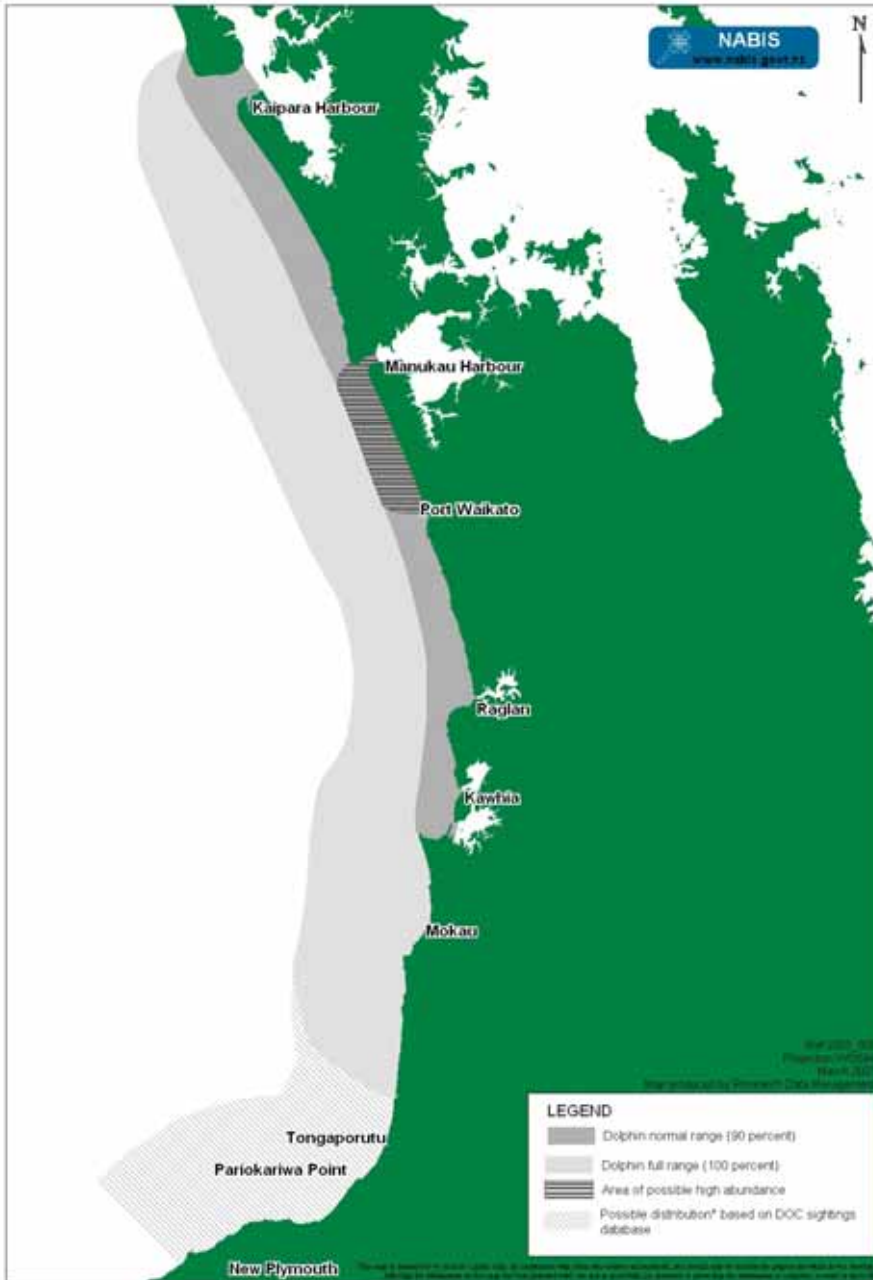


7.3. West Coast North Island (Maui's Dolphin)

7.3.1. *Population characteristics*

Distribution

Most recent sightings of Maui's dolphins have occurred between Maunganui Bluff on the North Island's west coast (WCNI), south to Tongaporutu, 40 km north-east of New Plymouth (Map 5). Confirmed sightings outside this range are rare, although Maui's dolphins were once found along most of the WCNI and up the east coast as far as Bay of Plenty. The lack of Maui's dolphin sightings in the south Taranaki-Wanganui region since the 1970s indicates a reduction in range from what was once a centre of the dolphin population.



Map 5: Maui's dolphin distribution⁵²

Aerial (e.g. 2004⁵³) and boat (Russell 2002; see Slooten, *et al* 2005) surveys suggest Maui's dolphins are now most common between the Manukau Harbour and Port Waikato within 4nm of the coast – 75% of summer survey sightings place Maui's dolphins within 1nm of coast compared to 33% in winter; maximum distances of offshore survey sightings were 3.1nm in summer and 3.3nm in winter.

⁵² Indicative only

⁵³ Slooten, E, *et.al.* Distribution of Maui's dolphin *Cephalorhynchus hectori maui*, New Zealand Fisheries Assessment Report, 2005/28.21 p.

New distribution information

Since 2003, an area on the WCNI has been closed to amateur and commercial set netting (further detail is provided in the Existing Threat Management section below). The extent of the closed area corresponds to the then known range of the Maui's population – from Pariokariwa Point (north of New Plymouth) to Maunganui Bluff (north of Dargaville) out to 4nm, as well as the mouth of the Manukau Harbour.

Maui's dolphins are not typically encountered in harbours (unlike Hector's dolphins). However, there have been recent verified sightings (since 2003) of Maui's dolphins inside the entrances to the Kaipara and Manukau Harbours and outside the entrance to the Raglan Harbour (Table 2). In addition, researchers using acoustic data loggers (PODs) recently recorded what they believe to be Maui's dolphin acoustics in the Manukau Harbour⁵⁴.

Table 2 Summary of West Coast Harbour and Taranaki Bight Distribution Research

	Maunganui - Pariokariwa	Kaipara	Manukau	Raglan	Aotea/Kawhia	Taranaki Bight
Verified sightings	173	4 (3 in entrance and 1 beyond)	2 (beyond entrance area)	1 (just outside)	0	0
Aerial surveys (Slooten <i>et al</i> 2005)	59	0	0	Not Surveyed	Not Surveyed	0
Strandings (since 1921)	40	0	0	0	0	0
POD detections	N/A	0	21	0	Not Surveyed	N/A

Recent verified sightings are limited to two Manukau Harbour sightings (further inside the harbour than the existing set net prohibition extends), four Kaipara Harbour sightings (three at the harbour entrance and one further inside the entrance), and one sighting outside the Raglan Harbour entrance.

PODs have detected sounds in the frequency range produced by Maui's dolphins in the Manukau Harbour past the current set net prohibition. Twenty one acoustic events have been logged in the Manukau Harbour (18 at Cornwallis on the northern side of the harbour and three at Kauri Point on the southern side). The researchers cannot determine whether these events relate to one or more sound sources. The POD research that detected the acoustics in Manukau Harbour is not complete, and results are preliminary. MFish notes that while Maui's dolphin acoustics recorded by PODs placed outside the Manukau Harbour have been verified by the simultaneous sighting of a Maui's dolphin in the vicinity of the POD, none of the acoustic events inside the Manukau Harbour are corroborated by sightings (ie, sightings have not been made at the same time as the acoustic events were recorded). PODs in the Kaipara and Raglan harbours have not detected sounds within the frequency range produced by Maui's dolphins.

Preliminary results from recent DOC aerial surveys in 2006 indicate that Maui's dolphins may move

⁵⁴ PODs detect sounds that can be attributed to Maui's dolphins. No Maui's dolphin acoustics have been detected in the Kaipara and Raglan Harbours. However, the Kaipara has a wide expanse of water so if dolphins do enter the harbour the chances of detection are probably low. The Raglan POD has only been in place a short time. Researchers will place PODs in the Kawhia Harbour in the future.

further offshore than the existing 4nm set net prohibition. However, the findings of this work are not yet verified, and MFish is therefore uncertain of the validity of the sightings.

There have been recent public sightings of dolphins reported in the Taranaki Bight, but investigations indicated all but one was unlikely to be a Maui's dolphin. This single possible Maui's dolphin sighting is unable to be confirmed because the information provided about the sighting was inconclusive. DOC has included this region in its aerial surveys but has made no sightings of Maui's dolphins.

Biology

Maui's dolphins mature late (7-9 years), have a slow reproductive rate (one calf every 2-3 years) and live to around 20 years old. The Maui's dolphin population is critically small (111 individuals, 95% confidence interval = 48-252) and genetic evidence suggests there may have been a recent decline in abundance (within the last few generations)⁵⁵. Researchers have indicated there may be fewer than 30 breeding females in the population meaning productivity of the population as a whole is extremely low.

7.3.2. Fishing threats to Maui's dolphins

Life history (maturity, fecundity, and longevity) and population size mean Maui's dolphins are threatened by any human-induced mortality. Potential Biological Removal (PBR) analysis estimates that human-induced mortalities need to be zero to reduce extinction risk for this population⁵⁶.

Potential fishing threats to the Maui's dolphin population are set netting, trawling, and drift netting.

DOC incident database lists 17 reported Maui's dolphin mortalities since 1988. Of these mortalities, the cause of death was able to be assessed in 9 cases. The remaining mortalities were either not assessed for cause of death (3) or the cause of death was not determinable due to the condition of the carcass (5 individuals). Fishing activity is the identified cause of death in two cases, natural mortality in a further two cases, and cause of death deemed to be unknown in one case (Table 3). The cause of death cannot be determined in the remaining mortalities although four have been identified as "possible net entanglements", "probable net entanglements", or "possible human interaction"⁵⁷.

Table 3 Total number of reported Maui's dolphin mortalities on the west coast North Island (including cause of death) since 1988 where the cause of death was confirmed.

Cause of death	Number
Net entanglement	2
Natural	2

Fishers are required by law to report any dolphin entanglement. However, MFish cannot be certain that fishers always see and report all fishing-related mortalities. Consequently, the fishing-related mortalities in Table 3 may be underestimates and, as such, MFish cannot determine with certainty the extent of actual Maui's dolphin mortalities caused by fishing.

⁵⁵ Pichler, F. B. 2002. Genetic assessment of population boundaries and gene exchange in Hector's dolphin. Department of Conservation Science Internal Series 44. 37 p

⁵⁶ See Appendix 3 for a description of the PBR analysis for Hector's (including Maui's) dolphins. PBR is only one of a number of factors in determining appropriate management action. There is currently debate around the inputs to the PBR analysis. MFish and DOC intend to have the Hector's dolphin PBR analysis independently reviewed to resolve this issue.

⁵⁷ The "possible" and "probable" net entanglements relate to carcasses that show evidence of entanglement (for example, some sign of net marks) but the cause of death cannot be determined with certainty.

7.3.2.1. *Set nets*

Vulnerability of dolphins (Maui's and other dolphins) to entanglement in fishing gear, particularly in inshore set nets, has been established through a combination of interviews and autopsies of set net caught and beach-cast animals. Maui's dolphin has a close inshore distribution that until recently overlapped with commercial and amateur set net fisheries – in 2003 MFish created set net exclusion zones across the confirmed Maui's dolphins range (further detail is provided in the Existing Threat Management section below).

Maui's dolphins are known to have been entangled in set nets historically. MFish cannot determine the extent of set net related mortalities but evidence (as noted above) suggests that at least two Maui's dolphins have died since 1988 as a result of net entanglements. There have been four reported mortalities since the 2003 set net prohibition was implemented and none have been attributed to fishing.

Commercial and amateur set netting is common in areas immediately outside the set net closed area, including in areas where new information suggests that Maui's dolphins may occasionally be present (ie, harbours and south of the closed area – see above section on new distribution information). Commercial and non-commercial set netting occurs in all west coast harbours. As such, any Maui's dolphin coming into these waters may be at risk of entanglement. The main set net target species are flounder, mullet, and rig. Set netting is the most effective way to catch these species. Virtually all parts of all the harbours are fished, from intertidal upper reaches to the deeper channels towards the entrances.

Set net practices at Port Waikato also represent a potential risk to Maui's dolphins because there is a possibility that nets get lost and washed out into areas where dolphins occur. MFish Compliance has ongoing problems with amateur net fishers who do not use correct netting practices and this increases chances that set nets become lost and float out to sea.

The Taranaki Bight is also fished by amateur (inshore) and commercial (further offshore) set netters. The Taranaki Bight was once a core area of distribution with comparatively large numbers of Maui's dolphins thought to have been in the region. However, this is no longer the case and the southernmost verified sighting in recent times was in the region of Mokau in northern Taranaki. Set netting in the Taranaki Bight southward of the closed area would represent a threat if Maui's dolphins are in this region.

Approximately 119 commercial set netters (operating about 136 vessels) fish on the WCNI. Most set netters fish in WCNI harbours, especially the Kaipara Harbour and the Manukau Harbour. Table 4 below characterizes the main commercial set net fisheries on the WCNI using estimated catch and effort data reported from statistical reporting areas 40 to 46. Not all the catch and effort (and value) listed in Table 4 can be attributed to the WCNI area that overlaps with Maui's dolphins because the statistical reporting areas cover a much wider area. However, the characterization illustrates the nature and extent of set netting on the WCNI and helps to assess potential costs to fishers of measures to avoid, remedy, and mitigate the adverse effects of fishing on Maui's dolphins (see later in this section). Selected WCNI fishery characterizations are in Appendix 4.

Table 4 WCNI set net characterisation captured from estimated catch and effort reporting in statistical reporting areas 40 to 46. Value is estimated from the port price for the corresponding fishing year⁵⁸.

Fishery		2003-04	2004-05	2005-06
School shark	Catch (tonne)	198	225	250
	Fishers	30	29	24
	Vessels	33	29	27
	Value (\$)	\$459,518	\$406,125	\$335,000
Grey Mullet	Catch (tonne)	207	265	212
	Fishers	80	74	61
	Vessels	92	88	73
	Value (\$)	\$434,648	\$643,950	\$533,180
Rig	Catch (tonne)	234	243	199
	Fishers	87	87	82
	Vessels	102	102	89
	Value (\$)	\$821,340	\$773,955	\$565,160
Flatfish ⁵⁹	Catch (tonne)	340	309	246
	Fishers	108	102	97
	Vessels	127	117	112
	Value (\$)	\$1,273,419	\$1,302,435	\$800,730
Warehou	Catch (tonne)	89	126	65
	Fishers	12	8	6
	Vessels	12	8	6
	Value (\$)	\$78,956	\$166,950	\$69,550
Kahawai	Catch (tonne)	46	47	34
	Fishers	85	85	72
	Vessels	103	99	84
	Value (\$)	\$19,877	\$38,070	\$14,620
Spiny dogfish	Catch (tonne)	13	32	33
	Fishers	7	7	8
	Vessels	7	7	8
	Value (\$)	\$6,474	\$14,080	\$15,510
Trevally	Catch (tonne)	31	41	30
	Fishers	76	74	64
	Vessels	89	84	73
	Value (\$)	\$20,770	\$36,490	\$25,800
Snapper	Catch (tonne)	22	37	21
	Fishers	28	33	27
	Vessels	30	37	29
	Value (\$)	\$95,241	\$160,580	\$82,320
Red gurnard	Catch (tonne)	16	21	18
	Fishers	53	51	35
	Vessels	57	58	42

⁵⁸ Port prices are calculated by surveying Licensed Fish Receivers (LFRs) to see what they are paying for each species. Survey replies may be skewed because (i) industry know they are used to set cost recovery levies (ii) the survey does not differentiate harvest method – fish caught by one method over another may command a price premium (iii) ownership structure can influence port price and (iv) port price does not reflect price differential for different grades of fish.

⁵⁹ Including all flatfish species codes.

Fishery		2003-04	2004-05	2005-06
	Value (\$)	\$30,078	\$36,015	\$28,260
Parore	Catch (tonne)	9	9	11
	Fishers	53	50	47
	Vessels	63	58	53
	Value (\$)	N/A	\$4,860	\$5,940

7.3.2.2. Commercial trawling

Trawl gear is a known risk to Maui's dolphins – there are confirmed incidences of Hector's dolphins being caught in trawl nets off the east coast of the South Island. MFish notes that trawl fishers on the WCNI occasionally catch other dolphin species but there are no reported incidences of Maui's dolphins being caught in trawl gear. However, there is no incentive for fishers to report Maui's dolphin mortalities (although there are financial penalties for non-reporting) and fisheries observer coverage in the WCNI trawl fishery is normally low. Trawling is prohibited on the WCNI within 1nm of the shore and within 2nm of harbour entrances but outside this area trawlers operate where dolphins have been sighted. For this reason, MFish considers that trawling should be regarded as a potential threat to Maui's dolphins.

There are approximately 23 trawl fishers operating about 34 vessels (under 46m) on the WCNI⁶⁰. The WCNI trawl fishery targets a range of species, notably jack mackerel, trevally, snapper, and gurnard in both near shore and deeper waters. Trawl positioning information inside 4nm suggests comparatively lower trawl activity between the Manukau Harbour and Port Waikato (ie, an area with higher abundance of Maui's dolphins) and higher trawl activity further north close to the Kaipara Harbour.

Table 5 below characterises the main commercial trawl fisheries on the WCNI using estimated catch and effort data reported from statistical reporting areas 040 to 046 over the past three fishing years. Not all the catch and effort (and value) listed in Table 5 can be attributed to the WNCI area that overlaps with Maui's dolphins because the statistical reporting areas cover a much wider area. However, the characterisation illustrates the nature and extent of trawling on the WCNI and helps to assess potential costs to fishers of measures to avoid, remedy, and mitigate the adverse effects of fishing on Maui's dolphins (see later in this section).

Table 5 WCNI trawl characterisation captured from estimated catch and effort reporting in statistical reporting areas 40 to 46. Value is estimated from the port price for the corresponding fishing year⁶¹. Analysis excludes vessels >46m except for * that may include vessels greater than 46m.

Fishery		2003-04	2004-05	2005-06
Trevally	Catch (tonne)	1287	1128	1471
	Fishers	24	21	20
	Vessels	36	30	27
	Value (\$)	\$862,367	\$1,004,196	\$1,264,761
Snapper	Catch (tonne)	1116	1109	976

⁶⁰ Vessels greater than 46 metres cannot trawl inside 12nm where threat management measures are proposed.

⁶¹ Port prices are calculated by surveying Licensed Fish Receivers (LFRs) to see what they are paying for each species. Survey replies may be skewed because (i) industry know they are used to set cost recovery levies (ii) the survey does not differentiate harvest method – fish caught by one method over another may command a price premium (iii) ownership structure can influence port price and (iv) port price does not reflect price differential for different grades of fish.

Fishery		2003-04	2004-05	2005-06
	Fishers	23	23	22
	Vessels	38	34	31
	Value (\$)	\$4,841,034	\$4,812,322	\$3,825,748
Red gurnard	Catch (tonne)	518	645	576
	Fishers	27	22	22
	Vessels	41	34	32
	Value (\$)	\$972,875	\$1,106,664	\$904,733
Barracouta	Catch (tonne)	224	896	406
	Fishers	21	19	18
	Vessels	35	27	27
	Value (\$)	\$93,856	\$250,880	\$117,740
Tarakihi	Catch (tonne)	264	277	264
	Fishers	20	14	16
	Vessels	32	24	24
	Value (\$)	\$636,973	\$623,876	\$583,190
Leatherjacket	Catch (tonne)	151	103	105
	Fishers	20	16	18
	Vessels	30	21	25
	Value (\$)	\$69,626	\$42,745	\$54,075
John dory	Catch (tonne)	81	130	67
	Fishers	27	21	21
	Vessels	38	33	30
	Value (\$)	\$426,776	\$634,409	\$300,992
School shark	Catch (tonne)	100	95	75
	Fishers	23	17	21
	Vessels	34	26	29
	Value (\$)	\$232,926	\$170,878	\$100,079
Spiny dogfish*	Catch (tonne)	38	42	22
	Fishers	12	9	10
	Vessels	18	16	13
	Value (\$)	\$18,924	\$18,480	\$10,340
Rig*	Catch (tonne)	20	11	10
	Fishers	24	17	28
	Vessels	37	28	30
	Value (\$)	\$70,200	\$35,035	\$28,400
Silver warehou	Catch (tonne)	1	3	4
	Fishers	5	1	3
	Vessels	5	5	6
	Value (\$)	\$1,045	\$2,346	\$3,049

7.3.2.3. Drift Net Fishing

Drift netting involves use of nets that drift with currents. Some fishers use drift nets as alternatives to set net fishing in the Waikato River (mainly for mullet). Although Maui's dolphins do not enter the Waikato River, the nearshore region at the river mouth is at the southern end of an area where Maui's dolphins appear more abundant than other areas. The potential threat associated with drift net fishing arises because fishers occasionally lose their nets. Unlike set nets, lost drift nets do not roll up but instead may float down the river and out into Maui's dolphin habitat where dolphins could get entangled.

MFish is unable to confirm any Maui's dolphin mortalities resulting from the drift net fishery. However, a dead Maui's dolphin was found close to the Waikato River mouth with a net nearby (identified as possibly being from a drift net). MFish invites information from stakeholders on the likelihood of lost drift nets.

There are currently four drift netters operating in statistical reporting area 042 (operating at Port Waikato) but up to six fishers have drift netted at the Port over the past three fishing years. Catch and effort appears to have declined over the past three years. MFish cannot ascertain how much catch and effort (i) falls in the lower and upper reaches of Port Waikato and (ii) may be affected by options to manage the effects of fishing on dolphins because fishers are only required to estimate catch when reporting by statistical reporting area. Nevertheless, MFish considers Table 6 below – that reports on estimated catch, participation, and value of key WCSI drift net fisheries – and the analysis later in this section illustrates the nature of potential costs associated with each threat management option.

Table 6 WCNI driftnet fishery characterisation captured from estimated catch and effort reporting in statistical reporting area 042. Value is estimated from the port price for the corresponding fishing year⁶².

Fishery		2003-04	2004-05	2005-06
Grey mullet	Catch (tonne)	46	54	36
	Fishers	4	5	4
	Vessels	2	5	4
	Value (\$)	\$96,588	\$97,470	\$48,240
Yellow eyed mullet	Catch (tonne)	6	2	0.5
	Fishers	2	2	1
	Vessels	2	2	1
	Value (\$)	\$12,960	\$4,500	\$1,230

7.3.3. Existing threat management

7.3.3.1. Set nets

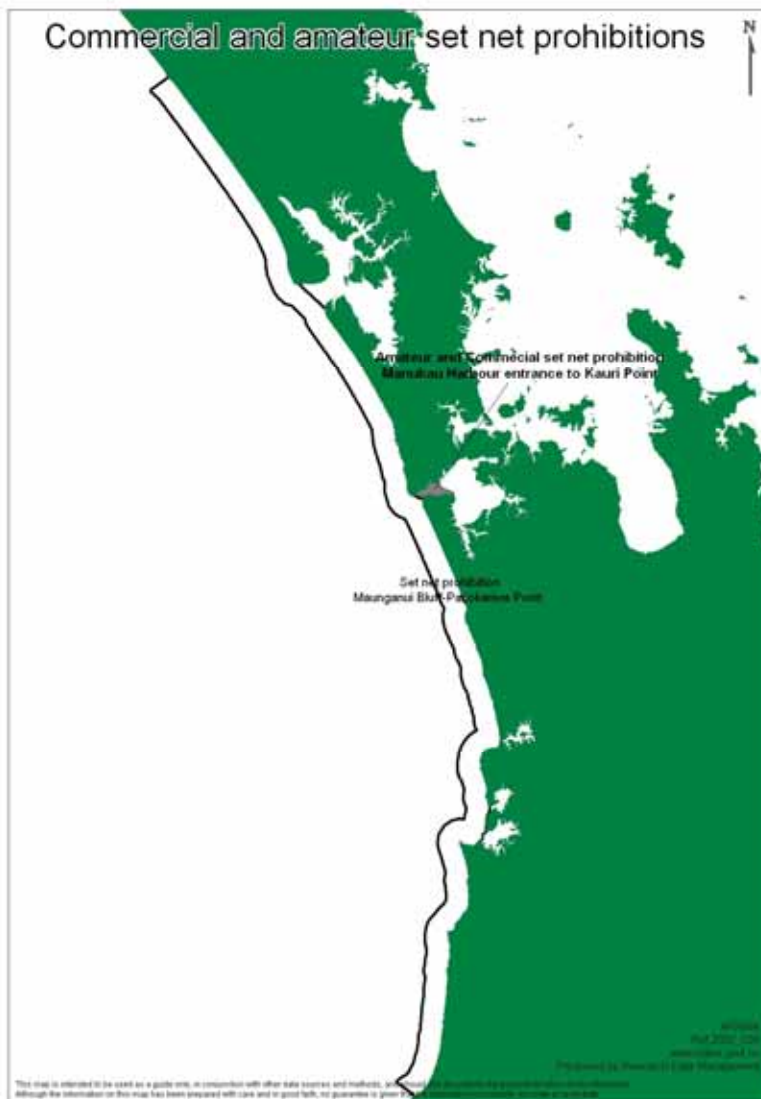
Amateur and commercial set net prohibition

Since 2003 both amateur and commercial set netting has been prohibited between Maunganui Bluff and Pariokariwa Point (out to 4nm) and inside the entrance to the Manukau Harbour (Map 6). As such, set

⁶² Port prices are calculated by surveying Licensed Fish Receivers (LFRs) to see what they are paying for each species. Survey replies may be skewed because (i) industry know they are used to set cost recovery levies (ii) the survey does not differentiate harvest method – fish caught by one method over another may command a price premium (iii) ownership structure can influence port price and (iv) port price does not reflect price differential for different grades of fish.

netting on the WCNI is now confined to harbours, offshore (outside 4nm), and to the north and south of the closed area. The Minister approved the prohibition to help avoid Maui's dolphin entanglements with set nets. The closed area was intended to cover Maui's dolphin range as determined by a combination of:

- ⇒ Strandings (e.g. dead dolphins washed ashore and dolphins recovered entangled in nets)
- ⇒ Verified public sightings⁶³
- ⇒ Aerial surveys and
- ⇒ Boat-based surveys.



Map 6: Commercial and amateur set net prohibition on the west coast of the North Island

⁶³ The prohibition extended 30km to 40km north and south of the verified sightings at the time.

In addition to the set net closed area, regulations and voluntary mechanisms that apply to set net use around New Zealand may help reduce the chance of interactions (if Maui's dolphins range beyond the set net prohibition). These nationally applicable measures are outlined below.

Amateur set nets

The following amateur set net rules apply throughout New Zealand:

- ⇒ Amateur nets must not exceed 60m in length⁶⁴.
- ⇒ The use of stakes to secure amateur nets is prohibited⁶⁵
- ⇒ Amateur set nets must not be set in a way that causes fish to be stranded by the falling tide⁶⁶
- ⇒ Amateur nets must not be set within 60m of another net⁶⁷.

Similarly to elsewhere in New Zealand, MFish publicises an amateur set net Code of Practice (CoP) that promotes good netting practice, including:

- ⇒ Using a net designed for the fish species being targeted
- ⇒ Deploying a net with anchors that are suitable for sea conditions to prevent losing nets
- ⇒ Setting a net that can be easily retrieved
- ⇒ Staying with and regularly checking the net
- ⇒ Avoiding setting nets when dolphins are present
- ⇒ Deploying a net for the shortest soak time possible
- ⇒ Avoiding setting nets overnight

Commercial set nets

The following commercial set net rules apply throughout New Zealand:

- ⇒ Commercial fishers cannot use more than 3000m of net per day⁶⁸
- ⇒ Commercial fishers must service their net while it is set at least every 18 hours⁶⁹
- ⇒ Commercial fishers must service their net while it is set at least every 24 hours⁷⁰

⁶⁴ r 12(1)(a) of the Fisheries (Amateur Fishing) Regulations 1986

⁶⁵ r 11 of the Fisheries (Amateur Fishing) Regulations 1986

⁶⁶ r 10 of the Fisheries (Amateur Fishing) Regulations 1986

⁶⁷ r 12(1)(c) of the Fisheries (Amateur Fishing) Regulations 1986

⁶⁸ r 65(3) of the Fisheries (Commercial Fishing) Regulations 1986

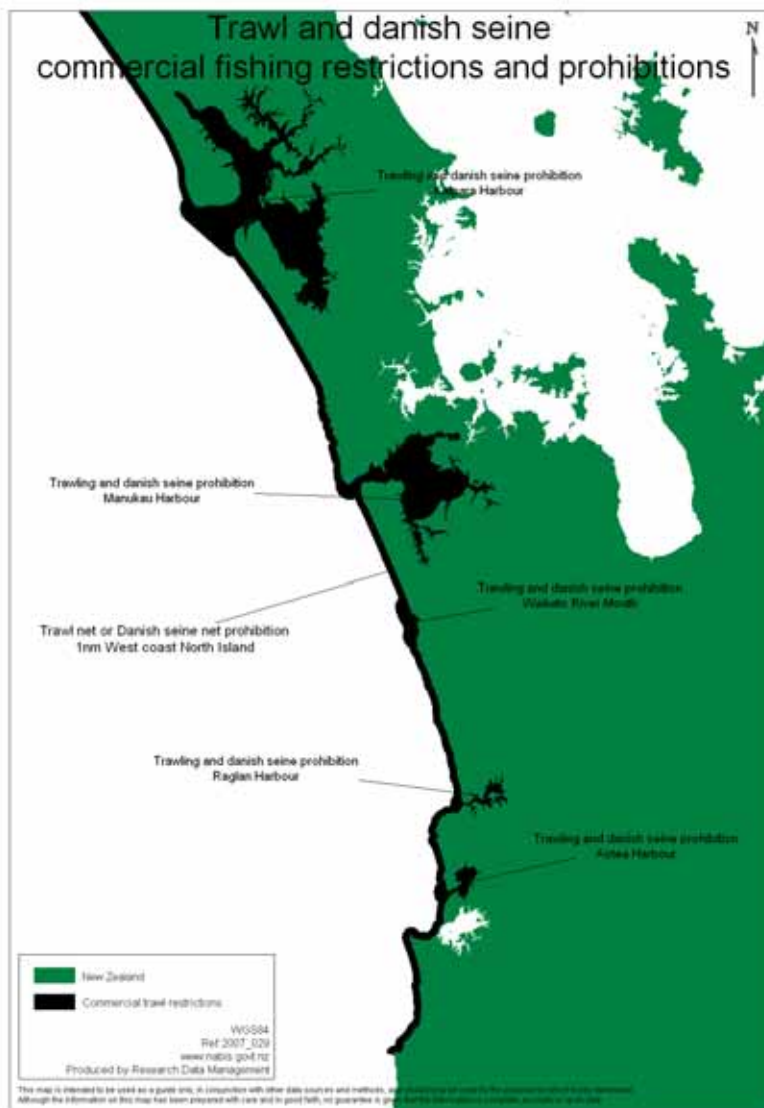
⁶⁹ r 66 of the Fisheries (Commercial Fishing) Regulations 1986

⁷⁰ r 7B of the Fisheries (Central Area Commercial Fishing) Regulations 1986

7.3.3.2. Commercial trawling

There are no specific legislative, regulatory, or voluntary management measures to avoid, remedy, or mitigate any effects of trawling on Maui's dolphins. However, the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 prohibit trawling within 1nm of the west Auckland coast, and prohibit trawling and Danish seining in defined areas including: Kawhia Harbour, Aotea Harbour, Raglan Harbour, Manukau Harbour, Kaipara Harbour, Hokianga Harbour, Waikato River Mouth and adjacent seas within 2nm, and the harbours of Herekino and Whangape (Map 7). In addition there is a 2nm voluntary trawl exclusion area in Taranaki between the Awakino River mouth and Port Taranaki.

The trawl prohibitions along the WCNI mean that trawl effort immediately offshore is not high.



Map 7: Current mandatory trawl and Danish seine restrictions on the west coast of the North Island

7.3.3.3. Drift net fishing

There are no specific legislative, regulatory, or voluntary management measures to avoid, remedy, or mitigate any effects of drift net fishing in the Waikato River on Maui's dolphins. However, in summer

2005-06, MFish worked to raise fishers' awareness of good drift netting practices through a public awareness campaign (including distribution of posters) in the Port Waikato area.

7.3.4. Additional threat management

Whether the Minister considers it necessary to implement further measures to manage the effects of fishing related mortality on Hector's dolphins depends ultimately on the balance between sustainability and utilisation the Minister considers appropriate. The following points are particularly relevant:

- ⇒The population is critically endangered and is the smallest out of any of the Hector's (Maui's) dolphin populations (about 111 animals; range 48 to 252)
- ⇒PBR analysis indicates the Maui's dolphin population can sustain no human-induced mortalities per year⁷¹
- ⇒Genetic analysis suggests the population may have undergone a recent decline in abundance (within the last few generations).

Even low levels (<1) of fishing related mortality will have an effect on the Maui's dolphin population. In this circumstance it is appropriate to consider the risk of fishing related mortality that may be appropriate. MFish considers that some residual risk of fishing-related mortality remains following measures implemented in 2003. The key decision is whether the Minister considers the current level of residual risk acceptable. If the current level of residual risk is considered acceptable then no further measures would need to be implemented to reduce risk. However, if the Minister considers current residual risk unacceptable then he should consider the options below that outline possible additional measures to reduce or remove risk.

MFish notes FA96 does not oblige the Minister to reduce the risk of fishing-related mortalities to zero. However, the characteristics of this population (subject to significant decline in number of dolphins over time and very low current number of dolphins) suggest the Minister should be cautious determining the degree of acceptable risk of fishing-related mortality. Residual risk from fishing arises from three key areas:

- ⇒Use of set nets in areas outside the set net closed area
- ⇒Trawling
- ⇒Drift netting.

⁷¹ The nature of PBR analysis, or any modelling exercise relying on estimated biological and variable inputs, does not necessarily lend itself to decision making with certainty. This is especially relevant in determining acceptable risk to a protected species like Maui's dolphin where the courts have determined that a precautionary approach to balancing utilisation and sustainability is open to the Minister.

7.3.4.1. *Set nets*

The previous Minister of Fisheries implemented measures to reduce the effect of fishing-related mortality from set nets in 2003. Since 2003 there have been no known mortalities confirmed as a result of fishing⁷².

New distribution information suggests there may be residual risk from set netting outside the current closed area. However, there is considerable uncertainty over the nature and extent of this risk. There are three key points of uncertainty in relation to this information that should be taken into account when deciding whether to implement further measures and what measures should be implemented:

- ⇒ The extent of use of the Manukau and Kaipara Harbours by Maui's dolphins
- ⇒ How far into the Manukau and Kaipara Harbours the dolphins travel
- ⇒ Whether the dolphins use other west coast harbours or move south or further offshore from the existing closed area.

Information prior to 2003 suggested dolphins were present in the Manukau Harbour entrance. When measures were applied to address the risk of set netting this area was included in the closed area. Since 2003, there have been four verified sightings of Maui's dolphins in the entrance to the Kaipara Harbour and two in Manukau Harbour further in than the existing closure. In addition, data from a POD further inside the Manukau Harbour from the existing closure also suggests dolphins may occasionally be present.

The POD information is uncertain – the scientific study of which the POD data are a part is still underway and has yet to be scientifically peer reviewed. In addition, POD acoustics further inside the harbour than the existing closure have not been corroborated by sightings, and a POD even further inside the Manukau Harbour has not recorded sounds associated with dolphins being present. This would suggest that less weight should be given to this information than a completed reviewed scientific document.

There is no information to indicate the extent to which dolphins travel into the Manukau and Kaipara harbours from the entrance – boat-based surveys inside Manukau Harbour have not identified Maui's dolphins and there are no stranding reports inside the harbour. As already noted, public sighting reports inside the harbour are limited to the harbour entrance area despite extensive boating activity inside the harbour. However the area is large, and lack of data does not necessarily mean that dolphins do not travel further into the harbour.

Environmental groups and councils in the Auckland and Waikato regions have proposed widespread closures covering all west coast harbours and south to Cape Egmont to manage the risk of interaction between dolphins and set nets. There is no information to suggest that dolphins enter any west coast harbours other than the Manukau and Kaipara Harbours, and information on the extent of the use of these harbours is uncertain. It is possible that if dolphins enter the Manukau and Kaipara harbours they may also enter other west coast harbours. Hector's dolphin's in the South Island are known to frequent shallow harbour environments. However, harbour entrances on the WCNI are often rough with bars, shoals and strong currents potentially acting as barriers to entry.

Information supporting a southern and seaward extension of the set net current closed area is also uncertain. There are no verified Maui's dolphin sightings south of the closed area since it was

⁷² Of the four reported mortalities since 2003, one was a natural mortality and cause of death in the others is unknown.

implemented in 2003 although there is at least one inconclusive sighting and DOC has information suggesting there may have been other sightings south of the existing closure. In addition, new survey information that indicates Maui's dolphins move seaward of the existing 4nm set prohibition (up to 9nm) is not yet verified or complete, and should be accorded the same status as the POD research.

As noted, the biological status of Maui's dolphin and effects of fishing-related mortality is such that an option erring on the side of sustainability is open to the Minister. The Minister should carefully consider whether he believes it reasonable to impose a total set net closure in all harbours and south to Cape Egmont given uncertainty in information. If the Minister decides to pursue such an option this would imply that he considers a very low level of residual risk of fishing-related mortality is acceptable.

7.3.4.2. Trawling

The previous Minister considered threats posed by trawling in 2003 and decided that mitigation measures were not necessary but agreed that additional fishery monitoring to determine the nature and extent of trawl-related threats should be implemented. However, there has been a low level of observer coverage of the inshore trawl fleet. There was no coverage in 2004-05 and 2005-06. There have been 68 observed tows on inshore trawl vessels fishing off the WCNI in the current fishing year (although some occurred outside Maui's dolphins range) and no Maui's dolphins were observed or captured on these tows. MFish also notes that there is little incentive (given possible consequences) to report incidents voluntarily.

In considering the most appropriate course of action, the Minister should note that there have been no reported Maui's dolphin interactions with trawlers but that trawling does overlap with Maui's dolphins range. In addition, trawling is known to catch Hector's dolphins in South Island waters (albeit that South Island trawlers have a higher probability of catching a Hector's dolphin due to a higher dolphin abundance) and other dolphin species off the WCNI.

The Minister should also note that aerial and boat-based surveys indicate most Maui's dolphins stay close inshore over summer inside voluntary and mandatory non-trawl zones. Maui's dolphins appear more dispersed in winter with a greater potential to overlap with the inshore trawl fishery. And as previously mentioned, trawl positioning information inside 4nm suggests lower trawl activity between Manukau Harbour and Port Waikato (ie. an area with comparatively higher number of Maui's dolphin's) than further north close to the Kaipara. Spatial differences in trawl effort may help mitigate risk of interactions with Maui's dolphins.

7.3.4.3. Drift nets

Loss of drift nets from the Waikato River is a potential threat to Maui's dolphins. MFish cannot quantify the incidence of lost nets or the level of risk posed to dolphins from this fishing method except to note that drift net effort has declined in recent years and there are no confirmed drift net related mortalities (although there one possible drift net entanglement).

7.3.5. Options

This section outlines options to avoid, remedy, or mitigate the effects of fishing on Maui's dolphins, if the Minister deems it necessary. Implicit in the Minister's decision is a careful consideration of the balance between sustainability and utilisation. Some options give more weight to sustainability relative to the use of fisheries resources. In considering the options the Minister should have regard to the information noted above, which outlines the nature of the risk from fishing-related mortality to the Maui's dolphin population, and should also have regard to the impact on fishers from the proposed measures and consider uncertainty in the information.

7.3.5.1. *Status quo option*

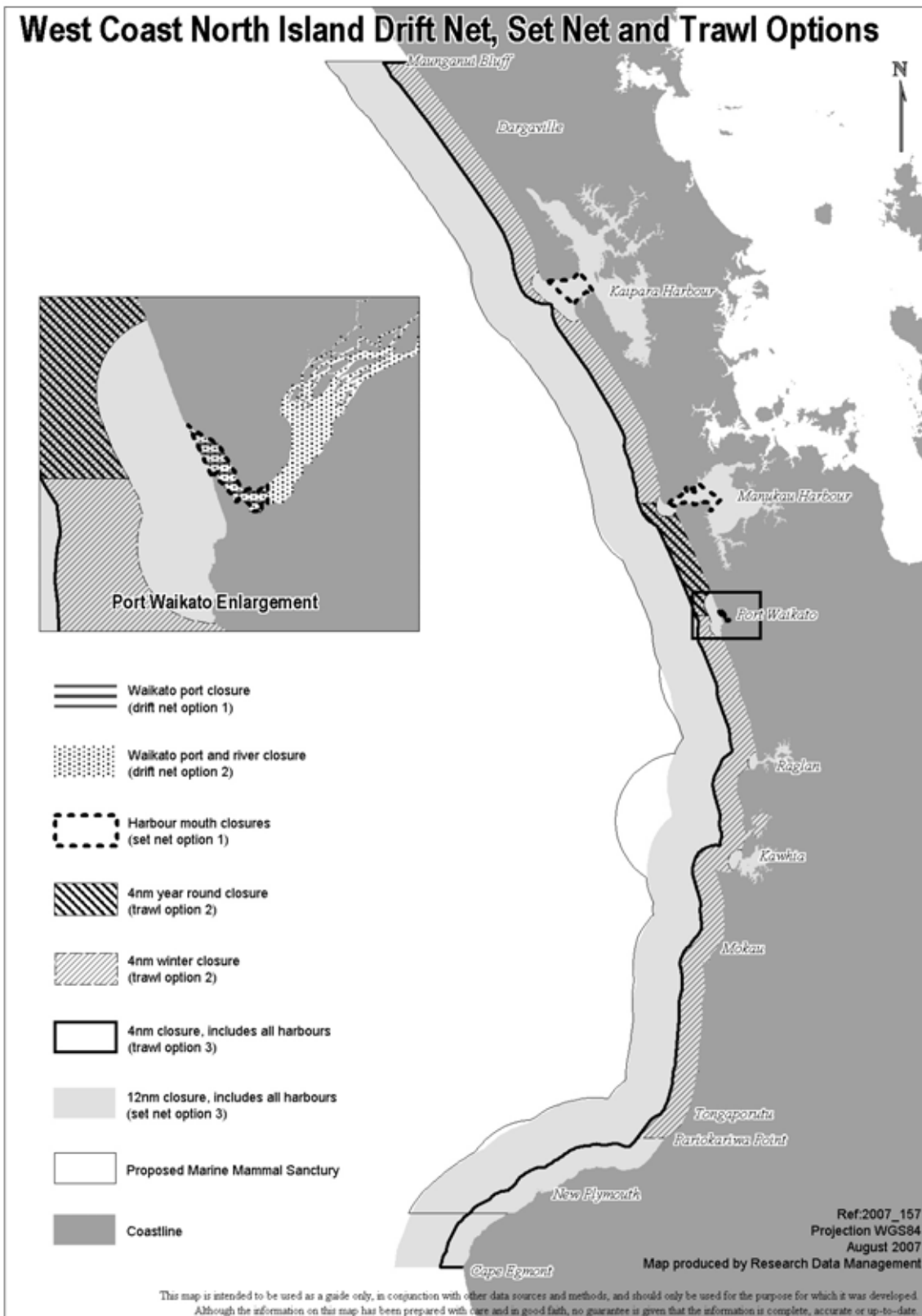
The nature and extent of fishing threats to the Maui’s dolphin population, and an analysis of effectiveness of current measures and consideration of the need for further measures have been outlined in the sections above. In light of this information, the Minister may consider that the risks of fishing-related mortality are acceptable and consequently further measures to avoid, remedy or mitigate the effects of fishing-related mortality on Maui’s dolphins are not necessary at present. MFish notes the *status quo* remains a valid option given uncertainty over the nature and extent of the impact of fishing-related mortality on Maui’s dolphins and the impact on fisheries users. No further analysis of the *status quo* is carried out in this option section.

7.3.5.2. *Amateur and commercial set nets*

MFish proposes the following options to manage the threats of amateur and commercial set netting on Maui’s dolphins. The measures are intended to address the potential risk of set netting in harbours and other areas outside the existing closure (see Map 8).

Status Quo	Existing Management
Option 1	Prohibit set netting at the mouth of the Kaipara Harbour and the lower reaches of the Waikato River, and also further into the Manukau Harbour entrance ⁷³
Option 2	Prohibit overnight set netting and require fishers stay with their fishing nets in all parts of Kaipara, Manukau, Raglan, Aotea, and Kawhia Harbours, and at Port Waikato
Option 3	Prohibit set netting in all parts of Kaipara, Manukau, Raglan, Aotea, and Kawhia Harbours, Port Waikato, and within 12nm of the shore from Maunganui Bluff to Cape Egmont.

⁷³ The lower reaches of the Waikato River is a smaller area than Port Waikato. Port Waikato includes the lower reaches of the Waikato River.



Map 8 WCNI set net options

Option 1

Option 1 proposes to prohibit amateur and commercial set net fishing:

- ⇒ In the entrance to the Kaipara Harbour – west of a line that runs from Pouto Point to South Head (excluding the lagoon) to encompass verified sightings post-2003
- ⇒ Further into the Manukau Harbour entrance than the present closure (Lawry Point generally south east to channel marker no. 4 then generally south west to a peninsula 1km south of Grahams Beach)
- ⇒ The lower reaches of the Waikato River – from the store (shop) to the river mouth.

The harbour entrance closures lower the risk of dolphin entanglements if dolphins do enter those harbour entrances. The Waikato River prohibition minimises potential net loss into dolphin habitat. Option 1 does not apply to the Raglan, Aotea, and Kawhia Harbour entrances, as there have been no confirmed sightings of Maui's dolphins in those areas. It is open to the Minister to strengthen the protection provided by Option 1 by including additional measures discussed in Option 2 below.

◆ *Effectiveness*

Closing the mouth of the Kaipara Harbour and Manukau Harbour to set netting would help avoid fishing-related mortalities if dolphins visit these areas. It is uncertain if, how often, and for how long Maui's dolphins come into these areas. New distributional information (sightings and POD research) suggests presence of Maui's dolphins in the entrances to the Manukau and Kaipara harbours is intermittent and not common. Based on this information, the Minister needs to determine if it is necessary to prohibit set netting in areas where Maui's dolphins may occasionally visit⁷⁴. In making this determination, the Minister will need to consider the uncertainty in distributional information and the impacts that closures will have on utilisation.

Maui's dolphins do not appear to enter Port Waikato, but a set net prohibition on the lower reaches of the river would minimise the chance of set net loss from the river and potential dolphin entanglements. Closure of this area could lower such risks appreciably as any nets lost further upstream would most likely have rolled up before they reach the sea.

Some residual risk to Maui's dolphin could remain if Option 1 was implemented. The nature and extent of residual risk, if any, would depend on whether dolphins may travel further into the Manukau and Kaipara Harbours than the proposed closures, and if so, how often. Risk would also stem from any use by the dolphins of other west coast harbours not covered by the proposed closures, and potential risk south and offshore from the existing prohibition. As noted, there is no information available (sightings or POD data) to confirm that dolphins travel into the inner reaches of the Manukau or Kaipara Harbours or enter any other west coast harbours.

◆ *Impacts on fishers*

Commercial and amateur fishers will face impacts on current use if the Minister chooses Option 1. However, the impacts are likely to be lower than those associated with Option 2 because Option 1 provides greater flexibility for fishers to continue to set nets despite the removal of part of the fishable area.

⁷⁴ Prohibiting set netting in the Kaipara Harbour entrance and further into the Manukau Harbour entrance is consistent with the rationale behind the 2003 prohibition, ie, to cover Maui's dolphin range determined by a combination of factors, including verified public sightings.

The Kaipara and Manukau harbours support important amateur and commercial set net fisheries including flatfish, grey mullet, kahawai, spiny dogfish, rig, trevally, and yellow eyed mullet. MFish has assessed the nature of costs associated with fishing method prohibitions in the assessment of Option 3 further below (Option 3 proposes set net prohibitions through the harbours' entirety). The Option 3 assessment is relevant to the assessment of costs associated with Option 1 because MFish cannot determine how fishing effort is distributed throughout Manukau and Kaipara Harbours with sufficient preciseness to enable assessment of costs associated with prohibitions in only part of the harbours. However, MFish notes that cost (in terms of lost fishing opportunity and/or catch) is probably lower in Option 1 than Option 3 because set nets would still be permitted in most parts of the harbours.

Anecdotal information indicates that rig is a popular amateur and commercial fishery inside the Manukau Harbour entrance. If this is the case, it is likely that rig fishers would be most affected by Option 1 (mullet and flounder are targeted further in the harbour although an extended prohibition will also effect these fishers). MFish notes the existing closed area removed a sizable portion of the Manukau Harbour that was fishable, and an expansion of that would cause a further loss of fishable area (commercial fishers have said that just inside the closed area line is a productive rig fishing area). It would also place more fishing pressure on the remainder of the harbour, which may increase gear conflict within and between sectors.

Anecdotal information from fishers in the Kaipara harbour suggests that because the Kaipara entrance area is subject to strong currents and often rough conditions it is not well suited to set net fishing. Some fishers suggest there is very limited amateur netting at the harbour entrance and only limited commercial fishing.

MFish is aware that there are 2-4 commercial set netters who are largely resident in the Port Waikato area and frequently fish at Port Waikato. It is likely that these fishers will often set net in other areas away from Port Waikato such as the Manukau Harbour or Firth of Thames. Up to a dozen commercial set netters from other areas such as South Auckland and around the Firth of Thames may also travel to Port Waikato for fishing. For the "resident" and "itinerant" fishers, most of the fishing is targeting mullet with nets inside the river delta. Closure of the river mouth area may not have a significant effect on these fishers because most fishing occurs further upstream (in the delta).

MFish invites submissions from fishers that describe the nature and effect of Option 1 measures on their fishing operations.

Option 2

Option 2 requires fishers to remain with their set nets at all times when fishing and prohibits overnight set net fishing. Option 2 focuses on reducing the number of nets used at any one time and enabling fishers to remove their nets immediately if dolphins appear.

Option 2 applies to commercial and amateur fishers fishing inside west coast harbours and harbour entrances between Maunganui Bluff and Pariokariwa Point, and at Port Waikato. However, the Minister is not bound to apply Option 2 to all proposed areas. The Minister could choose to include some areas (eg, the Kaipara and Manukau harbours) and exclude others in Option 2 after determining acceptable risk to Maui's dolphins from set netting in different areas.

◆ *Effectiveness*

Option 2 may lower the risk of dolphin entanglement in set nets by:

⇒ Decreasing the number of nets deployed – mandatory net attendance net is likely to discourage

fishers from using a set net in preference to other fishing methods (MFish Compliance report that mandatory net attendance at Kaikoura last summer produced a notable decline in amateur set net usage)⁷⁵

⇒Reducing set net soak time (fishers will not be able to leave their set net)

⇒Enabling fishers to immediately remove their set net from the water if a dolphin appears in the vicinity

⇒Enabling fishers to respond to dolphin entanglements faster in order to attempt to release entangled dolphins alive.

Prohibitions on overnight setting will further reduce the risk of net entanglement by reducing set frequency and ensuring that fishers only fish in daylight when they can see their nets and any Maui's dolphins that might be present.

MFish notes that an additional benefit of this option is that the above proposed restrictions will likely result in better quality fish and less wastage (due to reduced soak times, for example), and there will also be a reduced likelihood of nets being lost in inclement weather.

The overall effectiveness of Option 2 is difficult to quantify because set nets, despite proposed mitigation measures, could still pose a risk to Maui's dolphins (eg, dolphins could still become entangled in set nets and die before fishers can release them). However, MFish considers the mitigation does reduce risk of entanglement below *status quo* risk by creating disincentives to use set nets and providing the opportunity for a proactive response to entanglements and potential entanglements.

◆ *Impacts on fishers*

There are a number of potential costs to fishers associated with Option 2. MFish considers these potential costs will impact fishers more than costs associated with Option 1 because Option 2 removes flexibility in the exercise of amateur and commercial fishing activity to the extent that fishers may have to:

⇒Re-equip (if possible) to maintain current levels of catch

⇒Accept lower catches or fish longer for similar returns

⇒Cease fishing or shift to areas with fewer restrictions.

MFish does not consider commercial fishers could use different fishing gear and maintain current levels of catch with equivalent effort. MFish cannot quantify the effect of Option 2 on total catch from, and value of, WCNI set net fisheries apart to note that it is likely to be substantial because a large part of the WCNI set net fishery is fished in WCNI harbours. MFish considers the viability of some set net operations may decrease.

MFish considers the assessment of costs associated with Option 3 is also relevant to Option 2. Under Option 2, commercial fishers can continue to use nets (unlike Option 3), but commercial operations that use multiple set nets at any one time will be most affected if they cannot shift their fishing effort to other areas where the proposed restrictions do not apply.

⁷⁵ MFish would invite recreational fishers to hand in any unused or unwanted amateur set nets. The handing in of unused or unwanted nets would remove potential latent effort in the amateur set net fishery. MFish could consider ways to reward fishers who hand in nets such as t-shirts, posters, or school donations.

Option 2 will enable amateur fishers to continue to use set nets to target important recreational species in harbours including flatfish, rig, and mullet. However, the limitations on fishing activity proposed in Option 2 may impact the amateur fishing experience and daily catch. Some amateur fishers set nets then move on to set additional nets or line fish in another area. Requirements to stay with nets will effectively prevent this activity. MFish considers that lower overall recreational catch is the most likely outcome. MFish also considers there may be health and safety implications for fishers that stay with nets in rough weather.

MFish invites submissions from fishers that describe the nature and effect of Option 2 measures on their fishing operations.

Option 3

Option 3 prohibits amateur and commercial set netting in all WCNI harbours between Maunganui Bluff and Cape Egmont out to 12nm and also at Port Waikato. There is no obligation on the Minister to apply Option 3 in its entirety. The Minister could choose to include some areas and exclude others in Option 3 after determining acceptable risk to Maui's dolphins from fishing.

◆ *Effectiveness*

MFish considers that Option 3 provides the Minister with the greatest certainty that risks to Maui's dolphins from set nets will be avoided. Risk of entanglement would approach zero with the possible exception of any dolphins that may venture further offshore than 12nm, or further south of the boundary of the extended set net closed area. However, MFish cannot quantify the extent to which Option 3 provides more protection than Options 1 and 2 given the limited and uncertain nature of new information on the distribution of Maui's dolphins.

◆ *Impacts on fishers*

The overall impact of Option 3 on amateur and commercial fishers is difficult to quantify. However, MFish has characterised the main commercial set net fisheries on the WCNI to help the Minister consider the impacts on commercial use (see Table 4 above).

There are approximately 119 commercial set net fishers on the WCNI operating about 136 vessels. Option 3 will have a significant impact on these fishers (highest impact of the three options considered). Commercial fishers will be excluded from set netting on the west coast from Maunganui Bluff to Cape Egmont out to 12nm and in west coast harbours and Port Waikato. The most important and most valuable WCNI set net fisheries are unlikely to be viable outside the Option 3 prohibition. MFish considers that most commercial set net fishers on the WCNI would be negatively affected by Option 3.

The following points are relevant in considering cost to commercial fishers associated with Option 3:

- ⇒ Set nets support large harbour fisheries on the WCNI and also south of the current set net closed area towards Taranaki and outside the current 4nm prohibition. The main target fisheries are grey mullet, rig, trevally, flatfish, school shark, spiny dogfish, and kahawai (see Table 4).
- ⇒ The two largest harbours on the WCNI yield large volumes of fish and provide employment to fishers:
 - Around 611 tonnes of fish was harvested with set nets in the Manukau Harbour over the past three fishing years (worth nearly 2 million dollars – see Appendix 4). Over the same period MFish data indicates 52 fishers deployed set nets in the Manukau Harbour using 69 vessels. Estimated catches include:
 - 210 tonnes of grey mullet

- 97 tonnes of rig
- 28 tonnes of trevally
- 229 tonnes of flatfish (all flatfish species codes)
- 30 tonnes of kahawai

○ Over 1000 tonnes of fish was harvested with set nets in the Kaipara Harbour over the past three years (worth nearly 3.5 million dollars – see Appendix 4). Over the same period MFish data indicates 74 fishers deployed set nets in the Kaipara Harbour using 83 vessels. Estimated catches include:

- 276 tonnes of grey mullet
- 153 tonnes of rig
- 29 tonnes of trevally
- 514 tonnes of flatfish (all flatfish species codes)
- 50 tonnes of kahawai

⇒ Costs associated with Option 3 may include closure of some WCNI harbour fisheries and devaluation of Individual Transferable Quota (ITQ) for stocks taken in those harbours because there are no alternative fishing methods available to harvest the main target species inside WCNI harbours in quantities that would provide for viable commercial fishing operations equivalent to current operations⁷⁶

⇒ It is unlikely target set net fisheries in the harbours could shift effort without significant cost (many of the fishers are local to the harbour areas) or without reducing catches through increased effort in areas where set netting was still permitted (eg, Firth of Thames) for the main west coast harbour species.

⇒ Option 3 would force Taranaki set netters beyond 12nm. MFish cannot determine the viability of the fishery beyond 12nm but notes such a shift in set net activity would be costly because of operational costs associated with fishing further out at sea.

Lack of quantitative information about amateur set netting on the WCNI means only the nature of potential costs to amateur fishers are discussed. However, the following points are relevant in considering costs to amateur fishers associated with Option 3:

⇒ Set nets support large amateur fisheries on the WCNI harbours and also south of the current set net prohibition towards Taranaki. The main target fisheries are flatfish, mullet, and rig

⇒ Set netting is the preferred method for most amateur fishers who target rig, flatfish, and mullet in west coast harbours (ie, the most efficient and effective fishing method)

⇒ Amateur fishers cannot employ other methods to catch their favoured species in ways that produce catches equivalent to set net catches (with similar effort).

⇒ Amateur set netters generally fish the harbours, rivers, and coastal areas in close proximity to their residence such that Option 3 would remove most set net fishing opportunities unless fishers picked up additional traveling costs.

⇒ Iwi commonly fish using set nets under the amateur fishing regulations to catch flounder and mullet that are favoured species for kai moana, as well as at hui, tangi, and other important marae-based

⁷⁶ Trawling is already prohibited in the two largest west coast North Island harbours (Manukau and Kaipara).

functions.

MFish invites submissions from fishers that describe the nature and effect of Option 3 measures on their fishing operations.

Customary Fishing

MFish does not have quantitative information on the extent of customary set netting on the West Coast of the North Island. However, it is likely that customary fishing takes place using set net within the West Coast Harbours in this area. Customary fishing under the authority of the Kaimoana Customary Fishing Regulations or Regulation 27 of the Amateur Fishing Regulations will be unaffected by any measures implemented to manage the effects of fishing on Maui's dolphins. However, MFish will work with Tangata Tiaki/Kaitiaki to raise awareness of the issues associated with set netting and Maui's dolphins, and support non-issuance of authorisations for set netting in areas where Maui's dolphins are present.

Table 7: Summary of Set Net Management Options⁷⁷

	Kaipara	Manukau	Raglan	Aotea/Kawhia	Taranaki	Port Waikato
Information	No information that confirms all of harbour as dolphin habitat. 4 confirmed entrance area sightings.	POD detections beyond entrance closed area – no information that confirms all of harbour as dolphin habitat but 2 sightings beyond closed area.	No information that indicates that dolphins have entered harbours. 1 confirmed entrance area sighting.	No information that indicates that dolphins have entered harbours.	No confirmed sightings of dolphins in this area in recent years.	Dolphins offshore from Port Waikato at one end of core area.
Status quo	Status quo	Status quo	Status quo	Status quo	Status quo	Status quo
Social, cultural and economic implications.	No change	No change	No change	No change	No change	No change
Level of protection	No change	No change	No change	No change	No change	No change
Option 1 – Harbour and Port Waikato entrance set net closures	Entrance area closed to set netting.	Possibly extend current entrance closure ⁷⁸ .	No closure	No closure	Not included.	Close lower reaches of Waikato River to set netting.
Social, cultural and	There is little set netting in	Closure would further	N/A	N/A	N/A	Closure would

⁷⁷ MFish is gathering more information on the costs associated with each set net option to inform the final advice to the Minister.

⁷⁸ Acknowledging there have been no confirmed sightings well within the harbours.

	Kaipara	Manukau	Raglan	Aotea/Kawhia	Taranaki	Port Waikato
economic implications.	this area, but loss of fishing area could have adverse economic effects on the fishers who do set nets here.	reduce the area of the Manukau where set netting is allowed. Reduced catches would have social, cultural and economic impacts.				reduce area where set net fishing allowed. Uncertain whether this would mean reduced catches and associated impacts.
Level of protection	Sightings indicate dolphins are in entrance area, so closure would remove potential net threat from here.	POD detections do not yet show how far dolphins may venture into the harbour, so level of protection dependent on extent of any closed area.	N/A	N/A	N/A	Set nets lost at Waikato entrance most likely to reach dolphins offshore, so closure of this area would prevent this threat.
Option 2 – Net attendance and no night setting	Harbour set netters required to stay with their nets and not set at night.	Harbour set netters required to stay with their nets and not set at night	Harbour set netters required to stay with their nets and not set at night	Harbour set netters required to stay with their nets and not set at night	Taranaki set netters required to stay with their nets and not set at night.	Port Waikato set netters required to stay with their nets and not set at night.
Level of protection	Netting continues but possibly reduced in overall intensity – nets watched, could be retrieved if dolphins seen.	Netting continues but possibly reduced in overall intensity – nets watched, could be retrieved if dolphins seen.	Netting continues but possibly reduced in overall intensity – nets watched, could be retrieved if dolphins seen.	Netting continues but possibly reduced in overall intensity – nets watched, could be retrieved if dolphins seen.	Netting continues but possibly reduced in overall intensity – nets watched, could be retrieved if dolphins seen.	If complied with, attendance should ensure risks associated with nets lost at Port Waikato eliminated.
Social, cultural and economic implications	Some fishers stay with their nets now, others say it is impracticable and some	Some fishers stay with their nets now, others say it is impracticable and some	Some fishers stay with their nets now, others say it is impracticable and some	Some fishers stay with their nets now, others say it is impracticable	If attendance not feasible, social and economic	Attendance and no night setting should not present any

	Kaipara	Manukau	Raglan	Aotea/Kawhia	Taranaki	Port Waikato
	commercial fishers say it is uneconomic. No night setting could also reduce catches.	commercial fishers say it is uneconomic. No night setting could also reduce catches.	commercial fishers say it is uneconomic. No night setting could also reduce catches.	and some commercial fishers say it is uneconomic. No night setting could also reduce catches.	effects would be the same as a total ban.	particular difficulties for fishers at Port Waikato.
Option 3 – Set net ban	Harbour closed to all set netting	Harbour closed to all set netting	Harbour closed to all set netting	Harbours closed to all set netting	Coastal closure extended to Cape Egmont and out to 12nm	Port Waikato area closed to all set netting
Level of protection	Total – set netting eliminated as a risk (other than illegal activities).	Total – set netting eliminated as a risk (other than illegal activities).	Total – set netting eliminated as a risk (other than illegal activities).	Total – set netting eliminated as a risk (other than illegal activities).	Total – set netting eliminated as a risk (other than illegal activities).	Total – lost nets eliminated as a risk (other than illegal activities).
Social, cultural and economic implications	Significant social, cultural and economic impacts.	Significant social, cultural and economic impacts.	Significant social, cultural and economic impacts.	Significant social, cultural and economic impacts.	Significant impacts on non-commercial set netters fishing close to shore, reduced fishing ground for commercial fishers.	Significant social, cultural and economic impacts.

7.3.5.3. Commercial trawling (mid water, bottom, and pair)

MFish proposes the following options to manage the potential threat of commercial trawling on Maui's dolphins. In considering the most appropriate course of action, the Minister should note that there have been no reported Maui's dolphin interactions with trawlers but that trawling does overlap with Maui's dolphins range. In addition, trawling is known to catch Hector's dolphins in South Island waters and other dolphin species off the WCNI.

The previous Minister considered threats posed by trawling in 2003 and decided that mitigation measures were not necessary but agreed that additional fishery monitoring to determine the nature and extent of trawl-related threats should be implemented. However, MFish notes that monitoring in the WCNI trawl fleet remains very low.

Status Quo	Existing management
Option 1	Additional fisheries monitoring (observer coverage or electronic monitoring) to determine nature and extent of trawl/dolphin interactions inside 4nm from shore between Maunganui Bluff and Pariokariwa Point
Option 2	Trawl prohibition between Maunganui Bluff and Pariokariwa Point inside 4nm from shore between 1 June and 31 August; and Trawl prohibition between Manukau Harbour and Port Waikato inside 4nm from shore year-round
Option 3	Trawl prohibition inside 4nm from shore from Maunganui Bluff to Cape Egmont

Option 1

Option 1 proposes that vessels trawling inside 4nm of the shoreline between Maunganui Bluff and Pariokariwa Point (monitoring zone) are subject to monitoring commensurate with the risk that trawling in the area poses to Maui's dolphins. Option 1 is consistent with the previous Minister's evaluation of risk to Maui's dolphins from trawling and includes no other trawling restrictions.

◆ *Effectiveness*

Option 1 will not mitigate risk of entanglement with trawl nets but will instead provide quantitative information on the nature and extent of any risk. Option 1 is appropriate if the Minister considers trawlers pose low risk to Maui's dolphins, and the current level of risk from trawl activities is acceptable.

◆ *Impacts on fishers*

There are approximately 23 fishers on the WCNI operating about 34 vessels (<46m) (2005-06 fishing year) that may require additional monitoring as part of Option 1. Direct costs to these fishers from Option 1 could include:

- ⇒ Accommodating fisheries observers (up to \$1000 per day) or
- ⇒ Installing and operating video monitoring equipment (approximately \$10,000 installation and additional ongoing operating costs).

The overall impact of Option 1 on commercial fishers is difficult to quantify because it is difficult to determine the extent to which individual vessels are reliant on having access to inshore areas (eg, within 4nm where monitoring may be required) as part of their fishing operations. MFish has characterised the main trawl fisheries (vessels <46m) on the WCNI to help the Minister consider the impacts on use (See Table 5). Key indications from these characterisations are:

- ⇒ The WCNI inshore trawl fleet supports large and nationally valuable trawl fisheries including snapper, trevally, tarakihi, gurnard, school shark and kahawai:
 - The WCNI trawl fleet (<46m) caught approximately 12,000 tonnes of fish over the past three years in the Statistical Reporting Areas that encompass the proposed monitoring zone. MFish cannot determine how much of this catch came from inside the proposed monitoring zone but considers gurnard, snapper, rig and trevally may be part of the catch inside 4nm.
 - Over the past three years, approximately 60 trawl vessels (<46m) caught fish in Statistical Reporting Areas that include the proposed monitoring zone (MFish cannot determine which

vessels fished inside and outside 4nm and therefore cannot determine how many vessels would require monitoring under Option 1).

- ⇒ Some vessels may opt out of monitoring costs by refraining from trawling inside the proposed monitoring zone. MFish cannot determine what proportion of vessels may refrain from fishing inside the monitoring zone and what impact this might have on the value of the WCNI trawl fishery
- ⇒ Fisheries observer coverage may not be an option for smaller vessels due to on board space requirements. Video monitoring equipment will be the alternative cost.
- ⇒ Option 1 may rationalise the WCNI trawl fleet as smaller scale fishers and vessels unable to recover increased monitoring costs move out of the fleet

MFish notes that fisheries observer costs and video monitoring equipment installation costs are significant and also that video monitoring equipment is not widely available (MFish anticipates a transition to electronic monitoring would be necessary). However, Option 1 is probably least costly to the WCNI trawl fishery overall because trawlers will still be permitted to fish in the monitoring zone.

MFish invites submissions from fishers that describe the nature and effect of Option 1 measures on their fishing operations.

Option 2

Option 2 proposes a trawl prohibition between:

- ⇒ Maunganui Bluff and Pariokariwa Point within 4nm of the shore between 1 June and 31 August (the period that coincides with greater dispersion in the Maui's dolphin population) and
- ⇒ Manukau Harbour and Port Waikato within 4nm of the shore year-round (covering the area where Maui's dolphins are most abundant)

Option 2 is a more conservative measure than Option 1 and is appropriate if the Minister considers it necessary to immediately mitigate risk from trawling by implementing measures that will keep trawlers away from Maui's dolphins in the area where they are most abundant year-round (total prohibition) and when they exhibit greater dispersion (winter prohibition).

◆ *Effectiveness*

Option 2 would remove the risk of trawlers interacting with Maui's dolphins inside the area where they are most abundant (aerial and boat surveys indicate that Maui's dolphins are more abundant between Manukau Harbour and Port Waikato) while the seasonal prohibition (1 June – 31 August) reflects greater offshore movement over the winter (determined by aerial surveys).

Risk of entanglement with trawl gear would remain outside the area of the closure. MFish cannot quantify the nature of any remaining risk to dolphins following application of these measures because of uncertain distribution information and uncertainties about whether there is any interaction with trawl gear.

◆ *Impacts on fishers*

Like Option 1, the overall impact of Option 2 on commercial fishers is difficult to quantify because it is difficult to determine the extent to which individual vessels are reliant on having access to inshore areas (e.g., within 4nm) as part of their fishing operations. MFish has characterised the main trawl fisheries on the WCNI to help the Minister consider the impacts on use (See Table 5 above). Indications from these characterisations are discussed in Options 1 and 3 and are also relevant to Option 2. The following indications area also relevant:

- ⇒ Estimated catch over the past three years from the Statistical Reporting Area that covers the area where Maui's dolphin are most abundant is 2825.6 tonnes (*cf* with 9033.6 tonnes from the Statistical Reporting Areas that cover the remainder of the area covered by Option 2)
- ⇒ Estimated catch in the Statistical Reporting Areas that cover the proposed winter closure was 224.4 tonnes over winter in 2004; 974.3 tonnes over winter in 2005 384.4 tonnes over winter in 2006
- ⇒ Many fisheries along the WCNI can be prosecuted close in shore (eg, trevally, snapper, red gurnard, tarakihi, etc). It is likely the proposed 4nm closure would require affected fishers to either fish further offshore or shift effort into more northern and southern areas along the WCNI where the proposed closures would not apply. Shifting effort into southern areas could be problematic as trawling within inshore areas in Taranaki and Wanganui is already restricted (in Urenui Bay under a fisheries regulation, and between Awakino River to Rangitikei River under the north and south Taranaki voluntary trawl agreements). The proposed measures are likely to have a significant impact due to the limited availability of alternative inshore fishing areas along the WCNI and through increased fishing costs caused by lower catch levels and the requirement to fish further afield.
- ⇒ MFish notes that the trawl fleet may rationalise towards vessels that can harvest efficiently under the proposed restrictions and that some fishers and smaller vessels may leave the fishery.
- ⇒ If fishers cannot modify fishing activities under the proposed restrictions and are unable to fish in the remainder of the Quota Management Areas, the value of ITQ for stocks targeted off the WCNI may decrease.

MFish invites submissions from fishers that describe the nature and effect of Option 2 measures on their fishing operations.

Option 3

Option 3 proposes a trawl prohibition within 4nm of the coast from Maunganui Bluff to Cape Egmont. This area includes the current confirmed distribution of Maui's dolphins but also extends south to encompass the area where a single unconfirmed sighting has been made. Option 3 would reduce risk of fishing-related mortality from trawling to zero within the known range of the dolphins. Option 3 is appropriate if the Minister considers it necessary to reduce risk down to very low levels given the significance of the impact of any fishing-related mortality on the Maui's dolphin population.

The Minister is not restricted to the area defined in Option 3 should he determine that a trawl prohibition is necessary. The Minister can choose a smaller area if he considers that would suffice to avoid trawl interactions with Maui's dolphins.

◆ *Effectiveness*

A trawl prohibition inside 4nm between Maunganui Bluff and Cape Egmont will eliminate any trawl threat to Maui's dolphins in that area. Risk may remain for any dolphins that travel further offshore than 4nm.

Preliminary results from recent DOC aerial surveys in 2006 indicate that Maui's dolphins move outside the existing 4nm set prohibition, with sightings recorded further offshore than 4nm. However, the findings of this work are not yet verified, and MFish is therefore uncertain of the validity of the sightings.

There have been public sightings reported in the Taranaki Bight, but investigations indicated all but one was unlikely to be Maui's dolphin. This single sighting was unable to be confirmed because the information provided was inconclusive. DOC has included this region in its aerial surveys but has made

no sightings of Maui's dolphins.

◆ *Impacts on fishers*

The impacts of an all year-round trawl prohibition between Maunganui Bluff and Cape Egmont out to 4nm on the WCNI inshore trawl fishery would be substantial. Like Options 1 and 2, costs of this option are difficult to quantify. MFish considers the following points are important to help the Minister to determine the nature of costs to fishers associated with Option 3:

- ⇒ The WCNI inshore trawl fleet (vessels <46m) supports large and nationally valuable trawl fisheries including trevally, snapper, gurnard, tarakihi, school shark, and John Dory. These fisheries are very valuable as illustrated below (value for the 2005-06 fishing year estimated using estimated catch and port price information):
 - 1767 tonnes of trevally (\$1 519 262)
 - 769 tonnes of snapper (\$3 016 326)
 - 740 tonnes of red gurnard (\$1 161 995)
 - 330 tonnes of tarakihi (\$728 973)
- ⇒ The WCNI trawl fleet <46m caught approximately 11026.8 tonnes of targeted catch over the past three years in the Statistical Reporting Areas that include the area between Maunganui Bluff and Cape Egmont
- ⇒ Over the past three years, approximately 61 trawl vessels <46m caught fish in the Statistical Reporting Areas between Maunganui Bluff and Cape Egmont (MFish cannot determine how many vessels fished inside and outside 4nm)
- ⇒ Option 3 will require all trawl vessels to shift effort outside 4nm between Maunganui Bluff and Cape Egmont. MFish doubts the trawl fleet can maintain catches equivalent to current levels with equivalent effort (including cost) outside 4nm. As such, many inshore fishing operations would be substantially affected and this would have a significant impact on the local economy.
- ⇒ Similarly with Option 2, affected fishers would be required to either fish further offshore or shift effort into more northern and southern areas along the WCNI where the prohibition would not apply (alternative fishing areas south of Taranaki is already restricted between Cape Egmont and the Rangitikei River under the south Taranaki voluntary trawl agreement). The likely impacts identified under Option 2 would be substantially greater under Option 3 as some fishers seek alternative fishing areas in which to continue to catch inshore species. The requirement to redistribute fishing effort will have significant cost as a direct result of lower catch levels and substantially higher fishing (travel) costs.
- ⇒ MFish cannot determine if vessels will be able to shift effort inside a Quota Management Area to maintain existing catches of stocks targeted inside the proposed prohibition
- ⇒ MFish doubts that viable alternative bulk fishing methods (e.g. longlining) will enable trawl fishers to maintain catch equivalent to current levels inside 4nm between Maunganui Bluff and Cape Egmont.
- ⇒ Option 3 will most likely devalue ITQ for stocks targeted inside the proposed prohibition and a number of vessels and fishers will move out of the fishery.

MFish invites submissions from fishers that describe the nature and effect of Option 3 measures on their

fishing operations.

Table 8: Summary of Trawl Management Options and Impacts on Fishers

Information	<p>Trawling occurs within 1-4nm of shore within dolphin habitat;</p> <p>Intensity of trawling lower between Manukau Harbour and Waikato River than further north towards the Kaipara;</p> <p>No information that establishes that dolphins have been caught/injured by trawlers.</p>
Status Quo	Existing management
Option 1	Obtain information from observers and possibly electronic monitoring to determine level of risk/require a level of monitoring on vessels operating closer than 4nm
Level of Protection	Retains status quo with vessels operating in dolphin habitat but recognising that there is no proof that such operations have caused dolphin deaths/harm but there is residual risk that requires monitoring
Impacts on Fishers	Most vessels could continue to fish as they do now providing they cover monitoring costs if deemed necessary by the Minister
Option 2	Year- round closure within 4nm of shore between Manukau Harbour and Waikato River/Winter closure within 4nm of remainder of area Maunganui Bluff – Pariokariwa
Level of Protection	<p>Dolphins between Manukau Harbour and Waikato River totally protected from trawling;</p> <p>Dolphins in remainder of habitat protected in winter when they appear to move further offshore at times.</p>
Impacts on Fishers	<p>Trawlers would lose access to the area between Manukau Harbour and Waikato River and catches currently taken there, but level of trawling in this area appears relatively low;</p> <p>Trawlers would retain access to dolphins’ habitat in summer when most trawling occurs, and lose access in winter;</p> <p>Lesser economic impact than Option 1 as while some fishing area lost, can still fish “best” areas at best times.</p>

Option 3	Prohibition to apply within 4nm of shore from Maunganui Bluff – Cape Egmont
Level of Protection	A prohibition on trawling in all parts of the dolphins’ habitat would eliminate this method of fishing as a potential threat.
Impacts on Fishers	There would be economic impacts on the viability of trawl operations (the extent of these will become more apparent once socio economic research is complete); Removal of inshore areas is likely to cause catch reductions and reduced earnings; Loss of inshore grounds could increase fuel consumption as vessels travel further to find fish.

7.3.5.4. *Drift netting*

MFish proposes the following options to manage the threats of drift netting on Maui’s dolphins. In considering the most appropriate course of action, the Minister should note that there have been no confirmed Maui’s dolphin interactions with drift nets but there is a risk that dolphins could become entangled if drift nets are lost and float down the Waikato River and into Maui’s dolphin habitat.

MFish cannot quantify the incidence of lost nets or the level of risk posed to dolphins from this fishing method except to note that drift net effort has declined in recent years and there is one possible, but no confirmed drift net related mortalities.

Status Quo	Existing management
Option 1	Prohibit drift netting in the lower reaches of the Waikato River
Option 2	Prohibit drift netting in Port Waikato

Option 1

Option 1 proposes a drift net prohibition in the lower reaches of the Waikato River (from the store to the river mouth) and is appropriate if the Minister considers a residual level of drift netting further upstream is acceptable given potential risk from drift nets to Maui’s dolphins.

◆ *Effectiveness*

Prohibiting drift net fishing at the lower reaches of the river reduces chances of nets being lost and reaching the sea before they can be retrieved. MFish cannot determine the extent by which risk to Maui’s dolphins will be reduced because the extent of lost drift nets is unknown.

◆ *Impacts on fishers*

Drift netting for mullet decreased in Port Waikato over the past three years. Nevertheless, drift net fishing is a specialist method that supports a small number of fishers who would be affected if part of the fishable area was removed from the fishery. Option 1 leaves the upper reaches of Port Waikato available to fishers.

MFish invites submissions from fishers that describe the nature and effect of Option 1 measures on their

fishing operations.

Option 2

Option 2 proposes a drift net prohibition at Port Waikato including the lower reaches of the Waikato River from the store to the river mouth (ie, a more extensive area than Option 1). Option 2 is appropriate if the Minister considers any threat to Maui's dolphins from drift net fishing is unacceptable.

◆ *Effectiveness*

Option 2 would most likely prevent any drift net fishing in the Waikato River and remove any potential risk that a drift net would float into Maui's dolphin habitat.

◆ *Impacts on fishers*

Catch effort information shows that drift net use at Port Waikato has declined to the extent that few fishers would be affected by a prohibition (see Table 6). Fishers could use set nets to maintain catches equivalent to current levels, although the Minister's decision on set net use may prevent any net fishing in Port Waikato and the lower reaches of the Waikato River. Drift net fishing is a specialist method that supports a small number of fishers who would be affected if the entire fishable area at Port Waikato was removed from the fishery.

Table 9: Summary of Drift Net Management Options and Impacts

Information	Drift netting happens at Port Waikato - one end of the are within which Maui's dolphins' appear to be most abundant; Dead dolphin found in net that may have been a Port Waikato drift net; Drift nets do get lost at Port Waikato; Use of drift nets has declined in recent years
Status Quo	Existing management
Option 1	Close the lower reaches of the Waikato River to drift netting
Level of Protection	Some low level of risk remains that nets could be lost upstream from the closure and reach the sea.
Impacts on Fishers	The closed area will remove small part of the fishable area at Port Waikato but leave the most heavily fished area open to drift netters.
Option 2	Prohibit drift net fishing at Port Waikato
Level of Protection	- A prohibition on use of drift nets at Port Waikato would eliminate this method of fishing as a potential threat.
Impacts on Fishers	- It is mainly commercial fishers who fish with drift nets. Numbers are relatively small; - Those who do can probably use other methods, so their choice of drift nets indicates it is providing good returns for them.