



Ministry of
Fisheries
Te Tautiaki i nga tini a Tangaroa

Operational Management Plan for Large Pelagic Species

2010—2015



New Zealand Government

Overall Goal for New Zealand fisheries

New Zealanders maximising benefits from the use of fisheries within environmental limits

Outcomes

Use Outcome: Fisheries resources are used in a manner that provides greatest overall economic, social, and cultural benefit

Environment Outcome: The capacity and integrity of the aquatic environment, habitats and species are sustained at levels that provide for future and current use.

Governance Conditions: Sound governance arrangements that are well specified, transparent, and which support cost-effective and accountable decision-making

Management objectives for fisheries for Highly Migratory Species

Use Outcome	1	Promote a viable and profitable tuna fishery in New Zealand
	2	Maintain / enhance world class gamefisheries in New Zealand fisheries waters
	3	Deliver fair opportunities for access to HMS fisheries
	4	Minimise wastage and promote humane treatment
	5	Maori interests (including customary, commercial, recreational and environmental) are enhanced

Environment Outcome	6	Maintain a sustainable fishery for HMS within environmental standards
	7	Implement an ecosystem approach to fisheries management, taking into account associated and dependent species
	8	Protect, maintain, and enhance fisheries habitat
	9	Allow for HMS aquaculture development while ensuring the ecosystem and wild fisheries are protected

Governance conditions	10	Recognise and provide for Deed of Settlement obligations
	11	Influence international fora and ensure New Zealand interests are taken into account
	12	Maintain an effective fisheries management regime

Operational objectives for large pelagic species—this document

List of Abbreviations

6 th schedule	A schedule of the Fisheries Act 1996 that outlines provisions for the return of specified quota management species to the sea
ACE	Annual Catch Entitlement
B _{MSY}	The biomass level that can produce the maximum sustainable yield from a fish stock.
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CMM	Conservation and Management Measure – agreements adopted by the Western and Central Pacific Fisheries Commission
FAO	Food and Agriculture Organisation of the United Nations
HMS	Highly migratory species
ICCAT	International Commission for the Conservation of Atlantic Tunas
IPOA-Sharks / NPOA-Sharks	International / National Plan of Action for the Conservation and Management of Sharks
MFish	Ministry of Fisheries
NPOA—Seabirds	National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries
NZSFC	New Zealand Sports Fishing Council (formerly New Zealand Big Game Fishing Council)
NZRFC	New Zealand Recreational Fishing Council
QMS	Quota Management System
SeaFIC	Seafood Industry Council
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
WCPFC	Western and Central Pacific Fisheries Commission

Introduction

This operational management plan for large pelagic species establishes operational objectives and performance criteria for the period 2010-2015 for large pelagic species including:

- Southern bluefin tuna (STN)
- Bigeye tuna (BIG)
- Swordfish (SWO)
- Marlin species (STM, BEM, BKM)
- Yellowfin tuna (YFN)
- Pacific bluefin tuna (TOR)
- Albacore tuna (ALB)
- Pelagic sharks (BWS, MAK, POS)
- Other finfish bycatch species (e.g. Ray's bream, moonfish) (RBM, MOO)

The plan consists of the following sections:

1. Overview of the fishery for large pelagic species
2. Overview of fish and non-fish bycatch in large pelagic fisheries
3. Operational objectives and performance criteria for the fishery for large pelagic species

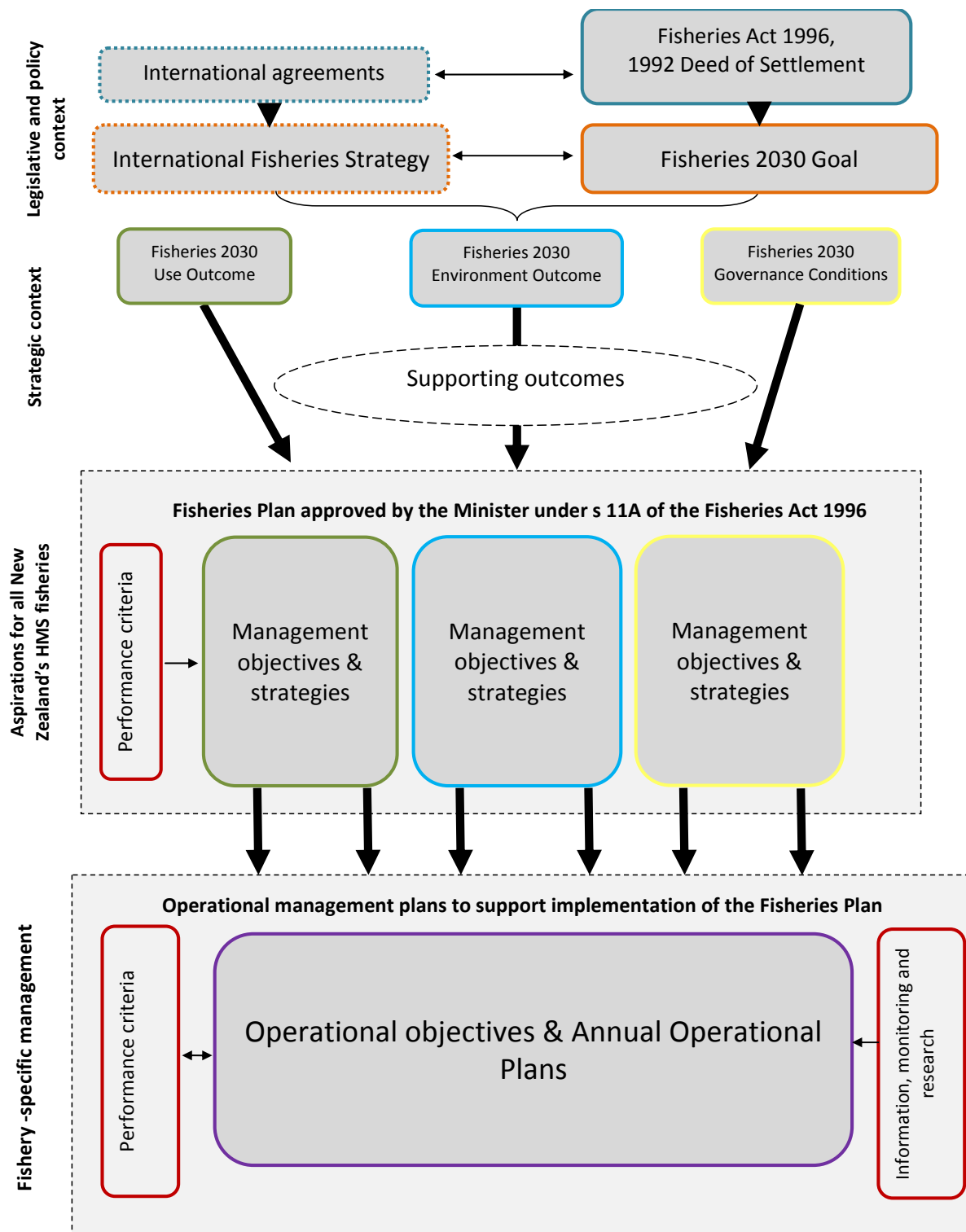
The operational objectives in this management plan provide greater detail on how the management objectives for highly migratory species will be implemented in relation to large pelagic species, as outlined in the diagram on the following page. Management objectives for highly migratory species are outlined in the National Fisheries Plan for Highly Migratory Species, which has been approved by the Minister of Fisheries under section 11A of the Fisheries Act.

This document covers management of key target and bycatch fisheries for large pelagic species (both commercial and recreational), as well as the management of any adverse environmental effects caused by fishing activity for large pelagic species.

An overview of the operational objectives and the actions proposed to meet the objectives is provided on page 3. The numbering used for the operational objectives outlined in this plan follows on from the management objectives outlined in the national fisheries plan. For example, management objective 1— to promote a viable and profitable tuna fishery in New Zealand has the following contributing objectives:

- Management objective 1.1—Reduce administrative barriers to profitability in the HMS fishery;
- Management objective 1.2—Negotiate favourable country allocations for New Zealand fishers;
- **Operational objective 1.3 (large pelagic species)— Ensure catch limits are not exceeded and annual catch entitlements are readily available and are used to cover catches**
- **Operational objective 1.4 (large pelagic species)— Ensure fair allocation of levy costs for quota owners in HMS fishstocks**

Structure of the National Fisheries Plan for Highly Migratory Species and operational management plans for large pelagic species, skipjack, and albacore



This document: operational objectives for large pelagic species

Summary of objectives and actions over timeline of plan (for further description of the priority ratings see page 15)

Operational objectives for large pelagic species	Actions	Five year prioritisation				
		2010-11	2011-12	2012-13	2013-14	2014-15
Use Outcome						
1 Promote a viable and profitable tuna fishery in New Zealand						
1.3 Ensure catch limits are not exceeded and annual catch entitlements are readily available and are used to cover catches	Annually review data to determine whether or not changes to deemed values are required; monitor catches against TACCs	On-going (annual review) (P3)				
1.4 Ensure fair allocation of levy costs for quota owners in HMS fishstocks	Annually review specific and generic costs attributed to HMS fisheries for their cost-effectiveness and fairness.	On-going (annual review) (P1)				
2 Maintain / enhance world class gamefisheries in New Zealand fisheries waters						
2.2 Ensure at least 50% of recreational marlin, Pacific bluefin tuna and HMS shark catch is released	Regularly review the gamefish tagging programme (P4) to ensure it continues to foster and encourage tagging and release of gamefish. Improve feedback and incentives for recreational and commercial fishers to participate (P1).	P1				P4
3 Deliver fair opportunities for access to HMS fisheries						
3.2 Discuss with stakeholders and review management of marlin	Discuss with stakeholders and review management of marlin, including quantifying the relative benefits of alternative management options.	P1				
4 Minimise wastage and promote humane treatment of HMS						
4.2 Encourage full use in the recreational fishery for Pacific bluefin tuna	Monitor the fishery through charter boat reporting of catches and tag/release information, including education during initial implementation (P1).	P1	On-going monitoring			
4.3 Minimise waste of HMS sharks	Monitor shark fisheries as outlined in the NPOA—Sharks, and monitor landed states of shark catches (P1/on-going). Industry to lead other actions e.g. finding additional markets (P4).	On-going monitoring and review, including under NPOA—Sharks				
		P1				P4
4.4 Implement a shark handling code of conduct for all fishers	Regularly review existing commercial code of conduct and encourage its uptake. Develop a code of conduct on shark handling for non-commercial fishers (P4).					P4
Environment Outcome						
6 Maintain a sustainable fishery for HMS within environmental standards						
6.4 Maintain the reproductive capacity of HMS shark populations	Annually monitor shark catches. Ensure accuracy of conversion factors in use (P2); contribute to Pacific-wide stock assessment for key HMS sharks (P3); contribute to the comprehensive review of shark fisheries outlined in the NPOA—Sharks (P1).	On-going (annual review; conversion factors review (P2); Pacific-wide stock assessment (P3))				
			P1 (NPOA—Sharks)			
6.5 Review non-commercial allowances and management measures (as required) when new information becomes available	Review non-commercial allowances and management as required; Pacific bluefin tuna is likely to require review in the near future (P1).		P1			
7 Implement an ecosystem approach to fisheries management, taking into account associated and dependent species						
7.5 Develop and apply effective seabird mitigation, including options for vessel specific measures and compliance	Evaluate a framework for vessel specific seabird mitigation, and regularly audit performance once implemented.	P1				
7.6 Ensure through regular review and update that effective mitigation measures are in place	Annually review mitigation requirements and specifications (P2), and provide for the trial and use of alternative seabird mitigation strategies as appropriate (P3). Implement commercial and non-commercial (P4) codes of practice, and educate fishers on mitigation measures.	On-going (annual review, P2; research on best practice, P3)				
						P4

1. Overview of the fishery for large pelagic species

Large pelagic species are the focus of important commercial and recreational fisheries, including a surface longline fishery and recreational gamefishery.

The key commercial target species in the surface longline fishery are southern bluefin tuna, bigeye tuna, and to a lesser extent swordfish. Other tuna species including albacore, yellowfin and Pacific bluefin tuna are a valued component of the catch, whether targeted or caught as bycatch. Pelagic sharks and other finfish including Ray's bream and moonfish are also caught as bycatch.

Marlins (striped, blue and black), broadbill swordfish, yellowfin, Pacific bluefin and southern bluefin tuna are all recognised target species in the world-renowned gamefisheries in New Zealand waters, as are mako, blue and hammerhead sharks. Other less frequently caught or bycatch species include shortbilled spearfish, mahimahi, thresher and porbeagle sharks. Albacore and skipjack are also taken for food and/or bait.

Biological overview

The distribution of tuna in New Zealand waters is seasonal, and is influenced by both short- and long-term environmental factors. Stock status can also influence availability in New Zealand waters. Catch rates of southern bluefin tuna, for example, have been affected by the overall status of the stock in recent years. Evidence of a long term decline in the availability of yellowfin in New Zealand waters may also be related to the level of fishing effort on the stock as a whole.

While there are known fishing grounds for species such as bigeye and southern bluefin, the timing and detail of their distribution can vary from year to year. The key spawning and juvenile grounds for these species, which are areas of importance for fisheries management, are generally outside of New Zealand fisheries waters.

Southern bluefin tuna consist of a single stock primarily distributed between latitudes 30°S and 45°S. Southern bluefin tuna caught in the New Zealand exclusive economic zone (EEZ) appear to represent the easternmost extent of a stock whose centre is in the Indian Ocean. A range of size classes is present in New Zealand waters (and taken by the commercial fishery), including both mature and juvenile fish. The estimated age at maturity is around 12 years, by which stage the fish may be as large as 165cm.

Bigeye tuna is distributed broadly across the Pacific Ocean, in both the Northern and Southern Hemispheres. Individuals found in New Zealand waters are mostly adults. A large-scale tagging programme is currently underway in the Pacific to examine whether there are one or more stocks of bigeye tuna in the Pacific Ocean.

Swordfish range from latitudes 50°N to 45°S in the western Pacific Ocean and from 45°N to 35°S in the eastern Pacific Ocean. Spawning takes place in the tropical waters of the western Pacific and to a lesser extent the equatorial waters of the central Pacific. The New Zealand fishery, which is based generally on mature fish, is assumed to be part of a south-west Pacific stock.

Striped marlin range from 45°N to 40°S in the Pacific and from continental Asia to 45°S in the Indian Ocean. Within the Western and Central Pacific Convention area there is generally considered to be a northern and a southern stock. Most marlin caught in New Zealand waters are large and are believed to be mature.

For further information on the biology of tuna and billfish species see the Ministry of Fisheries Plenary reports available at www.fish.govt.nz or the website of the Western and Central Pacific Fisheries Commission (WCPFC) <http://www.wcpfc.int/>.

Fisheries Management overview

Management of highly migratory species is largely driven by regional fisheries management organisations (RFMOs), in which New Zealand participates and influences but does not have full control over outcomes. Two RFMOs are of direct relevance to management of New Zealand fisheries for HMS:

- i. The Commission for the Conservation of Southern Bluefin Tuna (CCSBT); and
- ii. The Western and Central Pacific Fisheries Commission (WCPFC)

Stock assessments for the major western and central Pacific Ocean tuna species are undertaken by the Oceanic Fisheries Program of the Secretariat of the Pacific Community. The scientific committee of the WCPFC reviews these assessments. The scientific committee of the CCSBT assesses southern bluefin tuna. For the major tuna species, stock assessments occur regularly, although there are gaps in available data, including detailed catch and effort information for some fleets.

There are concerns about the current state of both main target tuna species, which are actively managed by the RFMOs – CCSBT and WCPFC. The main large pelagic stocks were introduced into the quota management system (QMS) in 2004. Southern bluefin tuna has a national catch allocation set by the CCSBT. The New Zealand allocation is in turn allocated as individual transferable quota that applies to the catch of southern bluefin by New Zealand nationals throughout the range of the stock (including both within and outside of New Zealand's zone). In addition to the catch limits established within the New Zealand zone, conservation and management measures established by WCPFC place various effort controls on fishing for other HMS stocks in the Pacific.

Southern bluefin tuna spawning stock biomass is very low (assessed in 2009 as being about 5% of the original spawning stock and 15% of the spawning stock biomass that would produce the maximum sustainable yield – MSY). Southern bluefin tuna recruit to the spawning stock at around 12 years of age and the stock status will be further influenced by three years of poor year classes (from 2000 to 2002) and indications of some further poor recruitments after 2004. As a result, the global catch limit, reduced by 3000t in 2006, was further reduced by 20% in 2009, from 11,810t to 9,449t (New Zealand's effective allocation is 570t). Further catch limit reductions may be required in the future. Future catch limits will be determined in the context of a rebuild plan and scientific management procedure that CCSBT is developing (the default position is a further reduction in 2012 if the management procedure cannot be agreed).

The bigeye tuna stock is assessed as being at or close to an overfished state. The 2009 stock assessment concluded that overfishing is occurring (fishing mortality is greater than that required to achieve MSY) and a 34-50% reduction in fishing mortality would be required to keep the biomass above MSY levels. WCPFC has adopted a range of measures with the objective of reducing fishing mortality in both longline and purse seine fisheries. The primary area of concern is the equatorial Pacific and as yet there is no impact of these measures on the domestic longline fishery (New Zealand is required to remain within a cap of 2,000 tonnes which is well above the total allowable catch – TAC).

Assessment of the swordfish stock indicates that overfishing is not occurring and that the south western Pacific swordfish stock is not in an overfished state. However, New Zealand and other Pacific Island countries have expressed concerns at the rapid expansion in swordfish catches by some distant water fishing nations in recent years. Due to uncertainties in the stock assessment, the scientific committee has recommended that there be no further increase in catch or effort in order to keep the stock above reference points. This advice was implemented through controls on vessel numbers in 2007 and both vessel numbers and total catches by fleet in 2008. In 2009 a long term limit on fleet catch and vessel numbers was agreed (WCPFC Conservation and Management Measure (CMM) 2009-03).

Striped marlin stock assessment information from 2006 suggests that at current levels of fishing mortality, overfishing may occur and biomass levels may approximate or be below B_{MSY} . The WCPFC scientific committee advised as a precautionary measure that there be no increases in fishing mortality on the southwest Pacific striped marlin stock until estimates of stock status are more certain. WCPFC adopted a conservation and management measure in 2006 (CMM 2006-04) to limit vessels fishing for striped marlin in specified areas. A commercial moratorium applies to the landing of striped marlin caught within New Zealand's zone.

Commercial fisheries

Although the longline fishery mostly targets bigeye and southern bluefin tuna and more recently swordfish, albacore tuna historically makes up the largest proportion of the longline tuna catch (making up approximately 20% of the total longline catch in 2008/09). Albacore tuna is also caught in a target troll fishery, and management issues specific to the stock are largely dealt with in that context (see the albacore management plan). Pacific bluefin and yellowfin tunas are also taken in small numbers in longline sets.

Overall, commercial landings of the large pelagic species taken by surface longline generally declined since 2002, consistent with a decline in fishing effort and number of vessels operating in these fisheries (Table 2), although both vessel numbers and catches for the main species increased in 2009 (see Figure and Table 1).

Figure 1: Historical catch (t) of key large pelagic species by New Zealand surface longline vessels in New Zealand fisheries waters and on the high seas

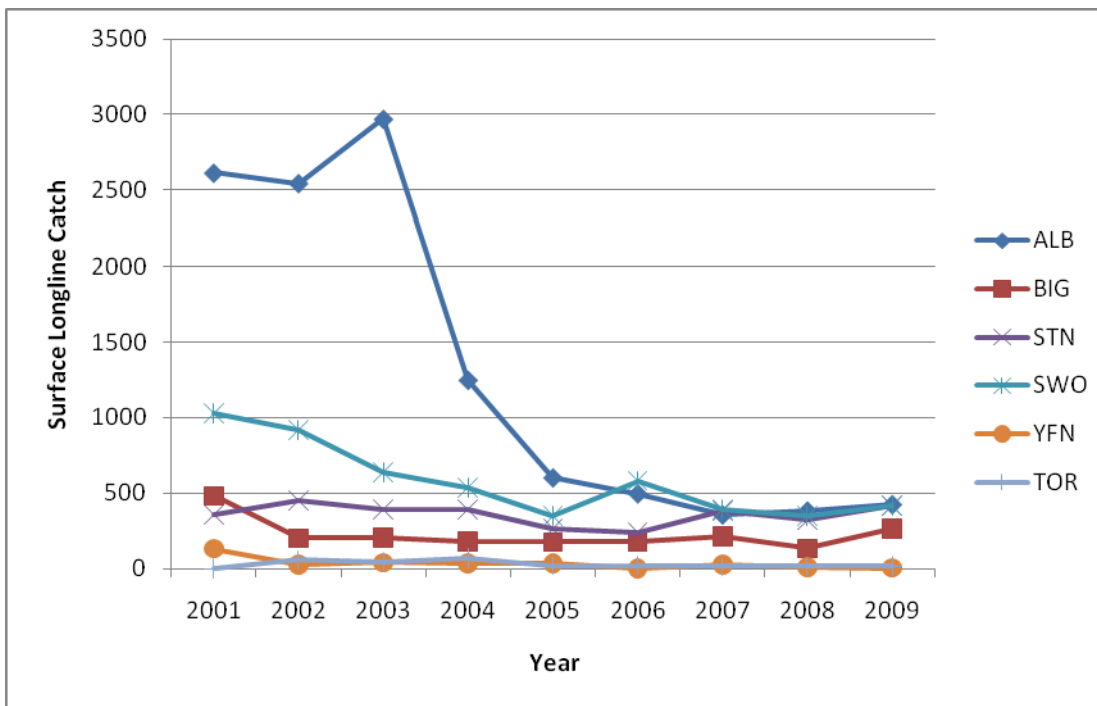


Table 1: Historical surface longline catches (t) of key large pelagic species by New Zealand vessels in New Zealand fisheries waters and on the high seas. (- Not available)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
ALB	2614	2545	2971	1248	602	496	357	382	424
BIG	481	201	204	177	175	177	213	132	263
STN	359	450	390	393	264	238	383	319	419
SWO	1027	920	635	538	348	581	392	347	419
YFN	131	27	39	36	36	3	25	11	3
TOR	-	56	41	67	21	21	14	14	16

Table 2: Number of New Zealand longline vessels fishing for large pelagic species in the WCPFC convention area 2001-2009

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Vessels	132	151	132	99	57	56	44	35	40

The southern bluefin tuna fishery occurs off the east coast of the North Island and the west coast of the South Island (the latter fishery primarily foreign charter vessels). The fishery involves both smaller domestic vessels which land fresh tuna for export and the foreign charter freezer vessels. During the remainder of the year the domestic fleet fishes mainly off the east coast of the North Island targeting bigeye tuna, swordfish and other minor target species.

For additional information see the annual operational plan; see also operational objective 1.3 relating to catch limits and catch entitlements (page 16).

Recreational fisheries

The northeast coast of New Zealand centred around the Bay of Islands area is world-renowned for striped marlin. The King Bank and Middlesex Bank north of the Three Kings Islands draw fishers from around the country and the world, targeting striped marlin and swordfish, while Westport and Greymouth attract bluefin tuna fishers. The abundance of marlin, tuna, and sharks

in specific areas changes from year to year. Gamefishers are highly mobile, and tend to congregate in areas of recent fishing success.

The main gamefish season runs from late December to April and focuses, in the North Island, on striped marlin and yellowfin tuna. Fishing for broadbill swordfish can extend the gamefish season beyond the warmest months. In southern waters pelagic sharks are commonly targeted.

Recently, an off-season game fishery for bluefin tuna has developed off the west coast South Island. Fishing is highly seasonal, between July and September. Fishing success mostly depends on the presence of hoki trawlers for attracting fish to the surface. Both bluefin species are caught, especially at the beginning of the season, but Pacific bluefin is more sought after because of its greater size.

Tag-and-release is popular in the gamefishery; the numbers of fish tagged and released is shown in table 3 below.

Table 3: Number of fish tagged and released by species and season, and the mean number of releases for the 10 seasons previous to 2008–09, for fish tagged inside the New Zealand EEZ only.

Season	Blue marlin	Black marlin	Blue shark	Mako shark	Other sharks	Shortbill spearfish	Striped marlin	Sword-fish	Pacific bluefin	Yellow-fin	All other species
1999–00	1		11	23	5			5			2
2000–01	34		203	277	72	1	851	6		17	4
2001–02	21	2	163	346	69	13	771	3		7	3
2002–03	6	1	78	155	54	14	671	3		76	2
2003–04	8		106	188	64	8	1 051	2		184	6
2004–05	29	5	102	241	61	7	1 348	6		81	
2005–06	17	2	95	193	76	11	923	5	7	5	4
2006–07	26	2	157	150	61	14	964	16	14	8	6
2007–08	29		108	294	50	8	806	25	31	21	7
2008–09	24	2	101	284	50	5	1 058	24	31		9
10 year mean	20	2	112	215	56	9	831	10	21	50	5

Source: Holdsworth, J.; Saul, P. (2009). New Zealand billfish and gamefish tagging, 2007-08. New Zealand Fisheries Assessment Report FAR 2010/12.

Environmental overview

Most large pelagic highly migratory species are 'apex' or 'top' predators when fully grown. They consume a range of fish and squid species. Adults of the species have few natural predators, although juveniles are likely to be an important food source for various other HMS. Apex predators are thought to play a crucial role in maintaining the health of an ecosystem, in part because they may exert substantial control over the sizes of the populations of many species on lower levels of the food web. Consequently, they may contribute to the stability of marine ecosystems, and maintain biodiversity.

Tuna longline fisheries catch a range of bycatch or non-target species, including pelagic sharks and other fish bycatch, many of which have catch limits within New Zealand waters. Strategies have been developed to mitigate interactions with seabirds, marine mammals and sea turtles, which are sometimes caught as unwanted incidental catches. Information on these interactions is provided in the following section. Because of the way in which the gear is set, pelagic longlining does not have adverse effects on benthic habitats.

Economic overview

Domestic longlining developed in the early 1990s. Rapid expansion, particularly in the late 1990s through to 2000, initially occurred because tuna fisheries were among the few open access fisheries in New Zealand at that time. Potential eligibility for quota on the basis of fishing history when tuna species entered the QMS also encouraged participation in the fishery. The number of vessels targeting tuna declined following government decisions on catch history years for several important species in the longline fishery.

A further driver for rationalisation in the tuna longline fleet was the allocation of southern bluefin tuna quota. Many fishers received uneconomic quota amounts when individual shares were allocated. Some responded by purchasing further quota, but many chose to exit the fishery.

The large pelagic species are generally high value species, with potential to fetch premium prices at sashimi (raw fish) markets in Japan. Large tunas including bigeye and southern bluefin tuna caught by smaller domestic 'ice boats' are typically air freighted to Japan, with a small proportion exported to the United States and elsewhere. The charter vessels that operate in the southern bluefin tuna fishery transport their catch directly to Japan as frozen whole fish.

The export price for tuna varies between species. Longline-caught tunas such as southern bluefin tuna, Pacific bluefin tuna, and bigeye tuna fetched the highest prices in 2008 (over \$30 per kg for southern bluefin tuna). While the return for these species is high, there is a high cost involved in getting longline-caught species to overseas markets when they are air-freighted as fresh product.

Gamefishing is a highly valued pastime for many New Zealanders and visitors to New Zealand. Gamefish species such as striped marlin and swordfish make up a multi-million dollar recreational gamefishery in New Zealand. It was estimated that in 2001-02 the billfish fishery in New Zealand generated \$65 million in expenditure nationally.¹ More recent estimates of expenditure are not available.

Compliance overview

The main drivers for fishing offences involving HMS include the high value of many of the species, the high demand in international markets, and the extensive and remote areas where these stocks can be found. Ensuring correct species identification is important for these high value tuna species. For example, while Pacific bluefin (TOR) are managed with a catch limit under the QMS, no catch limit applies for the non-quota species northern bluefin tuna (NTU), on the basis that they are not found in New Zealand waters. Occasional catches of NTU are still reported, although all genetic testing confirms that only Pacific bluefin is present here. Unless confirmed by genetic testing, future reports of NTU will be considered as misreporting of TOR, a quota species. There is also a risk of southern bluefin tuna being mislabelled as bigeye or Pacific bluefin tuna, either knowingly (e.g. in order to avoid quota constraints) or through misidentification. It would be a significant risk to New Zealand's international reputation if mislabelled tuna were exported and discovered in international markets.

There may also be some incentive to discard southern bluefin tuna of lower quality, even when they are dead. Such discarding contravenes the provisions of the 6th Schedule of the Fisheries Act 1996.

Statistical documents are required for exports of bigeye and swordfish to verify that catches did not occur in the Atlantic Ocean (an ICCAT requirement), while exports of southern bluefin tuna require CCSBT catch documentation scheme (CDS) documents. The CDS also involves tagging, measurements and documentation for individual tuna. The CDS applies to domestic sales of southern bluefin tuna as well as to exports.

Access to New Zealand recreational fisheries for HMS is generally open and unlicensed (e.g. no bag or size limits apply), subject to general controls on recreational fishing. From 1 October 2010, reporting requirements will be in place for recreational charter vessel operators. In the short term, the focus of operational compliance activities in the recreational fishery for HMS will be on billfish species, which are highly valued by gamefishers, and on the operators of recreational charter boats to assist with implementation of new charter reporting requirements.

Social overview

New Zealand's close cooperation with other Polynesian countries (Cook Islands, Niue, Samoa, Tokelau and Tonga) on fisheries management and development has recently been formalised through an arrangement called Te Vaka Moana. Albacore and swordfish are a particular focus of Te Vaka Moana discussions on developing regional management approaches that reflect coastal state interests in HMS fisheries. Te Vaka Moana's future activities include further development of

¹ Boyd, R ; Holdsworth, J ; Saul, P. (2002). The economic contribution of the New Zealand recreational billfish fishery in 2000-2001.

management frameworks for Polynesian longline fisheries, as well as cooperative work on monitoring, control, and surveillance (MCS), and a Polynesian Fisheries Development Package.

New Zealand's commercial longline tuna fishery is comprised mainly of owner-operators who fish independently, rather than being affiliated to a specific fishing company or fish receiver. Many owner operators do not own quota but rather acquire annual catch entitlements (ACE) to cover their catches.

Gamefish species are highly valued by fishers due to the unique nature of the gamefishing experience. Numerous factors contribute to the value of gamefisheries to recreational fishers, including: the technical nature and challenge of gamefishing, aesthetic/visual enjoyment and camaraderie of the experience and the use of tag and release methods.

As well as the commercial and recreational fisheries outlined above, Maori have past, present, and future interests in fisheries for large pelagic species. More information is required on contemporary Maori interests in these fisheries, as outlined in the national fisheries plan for HMS (see management objective 5).

Maori traditionally ate a wide variety of seafood. No specific records have been found to date of fishing for some HMS, but they were nonetheless potentially part of customary catches, given the distance offshore that Maori fished, and the quality of their fishing materials. Maori names are not commonly known for most of the tunas. Other HMS including pelagic sharks, swordfish (paea), and striped marlin (takeitonga or tekeketonga) are named. Customary fishers consider moonfish (aro kura) good eating. Prior to European settlement, Maori caught large numbers of cartilaginous fishes, including blue sharks (ngerongero) and mako.

2. Overview of non-target interactions

The surface longline catch can be divided into three components: tuna and billfish species (i.e. swordfish, marlin); pelagic sharks; and other finfish species.

Albacore tuna and blue shark are the most commonly caught bycatch species, along with sunfish, moonfish, Ray's bream, and lancetfish. Many of the common bycatch species, including the pelagic sharks, Ray's bream and moonfish were introduced into the QMS in 2004 and are managed under catch limits. The large reductions in longline effort since QMS introduction in 2004 resulted in initial reductions in landings of the major bycatch species. In recent years bycatch levels have been relatively stable.

Bycatch figures estimated from observer records of the longline fishery are shown in Table 4. Observer coverage is important for estimating catches of the less valuable species that are less likely to be retained or recorded. Levels of coverage in the domestic longline fishery have historically been low, making it difficult to obtain reasonable estimates for all fleets. For QMS species, catch records are also available from fisher returns, monthly harvest returns, and licensed fish receiver returns.

Table 4: Estimated catch (numbers of fish) of common bycatch species in the New Zealand longline fishery as estimated from observer data in 2006 to 2009. Also provided for 2009 only is the percentage of these species retained and the percentage of non-retained fish that were alive when caught.

Species	2006	2007	2008	2009	% retained (2009)	% alive (2009)
Blue shark	56647	52777	41059	50303	72.9	97.7
Lancetfish	11359	22068	14095	26772	0.0	12.5
Rays bream	14290	28609	12107	18072	98.5	11.5
Sunfish	3339	3201	2529	5341	0.6	99.7
Moonfish	2048	3977	1830	5038	98.4	50.0
Mako shark	4801	3778	2620	4511	59.6	91.7
Porbeagle shark	1886	2746	4273	4112	65.0	80.4
Pelagic stingray	5228	2124	1749	3348	0.0	98.5
Escolar	1077	2212	2666	2573	66.0	81.5
Butterfly tuna	434	845	479	904	74.2	16.3
Oilfish	1728	1178	519	895	20.5	84.6
Dealfish	202	1154	494	773	0.0	22.1
Big scale pomfret	779	3086	1385	548	61.0	70.3
Deepwater dogfish	982	1137	644	539	0.2	90.1
Dolphinfish	103	158	469	402	100.0	N/A
Rudderfish	563	1346	222	298	20.7	71.0
Thresher shark	414	324	288	278	37.5	100.0
Striped marlin ²	168	154	208	241	Not available	Not available

Main bycatch species

Tuna and billfish

Biological Overview

Yellowfin tuna found in New Zealand waters are mostly adults that are distributed in the tropical and temperate waters of the western and central Pacific Ocean. Pacific bluefin occur broadly across the Pacific Ocean, especially in the waters of the North Pacific Ocean. Individuals found in New Zealand fisheries waters are mostly adults, and can attain large sizes (200kg or more).

Two albacore stocks (North and South Pacific) are recognised in the Pacific Ocean, although there is some movement of fish between the two stocks. For the South Pacific stock, most catches occur in longline fisheries in the EEZs of other South Pacific states and territories, in high seas areas, and in a New Zealand-based troll fishery.

² Commercial moratorium applies so all striped marlin are released (whether dead or alive).

Fisheries Management Overview

The stock assessment for yellowfin tuna indicates that the stock is not in an overfished state and that it is not being overfished. However, in recent years both recreational and commercial fisheries in New Zealand have experienced a substantial drop in catches of yellowfin tuna, which indicates reduced abundance in New Zealand waters. The cause of this decline is not known; it may be environmental or the stock assessment may be failing to detect a contraction in the range of yellowfin tuna. Research has been initiated to investigate this.

The stock assessment for Pacific bluefin suggests the stock is about as likely as not to be at or near B_{MSY} . If fishing mortality remains at the current level and environmental conditions remain favourable, recruitment should be sufficient to maintain current yields. The WCPFC introduced a conservation and management measure for Pacific bluefin tuna in 2009 (CMM 2009-07).

Economic overview

The majority of the Pacific bluefin tuna and yellowfin tuna catches are exported, with limited amounts going to the domestic market. Export prices for Pacific bluefin tend to be similar to those for southern bluefin. Compared with southern bluefin tuna, catches and therefore exports of Pacific bluefin are more limited. Yellowfin is potentially also a highly valued export species, although less so than southern and Pacific bluefin tunas; in recent years catches (and hence total value) have been very low. The export price for albacore tuna is lower again, since most albacore including longline-caught fish are exported to overseas canneries rather than to sashimi markets.

Sharks

Biological Overview

Although there is no targeted fishing for sharks in the surface longline fishery, pelagic sharks, particularly blue shark, are a common bycatch species. Mako and porbeagle sharks are also commonly caught as bycatch species of the surface longline fishery, as well as in other fisheries including deepwater trawl fisheries.

Both blue and mako sharks are mainly found within tropical and temperate waters between 50° N to 50° S. Porbeagle sharks occur in the North Atlantic Ocean, and in a circumglobal band in the Southern Hemisphere. Given the scale of movements of tagged porbeagles, it seems likely that porbeagle sharks in the south-west Pacific comprise a single stock.

The majority of sharks caught by surface longlines are juveniles. Some HMS sharks are less productive, longer-lived species which tend to have more stable populations, but tend to be more vulnerable to overfishing. For example, compared to mako and porbeagle sharks, blue sharks are relatively fecund, fast growing, and widely distributed. There are concerns for the ability of porbeagle and mako sharks in particular to withstand significant fishing pressure.

Fisheries Management Overview

Global concerns about shark fisheries focus particularly on the practice of shark finning, both because of concerns about the status of shark populations, and animal welfare and wastage issues. The WCPFC has introduced a conservation and management measure (CMM 2009-04) covering better collection of data on shark catches; a commitment to undertake stock assessments for key species; and controls on fishing for sharks, including requirements for 'full utilisation' of shark catches. Unless alternative measures are in place to ensure the sustainability of shark catches there is a requirement to either land shark fins attached to the trunk, or to land fins totalling no more than 5% of the weight of shark carcasses landed.

New Zealand has adopted a National Plan of Action for the Conservation and Management of sharks (NPOA-sharks) which describes New Zealand's management system as it applies to shark species. It also outlines a range of actions to ensure that fisheries management in New Zealand satisfies the International Plan of Action for the Conservation and Management of sharks (IPOA sharks), to ensure the conservation and management of sharks and their long-term sustainable use.

For further information on New Zealand's management of shark fisheries see management objective 6.4 (page 20) and the annual operational plan.

Another factor influencing New Zealand management of shark species is the Convention on Migratory Species (CMS), as well as, potentially, the Convention on International Trade in

Endangered Species of Wild Flora and Fauna (CITES). Both of these international agreements may place additional controls of shark fisheries in order to ensure overall sustainability of shark populations. New Zealand implements such controls in a variety of ways, including under both fisheries and conservation legislation. For example, use of great white sharks (listed on appendix I of CMS) is prohibited under fisheries and conservation legislation both within New Zealand waters and by New Zealand vessels on the high seas.

CMS recently adopted a non-binding Memorandum of Understanding for the conservation of migratory sharks, covering all shark species listed in either appendix. New Zealand is not currently a signatory to this agreement, which outlines various conservation and management measures for sharks. A recent proposal to list porbeagle and short- and long-finned mako sharks (as well as northern hemisphere populations of spiny dogfish) on Appendix II of CITES was discussed in 2010 but was not agreed. Additional details are provided in the National Fisheries Plan for Highly Migratory Species.

Economic Overview

The flesh of shark species caught as bycatch in New Zealand's longline fisheries generally has a low value. Shark fins caught as a by-product add substantially to the value of the fishery. HMS shark species are utilised for their flesh to varying degrees as well as their fins, however for species such as blue shark the majority of the catch is landed as fins only.

The port prices for the three main shark species caught as bycatch in longline fisheries is around \$0.40-\$0.45 per kg and the ACE price is around \$0.06 per kg. There is no export value information for specific shark species, but international shark fin prices can range from anywhere between NZ\$10 and NZ\$10,000+ per kilo for dried fins (depending on the size, quality and species of shark). Shark fins are sold in Asian markets for an average of around NZ\$40 per kilo.

Other finfish species

A number of other finfish species are also caught as bycatch in the surface longline fisheries, including Ray's bream, moonfish and lancetfish, as well as several other less commonly caught species (see table 4).

Biological Overview

Most commercial moonfish catch appears to be of adult fish. A few spawning females have been collected in the Kermadec region, and at East Cape, suggesting that moonfish spawn in northern New Zealand.

Ray's bream probably come from a single, wide-ranging stock found throughout the South Pacific Ocean and southern Tasman Sea. At least two closely related species of Ray's bream are caught in New Zealand fisheries. The main species caught, and the species generally caught by surface longlining, is *Brama brama*. Southern Ray's bream (*B. australis*) is difficult to distinguish from external features but has been reported in both catch statistics and research survey data. A third closely related species, bronze bream (*Xenobrama microlepis*), is more easily distinguished from the other two, but is also likely to have been recorded together in catch statistics.

Little is known about the biology and distribution of the two species of lancetfish, longnose (*Alepisaurus ferox*) and shortnose (*A. brevirostris*) caught in surface longline fisheries. They are mainly found in deeper tropical and subtropical waters.

Fisheries Management Overview

Both moonfish and Ray's bream are among a group of species entered into the QMS in 2004. No stock assessments are available for Ray's bream or moonfish but catches in New Zealand fisheries waters are considered to be sustainable.

Lancetfish is managed outside of the QMS and almost all lancetfish catch is returned to the sea. There are no commercial fisheries targeted at lancetfishes. Their flesh, although edible, is difficult to utilise commercially.

Economic Overview

Both moonfish and Ray's bream have low commercial value. Much of New Zealand's moonfish catch is exported to Australia, Europe and the US, although some catch is landed to the domestic market. Catch of Ray's bream is primarily landed to the domestic market with small amounts being exported, mainly to Australia. Lancetfish has limited or no commercial value.

Incidental interactions with endangered, threatened and protected species

Seabirds

Several species of seabirds are caught in surface longline fisheries, both during setting and hauling of gear, primarily when they attack baited hooks as they enter or leave the water. Seabirds captured on the haul are more likely to survive the encounter, while those caught while setting gear generally drown. Observed seabird captures for the period 2002/03 to 2007/08 are provided in Table 5. Scaled estimates are not shown because these estimates are highly uncertain in some years because of the low level of observer coverage in the domestic fleet.

Table 5: Observed and estimated seabird interactions for surface longline vessels based on fisher and observer records.

	Total	Observed			
	Hooks	Observed hooks	% observed	Observed captures	Rate per 1000 hooks
2007/08	2,241,839	391,307	17.5	37	0.095
2006/07	3,746,672	955,919	25.5	187 ³	0.196
2005/06	3,687,569	636,796	17.3	37	0.058
2004/05	3,676,795	703,669	19.1	41	0.058
2003/04	7,382,293	1,464,465	19.8	71	0.048
2002/03	10,875,381	1,874,448	17.4	115	0.061

Data are provided by 1 Oct – 30 Sept fishing year. (Source: Abraham, Thompson and Oliver; Summary of the capture of seabirds, marine mammals, and turtles in New Zealand commercial fisheries, 1998-99 to 2007-08)

Seabird species captured incidentally include Buller's albatross, white-capped albatross, white-chinned and grey petrels, sooty shearwaters, and other albatross and petrel species.

Mitigation measures are generally most effective when used in combination (e.g. use of streamer line and line weighting). Longline vessels fishing for tuna or swordfish in New Zealand fisheries waters are required to use tori (streamer) lines, and may only set their lines at night unless using approved line weighting. New Zealand longline vessels fishing on the high seas south of 30°S must use two mitigation measures, as specified in the WCPFC measure (CMM 2007-04).

Marine Mammals

In the 2007-08 fishing year 10 fur seals were reported captured by surface longline fisheries, all of which were released alive. Captures are more common in the charter fishery that operates for southern bluefin tuna off the west coast of the South Island, although the domestic fishery does catch some fur seals off the east coast of the North Island.

There was a single observed cetacean capture in the surface longline fishery in the 2008-09 fishing year, which was subsequently released alive. It is estimated from observer data that between 2-3 whales are caught each year by the longline fishery.

Marine Reptiles

The scientific committee of the WCPFC has assessed the level of turtle interactions in the New Zealand surface longline fishery as negligible. Over the period 2001 to 2009, 17 turtles have been reported from the longline fishery (based on observer coverage). Two captures of turtles were observed in the surface longline fishery in the 2009/10 fishing year. All turtles except the one green turtle caught in 2001 were alive on capture and released. Thirteen of the turtles were leatherbacks, whilst the remainder were reported as green turtles (two), loggerhead (one), and one was unidentified.

Members of WCPFC have committed to implementing international guidelines to reduce sea turtle mortality, enhance the implementation of mitigation measures and report all available information on sea turtle interactions (CMM 2008-03). New Zealand has issued its surface longline vessels with turtle dehooking and line cutting equipment to improve the handling of any turtles that are caught.

³ Note the high number of birds observed in 2006/7 is largely influenced by a single trip of one vessel which did not comply with mitigation requirements and did not show good judgement in avoiding an area of high seabird concentration.

3. Operational objectives for large pelagic species

The operational objectives in this plan provide greater detail on how the management objectives for all highly migratory species will be implemented in relation to large pelagic species. This section provides the following information for the operational objectives identified:

- **Assessment:** What is the current status of the fishery in relation to the objective
- **Risk:** What is likelihood that current management will not achieve the objective?
- **Priority:** What is the priority associated with achieving the objective?
- **Performance criteria:** How will performance be measured?
- **Actions:** what actions would be required in order to achieve the objective over time, bearing in mind the priority of the objective, and the cost-effectiveness of actions required to achieve it?

The priorities are based on the following criteria:

Priority	Description
P1	Management objectives that are considered a high priority for delivery. The focus in the early years of the National Fisheries Plan for Highly Migratory Species will be to deliver services and complete the tasks for the fishery-specific operational objectives that underpin P1 management objectives.
P2	High priority but longer term management objectives. Typically this is because the successful completion of more than one fishery-specific operational objective is required before the management objective can be achieved.
P3	Management objectives that have a high priority but successful implementation is influenced by external factors. The influence of external factors can mean that despite a priority focus, these objectives may not be achieved during the initial five year timeframe.
P4	Management objectives where the timeframe for the delivery will be during the latter part of the five year period. In some instances the management objectives may be achieved before the five year period has elapsed but in others successfully achieving the management objective will not occur until the second five year period.

Management and operational objectives to support Use Outcome

Fisheries resources are used in a manner that provides greatest overall economic, social and cultural benefit

Management Objective 1	Promote a viable and profitable tuna fishery in New Zealand
Operational objective 1.3	Ensure catch limits are not exceeded and annual catch entitlements are readily available and are used to cover catches

Assessment:

Total allowable commercial catches (TACCs) for the main target species in large pelagic fisheries are seldom exceeded and are generally under-caught (see table 6 below). The market in annual catch entitlements (ACE) appears to be operating freely. At times deemed values are charged for small amounts of catch, despite the availability of ACE.

Some fishers have raised concerns about the relatively high cost of swordfish ACE relative to its port price. MFish does not have the ability to control market prices for ACE, but it remains important to ensure catch limits and deemed values are set appropriately. MFish regularly reviews deemed values. Some fishers consider the swordfish deemed value is too high, given difficulties in accessing ACE from time to time. The deemed value for swordfish was reduced in the 1 October 2008 fishing year. Future reviews will be based on the deemed value standard, which includes consideration of ACE price. However, deemed values are set to ensure catches remain within the catch limit, not as a proxy for allowing continuing fishing where ACE is difficult to access.

Table 6: Catch, TACC and deemed value payments made for bigeye tuna, southern bluefin tuna and swordfish, 2006/07 to 2008/09

		TACC (t)	Catch (t)	% TACC caught	Deemed value payments
BIG1	2006/07	714	196	27.50%	\$4,133
	2007/08		141	19.70%	\$500
	2008/09		237	33.20%	\$5,405
STN1	2006/07	413	379	91.80%	\$31,999
	2007/08		318	77.00%	\$0
	2008/09		417	101.0%*	\$0
SWO1	2006/07	885	413	46.60%	\$156
	2007/08		350	39.60%	\$4
	2008/09		399	45.00%	\$174

* Catch did not exceed available ACE due to carry-forward of unfished ACE from preceding season

Risk: Medium— catch limits are not exceeded but concerns about ACE availability are raised from time to time.

Performance criteria

- Limited or no deemed values paid where ACE was available
- Spread of deemed values (i.e. small amounts across fishery)
- deemed value rate is greater than ACE price, as set out in deemed value standard
- Catches are less than the TACC

Priority: P3

Action

- Annually review data to determine whether or not changes to deemed values are required
- Monitor catches in relation to TACCs

Operational objective 1.4	Ensure fair allocation of levy costs for quota owners in HMS fishstocks
---------------------------	---

Assessment:

As outlined in the National Fisheries Plan for HMS, commercial fisheries are subject to cost recovery levies for services that are both generic (compliance and registry) and specific (fisheries and conservation research, observers). The need to ensure generic charges are fair is highlighted in the national fisheries plan, both in relation to the overall quantum of these charges and the way the costs are attributed to different fisheries, including HMS fisheries. In addition, there is a need to ensure directed costs including research and observer services charges are reasonable, cost-effective, and transparent.

Risk: Medium— despite efforts to ensure costs are reasonable, levy charges are still relatively high in these fisheries.

Performance criteria

- ratio of levies to returns from fishery is favourable
- stakeholders participate in high-level planning of service delivery to ensure its cost-effectiveness
- costs are considered reasonable, cost-effective and transparent

Priority: P1

Action

- Annually review specific and generic costs attributed to HMS fisheries for their cost-effectiveness and fairness.

Management Objective 2	Maintain / enhance world class gamefisheries in New Zealand fisheries waters
Operational objective 2.2	Ensure at least 50% of recreational marlin, Pacific bluefin tuna, and HMS shark catch is released

Assessment:

Tag and release is well-established amongst sport fishers in New Zealand. Fishers like to participate in research and conservation, while handing in tag cards provides recognition of catch for club records. Reported rates of tag and release from clubs affiliated to the New Zealand Sport Fishing Council (NZSFC) were 59% for striped marlin, 85% for mako and 89% for blue sharks in 2008-09. The voluntary minimum weight of 90kg for marlin established by NZSFC in 1988 is now widely accepted and has influenced the proportion of fish tagged and the size of fish kept by club and non-club members. Tag and release rates amongst fishers who are not affiliated to NZSFC clubs are unknown. At least in some areas, release rates for marlin are likely lower than those cited here.

Fishers like to receive feedback on tagging programme results and recognition when the fish they tag has been recaptured. Improvements in these areas could result in better tag reporting rates by non-club sport fishers. Anecdotally there are low reporting rates for recaptured HMS fish caught by some New Zealand commercial fishers and distant water fishing fleets outside New Zealand waters. More effort is needed to identify barriers and provide incentives for commercial fishers to report recaptures.

Investment by NZSFC and the New Zealand Marine Research Foundation in satellite tagging programmes has demonstrated high survival rates of striped marlin and Pacific bluefin tuna following catch and release by anglers. This information reinforces the conservation and research values that motivate anglers to tag and release fish. The gamefish tagging programme was recently reviewed, and work will now concentrate on ensuring closer alignment between management objectives and the tagging programme.

Achieving this objective will require close cooperation with the gamefishing clubs and representative organisations.

Risk: Low-medium

Performance criteria

- reported release rates of marlin, pacific bluefin tuna, and sharks for NZSFC clubs are $\geq 50\%$
- anecdotal evidence on release rates for non-affiliated fishers
- at least 95% of tag release cards are received from fishers who have tagged fish
- improved reporting rate of recaptured fish from commercial fishery

Priority: **P1** (incentives for recreational and commercial fishers to participate) to **P4** (review of tagging programme)

Actions

- Ensure gamefish tagging programme continues to successfully foster and encourage tagging and releasing of gamefish
- Improve feedback and incentives for fishers to hand in tag and release information
- Identify barriers and provide incentives for commercial fishers to report recaptures

Management Objective 3	Deliver fair opportunities for access to HMS fisheries
Operational objective 3.2	Discuss with stakeholders and review management of marlin

Assessment:

Commercial fishers are currently prohibited from landing marlin caught within New Zealand fisheries waters. Originally this prohibition applied only to northern waters and resulted from decisions in 1987 designed to protect the recreational gamefishery. The prohibition was extended to include all New Zealand fishery waters in the early 1990s. Since that time it has been fiercely defended by the recreational sector, who believe the prohibition should extend to the high seas and to imports of marlin to reduce the risk of illegal catch finding its way onto the New Zealand market.

Currently commercial catches are low, but include both live and dead marlin, all of which must be discarded (see table 4; for recreational catches of marlin see table 3). Commercial fishers believe it would be possible to introduce management arrangements to allow the use of marlin which arrive at their vessels dead in order to improve the value of the fishery and reduce waste, while some believe all marlin should be available for use.

Possible competing objectives for management include:

- developing a framework for utilisation of marlin, including dead marlin, by the commercial sector; OR
- making marlin a completely non-commercial species (by prohibiting imports of marlin and prohibiting New Zealand nationals from taking marlin commercially on the high seas)

Risk: Medium– marlin management has not been formally discussed between sectors since the early 2000s and views on future management arrangements are strongly polarised.

Performance criteria

- A negotiated outcome is developed and implemented

Priority: **P1**

Actions

- Quantify the relative benefits of alternative management options
- Discuss with stakeholders and review management of marlin

Management Objective 4	Minimise wastage and promote humane treatment of HMS
Operational objective 4.2	Encourage full use in the recreational fishery for Pacific bluefin tuna

Assessment:

In the gamefishery for Pacific bluefin tuna off the west coast of the South Island, fishers tag and release around half to two-thirds of their catches, and retain the remainder. Tagging data shows good survival rates for released fish, while the size of the fish makes transportation and storage costly, and can lead to wastage of some retained catches. Individual charter vessel skippers are addressing these concerns through vessel limits on numbers of fish to be retained per trip. Anecdotal information suggests more privately-owned vessels are also engaging in the fishery, meaning a broad communication strategy is required to cover the full range of fishing interests.

Risk: Medium

Performance criteria

- limited or no anecdotal reports or evidence indicating wastage in the Pacific bluefin fishery

Priority: P1

Actions

- Monitor the Pacific bluefin fishery through charter boat reporting of catches and tag/release information (including regulated reporting from 1 October 2010)

Operational objective 4.3	Minimise waste of HMS sharks
---------------------------	------------------------------

Assessment:

Globally, concerns raised about shark finning relate to the sustainability of shark fisheries (see objective 6.4); animal welfare (objective 4.4); and a desire to see full utilisation of sharks that are killed. The Western and Central Pacific Fisheries Commission (WCPFC) has adopted a conservation and management measure to address these concerns. New Zealand implements the measure within New Zealand fisheries waters through QMS management. Outside of the EEZ, high seas permit conditions require fishers to land fins only if attached to the trunk. Waste of pelagic sharks could also be minimised by:

- employing methods to avoid unwanted bycatch, and monitoring emergence of new methods;
- seeking markets for shark products other than fins. MFish is not involved in directly influencing market demand; no industry body currently undertakes this role either.

A research and monitoring programme is planned under the NPOA—Sharks to evaluate trends in landed states and review the effectiveness of measures aimed at improving utilisation of shark catches. If there has been no improvement in the level of utilisation of shark species then measures to require full use can again be considered.

Risk: Medium

Performance criteria

- % shark landings that are only fins reduces over time

Priority: P1 (monitoring landed state of shark catches) to P4 (developing new markets)

Actions

- Monitor landed state of shark catches (fin on/off)
- Participate in the monitoring of shark fisheries planned under the NPOA—Sharks for HMS taken in association with the fishery for large pelagic tunas and billfish, and review management based on outcomes of monitoring if required
- Encourage the development of new markets for shark products to promote full utilisation (industry-led)

Operational objective 4.4	Implement a shark handling code of conduct for all fishers
---------------------------	--

Assessment:

Fishing clubs have adopted a general NZSFC policy of minimum sizes for retaining blue, bronze, hammerhead, mako, thresher, tiger and porbeagle sharks. The current baseline amongst NZSFC clubs is a minimum weight for landed sharks of 40kg, and minimum length for tag and release of 122cm (4ft). Commercial tuna fishers have in the past developed a code of practice that covers shark handling. More recently, SeaFIC has incorporated shark handling into a general code of practice they are developing for the fishery (initially developed for seabird mitigation).

Risk: Medium

Performance criteria

- code of conduct in place for both commercial and non-commercial fishers (MFish, SeaFIC and NZSFC)
- fishers aware of and supportive of codes of conduct

Priority: P4

Actions

- Develop a code of conduct for shark handling for non-commercial fishers
- Encourage uptake of commercial code of practice

Management and operational objectives to support Environment Outcome

The capacity and integrity of the aquatic environment, habitats and species are sustained at levels that provide for current and future use.

Management Objective 6	Maintain a sustainable fishery for HMS within environmental standards
------------------------	---

Operational objective 6.4	Maintain the reproductive capacity of HMS shark populations
---------------------------	---

Assessment:

HMS sharks are distributed throughout the Pacific. New Zealand has a role in contributing to stock assessment of HMS sharks in international bodies, both as an advocate for this to occur, and through contribution of fisheries data.⁴

No estimates of sustainable yield are available at present for HMS sharks. Within New Zealand, TACs were set in 2004 at levels that allowed for bycatch in associated tuna target fisheries. No formal regular review is in place to monitor any changes in fishing patterns. The approach under the QMS is to set a catch limit at a sustainable level; within that level fishers can manage their own catches (i.e. whether the fishery is targeted or bycatch). However, given the level of international interest in shark management, this issue requires attention beyond just setting a catch limit.

The first step in the assessment of the impact of fishing for large pelagic species on bycatch species is the collection of accurate records of catch. Observer data on status and likely survival of released/discarded sharks is useful to determine fishing mortality of sharks. Such analysis occurs for New Zealand's country report to WCPFC. Total catches must also be accurately converted from processed to greenweight. New Zealand fishers are required to report catches using species-specific codes. Use of generic codes such as 'SHA' is limited (<1%). However,

⁴ WCPFC measure 2009-04 outlines that in 2010 the Scientific Committee shall provide preliminary advice on the stock status of key shark species and propose a research plan for the assessment of the status of these stocks. WCPFC has defined key shark species as blue, silky, oceanic whitetip, mako and thresher sharks.

member countries of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and WCPFC may not report all their shark catches by species.⁵

Domestic management allows for release of sharks, if likely to survive, under the provisions of the 6th schedule of the Fisheries Act. There is no guidance for what constitutes 'likely to survive'. Most fishers are thought to use these provisions for small sharks where there is no incentive to land them (mako shark is an exception). It is especially important to encourage release of female sharks, so they can continue to breed. Some fishers may kill a shark on their line if concerned about crew safety when releasing the shark.

Research and monitoring outputs relating to HMS sharks will, subject to funding, be directed at routine reviews of fishery status both internationally and in support of the actions identified in the National Plan of action for sharks. It is of note that the WCPFC has recently approved an Assessment and Research Plan (to be undertaken by OFP-SPC) to support shark assessments in 2011 and 2012. This will provide an important contribution to understanding the status of key shark species on a stock wide basis.

National research can be undertaken on methods of avoiding shark bycatch (without affecting target species catch) e.g. through gear modifications.

In absence of a full stock assessment locally, these proxies can be used to assess fishery sustainability:

- Size, sex, survival status of 6th schedule discards (from observers);
- shark landings vs. reported discards;
- shark catches vs. target fishery catches;
- trends from NZSFC records

Risk: Within zone: Low-Medium. The review identified under the NPOA—sharks is reliant on research funding.

Out of zone: Medium-High. Stock assessment of HMS sharks will be difficult given data limitations and lack of collective will for action amongst some members of regional fisheries management organisations.

Performance criteria

- New Zealand practice complies with the requirements of the WCPFC and CCSBT, and New Zealand and WCPFC practices are consistent with the Code of Conduct for Responsible Fisheries and IPOA-Sharks
- Species-specific catch data is available for the Pacific and in areas that southern bluefin tuna is caught, including <1% use of generic shark codes reported caught by surface longline method in New Zealand fisheries waters
- observer and fisher reports of catches discarded under 6th schedule are comparable
- conversion factors for HMS are consistent with observer data on conversion rates

Priority: P1 (contribute to NPOA—Sharks review), **P2** (ensure accuracy of conversion factors) and **P3** (contribute to Pacific-wide stock assessments)

Actions

- Review of shark fisheries as outlined in the NPOA—Sharks
- Annually monitor shark catches, including available observer data (e.g. size composition; discard rates), target fishery catches, and landed states
- ensure conversion factors in use are accurate and internationally consistent
- research and monitoring programme ongoing but fully reviewed in 2012, including could on methods of avoiding shark bycatch
- advocate for and input into Pacific-wide stock assessment for key HMS sharks

⁵ WCPFC conservation and management measure 2009-04 requires annual catch and effort data and retained and discarded catches for specified shark species (blue, silky, oceanic whitetip, mako and thresher sharks). CCSBT has agreed on a recommendation that would also apply these requirements while fishing for southern bluefin tuna.

Operational objective 6.5	Review non-commercial allowances and management measures (as required) when new information becomes available
---------------------------	---

Assessment:

The records of the NZSFC provide a fairly good basis for quantifying recreational take of gamefish species, although not all fish are covered by these records. The total catch of sharks and smaller tuna is probably under-represented in club records, but almost all landed billfish are recorded.

Compulsory charter boat reporting will be introduced for some species (including Pacific and southern bluefin tuna in FMA 7) from 1 October 2010 (with subsequent expansion to other areas). At present, catches of these species are voluntarily reported to MFish. Reported estimates of Pacific bluefin catches exceed the current recreational allowance (which was set before this fishery developed). Once better information is gathered on actual catch levels, it may be necessary to review the allowance, along with management measures that apply.

Risk: Medium

Performance criteria

- estimates of recreational catch available for all key recreational HMS
- low-medium level of variance associated with estimates of recreational catch
- recreational allowances provide for recreational catches
- appropriate management measures in place

Priority: P1

Actions

- Review non-commercial allowances and management (as required)
- Incorporate HMS species into future surveys of recreational catch as appropriate

Management Objective 7	Implement an ecosystem approach to fisheries management, taking into account associated and dependent species
------------------------	---

Operational objective 7.5	Develop and apply effective seabird mitigation measures, including options for vessel specific measures and compliance
---------------------------	--

Assessment:

Even when vessels are using mitigation measures, seabird captures can occur, particularly in certain areas and times of year. The response to such events is important – whether the fisher continues to fish in the same manner, or attempts additional mitigation (e.g. adds another mitigation measure, or shifts fishing location if necessary). While it is not possible (or desirable) to regulate for the wide range of practices that fishers can use to respond to seabird bycatch events, it would be useful to have a way of penalising vessels that fail to respond appropriately to manage bycatch incidents. This would target action where the problem arises, and conversely, not potentially penalise the whole fleet because of the actions of a single vessel.

One approach is to develop (and regulate) an upper limit of bird captures per trip. Fishers could use a mixture of regulated and non-regulated measures to avoid breaching the limit. This concept is similar to the vessel management plan approach used by the Deepwater Group for deepwater trawlers. Vessel management plans are vessel-specific documents that set out the measures that an individual vessel must take to avoid seabird captures. Such plans are non-regulated, although the Chief Executive is able to issue vessel-specific directives if dissatisfied with performance. Another existing example is the Code of Practice used by NZ Japan Tuna Company's charter vessels, which sets out actions to manage any events of high incidental seabird bycatch (i.e. greater than 6 birds by a vessel in any one day), which may occur in high risk areas. Actions to be taken may include moving from the area of high incidental catch, or halting fishing for a certain period.

It has also been suggested that ways should be developed to reward vessels with good records of avoiding seabird bycatch e.g. by providing limited exemptions to observer coverage requirements. Vessels with demonstrated good bycatch mitigation practices (based on observer reports) could be assessed for a 'warrant of fitness'.

Risk: High – single/multiple incidents by individual vessels may affect the remainder of the fleet. There is no requirement for new fishers to learn from the experience of others, nor formal action plan for them to mitigate bycatch. Although two mitigation measures must be used in the pelagic longline fishery, in certain places/times this may be insufficient.

Performance criteria

- Vessel management framework for seabird mitigation developed for evaluation by July 2011 (other performance indicators identified as part of the framework)

Priority: P1

Actions

- develop and evaluate a framework for vessel specific seabird mitigation
- regularly audit the performance of vessels in relation to seabird mitigation

Operational objective 7.6	Ensure through regular review and update that effective mitigation measures are in place
---------------------------	--

Assessment:

Commercial fisheries

A code of practice covering seabird interactions was developed by SeaFIC with input from MFish and the Department of Conservation, and has been extended to cover bycatch of other protected species e.g. turtles, as well as management of shark bycatch. NZ Japan Tuna Company charter vessels also operate under a Code of Practice.

Surface longline vessels have been issued dehooking kits to allow the safe release of turtles, as well as other bycatch. Some ongoing training may be required, as well as ensuring new vessels are aware of the need to carry turtle mitigation equipment.

Reviews of mitigation measures are currently ad hoc e.g. responding to international requirements or events of high bycatch. Achievement of the objective would require flexible management that could respond to changes in 'best practice' for mitigation e.g. by revising specifications or allowing new mitigation measures to be used (in the case of regulated measures). Regulation 58A of the commercial fishing regulations should provide this flexibility, by allowing the Chief Executive to issue circulars requiring the use of specific seabird mitigation measures, as well as specifying the standards and requirements for any mitigation measure.

Non-commercial fisheries

Limited information is available on handling practices in non-commercial fisheries that may take an occasional bycatch of protected species e.g. seabirds.

Risk: Low-Medium—current management allows for *ad hoc* rather than formal reviews. The ability to monitor the efficacy of existing arrangements may be limited in some cases.

Performance criteria

- reduced capture rates of protected species
- required changes implemented in a timely fashion
- 95% of fleet using regulated seabird mitigation measures
- fleet using de-hookers as required
- 75% of hooks in use are circle hooks (research points to circle hooks potentially mitigating bycatch of both sea birds and sea turtles; assess using observer data)

Priority: P2 (annual reviews), P3 (research on best practice), and P4 (non-commercial code of practice)

Actions

- annual review of mitigation requirements and specifications (as required)
- provide for the trial and use of alternative seabird mitigation strategies, as appropriate
- produce and circulate the code of practice
- continue to distribute turtle mitigation equipment and educate fishers in its use
- develop code of practice on seabird handling techniques for non-commercial fishers