7: 133–150.

<sup>27</sup> Robertson, G., McNeill, M., Smith, N., Wienecke, B.C., Candy, S. and Olivier, F. 2006. Fast sinking (integrated weight) longlines reduce mortality of white-chinned petrels (*Procellaria aequinoctialis*) and sooty shearwaters (*Puffinus griseus*) in demersal longline fisheries. *Biological Conservation* 132, 458–471.

<sup>28</sup> CCAMLR Conservation Measure 25-02.

<sup>29</sup> CCAMLR Conservation Measure 24-02.

<sup>30</sup> Boggs, C.H. 2001: Deterring albatrosses from contacting baits during swordfish longline sets. Pp. 79-94 in: Melvin, E.; Parrish, J.K. (eds) Seabird bycatch: trends, roadblocks and solutions. University of Alaska Sea Grant, Fairbanks, Alaska

<sup>31</sup> Anderson, S.; McArdle, B. 2002. Sink rate of baited hooks during deployment of a pelagic longline from a New Zealand fishing vessel. *New Zealand Journal of Marine and Freshwater Research* 36: 185-195.

- ii) No negative impacts, and potentially positive effects, on fish catch because gear is held more effectively at fishing depth<sup>32</sup>
- iii) A normal part of bottom longline fishing operations
- iv) Requires storage for weights on vessels, and development of appropriate handling practices
- v) Depending on weights prescribed, could incur cost if weights must be purchased
- vi) Safe operating practices are required in managing weights
- vii) Accumulation of lead in marine environments if leaded gear is lost (e.g. IWL)

### Streamer lines

- 196 Streamer lines have been proven effective in reducing seabird captures in both bottom and surface longline fisheries, although optimal designs may differ between fishing methods.
- 197 Streamer lines work by protecting the baited hooks from seabirds as the hooks are set and start to sink to fishing depth. While low in cost and operationally very basic, streamer lines have been tested and proven effective in both New Zealand and international bottom longline fisheries. For example, in the bottom longline NZ ling (*Genypterus blacodes*) fishery on the Chatham Rise, the streamer line used kept all seabirds except cape petrels (*Daption capense*) away from the longline at setting<sup>33</sup>.
- 198 In the bottom longline fishery in Norway, use of a streamer line was shown to reduce seabird bycatch rates from 1.06 to 0.00 captures per 1000 hooks. Also, use of the streamer line reduced bait loss to seabirds and so delivered higher fish catch rates<sup>34</sup>. In Alaskan bottom longline fisheries, using two streamer lines has been found even more effective than a single line. However, the use of one line still delivered a significant reduction in seabird bycatch from 0.09 birds per 1000 hooks to 0.006 birds per 1000 hooks<sup>35</sup>.
- 199 Streamer lines have reduced seabird captures in surface longline fisheries including the Hawaiian swordfish fishery (*Xiphias gladius*), southern bluefin tuna (*Thunnus maccoyii*) fishery, and New Zealand tuna fishery<sup>36</sup>. For example, in the Hawaiian

<sup>32</sup> Robertson, G., McNeill, M., Smith, N., Wienecke, B.C., Candy, S. and Olivier, F. 2006. Fast sinking (integrated weight) longlines reduce mortality of white-chinned petrels (*Procellaria aequinoctialis*) and sooty shearwaters (*Puffinus griseus*) in demersal longline fisheries. *Biological Conservation* 132, 458–471.

<sup>33</sup> Smith, N. W. McL. 2001. Longline sink rates on an autoline vessel, and notes on seabird interactions. *Science for Conservation* 183. Department of Conservation.

<sup>34</sup> Løkkeborg, S. 2001. Reducing seabird bycatch in longline fisheries by means of bird-scaring lines and underwater setting. In: *Seabird Bycatch: Trends, Roadblocks and Solutions* (eds E. Melvin and J.K. Parrish). University of Alaska Sea Grant, Fairbanks, AK, pp. 33–41.

<sup>35</sup> Melvin, E., Parrish, J.K., Dietrich, K.S. and Hamel, O.S. 2001. Solutions to seabird bycatch in Alaska's demersal longline fisheries. *Washington Sea Grant Programme A/FP7*. 52 p.

<sup>36</sup> Imber, M. 1994. Report on a tuna longlining fishing voyage aboard the Southern Venture to observer seabird bycatch problems. DOC Science and Research Series 65; Boggs, C.H. 2001: Deterring albatrosses from contacting baits during swordfish longline sets. Pp. 79-94 in: Melvin, E.; Parrish, J.K. (eds) *Seabird bycatch: trends, roadblocks and solutions*. University of Alaska Sea Grant, Fairbanks, Alaska.; Minami, H.

swordfish fishery, streamer lines reduced black-footed and laysan albatross contacts with baits by 75% and 77% respectively. In the southern bluefin tuna fishery, streamer lines reduced seabird bycatch to between one third and one half of the catch rate when streamer lines were not used.

- 200 The efficacy of streamer lines is determined by the coverage the line provides to the baited hooks. This coverage is determined by the aerial extent of the line, and the frequency and type of streamers that hang from the streamer line to the ocean surface.
- 201 Aerial extent is affected by the height of the streamer line as it comes over the vessel stern, the nature of the towed object at the end of the streamer line, and the setting speed of the vessel.
- 202 Streamer line design for use in New Zealand bottom longline fisheries should consider international and domestic best practice. Recommended minimum specifications for key elements for effective streamer lines for bottom longline fisheries in New Zealand have been identified from this information, and are included in the recommendations in Appendix C below.
- 203 In summary, the costs and benefits of streamer lines are as follows:
- i) Relatively low cost device that delivers significant bycatch reductions
  - ii) Relatively easily tailored to particular vessels
  - iii) Improves potential fish catch by reducing bait loss to seabirds
  - iv) Rapid and simple deployment and retrieval
  - v) Simple and cost-effective to maintain and repair
  - vi) Installation may require attachment of a mounting structure on the vessel

### *Night-setting*

- 204 Setting longline gear at night is an effective way to reduce the exposure of seabirds to gear. This is because fewer seabirds of certain species are active at night, and also because baits are less detectable to certain seabirds at night. For example, in the bottom longline fishery around Kerguelen Island targeting Patagonian toothfish (*Disosstichus eleginoides*), night-setting reduced captures of white-chinned petrels from 0.91 to 0.17 birds per 1000 hooks<sup>37</sup>. Similarly, in the bottom longline fishery around the Falkland Islands, night-setting eliminated albatross bycatch<sup>38</sup>.
- 205 Night-setting has also been demonstrated to reduce seabird bycatch in New Zealand (surface) longline fisheries<sup>39</sup>. Similarly, amongst Japanese longliners surface fishing

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and Kiyota M. 2004: Effect of blue-dyed bait and tori-pole streamer on reduction of incidental take of seabirds in the Japanese southern bluefin tuna longline fisheries. CCSBT-ERS/0402/08.

<sup>37</sup> Weimerskirch, H.; Capdeville, D.; Duhamel, G. 2000: Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. *Polar Biology* 23: 236–249.

<sup>38</sup> Reid, T.; Sullivan, B.J. 2004: Longliners, black-browed albatross mortality and bait scavenging in Falkland Island waters: what is the relationship? *Polar Biology* 27: 131–139.

<sup>39</sup> Duckworth, K. 1995. Analysis of factors which influence seabird bycatch in the Japanese southern bluefin tuna longline fishery in New Zealand waters, 1989–1993. New Zealand Fisheries Assessment Research

in Australian waters, daytime seabird bycatch rates were five times higher than night time bycatch rates (0.25 birds/1000 hooks compared to 0.022 birds/1000 hooks, respectively)<sup>40</sup>.

- 206 However around full moon, night-setting is not as effective due to the significant amount of light the full moon provides<sup>41</sup>. Further, it is important to note the different behaviour amongst seabird species. Petrels in particular can still be very active at night. Consequently, measures additional to night-setting are required to reduce petrel bycatch, and the capture of seabirds around full moon.
- 207 CCAMLR measures provide for night-setting unless specified bottom longline sink rates are met<sup>42</sup>. Further, CCAMLR recommendations state that when fishing at night, only the minimum ship's lights necessary for crew safety can be used<sup>43</sup>.
- 208 The costs and benefits of night-setting are as follows:
- i) Gear-free method for reducing seabird bycatch
  - ii) Already practiced in some bottom longline fisheries some of the time
  - iii) Less effective in reducing bycatch during periods around full moon
  - iv) Use alongside another measure due to night time foraging by some seabird species
  - v) Reduces fishing time and flexibility in some fishing operations which may affect catch
  - vi) Requires careful use of deck-lighting to maintain crew safety

### *Offal and discard management*

- 209 Seabirds will not loiter around fishing vessels if they cannot feed. Consequently, the effective management of fish waste is widely recognised as the most effective bycatch reduction measure that can be implemented across all fishing methods. In both domestic and international longline and trawl fisheries, seabird bycatch has been shown to have a significant positive relationship with waste discharge<sup>44</sup>. Restricting discharge is therefore key to seabird bycatch reduction.
- 210 In longline fisheries, effective fish waste management means retaining offal and other processing waste, whole fish discards, old baits and baits that have not been successfully attached to hooks, until the fishing gear is no longer a danger to seabirds. For example, waste discharge may occur safely when longline setting is complete and the vessel has moved away from the line.

- 211 The costs and benefits of fish waste retention are as follows:

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Document 95/ 26, 62 pp.

<sup>40</sup> Klaer, N. and Polacheck, T. 1998: The influence of environmental factors and mitigation measures on by-catch rates of seabirds by Japanese longline fishing vessels in the Australian region. *Emu* 98: 305–316.

<sup>41</sup> Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

<sup>42</sup> CCAMLR Conservation Measure 24-02

<sup>43</sup> CCAMLR Conservation Measure 25-02

<sup>44</sup> Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

- i) Demonstrated to reduce the numbers of seabirds around vessels, and consequently reduce seabird bycatch
- ii) Requires development and implementation of retention practices where these are not already in place, e.g. installation of collection and holding bins with sufficient holding capacity

### ***Haul mitigation***

212 Mitigation devices used when longlines are hauled are not as well developed and researched as those used at other stages of the fishing operation. However, the ‘Brickle curtain’ is one measure that has been successfully implemented. This device excludes seabirds from the area in which bottom longlines are hauled, and so prevents seabird capture on hooks as the longline and hooks surface. To date, this measure has been deployed most widely on larger bottom longline vessels.

213 The costs and benefits of haul mitigation measures are as follows:

- i) No safety concerns around use
- ii) No negative impacts on the fishing operation
- iii) There is a cost for materials to make the brickle curtain or a similar device
- iv) Some habituation to the curtain may occur amongst seabirds over time, depending on the design of the curtain<sup>45</sup>

### ***Other measures***

214 As well as the measures identified above, there are others used in bottom and surface longline fisheries to reduce seabird captures. For example, measures with some efficacy include dyeing baits blue, ensuring baits are not completely frozen when deployed (so they sink faster), deterring seabirds through deploying natural oils on the sea surface and discharging a gas cannon when bird numbers are high.

215 However, these techniques are not as well tested as the measures described above, and do not give consistent reductions in bycatch across all seabird species over time<sup>46</sup>. Therefore, these measures will not be discussed further here.

### ***Measures available for trawl vessels***

216 There are a number of measures that have been employed to minimise the risk of seabird mortalities from deepwater trawl operations. The measures used fall into three broad categories;

- i) Changes to operational procedures (e.g. offal and discard management, reducing deck lighting, towing at night, reducing the availability of fish in the net)

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<sup>45</sup> Sullivan, B.J. 2004: Falkland Islands FAO National Plan of Action for reducing incidental catch of seabirds in longline fisheries. Falklands Conservation. 54 p.

<sup>46</sup> Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. Fish and Fisheries 8: 31-56.

- ii) Deployment of deterrent devices designed to keep seabirds away from the trawl net and warps (e.g. streamer lines, bird bafflers, warp scarers (deflectors), fish oil).
- iii) Changes to gear design (e.g. net binding, net weighting, removal of net monitor cables)

217 These measures are discussed further below.

### *Offal and discard management*

218 The presence of offal and discards, as discharge of fish waste from processing plants, discharge of water with solid material from sump pumps, or unwanted whole fish, is a major factor affecting seabird numbers attending trawl vessels<sup>47</sup>.

219 Seabirds feed on the discharged offal and discarded fish and subsequently associate vessels with food. Breaking the association between fishing vessels as a source of food, whilst also limiting seabird bycatch, requires measures to limit the discharge of offal and discards when fishing generally, and particularly when shooting, hauling or when the net is in the water or on the surface.

220 Managing offal and discards through retention onboard (e.g. mealing), strategic dumping (e.g. temporary retention on board and batch dumping) or mincing offal to reduce particle size may reduce seabird mortality, although mincing offal has not been broadly effective to date.

221 The costs and benefits of offal and discard management are as follows:

- i) Requires specific onboard capacity and operational measures dedicated to effective discharge management;
- ii) There may be health and safety issues connected with retaining offal on board;
- iii) There may be economic implications if fishing efficiency is reduced due to a lack of capacity to hold offal on board;
- iv) Some vessels with limited capacity may not be able to comply with stringent regulations for discharge retention;
- v) Several studies show that vessels not discharging fish waste during fishing catch fewer seabirds than vessels that do discharge offal during fishing<sup>48</sup>;
- vi) Preventing the discharge of offal during fishing has proved successful in contributing to a reduction in seabird bycatch in other fisheries such as in CCAMLR waters;
- vii) Preventing the discharge of offal eliminates interactions with fishing gear at the source resulting in less residual risk of such interactions

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<sup>47</sup> Abraham, E. (2005). Warp strike observations. Final Research Report for Ministry of Fisheries project IPA2004-014. Ministry of Fisheries, Wellington.

<sup>48</sup> Abraham, E and Pierre, J. 2007. Mincing, mealing and batching: strategies aimed at reducing seabird interactions with trawl vessels. CCAMLR WG-FSA-07-42.

(and thus less performance pressure on mitigation measures applied) at the back of the boat

### *Fishing at night*

- 222 Trawling at night may reduce seabird mortality because fewer birds are active then, thus reducing the numbers of seabirds exposed to fishing operations. However, at night, it may be more difficult for birds to see trawl gear, and therefore avoid contact with it.
- 223 The costs and benefits of fishing at night are as follows:
- i) Comprehensive research has not been done comparing seabird bycatch for daytime, versus night time, trawling;
  - ii) It may reduce the number of interactions with seabirds that are more active during daylight hours;
  - iii) It will not affect seabirds that forage during twilight or during the night;
  - iv) It may reduce the efficiency of the fishing operation if fishing is usually conducted round the clock; and,
  - v) It presents difficulties for recording warp strike interactions.

### *Reducing deck lighting*

- 224 Seabirds that are attracted to fishing vessels as a source of food may locate vessels with strong lighting on deck more easily at night. By reducing the deck lighting, it may be possible to reduce the number of seabirds that are attracted to vessels.
- 225 The costs and benefits associated with reduced deck lighting are as follows:
- i) There may be situations where low deck lighting is not appropriate for health and safety reasons;
  - ii) The measure is difficult to appropriately specify in regulation and may be difficult to enforce;
  - iii) There is no robust scientific evidence that deck lighting reduces the number of seabirds killed in trawl operations;
  - iv) It could be introduced relatively cheaply; and
  - v) It is already in common use in some fishing fleets.

### *Reducing the availability of fish in the net*

- 226 Seabirds are attracted to the availability of fish brought to the surface in nets. If the availability of fish to seabirds can be reduced, over time birds may be less likely to seek out fishing vessels as a source of food. Reducing the availability of fish in the net may be achieved through:
- i) Reducing the time that the net is at the surface during shooting and hauling; and

- ii) Cleaning out the net after each haul so that birds are not attracted to the ‘stickers’ when shooting.

227 The costs and benefits of reducing the availability of fish in the net are as follows:

- i) Adequate cleaning of the net may be difficult to regulate and enforce and may be impractical;
- ii) Reducing the length of time that the net is on the surface may be difficult to regulate and enforce;
- iii) There may be legitimate reasons why the net is sometimes on the water longer than normal, such as gear failure or entanglement;
- iv) There is a large variation in the amount of time that vessels take to haul the net, because of differences in hauling gear;
- v) There is some evidence to suggest that the length of time that the net is on the surface during shooting and hauling influences the number of seabirds caught and killed.

### *Warp deflectors (scarers)*

228 Warp deflectors (or warp scarers) have been developed to deter seabirds from contact with the warps. Rings are fitted around the warp and streamers are attached to these rings creating a protected area around the warp cables. Warp deflectors are deployed after shooting the net and retrieved prior to net hauling.

229 Empirical testing of warp scarers in fisheries around the Falkland Islands showed the design used had some efficacy in reducing seabird mortalities on trawl warps. The warp scarer was more effective than the bird baffler, but less effective than streamer lines<sup>49</sup>.

230 In New Zealand, empirical tests of a different warp scarer showed that this device was not effective, and during its deployment, warp strikes occurred at rates not significantly different from rates recorded when no mitigation was used.<sup>50</sup>

231 The costs and benefits of warp deflectors are as follows:

- i) Warp strikes may occur before the device is deployed and subsequent to it being retrieved;
- ii) May be more expensive than some other bird scaring devices (e.g. costs up to US\$800);
- iii) They may be difficult to deploy safely in some weather conditions;
- iv) There is empirical evidence that they can be partially effective (but not the design tested in New Zealand) in reducing the total number of seabird contacts, and the number of heavy seabird contacts, with the trawl warps;

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<sup>49</sup> Sullivan, B. J., Brickle, P., Reid, T.A., Bone, D.G. and Middleton, D.A.J. 2006. Mitigation of seabird mortality on factory trawlers: trials of three devices to reduce warp cable strikes. *Polar Biology*

<sup>50</sup> Abraham, E. R., Middleton, D. A. J., Waugh, S. M., Pierre, J. P., Walker, N., and C. Schröder. 2007. A fleet scale experimental comparison of devices used for reducing the incidental capture of seabirds on trawl warps. In review, *Fisheries Research*

- v) Require little storage space;
- vi) No costs associated with fitting; and
- vii) Relatively easy to maintain and replace.

### ***Streamer (tori) lines***

- 232 Paired or single streamer lines, attached to the stern of the vessel are used to provide protection over trawl warp cables. On trawlers, streamer lines are deployed after shooting and retrieved prior to hauling. The use of two streamer lines appears to provide protection of both warp cables.
- 233 Streamer lines have been tested empirically on trawl vessels both in New Zealand, and overseas, and evidence suggests that they are currently the most effective mitigation method for reducing seabird interactions<sup>51</sup>.
- 234 The costs and benefits of streamer (tori) lines are as follows:
- i) Streamer lines have been tested empirically on trawling vessels and results show that they are the most effective mitigation device for reducing seabird interactions with trawl warps;
  - ii) Warp strikes may occur before the streamer lines are deployed or subsequent to them being retrieved;
  - iii) They may not work as well in all weather conditions and during some normal fishing manoeuvres such as turning during a tow;
  - iv) Contact with streamer lines is known to occur;
  - v) They are relatively easy to regulate and enforce;
  - vi) Inexpensive (approximately US\$40 each);
  - vii) Require little storage space;
  - viii) Easy to maintain and replace; and
  - ix) Deployment only requires buoys or similar to be thrown into the water

### ***Bird baffler***

- 235 Bird bafflers consist of steel arms protruding sideways at the back of the vessel, with ropes and plastic cones hanging below to create a visual wall. Bafflers have been deployed in recent years in trawl fisheries in New Zealand and other areas of the Southern Ocean, and consist of either two or four arms.
- 236 Empirical testing of bird bafflers in fisheries around the Falkland Islands showed the design used had minimal efficacy in reducing seabird mortalities on trawl warps. The warp scarer and streamer lines were more effective in that fishery.

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<sup>51</sup>Sullivan, B. J., Brickle, P., Reid, T.A., Bone, D.G. and Middleton, D.A.J. 2006. Mitigation of seabird mortality on factory trawlers: trials of three devices to reduce warp cable strikes. *Polar Biology*; Abraham, E. R., Middleton, D. A. J., Waugh, S. M., Pierre, J. P., Walker, N., and C. Schröder. 2007. A fleet scale experimental comparison of devices used for reducing the incidental capture of seabirds on trawl warps. In review, *Fisheries Research*.

- 237 In New Zealand, empirical testing suggests that bafflers may have some effect in reducing warp strikes on trawlers with low block heights. However, they were less effective than streamer lines in reducing seabird strikes on trawl warps<sup>52</sup>.
- 238 Recent innovations by the New Zealand fishing industry have developed the baffler into a box or 'burka' around the trawl warps, creating a three dimensional barrier. While this method of protecting seabirds from trawl warps appears promising, it has not yet been empirically tested.
- 239 The costs and benefits of bird bafflers are as follows:
- i) Not as effective at reducing warp strikes as other mitigation measures such as streamer lines;
  - ii) They need to be deployed correctly to be effective and depending on their design, can tangle easily;
  - iii) They are relatively expensive (approximately US\$4800 plus fitting);
  - iv) They may not be effective in some weather conditions;
  - v) They are thought to be more effective for vessels with a lower block height;
  - vi) Wide variability in the design and deployment of bird bafflers is expected to influence their effectiveness;
  - vii) Reduce heavy seabird contacts and mortalities slightly, compared to using no mitigation device;
  - viii) Unlike streamer lines and warp scarers, bafflers are operational during shooting and hauling;
  - ix) They are easy to deploy and can be set in extreme weather;
  - x) They are easy to regulate and enforce; and
  - xi) They are already being used by some New Zealand middle depth trawling boats;

### *Acoustic scarers*

- 240 Acoustic scarers act by confusing and deterring birds that are attempting to feed behind the vessel. They are normally deployed as an additional measure for situations where large numbers of birds are present.
- 241 The costs and benefits of acoustic scarers are as follows:
- i) There is no empirical evidence that they reduce seabird bycatch or seabird interactions with fishing gear;
  - ii) Their effectiveness may be reduced over time if birds habituate to the sounds the scarers make;

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<sup>52</sup> Abraham, E. R., Middleton, D. A. J., Waugh, S. M., Pierre, J. P., Walker, N., and C. Schröder. 2007. A fleet scale experimental comparison of devices used for reducing the incidental capture of seabirds on trawl warps. In review, Fisheries Research

- iii) They are difficult to regulate;
- iv) They are relatively expensive;
- v) They can be an irritation and a health and safety issue to crew members;
- vi) They can be used in all weather conditions;
- vii) They can be deployed easily and safely; and
- viii) Deployment can be automated.

### *Net binding*

- 242 The aim of net binding is to increase the sink rate of the net and thereby reduce the time during which seabirds may interact with the net. Binding works by preventing the net from opening out on the surface as the tension created by the vessel is lost due to waves and swell action. As the trawl doors begin to spread the net opens and the bindings are broken.
- 243 Preliminary trials of net binding have yielded some promising results, however more work is needed to ascertain the reduction in seabird bycatch that this technique delivers<sup>53</sup>.
- 244 The costs and benefits of net binding are as follows:
- i) Further work is needed on effective binding of the net;
  - ii) Regulation may prove difficult to implement as no standard specifications currently exist;
  - iii) The effectiveness of net binding has not been quantified, although net binding has shown promise in trials in the Southern Ocean; and
  - iv) The net may sink more quickly to fishing depths.

### *Net weighting*

- 245 Weights can be added to the net to increase the sink rate and therefore reduce the time that the net is on the surface during deployment. This technique is also in its preliminary developmental stages.
- 246 The costs and benefits of net weighting are as follows:
- i) There may be large variances in the most appropriate weighting regime for each net;
  - ii) Net weighting has been deployed successfully in other fisheries such as CCAMLR; and
  - iii) The net may sink more quickly to fishing depths.

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<sup>53</sup> Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56

### **Measures available for set net fisheries**

- 247 The catch and bycatch (including seabirds) of set nets is largely determined by the design and the construction (particularly the mesh size) of the net, how it is set, where it is set and, to a lesser extent, by the behaviour of attendant fishermen.
- 248 Measures to avoid or mitigate seabird incidental mortality in set net fisheries are therefore largely dependent on these factors. For example:
- i) Nets set through the day should be attended by fishers so that the net can be retrieved if the operator suspects that seabirds are being caught, in order to prevent further captures.
  - ii) Set nets should be placed in positions and areas that are far enough away from breeding colonies or high-use areas to adequately reduce the threat of seabird by-catch in set nets. Ideally, set nets should not be set overnight within 1 km of key breeding colonies.
  - iii) As estuaries, harbours and river mouths are frequently used by diving birds, set nets should ideally not be used in these areas
  - iv) Sinking the nets deeper than 20 m will reduce the risk to diving seabirds. If set overnight, these nets should be retrieved as early as possible the next day.

## **Appendix C: Proposed Gazette Notice specifications for seabird mitigation measures**

### ***Definitions common to more than one method***

#### ***Setting at night***

- 249 For the purpose of this Notice, night is defined as half an hour before nautical dusk to half an hour after nautical dawn.
- 250 “Nautical dusk” means the time in the evening when the sun is 12 degrees below the horizon.
- 251 “Nautical dawn” means the time in the morning when the sun is 12 degrees below the horizon.

#### ***Offal***

- 252 For the purpose of this Notice, offal is defined as solid fish parts, including heads, guts, frames, tails, tentacles and fish trimmings, or parts thereof including minced parts.

### ***Proposed measures for bottom longline fisheries***

- 253 All vessels fishing using the method of bottom longline (BLL) are required to either:
- a) Deploy their lines using one of the line weighting regimes detailed below **and** use a streamer line to the specifications detailed below; or
  - b) Set their lines at night as defined above **and** use a streamer line to the specifications detailed below
- 254 All vessels fishing using the method of bottom longline (BLL) are required to retain all offal and fish<sup>54</sup> onboard during line setting and hauling.
- 255 It is also best practice to remove all hooks from unwanted bait if bait is to be discarded. As bait is covered by the definition of offal, it must not be discarded when the vessel is line setting or hauling.

#### ***Proposed line weighting regimes***

- 256 Line weighting regimes must be either:
- a) Integrated weighted line with at least 50g/m lead core; **or**
  - b) When externally weighted gear is used, at least 5kg of metal weight must be attached for every 60m of line
- 257 Regardless of which line weighting regime is used:

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<sup>54</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

- a) Any rope or line used to attach weight to the hook-bearing line must not be longer than 10m; **and**
- b) If more than 3 floats are attached for every 60 metres of line, 1kg of metal weight must be attached for every additional float.

### ***Streamer lines***

258 Streamer lines must meet the following minimum specifications:

- i) The streamer line must achieve at least 80m in aerial extent, from the point of attachment on the vessel to the point of contact with the sea surface;
- ii) The streamer line must be a minimum of 150m in length;
- iii) The streamer line must be suspended from a point on the vessel at least 5 m above the water in the absence of swell;
- iv) When a streamer line is deployed, each of the streamers must reach the sea surface in the absence of wind and swell
- v) Streamers must be spaced at a maximum of 5 m, commencing not more than 5 m from the stern of the vessel and extending thereafter along the aerial extent of the line.
- vi) Streamers must be made of fluorescent plastic tubing with a minimum diameter of 3mm
- vii) Each streamer shall be attached to the streamer line in a manner to prevent fouling of individual streamers with the streamer line

259 The following is recommended as best practice for streamer lines:

- i) Additional streamer lines should be carried at all times in case the streamer line that is in use breaks or is damaged and cannot be repaired.
- ii) The streamer line should be attached to the vessel so that when deployed the baits are protected by the streamer line, even in cross winds;
- iii) An object should be towed at the seaward end of the streamer line to create tension to maximise aerial coverage;

### ***Proposed measures for surface longline fisheries***

260 To be implemented by revisions to the Fisheries (Seabird Sustainability Measures) Notice 2007 and/or by circular pursuant to the Fisheries (Commercial Fishing) Regulations 2001.

261 All vessels fishing using the method of surface longline (SLL) are required to either:

- a) Set their lines at night as defined above **and** use a streamer line to the specifications below; **or**
- b) Deploy their lines using one of the line weighting regimes detailed below **and** use a streamer line to the specifications below; **or**

- c) Between the third and first quarter of the moon only (as defined below), deploy their lines using one of the line weighting regimes detailed below **and** set their lines at night as defined above
- 262 MFish notes that best practice would be to use night setting, streamer lines *and* line weighting during the periods of the lunar cycle where the moon is a significant source of illumination (between the first and third quarters).

### *Proposed line weighting regimes*

- 263 A metal weight of 45g or more must be attached for every hook deployed. The position of the weight must correspond to one of the following:
- i) Weights less than 60g must be within 1 metre of the hook; **or**
  - ii) Weights of 60-98 g must be within 3.5 metres of the hook; **or**
  - iii) Weights greater than 98g must be within 4 metres of the hook.

### *Phases of the moon*

- 264 The phases of the moon are defined as follows:
- a) New moon: The apparent longitudes of the Moon and Sun differ by 0 degrees
  - b) First quarter moon: The apparent longitudes of the moon and sun differ by 90 degrees
  - c) Full moon: The apparent longitudes of the moon and sun differ by 180 degrees
  - d) Last quarter moon: The apparent longitudes of the moon and sun differ by 270 degrees

### *Streamer line specifications*

- 265 The following specifications are proposed for surface longline vessels:
- a) The streamer line must be attached to the vessel so that when deployed the baits are protected by the streamer line, even in cross winds;
  - b) The streamer line must achieve at least 100 m in aerial extent;
  - c) The streamer line must be a minimum of 150 m in length;
  - d) Streamers must be brightly coloured, and must be spaced at a maximum of 5 m, commencing not more than 5 m from the stern of the vessel and extending thereafter along the aerial extent of the line. When a streamer line is deployed, each of the streamers must reach the sea surface in the absence of wind and swell. Streamer length will therefore vary depending on the height of their attachment point above the water;
  - e) The streamer line must be suspended from a point on the vessel at least 5 m above the water in the absence of swell;
  - f) If the streamer line that is in use breaks or is damaged, it must be repaired or replaced so that it meets these specifications before any further hooks enter the water.

### ***Proposed measures for inshore trawl vessels***

- 266 All vessels less than 28 metres in overall length fishing using the method of trawl are required to retain all offal and fish<sup>55</sup> onboard:
- a) during shooting and hauling; **and**
  - b) in the 20 minutes prior to shooting the trawl net, **unless** the vessel has steamed one nautical mile from where the last discharge of offal or discard (or return to sea) of fish occurred; **and**
  - c) while the trawl net is in the water
- 267 MFish notes that it is best practice to clean the net and remove any ‘stickers’ before shooting again.

### ***Proposed measures for deepwater trawl vessels***

- 268 All vessels 28 metres and over in overall length fishing using the method of trawl are required to retain all offal and fish<sup>56</sup> onboard:
- a) during shooting and hauling; **and**
  - b) in the 20 minutes prior to shooting the trawl net, **unless** the vessel has steamed one nautical mile from where the last discharge of offal or discard (or return to sea) of fish occurred; **and**
  - c) while the trawl net is in the water, **unless** discharging offal and fish in accordance with the relevant batch discharge regime detailed below
- 269 To ensure the safety of the vessel, the above requirements do not apply to offal and fish unintentionally entering sump pumps, scuppers and other mechanisms designed to remove excess water from the vessel. It is best practice to take all practical steps to minimise accidental spillage from the factory processing area.
- 270 Although all other waste (e.g. fish blood and liquid, stick water, grey water, black water) may be discharged at any time, MFish notes that it is best practice to avoid any discharge of waste during shooting and hauling, wherever possible. It is also best practice to clean the net and remove any ‘stickers’ before shooting again.

### ***Proposed batch discharging regimes***

- 271 Batch discharging is the process of storing offal and fish on the vessel for a specified period of time, followed by the rapid discharge of the accumulated offal and fish into the sea.
- 272 Batch discharging regimes are determined by vessel class as follows:
- a) Vessels without a packhouse licence and factory are not permitted to batch discharge;

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<sup>55</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

<sup>56</sup> Unless the fish is legally undersize, or is listed on the sixth schedule **and** is likely to survive

- b) Surimi vessels must discharge offal and fish in batches no more frequently than every 60 minutes for a period of up to five minutes, where it can be separated from the surimi manufacturing process
  - c) Japanese built vessels that are not licensed to process fish to fillet form must discharge offal and fish in batches no more frequently than every 30 minutes, for a period of up to five minutes;
  - d) All other vessels with a packhouse licence (including BATM/East German built, Sterkoder/Norwegian-built and Spanish built vessels) must discharge offal and fish in batches no more frequently than every 60 minutes, for a period of up to five minutes
- 273 When batch discharging, it is best practice to hold offal and discards as long as possible, ideally for the entire tow, where capacity allows.
- 274 It is also best practice to develop and follow a Vessel Management Plan approved by the Deepwater Group, to include a range of complementary seabird avoidance and mitigation measures.

## **Appendix D: Statutory considerations**

### ***Section 5(a): International obligations***

275 The proposals are consistent with international obligations relating to managing the effects of fishing-related mortality on protected species of seabirds. More information can be found in the section above on how seabird incidental mortality is managed in New Zealand.

### ***Section 5(b): Treaty of Waitangi (Fisheries Claims) Settlement Act 1992***

276 The proposals are not inconsistent with the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992

### ***Section 8: Purpose of the Act***

277 The proposals are consistent with the purpose of the Act. In particular, the requirement to avoid, remedy or mitigate any adverse effects of fishing on the aquatic environment.

### ***Section 9: Environmental principals***

278 The proposals are consistent with the Environmental Principles of the Act. In particular, that associated or dependent species should be maintained above a level that ensures their long-term viability and that biological diversity of the aquatic environment should be maintained.

### ***Section 10: Information principles***

279 The proposals are consistent with the Information Principles of the Act. MFish considers that the best available information has been used to develop the Initial Position Paper and that uncertainties in the information have been adequately highlighted for consideration.

### ***Section 11: Sustainability measures***

280 The paper proposes to implement sustainability measures through the use of a Gazette Notice, under Section 11(4)(b)(i) of the Act. In doing so, the Minister must take into account a range of factors set out under Section 11(1) and 11(2)

281 MFish considers that the Initial Position Paper discusses issues relating to the relevant factors, including the effects of fishing on the aquatic environment and any existing controls that apply to the stock or area concerned. The proposals are not inconsistent with any of the factors set out under sections 11(1) and 11(2).

### ***Section 12: Consultations***

282 MFish has initiated a four week consultation period. MFish considers that this process will meet the relevant requirements under Section 12 relating to consultation.