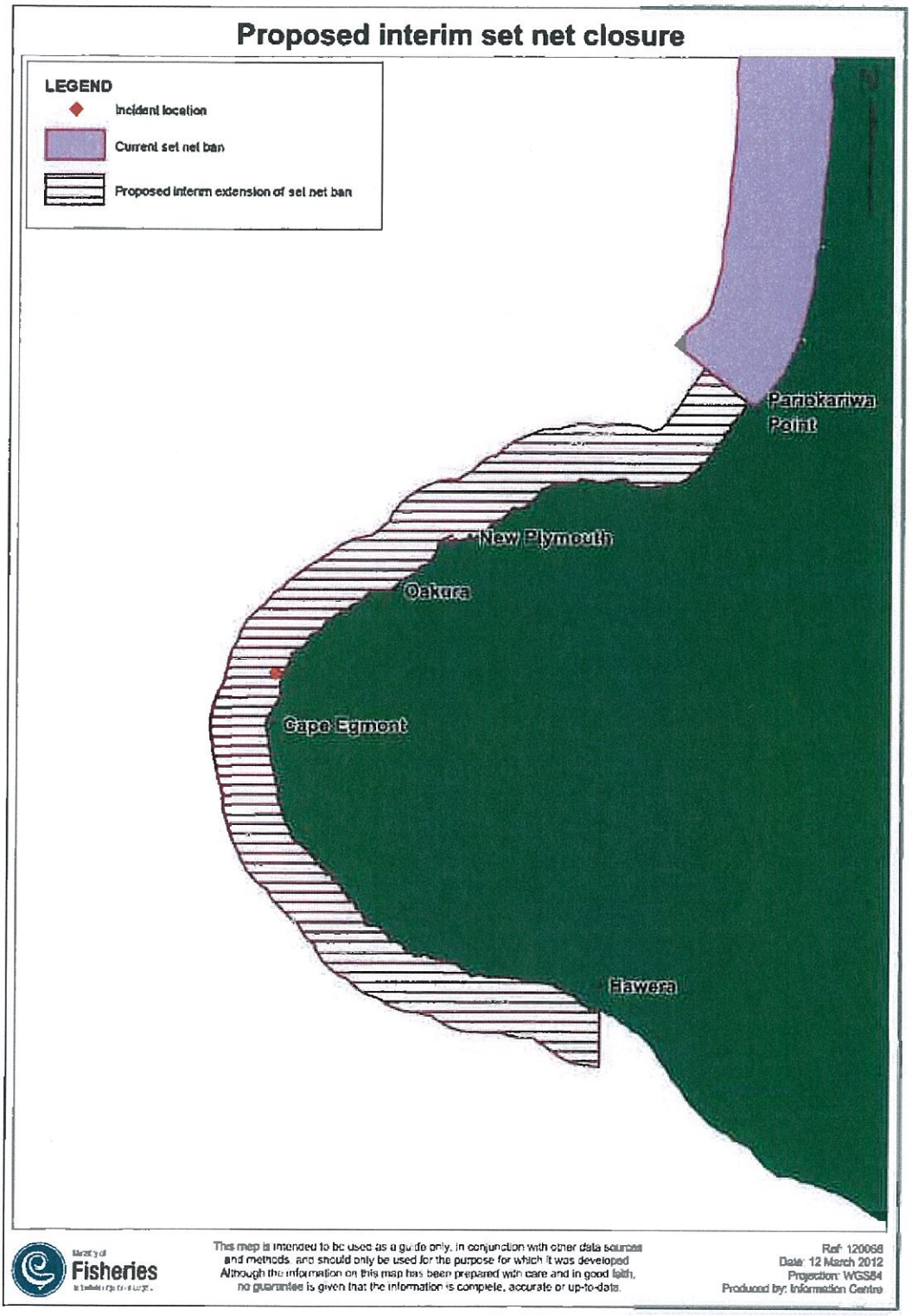
Appendices

APPENDIX ONE: Proposed interim set net closure



APPENDIX TWO: Statutory Considerations

Section 11 considerations

1. Before making any decision under section 11(1) of the Act you must have regard to the provisions listed in section 11(2) and take into account matters listed in section 11(2A). An assessment of these matters is provided below.

2. Section 11(2)(a): Before setting or varying any sustainability measure, you must have regard to any provisions of any regional policy statement, regional plan, or proposed regional plan under the Resource Management Act 1991 that apply to the coastal marine area and you consider relevant.

    a) Objectives outlined in the New Zealand coastal policy statement seek to protect indigenous biological diversity in the coastal environment by avoiding adverse effects on indigenous species that are listed at risk or threatened.
    b) The Taranaki Regional Policy Statement and Coastal Plan contain general policies and objectives that provide for the maintenance of habitats and biodiversity of indigenous marine fauna.
    c) The Auckland Council has submitted supporting increased protection for Maui's dolphins and requested that Auckland Council be given an opportunity to contribute to the Maui's portion on the TMP.

3. Section 11(2)(b): Before setting or varying any sustainability measure, you must have regard to any management strategy or management plan under the Conservation Act 1987 that apply to the coastal marine area and you consider relevant. The Wanganui Conservation Management Strategy is relevant to the area under consideration; however, there is nothing specific in this document relating to the management of Maui's dolphins.

4. Section 11(2)(c): Before setting or varying any sustainability measure, you must have regard to sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 that apply to the coastal marine area and you consider relevant. The boundary of the area under consideration is not within the Hauraki Gulf Marine Park.

5. Section 11(2)(d): Before setting or varying any sustainability measure, you must have regard to any provisions of a planning document lodged by a customary marine title group under section 91 of the Marine and Coastal Area (Takutai Moana) Act 2011. That act establishes the process for applying for a coastal marine title, but no such title has been granted yet.

6. Section 11(2A)(b): Before setting or varying any sustainability measure, you must take into account any relevant and approved fisheries plans. There are no fisheries plans approved for inshore fisheries at this time. The National Inshore Fisheries Plans have been released as drafts and will be trialled over the next year. The environmental objectives in these drafts are consistent with the proposals outlined in this paper.

7. Section 11(2A)(a) and (c): Before setting or varying any sustainability measure, you must take into account any conservation services or fisheries services or any decision not to require such services. The options proposed in this paper support objectives outlined in the DOC Marine Mammal Action Plan and Conservation Services Plan.

International Obligations

8. Section 5(a) of the Act requires that the Act be interpreted in a manner consistent with New Zealand's international obligations relating to fishing.

9. New Zealand is party to a number of international conventions including the Convention of Biological Diversity and the United Nations Convention on the Law of the Sea (UNCLOS). These conventions generally require measures to avoid remedy or mitigate fishing-related mortalities of associated, dependent and/or endangered species, to ensure their conservation status is improved or sustained and that the genetic diversity of the species is maintained.

Treaty of Waitangi (Fisheries Claims) Settlement Act 1992

10. The proposed measures do not impose restrictions on Maori customary fishing, which is authorised by kaitiaki. This is consistent with measures implemented to date in respect of Hector's and Maui's dolphin.

11. Quota awarded to iwi under the Treaty of Waitangi (Fisheries Settlement) Act and other quota held by Maori controlled interests has the same status as all other commercial quota. It is not protected from the consequences of sustainability measures implemented to address the adverse effects of fishing on protected species.

Other Domestic Considerations

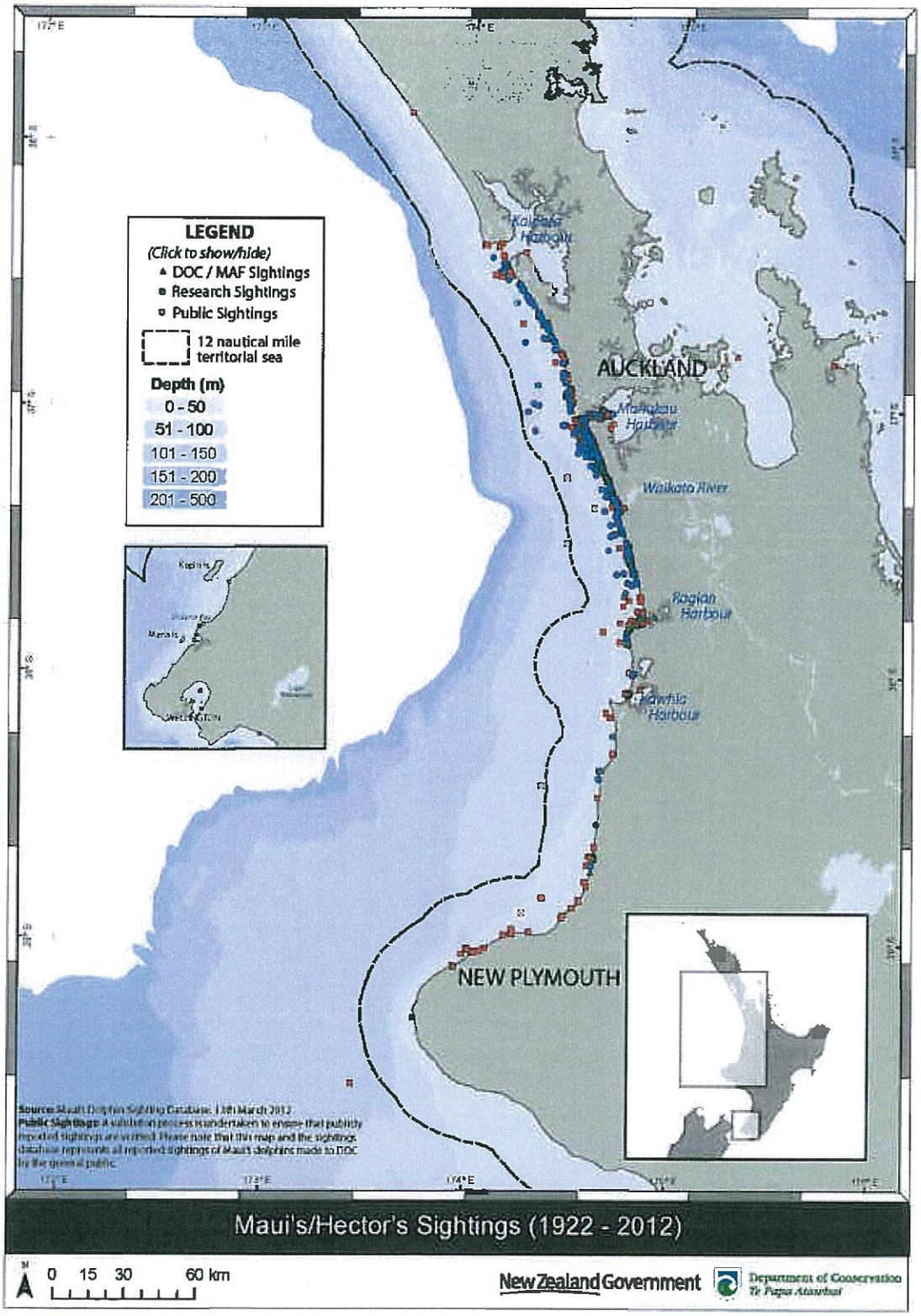
12. The New Zealand Biodiversity Strategy is relevant to the proposals outlined in this paper. A desired outcome of the New Zealand Biodiversity strategy is to ensure that rare and threatened species are adequately protected from harvesting and other human threats, enabling them to recover. Objective 3.7 in this strategy also states that agencies should protect and enhance populations of marine and coastal species threatened with extinction.

Conclusion

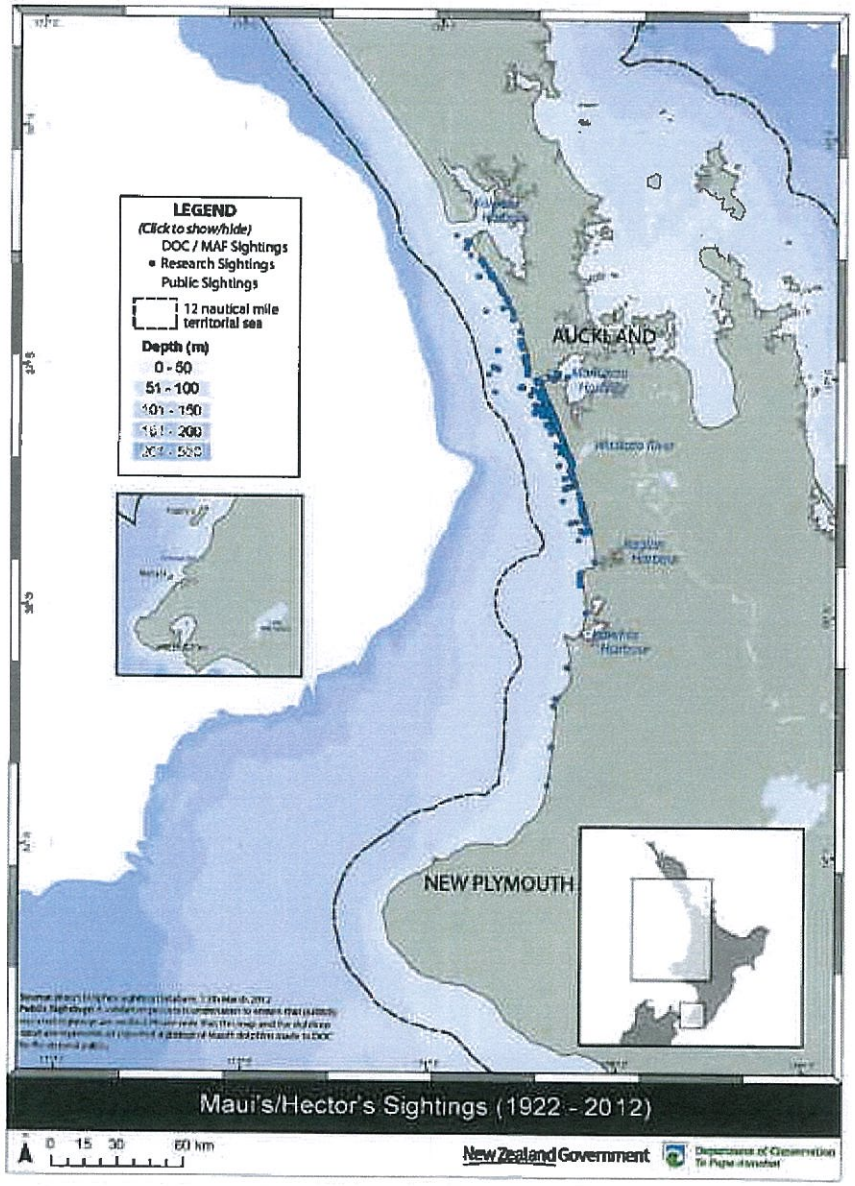
13. The options presented in this paper are consistent with the above considerations. This however, is dependent on whether you consider the risk to Maui's dolphins in the area south of the current set net ban to require interim management action.

APPENDIX THREE: Map of sightings held in the DOC Sightings database

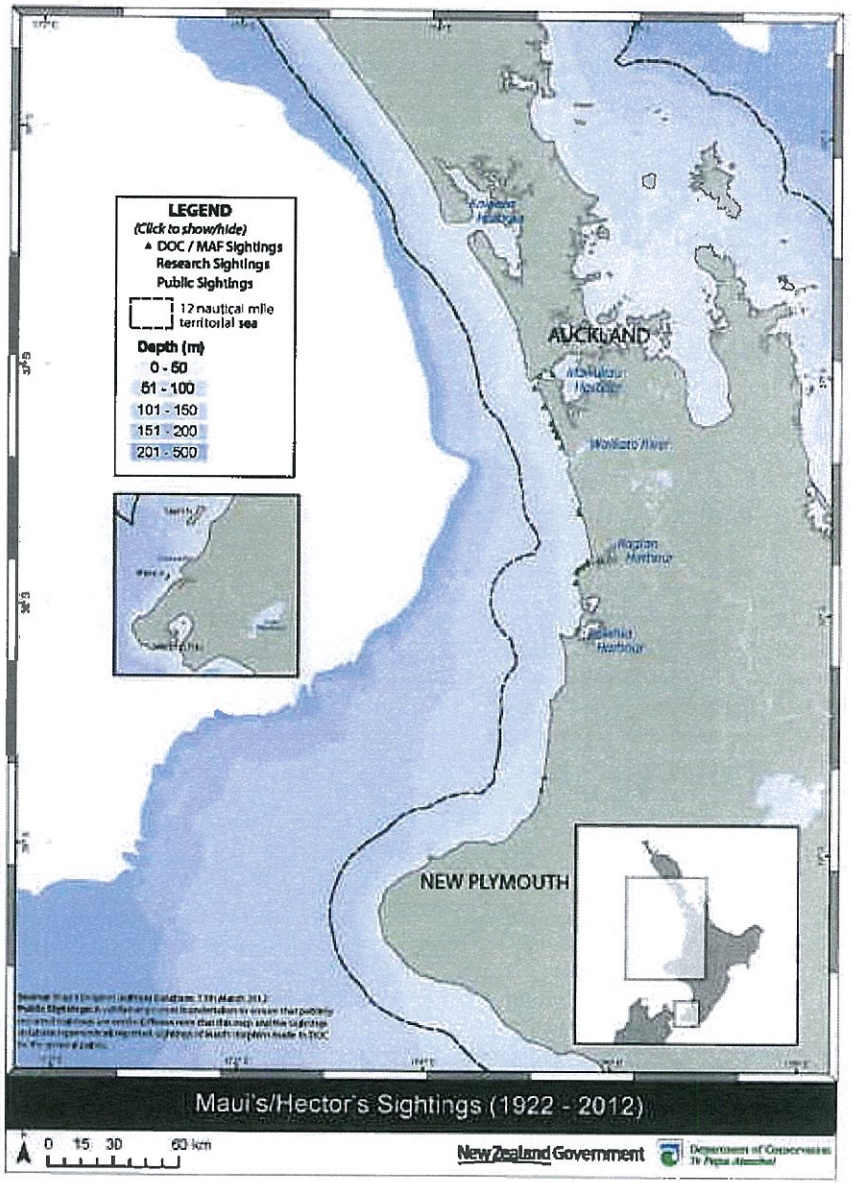
Map 1: Map plotting location of all sightings (research, government and public) held in DOC sightings database



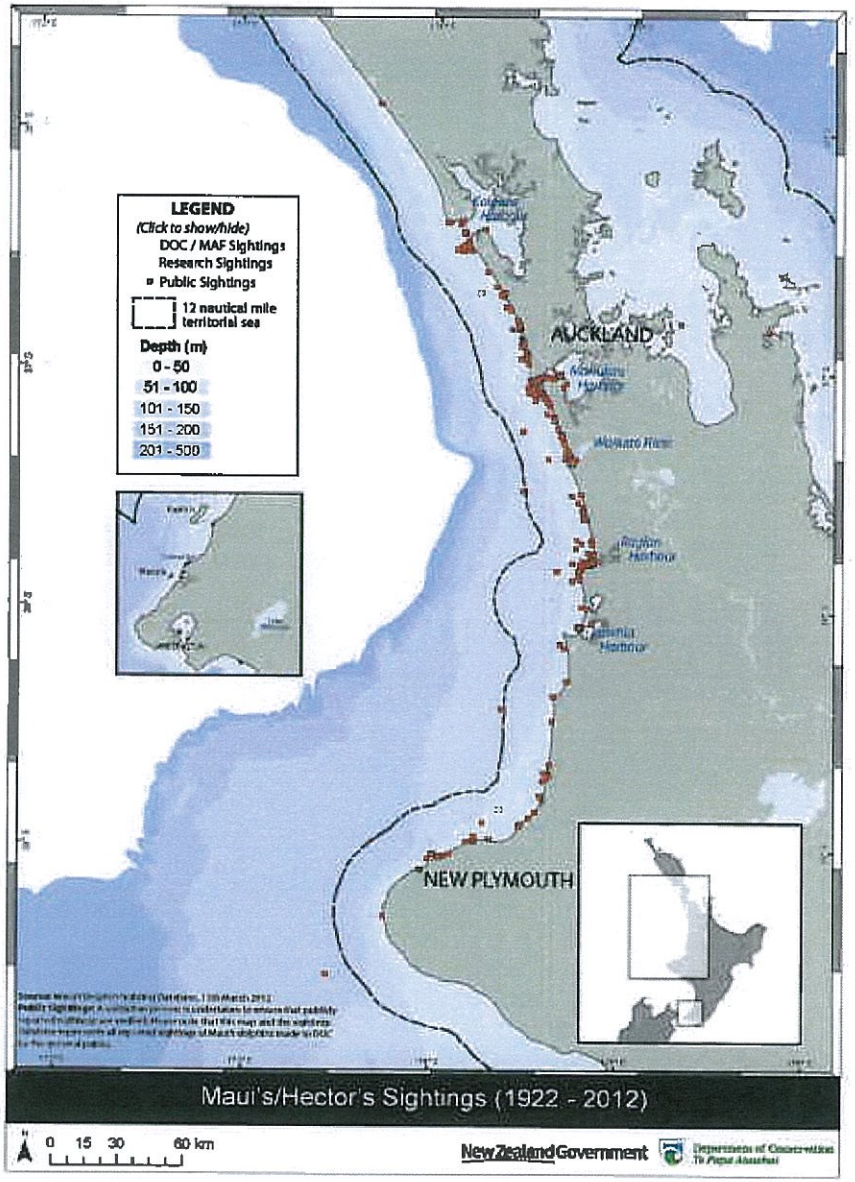
Map 2: Map plotting location of research sightings held by DOC



Map 3: Map plotting location of government sightings held by DOC



Map4: Map plotting location of public sightings held by DOC



APPENDIX FOUR: Ministry Assessment on the likelihood of the January Capture to be a Maui's dolphin.

1. The MPI science team's original assessment of the sub-species identification of the dolphin captured off Taranaki was completed on March 5, 2012. In that assessment, we concluded the capture was likely to be a Maui's dolphin based on a number of considerations. In the absence of a recovered carcass for necropsy or a tissue sample for genetic analysis, the only information that could be used to infer the identification of the captured dolphin was the species identification as recorded by the fisher and the location of the capture event.

2. The fisher identified the dolphin as a Hector's dolphin. Hector's dolphins are visually indistinguishable from Maui's dolphins so, provided we accept the visual identification of a Hector's dolphin, it could only be taken to mean either a Hector's or Maui's dolphin was captured. In order to ascertain which of these sub-species the capture was more likely to be, the capture location was also informative.

3. The capture event took place in inshore waters off Taranaki. Given that Maui's dolphins are found on the West Coast of the North Island, while Hector's dolphins are distributed around the South Island, this would indicate that the capture is likely to be a Maui's dolphin. There was the possibility that the captured dolphin may have been a Hector's dolphin from the South Island, however there were a number of reasons why this was deemed unlikely.

4. Between 2001 and 2011, a total of 89 dolphins were genetically sampled off the West Coast of the North Island by the Department of Conservation. Two of those sampled individuals were Hector's dolphins (based on mitochondrial DNA and nuclear DNA testing), while the remaining 87 dolphins were identified as Maui's dolphins. This means that Hector's dolphins may move through Taranaki waters on occasion, however they represent less than 3% of indentified individuals off the West Coast of the North Island, so their likelihood of being captured is much lower than that of Maui's dolphins. Indeed, if Hector's and Maui's dolphins are found off the West Coast of the North Island in the proportions indicated by the genetic sampling, and have equal vulnerability to set nets, then Hector's dolphins would only be expected to comprise less than 3% of capture events.

5. The fact the capture event took place beyond the established southern extent of the range of Maui's dolphins did not necessarily mean that the capture is less likely to be a Maui's dolphin. The same genetic sampling conducted by the Department of Conservation has demonstrated that Maui's dolphins have a larger mean alongshore range than Hector's dolphins and can move approximately 80km alongshore in some instances. Further, the small population size of Maui's dolphins means that detection of movements into areas adjacent to the established range is difficult as dolphin density is low. For both these reasons, the established range of Maui's dolphin is likely to underestimate the actual range of the sub-species. Consequently, the Taranaki capture event may well have occurred within part of what constitutes

the normal range of the sub-species, albeit a part of their range where they are difficult to detect.

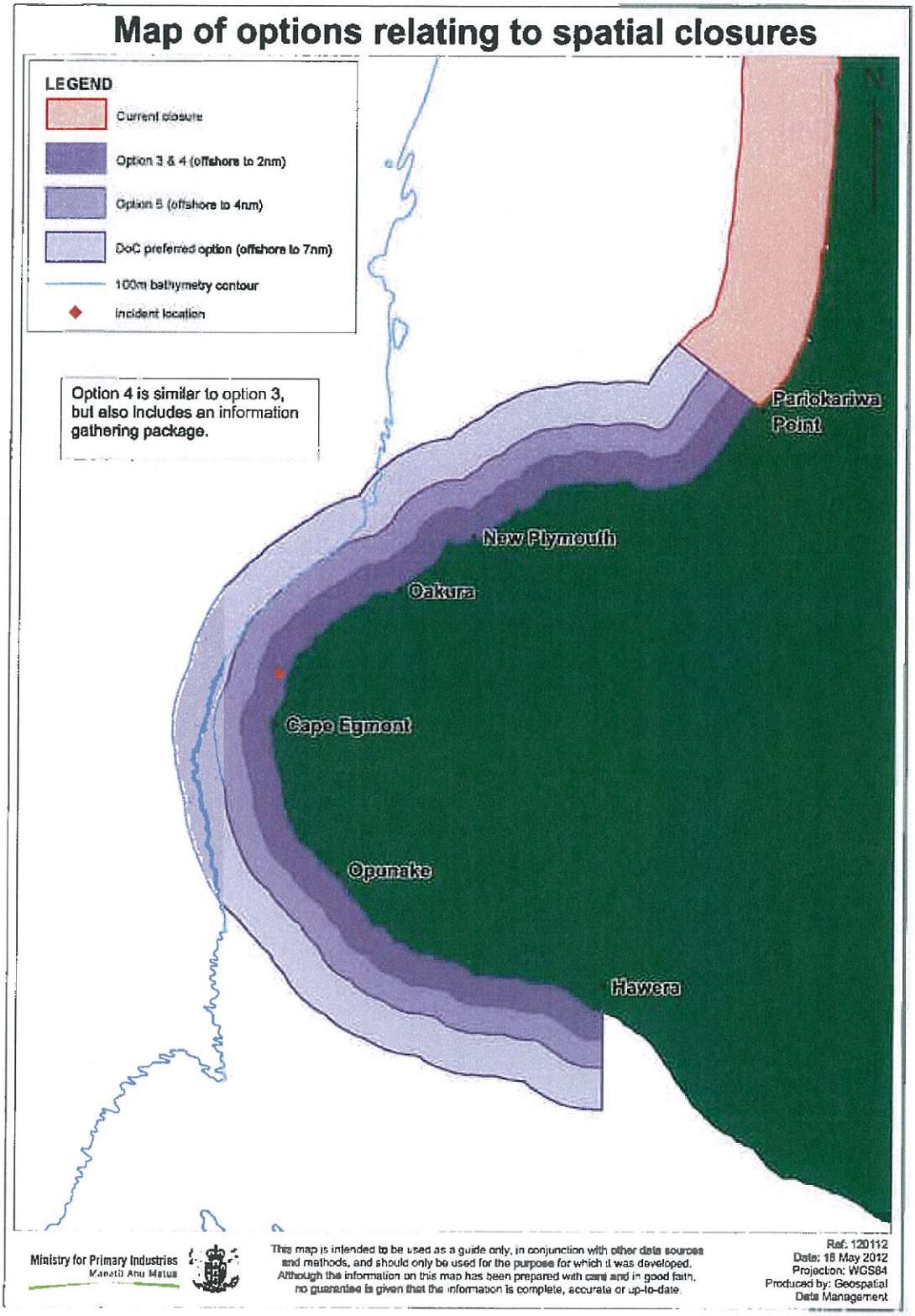
6. Accordingly we concluded the dolphin captured off Taranaki was likely to be a Maui's dolphin. Here, we used the term 'likely' in the sense of the Fisheries Assessment Plenary guidelines, to mean a 60-90% likelihood. At the time, we believed this appropriately reflected the level of uncertainty in sub-species identification.

7. Since the March evaluation, new information has become available. Two beachcast dolphins, one from the Manukau Harbour and another from Opunake, Taranaki, have recently been genetically tested. Preliminary results from mitochondrial DNA tests (nuclear DNA tests are pending) indicate the sub-species identification of both specimens is more consistent with being Hector's dolphins, rather than Maui's dolphins. This information means that as many as 4 of the 91 dolphins genetically sampled off the West Coast of the North Island could be Hector's dolphins.

8. While dedicated survey effort was conducted as far south as New Plymouth, prior to the Opunake dolphin being tested, there were no genetic samples obtained south of Raglan. Thus, although less than 5% of genetic samples are likely to be from Hector's dolphins, the only sample south of Raglan is likely to be from Hector's dolphin. What is not clear is how representative this single sample is likely to be: necropsy evidence suggests the dolphin was in poor condition, had not eaten in several days and had lesions on several organs, including its brain. An animal in this state is unlikely to have been behaving normally and may have strayed outside of its normal range or habitat. It may also have drifted at sea after death.

9. In light of the established distribution of Hector's and Maui's dolphins, the genetic evidence suggesting Hector's dolphins comprise a small proportion of dolphins sampled on the West Coast of the North Island, and the condition of the only dolphin sampled south of Raglan, we conclude the evidence for a particular sub-species identification is equivocal. It is somewhat more likely to be a Maui's dolphin rather than a Hector's dolphin. This revision reflects the fact the new information has made the sub-species identification more uncertain, but the weight of evidence still suggests one sub-species identification is slightly more plausible than the other.

APPENDIX FIVE: Map of Proposed options



APPENDIX 6: Economic Impacts Analysis – Incorporating SeaFIC Submission Feedback

Overview

This section provides estimates of the economic impacts that may result from an extension of the set net ban.

Solely in terms of the set net ban extension, in the final advice paper;

- Options 3 and 4 propose an extension to Hawera offshore 2nm
- Option 5 proposes an extension to Hawera offshore 4nm

The economic impacts of the proposed 2nm and 4nm extensions are estimated below. We also include analysis on an extension of the set net ban to Hawera offshore 7nm, as this option was originally consulted on.

This section incorporates feedback provided by the SeaFIC submission on the proposed extension to the set net ban.

Executive summary of impacts

14. Tables 1 and 2 summaries the economic impacts calculated in the sections above.

Table 1: Estimated Economic Impacts - MPI Methodology

	MPI Methodology		
Set Net Ban Options	3 Year Average	2010-11 Fishing Year	April 2011 to March 2012 Year
0-2 nm (options 3&4)	$0.53 million	$1.00 million	$1.96 million
0-4 nm (option 5)	$1.18 million	$2.18 million	$3.02 million
0-7 nm (not proposed)	$1.63 million	$2.68 million	$3.46 million

Table 2: Estimated Economic Impacts - Treasury Methodology

	Treasury Methodology		
Set Net Ban Options	3 Year Average	2010-11 Fishing Year	April 2011 to March 2012 Year
0-2 nm (options 3&4)	$1.21 million	$2.31 million	$4.39 million
0-4 nm (option 5)	$2.70 million	$4.99 million	$6.85 million
0-7 nm (not proposed)	$3.68 million	$6.09 million	$7.81 million

15. Tables 1 and 2 show that depending on the methodology, data timeframe and option selected, the economic impacts change significantly. MPI notes that all the economic impact numbers calculated above are well below SeaFIC's estimated economic impact of $13.6 million for an extension of the set net ban to 0-4nm.

16. MPI believes this is an over estimation of the true economic impact since the SeaFIC estimate uses catch figures for the area 0-4nm from shore from Pariokariwa Point to Hawera that are in some cases larger that the total set net

catch in the whole of statistical areas 040 and 041 for the selected species (using 2010-11 fishing year data).

17. MPI believes that the impacts are likely to be between the MPI methodology estimate and Treasury methodology estimate depending on the option selected.

Ability of WCNI set net fishers to adjust

18. Banning set nets from 0-2 nm, 0-4 nm or 0-7 nm from shore in the area from Pariokariwa Point to Hawera will provide few opportunities to set net fishers to adjust their behavior to minimize the impact on their operations. These bans come onto of the previous method restriction placed on the West Coast of the North Island under the original Threat Management Plan (TMP).

19. While there is some ability to adjust fishing behavior if the set net ban is from 0-2nm, the species mix outside of 4 nm is very different from 0–4 nm and may require fishers to change fishing gear and acquire different ACE packages so they can target different species. The mix changes again outside of 7 nm from shore.

20. MPI does not see any evidence that hook-and-line fishing is likely to be economically viable for the primary species targeted either. The only possible adjustment would be for vessels operators to move away from the area from Pariokariwa Point to Hawera to fish in some location, such as the east coast.

21. However, MPI does not find it reasonable to assume that set net fishers in the area from Pariokariwa Point to Hawera will move elsewhere. Moreover, most fishing resources in New Zealand are fully utilized, so the opportunities to expand output elsewhere are limited. Because the options for adjustment are limited for set nets, MPI believes that the mitigating effects of any adjustments will be small for set net fishers.

Methodology

Total revenue loss estimates: Appropriate estimate of price of fish

22. To estimate the direct revenue losses from an extension to the set net ban, two sets of information are required: estimates of landed prices and estimates of the reduction in landings that would be caused by putting in place the additional set net ban.

23. In the IPP, MPI compared port price and export price to various recent data on landed fish prices. MPI agrees with the fishing industry that port price appears to be substantially below recent landed prices. However, there are also problems with export price as a measure of the price paid to harvesters. For some species, exports are a small percent of landings and may not reflect the broader market. Export price includes the value of services that occur after harvesting, such as unloading fees, auction commissions, expenses for processing and freezing, and transportation. Rather than choosing either port

price or export price, MPI combined information on port price and export price with its best judgment to produce its price estimates for this final advice.

24. SeaFIC submitted what they believe there to be more up to date landed price for the species in the analysis. Table 3 presents the 2011-12 port price and the 2010-11 greenweight export-derived price for the species that are most significant in analyzing the impact of the proposed addition set net ban on the fishing industry. It also shows the MPI price estimates and the SeaFIC price estimates.

Table 3: Estimates of Fish Prices

Species	Port Price (2011-12 fishing year)	Export-derived price (2010-11 fishing year)	MPI estimate	SeaFIC estimate
Blue Warehou	$1.09/kg	$2.01/kg	$1.50/kg	$2.70/kg
School Shark	$2.43/kg	$4.49/kg	$3.50/kg	$2.30/kg
Rig	$3.74/kg	$6.64/kg	$5.60/kg	$4.40/kg
Trevally	$1.58/kg	$1.97/kg	$1.70/kg	$1.20/kg
Northern Spiny Dogfish	N/A	N/A	$0.50/kg	$1.00/kg
Snapper	$5.71/kg	$10.41/kg	$7.00/kg	$7.00/kg
Kahawai	$0.79/kg	$1.01/kg	$0.90/kg	$0.80/kg
Spiny Dogfish	$0.32/kg	$1.06/kg	$0.50/kg	$1.00/kg
Gurnard	$2.51/kg	$5.42/kg	$3.50/kg	$2.85/kg
Blue Mackerel	$0.51/kg	$1.52/kg	$1.00/kg	N/A

25. MPI believes the landed price data provided by SeaFIC is acceptable for use in the economic impact analysis except for the landed price provided for blue warehou. The greenweight export price for blue warehou is $2.01/kg while the landed price submitted by SeaFIC is $2.70/kg. MPI does not believe that the local price is likely to be higher than the export price so the $2.01/kg export price will be used in the analysis for blue warehou. SeaFIC did not provide a landed value estimate for blue mackerel so the $1.00/kg figure will be used in the analysis.

Estimates of income impacts

26. The revenue losses by sector and area were used to estimate income effects. This section explains how income effects were estimated.

27. MPI has developed estimates of lost income using value added estimates from an input-output model of the economy. Value added is the difference between the value of output and cost of goods and services purchased from other sectors. Note that value added includes income earned by labour (as wages and salaries) and by capital (as profits). While value added in an input-output model varies slightly from other definitions of income, it is an adequate estimate of income for present purposes. Those estimates were derived in a research

project by Market Economics (Research Project SEC2006-10) under a contract with the then Ministry of Fisheries (MFish). This study is an update of methodology in McDermott Fairgray Group (2000) "Economic Impact Assessment for New Zealand Regions" prepared for New Zealand Seafood Industry Council (SeaFIC). The methodology in the two reports is identical; only the time-frame of the estimates is different. MPI used the estimates from the current research, rather than the estimates from the 2000 report, because the underlying economic model has been updated by ten years and better reflects current economic conditions.

28. Input-output models enable estimation of how a change in output of one industry will affect value added in that industry and more broadly in the economy. Using the Market Economics estimates, MPI estimated lost value added in four categories:

    a) Value added lost in the harvesting sector (direct harvesting income);

    b) Value added lost in the processing sector (direct processing income);

    c) Value added lost in sectors that supply harvesting and processing (indirect income); and

    d) Value added lost in the broader economy as the three types of income above are spent and generate income for suppliers of a wide array of goods (induced income).

29. Table 4 presents the ratios derived from Market Economics model to estimate each of the value added components above. These ratios represent separate impacts; double-counting that would occur because of economic interrelationships has been removed.

Table 4: Estimates of value added impacts from Market Economics model

	Ratio of value added to harvesting sector total output
Direct harvesting value added	.25
Processing value added	.46
Indirect value added	.56
Induced value added	.41

30. Table 4 can be interpreted as follows. A $1 million reduction in landings would reduce annual value added in harvesting by $250,000, in processing by $460,000, in industries that supply harvesting and processing by $560,000, and in the broader economy through flow-on effects by $410,000.

31. Note that the methodology estimates all income earned by the harvesting sector and the processing sector under national income accounting definitions of value added. Because harvesters and processors own a substantial majority of the quota, the national accounts definition of value added would include

income from quota holdings by processors and harvesters. The value added from quota could include either ACE sales or the increased income earned by a harvester who does not have to purchase ACE.

Impact on quota values

32. Estimates of quota value were also computed by MPI. This section explains the methodology used to estimate quota values.

33. MPI concludes that the costs of adjustment will be shared between harvesters and quota owners. There is a market for ACE for each QMA. The restrictions will decrease the demand for ACE in the restricted areas, because the costs of fishing in those areas will increase. On the other hand, the demand for ACE for QMAs not directly affected by a proposed set net ban may increase as some vessels change their fishing patterns. The relative sharing of the costs of adjustment between harvesters and quota owners will depend upon the relative changes in supply and demand for ACE, both in the markets directly affected by the interim relief and in some ACE markets indirectly affected by the interim relief. MPI lacks information to make reliable predictions about how individual ACE markets will be impacted.

34. MPI assumes that the loss in quota value is proportional to the reduction in landings.

35. A double-counting error occurs if both ACE and quota value are used to determine losses to society. Quota has value because it generates ACE. The value of quota is the present value of the expected future ACE generated by the quota.

36. As noted above in paragraph 12, the methodology of applying national income account income multipliers to total revenues implicitly includes any ACE value generated by firms in the sectors that own quota. Where quota value loss is accounted for directly in losses, the income generated from ACE (either explicitly by sale or implicitly through use by the quota owner) must be deducted from income estimates to avoid the double counting error (above).

37. MPI believes it is useful to separate the likely impact on quota value (which is equivalent to the impact on the present value of future ACE income) from other income losses. This information can help assess the likely distributional impacts of restrictions on quota owners as compared to harvesters.

Estimates of overall impacts

38. The methodology described above estimates the first-year impacts of options. The first-year impacts present an incomplete estimate of losses, because some of those losses will recur.

39. For the purposes of approximating the present value of economic losses, MPI examined each category of loss and used its best judgment on how best to approximate the relation of the first-year loss to the present value of all future losses. MPI capitalised first-year income losses into permanent losses by making the following assumptions.

a) **Quota value.** If the restrictions are permanent, the loss of quota value is permanent. Therefore quota value lost is a permanent loss. Because quota value captures the present value of ACE, ACE value should not be included in income to avoid double-counting.

b) **Removing ACE value from income.** To avoid double-counting ACE price, the value of ACE earned by fishing, processing and fishing supply sectors must be deducted from income in sectors that own ACE. Absent information on how ACE value is reflected in the national accounts (upon which the input-output model is based), MPI assumed that 30% of ACE value flows to the harvesting sector, 50% to the processing sector, and 20% to other supply sectors.

c) **Direct income in harvesting.** If the capital and labour in the harvesting sector cannot be easily transferred to other harvesting uses, losses equal to several years of income will be incurred as resources are unemployed or underemployed. Both the capital and labour in harvesting are relatively specialized, so the adjustment period of several years might be expected. The Aranovus research confirms the general observation that the average age of those employed in fishing is relatively high, so retirement is possible for some set net harvesters, in particular. Likewise, because New Zealand's fisheries do not have significant unexploited fishery resources, some displaced harvesting capital is likely to be retired. To approximate the losses through the adjustment period, a loss of 5 times the initial displaced annual income is used in calculations.

d) **Direct income in processing.** The capital and labour in processing is less specialized to particular species, so the likely adjustment period will not be as long for processing. A loss of 2.5 times the initial annual displaced income is used in calculations.

e) **Indirect income in supply sectors.** The sectors supplying the fishing and processing sectors also supply very similar products to the broader boating and food processing industries. There may be one-time inventory losses if highly specialized inventories, such as set nets, become obsolete because of the restrictions. A loss of 1.5 times the initial displaced income in supply industries is used in calculations.

f) **Induced income in broader economy.** When income is lost in harvesting, processing, and fishing supply sectors, the broader economy will see reduced economic activity because of reduced consumption by those who earn income in the directly affected sectors. However, the broader economy will adjust to these changes by shifting resources towards other uses. How easy it will be for the economy to adjust depends upon (a) the relative magnitude of the impact and (b) the demand for other outputs by the economy. In the present context, the total changes are small in relation to the overall New Zealand economy and the New Zealand economy is currently operating at high levels of employment and capacity use. For these reasons, MPI

believes that the broader adjustments by the economy will be rapid and that all of the adjustment costs will be incurred within one year. Therefore, MPI suggests that one year of induced income losses are an appropriate estimate of total losses.

40. MPI emphasizes that the estimated multiples in the preceding paragraph are informed judgments. They are inherently imprecise. And because they multiply the annual impacts, they are the single most important driver of the final estimates of the present value of impacts. MPI believes that they are appropriate for the purpose of thinking about how changes are likely to unfold in the future. They are especially useful in understanding qualitatively which restrictions are associated with the largest costs, and which restrictions are less important in terms of overall cost impacts. But it is inappropriate to read high precision into the present value of losses that are computed from these income multiples.

New Zealand Treasury's Present Value methodology

41. SeaFIC, in its submission on the reconsideration of the interim relief measures, proposed to address the issue of recurring losses by assuming that all losses are permanent. SeaFIC proposed that MPI use the Present Value methodology outlined in New Zealand's Treasury's Cost Benefit Analysis Primer23. Using this approach SeaFIC capitalized those losses using a discounting factor of slightly over 6% over a maximum time period of 20 years.

42. MPI do not believe that all the income losses are permanent, so an assumption that all losses are permanent is inappropriate. MPI believe that some of the capital and labour that is displaced will find employment elsewhere in the economy. These movements to other employment will not immediate, so there can be significant transition costs. A useful way to think of these transition costs is to ask how long labour and capital are likely to take to find similar employment elsewhere.

43. As done in the previous advice paper on the reconsideration of the interim relief measures, MPI has presented estimated overall impacts using both methodologies; the MPI methodology and the Treasury's Present Value methodology. MPI used the Treasury default discount rate of 10% instead of the 6% discount rate proposed by SeaFIC at the time of the previous advice paper.

44. The assumption around quota value and induced income in the broader economy (described above) are still appropriate when using Treasury's Present Value methodology.

Estimated impacts on the West Coast North Island (WCNI) from Pariokariwa Point to Hawera

[23] http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis/primer

45. To estimate the impact a ban to set net fishing between 0-2nm, 0-4 nm and 0-7nm from shore, ACE and quota prices for the species allowed to be targeted under the interim relief are required. Table 5 presents the average ACE transfer price (2010/11 fishing year) and the average quota price (since 2001) for the species most affected. This data will be used in the calculations of quota value lost and to remove the double-counting of ACE income from income estimates.

Table 5: ACE and Quota prices for WCNI

Species	2010-11 ACE price ($/tonnes)	Average quota price since 2001 ($/tonnes)
Blue Warehou	$319.20	$2,591.00
School Shark	$1,142.20	$14,769.60
Rig	$488.60	$13,456.40
Trevally	$309.40	$5,276.26
Northern Spiny Dogfish	N/A	N/A
Snapper	$4,707.30	$48,790.70
Kahawai	$289.20	$3,010.29
Spiny Dogfish	$38.40	$351.42
Gurnard	$307.50	$2,738.25
Blue Mackerel	$136.00	$917.76

46. Since Northern Spiny Dogfish is not a QMS species, there are no ACE or quota prices available to be used in the analysis.

47. To estimate the economic impact on the commercial set net fleet, MPI first estimated the percentage of catch in statistical areas 040 and 041. These estimates used MPI data on set net activity.

48. MPI has collated latitude/longitude coordinates for all sets by set net fishers from vessels over 6 meters during the past 3 fishing years (2008-09, 2009-10 and 2010-11) in statistical areas 040 and 041. Using this data, MPI was able to obtain the number of set net events that occurred within 0 to 7nm of shore from Pariokariwa Point to Hawera. In the IPP, this data was then used to calculate what percentage of set net events occurred within each option area compared to all set net events in statistical areas 040 and 041 (based on a 3 year average).

Ban set nets from 0-2 nm from shore in the area from Pariokariwa Point to Hawera

49. This section reports the estimated economic impacts on the set net fishers on the WCNI from Pariokariwa Point to Hawera offshore 0-2nm (options 3 and 4 in this final advice paper).

50. A ban on set nets from 0-2 nm from shore in the area from Pariokariwa Point to Hawera will have the smallest impact on the number of species and fishers affected but fishers will have limited options to adjust their behavior to reduce the impact on their fishing activities.

51. MPI has calculated the percentage of each species caught in the area 0-2 nm from shore from Pariokariwa Point to Hawera for the 2010-11 fishing year (the

latest completed fishing year), the last 12 months (1 April 2011 to 30 March 2012) and the 3 year average. These percentages are presented in Table 6.

Table 6: Percentage of set net catch in 0-2nm

	0-2nm		
Species	Three Year Average	2010-11 Fishing Year	Last 12 Months
Blue Warehou	8.45%	20.88%	23.98%
School Shark	3.11%	2.01%	4.92%
Rig	4.81%	10.32%	23.86%
Trevally	2.55%	21.61%	42.46%
Northern Spiny Dogfish	3.46%	6.24%	10.03%
Snapper	2.05%	12.78%	42.11%
Kahawai	2.47%	55.03%	50.07%
Spiny Dogfish	0.41%	1.30%	1.20%
Gurnard	0.59%	22.60%	31.82%
Blue Mackerel	0.43%	22.23%	29.78%

52. This analysis shows that there has been increased set net activity within the area 0-2nm from shore from Pariokariwa Point to Hawera during the last 12 months compared to the 2010-11 fishing year and compared to the 3 year average. MPI will provide economic impact estimates below using the April 2011 to March 2012 (last 12 months) percentage figures, the 2010-11 fishing year percentage figures and the three year average percentage figure to show the difference these assumptions make to the economic impact numbers.

53. In the IPP, MPI stated it believed that while it is likely that the associated by-catch from targeting species in the area from Pariokariwa Point to Hawera could be caught by other fishers using different methods, there will be an impact on the revenue of the individual fishers who target species in this area who use set nets. The 10% adjustment proposed in the IPP will be used in the calculations for below.

54. Tables 7, 8 and 9 present MPI estimates of landed revenues for set netters. These tables use impacts from Table 6 and the price estimates from Table 3. Table 7 is calculated using the three year average data, Table 8 uses the data for the 2010-11 fishing year and Table 9 uses data from 1April 2011 to 31 March 2012.

Table 7: Estimates of the Economic Impact (three year average data)

Species	3 Year Average Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-2nm
Blue Warehou	112.73	$226,587.30	$249,246.03	$21,061.29
School Shark	236.94	$544,962.00	$599,458.20	$18,643.15
Rig	110.15	$484,660.00	$533,126.00	$25,643.36
Trevally	25.95	$31,140.00	$34,254.00	$873.48
Northern Spiny Dogfish	16.14	$16,140.00	$17,754.00	$614.29
Snapper	21.72	$152,040.00	$167,244.00	$3,428.50
Kahawai	11.90	$9,520.00	$10,472.00	$258.66

Spiny Dogfish	20.51	$20,510.00	$22,561.00	$92.50
Gurnard	7.74	$22,059.00	$24,264.90	$143.16
Blue Mackerel	4.08	$4,080.00	$4,488.00	$19.30
TOTAL	567.86	$1,511,698.30	$1,662,868.13	$70,777.69

Table 8: Estimates of the Economic Impact (2010-11 Fishing Year data)

Species	2010-11 Fishing Year Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-2nm
Blue Warehou	73.73	$148,199.31	$163,019.24	$34,038.42
School Shark	242.64	$558,065.10	$613,871.61	$12,338.82
Rig	98.16	$431,917.20	$475,108.92	$49,031.24
Trevally	24.98	$29,979.60	$32,977.56	$7,126.45
Northern Spiny Dogfish	9.94	$9,939.00	$10,932.90	$682.21
Snapper	21.71	$151,956.00	$167,151.60	$21,361.97
Kahawai	9.43	$7,543.20	$8,297.52	$4,566.13
Spiny Dogfish	17.65	$17,653.00	$19,418.30	$252.44
Gurnard	8.05	$22,942.50	$25,236.75	$5,703.51
Blue Mackerel	6.03	$6,028.00	$6,630.80	$1,474.03
TOTAL	512.32	$1,384,222.91	$1,522,645.20	$136,575.21

Table 9: Estimates of the Economic Impact (April 2011 to March 2012 data)

Species	April 2011 to Mar 2012 Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-2nm
Blue Warehou	73.18	$147,093.81	$161,803.19	$38,807.47
School Shark	143.77	$330,668.70	$363,735.57	$17,889.63
Rig	75.37	$331,632.40	$364,795.64	$87,028.04
Trevally	29.47	$35,367.60	$38,904.36	$16,518.48
Northern Spiny Dogfish	8.98	$8,976.00	$9,873.60	$990.00
Snapper	23.00	$161,014.00	$177,115.40	$74,582.20
Kahawai	9.83	$7,861.60	$8,647.76	$4,329.60
Spiny Dogfish	16.73	$16,726.00	$18,398.60	$220.00
Gurnard	7.47	$21,286.65	$23,415.32	$7,451.90
Blue Mackerel	5.90	$5,897.00	$6,486.70	$1,931.60
TOTAL	393.69	$1,066,523.76	$1,173,176.14	$249,748.92

55. Table 7 shows the annual lost revenue between 0-2 nm is just over $0.07 million, Table 8 shows the annual lost revenue between 0-2 nm of just under $0.14 million and Table 9 shows the annual lost revenue between 0-2 nm of just under $0.25 million.

56. Tables 10, 11 and 12 applies the ratios in Table 4 to revenue estimates in Tables 7, 8 and 9 to derive the estimated annual value added changes for set net harvesters in the area from Pariokariwa Point to Hawera.

57. Tables 10, 11 and 12 also present the MPI estimates of banning set netting between 0 to 2 nm from shore. Tables 10, 11 and 12 are computed by applying the factors from paragraph 38 to the annual income data in the Table and using the ACE and quota values in Table 5.

Table 10: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$17,694.42	$63,795.07	$81,489.49
Processing income lost	$32,557.74	$60,830.14	$93,387.88
Indirect income lost	$39,635.50	$54,517.85	$94,153.35
Induced income lost	$29,018.85	$0.00	$29,018.85
Quota value	$0.00	$231,082.17	$231,082.17
TOTAL	$118,906.51	$410,225.23	$529,131.74

58. The estimated loss of annual value added is $0.12 million and the estimated loss of future capitalised value is $0.41 million. The total estimated economic impact is just under $0.53 million.

Table 11: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$34,143.80	$122,096.22	$156,240.03
Processing income lost	$62,824.60	$116,542.50	$179,367.10
Indirect income lost	$76,482.12	$104,998.62	$181,480.74
Induced income lost	$55,995.84	$0.00	$55,995.84
Quota value	$0.00	$433,995.62	$433,995.62
TOTAL	$229,446.35	$777,632.96	$1,007,079.31

59. The estimated loss of annual value added is $0.23 million and the estimated loss of future capitalised value is $0.77 million. The total estimated economic impact is just over $1 million.

Table 12: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March 2012 data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$62,437.23	$200,688.69	$263,125.92
Processing income lost	$114,884.50	$194,296.71	$309,181.21
Indirect income lost	$139,859.39	$187,489.60	$327,348.99
Induced income lost	$102,397.06	$0.00	$102,397.06
Quota value	$0.00	$953,487.76	$953,487.76
TOTAL	$419,578.18	$1,535,962.75	$1,955,540.93

60. The estimated loss of annual value added is $0.42 million and the estimated loss of future capitalised value is $1.54 million. The total estimated economic impact is just under $1.96 million.

61. Tables 13, 14 and 15 show the estimates of the present value of banning set netting between 0 to 2 nm from shore using Treasury's Present Value methodology.

Table 13: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$17,694.42	$168,337.01	$186,031.43
Processing income lost	$32,557.74	$309,740.10	$342,297.83
Indirect income lost	$39,635.50	$377,074.90	$416,710.41
Induced income lost	$29,018.85	$0.00	$29,018.85
Quota value	$0.00	$231,082.17	$231,082.17
TOTAL	$118,906.51	$1,086,234.18	$1,205,140.70

62. The estimated loss of annual value added is $0.12 million and the estimated loss of future capitalised value is $1.09 million. The total estimated economic impact is just under $1.20 million.

Table 14: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$34,143.80	$324,829.24	$358,973.05
Processing income lost	$62,824.60	$597,685.81	$660,510.40
Indirect income lost	$76,482.12	$727,617.50	$804,099.62
Induced income lost	$55,995.84	$0.00	$55,995.84
Quota value	$0.00	$433,995.62	$433,995.62
TOTAL	$229,446.35	$2,084,128.17	$2,313,574.53

63. The estimated loss of annual value added is $0.23 million and the estimated loss of future capitalised value is $2.08 million. The total estimated economic impact is just over $2.31 million.

Table 15: Estimated annual income effects and Present Value of banning set netting between 0 to 2 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$62,437.23	$594,000.56	$656,437.79
Processing income lost	$114,884.50	$1,092,961.03	$1,207,845.53
Indirect income lost	$139,859.39	$1,330,561.25	$1,470,420.65
Induced income lost	$102,397.06	$0.00	$102,397.06
Quota value	$0.00	$953,487.76	$953,487.76
TOTAL	$419,578.18	$3,971,010.60	$4,390,588.78

64. The estimated loss of annual value added is $0.42 million and the estimated loss of future capitalised value is $3.97 million. The total estimated economic impact is just over $4.39 million.

65. Banning set nets from 0-2 nm from shore in the area from Pariokariwa Point to Hawera would have an estimated impact of between $0.53 million to $4.39 million on the wider New Zealand economy.

Ban set nets from 0-4 nm from shore in the area from Pariokariwa Point to Hawera

66. This section reports the estimated economic impacts on the set net fishers from an extension of the set net ban to Hawera offshore 0-4nm.

67. SeaFIC submitted: "*The use of a three year average for catch in the 0-4 nm area is not appropriate. Following the 2010 decision to close the 4-7nm area from Port Waikato to Pariokariwa Point for set netting, there has been a significant transfer of effort into the 0-4 nm area under consideration for closure. The three year average will not reflect that shift in effort.*"

68. MPI has calculated the percentage of each species caught in the area 0-4 nm from shore from Pariokariwa Point to Hawera for the 2010-11 fishing year (the latest completed fishing year), the last 12 months (1 April 2011 to 30 March 2012) and the 3 year average. These percentages are presented in Table 15.

Table 15: Percentage of set net catch in 0-4nm

	0-4nm		
Species	Three Year Average	2010-11 Fishing Year	Last 12 Months
Blue Warehou	21.90%	46.92%	52.94%
School Shark	8.45%	6.54%	11.14%
Rig	8.07%	16.30%	30.88%
Trevally	4.47%	38.85%	57.88%
Northern Spiny Dogfish	5.09%	44.85%	53.31%
Snapper	3.65%	34.93%	59.07%
Kahawai	3.56%	62.30%	70.09%
Spiny Dogfish	1.59%	14.45%	4.24%
Gurnard	1.09%	34.91%	45.40%
Blue Mackerel	0.90%	57.48%	70.44%

69. This analysis shows that there has been increased set net activity within the area 0-4nm from shore from Pariokariwa Point to Hawera during the last 12 months compared to the 2010-11 fishing year and compared to the 3 year average. MPI will provide economic impact estimates below using the April 2011 to March 2012 (last 12 months) percentage figures, the 2010-11 fishing year percentage figures and the three year average percentage figure to show the difference these assumption make to the economic impact numbers

70. In the IPP, MPI stated it believed that while it is likely that the associated by-catch from targeting species in the area from Pariokariwa Point to Hawera could be caught by other fishers using different methods, there will be an impact on the revenue of the individual fishers who target species in this area who use set nets. The 10% adjustment proposed in the IPP will be used in the calculations for below.

71. A ban to set nets from 0-4 nm from shore in the area from Pariokariwa Point to Hawera will have an increased impact on more species. Also fishers will have fewer options to adjust their behavior to reduce the impact on their fishing activities.

72. Tables 16, 17 and 18 present MPI estimates of landed revenues for set netters. These tables use impacts from Table 15 and the price estimates from Table 3. Table 16 is calculated using the three year average data, Table 17 uses the data for the 2010-11 fishing year and Table 18 uses data from 1 April 2011 to 31 March 2012.

Table 16: Estimates of the Economic Impact (three year average data)

Species	3 Year Average Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-4nm
Blue Warehou	112.73	$226,587.30	$249,246.03	$54,584.88
School Shark	236.94	$544,962.00	$599,458.20	$50,654.22
Rig	110.15	$484,660.00	$533,126.00	$43,023.27
Trevally	25.95	$31,140.00	$34,254.00	$1,531.15
Northern Spiny Dogfish	16.14	$16,140.00	$17,754.00	$903.68
Snapper	21.72	$152,040.00	$167,244.00	$6,104.41
Kahawai	11.90	$9,520.00	$10,472.00	$372.80
Spiny Dogfish	20.51	$20,510.00	$22,561.00	$358.72
Gurnard	7.74	$22,059.00	$24,264.90	$264.49
Blue Mackerel	4.08	$4,080.00	$4,488.00	$40.39
TOTAL	567.86	$1,511,698.30	$1,662,868.13	$157,838.01

Table 17: Estimates of the Economic Impact (2010-11 Fishing Year data)

Species	2010-11 Fishing Year Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-4nm
Blue Warehou	73.73	$148,199.31	$163,019.24	$76,488.63
School Shark	242.64	$558,065.10	$613,871.61	$40,147.20
Rig	98.16	$431,917.20	$475,108.92	$77,442.75
Trevally	24.98	$29,979.60	$32,977.56	$12,811.78
Northern Spiny Dogfish	9.94	$9,939.00	$10,932.90	$4,903.41
Snapper	21.71	$151,956.00	$167,151.60	$58,386.05
Kahawai	9.43	$7,543.20	$8,297.52	$5,169.35
Spiny Dogfish	17.65	$17,653.00	$19,418.30	$2,805.94
Gurnard	8.05	$22,942.50	$25,236.75	$8,810.15
Blue Mackerel	6.03	$6,028.00	$6,630.80	$3,811.38
TOTAL	512.32	$1,384,222.91	$1,522,645.20	$290,776.66

Table 18: Estimates of the Economic Impact (April 2011 to March 2012 data)

Species	April 2011 to Mar 2012 Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-4nm
Blue Warehou	73.18	$147,093.81	$161,803.19	$85,674.04
School Shark	143.77	$330,668.70	$363,735.57	$40,505.30
Rig	75.37	$331,632.40	$364,795.64	$112,651.00
Trevally	29.47	$35,367.60	$38,904.36	$22,516.56
Northern Spiny Dogfish	8.98	$8,976.00	$9,873.60	$5,263.50
Snapper	23.00	$161,014.00	$177,115.40	$104,619.90
Kahawai	9.83	$7,861.60	$8,647.76	$6,061.44
Spiny Dogfish	16.73	$16,726.00	$18,398.60	$781.00
Gurnard	7.47	$21,286.65	$23,415.32	$10,630.79

Blue Mackerel	5.90	$5,897.00	$6,486.70	$4,569.40
TOTAL	393.69	$1,066,523.76	$1,173,176.14	$393,272.92

73. Table 16 shows the annual lost revenue between 0-4 nm is just under $0.16 million, Table 17 shows the annual lost revenue between 0-4 nm of just over $0.29 million and Table 18 shows the annual lost revenue between 0-4 nm of just over $0.39 million.

74. These figures are considerably below the SeaFIC estimate of just under $0.72 million per annum. The SeaFIC estimates are driven by catch figures derived from a fisheries characterization commissioned by the Challenger FinFish Management Company last year.

75. MPI has used the Catch Effort Landing Return (CELR) data for the 2010-11 fishing year to produce estimates of the set net catch for each species within statistical areas 040 and 041 and also for the area 0-4 nm from shore from Pariokariwa Point to Hawera.

76. The catch figures provided by SeaFIC for the area 0-4nm from shore from Pariokariwa Point to Hawera are in some cases larger that the total set net catch in the whole of statistical areas 040 and 041 for the selected species. This is the case for blue warehou, trevally, northern spiny dogfish, kahawai and gurnard. This is shown in Table 19 below.

Table 19: Catch Figures – MPI versus SeaFIC estimates (tonnes of fish)

Species	MPI Catch Figure (Stat Areas 040 & 041)	MPI Catch Figure 0-4nm	SeaFIC Catch Figure 0-4nm
Blue Warehou	73.73	34.59	90.00
School Shark	242.64	15.87	20.02
Rig	98.16	16.00	42.00
Trevally	24.98	9.71	30.00
Northern Spiny Dogfish	9.94	4.46	15.00
Snapper	21.71	7.58	18.00
Kahawai	9.43	5.87	12.00
Spiny Dogfish	17.65	2.55	15.00
Gurnard	8.05	2.81	9.00
TOTAL	506.29	99.45	251.02

77. MPI has not used the SeaFIC catch figures in this analysis and will continue to use the from the Catch Effort Landing Return (CELR) data for the relevant time period.

78. Tables 20, 21 and 22 applies the ratios in Table 4 to revenue estimates in Tables 16, 17 and 18 to derive the estimated annual value added changes for set net harvesters in the area from Pariokariwa Point to Hawera.

79. Tables 20, 21 and 22 also present the MPI estimates of banning set netting between 0 to 4 nm from shore. Tables 20, 21 and 22 are computed by applying the factors from paragraph 38 to the annual income data in the Table and using the ACE and quota values in Table 5.

Table 20: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$39,459.50	$138,274.33	$177,733.83
Processing income lost	$72,605.48	$132,327.73	$204,933.21
Indirect income lost	$88,389.28	$120,779.29	$209,168.58
Induced income lost	$64,713.58	$0.00	$64,713.58
Quota value	$0.00	$525,745.30	$525,745.30
TOTAL	$265,167.85	$917,126.65	$1,182,294.51

80. The estimated loss of annual value added is $0.26 million and the estimated loss of future capitalised value is $0.92 million. The total estimated economic impact is just over $1.18 million.

Table 21: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$72,694.16	$245,249.54	$317,943.70
Processing income lost	$133,757.26	$235,875.42	$369,632.68
Indirect income lost	$162,834.93	$220,608.14	$383,443.07
Induced income lost	$119,218.43	$0.00	$119,218.43
Quota value	$0.00	$989,941.63	$989,941.63
TOTAL	$488,504.79	$1,691,674.72	$2,180,179.51

81. The estimated loss of annual value added is $0.49 million and the estimated loss of future capitalised value is $1.69 million. The total estimated economic impact is just over $2.18 million.

Table 22: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March 2012 data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$98,318.23	$319,255.78	$417,574.01
Processing income lost	$180,905.55	$308,651.05	$489,556.60
Indirect income lost	$220,232.84	$295,882.18	$516,115.02
Induced income lost	$161,241.90	$0.00	$161,241.90
Quota value	$0.00	$1,437,061.52	$1,437,061.52
TOTAL	$660,698.51	$2,360,850.53	$3,021,549.04

82. The estimated loss of annual value added is $0.66 million and the estimated loss of future capitalised value is $2.36 million. The total estimated economic impact is just over $3.02 million.

83. Tables 23, 24 and 25 show the estimates of the present value of banning set netting between 0 to 4 nm from shore using Treasury's Present Value methodology.

Table 23: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$39,459.50	$375,400.49	$414,859.99
Processing income lost	$72,605.48	$690,736.89	$763,342.38
Indirect income lost	$88,389.28	$840,897.09	$929,286.37
Induced income lost	$64,713.58	$0.00	$64,713.58
Quota value	$0.00	$525,745.30	$525,745.30
TOTAL	$265,167.85	$2,432,779.77	$2,697,947.62

84. The estimated loss of annual value added is $0.26 million and the estimated loss of future capitalised value is $2.43 million. The total estimated economic impact is just over $2.69 million.

Table 24: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$72,694.16	$691,580.57	$764,274.73
Processing income lost	$133,757.26	$1,272,508.25	$1,406,265.51
Indirect income lost	$162,834.93	$1,549,140.47	$1,711,975.40
Induced income lost	$119,218.43	$0.00	$119,218.43
Quota value	$0.00	$989,941.63	$989,941.63
TOTAL	$488,504.79	$4,503,170.92	$4,991,675.71

85. The estimated loss of annual value added is $0.49 million and the estimated loss of future capitalised value is $4.50 million. The total estimated economic impact is just under $5 million.

Table 25: Estimated annual income effects and Present Value of banning set netting between 0 to 4 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March 2012 data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$98,318.23	$935,356.76	$1,033,674.99
Processing income lost	$180,905.55	$1,721,056.43	$1,901,961.98
Indirect income lost	$220,232.84	$2,095,199.13	$2,315,431.97
Induced income lost	$161,241.90	$0.00	$161,241.90
Quota value	$0.00	$1,437,061.52	$1,437,061.52
TOTAL	$660,698.51	$6,188,673.83	$6,849,372.35

86. The estimated loss of annual value added is $0.66 million and the estimated loss of future capitalised value is $6.49 million. The total estimated economic impact is just under $6.85 million.

87. Banning set nets from 0-4 nm from shore in the area from Pariokariwa Point to Hawera would have an estimated impact of between $1.18 million to $6.85 million on the wider New Zealand economy.

88. The $6.85 million figure is significantly less than the SeaFIC estimate of $13.6 million. As outlined above the catch figures used by SeaFIC to produce these figures do not match what the CELR data for the 2010-11 fishing year show.

89. It is clear that the assumed length of time that it takes capital and labour displaced from the fishing industry to be put use by the broader economy affects the present value of the interim relief. As stated earlier, MPI does not believe that some of the labour and capital will be retired permanently and that discounting over 20 years is not appropriate in this case.

90. However, given the issues outlined in paragraph 39, MPI has provided the estimated annual income effects and present value of the interim relief using both the MPI methodology and Treasury methodology as the impact is likely to be somewhere in this range.

Ban set nets from 0-7 nm from shore in the area from Pariokariwa Point to Hawera

91. This section reports the estimated economic impacts on the set net fishers on the WCNI from Pariokariwa Point to Hawera offshore 7nm.

92. A ban to set nets from 0-7 nm from shore in the area from Pariokariwa Point to Hawera will have the biggest impact on the number of species and fishers affected and fishers will have no real options to adjust their behavior to reduce the impact on their fishing activities.

93. MPI has calculated the percentage of each species caught in the area 0-7 nm from shore from Pariokariwa Point to Hawera for the 2010-11 fishing year (the latest completed fishing year), the last 12 months (1 April 2011 to 30 March 2012) and the 3 year average. These percentages are presented in Table 26.

Table 26: Percentage of set net catch in 0-7nm

	0-7nm		
Species	Three Year Average	2010-11 Fishing Year	Last 12 Months
Blue Warehou	27.20%	50.62%	54.53%
School Shark	13.56%	11.06%	16.88%
Rig	9.61%	17.87%	33.65%
Trevally	5.48%	47.08%	61.20%
Northern Spiny Dogfish	5.23%	47.09%	57.73%
Snapper	4.86%	41.74%	66.07%
Kahawai	3.84%	67.65%	81.90%
Spiny Dogfish	2.02%	19.29%	15.25%
Gurnard	1.33%	41.29%	49.98%

Blue Mackerel	1.14%	69.51%	80.62%

94. This analysis shows that there has been increased set net activity within the area 0-7nm from shore from Pariokariwa Point to Hawera during the last 12 months compared to the 2010-11 fishing year and compared to the 3 year average. MPI will provide economic impact estimates below using the April 2011 to March 2012 (last 12 months) percentage figures, the 2010-11 fishing year percentage figures and the three year average percentage figure to show the difference these assumptions make to the economic impact numbers.

95. In the IPP, MPI stated it believed that while it is likely that the associated by-catch from targeting species in the area from Pariokariwa Point to Hawera could be caught by other fishers using different methods, there will be an impact on the revenue of the individual fishers who target species in this area who use set nets. The 10% adjustment proposed in the IPP will be used in the calculations for below.

96. Tables 27, 28 and 29 present MPI estimates of landed revenues for set netters. These tables use impacts from Table 26 and the price estimates from Table 3. Table 27 is calculated using the three year average data, Table 28 uses the data for the 2010-11 fishing year and Table 29 uses data from 1April 2011 to 31 March 2012.

Table 27: Estimates of the Economic Impact (three year average data)

Species	3 Year Average Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-7nm
Blue Warehou	112.73	$226,587.30	$249,246.03	$67,794.92
School Shark	236.94	$544,962.00	$599,458.20	$81,286.53
Rig	110.15	$484,660.00	$533,126.00	$51,233.41
Trevally	25.95	$31,140.00	$34,254.00	$1,877.12
Northern Spiny Dogfish	16.14	$16,140.00	$17,754.00	$928.53
Snapper	21.72	$152,040.00	$167,244.00	$8,128.06
Kahawai	11.90	$9,520.00	$10,472.00	$402.12
Spiny Dogfish	20.51	$20,510.00	$22,561.00	$455.73
Gurnard	7.74	$22,059.00	$24,264.90	$322.72
Blue Mackerel	4.08	$4,080.00	$4,488.00	$51.16
TOTAL	567.86	$1,511,698.30	$1,662,868.13	$212,480.32

Table 28: Estimates of the Economic Impact (2010-11 Fishing Year data)

Species	2010-11 Fishing Year Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-7nm
Blue Warehou	73.73	$148,199.31	$163,019.24	$82,521.15
School Shark	242.64	$558,065.10	$613,871.61	$67,887.49
Rig	98.16	$431,917.20	$475,108.92	$84,908.12
Trevally	24.98	$29,979.60	$32,977.56	$15,525.84
Northern Spiny Dogfish	9.94	$9,939.00	$10,932.90	$5,148.00
Snapper	21.71	$151,956.00	$167,151.60	$69,762.00
Kahawai	9.43	$7,543.20	$8,297.52	$5,613.52
Spiny Dogfish	17.65	$17,653.00	$19,418.30	$3,745.50
Gurnard	8.05	$22,942.50	$25,236.75	$10,420.74
Blue Mackerel	6.03	$6,028.00	$6,630.80	$4,609.00

TOTAL	512.32	$1,384,222.91	$1,522,645.20	$350,141.36

Table 29: Estimates of the Economic Impact (April 2011 to March 2012 data)

Species	April 2011 to Mar 2012 Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-7nm
Blue Warehou	73.18	$147,093.81	$161,803.19	$88,229.96
School Shark	143.77	$330,668.70	$363,735.57	$61,390.45
Rig	75.37	$331,632.40	$364,795.64	$122,752.08
Trevally	29.47	$35,367.60	$38,904.36	$23,810.16
Northern Spiny Dogfish	8.98	$8,976.00	$9,873.60	$5,700.20
Snapper	23.00	$161,014.00	$177,115.40	$117,016.90
Kahawai	9.83	$7,861.60	$8,647.76	$7,082.24
Spiny Dogfish	16.73	$16,726.00	$18,398.60	$2,805.00
Gurnard	7.47	$21,286.65	$23,415.32	$11,702.96
Blue Mackerel	5.90	$5,897.00	$6,486.70	$5,229.40
TOTAL	393.69	$1,066,523.76	$1,173,176.14	$445,719.34

97. Table 27 shows the annual lost revenue between 0-7 nm is just over $0.21 million, Table 28 shows the annual lost revenue between 0-7 nm of just over $0.35 million and Table 29 shows the annual lost revenue between 0-7 nm of just over $0.45 million.

98. Tables 30, 31 and 32 applies the ratios in Table 5 to revenue estimates in Tables 27, 28 and 29 to derive the estimated annual value added changes for set net harvesters in the area from Pariokariwa Point to Hawera.

99. Tables 30, 31 and 32 also present the MPI estimates of banning set netting between 0 to 7 nm from shore. Tables 30, 31 and 32 are computed by applying the factors from paragraph 38 to the annual income data in the Table and using the ACE and quota values in Table 5.

Table 30: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$53,120.08	$179,721.86	$232,841.94
Processing income lost	$97,740.95	$172,786.92	$270,527.86
Indirect income lost	$118,988.98	$161,307.76	$280,296.74
Induced income lost	$87,116.93	$0.00	$87,116.93
Quota value	$0.00	$757,273.67	$757,273.67
TOTAL	$356,966.93	$1,271,090.21	$1,628,057.14

100. The estimated loss of annual value added is $0.36 million and the estimated loss of future capitalised value is $1.27 million. The total estimated economic impact is just under $1.63 million.

Table 31: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – MPI Methodology

Annual Value	Capitalised Future Value	Total

Direct harvesting income lost	$87,535.34	$286,193.96	$373,729.30
Processing income lost	$161,065.03	$276,426.95	$437,491.98
Indirect income lost	$196,079.16	$263,822.20	$459,901.36
Induced income lost	$143,557.96	$0.00	$143,557.96
Quota value	$0.00	$1,266,531.89	$1,266,531.89
TOTAL	$588,237.49	$2,092,975.00	$2,681,212.49

101. The estimated loss of annual value added is $0.59 million and the estimated loss of future capitalised value is $2.09 million. The total estimated economic impact is just over $2.68 million.

Table 32: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March 2012 data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$111,429.84	$355,875.17	$467,305.00
Processing income lost	$205,030.90	$344,848.90	$549,879.80
Indirect income lost	$249,602.83	$334,149.44	$583,752.27
Induced income lost	$182,744.93	$0.00	$182,744.93
Quota value	$0.00	$1,679,412.71	$1,679,412.71
TOTAL	$748,808.49	$2,714,286.23	$3,463,094.72

102. The estimated loss of annual value added is $0.75 million and the estimated loss of future capitalised value is $2.71 million. The total estimated economic impact is just over $3.46 million.

103. Tables 33, 34 and 35 show the estimates of the present value of banning set netting between 0 to 7 nm from shore using Treasury's Present Value methodology.

Table 33: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (3 year average data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$53,120.08	$505,361.26	$558,481.33
Processing income lost	$97,740.95	$929,864.71	$1,027,605.66
Indirect income lost	$118,988.98	$1,132,009.21	$1,250,998.19
Induced income lost	$87,116.93	$0.00	$87,116.93
Quota value	$0.00	$757,273.67	$757,273.67
TOTAL	$356,966.93	$3,324,508.85	$3,681,475.78

104. The estimated loss of annual value added is $0.36 million and the estimated loss of future capitalised value is $3.32 million. The total estimated economic impact is just over $3.68 million.

Table 34: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (2010-11 Fishing Year data) – Treasury's Methodology

Annual Value	Capitalised Future Value	Total

Direct harvesting income lost	$87,535.34	$832,773.04	$920,308.38
Processing income lost	$161,065.03	$1,532,302.40	$1,693,367.42
Indirect income lost	$196,079.16	$1,865,411.61	$2,061,490.78
Induced income lost	$143,557.96	$0.00	$143,557.96
Quota value	$0.00	$1,266,531.89	$1,266,531.89
TOTAL	$588,237.49	$5,497,018.94	$6,085,256.43

105. The estimated loss of annual value added is $0.59 million and the estimated loss of future capitalised value is $5.50 million. The total estimated economic impact is just under $6.09 million.

Table 35: Estimated annual income effects and Present Value of banning set netting between 0 to 7 nm from shore in the area from Pariokariwa Point to Hawera (April 2011 to March 2012 data) – Treasury's Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$111,429.84	$1,060,094.84	$1,171,524.67
Processing income lost	$205,030.90	$1,950,574.50	$2,155,605.39
Indirect income lost	$249,602.83	$2,374,612.43	$2,624,215.26
Induced income lost	$182,744.93	$0.00	$182,744.93
Quota value	$0.00	$1,679,412.71	$1,679,412.71
TOTAL	$748,808.49	$7,064,694.48	$7,813,502.97

106. The estimated loss of annual value added is $0.75 million and the estimated loss of future capitalised value is $7.06 million. The total estimated economic impact is just over $7.81 million.

107. Banning set nets from 0-7 nm from shore in the area from Pariokariwa Point to Hawera would have an estimated impact of between $1.63 million to $7.81 million on the wider New Zealand economy.

APPENDIX 7: DOC Preferred Option

137. DOCs preferred option for protection of Maui's dolphins on the West Coast of the North Island is a set net ban out to 7 nm. DOC does not believe that the options proposed in the current paper adequately reduce risk to the dolphins.

138. DOC is of the view that the options proposed in the paper are inadequate. None of the proposed options put forward in this paper reflect;
    i. The best available information on the biology of the dolphins, or.
    ii. The level of support for protection measures greater than 4 nm.

139. As stated in paragraph 5, dependant species should be maintained above a level that ensures their long-term viability. To achieve this for a small, potentially declining population, protection needs to cover not just their "core" range where their density is highest, but also the extremes of their current distribution, where they are likely to recover into. Given that the area under consideration is part of the dolphin's historic range, protection of this area is important to support recovery of the population to a level of long-term viability.

140. At the time that the Maui's dolphin was classified as a subspecies it was noted that the population was likely to be less than 100 (Pichler 2002[24]). This population has been small and reproductively isolated for some time. This puts the population at increased risk to any human-induced mortality. With the revised PBR likely to be in the range of 1 dolphin every 10-23 years, this indicates the vulnerability of the population to any additional mortality, and the consequence.

141. DOC considers an offshore boundary of 2 nm does not adequately reduce the risk to the dolphins. Their distribution will be tied to biological factors such as prey distribution, which is more likely to be linked to depth than distance offshore. For example, off Banks Peninsula, a shallow water environment associated with the Chatham Rise, Hector's dolphins range as far offshore as 19 nm. Where shallow waters extend further offshore, the dolphins are more likely to range further offshore. South Taranaki is similarly a shallow water environment. Off the coast of Hawera water depth at 7nm is approximately 22m, and at 2 nm is 11m.

142. Evidence suggest for Maui's dolphins that although predominantly inshore, reliable sightings have been recorded beyond the 4 nm limit, and are known to range offshore at least to 7 nm, consistent with the set net restrictions from Pariokariwa north.

143. Evidence suggests that Hector's and Maui's dolphins disperse more in winter which may include moving further offshore. Additionally, observations are limited to daylight hours. It is possible that for feeding they disperse further offshore at night as has been suggested by preliminary diet analysis of Hector's dolphins on Banks Peninsula.

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[24] Pichler, F.B. (2002). Genetic assessment of population boundaries and gene exchange in Hector's dolphin. *DOC Science Internal Series 44*. Department of Conservation, Wellington. 37 p.

144. In relation to the Southern boundary, the area under consideration is part of the dolphin's historic range. The January incident, the beachcast Opunake dolphin, public sightings in the area and anecdotal sightings from fishers, confirm that the dolphins are present in this area.

145. DOC notes the high level of support from submitters on increased protection for Maui's dolphins, with only 31 out of 23,347 submissions opposed to any restrictions on fishing. The Department also notes the support for protection measures greater than what was consulted on (1206 submissions for an offshore extent of 7 nm, and 14,734 for a closure out to the 100 m depth contour).

146. DOC considers that observer coverage does not reduce the risk of capture to the dolphins and as proposed in the paper, is not supported by trigger points. Eg, what action would be taken if another Hector's or Maui's dolphin were accidentally caught?

147. The preliminary results of the DNA tests from the Opunake beachcast dolphin and the Clark's Beach, Manukau beachcast dolphin, in addition to the two Hector's dolphins sampled during the abundance estimate study, highlight that Hector's dolphins are present within the Maui's dolphin range. It is important to note that:

    i. Of 91 DNA samples available from the West Coast of the North Island, only 4 of these are confirmed, or likely to be Hector's. This represents less than 5% of all dolphins sampled along this coastline.
    ii. There is only one DNA sample available for a Hector's or Maui's dolphin in the area under consideration. While this dolphin is more likely to be a Hector's there remains a question on how representative this one sample is of the dolphins in this area. Given the severe health issues, this animal is not likely to be very representative. MPI Science assessment considers that given the health of this dolphin, it is unlikely to be representative of all dolphins in this area (See Appendix 4 in this paper).
    iii. DOC agrees with MPI's reanalysis that the January incident still remains, more likely than not to be a Maui's dolphin.

148. Regardless of the subspecies, through the TMP the Government committed to managing the Maui's dolphins for their long-term viability. Ensuring that Maui's dolphins are able to recover to this level would require protection in the area.

149. This issue has significant international interest. A motion has been put forward that discusses small cetaceans and highlights the issue around Maui's dolphins at the International Union for the Conservation of Nature (IUCN). This meets in September 2012. Papers are also being presented at the International Whaling Commission (IWC) by scientists and international NGO's. This meets from 11 June to 6 July 2012.

150. Moreover, DOC notes from both the MPI and DOC consultation processes there has been considerable national and international interest. Not introducing

adequate protection measures would result in considerable negative reaction globally and impact negatively on New Zealand's international image.