

CONTENTS

MONITORING	2
Executive Summary	2
Proposals	3
Submitter Comments	3
MFish Assessment	3
Need for Additional Monitoring	4
Types of monitoring available.....	5
Fisher self-reporting	5
Electronic monitoring:	5
Observers	6
Levels of observer coverage	6
Lower levels of observer coverage	7
Higher levels of observer coverage	7
Practicalities	8
The cost to industry	10
Proposed Set Net and Trawl Vessel Observer Coverage for the 2008/09 year	10
Observer coverage from 2009/10 onwards	12
Longer term options for observer coverage.....	12
Monitoring of Recreational Fishing Activity	14
Recommendation.....	14
RESEARCH.....	15
Submitter Comments	15
MFish Assessment	15
Species Level Research Priorities.....	18
Potential projects	19
Maui's Dolphin Research Priorities	19
Potential projects	20
WCSI Dolphin Research Priorities	20
Potential projects	20
ECSI Dolphin Research priorities.....	21
Key information gaps	21
Potential projects	21
SCSI Dolphin Research priorities.....	22
Potential projects	22
Recommendation.....	23

MONITORING

Executive Summary

1 The draft TMP contained proposals to increase the level of monitoring for the different Hector's and Maui's populations to improve information on levels of fishing-related mortality. The draft TMP is not explicit about what level the observer coverage should be increased to.

2 The Fisheries Act 1996 enables the chief executive to "place any observer ... on any vessel to observe fishing and ... landing of fishing, aquatic life, or seaweed" (s 223). It is relevant that you consider the existing and required extent of observer coverage when determining the proposed management options of each Hector's and Maui's dolphin population. You should also consider the expected costs of observer coverage, as in some cases, observer costs are expected to be high and may be comparable to the costs outlined for the more restrictive management options to control fishing activity.

3 Submitters accept the need for greater levels of monitoring. However, the fishing industry considers the costs for additional monitoring must be borne by the Crown and be less than the levels inferred to in the draft TMP. Environmental and general submitters typically consider that observer coverage must be much greater (advocating for up to 100% coverage) and should not be a substitute for taking strong management action.

4 There is a risk of ongoing fishing-related mortality associated with options that allow continued overlap with fishing (primarily set net and trawl methods) and Hector's and Maui's dolphins. Currently the extent of fishing-related mortality of Hector's and Maui's dolphin is uncertain due to poor incentives to report and lack of independent monitoring. MFish considers it prudent to implement an improved monitoring regime in areas where risk of mortality from fishing remains after any new measures are put in place. However, if implemented, this improved regime will impose costs on industry, which should be taken into account when considering the costs and benefits of options outlined in the final advice paper.

5 This section presents a range of alternative monitoring options based on a spectrum of low to high levels of observer coverage. The analysis assesses the costs, benefits and practicalities (including timeframe for implementation) associated with each option.

6 In the short-term, approaches are limited by lack of capacity in the observer programme and caps on expenditure on services including observer coverage. In the longer-term, constraints are associated with high costs to the fishing industry including the ability to levy the commercial sector, difficulties of placement of observers on smaller inshore vessels, and in some cases, the high level of observer coverage necessary to detect rare bycatch events.

7 MFish has developed a monitoring programme if new initiative funding is approved for the 2008-09 fishing year. This programme provides a high level of coverage across the fishing fleets that overlap with dolphin range for a period of two months only. MFish considers this option will provide valuable information on fishing-related mortalities of dolphins, and an indication on the level of residual risk to dolphin populations following the implementation of the TMP.

8 Consideration will need to be given to options for monitoring in future years. Options for greater levels of observer coverage will need increased levels of funding. MFish will put forward proposals for this funding in future years depending on decisions made on management options to

mitigate risk outlined in this final advice paper, your views on future approach (if any), and future priority decisions for Ministry funding.

Proposals

The draft TMP noted that monitoring allows for an analysis of dolphin-fishing interactions in areas where the range of the dolphins and fishing activity overlaps. It does not reduce the risk to Hector's and Maui's dolphins. Monitoring objectives include:

- i) gathering information on the nature and extent of interactions between fisheries and dolphins, and
- ii) assessing compliance with mandatory and voluntary mitigation measures.

When selecting management action that does not eliminate risk, the Minister should consider additional monitoring to verify the effectiveness of the chosen management action. The greater the residual risk, the greater the imperative for additional monitoring.

Submitter Comments

9 The majority of submitters acknowledge the importance of monitoring.

10 SeaFIC and other industry submitters consider that observer coverage should be more strategically planned and has failed to achieve objectives in previous years that industry have already been levied for. SeaFIC considers the costs of any future observer coverage should be borne by the Crown, as observers would be monitoring compliance with the law. Many industry submitters consider that they would be unable to afford greater levels of observer coverage¹, as well as noting a loss of privacy if cameras are operating on their vessels over a 24 hour period.

11 Sanford and other industry submitters state that a number of issues need to be resolved before monitoring options can be implemented, including demonstrating a need for 100% observer coverage and considerations of the social implications of such an approach. CFMC request further consultation on a monitoring paper before options are implemented, as such a paper was signaled in the draft TMP.

12 Some recreational fishers express concern over lack of monitoring of commercial trawl fisheries and suggest use of Vessel Monitoring System (VMS) equipment and observers. Some recreational fishers support further engagement with MFish on monitoring recreational fishing activities, but have concerns over possible repercussions on fishers when reporting a dead dolphin.

13 Environmental and many general submitters consider that monitoring should be implemented as soon as possible, be cost recovered, and in some cases, cover 100% of fishing effort or occur wherever there is an overlap between dolphin distribution and fishing activity.

MFish Assessment

14 MFish notes support for monitoring from environment and general submitters.

15 MFish acknowledges the views of the fishing industry that individual fishers could not afford the cost of additional monitoring. MFish notes the views of some submitters that the draft

¹ Some submitters misunderstood the basis upon which observer costs are recovered from industry and this may have contributed to their statements on affordability

TMP was unclear on actual costs of greater observer coverage, and as a result, some fishers understood they would have to pay the estimated \$800-1 000 per day cost for placing an observer onboard their boat. MFish accepts the draft TMP may have caused fishers to misinterpret likely costs on individuals under increased observer coverage, but notes that increased costs for inshore observer coverage are levied across quota owners within a quota management area, and not on individual fishers. MFish discusses the specific costs of higher observer coverage later in this section.

16 MFish considers the existing observer programme for protected species (run by Conservation Services Programme (CSP) in DOC) seeks to strategically plan observer coverage across the fishing industry to establish the nature of fishing interactions with protected species. MFish notes that it has been problematic to place observers on inshore vessels due to a variety of practical and logistical factors including high priorities for observer coverage in deepwater fisheries where fishing interactions with marine mammals and seabirds is well documented and where there is capacity for small, inshore vessels to accommodate an observer. MFish is confident that cooperation from industry over future observer programmes can reduce the gap between desired results and levels of observer coverage.

17 MFish considers there is an important role that fisher and public reporting of fishing-related mortalities can provide in gathering information on fishing threats to dolphins in the future. While some fishers express concern about potential repercussions of reporting fishing-related mortalities, both MFish and DOC are able to withhold people's identities and associated information that may identify the fisher concerned under the Official Information Act 1982².

Need for Additional Monitoring

18 There is a high level of uncertainty on the nature and extent of fishing-related mortalities on Hector's and Maui's dolphins across all populations. MFish contends there are real benefits from increased monitoring to better assess residual risk of fishing interactions under existing and future management regimes that are in place.

19 Some management options (for each dolphin population) enable fishing effort to continue to overlap with dolphin distribution, including *status quo* management options. In these instances there remains some residual risk that fishing-related mortalities could occur. To better understand the nature and extent of this risk, MFish recommends these options should be accompanied by increased levels of monitoring.

20 The primary objective of increased monitoring is to better understand the nature and extent of the risk of fishing-related mortality associated with any implemented management regime, which in turn will enable improved assessment of whether that level of risk is acceptable.

21 A secondary objective of increased monitoring is to reduce uncertainties associated with life history and population demographics of the Hector's dolphin populations, and to improve the quality of population models. In the event where a fishing-related mortality occurs, the carcass will be returned for necropsy and relevant biological information gathered.

² Section 9(2)(a) of the Official Information Act 1982 states that such information may be withheld if the public interests are outweighed by the protection of personal privacy

Types of monitoring available

22 MFish considers there are three approaches to improve the information on fishing-related mortality of Hector's and Maui's dolphins. These are:

- a) Fisher self-reporting;
- b) Electronic monitoring; and
- c) Observers.

23 The following section describes the benefits and limitations of the different sorts of monitoring options that are available.

Fisher self-reporting

24 The *Marine Mammals Protection Act 1978* and the *Wildlife Act 1953* require fishers to report all protected species interactions, including dolphin entanglements. However, MFish believes there are a lack of incentives for fishers to report instances where fishing-related interactions occur. MFish anticipates more information should be forthcoming on the level of fisher-self reported dolphin interactions following the implementation of a regulated protected species bycatch form³. Commercial fishers will be required after 1 October 2008 to furnish specific information in the event of an interaction with a protected species including Hector's and Maui's dolphins. The requirement to use this form both clarifies and strengthens the obligations on fishers to report any fishing-related mortalities of dolphins, and will enable a comparison between reporting levels of bycatch between observed and non-observed vessels. Should reporting rates prove comparable, MFish considers there may be a greater role for fisher self-reporting in the future.

25 Currently, MFish does not consider that fisher self-reporting is sufficiently robust to meet monitoring objectives.

Electronic monitoring:

26 The draft TMP identified electronic monitoring as one mechanism to monitor the fishing activity of the inshore fleet. Following feedback from submissions, MFish considers there remains practical limitations to electronic monitoring that do not make this approach feasible in the short-term in the inshore fleet.

27 The key limitations of electronic monitoring are focused around consistent and reliable detection of bycatch. Potential problems to identify a fishing-related mortality include:

- a) Where large quantities of fish are landed onboard a trawl vessel and a dolphin is buried under the catch
- b) Where fish are landed onboard a trawl vessel directly into the hold and any dolphin is concealed
- c) Where a dolphin is released from a net prior to the net being retrieved onboard

³ Fisheries (Reporting) Amendment Regulations 2008

28 Other aspects that need to be considered are data retrieval, tamper proofing devices, and more cost efficient way to implement widespread use of electronic monitoring if suitable for observing bycatch across all inshore fisheries.

29 Further studies by DOC and MFish are underway to improve our understanding of electronic monitoring. The results of these studies may assist to enable electronic monitoring to be used by industry in the future. However, MFish does not consider that current electronic monitoring technology is sufficiently well developed to meet monitoring objectives.

Observers

30 Traditionally, MFish has used fisheries observers for a wide range of tasks, including checking fisher's compliance with fisheries regulations eg, observing catch that is landed, recording species caught, and monitoring interactions with marine mammals and other protected species. Observers are also involved in various research projects eg, collect biological samples for analysis. As such, observers provide independent verification of a wide range of fishing activities and are an important source of information for scientific and fisheries management.

31 MFish considers that observers are the only viable option to assess the nature and extent of interactions between fishing and Hector's and Maui's dolphins at this time.

32 An examination is presented below of different approaches to achieving monitoring objectives through observer coverage, including the benefits and limitations of observer coverage and the practicalities and costs to industry.

Levels of observer coverage

33 This paper considers a spectrum of options to implement observer coverage from status quo (ie, 1-2% of inshore fishing days) through to very high (ie, 80%) to illustrate the advantages and disadvantages of varying degrees of coverage. Key factors to consider for each option are:

- a) Benefits and limitations of the information likely to be gained
- b) Practicalities associated with increased observer coverage
- c) Cost to industry

34 As the level of observer coverage increases there is an increase in benefits of the quality of information that is obtained, costs, and time taken to recruit people. MFish considers that you consider observer coverage across the duration of the fishing year or over a defined period of time where risk of dolphin interactions is higher.

35 There are many benefits to increasing observer coverage from existing and historic levels for Hector's dolphins. As observer coverage increases, uncertainty over the extent of fishing-related mortalities decreases and qualitative information can also be gathered on factors affecting fishing-related mortalities.

Lower levels of observer coverage

36 Under a low level of observer coverage, the level of information gained will be limited. For example, there is a range of potential biases associated with low levels of coverage, including:

- a) Fishers could alter their normal fishing practices while being observed
- b) Variation between individual fisher behaviour and practices (which may be influenced by species that are being targeted)
- c) Non-representative area and seasonal coverage

37 Consequently, information from low levels of coverage cannot be used with certainty for modeling purposes or to gain a good understanding of the fishing-related impacts on dolphins.

38 A higher level of coverage is necessary to monitor rare species or where fishing-related mortality is reported as a rare event. For Maui's dolphins, lower levels of observer coverage are unlikely to reveal significant new information. However, for larger populations of Hector's dolphins (such as the WCSI where fishers report seeing dolphins on a very regular basis), lower levels of coverage could still provide useful data on fishing-related mortality.

39 Any increase in observer coverage, even to low levels such as 10%, would still be higher than the status quo for most fisheries. This would represent an increase in information on the nature and extent of fishing-related mortalities.

Higher levels of observer coverage

40 As observer coverage levels increase, potential biases associated with observer placement are reduced and the information gathered by observers has increasing benefits to fisheries managers. Information can be used to generate broadly representative bycatch rates, particularly for specific areas and seasons or where high levels of bycatch are detected.

41 When there are very high levels of coverage, information can be used to get a good estimate for bycatch rates and total captures of Hector's dolphins, and a broadly reliable estimate of bycatch rates and total captures of Maui's dolphins. MFish expects a high level of coverage (e.g. 80% year-round) will have the following benefits:

- a) Good estimates of Hector's dolphin bycatch rates that require fewer assumptions about seasonal trends and broadly reliable estimates of Maui's dolphin mortalities
- b) Analysis of factors affecting fishing interactions
- c) Modelling of the population and impacts of fishing-related mortalities

Practicalities

42 Different options for observer coverage have differing levels of practicality associated with their implementation. These issues fall into the following five broad areas:

- a) Capacity of the observer programme
- b) Structure of the observer programme
- c) Delivery of information
- d) Suitability of vessel to carry observers
- e) Caps on funding of observer coverage

Capacity of the observer programme

43 Currently, MFish employs 55 observers and aims to deliver 7 462 observed sea days per year. While some of the existing observer-days may be able to be reassigned to monitor Hector's dolphin bycatch, this will not be possible in the short-term for the large majority of days as observers are already committed to deliver a wide range of existing research and monitoring programmes in other fisheries.

44 Therefore, all options for monitoring except status quo require an increase in the number of observers from current levels. Some reallocation of current observer-days may be achievable over time.

45 The number of additional permanent observers necessary to achieve very high levels of observer coverage across all the dolphin populations is very high - probably more than double the existing number of observers (eg, 65-85 additional observers). It is likely that such an increase in observer resourcing would take up to five years to achieve given potential difficulties in recruiting suitable staff.

46 MFish notes it is difficult to estimate with certainty the additional number of observers for varying levels of observer coverage. This is because there is significant variation between requirements for each fishery. For example, there are three ports that are encompassed within the within the WCSI population and 13 ports that are within the ECSI population. If observers are required within each port, the ECSI would require a higher number of observers. In addition, more infrastructure is needed to manage observer coverage for the ECSI population (eg, transport for observers, accommodation).

Structure of the observer programme

47 The observer programme was originally designed to provide coverage on fishing vessels that would be at sea for long periods of time (ranging from 3-10 weeks). This programme has expanded over time to include coverage of the inshore fisheries⁴, however, the underlying logistics and infrastructure have not been adapted to be able to minimize costs on inshore fishers.

⁴ Coverage of the inshore fisheries has historically been achieved through the Conservation Services Programme. Recently MFish has added a small proportion of MFish observer days to the programme.

48 The ability to reduce costs and develop an infrastructure that will work effectively for inshore coverage will require time to develop and would best be achieved in partnership with industry. For example, costs can be reduced where observers can be easily placed on boats at short-notice, maximizing at-sea days, and reducing time ashore.

Delivery of Information

49 Some options for observer coverage will require more time to deliver sufficient information on risk of dolphin mortalities, particularly where observer coverage across more than one population is required.

50 If resource limitations prevent the monitoring of all vessels operating within the range of a dolphin population throughout the year, then you could consider a 'rotational' approach that prioritises coverage over a number of years. Such an approach would take an additional 1-2 years to meet monitoring objectives. MFish notes that while this approach spreads the total costs of observer coverage across a number of years, the actual costs recovered per region remains the same.

Suitability of vessels to carry observers

51 There is likely to be safety and practicality difficulties associated with placing observers on some fishing vessels. For example, some vessels may be too small to take an observer, may lack facilities such as sleeping quarters, or may have to fish without a crew member. These factors have historically made observer coverage difficult to achieve in the inshore fisheries.

52 MFish cannot determine whether it would be feasible to achieve very high levels of observer coverage on any particular fishing fleet without undertaking a detailed assessment, including vessel examinations.

53 MFish considers that while it may be desirable to obtain a very high level of observer coverage where there is risk of fishing-related mortalities occurring, there may be insufficient vessels available to take an observer. If, after an assessment of vessels is completed and a significant proportion of the vessels cannot have an observer placed on them, you may need to decide if it is appropriate that vessels that cannot take an observer continue to operate or if alternative methods such as electronic monitoring may need to be phased in over the long-term.

Funding of additional observer coverage

54 As part of the 2008 Budget process, MFish was successful in gaining additional funding of \$1 million in 2008/09, \$2 million in 2009/10, and \$3 million in 2010/11 to facilitate an increase in observer days. The bid covered a wide range of possible activities from:

- a) Monitoring of environmental standards, such as the proposed seabird standard
- b) Optimizing coverage in fisheries such as hoki, to address problems with shed sampling as a result of increased processing at sea with larger vessels
- c) The TMP for Hector's and Maui's dolphins.

55 The range does not preclude you from using the additional funding for a very specific and targeted increase in observer coverage for vessels operating in Hector's and Maui's dolphin distributional range. It is a matter for you to determine where the effort might be best placed to achieve the desired results.

56 MFish notes that to date the majority of observer days for inshore fisheries has been delivered through DOC's CSP. MFish will investigate whether there is any room for provision of additional inshore coverage in this programme.

The cost to industry

57 Observer coverage is cost recovered from quota owners based on the area and fishstocks that are relevant to the fishing vessels in question. Currently, the estimated cost to the inshore fishing industry is around \$480 000-600 000 per year for 1.5-2% of observer coverage.

58 The range of options presented to increase levels of observer coverage will have a significant impact on total costs recovered through cost recovery levies to industry.

59 For example, 80% coverage year round of all fisheries that overlap with dolphin distributions could cost \$15 million per year. The lowest meaningful option for gaining better information on all dolphin populations would likely cost \$1.4 million. MFish acknowledges that under the current cost structure, an increase to, for example, 50% coverage or more in some areas, could cost fishers more than they are reported to earn. These types of costs are discussed in each regional section in the context of the different options that have been proposed in the draft TMP

60 Currently, one inshore observer-day costs the fishing industry \$800 (in the deepwater fishery this is around \$500 due to efficiency savings). In the longer-term, costs could reduce from these daily rates.

Proposed Set Net and Trawl Vessel Observer Coverage for the 2008/09 year

61 Short-term options for increasing observer coverage are constrained by a range of practicality issues, including caps on funding, and capacity and structure of the observer programme.

62 Table 1 presents observer coverage that could be achieved in the 2008/09 fishing year if there is sufficient funding available (based on inshore set net and trawl vessels where appropriate). MFish notes that it can only deliver Option 1 (ie, existing levels of coverage) and Option 2 for some of the dolphin populations.

Table 1: Summary of Options for different levels of observer coverage that can be applied to Hector’s dolphins

Monitoring starts	Options	Level of information ⁵	Timeframe for information and data to be available	Total Cost
Current	Option 1: <i>Status Quo</i>	Low-poor Highly uncertain bycatch rate.	No change	\$480,000-600,000 ⁶ New Zealand wide costs, not specific to just observing vessels that overlap with Hector’s and Maui’s dolphins
Jan 2009	Option 2: 50% coverage for 2 months in summer	Medium Broadly representative bycatch rate for the summer months. Strong assumptions needed to estimate annual total bycatch.	A large number (estimated at between 65-85) of observers are required for this option ⁷ . Subject to a successful new initiative bid, this could be set up for the 08/09 summer for 2 of the three South Island dolphin populations. Data would be available mid 2009.	\$1.4 million ⁸ per year if all set net and trawl vessels are monitored in the South Island and trawl vessels are monitored in the North Island.

63 Option 1 retains the current ongoing observer programme that includes CSP and MFish allocated observer days. MFish notes that currently this programme observes 1.5-2% coverage of inshore fishing days. However, this coverage is spread across all inshore areas, and is not funded or designed to provide specific observer coverage for Hector’s and Maui’s dolphins. CSP has other objectives and coverage it needs to achieve for other fisheries and protected species interactions. The status quo may not be appropriate to meet monitoring objectives unless you were to choose options that reduce risk of fishing-related mortality considerably. In the absence of a substantial reduction in risk, without increased observer coverage, there would be ongoing uncertainty over impacts of fishing on dolphin populations.

64 Option 2 (based on a 2-month period) does not incur the same costs as other observer coverage because it is designed to function outside of the existing Observer Programme infrastructure. Instead, this option employs observers for a fixed term 2-month period over the summer, paying them a wage to be based in ports around the country and to go to sea whenever a suitable vessel is departing. This approach offers considerable cost savings over the normal daily rate of an observer.

65 MFish notes that having a high level of coverage over a shorter period of time will enable MFish to assess what current bycatch rates are during a time when dolphin range and fishing activity is known to overlap. This coverage will not necessarily provide an absolute estimate per annum of dolphin mortalities as extrapolation of bycatch from a discrete period can have biases associated with it. However, from the results of the monitoring programme, MFish recommends that an assessment is completed to determine whether changes to management measures or future

⁵ See section on ‘Benefits and limitations of information from observer coverage’ for more details

⁶ This is calculated based on the total number of expected observer days (600) multiplied by the estimated cost range of \$800-1000 per day. MFish considers this would be the upper limit of costs.

⁷ These observers will be employed on a short-term contract and would therefore be available for 08/09

⁸ Note that this option is more cost effective than other options due to the use of short-term contractors

observer coverage is required. At this point you will need to consider where observer coverage in future years needs to be targeted for Hector's and Maui's dolphins.

66 MFish notes that although Option 2 is described as delivering 50% coverage, there will be some variation depending on the particular dolphin population in question. For example, it is probable that 100% of trawl vessels could be observed over this period for the Maui's dolphin population.

Observer coverage from 2009/10 onwards

67 MFish considers that observer coverage for Hector's dolphins should be focused over more than one summer or season. This will help eliminate potential biases and generate information over a longer time period. For the 2009/10 fishing year, MFish could implement the same 2-month period observer programme to reduce potential biases associated with short-term coverage programmes. Alternatively, MFish could start to establish resources for monitoring regimes set out in Table 2.

Longer term options for observer coverage

68 Table 2 presents a much broader range of options to increase observer coverage to monitor dolphin interactions over the longer term (based on all set net and trawl vessels where appropriate). Under each option, the main issues are the level of certainty of information required by you and the cost that gathering this information would impose on the fishing industry. Many options may not be as cost effective as imposing costs on fishers through taking stronger management action that would exclude fishing from areas of dolphin distribution and therefore not require observer coverage.

Table 2: Summary of examples for different levels of observer coverage that can be applied to Hector’s dolphins in the future

Monitoring starts (based on time to build capacity)	Options	Level of information ⁹	Timeframe for information and data to be available	Total Cost
2013	Option 3: 50% coverage for four months over summer, one dolphin population per year	Medium Broadly representative bycatch rate for the summer months. Assumptions needed to calculate winter bycatch rate, and total annual bycatch rate.	A large number of observers (differing by dolphin population) are required for this option. It may take 4-5 years to recruit sufficient observers. Data would be available 2014/15 – 2018/19	\$3.3 million over 4 years to observe 3 south Island areas. The costs would be spread out per year as the dolphin populations are rotated. Subject to new funding.
2013	Option 4: 50% coverage for each dolphin population in the South Island at the same time for 4 summer months	Medium Broadly representative bycatch rate for the summer months Assumptions needed to calculate winter bycatch rate, and total annual bycatch rate.	A large number of observers (65-85) are required for this option. It may take 4-5 years to recruit this level of people. Data would be available 2014/15	\$3.3 million per year Subject to new funding
2013	Option 5: 50% coverage for each dolphin population in the South Island at the same time for the entire year	Medium Broadly representative bycatch rate Total bycatch estimates require fewer assumptions about seasonal trends. An analysis of factors affecting bycatch could also be completed.	A large number of observers (65-85) are required for this option. It may take 4-5 years to recruit this level of people. Data would be available 2015	\$8.8 million per year Subject to new funding
2013	Option 6: 80% coverage for each dolphin population in the South Island at the same time for four summer months	High Good estimate of bycatch rates for Hector’s dolphins and broadly representative for Maui’s dolphins. Assumptions needed about winter bycatch rates in order to calculate likely total bycatch and in analysis of factors affecting bycatch.	MFish anticipates, under the current framework for the observer programme that it would take 5 years to recruit enough observers for this level of coverage. Data would be available 2015	\$5 million per year Subject to new funding
2013	Option 7: 80% coverage for each dolphin population in the South Island at the same time for entire year	High Good estimate of bycatch rates for Hector’s dolphins and broadly representative for Maui’s dolphins. Total bycatch estimates require fewer assumptions about seasonal trends. Would allow for analysis of factors affecting bycatch.	MFish anticipates, under the current framework for the observer programme that it would take 5 years to recruit enough observers for this level of coverage. Data would be available 2015	\$15 million per year
Note: calculation of costs for option 4-9 is based on the total number of fishing days for the fleets within all dolphin areas, multiplied by the appropriate percentage and multiplied by \$800 per day.				

⁹ See section on ‘Benefits and limitations of information from observer coverage’ for more details

Monitoring of Recreational Fishing Activity

69 The draft TMP noted that monitoring recreational fishers is problematic. Currently, the only mechanism MFish has to monitor recreational fishing is through the MFish compliance programme. This programme focuses on illegal set net activity and education, rather than specifically trying to observing dolphin mortalities from set net fishing.

70 MFish is currently unable to effectively monitor fishing-related dolphin mortalities within the recreational sector and relies on fishers or the public reporting mortalities.

Recommendation

71 It is recommended that you:

- a) Note the monitoring options outlined in this section;
- b) Note the need for monitoring and extent of monitoring is linked to decisions on new or additional mitigation measures outlined in this document;
- c) Agree to suggest that the Chief Executive implement measures to monitor fishing-related mortality of Hector's and Maui's dolphins in line with "option two" for the 2008-09 fishing year;
- d) Note the Ministry will propose additional funding for future observer coverage if necessary, dependent on the level of ongoing residual risk of fishing-related mortality to Hector's and Maui's dolphins.

RESEARCH

The draft TMP noted that research on Hector's and Maui's dolphins is needed to aid future management decisions and to assess the effectiveness of management measures. If residual risk of dolphin mortalities remains after implementation of the TMP, the Minister should consider the level of information necessary to define and monitor this risk including any required research.

The draft TMP stated that where there is an overlap between the dolphins' range and activities that threaten them, a high priority needs to be given to gathering more information on the status of the dolphin populations.

Submitter Comments

72 Marine mammal scientists submit that Hector's dolphins are one of the best studied dolphins worldwide and the draft TMP is out of touch with recent published science.

73 Greenpeace states that a paucity of adequate scientific data on Hector's and Maui's dolphins should not prevent decision-makers from adopting a precautionary approach when considering management measures for each population. Greenpeace notes that a precautionary approach is consistent with international best practice.

74 The industry states that research into dolphin status and trends, and levels of human-induced mortality should be undertaken before any closures are implemented. As a first step, SeaFIC considers that existing work should be reviewed and consolidated. SeaFIC questions whether work undertaken by DOC is proceeding in a co-ordinated fashion. WWF also suggests that all existing information should be collated and made public, including DOC's incident database and other sighting data including possible and potential sightings.

75 Some stakeholders express concern there is no funding available for research. SeaFIC acknowledges that research is expensive but submits the proposed management measures will be even more expensive on industry. Some industry submitters suggest that all research into dolphins should be Crown funded.

76 Some industry stakeholders submit that the priority for research should be population and distribution of each dolphin population. Other stakeholders consider that the effects of non-fishing threats should be assessed as very few mortalities can be attributed to fishing.

MFish Assessment

77 MFish acknowledges stakeholder comments regarding investigating the effects of non-fishing threats on Hector's and Maui's dolphins. This issue is outside the scope of the Fisheries Act 1996 and is discussed in separate advice to the Minister of Conservation. The following discussion therefore relates only to research that is conducted within the scope of your obligations under the Fisheries Act. Similarly, descriptions of priorities also relate only to your obligations and not to non fishing-related research programmes.

78 There is a considerable body of information on dolphin distribution, abundance and genetics. MFish agrees with SeaFIC and WWF that the priority should be a review and consolidation of existing work that has been completed on Hector's and Maui's dolphins. MFish proposes to undertake an inventory of past, existing and proposed research projects using existing research funding.

79 MFish does, however, consider that the majority of existing information is already known to MFish, including critical information on abundance and distribution of dolphin populations. This paper therefore outlines research priorities based on current knowledge, but notes that these may be revised following the review.

80 Table 3 provides a summary of the types of information that are useful to managing the effects of fishing-related mortality on dolphins, including the benefit of gathering this information and current level of knowledge. The table shows that despite good information, there are some obvious gaps in knowledge.

Table 3: Summary of information to be collected from proposed Hector's and Maui's Dolphin Research Projects

Type of information	Benefits of information	Current available information
The summer and winter distribution of dolphin populations and their overlap with fishing activity, including changes over time	Determines if management is focused at the appropriate spatial scale and if there is any change in distribution following management action Confirms the depth and offshore limits of the dolphins Records seasonal movements of dolphins Helps to assess population susceptibility to fragmentation	Good information on core distribution of all four dolphin populations, particularly in the summer months Poor understanding of complete range of Maui's dolphins Poor understanding of winter distribution of Hector's dolphins Poor understanding of migratory movements of individual dolphins
The abundance of dolphin populations and trends in abundance over time	Allows a more accurate assessment of the current state of the populations using best practice methodology Repeated surveys using the same methodology allows long-term identification of any population trends	Reasonable abundance estimate for Maui's dolphin Reasonable abundance estimates for Hector's dolphin populations Very poor estimate of trends in abundance for all four dolphin populations
The genetic flow within and between populations, including home range size and migrations between sub-populations	Provides a source of information on the genetic structure and relatedness of groups May allow an assessment of the degree of relatedness within groups and along geographical lines Provides information on possible effects of fragmentation genetic dispersion among groups	Good information that Maui's dolphin genetically separate to other Hector's dolphin populations Reasonable information on East Coast South Island and West Coast South Island populations Poor information on South Coast South Island population
Information on the life history characteristics of the species such as survival rate and age at first reproduction	Enables more accurate modelling of Hector's dolphin populations due to better understanding of productivity and natural mortality	Reasonable information on some life history characteristics
The nature and extent of fishing-related mortalities from different fishing methods ¹⁰	Provides information on the threat posed by different fishing methods and operations	Poor information for all four dolphin populations

¹⁰ Note that the advantages of gathering better information on the nature and extent of fishing-related mortalities is discussed in the previous section on monitoring

81 MFish agrees with submissions stating that Hector's and Maui's dolphins are well researched. However, there remains a great deal of uncertainty in the information that is available to you. You are obliged to act on the best available information, and must not use a lack of information as a reason for postponing or failing to take any measures that you consider necessary. However, you may also consider it necessary to improve the level of information available on the effects of fishing-related mortality on dolphins, to allow for a more accurate assessment of the effectiveness of current or proposed management measures to be made in the future.

82 Further research would be usefully used to gather new data in order to improve knowledge about the Hector's and Maui's dolphin population dynamics. This information will enable better monitoring of populations trends, allow more accurate analysis of population viability, and assess management options to reduce fishing-related threats.

83 A research programme for Hector's and Maui's dolphin had been proposed through the MFish normal research planning process but was not progressed due to funding constraints. This programme was included in a proposal for further research funding (new initiative bid). This comprehensive research programme covers most areas identified in this section and had been estimated to cost a total of approximately \$2 million over 4-5 years.

84 The following information sets out areas of priority for future research that would have the greatest effect in reducing uncertainty in key information areas for each dolphin population. This information describes how such research might be used, indicative costs, and when it would become available. This information enables you to consider the best management approach including what steps are necessary now and what action may not be required immediately but may follow when better information becomes available.

Species Level Research Priorities

85 Further knowledge on biological characteristics of Hector's and Maui's dolphins is important to better understand their productivity and ability to withstand fishing-related mortalities. Research into the biological characteristics of each Hector's and Maui's dolphin population is somewhat unnecessary as these are likely to be similar between different populations. As such, it may be more viable to undertake research focusing on either one or two populations.

86 Determining natural survival rate is important when considering the overall productivity of the species and the effect of additional fishery-related mortality. A previous survival rate estimate has been estimated for Hector's dolphins around the Banks Peninsula and further studies could refine this estimate or provide contrast with an estimate from another area.

87 Risk assessment models are sensitive to the currently available estimates of age-at-first-reproduction due to the small numbers of samples available for analysis. Hector's and Maui's dolphins need to be necropsied shortly after death in order to gather a suitable sample that enables an estimate of their age when they first reproduce. An observer programme in the set net and inshore trawl fisheries may supply suitable dolphins for necropsy.

88 A key information gap is the size of home ranges and seasonal movements of Hector's and Maui's dolphins. Further research would expand the understanding of fragmentation between and within the populations that is a potential risk to the biological diversity present in the current populations.

Potential projects

89 Table 4 shows potential projects for species level research priorities, and includes information on benefits, delivery dates, and estimated cost.

Table 4: Potential Projects for Species Level Research Priorities

Title	Benefits	Earliest delivery date	Estimated cost
Estimation of survival rate	Improved understanding of natural mortality	2012	\$200,000-\$300,000
Age at first reproduction	Improved understanding of the productivity of a species leading to more robust population models	2012	\$50,000-\$100,000 depending on source of samples
Detection of seasonal movements and estimation of home range size	Better understanding of the fragmentation between and within the populations and any seasonal movements made by individuals.	2010	\$100,000 - \$150,000

Maui's Dolphin Research Priorities

90 Table 5 shows potential projects for Maui's dolphin research priorities, and includes information on benefits, delivery dates, and estimated cost.

91 Maui's dolphins are known to be very low in number. This suggests that even very low levels of fishing-related mortality will prevent the population from rebuilding. Management of fishing-related mortalities of Maui's dolphins should focus on understanding the overlap of fishing activity and dolphin distribution.

92 MFish considers the most critical information for managing the effects of fishing on Maui's dolphin is gaining a better understanding of the distribution of the dolphin population, both in the summer and winter months. Key information gaps include the extent and frequency of dolphin distribution in harbours, the southern boundary of dolphin distribution and the extent of offshore migration of dolphins in winter.

Potential projects

Table 5: Potential Projects for Maui’s Dolphin Research Priorities

Title	Benefits	Earliest delivery date	Estimated cost
Aerial survey of Maui’s distribution in winter and summer	Assess extent of Maui distribution south towards Taranaki, in harbours and out from the coast Compare with existing fisheries closures	2010	\$150,000-\$200,000

WCSI Dolphin Research Priorities

93 WCSI dolphins are of relatively high abundance compared to the other populations. Because of their abundance, some level of fishing-related mortality that does not adversely affect the population may be considered acceptable by you. Management of fishing-related mortalities of WCSI dolphins should focus on understanding whether the population is likely to be increasing or decreasing as a result of fishing-related mortalities.

94 MFish considers the most critical additional research for managing the effects of fishing on WCSI dolphins is gaining a better understanding of baseline abundance to improve the quality of models of population trends once management action (if required) is put in place. Levels of fishing-related mortality would also be valuable and is described in the previous section on monitoring.

Potential projects

95 Table 6 shows potential projects for WCSI dolphin research priorities, and includes information on benefits, delivery dates, and estimated cost.

Table 6: Potential Projects for WCSI Dolphin Research Priorities

Title	Benefits	Earliest delivery date	Estimated cost
Aerial survey of abundance during winter and summer, or during one particular time of year	Assess abundance of WCSI dolphins using consistent methodology that can be repeated over time Provides baseline for future surveys of abundance	2010	\$150,000-\$200,000

ECSI Dolphin Research priorities

Key information gaps

96 ECSI dolphins are of relatively high abundance compared to the other sub-populations, with the exception of WCSI, meaning that small levels of fishing-related mortality may not significantly affect the population and may be considered acceptable to you. However, the ECSI is also subject to relatively high fishing effort and reported mortalities. Management of fishing-related mortalities of ECSI dolphins therefore focuses on understanding the overlap between distribution of dolphins and fishing activity, understanding levels of fishing-related mortalities and whether the population is likely to be increasing or decreasing as a result, and whether fragmentation of the population may be occurring.

97 MFIsh therefore considers that the most critical information for managing the effects of fishing on ECSI dolphins is gaining a better understanding of year-round distribution of dolphin populations and the movement of dolphins between geographical areas, as well as understanding population trends once any further management action (if required) is put in place. Levels of fishing-related mortality would also be valuable and is described in the previous section on monitoring.

Potential projects

98 Table 7 shows potential projects for ECSI dolphin research priorities, and includes information on benefits, delivery dates, and estimated cost.

Table 7: Potential Projects for ECSI Dolphin Research Priorities

Title	Benefits	Earliest delivery date	Estimated cost
Aerial survey of ECSI distribution in winter and summer	Assess extent of ECSI offshore distribution Compare with existing fisheries effort and restrictions Provides baseline for future surveys including changes in local distribution	2010	\$150,000-\$200,000
Survey of abundance during winter and summer, or during one particular time of year	Assess abundance of ECSI dolphins using consistent methodology that can be repeated over time Provides baseline for future surveys of abundance	2010	\$200,000 or \$100,000 if in combination with above project

SCSI Dolphin Research priorities

99 SCSI dolphins are of relatively low abundance compared to other populations of Hector's dolphin. This suggests that even low levels of fishing-related mortality may prevent the population from rebuilding or expanding in range. Management of fishing-related mortalities of SCSI dolphins should focus on understanding the overlap between distribution of dolphins and fishing activity, understanding levels of fishing-related mortalities and whether the population is likely to be increasing or decreasing as a result, and if the core population is dispersing towards other areas along the coast.

100 MFish considers the most critical information for managing the effects of fishing on SCSI dolphins is gaining a better understanding of year-round distribution of dolphin populations and the movement of dolphins between geographical areas, as well as understanding population trends once any further management action (if required) is put in place. Levels of fishing-related mortality would also be valuable and is described in the previous section on monitoring.

Potential projects

101 Table 8 shows potential projects for SCSI dolphin research priorities, and includes information on benefits, delivery dates, and estimated cost.

Table 8: Potential Projects for SCSI Dolphin Research Priorities

Title	Benefits	Earliest delivery date	Estimated cost
Aerial survey of SCSI distribution in winter and summer	Assess extent of SCSI offshore distribution and local distribution outside of core area Compare with existing fisheries effort and restrictions Provides baseline for future surveys including changes in local distribution	2010	\$150,000-\$200,000
Survey of abundance during winter and summer, or during one particular time of year	Assess abundance of SCSI dolphins using consistent methodology that can be repeated over time Provides baseline for future surveys of abundance	2010	\$200,000 or \$100,000 if in combination with above project

Recommendation

102 It is recommended that you:

- a) Note the possible research programmes for Hector's and Maui's dolphin outlined in this section;
- b) Note that these projects are not currently a priority for MFish under current funding baselines.