

**OPERATIONAL PLAN TO MANAGE
THE INCIDENTAL CAPTURE
OF NEW ZEALAND SEA LIONS
IN THE SQUID FISHERY
FOR THE 2003–2004 FISHING YEAR**

23 September 2003

Purpose of Paper

1 This paper outlines the management regime to address New Zealand sea lion interactions in the southern squid trawl fishery (SQU6T) during the 2003-04 fishing year. This regime continues the use of a Maximum Allowable Level of Fishing-Related Mortality (MALFiRM) to constrain New Zealand sea lion mortalities within the SQU6T fishery to a biologically acceptable level.

Background Information

2 The New Zealand sea lion is currently classified as a *Category B “threatened species”* under s 2 of the Marine Mammals Protection Act 1978. Under this classification, this species is considered not immediately threatened with extinction, but is potentially still vulnerable to population decline.

3 The southern squid trawl fishery (SQU6T) operates on the shelf around the Snares Islands and the Auckland Islands. The fishery runs from February to April/May each year. Trawls are conducted at depths between 140 and 400 meters, with the majority of squid catch reported at depths between 150 and 200 meters. A 12 nautical mile exclusion zone around the Auckland Islands prevents fishing close to the major breeding areas of the New Zealand sea lion. This area became part of the Auckland Island Marine Reserve in January 2003, continuing the existing prohibition on all fishing activities within the 12-mile exclusion zone. Outside the 12-mile exclusion zone, there are active commercial fisheries for various species, including arrow squid in quota management area SQU6T.

4 The New Zealand sea lion foraging area overlaps the squid trawl fishery on the Auckland Islands Shelf and results in the incidental capture and drowning of sea lions in trawl nets. The capture of threatened species in this fishery has raised public concerns over New Zealand sea lions in the last decade, including the role of the Ministry of Fisheries in managing the associated squid fishery. Under s 15(2) of the Fisheries Act 1996, the Minister of Fisheries may take steps that he considers necessary to avoid, remedy or mitigate the adverse effects of fishing on protected species. Under s 8 of the Fisheries Act 1996, the Minister of Fisheries must balance concerns over sustainability in the sea lion population with measures to provide for the utilisation of the squid 6T fishery when making a decision under s 15.

5 The incidental capture of New Zealand sea lions in the SQU6T fishery has led to the development and implementation of operational plans extending back to the 1992–93 season. The principal objective of these plans has been to constrain the number of sea lion deaths through fishing to a biologically acceptable level. These operational plans have been developed and implemented in the absence of the development of a Population Management Plan under the Marine Mammals Protection Act 1978 by the Department of Conservation.

6 In previous years, the management objective established for this species was to retain existing breeding locations, establish at least two additional breeding sites, and allow population size to increase with the aim of moving this species towards a ‘non-threatened’ status over a 20 year timeframe. In practice, the Minister has little direct ability or authority to bring about an increase in the number of sea lion breeding locations but is able to manage the interaction between fishing and the sea lion population through management of the SQU6T fishery, and has therefore sought more explicit objectives for managing SQU6T sea lion interactions in the Operational Plan.

7 A group comprised of industry, environmental, Department of Conservation, and MFish interests was established in early 2003 within the Ministry of Fisheries Aquatic Environment Working Group (AEWG) to examine research findings and scientific matters relating to bycatch of the New Zealand sea lion. For purposes of the sea lion Operational Plan, the AEWG adopted the following objective for gauging the effectiveness of SQU6T sea lion management:

Management interventions will be designed to ensure the sea lion population remained above 90% of its carrying capacity, K, or else remained above 90% of the level it would obtain in the absence of fishery bycatch, 90% of the time in 20- and 100-year runs.

Legal considerations

8 The primary legislative mechanism with which to manage the impacts of fishing related mortality on marine mammals is the development of a Population Management Plan (PMP) under the Marine Mammals Protection Act 1978 (administered by the Department of Conservation). Under a PMP, the Minister of Fisheries shall take all reasonable steps to ensure that the maximum allowable fishing-related mortality level set by the PMP is not exceeded, and may take measures that are considered necessary to further avoid, remedy, or mitigate any adverse effects of fishing on the relevant protected species.

9 Under a PMP for a species that is gazetted as “threatened” (such as the New Zealand sea lion), the determination of a MALFiRM must follow the criterion prescribed in the Marine Mammals Protection Act 1978:

"In the case of any threatened species,...[the] level of fishing-related mortality... should allow the species to achieve non-threatened status as soon as reasonably practicable, and in any event within a period not exceeding 20 years."

10 A MALFiRM within the context of a PMP, as developed and approved by the Minister of Conservation, requires concurrence from the Minister of Fisheries. The responsibility to ensure the maximum mortality level is not exceeded under a PMP lies with the Minister of Fisheries pursuant to s 15(1) of the Fisheries Act 1996.

11 There is no PMP for the New Zealand sea lion. A draft PMP is currently being developed by the Department of Conservation. The PMP will outline the status of the sea lion and establish objectives for the medium and long-term management of this species.

12 In the absence of a PMP, the Fisheries Act 1996 provides alternative mechanisms to manage, if the Minister considers it necessary, the effects of fishing-related mortality on the New Zealand sea lion. In particular, s 15(2) of the Fisheries Act 1996 states that in the absence of a PMP, the Minister of Fisheries, after consultation with the Minister of Conservation, may take such measures as are considered necessary to avoid, remedy or mitigate the effect of fishing-related mortality on any protected species and this may include setting a limit on fishing related mortality. It is proposed that a limit on fishing related mortality is set under s 15(2). For the purposes of this paper the term "MALFiRM" is used not in a technical sense applicable to a PMP, but as shorthand for a limit on fishing related mortality established under s 15(2) of the Act. To give effect to any established MALFiRM, s 15(5) states the Minister may, by notice in the Gazette, prohibit all or any fishing or fishing methods in an area to ensure that any limit on fishing-related mortality is not exceeded.

13 Because there is no PMP for the New Zealand sea lion, MFish considers that it is appropriate to consider alternative options for implementing a MALFiRM-based approach to manage the effects of the SQU6T fishery on the New Zealand sea lion population. MFish proposes a MALFiRM based on the operational objective agreed by the AEWG that *management interventions will ensure the sea lion population remained above 90% of its carrying capacity, K , or else remained above 90% of the level it would obtain in the absence of fishery bycatch, 90% of the time in 20- and 100-year runs.*

14 Irrespective of when the draft New Zealand sea lion PMP is released to the public for consultation, the statutory process under the Marine Mammals Protection Act 1978 will take time to complete and will not be completed prior to the 2003-04 fishing season. Therefore, based on the best information available concerning alternative sea lion management procedures as put forth in advice papers to the Minister of Fisheries, the Minister has decided to implement a further operational plan to manage the effects of fishing related mortality of New Zealand sea lions within the SQU6T fishery for the 2003–04 season under s 15(2) of the Fisheries Act 1996.

MALFiRM for the 2003-04 season

15 The 2003-04 operational plan uses the Breen & Kim¹ model to establish an appropriate MALFiRM. The Breen & Kim model is designed to ensure the New Zealand sea lion population will:

- a) increase in population to more than 90% of carrying capacity (K), or to within 10% of the proportion of K that would have been attained in the absence of fishing. This target is consistent with the provisions for a threatened species MALFiRM under the Marine Mammals Protection Act 1978, which should allow a threatened species to achieve non-threatened status within 20 years;
- b) attain the levels in a), with 90% certainty, over 20-year and 100-year projection periods (*crit20* and *crit100*, respectively); and
- c) attain a mean number of mature animals that exceeded 90% K (*crit Nmat/K*)%, in the second 50 years of 100-year projection runs (to allow for build-up of numbers in depleted, hypothetical populations over time).

16 Aside from these three primary criteria, evaluation of the management strategies was made using a larger suite of performance indicators. These included: mean annual and maximum bycatch during 100 year projection runs, population level at the end of 100 year runs as a proportion of K ($N100/K$), and the percentage of fishing seasons closed as an index of cost to the fishery.

17 Using the values from the latest population counts and recommended MALFiRM parameters applicable to the New Zealand sea lion population, the MALFiRM for the 2003–04 season is set at 62 New Zealand sea lions.

18 The decision to formally impose a limit pursuant to s 15(2) of the Fisheries Act 1996 hinges on whether this level of mortality is likely to be exceeded without any type of formal

¹ Breen P.A. and Kim S.W. (30 June 2003.) Exploring alternative management procedures for controlling bycatch of Hooker's sea lions in the SQU 6T squid fishery. Final Research Report to the New Zealand Ministry of Fisheries. Wellington.

control. Both the Ministry of Fisheries and the Department of Conservation believe that, without the formal imposition of a MALFiRM, there is a high probability of fishing-related mortality exceeding the maximum mortality figure derived from the Breen-Kim model.

19 Therefore, the Minister of Fisheries has decided that a MALFiRM of 62 New Zealand sea lions will be established for the 2003-04 SQU6T Operational Plan, pursuant to s 15(2) of the Fisheries Act 1996.

Arrangements to Monitor the 2003-04 MALFiRM

20 The MALFiRM will be monitored using two procedures:

- a) Option 1 - dedicated 'MALFiRM vessels'
- b) Option 2 - predetermined strike rate.

Option 1 - Dedicated 'MALFiRM vessels'

21 MFish observers will be placed on selected vessels ('MALFiRM vessels') intending to target squid to provide coverage for a representative 20% minimum and 30% maximum sample of all tows undertaken in the SQU6T fishery. This coverage requirement applies explicitly to quota management area SQU6T. All designated MALFiRM vessels fishing in SQU6T must use trawl nets that either do not employ a sea lion exclusion device (SLED), or employ a SLED that is closed (ie, a cover net is placed over the escape hatch). All sea lions caught by MALFiRM vessels will be retained in nets where they can be accurately counted by the observers and held for research purposes.

22 MFish requires the cooperation of Industry in providing the logistical information necessary to plan and meet observer coverage needs. This information includes:

- a) Advance notice prior to commencement of fishing activity consisting of a list of all vessels participating in the fishery
- b) at least 72 hours advance notice of vessel departure dates
- c) planned area of fishing activity (whether SQU6T or elsewhere) and
- d) other data that may facilitate efficient use of observer resources.

23 If total observer sea-days in the squid fishery required under this coverage plan exceed those days already levied to the Industry, the additional sea-days will be charged to the Squid Fishery Management Company.

24 To ensure the minimum 20% coverage threshold by MALFiRM vessels under Option 1 is achieved with a high level of confidence (75%), MFish observers will be placed on a minimum of 25% of vessels targeting squid at any one time.² The Squid Fishery Management Company has undertaken to assist MFish in ensuring achievement of the

² This level of coverage is based on a NIWA estimate of a statistically valid level of observer coverage in the SQU fishery (SQU1T and 6T) that would enable a level of assurance that at least 20% coverage will be maintained at any time in SQU6T. Results indicate that requiring 25% observer coverage of SQU vessels would provide coverage of 20% or more with a probability of 75%, while requiring 30% coverage ensured similar coverage with 90% probability.

minimum and maximum thresholds, and ensuring that designated MALFiRM vessels fish in a manner representative of the SQU6T fleet.

25 The number of MALFiRM vessels fishing in SQU6T cannot exceed 30% of total vessels fishing in SQU6T during any one reporting period. This should ensure that sea lion bycatch from observed vessels with tied down cover nets (which cannot be applied to the MALFiRM count under the April 2003 High Court ruling) does not become excessive relative to the underlying MALFiRM.

26 Should the number of MALFiRM vessels fishing in SQU6T during a designated reporting period (defined below) exceed 30%, those vessels in excess of the 30% maximum must remove cover nets (if present). This action is to be coordinated through the Squid Fishery Management Company and MFish to ensure that minimum coverage levels are maintained. Prior to removing cover nets in this situation, vessels must notify the MFish Observer programme to ensure that onboard observers are aware of the change in reporting status.

27 SQU6T vessels without MFish observers have discretion to employ SLEDs when fishing, and must not tie down cover nets over the escape hatches.

28 Up to the point where 70% of the MALFiRM is reached, the reporting period used to measure observer coverage is to be the seven day calendar week commencing at 0001 hours Monday and ending at 2400 hours the following Sunday.³ At the point when 70% of the MALFiRM is reached, the reporting period will switch to a daily basis, including provisions for maintaining a minimum 20% and maximum 30% observer coverage by MALFiRM vessels in SQU6T. MFish emphasizes that this is a reduction in the percentage of MALFiRM threshold for shifting reporting period from a weekly to daily basis; from 80% in previous years to 70% in the 2003-04 SQU6T season.

29 MFish also acknowledges that daily monitoring procedures, including requirements for observer coverage rates, may pose difficulties for fishers, and will work with fishers and industry to facilitate both efficient and accurate reporting.

30 Any tow where a sea lion is retained by a MALFiRM vessel with a tied down cover net for research purposes will not be counted towards the MALFiRM. Where the fishing industry follows the instructions to tie down cover nets to prevent the escape of sea lions, research permits under s 5 of the Marine Mammals Protection Act will be obtained as a precautionary measure. MFish anticipates that these research permits will be issued by the Department of Conservation in the name of the Chief Executive of the Ministry of Fisheries, on behalf of fishers.

31 The observers will confirm sea lions caught by nets and report all mortalities on a timely basis. These mortalities will also be used for autopsy analysis when the carcasses are returned to shore and sent to Massey University.

32 An actual in-season strike rate (per tow) is calculated on the basis of the applicable weekly or daily reporting periods as follows:

³ MFish anticipates that fishers will begin fishing in SQU6T on 1 February 2004. For purposes of the applicable reporting period, the week covering the opening of the SQU6T fishery on 1 February will be extended to the eight-day period commencing 1 February 2004 at 0001 hours and ending at 2400 hours on 8 February 2004.

(total confirmed sea lion captures by MALFiRM vessels) ÷ (total number of tows by MALFiRM vessels)

33 The estimated total number of sea lion captures for purposes of monitoring the MALFiRM is determined by extrapolating the actual in-season strike rate to the total number of tows reported by all vessels in SQU6T (ie, MALFiRM and non-MALFiRM vessels), *minus* the number of actual sea lions captured in SLED-equipped MALFiRM designated vessels,⁴

[(actual in-season strike rate)*(total number of tows by all vessels)] – (actual number of sea lions captured by SLED-equipped MALFiRM vessels with tied down cover nets over escape hatches⁵).

34 The use of Option 1 will be contingent on the following two criteria:

- a) that a minimum of 20% and a maximum of 30% of all tows in SQU6T are undertaken by MALFiRM vessels with MFish observer coverage.
- b) the distribution of tows by all MFish observed vessels is generally representative of fishing activity undertaken by the SQU6T fleet.⁶

35 If either of the above two criteria are not upheld for a given reporting period (weekly or daily, as determined by the proportion of the MALFiRM reached) during the season, a predetermined strike rate is applied in order to effectively estimate total sea lion catches as described under Option 2, below.

36 The Minister of Fisheries acknowledges there may be some vessel operators that will object to being a MALFiRM vessel. Option 1 accommodates these views by exempting those vessels that do not wish to comply with the requirement to use closed nets, so long as a representative minimum 20% observer coverage by MALFiRM vessels can be maintained over squid fishers operating in SQU6T. This requires industry to identify participating vessels well before the commencement of the fishing season.

37 To ensure there are sufficient vessels for placement of observers and to accommodate vessels not wishing to become MALFiRM vessels, industry must provide a list of all vessels intending to fish in SQU6T and whether those vessels will operate as MALFiRM vessels. This list is to be delivered to the Manager, MFish Observer Programme by 1 December 2003. In addition, all vessel operators must advise the Manager, MFish Observer Programme by facsimile (04 460 4675) or e-mail (observer@fish.govt.nz) at least 72 hours before the vessel leaves port to target squid in SQU6T and/or SQUIT.⁷

⁴ The April 2003 High Court ruling held that sea lions captured by cover nets placed over escape hatches were not to be counted against the SQU6T MALFiRM since such captures were deliberate rather than accidental or incidental.

⁵ In the event a MALFiRM vessel does not employ a SLED, any resulting sea lion mortalities observed from such vessels would not constitute a “deliberate” taking in the context of the High Court ruling, and therefore these mortalities would be included in the MALFiRM count.

⁶ In this context, ‘representative’ means that observed vessels are fishing in the same general vicinities, with similar trawl patterns as unobserved vessels. Verification will be based on interpretation of vessel automatic location communicator (ALC) transmissions provided by MFish.

⁷ This is in view of the fact that vessels may not have definite plans on intended fishing activity in SQU6T vs. SQUIT during the duration of each voyage, in which case observer coverage must anticipate switching between the two areas.

Option 2 – Predetermined strike rate

38 In the event fishers do not achieve the required minimum 20% observer coverage rate by MALFiRM vessels during any relevant reporting period (weekly or daily, as described above) necessary to compute the actual strike rate, the procedure for estimating sea lion captures for the SQU6T fishery will rely on the application of a predetermined 5.3% strike rate. This strike rate will apply to the total number of tows reported by all vessels in SQU6T during the relevant reporting period for which insufficient observer coverage was obtained, as follows:

$$(\text{predetermined strike rate}) * (\text{total number of tows in SQU6T by all vessels})$$

39 Option 2 provides an alternative means of monitoring the MALFiRM if the SQU6T fleet does not comply with Option 1 criteria. The industry may elect to operate under Option 2 rather than Option 1, but MFish notes that the use of Option 2 will not allow for the calculation of an actual strike rate for the 2003-04 fishing year. Given the high level of variability in the strike rate over time, MFish recommends that use of a predetermined strike rate in 2003-04 is contingent on implementation of an actual strike rate monitoring procedure in the 2004-05 season, such as offered by Option 1. Thus, MFish recommends that Option 2 not be continued as a long run MALFiRM monitoring regime unless provisions can be made to update or verify the predetermined strike rate.

In Season Changes to the Predetermined Strike Rate

40 A procedure is specified by which changes in the predetermined strike rate might be undertaken during the season if evidence from actual strike rate calculations reveals that the predetermined strike rate is not representative of the observed strike rate.

41 The predetermined strike rate will be compared with the ongoing, most recent 4-week moving average of actual strike rate as a basis for changing the predetermined strike rate in season.⁸ The relevant period for purposes of determining the strike rate will be the weekly reporting period used by NIWA to estimate an actual strike rate if statistically valid observed strike rates are available for such calculations. The initial 5.3% predetermined strike rate will be replaced by the 4-week moving average strike rate for all subsequent reporting periods in calculating the MALFiRM count under monitoring Option 2. This procedure requires that at least four previous weeks be available to justify such changes, where at least 20% coverage was recorded with a representative number to tows within the 2003-04 SQU6T season.

MALFiRM Monitoring Calculations

42 MFish anticipates that MALFiRM monitoring operations over the course of the 2003-04 SQU6T season might include a combination of Options 1 and 2. The ongoing process of monitoring sea lion mortalities counting toward the designated MALFiRM limit will be undertaken as follows:

- a) The MALFiRM count from Option 1 is based on the ongoing seasonal

⁸ A moving average is a standard statistical smoothing technique used where a data series is thought to have a large random factor. In this application, the moving average is the most recent 4 weeks with actual strike rate information (these do not have to be consecutive) averaged to develop the strike rate estimate. As a new weekly strike rate estimate becomes available, the earliest period observation is dropped, and replaced with the most recent.

calculation of the strike rate, for all periods during which the cumulative 20% minimum observer coverage within the SQU6T fishery has been achieved, according to the estimation procedure described above.

- b) In the event the minimum observer coverage falls below 20%, the MALFiRM count for the relevant period or periods will be based on Option 2 criteria using the predetermined strike rate, also described above.
- c) In the event separate mortality count estimates develop under monitoring Options 1 and 2 for different periods based on observer coverage levels obtained, the MALFiRM count will combine these two estimates (Option 1 count plus Option 2 count) in order to obtain a count applicable to the entire period during which fishing has occurred.

Research permits to take sea lions

43 Where the fishing industry follows the instructions to tie down cover nets to prevent the escape of sea lions under MALFiRM monitoring Option 1, research permits under s 5 of the Marine Mammals Protection Act will be necessary. These must be obtained before designated MALFiRM vessels intending to fish with cover nets placed over escape hatches commence fishing for squid. The Department of Conservation will process and issue these research permits. MFish anticipates that these research permits will be issued by the Department of Conservation in the name of the Chief Executive of the Ministry of Fishery, on behalf of fishers.

Reporting arrangements

44 The requirements of a master of the fishing vessel and the Ministry of Fisheries observer, respectively, in reporting New Zealand sea lion captures are as follows:

- a) Masters of all vessels must submit a report on any encounter with a marine mammal, which resulted in death or injury, at the end of the voyage as required under the Marine Mammal Protection Act 1978, and
- b) Ministry of Fishery observers will ensure that a telex, fax, or email is sent to the Fisheries Communication Centre immediately following any New Zealand sea lion capture on their observed vessel.

45 The other requirement is the vessel daily voluntary reporting regime that is conducted through the New Zealand Seafood Industry Council. This information is required to allow the in-season extrapolations of New Zealand sea lions against the MALFiRM. Given the arrangements for the 2003-04 season, all vessels (including MALFiRM vessels) will be required to report the following information:

- a) each tow undertaken
- b) whether the tow is observed by a Ministry of Fisheries' observer
- c) whether a SLED is used on the tow
- d) whether the escape hatch on the SLED is open or closed, and
- e) whether a sea lion is caught during a tow.

Observer coverage

46 All MALFiRM vessels will be required to carry a Ministry of Fisheries observer. The role of these observers is to ensure that each vessel accurately records and reports any New Zealand sea lion captures in accordance with the 2003–04 operational plan. Observers will also record net configuration and deployment relative to SLED use as appropriate.

Discount factor

47 A 20% discount factor adjustment will be made to the strike rate of SLED-equipped vessels, whether under monitoring Option 1 or 2. The 20% discount factor will be applied to the assessed strike of SLED-equipped vessels not designated as MALFiRM vessels. In the event a minimum 20% observer coverage by MALFiRM vessels is not obtained, the 20% discount factor will also be applied to all SLED-equipped vessels under the Option 2 predetermined strike rate.

- a) As a condition for the application of a strike rate discount factor, vessels will be required to participate in a research programme following a plan approved by the MFish Aquatic Environment Working Group (AEWG), prior to the commencement of fishing in the 2003-04 SQU6T season. The research plan will detail SLED design and a procedure for reporting statistical characteristics of fishing operations relevant to SLED use in SQU6T.
- b) In order to qualify for the discount strike rate, qualifying SLED vessels must satisfy the following conditions:
 - i) That vessel used a SLED device approved by MFish (as established by the AEWG research programme described above), and that the escape hatch on the SLED remained open during fishing operations.
 - ii) That SLED's specifications have been provided by the Squid Fishery Management Company to the Ministry of Fisheries as part of the AEWG research programme design, and for use in observer briefings.
 - iii) A Ministry of Fisheries observer was present on that vessel to document net deployment and report on sea lion interactions associated with fishing activity.
- c) In the event MFish is unable to provide observer coverage for all SQU6T SLED vessels qualifying for the strike rate discount factor, MFish will endeavor to utilise alternative monitoring procedures such as on-board video surveillance or gear inspections. MFish will assess costs associated with alternative monitoring procedures and consult with industry on the appropriate basis to allocate these costs. Qualifying vessels will be allowed to operate without an observer and will obtain the discount factor. Any such vessel is required to use a SLED device approved by the Ministry of Fisheries in all SQU6T fishing operations. Such allowance will only be made in the case where vessels have provided the MFish observer program with at least 72 hours advanced notice of fishing intentions and voyage dates.
- d) If total observer sea-days in the squid fishery exceed those days already levied

to the Industry, the additional sea-days will be charged to the Squid Fishery Management Company.

Possible closure process

48 MFish will develop weekly reports of cumulative estimated sea lion mortalities up to the point where 70% of the MALFiRM has been reached, at which point monitoring will be conducted on a daily basis, whether under monitoring Option 1 or 2. The Minister of Fisheries will close the fishery by Gazette notice under s 15(5) of the Fisheries Act 1996 if the point estimate indicates that the MALFiRM is about to be reached.

49 Consultation during the season will be restricted to new information that impacts upon closure decisions and will not re-litigate the Minister's original decisions on the operational plan.

Hon Pete Hodgson
Minister of Fisheries

Hon Chris Carter
Minister of Conservation