10.0 Appendix 2: MPI Statutory Considerations

10.1 PURPOSE OF THE FISHERIES ACT 1996

In making any decision the Minister for Primary Industries must bear in mind and conform to the purpose of the Fisheries Act 1996 ('the Act'), as set out in section 8: "To provide for the utilisation of fisheries resources while ensuring sustainability".

Ensuring sustainability means:

(a) Maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and
(b) Avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment.

As defined under section 2 of the Act, the aquatic environment would include Maui's dolphins.

MPI considers that in providing for the utilisation of a fisheries resource, enabling people to provide for their social, economic and cultural wellbeing is a relevant consideration when setting a sustainability measure. This consideration is also consistent with the goal of the TMP 'to further reduce impacts of human activities as far as possible, taking into account advances in technology and knowledge, and financial, social and cultural implications'. It is up to the Minister to determine how much weight to give to wellbeing in making his overall decision.

More restrictive sustainability measures are likely to have a greater impact on utilisation. The nature and extent of additional management necessary to avoid, remedy, or mitigate the effects of fishing on Maui's dolphins, if any, will depend on the balance between sustainability and utilisation the Minister considers appropriate. The selection of the most appropriate suite of measures requires the Minister to weigh the benefits of more effective mitigation against the likely costs of those measures.

MPI invites submitters to provide further information on the impacts of the proposed management options and the ability of people to provide for their social, economic and cultural wellbeing.

10.2 ENVIRONMENTAL PRINCIPLES

The environmental principles set out in section 9 of the Fisheries Act (1996) ('the Act') are relevant when considering whether measures are necessary to avoid, remedy or mitigate the effects of fishing-related mortality on Maui's dolphins. These principles are:

- Associated or dependent species should be maintained above a level that ensures their long-term viability;
- Biological diversity of the aquatic environment should be maintained;
- Habitat of particular significance for fisheries management should be protected.

Maui's dolphins are an associated or dependent species as defined in the Act. MPI considers the Minister should take into account maintaining the Maui's dolphin species above a level that ensures long-term viability.[166] This consideration is consistent with the goal of the TMP, 'to ensure that the long-term viability of Hector's dolphins is not threatened by human activities'.

[166] Fisheries Act 1996, section 2: 'Long-term viability' of Maui's dolphins would mean there is a low risk of collapse of the species, and the species has the potential to recover to a higher biomass level.

10.3 INFORMATION PRINCIPLES

Under section 10 of the Act, decision makers, including the Minister, shall take into account the following information principles:

- Decisions should be based on best available information[167];
- Decision makers should take into account any uncertainty in the available information;
- Decision makers should be cautious when information is uncertain, unreliable or inadequate, and;
- The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the Act.

The degree of uncertainty and the adequacy of the available information are matters for the Minister to assess and weigh in making decisions on any measures he considers necessary to avoid, remedy or mitigate the effects of fishing-related mortality on Maui's dolphins.

10.4 SUSTAINABILITY MEASURES

Before making any decision under sections 15(2) or 15(3) and 298 of the Act the Minister must have regard to the provisions listed in section 11(2) of the Act.

Section 11(2)(a): The Minister 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 are considered relevant.

- 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.
- 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.
- The Waikato Regional Policy Statement and Coastal Plan contain general policies and objectives that provide for the development and use of natural and physical resources while avoiding, remedying or mitigating adverse effects on biodiversity in the region.
- The Auckland Regional Council Policy Statement and Coastal Plan contain general policies and objectives that provide for the preservation or protection, and avoidance of significant adverse effects on threatened species.

Section 11(2)(b): The Minister must have regard to any management strategy or management plan under the Conservation Act 1987 that apply to the coastal marine area and are considered relevant. The Auckland, Waikato and Wanganui Conservation Management Strategies are relevant to the areas under consideration. There is nothing specific in these documents relating to the management of Maui's dolphins, but include references to the protection of threatened indigenous natural fauna.

Section 11(2)(c): The Minister must have regard to sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 that apply to the coastal marine area. The areas under consideration in this consultation paper do not fall within the Hauraki Gulf Marine Park.

Section 11(2)(d): The Minister 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

[167] Fisheries Act 1996, section 2. 'Best available information' means the best information that, in the particular circumstances, is available without unreasonable, cost, effort, or time.

(Takutai Moana) Act 2011. That act establishes the process for applying for a coastal marine title, but no such title has been granted yet.

Section 11(2A)(a) and (c): The Minister 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.

Section 11(2A)(b): The Minister must take into account any relevant and approved fisheries plans. There are no fisheries plans approved for inshore fisheries that apply to this area at this time. The National Fisheries Plans for Inshore Fisheries have been released as drafts and are being trialled over the next couple of years. The environmental objectives in the draft plans are consistent with the proposals outlined in this paper.

Section 11(4)(b): The Minister may implement any sustainability measure or the variation of any sustainability measures, as set or varied under subsection (1),

(i) by notice in the *Gazette*; or

(ii) by recommending the making of regulations under section 298.

10.5 INTERNATIONAL OBLIGATIONS

Section 5(a) of the Fisheries Act requires that it be interpreted in a manner consistent with New Zealand's international obligations relating to fishing. 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. The management options presented in this paper are consistent with these obligations.

10.6 TREATY OF WAITANGI (FISHERIES CLAIMS) SETTLEMENT ACT 1992

The proposed management options do not impose restrictions on Maori customary fishing, which is authorised by kaitiaki. This is consistent with measures put in place to date in respect of Hector's and Maui's dolphins. Quota awarded to iwi under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 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 put in place to address the adverse effects of fishing on protected species.

11.0 Appendix 3: WCNI Fishery Characterisations

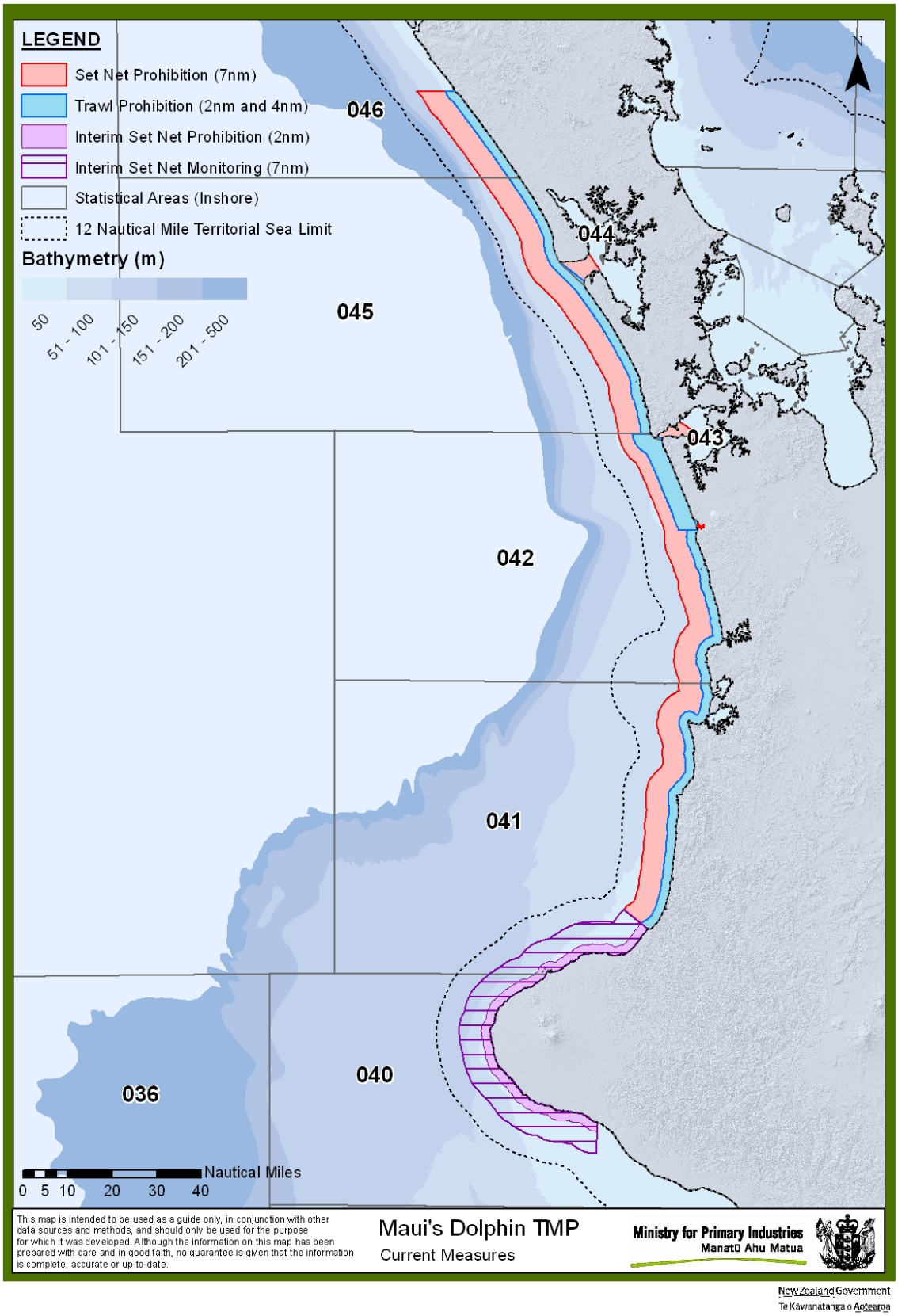
Fishing in the stretch of coastline between Manganui Bluff and Hawera takes place by set netting, trawling, various forms of lining and seining and some potting. Set netting is the method used the most number of hours and by the most individual fishers. Trolling, long lining, ring netting and trawling are also important methods along this coast. Set net is a commonly used gear by recreational fishers but other methods such as rod and line, surf casting, drag netting/beach seining, rock fishing and long lining are also used.

The percentage of commercial reporting by position, the average annual number of vessels, fishers and fished days for the key species for both the commercial set net and trawl activities, are provided in Table 11.1.

Table 11.1: The inshore commercial fisheries in statistical areas 40-46 over the fishing years 2007-08 to 2010-11.

Fishery segment	Methods used	% reporting by position	Average annual no. vessels	Average annual no. fishers	Average annual fished days
Set netting					
flatfish	set net	8	91.3	75.8	4195.0
grey mullet	set net	2	63.8	54.0	1288.3
yellow-eyed mullet	set net	0	9.0	9.0	51.0
rig	set net	61	61.8	56.3	573.5
mixed species	set net	57	71.3	65.3	388.0
kahawai	set net	13	45.3	40.0	311.8
trevally	set net	39	36.8	33.0	176.5
school shark	set net	99	17.8	17.5	164.0
warehou	set net	100	4.8	5.0	152.3
Trawling					
mixed species	bottom trawl (55%)	99	31.3	7.5	306.8
gurnard	bottom trawl(89%)	93	18.8	22.3	188.5
snapper	bottom trawl (88%)	97	20.5	16.3	171.5
trevally	bottom trawl (77%)	99	14.3	10.8	140.3
barracouta	midwater trawl (84%)	100	22.8	14.8	126.0
tarakihi	bottom trawl(90%)	98	14.3	10.5	103.5

Restrictions on fishing for managing threats to Maui's dolphins off the west coast of the North Island (WCNI) affect the commercial and amateur set net fishery, and commercial trawl fishery (Map 11.1).



Map 11.1. Current set net and trawl restrictions and prohibitions off the WCNI shown with the relevant inshore statistical reporting areas (40 – 46).

A chronology of all the management measures that have been brought in, as well as show when interim relief has applied is shown here:

Date	Management measures	Interim relief
2003	*From Maunganui Bluff to Pariokariwa Point, including the entrance to the Manukau harbour:* Set netting – commercial and recreational – is prohibited: • between 0 and 4 nautical miles. Trawling is prohibited: • between 0 and 1 nautical mile along the coast, and; • between 0 and 2 nautical miles in areas adjacent to harbours and river mouths.	
October 2008	*From Maunganui Bluff to Pariokariwa Point:* Set netting - commercial and recreational - is prohibited: • offshore to seven nautical miles, and; • in these harbour entrances: o Kaipara Harbour entrance; o Manukau Harbour entrance; o Waikato River entrance; o Raglan Harbour entrance. Trawling is prohibited: • offshore to two nautical miles, and to four nautical miles between Manukau Harbour and Port Waikato. Drift netting - commercial and recreational - is prohibited: • in any part of the Waikato River. Harbours and rivers: • Unless specified, the new prohibitions do not apply to these.	*From 1 October to 24 December in 2008, 2009 and 2010:* Set setting (for rig and school shark) by commercial fishers permitted between 4 and 7 nm from Maunganui Bluff to Pariokariwa Point (excluding the waters lying within 7 nm from Manukau Harbour to Waikato River mouth). *1 October 2008 – present.* Ring netting for mullet in the area where the pre-existing set net ban in the Manukau harbour was extended.
March 2011	Reinstatement: *From Maunganui Bluff to Pariokariwa Point:* Set netting – commercial – is prohibited: • for rig and school shark between 4 and 7 nautical miles.	
July 2012	Interim measures: *From Pariokariwa to Hawera:* Set netting – commercial and recreational – is prohibited: • between 0 and 2 nautical miles. Set netting – commercial– is prohibited: • between 2 and 7 nautical miles in the same area without an observer on board.	

A characterisation of these fisheries illustrate the nature and extent of set net and trawl activity off the WCNI and helps to assess potential costs to fishers from the management options being proposed.

11.1 WCNI SET NET FISHERY

MPI has assessed the commercial set net fishery off the WCNI based on estimated catch effort and landings data. There are approximately 106 fishers operating 133 vessels in the inshore statistical reporting areas 40 – 46 (Figures 11.1 and 11.2).

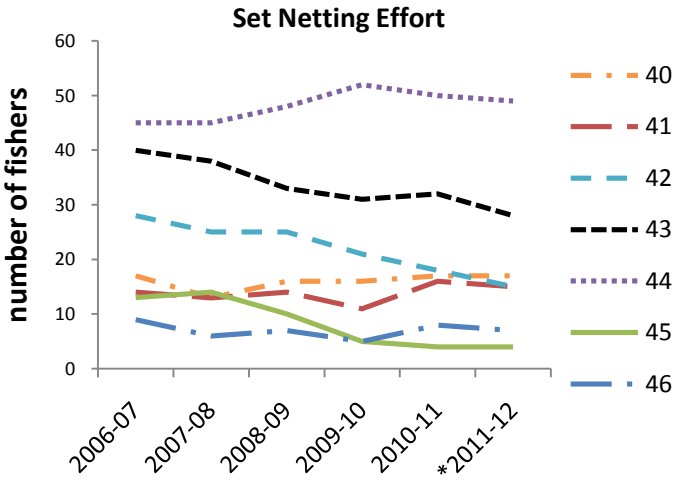


Figure 11.1. Number of commercial set net fishers operating in each of statistical reporting areas 40-46 since 2006/07. Note: numbers not additive as a single fisher may operate across more than one statistical reporting area.

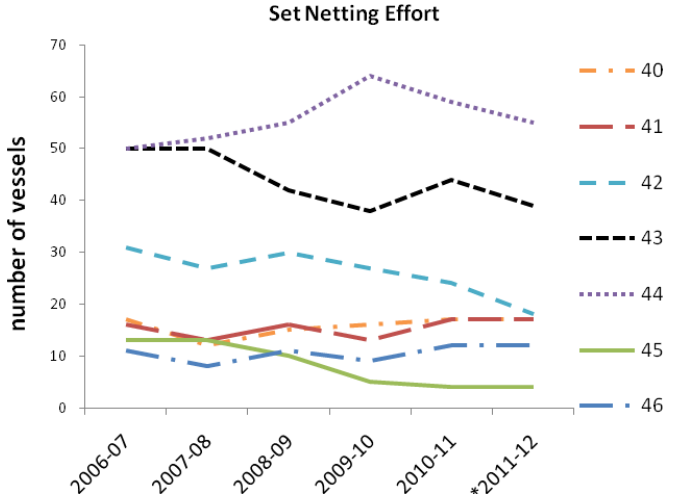


Figure 11.2. Number of commercial set net vessels operating in each of statistical reporting areas 40-46 since 2006/07. Note: numbers not additive as a single vessel may operate across more than one statistical reporting area.

The main commercial set net fisheries off the WCNI vary depending on the species being targeted, which can vary depending on the time of year, and where the set net activity occurs (e.g. offshore, inshore or within harbours).

Recreational set netting is carried out in the Kaipara, Manukau, Kawhia, Raglan and Aotea harbours and between Pariokawira Point and Cape Egmont where the main target species for set netting and drift netting are grey mullet, rig and flounder with kahawai, trevally and

dogfish also being caught. There is also some line fishing, especially in the deeper channels for snapper and other species such as kahawai.

Recreational fishers have reported that harbour based fishing is more focused on sustenance and is more family oriented than line fishing on the coast. Set netting is carried out year round with a higher frequency in summer due to more hours of daylight foe setting and retrieving nets, more time spent at the fishing location while at the family batch, and better weather. Set netting is usually done close to shore in shallow water from small boats.

11.1.1 WCNI Harbours

Most commercial set net fishers off the WCNI fish in the harbours (Kaipara, Manukau, Raglan and Kawhia), particularly the Kaipara (statistical reporting area 44) and the Manukau (statistical reporting area 43) harbours. Landings and estimated values of the main target species in the Kaipara and Manukau Harbours are shown in Tables 11.2 and 11.3.

Table 11.2. Characterisation of the commercial set net fishery in the Manukau Harbour (statistical area 43) using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Manukau Harbour				
Fishery		2008/09	2009/10	2010/11
Flatfish	Landings (tonnes)	31	27	41
	Value ($)	$93 000	$81 000	$123 000
Grey mullet	Landings (tonnes)	187	138	170
	Value ($)	$561 000	$414 000	$510 000
Rig	Landings (tonnes)	22	25	33
	Value ($)	$96 800	$110 000	$145 200
Kahawai	Landings (tonnes)	18	14	23
	Value ($)	$14 400	$11 200	$18 400
Trevally	Landings (tonnes)	13	14	20
	Value ($)	$15 600	$16 800	$24 000

Table 11.3. Characterisation of the commercial set net fishery in the Kaipara Harbour (statistical area 44) using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Kaipara Harbour				
Fishery		2008/09	2009/10	2010/11
Flatfish	Landings (tonnes)	170	140	104
	Value ($)	$510 000	$420 000	$312 000
Grey mullet	Landings (tonnes)	263	207	209
	Value ($)	$789 000	$621 000	$627 000
Rig	Landings (tonnes)	38	42	54
	Value ($)	$167 000	$184 000	$237 600
Kahawai	Landings (tonnes)	32	38	36
	Value ($)	$25 600	$30 400	$28 800
Trevally	Landings (tonnes)	10	17	19
	Value ($)	$12 000	$20 400	$22 800

The Kawhia and Raglan Harbours do not have their own statistical reporting areas; catch effort and landings data are recorded under the much larger statistical reporting areas 41 and

42, respectively. However, flatfish and grey mullet are primarily targeted within harbours. The catch effort and landings data for these species in statistical reporting areas 41 and 42 over the last three fishing years are shown in Tables 11.4 and 11.5.

Table 11.4. Characterisation of the commercial flatfish and grey mullet fisheries in statistical reporting area 41 (containing Kawhia Harbour) using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistical Area 41				
Fishery		2008/09	2009/10	2010/11
Flatfish	Landings (tonnes)	9	9	7
	Value ($)	$27 000	$27 000	$21 000
Grey mullet	Landings (tonnes)	3	4	2
	Value ($)	$9 000	$12 000	$6 000

Table 11.5. Characterisation of the commercial flatfish and grey mullet fisheries in statistical reporting area 42 (containing Raglan Harbour) using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistical Area 42				
Fishery		2008/09	2009/10	2010/11
Flatfish	Landings (tonnes)	10	6	5
	Value ($)	$30 000	$18 000	$15 000
Grey mullet	Landings (tonnes)	61	40	54
	Value ($)	$183 000	$120 000	$162 000

The relative intensity of fishing effort in the flatfish and grey mullet set net fisheries in the statistical reporting areas 40-46 between the 2006-07 and 2010-11 fishing seasons, in addition to the April 2011 - March 2012 fishing period can be found in the Figures 11.3 and 11.4 respectively.

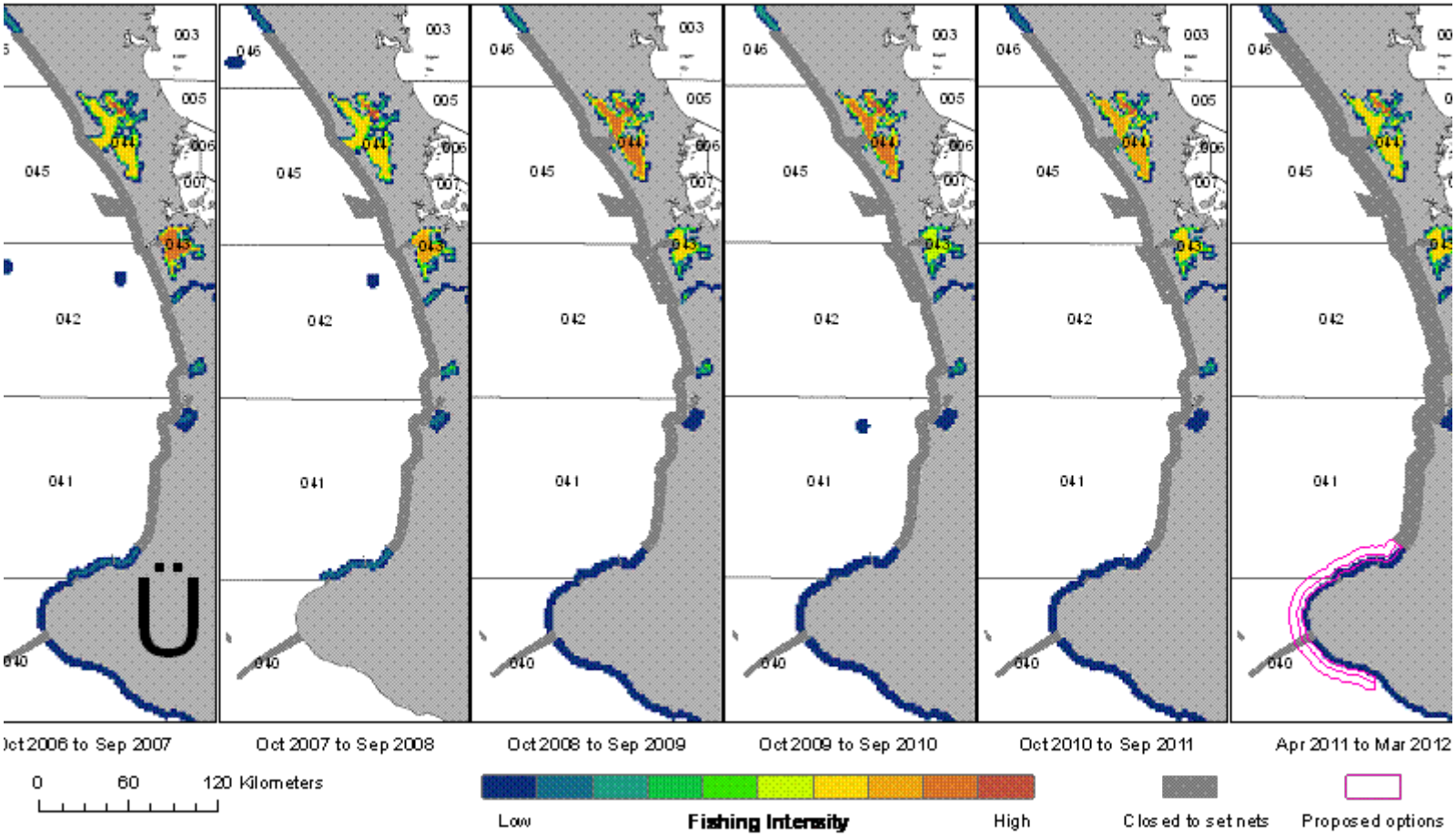


Figure 11.3. Relative intensity of fishing effort in the flatfish set net fishery. 92% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

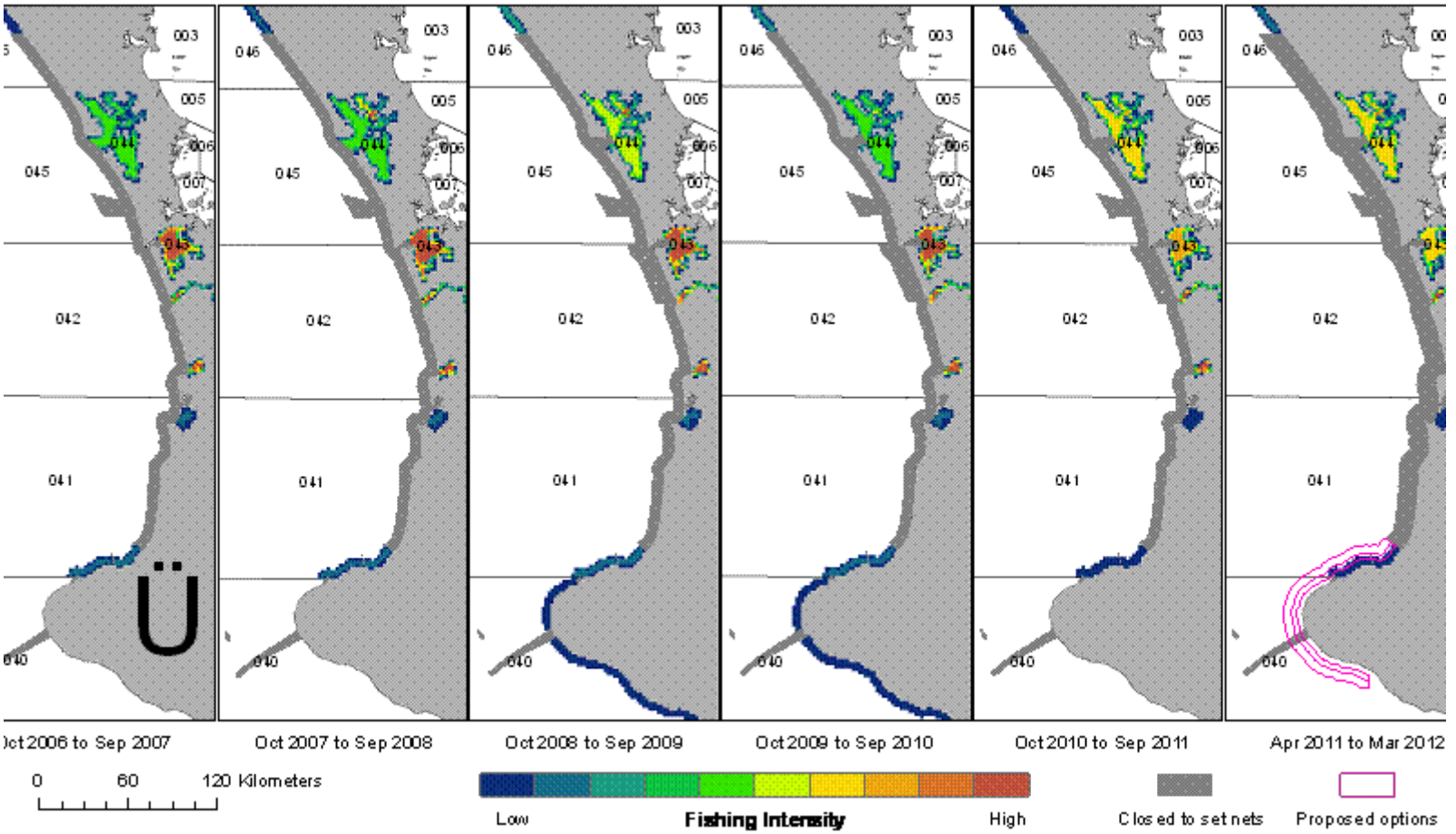


Figure 11.4. Relative intensity of fishing effort in the grey mullet set net fishery. 98% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

11.1.2 WCNI – Coastal and Offshore

In 2008 the WCNI set net fishery was restricted out to 7 nautical miles from shore from Maunganui Bluff to Pariokariwa Point. However, industry was awarded interim relief permitting the following:

- Set setting (for rig and school shark) by commercial fishers during the period 1 October to 24 December (inclusive) in waters lying between 4 and 7 nautical miles from the mean high-water mark that extends from Maunganui Bluff to Pariokariwa Point (excluding the waters lying within 7 nautical miles to the seaward of the baseline commencing from a point on the north head of the Manukau Harbour and running south to a point north of the Waikato River mouth).

Interim relief applied from 1 October to 24 December in 2008, 2009 and 2010. The then Minister of Fisheries made his decision in 2011 to close the area where interim relief had applied.

The coast areas most affected by the 2008 closures are statistical areas 42 (north of Kawhia to the Manukau Harbour) and 45 (north of the Manukau Harbour and south of Maunganui Bluff). In statistical area 42, the most commonly caught species (outside of the set net activity that occurs within Raglan Harbour) is school shark (offshore beyond 7 nautical miles), along with a mixed species set net fishery. In statistical area 45 there is no major target fishery and landings of all species caught by set net in 2010/11 equates to < 4 tonnes. The catch effort and landings data for the most commonly caught species in statistical area 42 over the last three fishing years is shown in Table 11.6.

Table 11.6. Characterisation of the most commonly caught species in statistical reporting area 42 (excluding flatfish and grey mullet) using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistical Area 42				
Fishery		2008/09	2009/10	2010/11
School shark	Landings (tonnes)	28	11	43
	Value ($)	$64 000	$25 300	$98 900
Rig	Landings (tonnes)	8	2	4
	Value ($)	$35 200	$8 800	$17 600
Snapper	Landings (tonnes)	0.6	0.8	5
	Value ($)	$4 200	$5 600	$35 000
Kahawai	Landings (tonnes)	27	28	28
	Value ($)	$21 600	$22 400	$22 400

The relative intensity of fishing effort in the kahawai, school shark, rig, trevally and warehou set net fisheries which are caught both in the harbours and in the coastal areas of the statistical reporting areas 40 – 46 between the 2006-07 and 2010-11 fishing years, in addition to the April 2011 - March 2012 fishing period can be found in the Figures 11.5 to 11.9 respectively.

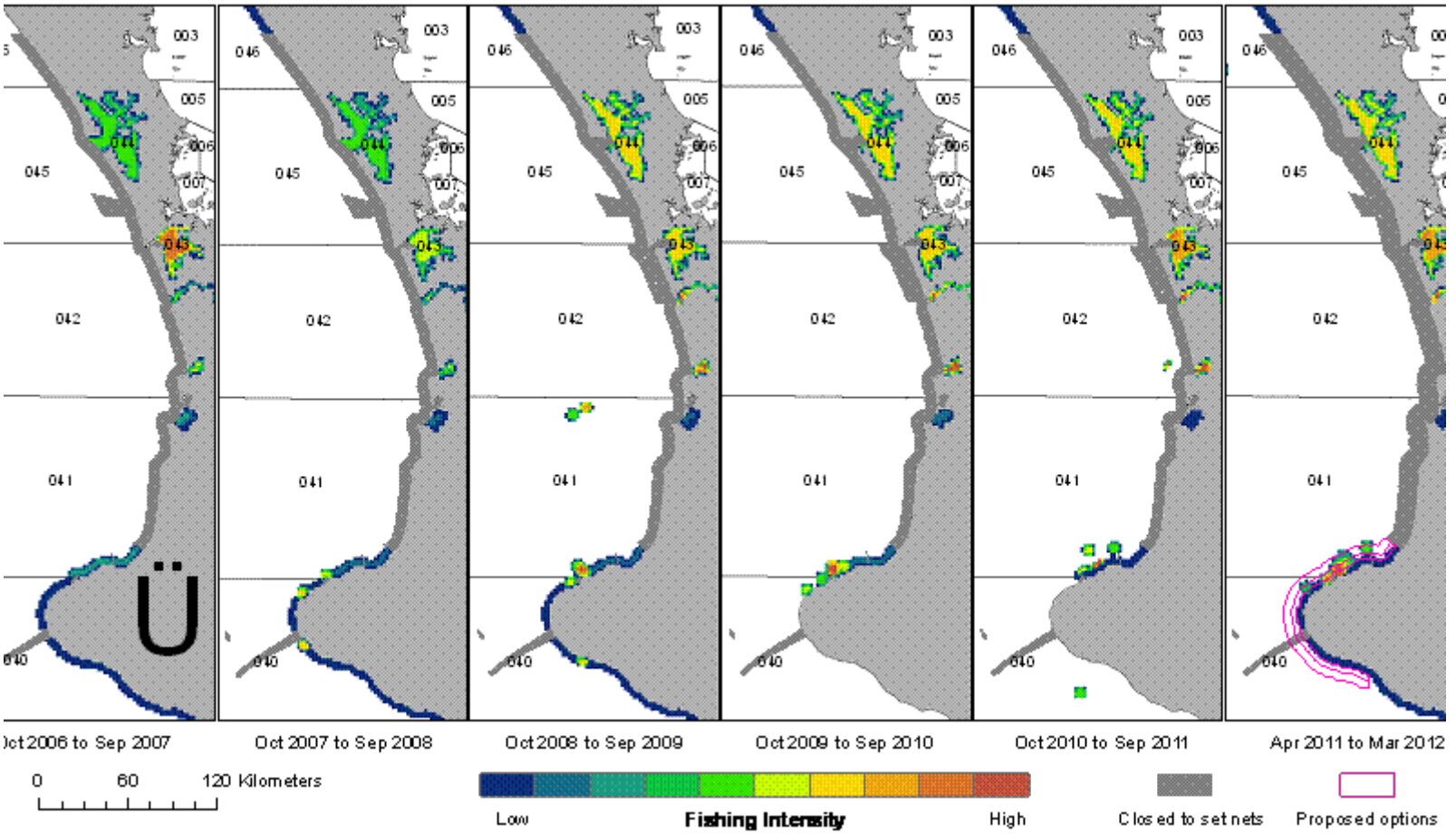


Figure 11.5. Relative intensity of fishing effort in the kahawai set net fishery. 87% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

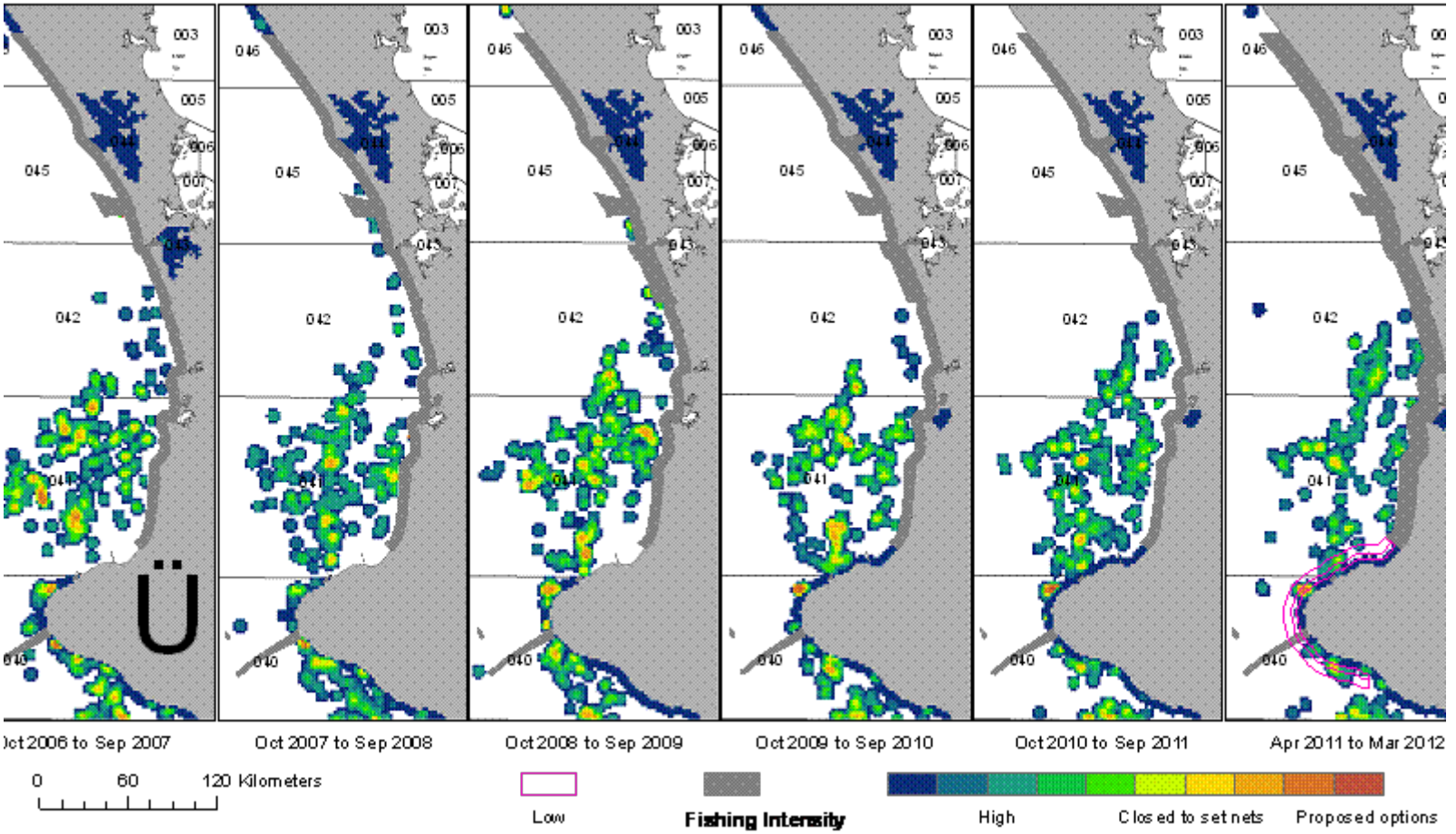


Figure 11.6. Relative intensity of fishing effort in the school shark set net fishery. 1% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

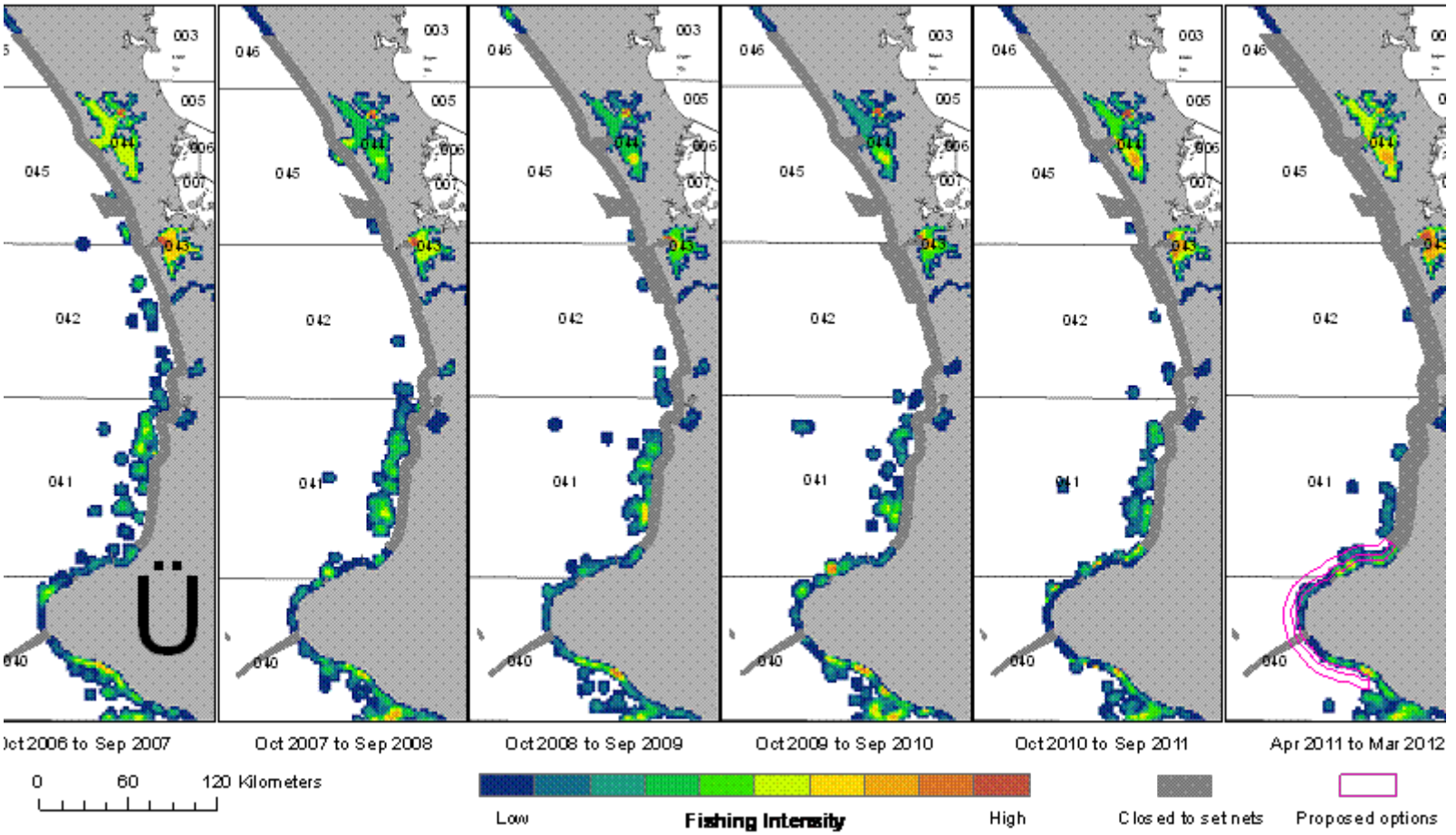


Figure 11.7. Relative intensity of fishing effort in the rig set net fishery. 39% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

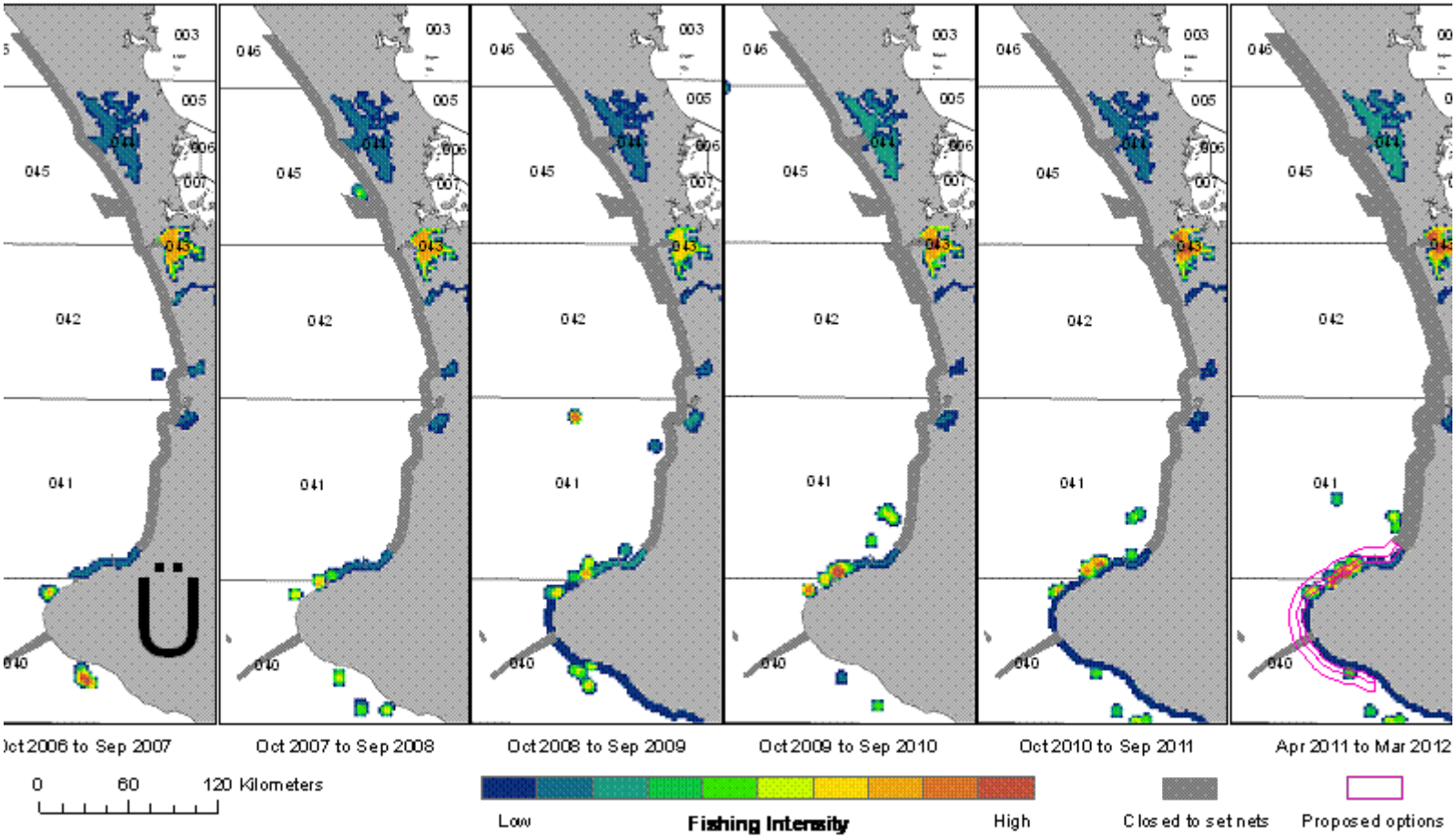


Figure 11.8. Relative intensity of fishing effort in the trevally set net fishery. 61% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

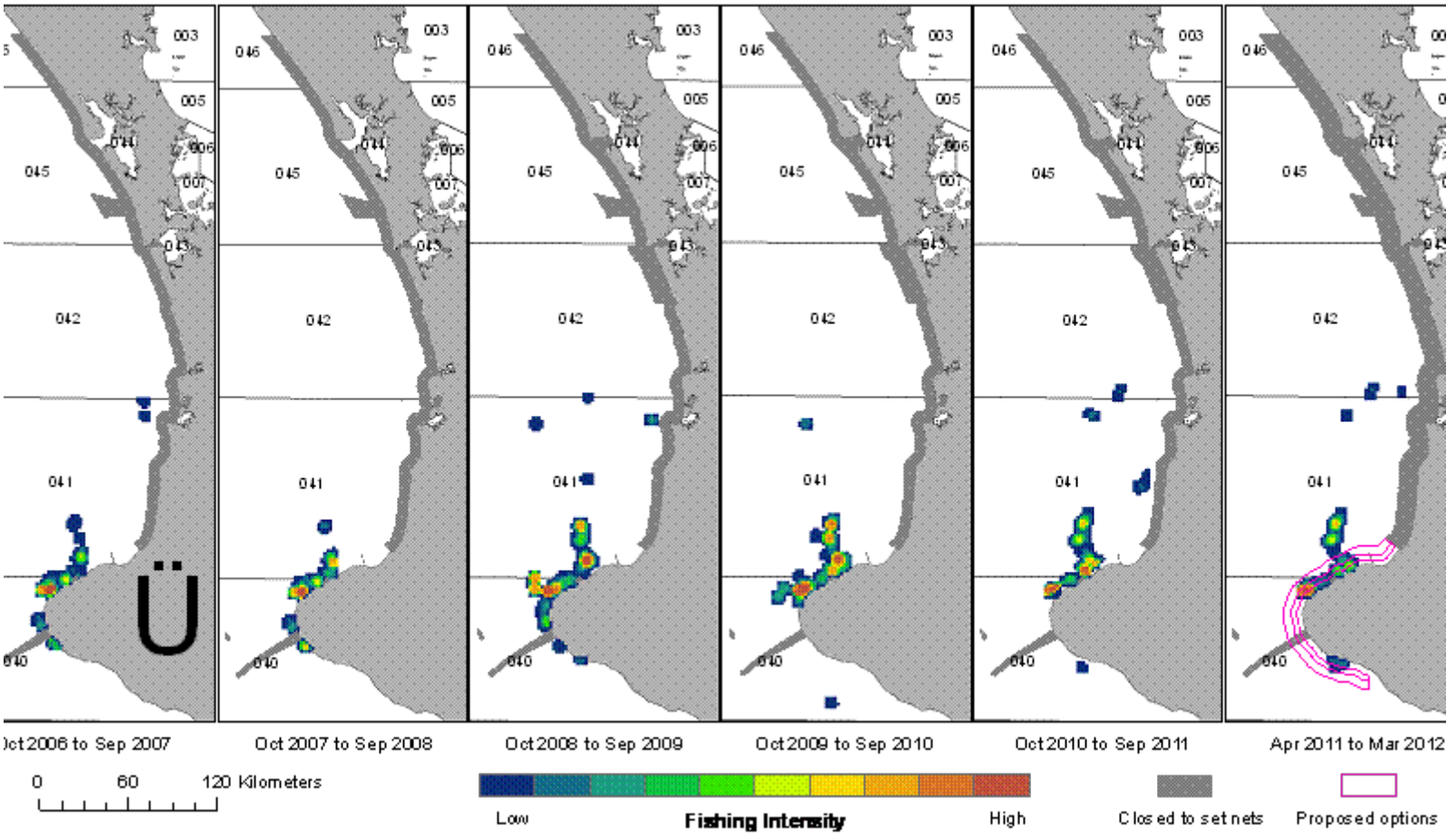


Figure 11.9. Relative intensity of fishing effort in the warehou set net fishery. 0% of the effort in this fishery reports by statistical area rather than by coordinates of start of each fishing event and this effort is assigned to areas within the statistical area where this fishery is thought to occur. In particular boats less than 6 m in length are assumed to operate within 2 nautical miles of open coast in accordance within safety requirements.

11.2 WCNI TRAWL FISHERY

MPI has assessed the commercial trawl fishery off the WCNI based on estimated catch effort and landings data. This fishery is smaller in terms of number of fishers and vessels compared to the set net fishery (106 fishers for the set net fishery versus 28 fishers for the trawl fishery and 133 vessels for the set net fishery versus 39 vessels for the trawl fishery) in the inshore statistical reporting areas 40 – 46 (Figures 11.10 and 11.11). But it is important to note that there is no trawling activity on the harbours, hence no data for the statistical areas 43 and 44.

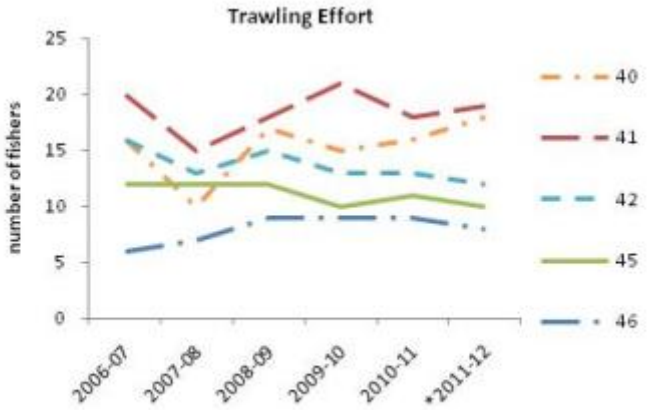


Figure 11.10. Number of commercial trawl fishers operating in each of statistical reporting areas 40 to 42, 45 and 46 since 2006/07. Note: numbers not additive as a single fisher may operate across more than one statistical reporting area.

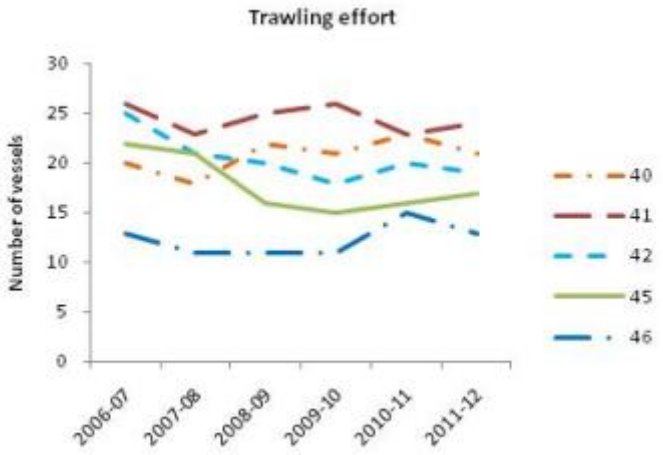


Figure 11.11. Number of commercial trawl vessels operating in each of statistical reporting areas 40 to 42, 45 and 46 since 2006/07. Note: numbers not additive as a single vessel may operate across more than one statistical reporting area.

Landings and estimated values for the most commonly caught species in statistical areas 40, 41, 42, 45 and 46 over the last three fishing years are shown in Tables 11.7, 11.8, 11.9, 11.10 and 11.11 respectively.

Table 11.7. Characterisation of the most commonly caught species in statistical reporting area 40 using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistic Area 40				
Fishery		2008/09	2009/10	2010/11
Gurnard	Landings (tonnes)	34	34	35
	Value ($)	$96 900	$96 900	$99 750
Snapper	Landings (tonnes)	28	23	51
	Value ($)	$196 000	$161 000	$357 000
Trevally	Landings (tonnes)	48	46	143
	Value ($)	$57 600	$ 55 200	$171 600
Tarakihi	Landings (tonnes)	14	13	17
	Value ($)	$56 000	$52 000	$68 000

Table 11.8. Characterisation of the most commonly caught species in statistical reporting area 41 using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistic Area 41				
Fishery		2008/09	2009/10	2010/11
Gurnard	Landings (tonnes)	233	249	162
	Value ($)	$664 050	$709 650	$461 700
Snapper	Landings (tonnes)	290	197	238
	Value ($)	$2 030 000	$1 379 000	$1 666 000
Trevally	Landings (tonnes)	470	194	403
	Value ($)	$564 000	$232 800	$483 600
Tarakihi	Landings (tonnes)	89	226	101
	Value ($)	$356 000	$904 000	$404 000

Table 11.9. Characterisation of the most commonly caught species in statistical reporting area 42 using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistic Area 42				
Fishery		2008/09	2009/10	2010/11
Gurnard	Landings (tonnes)	81	69	66
	Value ($)	$230 850	$196 650	$188 100
Snapper	Landings (tonnes)	215	171	199
	Value ($)	$1 505 000	$1 197 000	$1 393 000
Trevally	Landings (tonnes)	372	318	272
	Value ($)	$446 400	$381 600	$326 400
Tarakihi	Landings (tonnes)	29	31	17
	Value ($)	$116 000	$124 000	$68 000

Table 11.10. Characterisation of the most commonly caught species in statistical reporting area 5 using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistic Area 45				
Fishery		2008/09	2009/10	2010/11
Gurnard	Landings (tonnes)	84	103	86
	Value ($)	$239 400	$293 550	$245 100
Snapper	Landings (tonnes)	293	328	233
	Value ($)	$2 051 000	$2 296 000	$1 631 000
Trevally	Landings (tonnes)	522	391	438
	Value ($)	$626 400	$469 200	$525 600
Tarakihi	Landings (tonnes)	76	51	73
	Value ($)	$304 000	$204 000	$292 000

Table 11.11. Characterisation of the most commonly caught species in statistical reporting area 46 using catch effort and landings data for the last three fishing years. Value is calculated using MPI estimated fish prices (Appendix 4).

Statistic Area 46				
Fishery		2008/09	2009/10	2010/11
Gurnard	Landings (tonnes)	39	61	64
	Value ($)	$111 150	$173 850	$182 400
Snapper	Landings (tonnes)	120	121	118
	Value ($)	$840 000	$847 000	$826 000
Trevally	Landings (tonnes)	228	263	224
	Value ($)	$273 600	$315 600	$268 800
Tarakihi	Landings (tonnes)	54	39	44
	Value ($)	$216 000	$156 000	$176 000

The relative intensity of fishing effort in the gurnard, snapper and trevally trawl fisheries in the statistical reporting areas 40-42, 45 and 46 between the 2007-08 and 2010-11 fishing years can be found in the Figures 8 to 10 respectively.

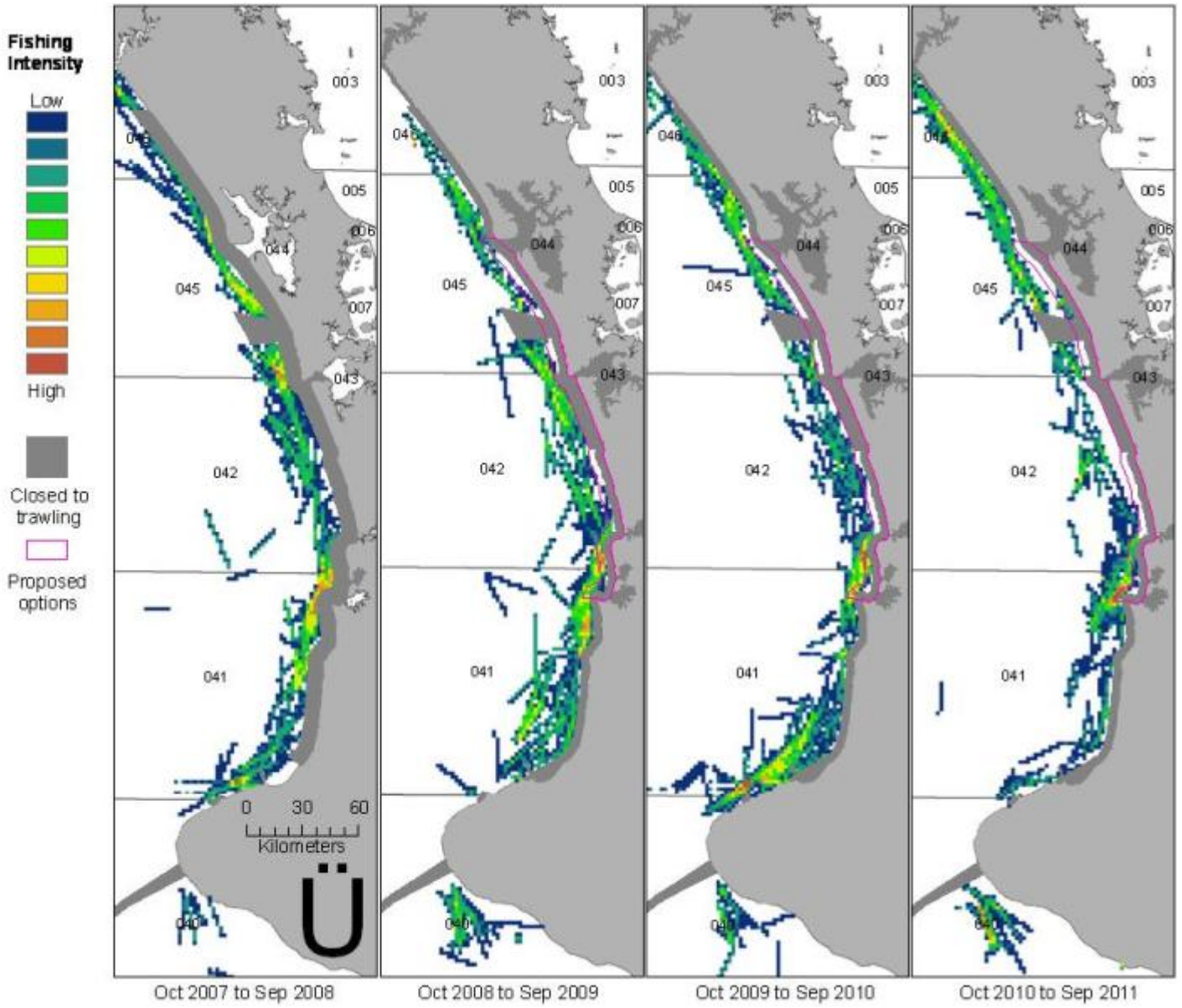


Figure 11.12. Relative intensity of fishing effort in the gurnard trawl fishery.

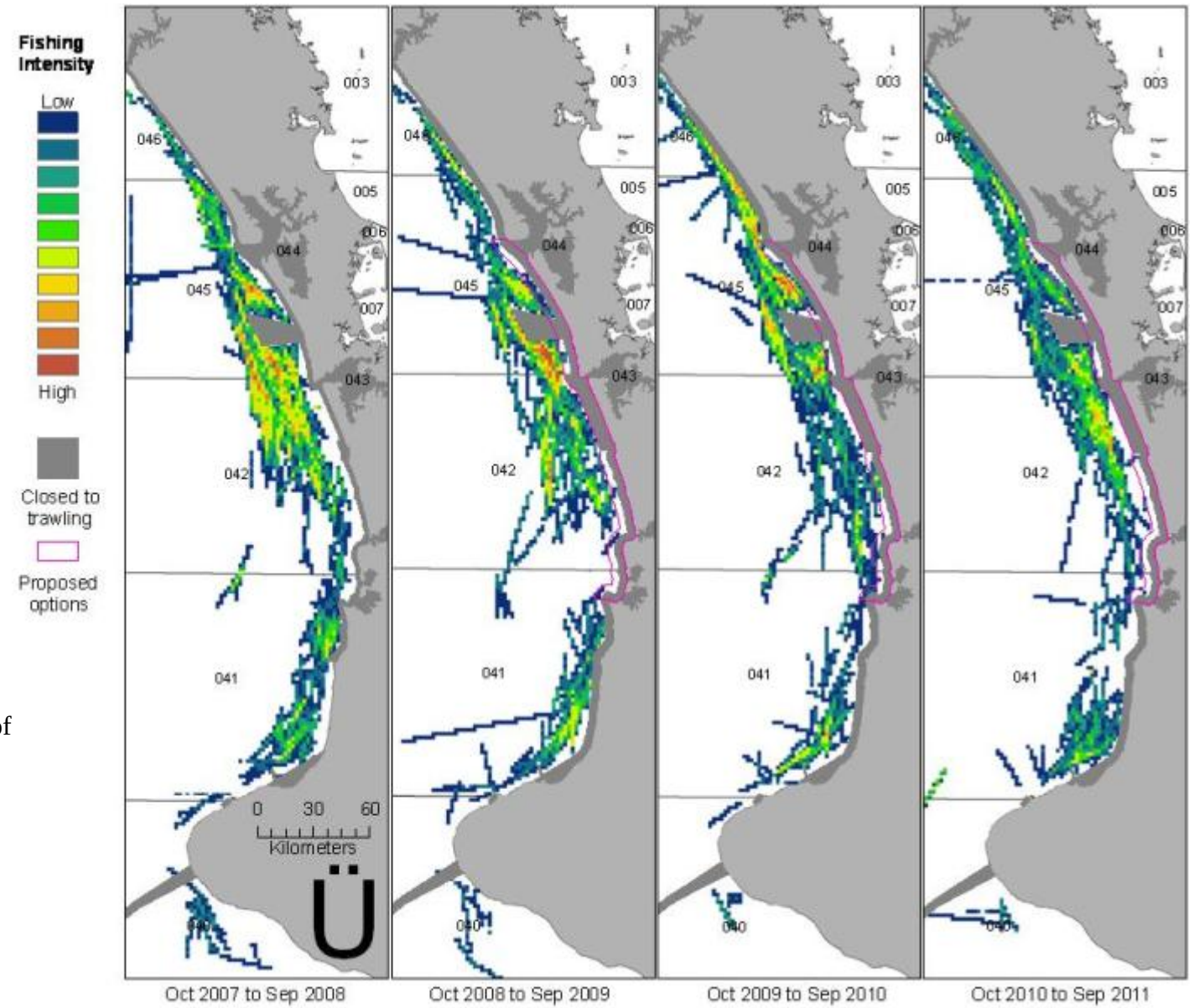


Figure 11.13. Relative intensity of fishing effort in the snapper trawl fishery.

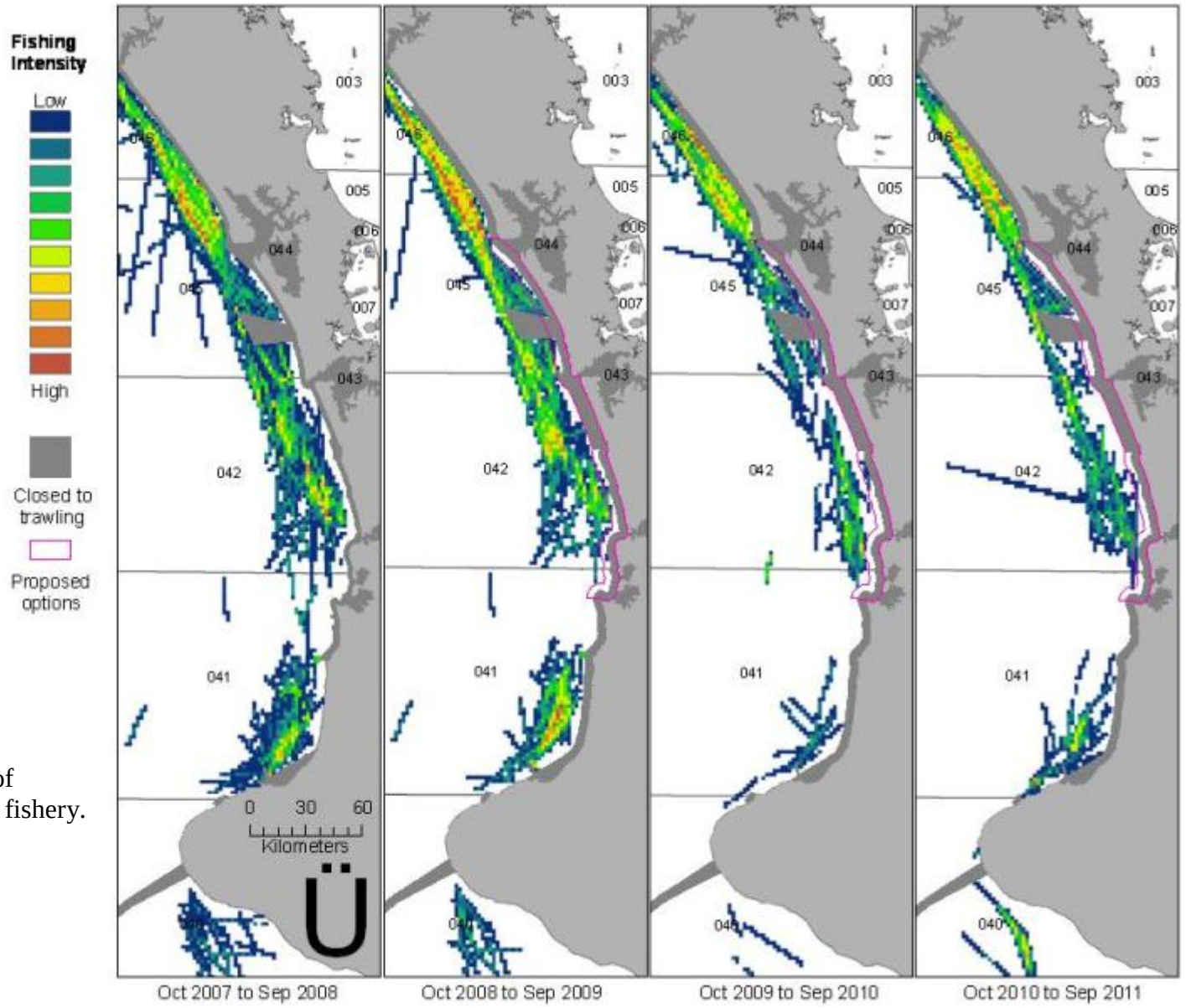


Figure 11.14. Relative intensity of fishing effort in the trevally trawl fishery.

12.0 Appendix 4: Economic Impacts Analysis of Fishing-Related Options

12.1 OVERVIEW

This analysis focuses on the economic impact of the following options that may result in displacement or loss of catch with regards to set netting (coastal), setting netting (harbours) and trawling on the west coast of the North Island.

Commercial and Amateur Set Netting (Coastal)	
Option 1	*Status quo*: Keep existing management, including the interim measures to: • retain the set net ban between 0 and 2 nautical miles offshore from Pariokariwa Point to Hawera; • prohibit the use of commercial set nets between 2 and 7 nautical miles offshore from Pariokariwa Point to Hawera without an observer onboard, and; • pay for observer services costs with Crown-funding. The interim measures would be reviewed in 2015 to inform management going forward.
Option 2	Keep existing management, and put the interim measures in place via regulation to: • retain the set net ban between 0 and 2 nautical miles offshore from Pariokariwa Point to Hawera; • prohibit the use of commercial set nets between 2 and 7 nautical miles offshore from Pariokariwa Point to Hawera without an observer onboard, and; • require observer services costs to be cost-recovered from industry beginning 1 October 2013.
Option 3	• Extend the set net ban between 0 and 4 nautical miles offshore from Pariokariwa Point to Hawera. • Prohibit the use of commercial set nets between 4 and 7 nautical miles offshore from Pariokariwa Point to Hawera without an observer onboard.

Commercial and Amateur Set Netting (Harbours)	
Option 1	*Status quo*: Keep existing management.
Option 2	Improve information on Maui's dolphin distribution and set net activity in the west coast North Island harbours, with a focus in the Manukau Harbour.
Option 3	• Extend the existing set net ban in the entrance of the Manukau Harbour further into the harbour. • Improve information on Maui's dolphin distribution and set net activity in the west coast North Island harbours, with a focus in the Manukau Harbour.

Commercial Trawling	
Option 1	*Status quo*: Keep existing management.
Option 2	Put in place extensive monitoring coverage in the commercial trawl fishery between 2 and 7 nautical miles offshore from Maunganui Bluff to Pariokariwa Point.
Option 3	• Extend the trawl ban from 2 and 4 nautical miles offshore from Kaipara Harbour to Kawhia Harbour. • Put in place extensive monitoring coverage in the commercial trawl fishery between 2 and 7 nautical miles offshore from Maunganui Bluff to Pariokariwa Point.

This analysis will provide the long term economic impact estimates using the two different methodologies. These are described in more detail in sections 12.3.2 and 12.3.3.

12.2 TOTAL REVENUE LOSS ESTIMATES: APPROPRIATE ESTIMATE OF PRICE OF FISH

To estimate the direct revenue losses, 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.

The Ministry for Primary Industries (MPI) compared port price and export price to various recent data on landed fish prices. MPI acknowledges 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 (Table 1).

Table 1. Estimates of Fish Prices.

Species	Port Price (2012-13 fishing year)	Export-derived price (2010-11 fishing year)	MPI estimate
Blue Warehou	$1.08/kg	$2.01/kg	$2.01/kg
School Shark	$2.41/kg	$4.49/kg	$2.30/kg
Rig	$3.71/kg	$6.64/kg	$4.40/kg
Trevally	$1.87/kg	$1.97/kg	$1.20/kg
Northern Spiny Dogfish	N/A	N/A	$1.00/kg
Snapper	$5.70/kg	$10.41/kg	$7.00/kg
Kahawai	$0.71/kg	$1.01/kg	$0.80/kg
Spiny Dogfish	$0.32/kg	$1.06/kg	$1.00/kg
Gurnard	$2.49/kg	$5.42/kg	$2.85/kg
Blue Mackerel	$0.42/kg	$1.52/kg	$1.00/kg
Flatfish	2.95/kg	9.29/kg	3.00/kg
Grey Mullet	3.60/kg	9.88/kg	3.00/kg
Yellow-eyed Mullet	3.44/kg	9.88/kg	3.00/kg
Parore	$2.01/kg	N/A	$2.01/kg
John Dory	$6.99/kg	$12.42/kg	$7.50/kg
Tarakihi	$3.85/kg	$4.46/kg	$4.00/kg
Leatherjacket	$0.75/kg	$2.41/kg	$1.00/kg
Red Cod	$0.77/kg	$1.85/kg	$0.90/kg

12.3 ESTIMATES OF INCOME IMPACTS

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

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 methods used in the two reports are 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.

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 into four categories:

- Value added lost in the harvesting sector (direct harvesting income);
- Value added lost in the processing sector (direct processing income);
- Value added lost in sectors that supply harvesting and processing (indirect income); and
- 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).

Table 2 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 2. 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

Table 2 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.

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.

12.3.1 Impact on quota values

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

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 affected.

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

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.

As noted above, the method 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).

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.

12.3.2 Estimates of overall impacts

The method 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.

For 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. Previous research by Aranovus[168] confirms the general observation that the average age of those employed in fishing is relatively high, so

[168] Penny et al (2007): http://www.fish.govt.nz/ en-nz/Consultations/Archive/2008/Hectors+dolphins/Socio+economic.htm

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 considers 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.

MPI emphasises 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 considers that they are appropriate for 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.

12.3.3 New Zealand Treasury's Present Value methodology

In prior consultations, industry has suggested the issue of recurring losses should be addressed by assuming that all losses are permanent. The Present Value methodology outlined in New Zealand's Treasury's Cost Benefit Analysis Primer[169] can be used to assess permanent loss.

MPI does not consider that all the income losses are permanent, so an assumption that all losses are permanent is inappropriate. MPI considers 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.

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

However, MPI has estimated overall impacts using Treasury's Present Value methodology to provide stakeholders the estimates cost impact using both methodologies using the Treasury default discount rate of 10%.

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

12.3.4 Key assumptions

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 impact numbers. MPI does not consider that some of the labour and capital will be retired permanently and that discounting over 20 years is not appropriate in this case.

However, given the issues outlined previously, MPI has provided the estimates of the annual income effects and capitalized future value effects using both the MPI methodology and Treasury methodology as the economic impact is likely to be somewhere in this range.

MPI considers that while it is likely that the associated by-catch from targeting species outline in each of the options below (set netting and trawling) 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 or trawl nets. A 10% adjustment will be used in the calculations to allow for the revenue from bycatch species.

Some of the management options being proposed include mandatory monitoring coverage. The proposed monitoring will have a cost associated with it but these estimates are provided in MPI's consultation paper (Section 6). Therefore, the costs associated with the proposed monitoring have been excluded from this analysis.

The analysis below assumes that all catch is lost (and not caught elsewhere in the relevant QMAs). MPI considers there will be some adjustment by the fishing industry to the options proposed below but it is impossible to predict exactly how the fishing industry will adjust. Some fishers will be able to adjust better than others. The economic impact numbers below are therefore considered a worst case scenario.

12.4 METHOD USED TO CALCULATE PERCENTAGE OF DISPLACED LANDINGS

The commercial landing and catch effort data that was used in the economic impact analyses was extracted from MPI's New Zealand Fisheries reporting database in June 2012. To estimate the percentage of landings for an entire stock that could be affected by each of the management options being considered, the following steps were taken:

1. Fishing events (for example, a single trawl shot with non-zero catch) were retrieved for fishing trips where at least one event was reported as being in statistical reporting areas 40 to 46, or where GPS (latitude and longitude coordinates) position started within one of these statistical reporting areas.

2. Fishing events with missing trip numbers, unknown statistical reporting area, missing gear method codes or missing dates were groomed where possible to assign a likely value to the missing field. This approach maximised the possible number of fishing events for analysis.

3. Fishing events were grouped by distinct types of fishing activity based on fishing method used and catch composition (classified as a 'fishery segment').

4. The species composition of the catch was calculated from estimated catch weights for each species or species group.

5. Effort details for each fishing event were identified. If effort information was missing medians for the stratum of the same year, statistical reporting area, fishing method and fishery segment were used.

6. A subsample of fishing events was used to calculate the landings of a fishstock per unit of effort for each strata of unique combinations of year, statistical reporting area, fishing method and fishery segment. Subsamples comprised complete fishing trip records with matching trip landing records and where only one fishing method was used in the trip. A share of the trip landings of all fishstocks was apportioned to each fishing event in proportion to estimated catch values or number of events in the trip.

7. Fishing intensity (effort per ha) of each fishing event was calculated by assigning fishing effort to a polygon representing the best possible information about where that even occurred, and dividing the units of effort into the polygon area.

    a. In the case of set netting reporting by coordinates of start position, event effort was assigned to a circle of 2 nautical miles radius from the start position (in accordance with the statutory definition of a set net event for the Netting Catch, Effort and Landing Return (NCELR) reporting forms).

    b. In the case of set net events that report only by statistical area (mostly boats less than 6 m in length), event effort was spread over a polygon of the likely fishable area for that type of fishing. MPI has assumed that fishing vessels less than 6 m in length operate within enclosed waters or within 2 nautical miles of the coast.

    c. In the case of a trawl event, effort was assigned to a polygon constructed from start and end latitude and longitude positions of each tow and the width of the reported wingspread of the trawl. Where end positions were not reported they were estimated using tow length calculated from speed and duration of the tow and using the direction of the start position of the next tow.

8. Fishing event data that was within the area where fishing was permitted and feasible (that is, not on land) was used to calculate fishing intensity. The fishing effort that was used was scaled up to adjust for any missing effort (for example, where errors in coordinates placed an event on land or within a prohibited area or the last trawl of each day where direction was not estimated).

9. Average annual effort expected to be displaced by proposed restrictions was estimated by including all fishing events to a proposed restriction area, and for each event, calculating the hectares of overlap and multiplying by the fishing intensity. Effort overlapping with the restriction area was then summed over each fishing year and averaged over the years.

10. Expected displaced catch was estimated by multiplying displaced effort by catch per unit effort for all fishstocks caught within the respective stratum of year, stat area,

fishing method and fishery segment.

11. The spatial distribution of fishery segments was mapped by aggregating estimated fishing intensity of all fishing events within a segment to a raster grid of 2 km cell resolution on the New Zealand Transverse Mercator (NZTM) 2000 coordinate system.

12.5 ESTIMATED IMPACTS ON COASTAL SET NETTING (PARIOKARIWA POINT TO HAWERA)

This section reports the estimated economic impacts on commercial set net fishers from Pariokariwa Point to Hawera.

To estimate the impacts of Option 1, 2 and 3; ACE and quota prices for the set net species targeted from Pariokariwa Point to Hawera are required for these calculations. Table 3 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 3. ACE and Quota prices for set net species (Pariokariwa Point to Hawera).

Species	2010-11 ACE price ($/tonnes)	Average quota price since 2001 ($/tonnes)
Blue Warehou (WAR8)	$319.20	$2,591.00
School Shark (SCH8)	$1,142.20	$14,769.60
Rig (SPO8)	$488.60	$13,456.40
Trevally (TRE7)	$309.40	$5,276.26
Northern Spiny Dogfish	N/A	N/A
Snapper (SNA8)	$4,707.30	$48,790.70
Kahawai (KAH8)	$289.20	$3,010.29
Spiny Dogfish (SPD8)	$38.40	$351.42
Gurnard (GUR8)	$307.50	$2,738.25
Blue Mackerel (EMA7)	$136.00	$917.76

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

To estimate the economic impact on the commercial set net fleet, MPI first estimated the percentage of catch in this area (by QMA). These estimates used MPI data on set net activity.

MPI has calculated the percentage of each species caught in the area from Pariokariwa Point to Hawera using the 3 year average of the last three completed fishing years, the last completed fishing year (1 October 2010 to 30 September 2011) and the 12 months from 1 April 2011 to 30 March 2012. These percentages are presented in Table 4.

Table 4. Percentage of set net landings from Pariokariwa Point to Hawera displaced under each management option.

Species	Option 1 and 2			Option 3		
	3 Year Average	2010-11 Fishing Year	April 2011 to March 2012	3 Year Average	2010-11 Fishing Year	April 2011 to March 2012
Blue Warehou	15.97%	23.17%	23.27%	43.47%	47.51%	48.18%
School Shark	2.78%	2.77%	3.16%	7.37%	6.52%	7.36%
Rig	8.48%	9.25%	11.00%	15.56%	15.26%	17.25%
Trevally	0.36%	0.31%	0.63%	0.77%	0.67%	1.13%
Northern Spiny Dogfish	3.54%	4.31%	6.31%	9.71%	9.75%	13.25%
Snapper	0.30%	0.32%	0.61%	0.72%	0.65%	1.12%
Kahawai	1.09%	0.91%	0.89%	2.18%	1.33%	1.62%
Spiny Dogfish	2.00%	1.43%	1.63%	4.52%	2.95%	2.91%
Gurnard	0.60%	0.88%	1.48%	1.43%	1.74%	2.75%
Blue Mackerel	0.02%	0.10%	0.15%	0.09%	0.23%	0.32%

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 figures to show the difference these assumptions make to the economic impact numbers.

12.5.1 Option 1 and 2: Ban set nets between 0 and 2 nautical miles offshore from Pariokariwa Point to Hawera

Option 1 (ban set nets between 0 and 2 nautical miles offshore 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 behaviour to reduce the impact on their fishing activities.

Tables 5, 6 and 7 present MPI estimates of landed revenues for set netters. These tables use impacts from Table 4 and the price estimates from Table 1. Table 5 is calculated using the three year average data, Table 6 uses the 2010/11 fishing year data and Table 7 uses data from 1 April 2011 to 31 March 2012.

Table 5. 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	132.64	$266,602.77	$293,263.05	$46,821.93
School Shark	545.58	$1,254,830.47	$1,380,313.52	$38,366.61
Rig	228.62	$1,005,925.94	$1,106,518.53	$93,849.35
Trevally	1,958.55	$2,350,261.70	$2,585,287.87	$9,248.41
Northern Spiny Dogfish	35.54	$35,540.23	$39,094.25	$1,384.18
Snapper	1,308.13	$9,156,887.92	$10,072,576.71	$29,991.21
Kahawai	432.39	$345,914.60	$380,506.06	$4,147.59
Spiny Dogfish	198.90	$198,897.88	$218,787.67	$4,369.01
Gurnard	230.65	$657,350.69	$723,085.75	$4,343.89
Blue Mackerel	2,945.07	$2,945,074.10	$3,239,581.51	$762.51
TOTAL	8,016.07	$18,217,286.29	$20,039,014.92	$233,284.71

Table 6. 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	92.5	$185,865.22	$204,451.74	$47,362.20
School Shark	589.27	$1,355,319.57	$1,490,851.53	$41,229.07
Rig	216.5	$952,529.69	$1,047,782.66	$96,952.27
Trevally	1,906.29	$2,287,549.89	$2,516,304.88	$7,832.12
Northern Spiny Dogfish	39.4	$39,440.01	$43,384.01	$1,870.46
Snapper	1,298.20	$9,087,416.80	$9,996,158.48	$31,548.68
Kahawai	459.17	$367,334.38	$404,067.82	$3,664.58
Spiny Dogfish	233.38	$233,384.80	$256,723.28	$3,678.64
Gurnard	179.31	$511,047.01	$562,151.71	$4,943.91
Blue Mackerel	2,018.15	$2,018,145.74	$2,219,960.31	$2,288.04
TOTAL	7,032.17	$17,038,033.11	$18,741,836.43	$241,369.98

Table 7. Estimates of the Economic Impact (April 2011 to March 2012 data).

Species	April 2011 to March 2012 Catch (tonnes)	Total Revenue from Catch	Total Revenue + 10% (bycatch)	Loss of Revenue between 0-2nm
Blue Warehou	91.7	$184,317.30	$202,749.03	$47,171.11
School Shark	454.64	$1,045,679.38	$1,150,247.32	$36,376.60
Rig	208.9	$919,088.15	$1,010,996.96	$111,197.52
Trevally	1,810.35	$2,172,414.91	$2,389,656.40	$15,004.64
Northern Spiny Dogfish	42.2	$42,225.33	$46,447.86	$2,933.13
Snapper	1,179.27	$8,254,901.41	$9,080,391.55	$55,170.86
Kahawai	539.97	$431,975.02	$475,172.52	$4,215.13
Spiny Dogfish	244.47	$244,465.30	$268,911.83	$4,396.44
Gurnard	163.64	$466,365.36	$513,001.90	$7,607.81
Blue Mackerel	1,783.13	$1,783,126.71	$1,961,439.38	$2,950.97
TOTAL	6,518.27	$15,544,558.88	$17,099,014.77	$287,024.20

Table 5 shows the annual lost revenue between 0 to 2 nautical miles is just over $0.23 million, Table 6 shows the annual lost revenue between 0 to 2 nautical miles is just over $0.24 million and Table 7 shows the annual lost revenue between 0 to 2 nautical miles of just under $0.29 million.

Tables 8, 9 and 10 apply the ratios in Table 2 to revenue estimates in Tables 5, 6, and 7 to derive the estimated annual value added changes for set net harvesters in the area from Pariokariwa Point to Hawera.

Tables 8, 9 and 10 also present the MPI estimates of banning set netting between 0 to 2 nm from shore. Tables 8, 9 and 10 are computed by applying the factors from section 12.3.2 to the annual income data in the Table and using the ACE and quota values in Table 3.

Table 8. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$58,321.18	$207,465.94	$265,787.11
Processing income lost	$107,310.97	$198,160.79	$305,471.76
Indirect income lost	$130,639.44	$179,131.17	$309,770.60
Induced income lost	$95,646.73	$0.00	$95,646.73
Quota value	$0.00	$786,789.17	$786,789.17
TOTAL	$391,918.31	$1,371,547.06	$1,763,465.37

The estimated loss of annual value added is $0.39 million and the estimated loss of future capitalised value is $1.37 million. The total estimated economic impact is just under $1.76 million.

Table 9. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$60,342.49	$214,020.03	$274,362.52
Processing income lost	$111,030.19	$204,498.44	$315,528.63
Indirect income lost	$135,167.19	$185,212.29	$320,379.48
Induced income lost	$98,961.69	$0.00	$98,961.69
Quota value	$0.00	$816,891.33	$816,891.33
TOTAL	$405,501.56	$1,420,622.08	$1,826,123.64

The estimated loss of annual value added is $0.41 million and the estimated loss of future capitalised value is $1.42 million. The total estimated economic impact is just under $1.83 million.

Table 10. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$71,756.05	$247,250.81	$319,006.86
Processing income lost	$132,031.13	$237,136.63	$369,167.76
Indirect income lost	$160,733.55	$218,794.44	$379,527.99
Induced income lost	$117,679.92	$0.00	$117,679.92
Quota value	$0.00	$1,011,288.18	$1,011,288.18
TOTAL	$482,200.65	$1,714,470.05	$2,196,670.71

The estimated loss of annual value added is $0.48 million and the estimated loss of future capitalised value is $1.71 million. The total estimated economic impact is just under $2.20 million.

Tables 11, 12, and 13 show the estimates of the present value of banning set netting between 0 to 2 nautical miles from shore using Treasury's Present Value methodology.

Table 11. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$58,321.18	$554,842.23	$613,163.41
Processing income lost	$107,310.97	$1,020,909.71	$1,128,220.67
Indirect income lost	$130,639.44	$1,242,846.60	$1,373,486.04
Induced income lost	$95,646.73	$0.00	$95,646.73
Quota value	$0.00	$786,789.17	$786,789.17
TOTAL	$391,918.31	$3,605,387.71	$3,997,306.02

The estimated loss of annual value added is $0.39 million and the estimated loss of future capitalised value is $3.61 million. The total estimated economic impact is just over $4.00 million.

Table 12. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$60,342.49	$574,072.16	$634,414.66
Processing income lost	$111,030.19	$1,056,292.78	$1,167,322.97
Indirect income lost	$135,167.19	$1,285,921.64	$1,421,088.83
Induced income lost	$98,961.69	$0.00	$98,961.69
Quota value	$0.00	$816,891.33	$816,891.33
TOTAL	$405,501.56	$3,733,177.91	$4,138,679.47

The estimated loss of annual value added is $0.41 million and the estimated loss of future capitalised value is $3.73 million. The total estimated economic impact is just under $4.14 million.

Table 13. Estimated annual income effects and Present Value of banning set netting between 0 and 2 nautical miles 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	$71,756.05	$682,655.75	$754,411.80
Processing income lost	$132,031.13	$1,256,086.58	$1,388,117.72
Indirect income lost	$160,733.55	$1,529,148.88	$1,689,882.44
Induced income lost	$117,679.92	$0.00	$117,679.92
Quota value	$0.00	$1,011,288.18	$1,011,288.18
TOTAL	$482,200.65	$4,479,179.40	$4,961,380.06

The estimated loss of annual value added is $0.48 million and the estimated loss of future capitalised value is $4.48 million. The total estimated economic impact is just over $4.96 million.

Banning set nets from 0-2 nm from shore in the area from Pariokariwa Point to Hawera would have an estimated impact of between $1.83 million to $4.96 million on the wider New Zealand economy.

12.5.2 Option 3 - Ban set nets between 0 and 4 nautical miles offshore from Pariokariwa Point to Hawera

Option 3 (ban set nets between 0 and 4 nautical miles offshore in the area from Pariokariwa Point to Hawera) will have an increased impact on more species and fishers will have fewer options to adjust their behaviour to reduce the impact on their fishing activities.

MPI has calculated the percentage of each species caught between 0 and 4 nautical miles from Pariokariwa Point to Hawera for the last 12 months (1 April 2011 to 30 March 2012) and the 3 year average. These percentages are presented above in Table 4.

Tables 14, 15, and 16 present MPI estimates of landed revenues for set netters. These tables use impacts from Table 4 and the price estimates from Table 1. Table 14 is calculated using the three year average data, Table 15 uses the 2010/11 fishing year data and Table 16 uses data from 1 April 2011 to 31 March 2012.

Table 14. 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	132.64	$266,602.77	$293,263.05	$127,487.33
School Shark	545.58	$1,254,830.47	$1,380,313.52	$101,748.70
Rig	228.62	$1,005,925.94	$1,106,518.53	$172,169.42
Trevally	1,958.55	$2,350,261.70	$2,585,287.87	$20,011.57
Northern Spiny Dogfish	35.54	$35,540.23	$39,094.25	$3,796.91
Snapper	1,308.13	$9,156,887.92	$10,072,576.71	$72,205.76
Kahawai	432.39	$345,914.60	$380,506.06	$8,285.50
Spiny Dogfish	198.90	$198,897.88	$218,787.67	$9,899.99
Gurnard	230.65	$657,350.69	$723,085.75	$10,318.94
Blue Mackerel	2,945.07	$2,945,074.10	$3,239,581.51	$2,856.84
TOTAL	8,016.07	$18,217,286.29	$20,039,014.92	$528,780.96

Table 15. 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	92.5	$185,865.22	$204,451.74	$97,140.90
School Shark	589.27	$1,355,319.57	$1,490,851.53	$97,173.15
Rig	216.5	$952,529.69	$1,047,782.66	$159,844.33
Trevally	1,906.29	$2,287,549.89	$2,516,304.88	$16,958.32
Northern Spiny Dogfish	39.4	$39,440.01	$43,384.01	$4,228.57
Snapper	1,298.20	$9,087,416.80	$9,996,158.48	$64,649.86
Kahawai	459.17	$367,334.38	$404,067.82	$5,367.61
Spiny Dogfish	233.38	$233,384.80	$256,723.28	$7,573.63
Gurnard	179.31	$511,047.01	$562,151.71	$9,779.39
Blue Mackerel	2,018.15	$2,018,145.74	$2,219,960.31	$5,050.56
TOTAL	7,032.17	$17,038,033.11	$18,741,836.43	$467,766.32

Table 16. 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	91.7	$184,317.30	$202,749.03	$97,694.52
School Shark	454.64	$1,045,679.38	$1,150,247.32	$84,643.63
Rig	208.9	$919,088.15	$1,010,996.96	$174,432.62
Trevally	1,810.35	$2,172,414.91	$2,389,656.40	$26,976.73
Northern Spiny Dogfish	42.2	$42,225.33	$46,447.86	$6,154.93
Snapper	1,179.27	$8,254,901.41	$9,080,391.55	$101,485.26
Kahawai	539.97	$431,975.02	$475,172.52	$7,719.41
Spiny Dogfish	244.47	$244,465.30	$268,911.83	$7,819.74
Gurnard	163.64	$466,365.36	$513,001.90	$14,091.39
Blue Mackerel	1,783.13	$1,783,126.71	$1,961,439.38	$6,322.13
TOTAL	6,518.27	$15,544,558.88	$17,099,014.77	$527,340.35

Table 14 shows the annual lost revenue between 0 and 4 nautical miles is just under $0.53 million, Table 15 shows the annual lost revenue between 0 and 4 nautical miles of just under $0.47 million and Table 16 6hows the annual lost revenue between 0 and 4 nautical miles of just under $0.53 million.

Tables 17, 18, and 19 applies the ratios in Table 2 to revenue estimates in Tables 15, 16 and 17 to derive the estimated annual value added changes for set net harvesters in the area from Pariokariwa Point to Hawera.

Tables 17, 18, and 19 present the MPI estimates of banning set netting between 0 and 4 nm from shore. Tables 17, 18, and 19 are computed by applying the factors from section 12.3.2 to the annual income data in the Table and using the ACE and quota values in Table 3.

Table 17. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$132,195.24	$458,494.08	$590,689.32
Processing income lost	$243,239.24	$439,363.00	$682,602.25
Indirect income lost	$296,117.34	$403,679.58	$699,796.92
Induced income lost	$216,800.19	$0.00	$216,800.19
Quota value	$0.00	$1,802,479.55	$1,802,479.55
TOTAL	$888,352.02	$3,104,016.22	$3,992,368.23

The estimated loss of annual value added is $0.89 million and the estimated loss of future capitalised value is $3.10 million. The total estimated economic impact is just over $3.99 million.

Table 18. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$116,941.58	$402,997.34	$519,938.92
Processing income lost	$215,172.51	$386,505.80	$601,678.31
Indirect income lost	$261,949.14	$356,581.60	$618,530.74
Induced income lost	$191,784.19	$0.00	$191,784.19
Quota value	$0.00	$1,636,492.00	$1,636,492.00
TOTAL	$785,847.42	$2,782,576.73	$3,568,424.15

The estimated loss of annual value added is $0.79 million and the estimated loss of future capitalised value is $2.78 million. The total estimated economic impact is just over $3.57 million.

Table 19. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$131,835.09	$444,277.72	$576,112.81
Processing income lost	$242,576.56	$427,359.97	$669,936.53
Indirect income lost	$295,310.60	$399,986.35	$695,296.95
Induced income lost	$216,209.54	$0.00	$216,209.54
Quota value	$0.00	$1,890,957.08	$1,890,957.08
TOTAL	$885,931.79	$3,162,581.12	$4,048,512.91

The estimated loss of annual value added is $0.89 million and the estimated loss of future capitalised value is $3.16 million. The total estimated economic impact is just under $4.05 million.

Tables 20, 21, and 22 show the estimates of the present value of banning set netting between 0 to 4 nautical miles from shore using Treasury's Present Value methodology.

Table 20. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$132,195.24	$1,257,647.84	$1,389,843.09
Processing income lost	$243,239.24	$2,314,072.03	$2,557,311.28
Indirect income lost	$296,117.34	$2,817,131.17	$3,113,248.51
Induced income lost	$216,800.19	$0.00	$216,800.19
Quota value	$0.00	$1,802,479.55	$1,802,479.55
TOTAL	$888,352.02	$8,191,330.60	$9,079,682.62

The estimated loss of annual value added is $0.89 million and the estimated loss of future capitalised value is $8.19 million. The total estimated economic impact is just over $9.08 million.

Table 21. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$116,941.58	$1,112,531.18	$1,229,472.76
Processing income lost	$215,172.51	$2,047,057.37	$2,262,229.88
Indirect income lost	$261,949.14	$2,492,069.84	$2,754,018.98
Induced income lost	$191,784.19	$0.00	$191,784.19
Quota value	$0.00	$1,636,492.00	$1,636,492.00
TOTAL	$785,847.42	$7,288,150.39	$8,073,997.81

The estimated loss of annual value added is $0.79 million and the estimated loss of future capitalised value is $7.29 million. The total estimated economic impact is just under $8.08 million.

Table 22. Estimated annual income effects and Present Value of banning set netting between 0 and 4 nautical miles 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	$131,835.09	$1,254,221.51	$1,386,056.60
Processing income lost	$242,576.56	$2,307,767.59	$2,550,344.15
Indirect income lost	$295,310.60	$2,809,456.19	$3,104,766.79
Induced income lost	$216,209.54	$0.00	$216,209.54
Quota value	$0.00	$1,890,957.08	$1,890,957.08
TOTAL	$885,931.79	$8,262,402.37	$9,148,334.16

The estimated loss of annual value added is $0.89 million and the estimated loss of future capitalised value is $8.26 million. The total estimated economic impact is just under $9.15 million.

Banning set nets between 0 and 4 nautical miles from shore in the area from Pariokariwa Point to Hawera would have an estimated impact of between $3.57 million to $9.15 million on the wider New Zealand economy.

12.5.3 Summary of economic impacts

Table 23 summarises the economic impacts of the proposed options for the set net activity from Pariokariwa Point to Hawera calculated in the sections above. MPI believes that the impacts are likely to be between the MPI methodology estimate and Treasury methodology estimate depending on the option selected.

Table 23. Total Estimated Economic Impacts for each Option.

	MPI Methodology			Treasury Methodology		
Set Net Ban	3 Year Average	2010/11 Fishing Year	April 2011 to March 2012 Year	3 Year Average	2010/11 Fishing Year	April 2011 to March 2012 Year
Option 1 and 2 (0 - 2 nautical miles)	$1.97 million	$1.83 million	$2.20 million	$4.47 million	$4.14 million	$4.96 million
Option 3 (0 - 4 nautical miles)	$3.98 million	$3.57 million	$4.05 million	$9.06 million	$8.08 million	$9.15 million

12.6 ESTIMATED IMPACTS ON EXTENDING THE SET NET BAN IN THE MANUKAU HARBOUR

This section reports the estimated economic impacts on commercial set net fishers in the Manukau Harbour.

Option 1 (*Status quo*) for these harbours will not be analysed as it does not have a negative economic impact on commercial set net fishers.

Option 2 for the harbours will not be analysed as it does not involve the loss or displacement of catch, and any negative economic impact on commercial set net fishers would depending on the design of any monitoring programme.

To estimate the potential impact of Option 3 (extend the set net ban in the entrance of the Manukau Harbour) on commercial set net fishers; ACE and quota prices for the set net species targeted in the Manukau Harbours are required for these calculations.

Table 24 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 24. ACE and Quota prices for set net species (Manukau Harbour).

Species	2010/11 ACE price ($/tonnes)	Average quota price since Oct 01 ($/tonnes)
Grey Mullet (GMU1)	$523.40	$4,136.82
Yellow-eyed Mullet (YEM9)	$176.40	$2,626.32
School Shark (SCH1)	$1,399.00	$16,934.20
Trevally (TRE7)	$309.40	$5,276.26
Flatfish (FLA1)	$361.20	$2,765.88
Rig (SPO1)	$554.40	$5,370.87
Kahawai (KAH8)	$289.20	$3,010.29
Parore (PAR9)	$296.90	$2,448.98

To estimate the economic impact on the commercial set net fleet, MPI first estimated the percentage of catch in this area (by QMA). These estimates used MPI data on set net activity in the Manukau Harbour statistical reporting area (43).

MPI has calculated the percentage of each species landed in the Manukau Harbour for the last completed fishing year (1 October 2010 to 30 September 2011) and the last 3 completed fishing year's average. These percentages are presented in Table 25.

Table 25. Percentage of set net landings from the Manukau Harbour.

	Manukau Harbour	
Species	3 Year Average	2010-11 Fishing Year
Grey Mullet	10.02%	6.12%
Yellow-eyed Mullet	56.45%	65.14%
School Shark	0.06%	0.08%
Trevally	1.01%	1.56%
Flatfish	9.30%	15.01%
Rig	17.70%	22.72%
Kahawai	2.91%	3.43%
Parore	10.67%	21.15%

MPI has analysed the economic impact by assuming the rig fishery is most impacted and other species may still be caught in areas outside the set net ban area or by other methods. MPI will provide economic impact estimates below using the last completed fishing year (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

12.6.1 Option 3 – Extending the set net ban in the Manukau Harbour

MPI estimates Option 3 (ban set netting in the harbour) will most impact on the rig fishery and those fishers who rely target the species. These fishers will have limited options to adjust their behaviour to reduce the impact on their fishing activities.

Tables 26 and 27 present MPI estimates of landed revenues for set netters assuming the rig fishery is most affected by the extended set net ban. These tables use impacts from Table 25 and the price estimates from Table 1. Table 26 is calculated using the three year average data. Table 27 uses the 2010/11 fishing year data.

Table 26. 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 extending set net ban
Rig	306.31	$1,347,752.27	$1,482,527.49	$263 690
TOTAL	306.31	$1,347,752.27	$1,482,527.49	$263 690

Table 27. 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 extending set net ban
Rig	315.72	$1,389,180.28	$1,528,098.31	$347,246.71
TOTAL	315.72	$1,389,180.28	$1,528,098.31	**$347,246.71**

Table 26 shows the annual lost revenue is just under $0.26 million. Table 27 shows the annual lost revenue is just under $0.35 million.

Tables 28 and 29 applies the ratios in Table 2 to revenue estimates in Tables 26 and 27 to derive the estimated annual value added changes for set net harvesters.

Tables 28 and 29 present the MPI estimates of extending the set net ban in the Manukau Harbour. Table 28 and 29 are computed by applying the factors from section 12.3.2 to the annual income data in the table and using the ACE and quota values in Table 24.

Table 28. Estimated annual income effects and Present Value of extending the set net ban in the Manukau harbour (3 year average data) – MPI Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$65,922.42	$284,305.43	$350,227.85
Processing income lost	$121,297.26	$265,487.57	$386,784.83
Indirect income lost	$147,666.23	$212,438.00	$360,104.23
Induced income lost	$108,112.77	$0.00	$108,112.77
Quota value	$0.00	$292,612.20	$292,612.20
TOTAL	$442,998.68	$1,054,843.20	$1,497,841.87

The estimated loss of annual value added is $0.44 million and the estimated loss of future capitalised value is $1.05 million. The total estimated economic impact is just over $1.50 million.

Table 29. Estimated annual income effects and Present Value of extending the set net ban in the Manukau harbour (2010/11 Fishing Year data) – MPI Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$86,811.68	$374,395.09	$461,206.77
Processing income lost	$159,733.49	$349,614.31	$509,347.79
Indirect income lost	$194,458.16	$279,754.58	$474,212.74
Induced income lost	$142,371.15	$0.00	$142,371.15
Quota value	$0.00	$385,334.08	$385,334.08
TOTAL	$583,374.48	$1,389,098.06	$1,972,472.54

The estimated loss of annual value added is $0.58 million and the estimated loss of future capitalised value is $1.39 million. The total estimated economic impact is just over $1.97 million.

Tables 30 and 31 show the estimates of the present value of extending the set net ban in the Manukau harbour using Treasury's Present Value methodology.

Table 30. Estimated annual income effects and Present Value of banning set netting in the Manukau harbour (3 year average data) – Treasury's Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$65,922.42	$627,157.16	$693,079.58
Processing income lost	$121,297.26	$1,153,969.18	$1,275,266.43
Indirect income lost	$147,666.23	$1,404,832.04	$1,552,498.27
Induced income lost	$108,112.77	$0.00	$108,112.77
Quota value	$0.00	$292,612.20	$292,612.20
TOTAL	$442,998.68	$3,478,570.58	$3,921,569.25

The estimated loss of annual value added is $0.44 million and the estimated loss of future capitalised value is $3.48 million. The total estimated economic impact is just over $3.92 million.

Table 31. Estimated annual income effects and Present Value of extending the set net ban in the Manukau harbour (2010/11 Fishing Year data) – Treasury's Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$86,811.68	$825,888.44	$912,700.11
Processing income lost	$159,733.49	$1,519,634.72	$1,679,368.21
Indirect income lost	$194,458.16	$1,849,990.10	$2,044,448.25
Induced income lost	$142,371.15	$0.00	$142,371.15
Quota value	$0.00	$385,334.08	$385,334.08
TOTAL	$583,374.48	$4,580,847.33	$5,164,221.81

The estimated loss of annual value added is $0.58 million and the estimated loss of future capitalised value is $4.58 million. The total estimated economic impact is just over $5.16 million.

Extending the set net ban further into the Manukau Harbour would have an estimated impact of between $1.5 million to $5.16 million on the wider New Zealand economy.

12.6.2 Summary of economic impacts

Table 32 summarises the economic impacts calculated in the sections above. MPI believes that the impacts are likely to be between the MPI methodology estimate and Treasury methodology estimate depending on the option selected.

Table 32. Total Estimated Economic Impacts of Option 3.

	MPI Methodology		Treasury Methodology	
Set Net Ban	3 Year Average	2010/11 Fishing Year	3 Year Average	2010/11 Fishing Year
Manukau Harbour	$1.50 million	$1.97 million	$3.92 million	$5.16 million

12.7 ESTIMATED IMPACTS ON TRAWLING

This section reports the estimated economic impacts on commercial trawl fishers under the proposed management options.

Option 1 (Status quo) for these ranges will not be analysed as it does not have a negative economic impact on trawl fishers.

Option 2 involves extensive monitoring coverage, so an analysis of the economic impact is not undertaken using the above methodologies.[170] Estimates of the cost of monitoring coverage can be found in section 6.0.

To estimate the impacts of Option 3 (ban trawling out to 4 nm from shore between Kaipara Harbour and Kawhia) on commercial trawl fishers; ACE and quota prices for the trawl species targeted in the three ranges are required for these calculations. Table 33 presents the

[170] The extensive monitoring coverage proposed in Options 2 and 3 are not analysed in this section; the estimates for monitoring are found in the MPI chapter (Section 6 of this paper).

average ACE transfer price (2010/11 fishing year) and the average quota price (since 2001) for the species most affected in this area. 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 33. ACE and Quota prices for trawl species (Kaipara Harbour to Kawhia).

Species	2010/11 ACE price ($/tonnes)	Average quota price since Oct 01 ($/tonnes)
John Dory (JDO1)	$901.40	$10,929.30
School Shark (SCH1)	$1,399.00	$16,934.20
Rig (SPO1)	$554.40	$5,370.87
Trevally (TRE7)	$309.40	$5,276.26
Snapper (SNA8)	$4,707.30	$48,790.70
Kahawai (KAH8)	$289.20	$3,010.29
Tarakihi (TAR1)	$1,486.50	$17,711.70
Gurnard (GUR1)	$266.60	$1,560.26
Flatfish (FLA1)	$361.20	$2,765.88

To estimate the economic impact on the commercial trawl fleet, MPI first estimated the percentage of catch in this area (by QMA). These estimates used MPI data on trawl activity.

MPI has calculated the percentage of each species landed from the Kaipara Harbour to Kawhia area between 2 and 4 nautical miles offshore for the last completed fishing year (1 October 2010 and 30 September 2011) and the last 3 completed fishing year's average. These percentages are presented in Tables 34.

Table 34. Percentage of trawl landings between 2 to 4 nautical miles offshore from Kaipara Harbour to Kawhia.

	Kaipara Harbour to Kawhia (Option 3)	
Species	3 Year Average	2010-11 Fishing Year
John Dory	0.78%	0.93%
School Shark	0.73%	0.59%
Rig	0.24%	0.26%
Trevally	1.36%	1.46%
Snapper	1.69%	1.75%
Kahawai	1.11%	1.17%
Tarakihi	0.20%	0.20%
Gurnard	1.06%	0.93%
Flatfish	0.16%	0.19%

MPI will provide economic impact estimates below using the last completed fishing year (2010/11 fishing year) percentage figures and the three year average percentage figures to show the difference these assumptions make to the economic impact numbers.

12.7.1 Option 3 - Ban trawling out to 4 nautical miles from Kaipara Harbour to Albatross Point (Kawhia)

Option 3 (ban trawling out to 4 nm from Kaipara Harbour to Kawhia) will have the biggest impact on the number of species and fishers affected and fishers will have no real options to adjust their behaviour to reduce the impact on their fishing activities.

Tables 35 and 36 present MPI estimates of landed revenues for trawl fishers. These tables use impacts from Table 34 and the price estimates from Table 1. Table 35 is calculated using the three year average data. Table 36 uses the 2010/11 fishing year data.

Table 35. 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 2–4 nm
John Dory	385.31	$2,889,834.05	$3,178,817.46	$24, 804.32
School Shark	697.9	$1,605,131.92	$1,765,645.12	$12, 820.81
Rig	306.31	$1,347,752.27	$1,482,527.49	$3,600.90
Trevally	1,958.55	$2,350,261.70	$2,585,287.87	$35, 145.34
Snapper	1,308.13	$9,156,887.92	$10,072,576.71	$169, 974.31
Kahawai	432.39	$345,914.60	$380,506.06	$4, 214.97
Tarakihi	1,362.00	$5,448,005.39	$5,992,805.93	$12, 082.57
Gurnard	1,063.61	$3,031,282.51	$3,334,410.76	$35, 414.18
Flatfish	589.6	$1,768,761.50	$1,945,637.65	$3, 067.13
TOTAL	8,103.77	$27,943,831.85	$30,738,215.04	$301, 124.54

Table 36. 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 2–4 nm
John Dory	381.24	$2,859,303.98	$3,145,234.37	$29, 128.27
School Shark	793.68	$1,825,470.52	$2,008,017.57	$11, 814.44
Rig	315.7	$1,389,180.28	$1,528,098.31	$3, 910.14
Trevally	1,906.29	$2,287,549.89	$2,516,304.88	$36, 622.81
Snapper	1,298.20	$9,087,416.80	$9,996,158.48	$174, 748.34
Kahawai	459.17	$367,334.38	$404,067.82	$4, 717.37
Tarakihi	1,357.7	$5,430,957.88	$5,974,053.67	$11, 977.45
Gurnard	1,047.40	$2,985,090.40	$3,283,599.44	$30, 521.47
Flatfish	497.7	$1,493,016.38	$1,642,318.02	$3, 171.36
TOTAL	8,057.12	$27,725,320.50	$30,497,852.55	$306, 611.66

Table 35 shows the annual lost revenue is just over $0.30 million. Table 36 shows the annual lost revenue is just under $0.31 million.

Tables 37 and 38 applies the ratios in Table 5 to revenue estimates in Tables 35 and 36 to derive the estimated annual value added changes for trawl fishers.

Tables 37 and 38 present the MPI estimates of banning trawling between 2 and 4 nm from Kaipara Harbour to Kawhia. Tables 37 and 38 are computed by applying the factors from section 12.3.2 to the annual income data in the table and using the ACE and quota values in Table 33.

Table 37. Estimated annual income effects and Present Value of banning trawling between 2 and 4 nautical miles from Kaipara Harbour to Kawhia (3 year average data) – MPI Methodology

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$75,281.14	$179,641.50	$254,922.64
Processing income lost	$138,517.29	$182,323.08	$320,840.37
Indirect income lost	$168,629.74	$213,591.78	$382,221.52
Induced income lost	$123,461.06	$0.00	$123,461.06
Quota value	$0.00	$1,423,437.83	$1,423,437.83
TOTAL	$505,889.23	$1,998,994.19	$2,504,883.42

The estimated loss of annual value added is $0.51 million and the estimated loss of future capitalised value is $2.00 million. The total estimated economic impact is just under $2.50 million.

Table 38. Estimated annual income effects and Present Value of banning trawling between 2 and 4 nautical miles from Kaipara Harbour to Kawhia (2010/11 Fishing Year data) – MPI Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$76,652.91	$182,088.67	$258,741.58
Processing income lost	$141,041.36	$184,956.82	$325,998.18
Indirect income lost	$171,702.53	$217,318.61	$389,021.14
Induced income lost	$125,710.78	$0.00	$125,710.78
Quota value	$0.00	$1,457,877.06	$1,457,877.06
TOTAL	$515,107.58	$2,042,241.16	$2,557,348.75

The estimated loss of annual value added is $0.52 million and the estimated loss of future capitalised value is $2.04 million. The total estimated economic impact is just under $2.56 million.

Tables 39 and 40 show the estimates of the present value of extending the trawl ban from 2 to 4 nautical miles between Kaipara Harbour and Kawhia using Treasury's Present Value methodology.

Table 39. Estimated annual income effects and Present Value of banning trawling between 2 and 4 nautical miles from Kaipara Harbour to Kawhia (3 year average data) – Treasury's Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$75,281.14	$716,191.88	$791,473.01
Processing income lost	$138,517.29	$1,317,793.05	$1,456,310.34
Indirect income lost	$168,629.74	$1,604,269.80	$1,772,899.54
Induced income lost	$123,461.06	$0.00	$123,461.06
Quota value	$0.00	$1,423,437.83	$1,423,437.83
TOTAL	$505,889.23	$5,061,692.56	$5,567,581.79

The estimated loss of annual value added is $0.51 million and the estimated loss of future capitalised value is $5.06 million. The total estimated economic impact is just over $5.57 million.

Table 40. Estimated annual income effects and Present Value of banning trawling between 2 and 4 nautical miles from Kaipara Harbour to Kawhia (2010/11 Fishing Year data) – Treasury's Methodology.

	Annual Value	Capitalised Future Value	Total
Direct harvesting income lost	$76,652.91	$729,242.38	$805,895.30
Processing income lost	$141,041.36	$1,341,805.98	$1,482,847.34
Indirect income lost	$171,702.53	$1,633,502.93	$1,805,205.46
Induced income lost	$125,710.78	$0.00	$125,710.78
Quota value	$0.00	$1,457,877.06	$1,457,877.06
TOTAL	$515,107.58	$5,162,428.36	$5,677,535.94

The estimated loss of annual value added is $0.52 million and the estimated loss of future capitalised value is $5.16 million. The total estimated economic impact is just under $5.68 million.

12.7.2 Summary of economic impacts

Table 41 summarises the economic impacts calculated in the sections above. MPI believes that the impacts are likely to be between the MPI methodology estimate and Treasury methodology estimate depending on the option selected.

Table 41. Total Estimated Economic Impacts of Option 3.

	MPI Methodology		Treasury Methodology	
Trawling Ban	3 Year Average	2010/11 Fishing Year	3 Year Average	2010/11 Fishing Year
Kaipara Harbour to Kawhia from 2 to 4 nautical miles	$2.50 million	$2.56 million	$5.57 million	$5.68 million

13.0 Appendix 5: References

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