



Ministry of
Fisheries
Te Taubieki i nga timi a Tangaroa

DRAFT FISHERIES PLAN

NORTH-EAST FINFISH FISHERY



December 2007

Snapper (SNA 1)	Grey mullet (GMU 1)
Kahawai (KAH 1)	Bluenose (BNS 1)
Red gurnard (GUR 1)	Kingfish (KIN 1)
Pilchard (PIL 1)	School shark (SCH 1)
Tarakihi (TAR 1)	Rig (SPO 1)
Flatfish (FLA 1)	John dory (JDO 1)
Trevally (TRE 1)	Hāpuku/bass (HPB 1)

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INTRODUCTION

Executive Summary

1 This fisheries plan applies to most of the main commercial and non-commercial finfish fisheries along the length of the North Island's North-East coast. This document summarises available information on species that comprise the greater proportion of catches in the fishery, provides an overview of the key stakeholders and their particular interests, and outlines how these fisheries are currently managed.

2 Information within this plan will be used to devise management objectives for the fishery and measures to ensure that these objectives are achieved. When completed, it will therefore represent a "complete management package" for the North-East coast finfish fisheries, with provisions for monitoring and evaluation to maintain the relevance and effectiveness of the fisheries plan.

3 The main commercial species covered by this plan is snapper. Catch within SNA 1 made up a substantial portion of the total landings for all snapper (around two-thirds) for the period 1995-2006. Snapper is also the main recreational species covered by this plan (a 2001 national diary survey identified snapper as the main target species for over 50% of recreational fishers). Many of the other species covered by this plan such as kahawai, gurnard, tarakihi, trevally and flatfish are highly valued by both commercial and non-commercial fishers alike.

4 The Ministry of Fisheries (MFish), tāngata whenua and stakeholders will develop this plan by working together to formulate management objectives and measures for the finfish fisheries covered by the plan, and to propose an operational plan for the future management of the fisheries. In short, the purpose of the plan is to give all sectors with an interest in finfish stocks on the north-east coast of the North Island direct input into how these fisheries are managed.

Purpose of the North-East Finfish Plan

5 The North-East Finfish Plan is a collaborative approach between the Government, tāngata whenua, and stakeholders to maximise value to New Zealanders through sustainable use of fisheries and protection of the marine environment.

6 The plan is incomplete because it only outlines the current situation, available information and management of the fishery from the Government's perspective. Completion of the plan requires working with tāngata whenua and stakeholders to ensure the best available information on the current situation is considered. Stakeholder collaboration is required to develop management objectives, assess the fishery, recommend management measures and propose an operational plan for the future management of the fishery.

7 Section 1 of the North-East Finfish Plan provides a summary of information on:

- The finfish species that are taken in the commercial fisheries on the North-East coast of the North Island (with a focus on inshore species);
- North-East coast non-commercial fisheries;
- Environmental considerations associated with these fisheries, such as protected species and benthic impacts; and
- How the fisheries are managed and how services like compliance and research are allocated.

8 This information has been compiled as a basis for stakeholders to develop objectives for the North-East inshore finfish fisheries. Objectives are to enable stakeholders to maximise the values that they gain from the fisheries while ensuring that sustainability is maintained and the aquatic environment is protected.

9 Management measures will be prioritised against measures proposed in other fisheries plans. Once the plan is operational, MFish, tāngata whenua and stakeholders will monitor and review it. The plan will be fully reviewed at appropriate times in the future to update the best available information, review objectives, reassess the fishery, and develop new management measures.

Scope of the North-East Finfish Plan

10 The plan covers species caught in inshore waters and harbours along the North-East coast of the North Island – within Fisheries Management Area (FMA) 1 (Figure 1).

11 The following species are the main focus of this plan:

Snapper (SNA 1)	Grey mullet (GMU 1)
Kahawai (KAH 1)	Bluenose (BNS 1)
Red gurnard (GUR 1)	Kingfish (KIN 1)
Pilchard (PIL 1)	School shark (SCH 1)
Tarakihi (TAR 1)	Rig (SPO 1)
Flatfish (FLA 1)	John dory (JDO 1)
Trevally (TRE 1)	Hāpuku/bass (HPB 1)

12 Fish species are often referred to by their abbreviated species codes eg, TRE for trevally, SNA for snapper and so on. The number following the species abbreviation refers to the quota management area (QMA) for the species. The QMA may consist of either a single or multiple FMAs*. Commercial fishers generally report where they have caught fish by statistical area. FMA 1 is divided into a number of statistical areas, numbered 001 – 010 (Figure 1).

* For example, the QMA for snapper on the North-East coast – SNA 1 – corresponds to FMA 1. However, many northern stocks are managed in QMAs that combine more than one FMA. For example, the QMA for tarakihi – TAR 1 – is made up of FMA 1 (North-East coast) and FMA 9 (North-West coast).

Fisheries Management Areas 1 and 9

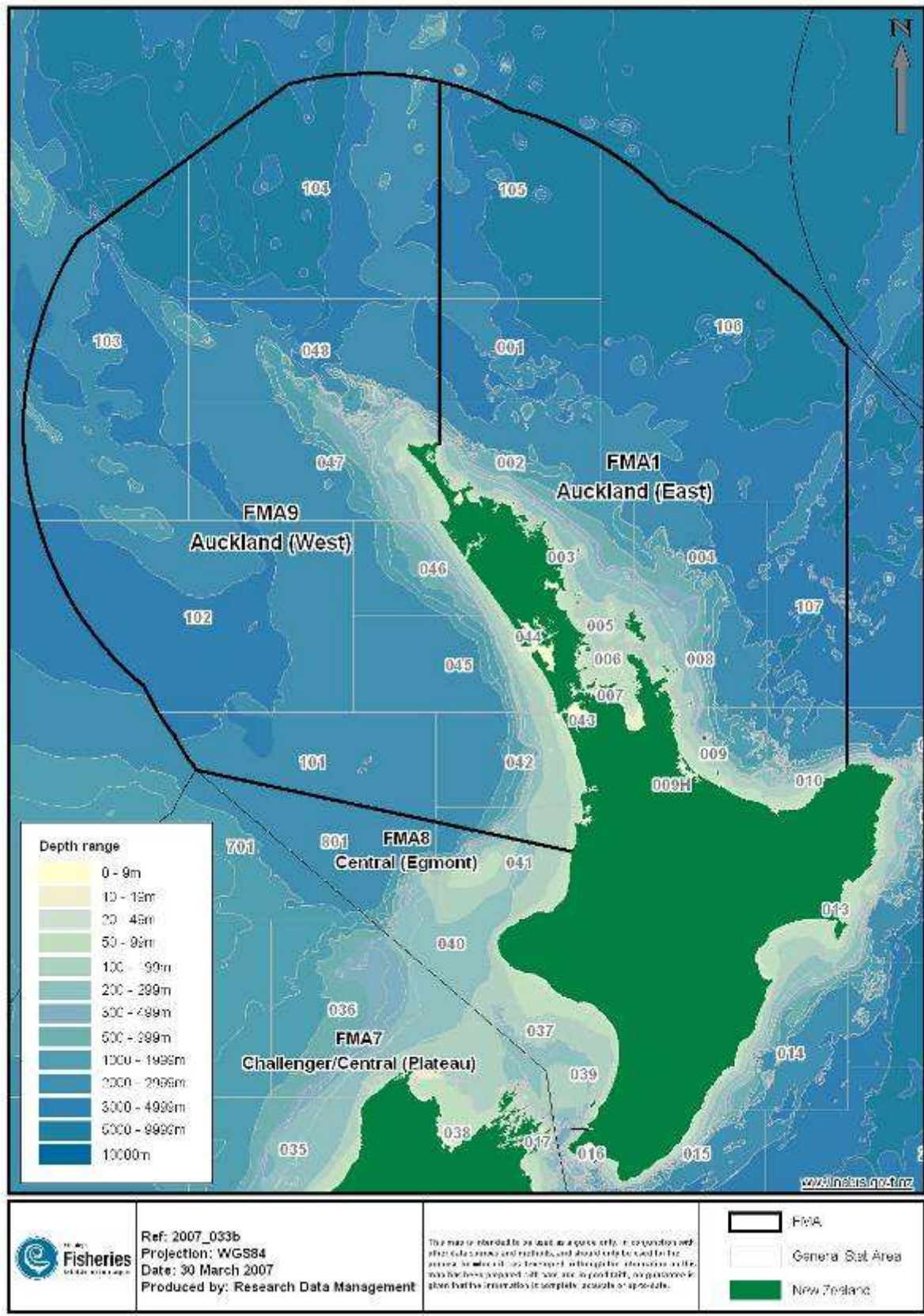


Figure 1: Map of Fisheries Management Areas 1 and 9 and statistical areas

13 Those species that are caught within the North-East inshore statistical areas, but are predominantly caught by other fisheries, will be managed under different fisheries plans as follows:

- | | |
|-----------------|--|
| • Skipjack tuna | Highly migratory species fisheries plan |
| • Jack mackerel | Deepwater / middle-depths fisheries plan |
| • Blue mackerel | Deepwater / middle-depths fisheries plan |
| • Barracouta | Deepwater / middle-depths fisheries plan |
| • Ling | Deepwater / middle-depths fisheries plan |

Fisheries in the Plan

14 The main commercial fisheries species covered in this plan are:

- Snapper;
- Kahawai;
- Red gurnard;
- Pilchard;
- Tarakihi;
- Flatfish (sand flounder and yellow-belly flounder);
- Trevally;
- Grey mullet;
- Rig;
- Bluenose;
- John dory; and
- Hāpuku/bass.

15 Other fish stocks covered in this plan are caught mainly as bycatch species in other commercial fisheries. These include:

- Kingfish (mainly caught as a bycatch in bottom long-line and bottom trawl fisheries targeting snapper, trevally and tarakihi);
- School shark (mainly caught as a bycatch in bottom long-line, set net and bottom trawl fisheries targeting hāpuku/bass, tarakihi, snapper and trevally).

16 Most of the species covered in this fisheries plan are also popular targets for non-commercial fishers. In particular, snapper, kahawai, gurnard, tarakihi, flounder, trevally, mullet, kingfish, John dory, rig, and hāpuku/bass are important for non-commercial fishers. Table 1 shows the management areas for these stocks, and the main commercial and non-commercial fishing methods.

17 Many other fishstocks are commercially caught in relatively small numbers on the North-East coast, either as bycatch of the main North-Eastern inshore fisheries, or as small target fisheries. There is also non-commercial interest in some of these species. Because of the small volume of catches for these fisheries they will not be examined in detail in this plan. Such species include blue and pink maomao, red snapper, yellow-eyed mullet, blue cod and garfish (piper) (Table 2).

Table 1: North-Eastern inshore species, stocks and main fishing methods

Species common name	Māori name/s	Species scientific name	Stock	FMA's	Main commercial fishing methods (FMA 1)	Main non-commercial fishing methods
Snapper	Tamure Karati (small snapper)	<i>Pagrus auratus</i>	SNA1	1	Bottom trawl, bottom longline, Danish seine	Line
Kahawai	Kahawai, Koukauaka Hapukupuku / Kopapa / Korā (young kahawai); Tapurupuru (half-grown)	<i>Arripis trutta</i> ; <i>A. xylabion</i>	KAH1	1	Purse seine, set net	Line
Red gurnard	Kumukumu, Puwhaiāu	<i>Chelidonichthys kumu</i>	GUR1	1 & 9	Bottom trawl, bottom longline, Danish seine	Line
Pilchard	Mohimohi	<i>Sardinops sagax</i>	PIL1	1	Purse seine	Not a common target species
Tarakihi	Tarakihi	<i>Nemadactylus macropterus</i>	TAR1	1 & 9	Bottom trawl, bottom longline	Line
Flatfish Sand flounder Yellow-belly flounder Greenback flounder Black flounder New Zealand sole Lemon sole Brill Turbot	Patiki	<i>Rhombosolea plebeia</i> <i>R. leporina</i> <i>R. tapirina</i> <i>R. retiaria</i> <i>Peltorhamphus novaezeelandiae</i> <i>Pelotretis flavilatus</i> <i>Colistium guntheri</i> <i>C. nudipinnis</i>	FLA1	1 & 9	Set net	Set net
Trevally		<i>Pseudocaranx dentex</i>	TRE1	1	Bottom trawl, purse seine	Line and set net
Grey mullet	Kanae / Kopuwai Hopuhopu	<i>Mugil cephalus</i>	GMU1	1 & 9	Set net, ring net	Set net
Bluenose		<i>Hyperglyphe antarctica</i>	BNS1	1 & 9	Bottom longline	Line
Kingfish	Warehenga / Wharehenga	<i>Seriola lalandi</i>	KIN1	1	Bottom longline, bottom trawl, set net	Line
School shark	Pioka / Pioke	<i>Galeorhinus galeus</i>	SCH1	1 & 9	Bottom longline, set net	Not a common target species
Rig	Mango / Kapeta	<i>Mustelus lenticulatus</i>	SPO1	1 & 9	Set net	Set net, line

Species common name	Māori name/s	Species scientific name	Stock	FMA's	Main commercial fishing methods (FMA 1)	Main non-commercial fishing methods
John dory	Kuparu	<i>Zeus faber</i>	JDO1	1 & 9	Bottom trawl, Danish seine	Line
Hāpuku/Bass	Hāpuku / Hapuka, Kauaeroa Hakura (large groper)	<i>Polyprion oxygeneios</i> , <i>P. americanus</i>	HPB1	1 & 9	Bottom longline, drop line	Line

Table 2: North-Eastern inshore species and stocks not covered in detail in this plan

Species Common name	Species Scientific Name	Stock	Fisheries Management Area/s	Main commercial fishing methods	Main non-commercial fishing methods
Blue maomao	<i>Scorpius violacea</i>	BMA 1	1	Bycatch in setnet, purse seine, bottom longline fisheries (of TRE, SNA, TAR fisheries)	Line
Red snapper	<i>Centroberyx affinis</i>	RSN 1	1	Bycatch in bottom longline, bottom trawl and setnet fisheries (of SNA, TAR, TRE fisheries)	Line
Yellow-eyed mullet	<i>Aldrechetta forsteri</i>	YEM 1	1	Setnet, beach seine (small target fishery)	Netting
Blue cod	<i>Parapercis colias</i>	BCO 1	1 & 9	Bycatch in bottom longline fisheries (of SNA, HPB, GUR fisheries)	Line
Garfish	<i>Hyporhamphus ihi</i>	GAR 1	1	Beach seine & lampara (small target fishery)	Netting

Section 1: The Current Situation

18 This section provides the best available information on the current situation across three broad outcomes of MFish’s Statement of Intent (SOI):

- Health of the aquatic environment is protected;
- Best value is able to be realised; and
- Credible fisheries management.

The Health of the Aquatic Environment is Protected

MFish Statement of Intent Outcome:
“The health of the aquatic environment is protected”

19 Protecting the health of the aquatic environment is one of the outcomes described in the MFish Statement of Intent. Working towards this outcome involves:

- Providing frameworks and incentives to improve environmental performance of fisheries;
- Setting standards for fishing activity;
- Achieving compliance with environmental standards set for fishing activity; and
- Contributing to processes that manage impacts not caused by fishing.

North-East coast marine environment

20 Environmental influences include: the contours of the sea bed (bathymetry), the width of the continental shelf, substrate types, hydrology, temperature, salinity, oxygen and light. Each of these, in various combinations, will influence both the type of marine species and the biodiversity of coastal regions.

21 The North-Eastern seaboard is characterised by a relatively sheltered ‘lee shore’ in an area of predominantly westerly winds. The northern areas are at lower latitudes and are influenced by relatively warm, subtropical waters. The continental shelf on the North-East coast is very narrow (10-20km) between North Cape and Cape Brett, and the bottom is hard and scattered with numerous reef and shoal systems. South of Cape Brett, the shelf widens to approximately 70-100km to encompass the shallow expanse of Bream Bay and the Hauraki Gulf. The sea bed over this area is irregular, varying from the relatively flat expanses of the Hauraki Gulf and Bream Bay to rugged areas of hard reef and shoal along the coast between Cape Brett and Tutukaka.

22 In the relatively shallow expanse of the Bay of Plenty, the continental shelf is approximately 70km wide, but near Cape Runaway in the East, it narrows rapidly to approximately 10km. The sea bed in the Bay of Plenty is generally smooth or undulating with few extended areas of reef or shoal.

23 The circulation and hydrology of coastal shelf waters play an important role in determining the patterns of distribution and abundance of the major demersal and pelagic species in the region. The North-Eastern region of the North Island is subject to a warm temperate climate. The sub-tropical East Auckland Current significantly influences the local marine environment. This current is part of the South Pacific circulation that flows along the offshore regions of the continental shelf, in a south-easterly direction. Features of the East Auckland Current are relatively high salinity and water temperatures. These features are caused by a sub-tropical, eastward extension of the East Australian Current that meanders towards New Zealand from the Tasman Sea.

24 The South Pacific circulation is not constant, but is subject to decadal oscillation. During periods of El Niño, the North-East coast is subject to strong westerly winds. This pushes surface water offshore which drives the upwelling of cooler water from the depths. This generally results in cooler water temperatures and a high level of available nutrients. In periods of La Niña, the North-East coast generally experiences more north-easterly winds, and the likelihood of tropical cyclones is increased. These winds tend to push the warmer, nutrient-poor water from the East Auckland Current closer into shore. In addition, the increased rainfall associated with La Niña introduces additional nutrients from land run-off to the local marine environment.

25 The North-East coast of the North Island falls within the North-Eastern area of the Marine Environment Classification (MEC)[†] (from Ahipara around the tip of the North Island down to East Cape). This warm temperate region is bounded in the south by the confluence of the warm East Cape current that moves south and the cool Wairarapa current that flows north.

26 The North-East North Island has a variety of benthic substrates, but the distribution of these is not well described. The 2005 MEC can be used to predict the distribution of habitats and communities, although these predictions are known to be less accurate for benthic habitats than they are for pelagic and demersal fish communities. The 40-class MEC for this area shows at least seven classes in the area likely to be fished (Figure 2).

27 One of the main problems with the 2005 MEC was that data on substrate or sediment type could not easily be included in the classification scheme. This is unfortunate because benthic community composition is known to be strongly affected by depth and substrate type. The available data are relatively coarse, but show that most of the “fishable” parts of FMA 1 (Figure 3) have a seabed of mud (green), with smaller amounts of volcanic sediments (paler green) and sand/gravel (purple). The unstable terrain and high sediment discharge rates of many East-coast rivers indicates that much of the substrate in FMA 1 is terrestrial in origin.

28 An alternative to using MEC classes to predict benthic habitat would be to use some combination of depth and substrate type. In addition, there are smaller-scale features such as seamounts, canyons, areas of very steep contour, subtidal rocky reefs, and embayments that provide very different benthic habitats. These cannot be easily represented at the scale of Figure 3.

[†] The MEC provides a general map that shows the variation in both the physical and biological characteristics of New Zealand’s marine area within our Exclusive Economic Zone.

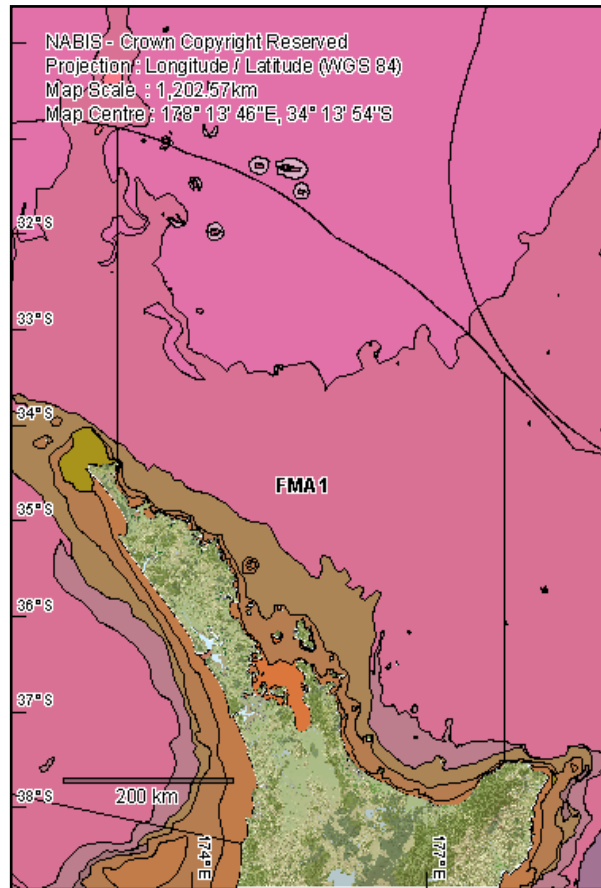


Figure 2: 40-class MEC for Fisheries Management Area 1

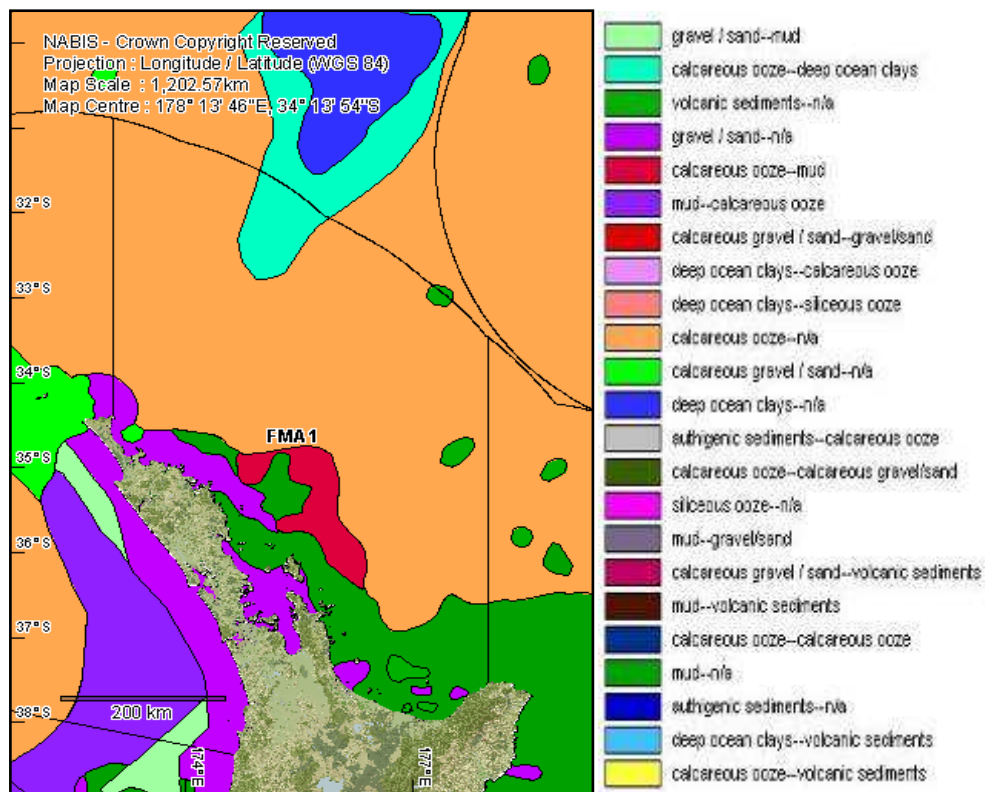


Figure 3: The broad-scale distribution of bottom sediments in Fisheries Management Area 1

29 A “benthic optimised” MEC is under development and should be available in late 2007. This revised version will include substrate data and will be tested and “tuned” against many more biological data than the original version. Predictions of the distribution of benthic habitats should be much improved when derived from the “benthic optimised” MEC.

Biodiversity

30 Section 9 of the Fisheries Act 1996 outlines several environmental principles for decision-makers to take into account. One of those principles is that biological diversity of the aquatic environment should be maintained.

31 A key method of protecting biodiversity is the establishment of marine protected areas (MPAs). In December 2005, the government released the “Marine Protected Areas Policy and Implementation Plan”. This plan provides overlying guidance for regional strategies that will address local biodiversity protection mechanisms. More recently the government has consulted in a proposed MPAs classification and protection standard.

32 The Government aims to protect 10% of New Zealand’s marine environment by 2010. Marine reserves are established under the Marine Reserves Act 1971 and can provide absolute protection to all marine life within the reserve. Marine reserves are established to retain marine areas in unmodified states for scientific research, and are seen as one key mechanism to achieve biodiversity outcomes. Table 3 lists the marine reserves currently established within FMA 1 (also see Figure 4). It should be noted that an application for a further marine reserve near Great Barrier Island is currently under consideration.

33 Other marine areas that have been closed to fishing include shipping lanes and/or marine cable protection zones (Figure 5). Although these were not established for the purpose of marine protection, these may also achieve this purpose. Other marine areas are under various types of customary management, including mātaihai reserves and taiāpure-local fisheries (detail in later sections). Although not their principle goal, customary areas may also achieve some biodiversity outcomes.

34 Unlike marine reserves, marine parks offer differing levels of protection. Three marine park areas are contained within FMA 1 (Table 4):

- The Mimiwhangata Marine Park prohibits commercial fishing and places equipment restrictions on recreational fishers in order to protect reef fish species. Non-reef fish species, crayfish and invertebrates are allowed to be taken by non-commercial fishers.
- The Tawharanui Marine Park provides fisheries controls to protect all fish stocks within the park by regulations. An application is currently before the Director General of Conservation to reclassify Tawharanui Marine Park as a marine reserve.
- The Hauraki Gulf Marine Park was established under the Hauraki Gulf Marine Park Act 2000. However, the Hauraki Gulf Marine Park provides no specific protection to marine life.

Table 3: Marine reserves in Fisheries Management Area 1.

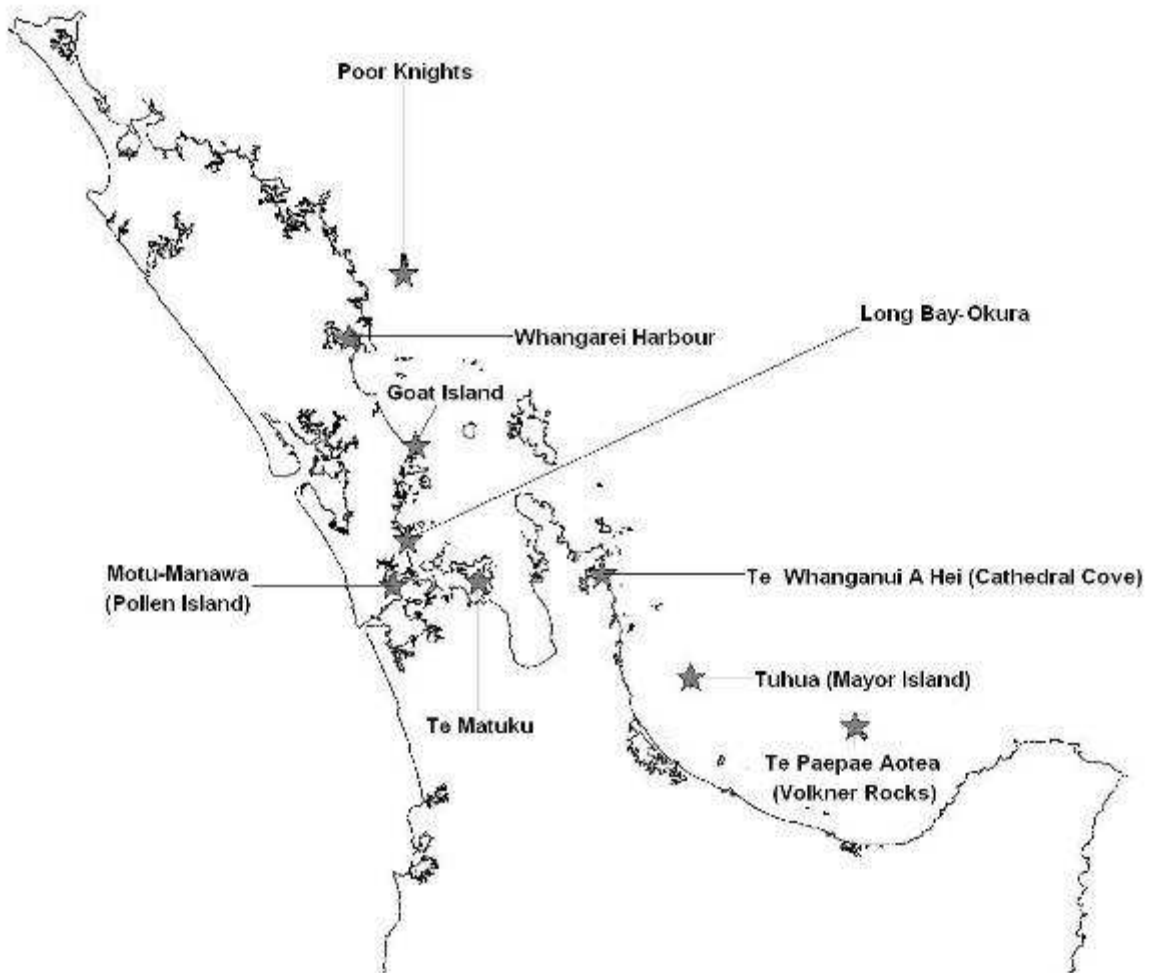
Name of marine reserve	Location	Area (ha)	Established
Poor Knights Islands Marine Reserve	Whangarei	2 400	1981
Whangarei Harbour Marine Reserve	Whangarei Harbour	254	2006
Cape Rodney to Okakari Point Marine Reserve	Leigh	518	1975
Long Bay Okura Marine Reserve	Auckland	980	1995
Motu Manawa (Pollen Island) Marine Reserve	Waitemata Harbour	500	1995
Te Matuku Marine Reserve	Hauraki Gulf	690	2005
Te Whanganui-A-Hei Marine Reserve	Mercury Bay	900	1992
Tuhua –Mayor Island Marine Reserve	Mayor Island	1 060	1993
Te Paepae o Aotea (Volkner Rocks)	Whakatane	267	2006

Table 4: Marine parks along the North-East coast.

Name of Marine Park	Location	Area (ha)	Established
Mimiwhangata Marine Park	Mimiwhangata	2 000	1983
Tawharanui Marine Park	Omaha	588	1981
Hauraki Gulf Marine Park	Hauraki Gulf	1 390 000	2000

Protecting biodiversity outside of marine protected areas

35 In 2010, the current government aims to have achieved a target of 10% of New Zealand's marine environment under some method of formal protection. However it should be recognised that the 90% of the marine environment will remain unprotected. In this respect, fisheries controls (either legislative or non legislative) provide a key means of protecting biodiversity in areas outside of marine protected areas.



Ref: 2005_101_4

Projection: WGS84

Date: 18 January 2007

Produced by: Research Data Management

This map is intended for use as a reference, in conjunction with other data sources and methods, and should only be used for the purpose for which it was developed. Although the information on this map has been prepared with care and in good faith, no guarantee is given that the information is complete, accurate or up-to-date.

Figure 4: Marine reserves on the North-East coast

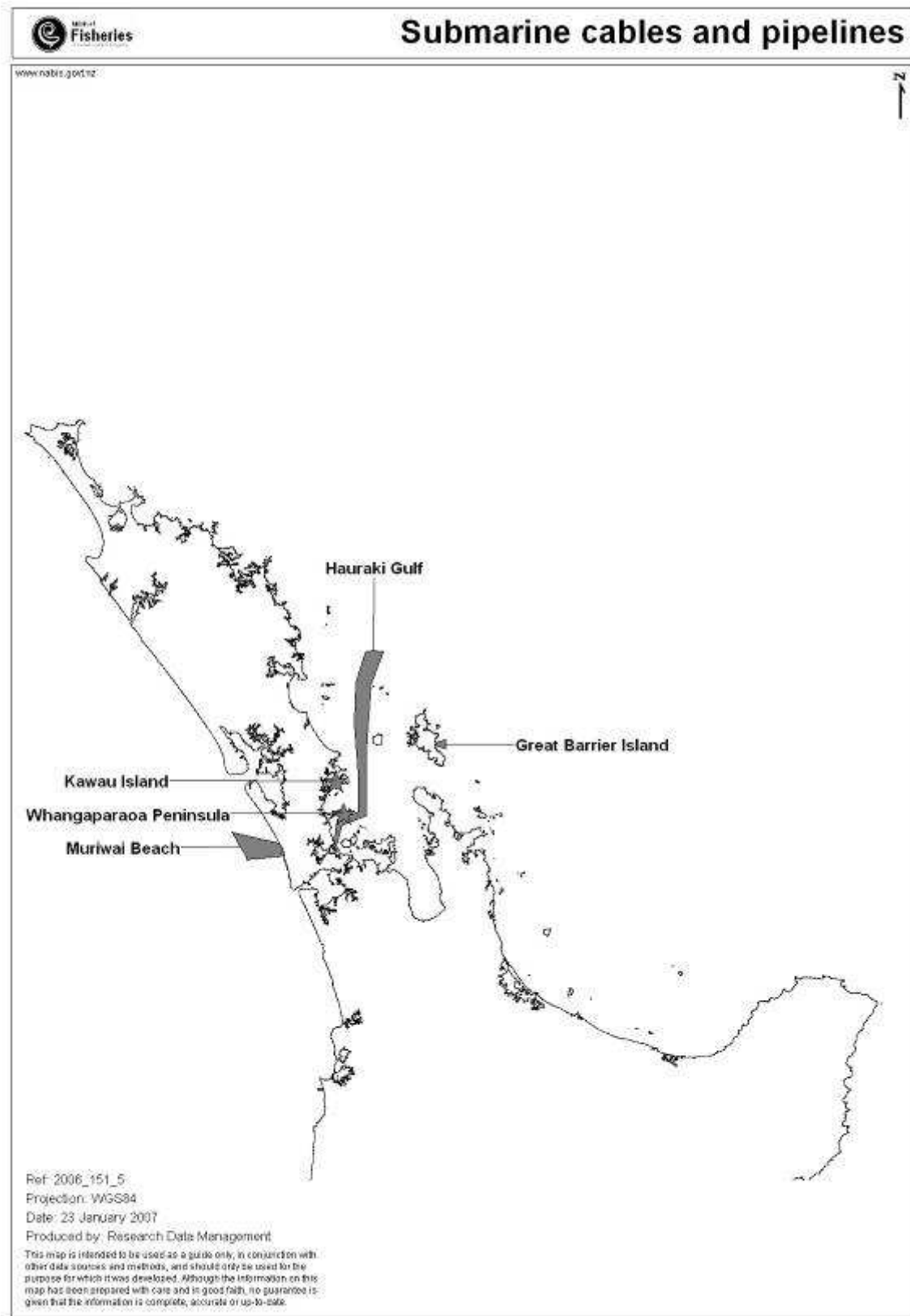


Figure 5: Areas for submarine cable/pipeline protection* within Fisheries Management Area 1

* No fishing or anchoring except for (a) ships being used for research by or for Ministry of Fisheries as long as research is done without directly or indirectly attaching any ship to the seabed; (b) (in case of Hauraki Gulf area) ships used by Telecom Ltd or Southern Cross Cables Ltd for laying, monitoring, maintaining, or repairing submarine cables or for undertaking other operational activities in respect of submarine cables.

Benthic impacts

Benthic impacts are impacts on the animals and plants living on, or attached to the bottom of the sea or lake, from the high water mark down to the deepest levels (ie, the benthos).

36 Fishing methods that can impact on the benthic environment include bottom trawling, bottom pair trawling and Danish seining. Midwater trawling can impact on the benthos during those times when midwater gear comes into contact with the sea floor. Set netting and longlining have little direct impact on the benthos other than the localised physical impact of anchors which are used to weight longlines or set nets.

37 Bottom trawling is known to affect most benthic habitats when fishing equipment interacts with the benthos, reducing habitat structure (especially biogenic reef structure); reducing the abundance of long-lived, foliose and emergent animals; and reducing benthic biodiversity.

38 According to TCEPRs (trawl catch effort processing returns), bottom trawling is relatively common throughout most of the coastal zone in FMA 1 and extends out to several hundred metres depth (Figure 6). It should be noted that the map does not show all fishing effort, but only that for which latitudes and longitudes are reported. Some additional trawling by smaller vessels is reported on CELRs (catch effort landing returns) that do not provide tow-by-tow fishing locations, and therefore cannot be plotted on charts. These data suggest that a relatively high proportion of most of the unconsolidated sedimentary habitats shallower than approximately 600 m in FMA 1 are impacted by bottom trawling. The exceptions are areas where the contour is very steep or where there are areas of “foul” ground or other obstructions to trawling.

39 In other regions, fishing methods that are less likely to affect benthic habitat are used (eg, various sorts of lining for demersal and pelagic fishes, midwater trawling and rock lobster potting).

40 Our knowledge of the relative vulnerability of different seabed types to bottom trawling is limited, but available data and ecological principles suggest that the most vulnerable communities will be those dominated by erect epifauna or other long-lived species, and which are adapted to low levels of physical disturbance. The rate of recovery of benthic habitats from fishing damage is poorly known. It is generally assumed that the re-establishment of corals and other erect fauna on seamounts and deep reefs is likely to take decades or even centuries.

41 Mobile sandy sediments in or close to the surf zone are likely to be most resilient to trawling disturbance and to recover rapidly. All else being equal, vulnerability to trawling impacts and length of recovery times are likely to increase with increasing depth. This is because general productivity and the likelihood of natural disturbances generally decrease with depth.

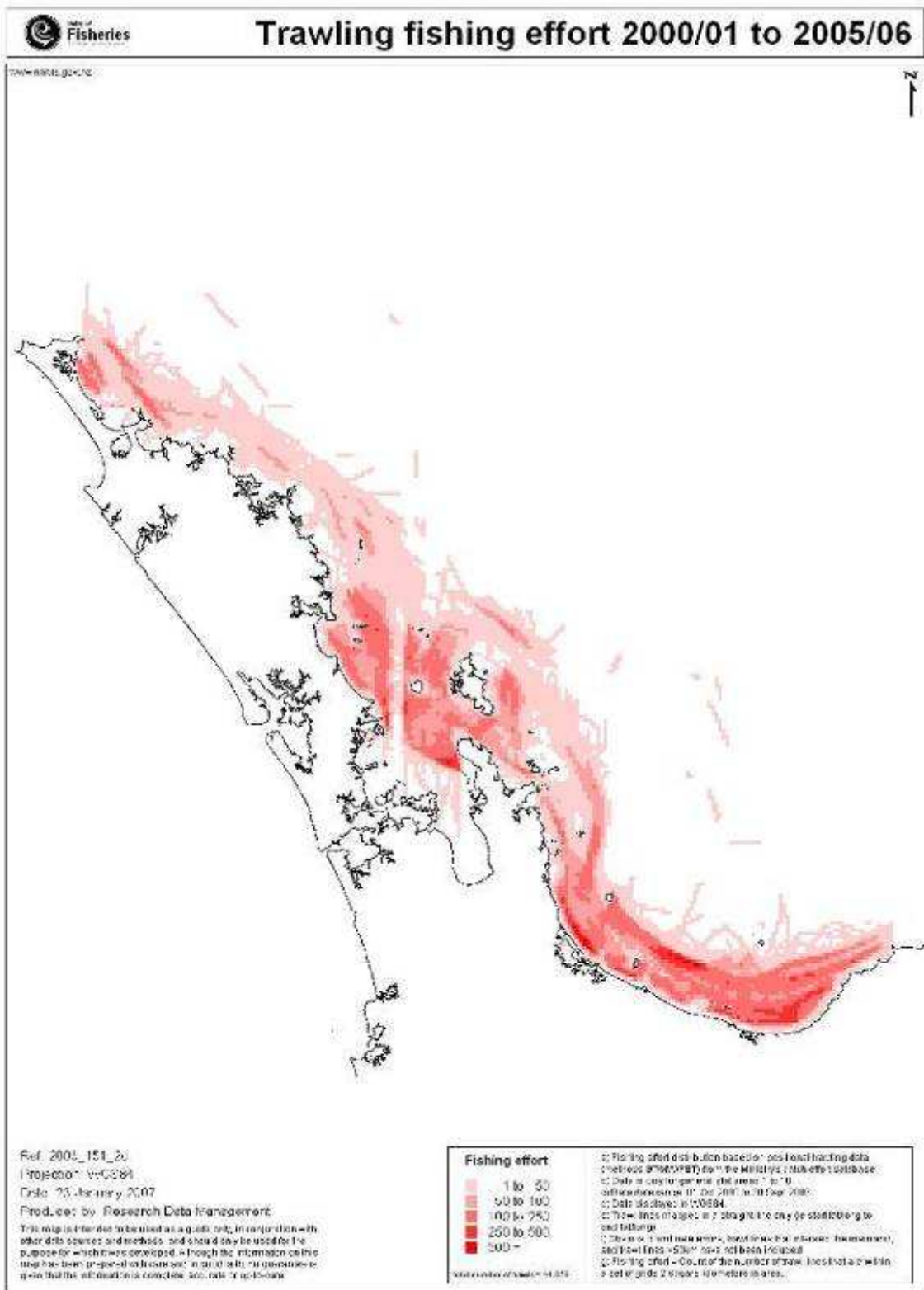


Figure 6: The distribution of bottom trawling fishing effort in Fisheries Management Area 1 (2000/01–2005/06)

Static netting methods

42 Netting methods such as set netting may have a variety of impacts on the aquatic environment. Such impacts include:

- Accidental capture of marine mammals or seabirds (see associated and dependent species section);
- Bycatch of unwanted species (eg, juvenile or undesirable fish); and
- Loss of fishing nets which can lead to the indiscriminate capture of fish from unsupervised nets - also known as 'ghost fishing'. This is a potential problem in areas with rocky bottoms and/or strong currents which may result in the loss of nets.

43 In the North-Eastern region of the North Island, several areas with these characteristics have been closed to set netting (portions of the Bay of Islands, the Hen and Chicken Islands, waters surrounding various islands of the Hauraki Gulf, waters of various islands off the Coromandel Peninsula, and waters off Cape Runaway (Figures 7-10).

Habitats of particular significance to fisheries management

44 Protecting habitats of particular significance to fisheries management is one of the environmental principles outlined in s9 of the Fisheries Act 1996. Habitats of particular significance for fisheries management can include:

- Spawning areas;
- Nursery areas;
- Estuaries;
- Migratory routes;
- Areas of particularly high biodiversity; and
- Biogenic reefs.

45 Various regulations that control fishing on the North-East coast may achieve a variety of goals. These include protection of habitats of particular significance to fisheries management (eg, areas where juvenile fish are more prevalent), general marine biodiversity protection (associated and dependent species), and provision for some spatial separation of commercial and non-commercial fishing methods. The main controls that currently protect habitats of significance to fisheries management are shown in Figures 7-11c.

46 Some of the controls on amateur fishing in the region are also aimed at protecting habitats of significance to fisheries management (Figures 11a-c). In particular, various closures were put in place after a review of set net practices in the early 1990s. These closures were aimed at preventing set netting on some reefs, where it was considered reef fish were particularly vulnerable to fishing, and that lost or snagged nets could contribute to habitat damage.

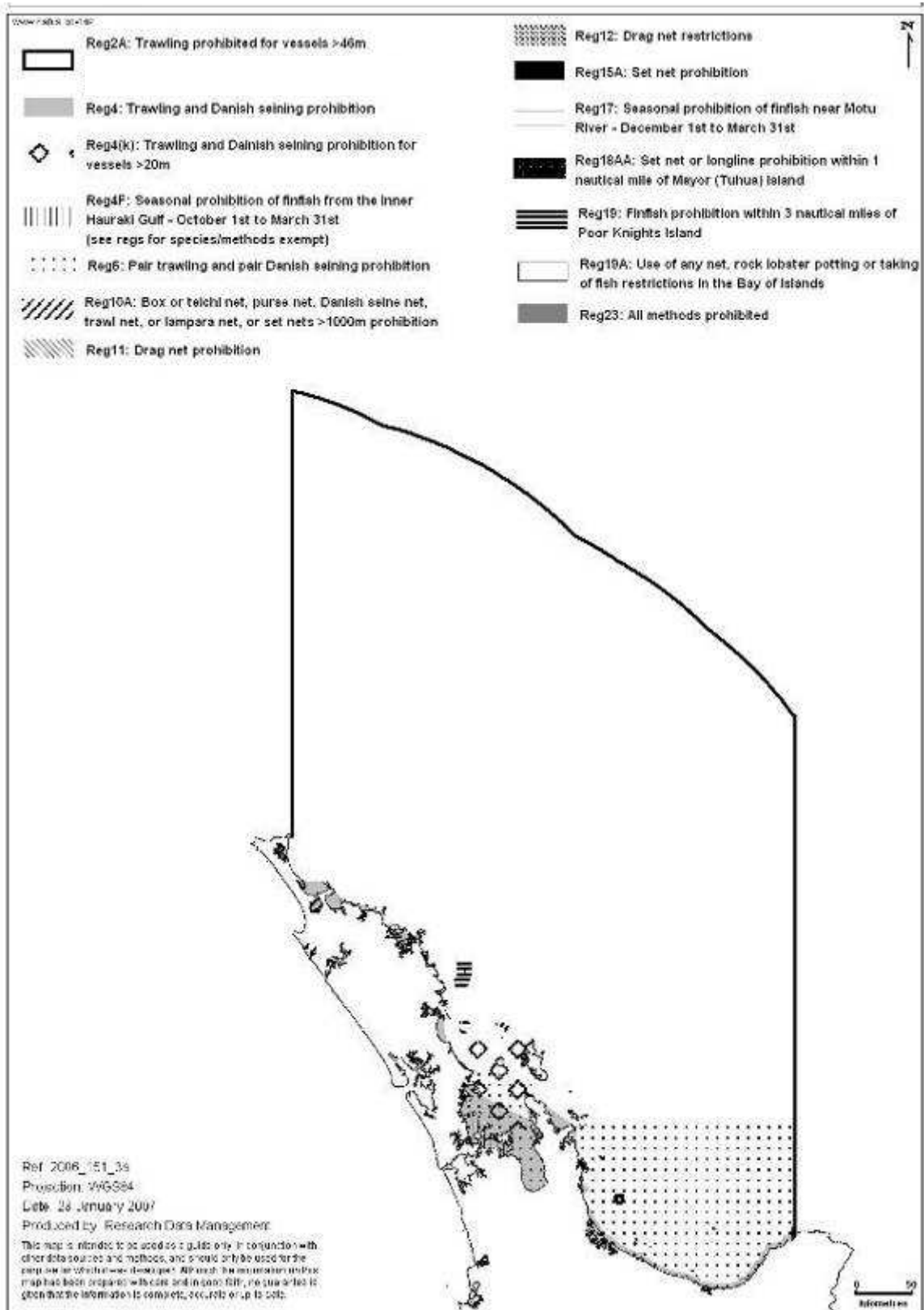


Figure 7: Selected commercial fishing restrictions that apply in Fisheries Management Area 1

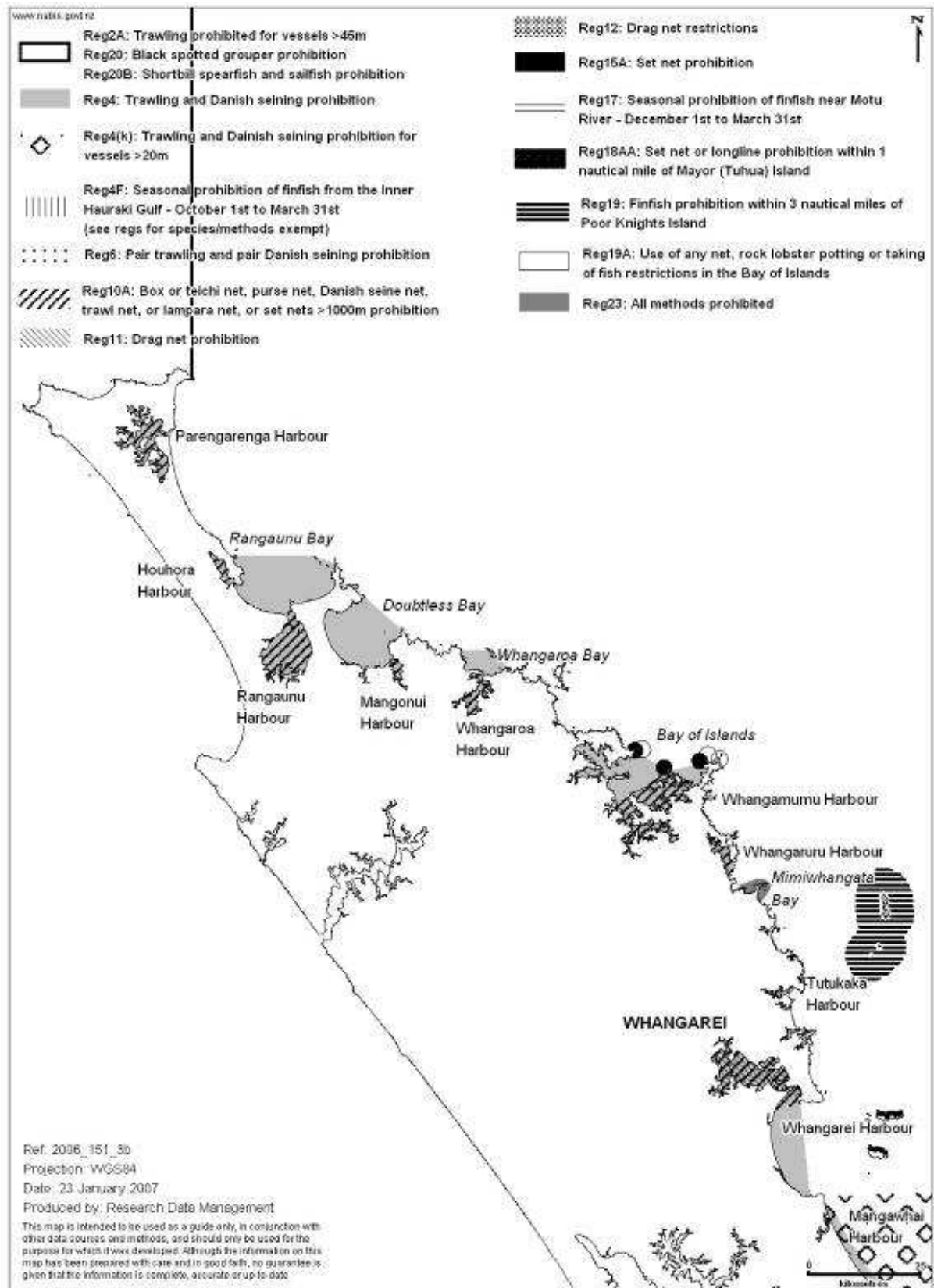


Figure 8: Selected commercial fishing restrictions that apply in East Northland

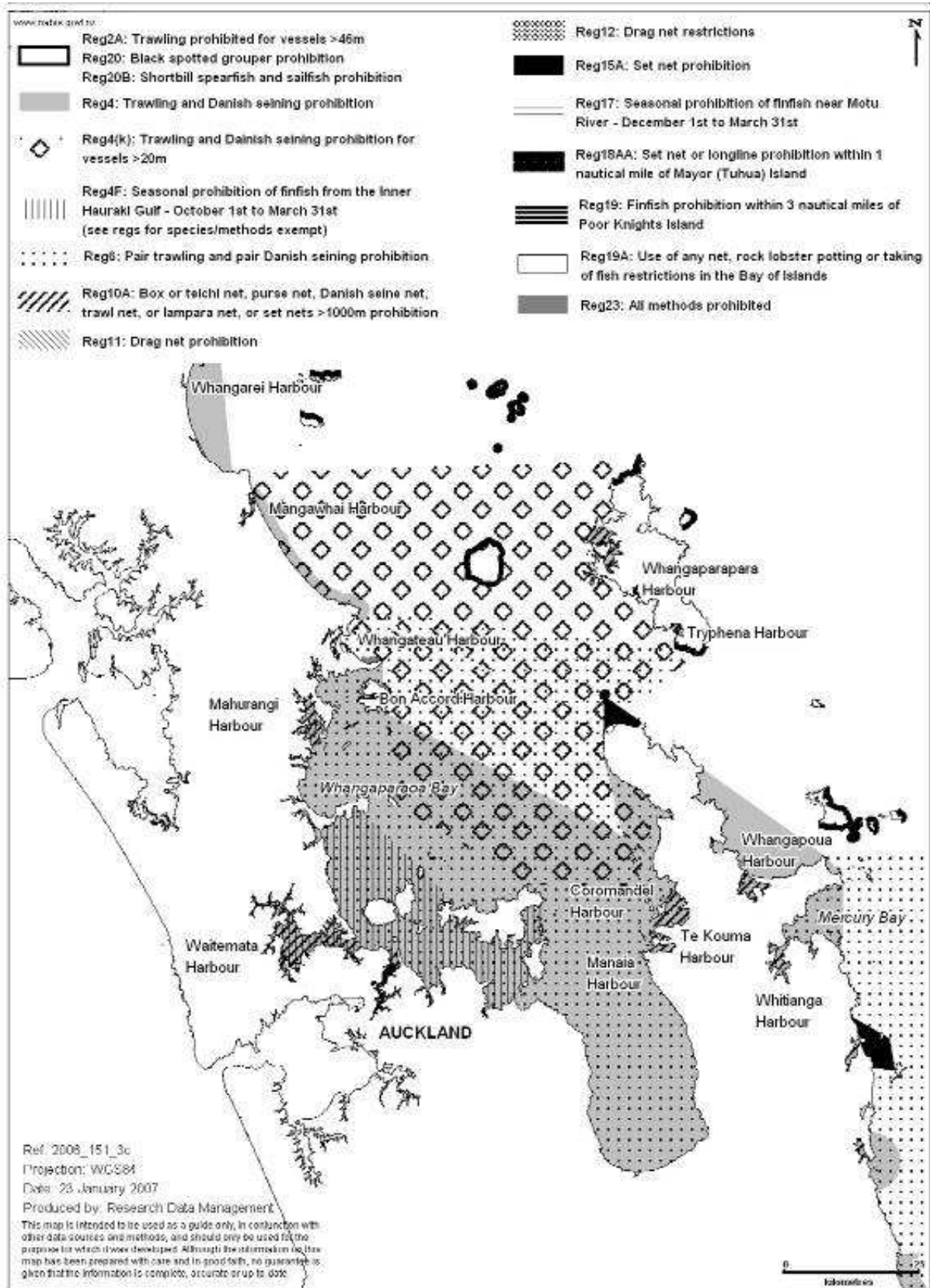


Figure 9: Selected commercial fishing restrictions that apply in the Hauraki Gulf

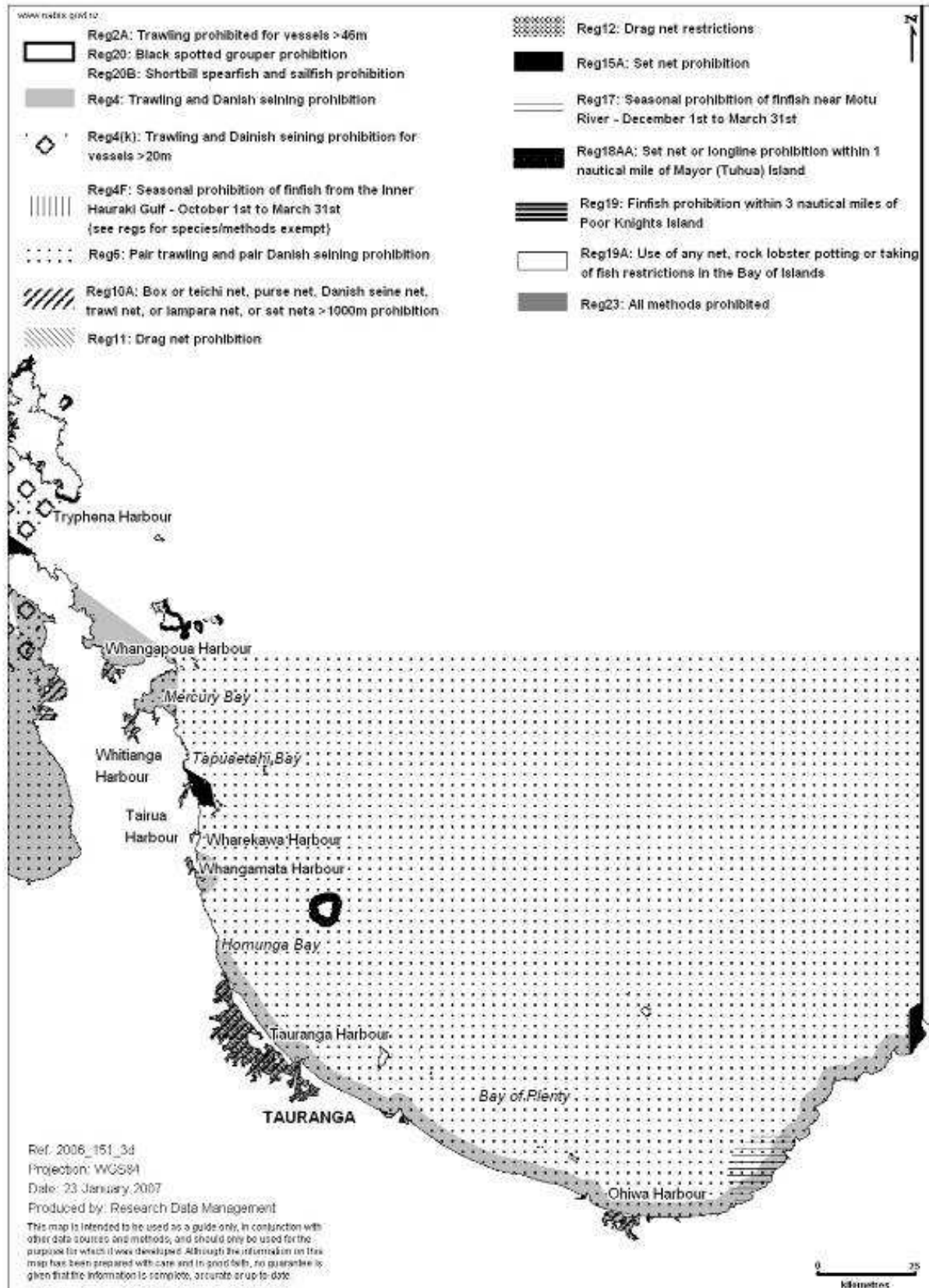


Figure 10 Selected commercial fishing restrictions that apply in the Bay of Plenty

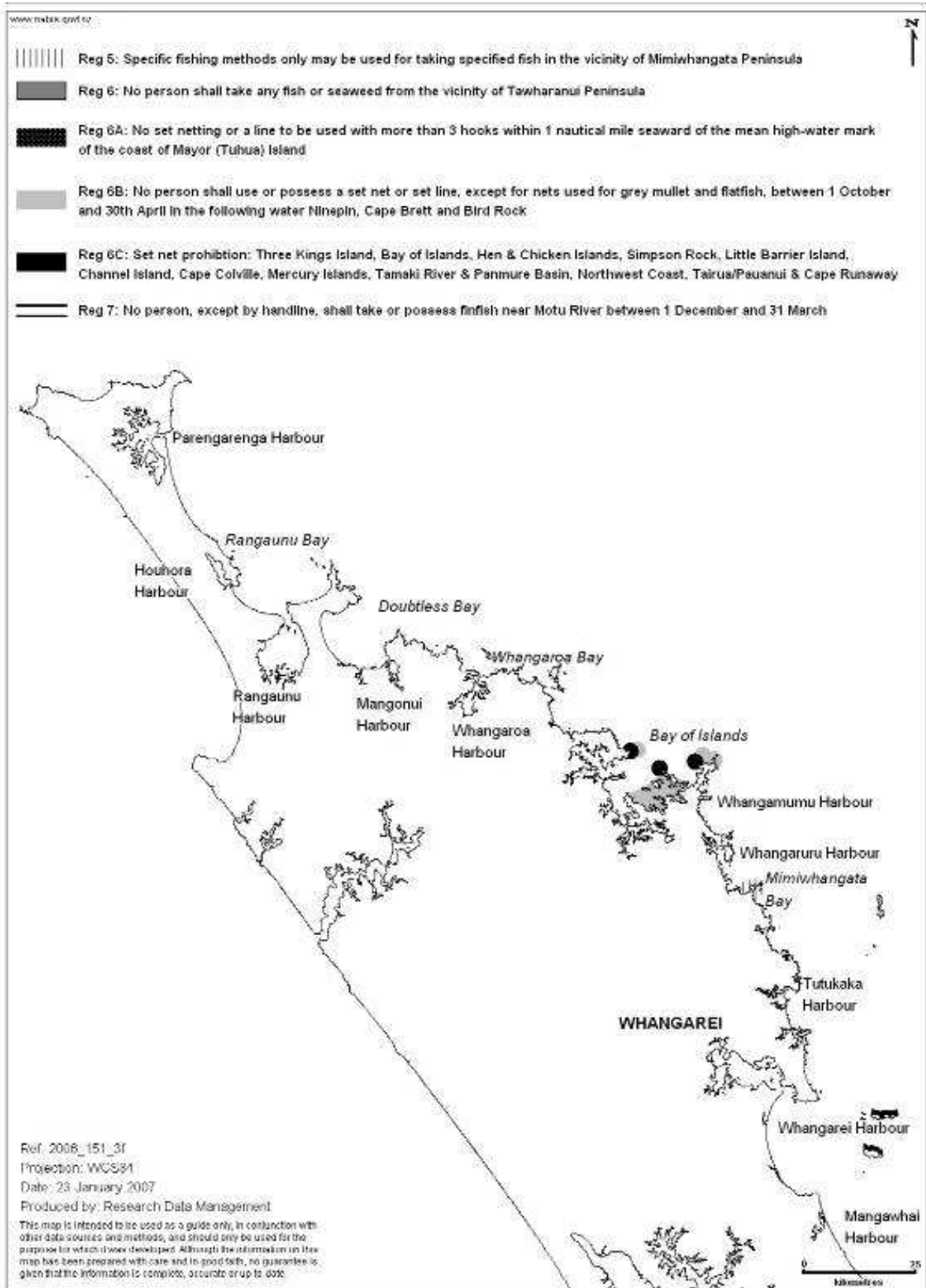


Figure 11 (a): Selected amateur fishing restrictions that apply in Fisheries Management Area 1 East Auckland)

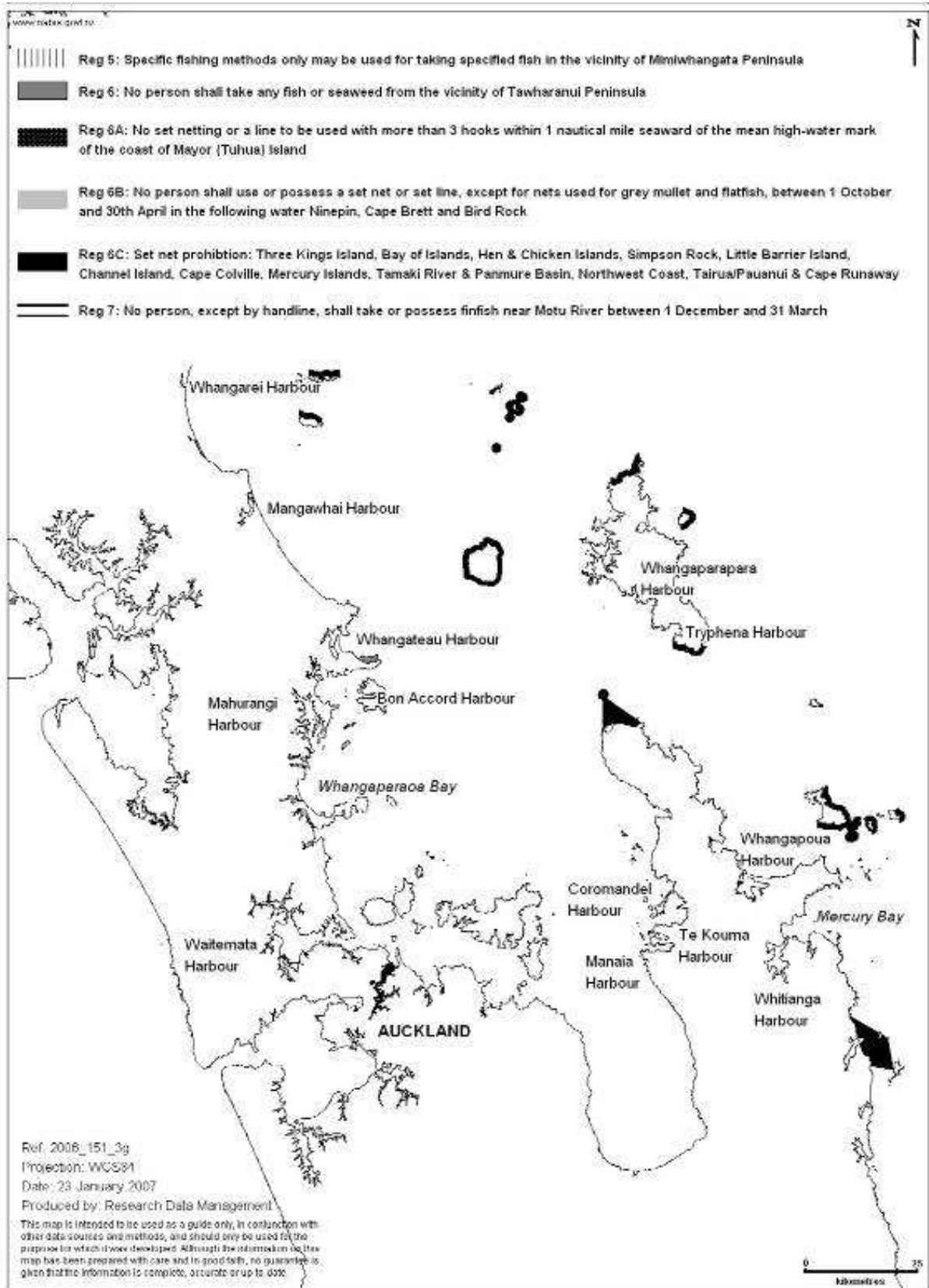


Figure 11 (b): Selected amateur fishing restrictions that apply in Fisheries Management Area 1 (Hauraki Gulf)

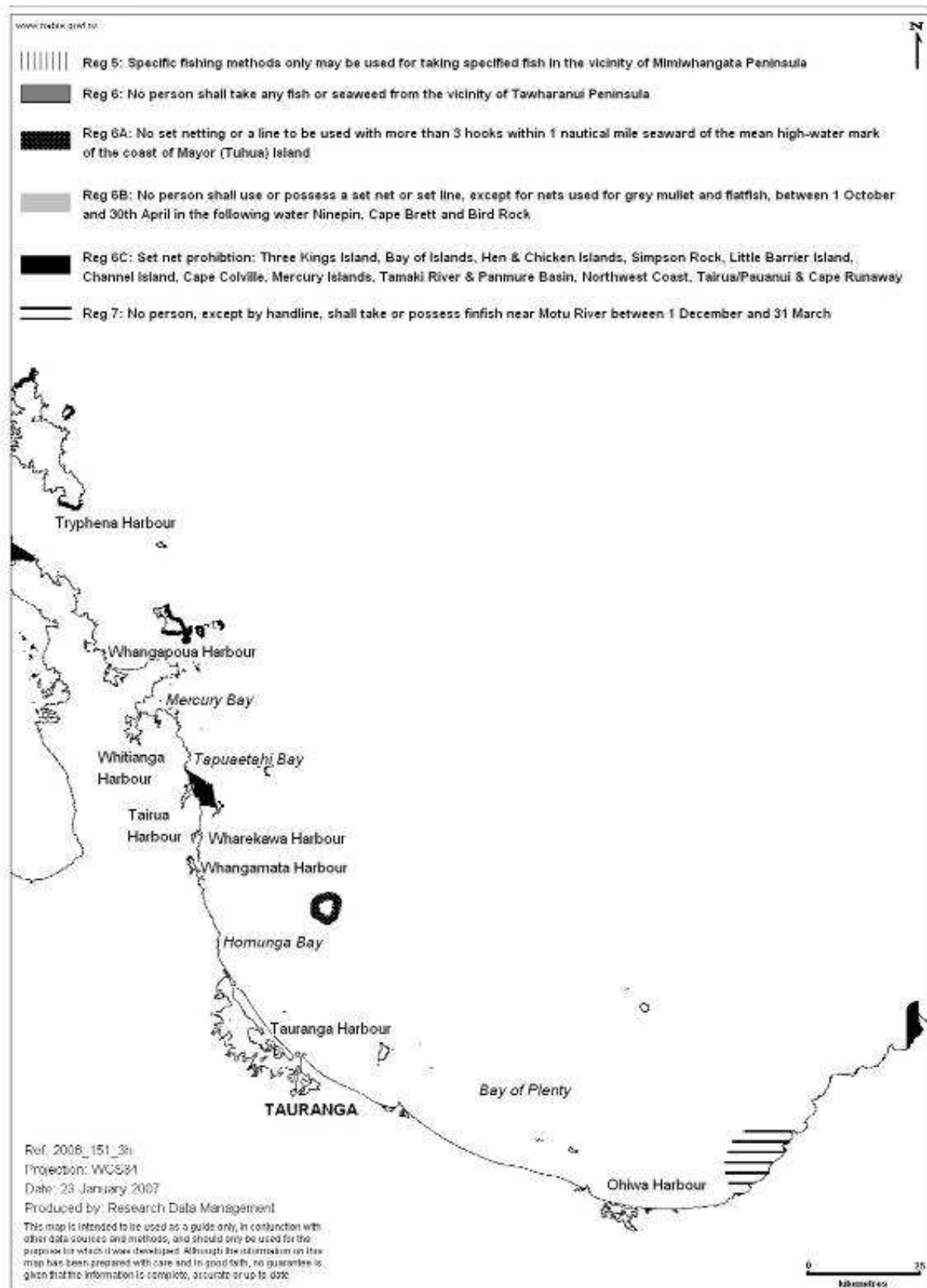


Figure 11 (c): Selected amateur fishing restrictions that apply in Fisheries Management Area 1 (Bay of Plenty)

Associated or dependent species

47 Maintaining populations of associated or dependent species above a level that ensures their long-term viability is an environmental principle outlined in the Fisheries Act 1996.

48 Associated or dependent species refers to any non-harvested species which is either taken, or otherwise affected by the taking of any harvested species. These species may include marine mammals, seabirds, non-commercial bycatch fish species, corals and bryozoans.

Non-QMS bycatch species

49 Table 5 shows the main non-QMS bycatch species caught in FMA 1. Numerous other species are also caught in lesser quantities (<1 tonne per year), but are not given here.

Table 5: Non-QMS species caught in North-East inshore target fisheries (average estimated catches from 1990-91 to 2005-06)

Volume of catch *	Code	Common name	Scientific name	Endemic ** to NZ?
Average 10-20 tonnes per year	RRC	Red scorpion fish	<i>Scorpaena cardinalis</i> <i>S. papillosus</i>	N
	KOH	Koheru	<i>Decapterus koheru</i>	Y
	JGU	Japanese gurnard	<i>Pterygotrigla picta</i>	N
	RMO	Red moki	<i>Cheilodactylus spectabilis</i>	N
	SDO	Silver dory	<i>Cyttus novaezealandiae</i>	N
Average 5-10 tonnes per year	BRC	Northern bastard cod	<i>Pseudophycis breviuscula</i>	N
	OSD	Other sharks and dogs	-	-
	PMA	Pink maomao	<i>Caprodon longimanus</i>	N
	EGR	Eagle ray	<i>Myliobatis tenuicaudatus</i>	N (NZ + Norfolk Island)
	POP	Porcupine fish	<i>Allomycterus jaculiferus</i>	N
	BWH	Bronze whaler shark	<i>Carcharhinus brachyurus</i>	N
Average 1-5 tonnes per year	BRA	Short-tailed black ray	<i>Dasyatis brevicaudatus</i>	N
	BMA	Blue maomao	<i>Scorpius violaceus</i>	N
	RPE	Red perch	<i>Helicolenus percoides</i>	N
	NSD	Northern spiny dogfish	<i>Squalus mitsukurii</i>	N
	WRA	Whiptail ray	<i>Dasyatis thetidis</i>	N
	OFH	Oilfish	<i>Ruvettus pretiosus</i>	N
	SPZ	Spotted stargazer	<i>Genyagnus monoptyerygius</i>	N
	CON	Conger eel	<i>Conger verreauxi</i>	Y
	HHS	Hammerhead shark	<i>Sphyrna zygaena</i>	N
	OCT	Octopus	<i>Octopus maorum</i>	N
STR	Stingray	<i>Dasyatis thetidis</i> <i>D. brevicaudata</i>	Y	

Volume of catch *	Code	Common name	Scientific name	Endemic ** to NZ?
	BSQ	Broad squid	<i>Sepioteuthis australis</i>	N
	SBO	Southern boarfish	<i>Pseudopentaceros richardsoni</i>	N
	POT	Parrotfish	<i>Leptoscarus vaigiensis</i>	Y
	SHA	Shark	-	-
	SND	Shovelnose spiny dogfish	<i>Deania calcea</i>	N
	BOA	Sowfish	<i>Paristiopterus labiosus</i>	N
	SEV	Broad snouted seven gill shark	<i>Notorynchus cepedianus</i>	N
	WPS	Great white shark	<i>Carcharodon carcharias</i>	N ***
	MDO	Mirror dory	<i>Zenopsis nebulosus</i>	N
	SKJ	Skipjack tuna	<i>Katsuwonus pelamis</i>	N
	ERA	Electric ray	<i>Torpedo fairchildi</i>	Y

* The estimated catch data used here includes only the top five species caught in a given fishing event. Therefore, estimated catch data may underestimate the total catch of some species. Further, some species codes may refer to a group of species rather than a single species. As a result, some mis-identification of species and/or species codes is probable (eg, confusion between silver dory and mirror dory; or between scorpion fish, sea perch and red perch; or use of species code SHA 'other sharks', which may describe a wide range of species including some that are also recorded under other species codes such as NSD 'northern spiny dogfish').

** Endemic: a species which is unique to New Zealand: found *only* there, and not found naturally anywhere else.

*** Great white sharks are a protected species within New Zealand waters.

Reef fish

50 Nineteen reef fish species commonly found around north-eastern reefs have been prohibited from sale when caught within the Auckland and Kermadec FMAs (Table 6). The purpose of this restriction is to provide protection for the diversity of fish species with reefs as their principal habitat. Such species are relatively sedentary, and commercial fishing (particularly set netting) over reefs has been linked in the past to serial depletion of these species. These species are caught only in very small quantities.

Table 6: Reef fish species found within Auckland and Kermadec fisheries management areas that are prohibited from sale

Banded wrasse	Red moki
Black angelfish	Red mullet (goatfish)
Butterfly perch	Red pigfish
Giant boarfish	Rock cod
Green wrasse	Sandager's wrasse
Kelpfish (hiwihiwi)	Scarlet wrasse
Long-finned boarfish	Silver drummer
Marblefish	Splendid perch
Notch-headed marblefish	Toadstool groper
Painted moki	

Protected species

51 The protected species that are potentially affected by utilisation of the North-East finfish fisheries covered in this plan are:

- Black coral;
- Spotted black grouper;
- Great white shark;
- Various seabird species;
- Marine turtles; and
- Marine mammals.

52 Inshore longline fishing methods may incidentally capture protected seabird species, and black petrel have recently been identified as a seabird species of concern.

53 Records show that set nets have captured great white sharks in the past.

54 It is probable that spotted black grouper are bycaught in line fisheries, but the bycatch rate is not properly identified.

55 Existing mitigation measures include requirements for longline vessels and trawlers >28m length to use bird bafflers or tori lines.

Other resource users

56 Local authorities manage the effects of land-based activities on the marine environment. The two primary effects from land-based activities related to FMA 1 are sedimentation from land erosion, and the discharge of pollutants into storm-water and sewage drainage systems. Little information is available on the nature and extent of these effects within FMA 1.

57 Local authorities also manage the disposal of wastes and other pollutants from vessels which can potentially affect the health of inshore finfish stocks and the marine environment. Dumping of waste from vessels requires consent from the regional council.

58 Regional councils must consider resource consent applications for the extraction of sand from the marine environment (eg, Pakiri beach). Such applications could potentially affect inshore finfish fisheries.

59 The Ministry of Transport administers the Submarine Cables and Pipelines Protection Act 1996. This Act ensures that submarine cables and pipelines areas are protected from certain uses (Figure 5). It is unlawful for persons to fish or anchor within a submarine cable or pipeline protected area (exceptions are for specific research activities operated by MFish).

60 The marine environment may contain petroleum and mineral resources. The extraction of these resources could have fisheries implications. The allocation of the right to prospect, explore or mine is managed by the Crown Minerals Group of the Ministry of Economic Development.

61 The creation of aquaculture management areas (AMAs) and the development of new aquaculture operations could potentially affect the management of finfish stocks.

Hauraki Gulf Marine Park Act 2000

62 The boundaries of the Hauraki Gulf Marine Park (Figure 12) are covered by the North-East Finfish Plan. Many of the species included in the plan are important to fishers in various parts of the park.

63 The Fisheries Act 1996 makes reference to the Hauraki Gulf Marine Park Act. Section 11 (2) (c) expressly states that the Minister of Fisheries shall have regard to sections 7 and 8 of the Hauraki Gulf Marine Park Act before setting or varying any sustainability measure under s 11 (1) of the Fisheries Act.

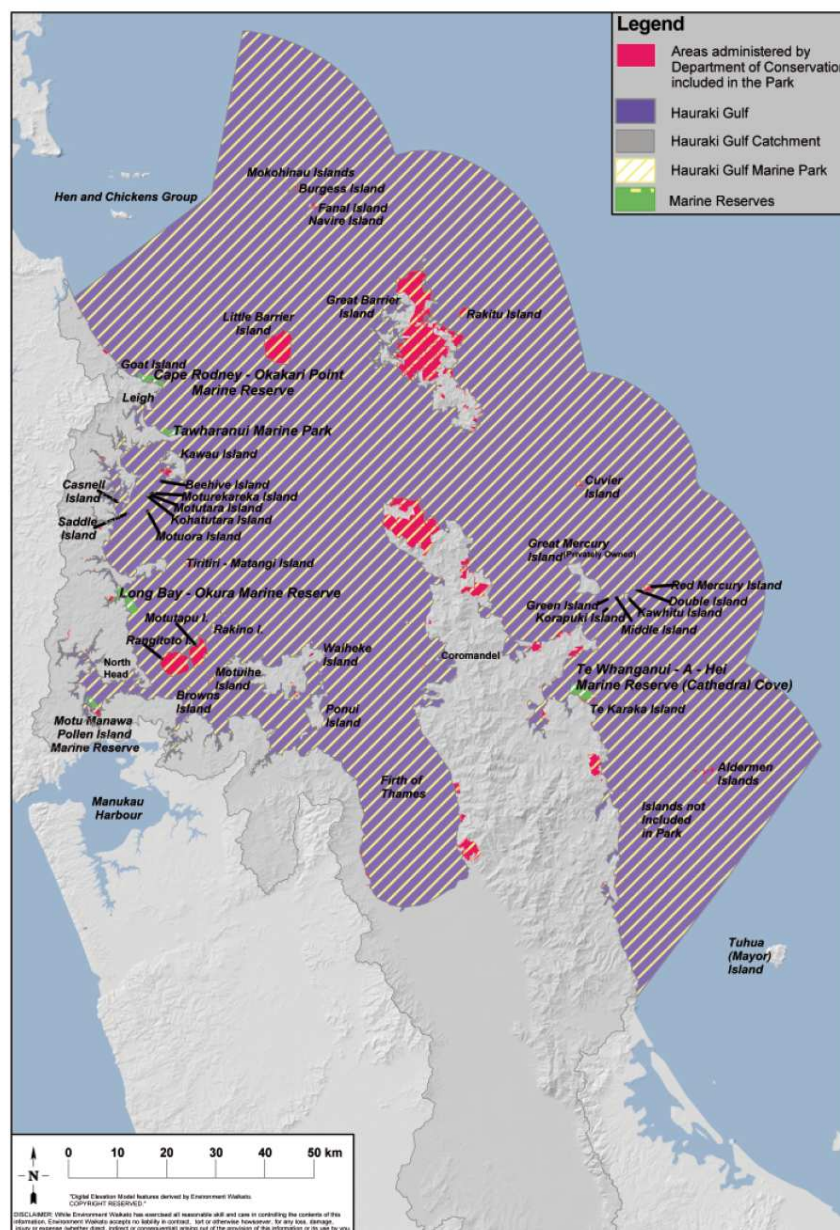


Figure 12. Boundaries of the Hauraki Gulf Marine Park

64 Section 7 of the Hauraki Gulf Marine Park Act recognises an inter-relationship between the Hauraki Gulf, its catchment and islands; and the need to sustain the Hauraki Gulf's life-supporting capacity as a matter of national significance.

65 Further to this, section 8 of the Hauraki Gulf Marine Park Act establishes a number of management objectives:

- The protection, and where appropriate, enhancement of the life supporting capacity and its individual components;
- The protection, and where appropriate, enhancement of the natural, historic and physical resources with which Māori have a traditional, cultural and spiritual relationship; and
- The maintenance, and where appropriate, enhancement of the natural, historic and physical resources from which people gain social and economic wellbeing, recreation and enjoyment.

66 These are matters relevant to protecting the health of the aquatic environment generally, and are also important in determining catch limits for various species.

Harvest strategies

67 MFish is developing a harvest strategy standard that will guide the setting of total allowable catches (TACs) for all stocks.

Productivity

68 Species productivity is an important characteristic for helping to determine an appropriate fisheries harvest strategy. Numerous factors influence fisheries productivity, including:

- Age at maturity;
- Growth rate;
- Longevity;
- Natural mortality rate (the higher the natural mortality rate of a stock, the greater the annual fluctuation in biomass);
- Frequency of reproduction;
- Rate of reproduction (highly variable between species: from species that bear only a few live young, such as rig and school shark; to species that broadcast spawn millions of eggs into marine waters, such as flounder and snapper); and
- Survival to maturity (influences the rate of recruitment).

69 Table 7 summarises the available productivity information for the finfish species covered in this fisheries plan. Species are grouped based on their natural mortality, because natural mortality can be a good proxy for indicating how vulnerable a species will be to fishing pressure. In general, short-lived species with high natural mortality are less vulnerable to over fishing. Longer-lived species generally have lower levels of natural mortality, and tend to be more vulnerable to over fishing.

Table 7: Key biological characteristics of North-East North Island stocks

Species	Natural mortality rate **	Reproductive strategy	Fecundity	Maturity length and age (male and female)	Maximum age/size	Growth	Nursery areas	Depth distribution
Snapper	0.075	Broadcast spawner	High	20-28cm/3-4yrs	60yrs+ / 100cm	Fast	Harbours, Estuaries	0-200m
Kahawai *	0.18	Broadcast spawner	Unknown	f = 40cm/4yr m = 39cm/4yr	26yr / 55cm	Fast	Harbours, Estuaries	Unknown
Red gurnard	f = 0.29 m = 0.35	Broadcast spawner	Moderate	23cm/2-3yr	16yr /55cm	Moderate	Shallow inshore areas	<100m
Pilchard	0.46/0.6	Broadcast spawner	Unknown	10cm/ 2yr	9yr / 25cm	Fast	Unknown	Unknown
Tarakihi	0.10	Broadcast spawner	Low	25-35cm/4-6yr	40yrs+	Slow	<50m	Unknown
Sand flounder	1.1-1.3	Broadcast spawner	High	25cm/2yr	6yrs	Fast	Estuaries	<100m
Yellow-belly flounder	Unknown	Broadcast spawner	High	25cm/2yr	6yrs	Fast	Estuaries	<100m
Trevally	Unknown	Broadcast spawner	Low	32-37cm/1yr	40yrs+ / 60cm+	Moderate	Estuaries, shallow inshore waters	Unknown
Grey mullet	0.33	Broadcast spawner	High	f = 35cm /3yrs m = 33cm /3yrs	12-14yrs	Unknown	Estuaries	Unknown
Rig	0.2-0.30	Bears live young	Low	5-6yrs	f = 100cm /7-8yrs m = 85cm /5-6yrs	Slow	Shallow inshore waters	<50m
Bluenose	0.18	Broadcast spawner	Unknown	62cm /4-5yr	25yrs+	Unknown	Unknown	Unknown
Kingfish	0.2-0.25	Broadcast spawner	Unknown	f = 97cm; m = 83cm	150cm+	Unknown	Unknown	0-200m
School shark	0.1	Bears live young	Low	110-130cm / m = 12-17yrs f = 13/15yrs	50yrs+	Slow	<30m	0-600m
John dory	0.38	Broadcast spawner	High	f = 29-35cm; m = 23-29cm	12	Fast	Unknown	<0-50m
Hāpuku /bass	0.1	Broadcast spawner	Unknown	f = 85-90cm; m = 80-85cm / 10-13 yr	60+yrs	Slow	Unknown	Estimated 100-500m

* Kahawai is an assemblage of two species. Characteristics pertain to *Arripis trutta* only and almost nothing is known of the northern or Kermadec kahawai (*Arripis xylabion*).

** Natural mortality is the mortality within a fish stock caused by factors other than fishing

70 Flatfish (apart from turbot and brill) are highly fecund, fast growing and short lived. Consequently these stocks can vary in size from year to year.

71 Rig and school shark are vulnerable to over fishing because they are longer lived with low fecundity. Snapper has low natural mortality, which combined with high productivity means it is less vulnerable to over fishing.

72 The distribution of a fish stock may also influence how vulnerable it is to over fishing. Some species tend to remain resident in particular areas, such as rocky reefs. Fishing can deplete the local populations of such species relatively quickly, even if the overall population size remains large. For example, hāpuku/bass aggregate around reefs, with a relatively small part of the population occurring over the open seafloor (juveniles). It is known that good fishing grounds for hāpuku/bass (pinnacles, reefs or ledges) can be rapidly depleted and take some time to recover.

73 In comparison to hāpuku/bass, bluenose demonstrates greater resilience to fishing pressure. This is due to a wide distribution of bluenose stocks, their occurrence in areas where trawling is difficult, and the pelagic dispersal of juveniles. However, because bluenose have great longevity and mature fish tend to be relatively sedentary, localised depletions of bluenose stocks can also occur.

74 Other stocks such as snapper are wide-spread, and individuals can cover quite large distances. Localised depletion is less likely in such species (although it can still occur), because adult fish are highly mobile and provide a reliable source of recruitment.

75 The known nursery areas for most species considered in this fisheries plan occur in shallow inshore areas and estuaries. The risk of over fishing is increased by taking immature fish. The areas in which fishing occurs and the types of fishing methods and gear will influence the size range of fish that are caught.

Sustainability indicators and stock status

76 Inshore fishstocks are monitored in various ways, depending on the biological characteristics of the species and the size of the fishery. Wherever possible, an index of abundance for each fish stock is determined from either the standardised catch per unit effort (CPUE) or fishery-independent surveys (such as research trawl surveys).

77 CPUE is often calculated as the catch weight per unit measure of the fishing effort (eg, per metre of net used, or number of hooks, or length of net soak time). Declining CPUE may mean that more effort (eg, metres of net set and/or length of net soak time) is required to catch a given volume of fish. This may indicate that a fish stock has declined, although other factors can also cause declining trends of CPUE (eg, patchy or clumped stock distribution).

78 The indices of abundance are generally updated on a two to three year cycle. If the abundance index demonstrates a declining trend, further stock assessment may be required. This usually takes the form of a stock assessment model developed with a range of inputs (such as biological characteristics, fishing patterns and catch history).

79 Estimates of the age structure of populations may also be used to monitor fishstocks,

particularly where CPUE is not successful. The age structure of a population will vary depending on the level of harvesting pressure. Fish populations that are subject to elevated harvesting levels tend to have fewer size/age classes, and proportionally more younger fish. Sampling of commercial processing sheds can be used to gain additional information to monitor fisheries in some situations.

80 For smaller fisheries where catches are low, stocks may be monitored by comparing annual landings over time or with the commercial catch limit. In some situations annual landings are far below the catch limit because the fishery has not yet developed to its full capacity (eg, sprats). In situations where the disparity between the TACC and annual catch increases inexplicably with time, an assessment of stock status and sustainability may be necessary to determine the factors responsible.

81 Several inshore fishstocks are managed under the Adaptive Management Programme (AMP). The AMP was introduced in 1991 as a basis for varying the TACC of stocks for which MFish has limited information – ie, to allow increased utilisation while data collection occurs. Under an AMP, the TACC is increased for a limited period (usually five years) and the fishing industry is required to provide data to MFish that will improve understanding of stock status. The fishing industry is also required to collect biological data and detailed catch and effort data, and to perform the data analyses necessary for monitoring the stock (eg, CPUE standardisation or age structure).

82 MFish released a letter on 24 August 2007 to confirm that AMPs will not be established in the future, and providing guidance on how the existing AMPs will be managed to the end of their respective terms. At that time, decisions will be made on case by case to either maintain the AMP until its relevant components can be incorporated within a fisheries plan, or to terminate the AMP and review the TAC and other sustainability measures.

83 Table 8 summarises information on how North-Eastern inshore finfish stocks are assessed and monitored.

Table 8: Information status for North-Eastern inshore stocks – monitoring and stock assessment

Stock	How stock is assessed / monitored	Last assessment	Comments on sustainability indicators	Stock assessment next due
SNA 1	Snapper biomass and sustainable yields are modelled in a stock assessment, using the following inputs:	Stock assessment for SNA 1 was last updated in 2000.	According to stock trajectories, long-term sustainability is becoming increasingly uncertain.	Stock assessments for SNA1 will be updated in 2010, once new tag-based biomass estimates become available (in 2010). Components of data needed for the stock assessment model will be collected as indicated in the preceding columns.
	- Age composition of longline catch (shed sampling)	2005/06 (SNA 2006/01) (annual)	Age composition of the catch is used to help estimate recruitment strength and population structure. The SNA 1 catch was previously taken mostly in spring/summer, but is now taken throughout the year. Future market sampling should include all seasons. Project SNA 2006/07 is investigating optimal market sampling for SNA 1. Catches will be sampled annually until these results are available.	
	- Biomass and selectivity (ie, vulnerability of fish to fishing gear), from tagging surveys	1993/94. 2004/05 project deferred. Tagged fish will now be released in Nov 2008.	N/A	
	- Standardised CPUE indices from commercial catch data	Updated to 2003/04 (SNA 2004/01) (three year cycle). Next: 2007/08	CPUE is not thought to accurately reflect SNA 1 abundance, so should not be used in the model. However, it provides a coarse monitoring tool for periods between tagging surveys.	
	- Annual commercial catches	N/A	N/A	
	- Recreational catch estimate (aerial overflight methodology)	Summers of 2003/04 and 2004/05	Reasonable confidence in the recreational harvest estimates for SNA by this method.	
KAH 1	- Monitoring landings against TAC - Recreational catch sampling - Stock assessment	Stock reduction model 1996 CASAL model 2007	Used as reference for setting catch limits in 2004 and reviewing sustainability measures in 2005 Stock status and yield updated; uncertainties arose from different assumptions about non-commercial catches used in model.	Last stock assessment was undertaken in 2007.
GUR 1	- Comparison of annual landings with TACC - Periodic (two years sampling every five years) catch sampling to monitor age structure of the fishery. - Standardized CPUE indices (every three years). - Relative abundance estimated from	INS2002-01 covered catch sampling up to 2002/03. CPUE indices last updated to 1997/98 (INS 97/01).	Standardised CPUE is used to track relative abundance.	Research project GUR2005/01 will provide updated CPUE data to 2004/05. In 2006, the research planning group recommended that a stock assessment should be undertaken if GUR 2005/01 shows sufficient signal in the index of abundance. The working group will review the efficacy of age structure to monitor gurnard when the INS2002-01 catch sampling project is complete.

Stock	How stock is assessed / monitored	Last assessment	Comments on sustainability indicators	Stock assessment next due
	three year trawl surveys off the Hauraki Gulf (GUR 1E) (discontinued as SNA 1 monitored with tagging).			Shed sampling of GUR1 will occur in 2008/09 and 2008/10.
PIL 1	- Monitoring landings against TAC	There have been no stock assessments for New Zealand pilchard.	No estimates of fishery parameters or abundance are available. There are no estimates of biomass available.	None planned.
TAR 1	- Comparison of annual landings with TACC - Standardised CPUE for TAR 1 W, TAR 1 E and Bay of Plenty target fisheries. - Age structure of the commercial catch (three years in every five).	Last stock assessment given in the 1996 Plenary Report. TAR2004/02 updated the CPUE series to the end of 2003/04.	TAR 1 indices of abundance have been relatively stable, current catches and TACC appear to be sustainable.	Update CPUE indices to 2006/07 TAR2005/01 to cover 2005/06, 2006/07 and 2007/08. Withdrawn for 2005-06 on account of high cost and pending AMP application – project to be let for 2007-08. Shed sampling to be discussed in relation to costs.
FLA 1	- CPUE analysis to be standardised on a three year cycle. - Comparison of annual landings with TACC.	In 2005, SAP2004/07 presented standardised CPUE from the FLA 1 set net fishery for 1989-90 to 2003-04. Standardised CPUE trends were derived for areas on both the East and West coasts.	The inshore working group concluded the CPUE indices probably reflect flatfish abundance. Most of the flatfish catch from FLA 1 East, including a substantial and variable proportion of sand flounder, is taken from the Firth of Thames (Statistical area 007). Separate indices were calculated for sand and yellowbelly flounder. Accounting for a two year lag between egg production and recruitment, a fairly strong negative relationship between sea surface temperature and sand flounder abundance was established.	Next project 2008/09 to update CPUE to 2007/08 fishing year.
TRE 1	- Monitoring landings against TAC - Commercial catch sampling - Stock assessment	Catch sampling: 2005/06 Stock assessment: 2004/05	Estimates of absolute current and reference biomass are not available. Recent catches are below the TAC. Catch sampling results suggest that the TAC is probably sustainable.	Next stock assessment 2009/10. Catch sampling 2006/07.
GMU 1	- Standardised CPUE updated every four years (spatial strata treated separately). - Periodic (two-three years sampling every five years) catch sampling to monitor age structure of the fishery. - Comparison of annual landings with TACC. - Information on gear selectivity (eg, experimental fishing using multi-panel nets) and movement between harbours would be necessary for stock assessment purposes.	CPUE series updated to 2001/02 (GMU2002-0). Catch sampling: up to 2003/04 and 2004/05 (INS2003-01).	A West GMU 1 stock assessment was attempted (in 2000, GMU1997-01) but results were inconclusive. The working group concluded in 2004 that if trends in standardised CPUE continued to decline in the Kaipara and also became more widely spread, a second stock assessment should be attempted.	GMU2006/01 will update the series to the end of the 2005/06 fishing year. GMU2007-01: Tagging study to investigate movement. The research planning group agreed in August 2005 that a project investigating exchange rates between harbours should be scheduled in 2006 for the 2007/08 fishing year.

Stock	How stock is assessed / monitored	Last assessment	Comments on sustainability indicators	Stock assessment next due
SPO 1	<ul style="list-style-type: none"> - Comparison of annual landings with TACC - Standardised CPUE for SPO 1E and SPO 1W (every three years). 	Most recent CPUE analysis is up to 2003/04 (SPO2003/01).	Standardised CPUE is used to track relative abundance.	Update standardised CPUE to the 2006/07 fishing year.
BNS 1	<ul style="list-style-type: none"> - BNS 1 has been managed under an AMP since Oct 2001. The AMP was due to finish in Sept 2006, but the term was extended until Sept 2008. - The stock is monitored using standardised longline CPUE and age/size structure of the catch (by sex). - Landings are also monitored against TACC. 	Annual indices of abundance (standardised CPUE) reported as part of the AMP (1989-90 – 2004-05).	Standardised CPUE may not be very useful for monitoring bluenose abundance (because of the low level of spatial resolution for recording catch and effort data), so additional emphasis has been placed on the use of spatial age structure of the catch to monitor the stock. Otoliths (inner ear bones that can be used to measure age) being collected via a logbook programme will be read once an ageing protocol has been finalised.	AMP review due 2008.
KIN 1	<ul style="list-style-type: none"> - Monitoring landings against TAC 	There is a lack of data available to conduct stock assessment.	There have been no assessments of sustainable yield, biomass, or trends in relative abundance.	None planned.
SCH 1	<p>SCH 1 is monitored using the following methods:</p> <ul style="list-style-type: none"> - Comparison of annual landings with TACC - Standardised CPUE indices - Tagging studies indicated school shark around NZ comprise a single stock. The stock is managed according to FMAs to prevent large scale overfishing. Because SCH CPUE for target fisheries could theoretically be hyperstable*, each fishstock is (wherever possible) monitored using standardised CPUE from the target and one bycatch fishery. Although larger fish may avoid trawlers, trawl CPUE should provide a recruitment index which, on account on the good relationship between recruitment and spawner biomass in sharks, should reflect adult female biomass. 	Bycatch CPUE standardised to 2001/02 (HPB 2002/01) using dropline data for SCH1E.	CPUE analyses from target fisheries have not been very successful for monitoring school shark abundance. CPUE series using data from school shark bycatch in proper fisheries have been used as an alternative, but also with limited success. There was no overall trend that could be interpreted as a change in abundance for the NZ stock as a whole. However, the CPUE indices for North Island sub-stocks tended to be flat or declining, while they were flat or increasing for South Island sub-stocks.	SCH2006-01 will characterise the fishery and update standardised indices of abundance to the 2005/06 fishing year. Both target and bycatch CPUE will be investigated as potential indices of abundance.

Stock	How stock is assessed / monitored	Last assessment	Comments on sustainability indicators	Stock assessment next due
JDO 1	<ul style="list-style-type: none"> - Comparison of annual landings with TACC - Periodic catch sampling to assess size structure of the commercial catch - Relative abundance of East JDO 1 estimated from three year trawl surveys in the Hauraki Gulf (discontinued as SNA 1 assessed with tagging). 	Latest series of catch sampling 2002/03, 03/04, 04/05.	<p>John dory are not long lived and preliminary results indicate that there are probably too few recruited year classes to reliably estimate total mortality (Z) for JDO 1.</p> <p>John dory is principally a by-catch species. It can be difficult to determine whether changes in reported catches indicate actual changes in the stocks or simply changes in the catches of the target species.</p> <p>The trawl survey indices for Bay of Plenty and Hauraki Gulf show no apparent trend since 1988.</p>	<p>No full stock assessment planned.</p> <p>The use of CPUE to monitor JDO 1 is currently being investigated (JDO2005/01).</p> <p>INS2005/02 will investigate the use of alternative trawl survey designs to monitor important inshore finfish.</p>
HPB 1	<ul style="list-style-type: none"> - Comparison of annual landings with TACC 	HBP 2002-01 project analysed CPUE for both target and bycatch fisheries.	CPUE indices based on both target and bycatch data have been found to be unreliable (HBP2002-01). Fine scale reporting is likely to be required for further analyses to be useful.	No research identified for 2007/08

* Hyperstable: refers to a phenomenon in which an observed index of stock abundance remains stable although the abundance of the stock is actually declining.

Further information:

Report from the Fisheries Assessment Plenary, May 2007: stock assessments and yield estimates

Compiled by Ministry of Fisheries Science Group, May 2007

Total allowable catch

84 The Fisheries Act 1996 contains a number of provisions to ensure a stock is managed sustainably. A key sustainability measure is the total allowable catch (TAC). When setting a TAC, a number of specific and generic provisions of the Fisheries Act 1996 are taken into account, including:

- The maximum sustainable yield (MSY) for that stock;
- The interdependence of stocks;
- Social, cultural and economic factors;
- Environmental principles including the effects of fishing on the aquatic environment;
- Information principles;
- International obligations;
- The Treaty of Waitangi (Fisheries Claims) Settlement Act 1992;
- Relevant compliance, fishery monitoring, and research services; and
- Other Crown statutory plans, policy statements, and management strategies (eg. the Hauraki Gulf Marine Park Act)

85 All of the stocks in this plan are managed under s 13 of the Fisheries Act. Section 13 of the Act requires stocks in the QMS to be managed at a stock size that is at or above the biomass level that can produce the MSY for that stock (B_{MSY}). Table 9 details the best available information on where FMA 1 finfish stocks are in relation to their relevant B_{MSY} level. The table also shows when the stock was introduced into the QMS, and how the catch limit was set at that time.

86 The previous subsections on productivity and sustainability indicators provide additional context for how TACs are set. The productivity subsection outlines the biological characteristics of these species that are relevant to the size of the fishery they can sustain. The subsection on sustainability indicators and stock status gives further information on how the stocks are assessed, and the reliability of stock status information.

Table 9: Total allowable catches and current stock status for North-Eastern inshore stocks

Stock	Date into QMS (original TAC(t))	Basis for setting original TAC/C	1983-84 commercial landings	Date reviewed**	Outcome of review	TAC 2006-07 (t)	Where stock is in relation to B _{MSY}	Current status or projection
SNA 1	1986 (4710)	The TACC was set below 1983 commercial landings to allow for some stock rebuilding. Decisions by the Quota Appeal Authority saw the TACC increase to over 6000t.	6 539	1992 / 1997	TACC reduced in 1992 and again in 1997, at which point TAC and allowances were also set.	7550	East Northland: ~ B _{MSY} Hauraki Gulf/Bay of Plenty: < B _{MSY}	East Northland: the base case stock assessment indicates the current recruited biomass is approximately at the B _{MSY} reference point, and is expected to exceed B _{MSY} at the end of the 20 year projection period (with 67% probability). Hauraki Gulf/Bay of Plenty: the base case assessment indicates the current recruited biomass is less than the B _{MSY} reference point but is expected to exceed B _{MSY} at the end of the 20 year projection period (with 100% probability).
KAH 1	2004 (3685)	TAC set at level designed to maintain and preferably increase biomass. TAC was a 25% reduction of average landings for all sectors between 1997 and 2002 (recreational and customary landings based on estimates from the 2000 diary survey).	2 277	2005	TAC/C and allowances reduced by 10%.	3315	>B _{MSY}	The 2007 Report from the Fishery Assessment Plenary states that based on the 2007 stock assessment it is likely that current spawning biomass is above B _{MSY} but it is uncertain how far above. Current assumed removals are lower than almost all estimates of deterministic MSY. Combining this with the result that most estimates of current biomass are well above B _{MSY} it is unlikely that the stock will decline below B _{MSY} at current assumed catch levels, given the model recruitment assumptions. There is widely differing perceptions by stakeholders regarding fishery information. The recreational perception of depleted kahawai stocks due to historic purse seine fishing remains intense. The commercial view is that there is a lack of information to support any suggestion of a decline in stock size.
GUR 1	1986 (2010)	Based on 1983 landings.	2099	-	-	2287*	> B _{MSY}	Standardised CPUE indices for GUR 1E suggest biomass declined in the early 1980s, but recovered slightly during the 1990s. Current biomass appears to be above B _{MSY} . B _{mid99} was estimated at 59% of B ₀ (range 9-83%). Current catch levels are considered likely to be sustainable.

Stock	Date into QMS (original TAC(t))	Basis for setting original TAC/C	1983-84 commercial landings	Date reviewed**	Outcome of review	TAC 2006-07 (t)	Where stock is in relation to B _{MSY}	Current status or projection
PIL 1	2002 (2030)	TAC set higher than previous landings, but at a level thought likely to maintain stock above BMSY, because of the importance of pilchard within the marine food chain (ie, having regard to the interdependence of stocks).	0	-	-	2030	Probably > B _{MSY}	No information is available for determining MSY for PIL 1 and the stock was practically unfished prior to introduction into the QMS in 2002. Catch limits were set (having regard to available information on biology, habitat and historical catch) at a level that was considered most unlikely to result in biomass declining to B _{MSY} . This was because of the importance of the species to the ecosystem and interdependence of stocks.
TAR 1	1986 (1210)	Based on 1983 landings.	1326	2007	TAC increased by 70 tonnes	2029	Unknown	Given the long, relatively stable catch history, current catch levels and TACCs are thought to be sustainable. However, it is not known if the current TACCs and recent catch levels will allow the stock to move towards a size that will support B _{MSY} .
FLA 1	1986 (1100)	Set at a high level based on 1983 catch levels that were the highest on record.	1215	2005	TAC/C and other allowances set in 2005	1762	Unknown	Adult flatfish populations generally consist of only one or two year classes at any time. The size of the population depends heavily on the strength of the recruiting year classes, and can therefore be variable from year to year. A constant catch at the level of the current TACC is considered unlikely to be attainable or sustainable, nor would it be likely to allow the stock to move towards a size that will support the B _{MSY} . It is unknown if recent catches will allow FLA 1 to move towards a size that will support the B _{MSY} .
TRE 1	1986 (1210)	Sustainable yield estimates, largely based on catch history. There was some concern that recent catches could not be sustained at the same level.	1798	-	-	1507	Unknown	Unknown

Stock	Date into QMS (original TAC(t))	Basis for setting original TAC/C	1983-84 commercial landings	Date reviewed**	Outcome of review	TAC 2006-07 (t)	Where stock is in relation to B _{MSY}	Current status or projection
GMU1	1986 (910)	Based on average commercial landings between 1981 and 1983. There was some concern that rapid increases in catches over the previous three years had led to localised depletion, and reduction of average fish size in heavily fished areas.	1142	1998/ 2005	TACC decreased in 1998, and customary & recreational allowances set; no change in 2005 review.	1125	Unknown	CPUE analysis shows different abundance trends between the key harbours and estuaries within GMU 1. The overall trend for the East coast is relatively flat, while the West Coast appears to be declining. It is not known if recent catches will allow the sub-stocks to move towards a size that will support the global MSY for GMU 1.
SPO 1	1986 (540)	Based on present sustainable yield estimate, taking into account low to moderate growth rate after recruitment to commercial fishery; low/moderate natural mortality; and high risk of recruitment overfishing.	650 (1982-83)	1991 / 1997 / 2005	TAC increased under AMP in 1991; reverted to pre-AMP level 1997; TAC/allowances set in 2005 review but no change to TACC.	752	Unknown	SPO 1 landings have generally declined since 1991-92. This decline may be partially due to quota distribution problems. Patterns in relative abundance suggest recent catch levels are probably sustainable. However, it is unknown whether the current TACC is sustainable, or whether the recent catch levels and the current TACC are at levels that will allow the stock to move towards a size that would support the maximum sustainable yield.
BNS 1	1986 (450)	Set at reported landings from 1983-1984. Some concern about overfishing on inshore grounds was balanced by the ability of offshore grounds to support increased fishing effort.	464	1996 / 2001	Total allowable commercial catch (TACC) increased in 1996 under an Adaptive Management Program (AMP); AMP reviewed in 2001, and fishery maintained under AMP; other allowances set 2001.	1023	Probably > BMSY	There is no long term trend in catch per unit effort (CPUE). Assuming that CPUE indices reflect abundance, this would indicate the fishery has not had a detectable impact on the resource. However, owing to changes in marketing and gear, standardised CPUE may be affected by factors other than bluenose abundance. BNS 1 was believed to be above BMSY when it was introduced into the AMP in 1996/97. Based on the size of the area currently fished in relation to the total area of BNS 1, the lack of a consistent trend in CPUE, and the volume of catches sustained over the last 10 years, BNS 1 is considered most likely to be above BMSY. However, it cannot be determined if the TAC is sustainable in the long term or able to allow the stock to move towards the size that will support BMSY.

Stock	Date into QMS (original TAC(t))	Basis for setting original TAC/C	1983-84 commercial landings	Date reviewed**	Outcome of review	TAC 2006-07 (t)	Where stock is in relation to B _{MSY}	Current status or projection
KIN 1	2003 (673)	Set to rebuild fishery, based on reducing average landings between 1993 and 2002 by 20%.	307	-	-	673	Unknown	Unknown
SCH 1	1986 (560)	TACC was originally set at half the 1983 catch because of apparently declining catch rates and concern about the species' low productivity.	1087	2007	TAC increased by 27 tonnes	893	Unknown	Not known whether current catches are sustainable. In Australia, school shark is considered seriously threatened, because of recruitment overfishing (removal of too many large, productive females from the population). Fishing pressure on large females in NZ needs to be minimised to maintain the productivity of this species. Catches have increased steadily since 1986/87.
JDO 1	1986 (510)	Based on sustainable yield estimate based on historical catch level; assumed stock was not under severe fishing pressure but potential for increased targeted catches should be prevented.	659	-	-	704*	Unknown	Recent catch levels and the current TACC are likely to be sustainable at least in the short term. It is unknown whether recent catches or the current TACCs are at levels that will allow the stocks to move towards a size that will support the MSY.
HPB 1	1986 (360)	Significant reduction from 1983 landings, because of overfishing concerns.	974	-	-	481*	Unknown	Recent catches of HPB 1 are less than Maximum Constant Yield (MCY) estimates, are considered sustainable, and are probably at levels that will allow the stocks to move towards a size that will support the maximum sustainable yield. Current TACCs are larger than the MCY estimates and it is not known if they are sustainable.

* This is the TACC, as no TAC has yet been set for these stocks.

** Excludes changes due to quota appeal authority decisions, or changes under s 362 of the Fisheries Act (allocation of quota for bait).