New Zealand Country Report: Ecologically Related Species in the New Zealand Southern Bluefin Tuna Longline Fishery, 2002–03 to 2003-04.

February 2006

1. Introduction

Since the start of New Zealand's domestic southern bluefin tuna (STN) fishery, handline, trolling and longline have been used to target STN in the NZ EEZ. In recent years nearly all of the STN catch has been by surface longline with occasional small catches by trolling and a small bycatch in the mid-water trawl fishery for hoki. The domestic fishery is composed of a wide range of vessel types including many small owner-operated boats, a few large low temperature longliners purchased overseas and 4–5 large low temperature Japanese operated distant water longliners chartered by a New Zealand company. Both the chartered vessels and the New Zealand owner-operated vessels fished competitively against New Zealand's STN catch allocation until 1 October 2004.

STN is seasonally present in New Zealand from March/April to August/September. Fishing takes place in two areas, off the east coast of the North Island north of 42^{o} S and off the west coast of the South Island south of 42^{o} S. The distribution of STN catches by month and latitude in 2003/04 is shown in Figure 1. Figure 1 indicates that the season was somewhat earlier and larger catches were taken off the west coast than off the east coast in 2003/04

Domestic owner-operator vessels operate throughout the year. These vessels target albacore during January to March in waters to the north of New Zealand, then move south to target southern bluefin and bigeye tunas north of about 40° S. One large domestic vessel also targeted southern bluefin tuna in southern New Zealand waters and often fished with the chartered vessels. Since 1991–92, most vessels fishing in New Zealand waters have voluntarily undertaken to set lines at night. The use of tori lines became mandatory in 1993. Some vessels operate under a voluntary code of practice relating to catch size, fishing strategy, and bycatch.

Japanese charter vessels operate mainly during March to June in waters around southern New Zealand, targeting southern bluefin tuna. Until the late 1990s, these vessels moved north during July-August to target southern bluefin and bigeye tunas north of about 38° S. In recent years, vessels in these northern waters have expended less effort, in part, because of the increased likelihood of catching seabirds in this area. This fleet follows a voluntary code of practice that includes, amongst other measures, a limit on the allowable capture of certain "at-risk" seabird species, most of which tend to be caught in northern waters.

Non-target fish species such as sharks, Ray's bream, albacore and dealfish are caught in large numbers as bycatch on tuna longlines. 11 taxa of seabirds were recorded as bycatch during 2003 and 2004, with conservation status of the species ranging from rare to abundant. New Zealand fur seals were captured during fishing for STN during 2003 and 2004, most of which were released alive. Occasional captures of whales have also been reported and these were released alive.

2. Review of Southern Bluefin Tuna Fisheries in the New Zealand Exclusive Economic Zone

Fleet size and distribution

Annual Fleet Size and Distribution

Longline fishing targeting STN primarily occurs off the west coast of the South Island south of 42º S and along the east coast of the North Island north of 42º S. STN also comprises a bycatch in the bigeye target fishery in the Bay of Plenty. Figure 2 shows the position of all longline sets targeting STN in 2003/04 (charter and owner-operator vessels combined). In 2003/04 longline fishing was generally more broadly spread than in most years with target fishing spread south along the Wairarapa coast, north into the Bay of Plenty, and the North Taranaki Bight off the west coast of the North Island.

The total number of longliners fishing in 2004 was 82 vessels, most of which were small longliners (< 50 GRT). Five large longliners caught nearly half of the total STN catch in 2004 with the remaining domestic owned and operated vessels catching the remainder.

Historical Fleet Size and Distribution

The New Zealand STN fishery began off the west coast of the South Island as a winter small boat handline and troll fishery in the early 1980s. Most fishing by these vessels was in July and August. Since 1990, however, these methods have comprised only a minor component of the fishery as longline vessels had generally caught the STN quota by the time the handline fishery started.

During the 1980s to mid-1990s most longlining was conducted by foreign licensed longliners from Japan. However, declining catch rates, shortened seasons of availability and reports of increased operating costs in the EEZ resulted in the foreign licensed fleet ceasing operations in 1995. Domestic longlining began in 1991 and steadily increased to over 150 vessels in 2002 before declining in 2003 (132 vessels) and again in 2004 (82 vessels).

Distribution of Catch and Effort

Table 1 gives the total estimated STN catch by gear type since 1999 and shows that the New Zealand STN fishery, initially a handline and troll fishery, has essentially become a longline fishery. With the advent of domestic longline fishing (starting in 1990) longline effort has almost completely replaced fishing effort by trolling and handline. However, small amounts of STN continue to be caught by trolling, with a small STN bycatch in the mid-water trawl fishery (1.1 to 5.8 t per year). Total STN catches are summarised by calendar year and fishing year (1 October to 30 September) in Table 2.

The charter fleet primarily operates off the west coast of the South Island while smaller domestic owned and operated vessels primarily operate off the east coast of the North Island. The fishing season for STN is essentially the same for both areas and begins in March/April and finishes when the quota is reached usually in June/July.

3. Fisheries Monitoring

Observer coverage

Observer coverage has been nearly 100% in the charter fleet for several years. However, the small size of domestic owned and operated vessels and short trips has made it difficult for the Ministry of Fisheries (MFish) to realise the 10% target for observer coverage in this fleet.

All sets from the Japanese Charter fleet were observed, though only about 93% of hooks were observed during the hauling phase due to observers taking breaks during the long hauling period on these vessels. In spite of reductions in effort for the domestic fleet, total observed effort increased for this fleet to 14% of total effort in 2003-04. It should be noted that because of the full observer coverage of the one large domestic vessel in the New Zealand fleet that fished in the southern fishery, the domestic observer coverage was not fully representative of the fleet. This absence (2002-03) and very low (2003-04) observer coverage in the north has lead to problems in accurately estimating catch levels from observer data for this fleet. Realignment of MFish observer allocation is expected to result in continued improvements in coverage of domestic owned and operated longline vessels. Observer coverage on vessels using handline or trolling is not done because the contribution of these methods to the total catch is negligible.

Observer collection of information

Biological information

Observers from the MFish Scientific Observer Programme are responsible for collecting biological data on STN and bycatch data for catch characterisation. In 2003/04, 2007 STN were measured for length (out of 2063 observed), otoliths were collected from 1140 STN and observers recovered 5 tags (3 CSIRO dart tags, 1 CSIRO archival tag, and 1 CCSTN dart tag). In addition, observers tagged six STN with Mk9 archival tags. Tag recovery data was provided to each tagging agency. Otoliths are stored at the National Institute of Water and Atmosphere (NIWA) and this year nearly 200 STN otoliths collected in 2001 through 2004 were aged. Length, weight (both processed and whole weights) and sex are recorded regularly for STN and all major fish bycatch species.

Fish bycatch estimates

Data from the Observer Programme is used to quantify the extent of fish bycatch caught on tuna longlines in New Zealand waters. These data provide information on which species appeared as bycatch, the CPUE of the most common species, and estimates of total catch.

Catch monitoring

STN

Prior to 1 October 2004, MFish operated an in-season catch monitoring system for STN. This system required that on-shore processing companies and freezer vessels (including all of the chartered fleet) report their catch by e-mail or fax during the season to MFish. Weekly reporting was required once 25% of the catch allocation

was reached and daily reporting required when 50% of the catch allocation had been reached. Reports were collated and analysed by MFish with the season being closed as close as possible to reaching our national allocation. All STN permit holders were then notified that the season was closed and that it would be an offence to take southern bluefin tuna for the remainder of the fishing year.

From 1 October 2004, when STN was introduced into the NZ quota management system (QMS), the catch monitoring and catch balancing systems in place for all other NZ quota species were applied to STN. All fishers are required to furnish monthly returns of catch and these are then matched to individual holdings of quota entitlement. Financial penalties will apply to fishers (on a monthly basis) who catch southern bluefin tuna other than under the authority of quota. Fishers have the opportunity to reconcile their catch and quota entitlements up until the end of the fishing year and if they do not do so the financial penalties increase. The total fishery catches will be assessed annually and adjustment to future catch limits will be made to account for any annual overcatch as required

Fish Bycatch

Quota species

The main fish species associated with the STN fishery within the NZ EEZ were also introduced into the QMS on 1 October 2004. As for STN, all fishers are required to furnish monthly returns of catch of these associated species. Included in the monthly returns is area of harvest and effort information. Financial penalties apply to fishers who do not furnish returns, do not hold quota entitlement, or whose catch exceed their entitlements.

The total allowable catch of each of the main fish bycatch species associated with New Zealand's STN longline fishery is presented in Table 3.

Non-quota species

There are a number of species caught as bycatch in the STN fishery that are not managed under the QMS, such as albacore and striped marlin. However, fishers are required to report the catch of all species, including any non-QMS species, when furnishing their monthly returns. As a result, the commercial reporting requirements provide information on total catch and effort of fish bycatch in the STN fishery.

4. Seabirds

This section summaries paper CCSTN-ERS/0602/7 A total of 133 seabirds from 11 taxa were caught during 2003 and 2004 in New Zealand's STN longline fishery (Table 4). Species ranged in conservation status from rare to abundant, with eight species having vulnerable to endangered threat classifications. The birds were landed both dead and alive, with 24% landed alive. This indicates that birds were caught both at the set and during the haul, and mitigation techniques need to be applied during both parts of the fishing operation to avoid seabird captures.

Seabird bycatch in the domestic STN longline fleet, 2003 to 2004

A total of 25 seabirds were observed caught in the domestic STN longline fishery in 2003 and 2004. Due to the low observer coverage of the domestic fleet (8% hooks observed in 2002-03 and 14% observed in 2003-04) total bycatch is unavailable. However, it has been estimated that the total seabird catch was approximately 439 in 2003 and 322 in 2004.

The overall strike rate per 1000 hooks was 0.004 in 2003 and 0.075 in 2004.

Seabird bycatch in the Japanese charter STN longline fleet, 2003 to 2004

A total of 89 seabirds were observed caught in the Japanese charter STN longline fishery in 2003 and 2004. Observer coverage of the charter fleet is high (94% hooks observed in 2002-03 and 92% observed in 2003-04) and it was estimated that total seabird catch was approximately 45 in 2003 and 53 in 2004.

The overall strike rate per 1000 hooks was 0.052 in 2003 and 0.046 in 2004.

5. Non-Target Fish

This section summaries paper CCSTN-ERS/0602/6 The species most commonly caught in tuna longline sets that either targeted or caught STN were Ray's bream (*Brama brama*), blue shark (*Prionace glauca*), albacore(*Thunnus alalunga*) and dealfish (*Trachipterus trachypterus*). Other non-target fish of importance caught in large numbers were deepwater dogfish (Squaliformes of various species), rudderfish (*Centrolophus niger)* and porbeagle shark (*Lamna nasus)*. Smaller amounts of school shark (*Galeorhinus galeus*), moonfish (*Lampris guttatus*), mako shark (*Isurus oxyrinchus)*, thresher shark (*Alopias vulpinus)*, swordfish (*Xiphias gladius)*, butterfly tuna (*Gasterochisma melampus)*, lancetfish (*Alepisaurus ferox & A. brevirostris)*, oilfish (*Ruvettus pretiosus)* and hoki *(Macruronus novaezelandiae)* were also caught.

Bycatch composition from the Japanese charter fleet and the domestic fleet is quite different. This is likely due to differences in waters fished, with the Japanese charter fleet mostly operating in southern waters, and the domestic vessels fishing primarily in waters north of about 40^{o}S. In both 2002-03 and 2003-04, the Japanese charter fleet mostly caught Ray's bream and blue shark. In contrast, albacore dominated domestic fleet catches. While Ray's bream and blue shark were common in domestic catches as they were in the Japanese charter fleet catches, oilfish, swordfish and moonfish are far more common in the domestic catches.

Observers onboard both the Japanese charter and domestic fleets reported on both fish that were caught and subsequently discarded, and fish that were lost before they could be bought aboard the vessel. For the discarded fish, observers also recorded whether they were discarded alive or dead.

In 2002-03 and 2003-04, the highest numbers of discards were Ray's bream, blue shark and dealfish. Most of the lancetfish, deepwater dogfish, rudderfish, and dealfish caught were subsequently discarded (ranging from 76% to 100% across species and fleets). Ray's bream were discarded less than half the time and the tunas and

swordfish were seldom discarded. There were some differences between the domestic and Japanese charter fleet, with the domestic fleet far more likely to discard sharks.

Most discards were alive, and the most discarded species by number had relatively low rates of dead discards, e.g. Ray's bream and the pelagic sharks. Tunas were generally discarded when they were dead (and typically damaged). Dealfish were typically discarded dead, and this combined with the relatively high rate of discarding for this species suggests that it is considered of little value to the longline fleet. The relatively high discard rates of pelagic sharks in the domestic fishery, in particular live discards, indicates a general practice across this fleet which should act to reduce the impact of the fishery on sharks.

6. Marine Mammal and Marine Reptile Bycatch

Marine mammals

Ninety-six New Zealand fur seals (*Arctocephalus forsteri)* were captured during fishing for southern bluefin tuna during 2003 and 2004. Ninety-three of these were released alive. Two pilot whales (*Globicephala melaena)* were caught and released alive. One whale of unspecified species was also caught and released alive.

Marine reptiles

No marine reptiles were reported caught.

7. Mitigation Measures to Minimise Seabird and Other Species Bycatch

Current measures

Mandatory measures for each fleet

Tori lines are the only mandatory mitigation measure in place to avoid capture of non-fish species for tuna longliners in New Zealand waters. The use of tori lines was regulated in 1993. Specifications of the required minimum tori line refer to its length and attachment point, as well as the number, size and distance between streamers.

Government observers monitor tori line deployment when they are assigned to vessels in longline fleets, including those targetting tuna species. Observer coverage targeting domestic tuna fishers is lower than for charter fleets, but anecdotal reports suggest that at least some fishers do not deploy tori lines when setting at night. In the charter fleet, observers report use of tori lines on all vessels.

Voluntary measures for each fleet

Voluntary mitigation measures stipulated in any formal way are done so through Codes of Practice. There is currently no Code of Practice recognised for domestic tuna vessels. For charter vessels operated through the New Zealand Japan Tuna Co. Ltd., a Code of Practice is in place that stipulates:

- Night setting and potential need for extra mitigation devices over full moon periods

- Use of at least one tori line that meets government specifications, with preferably another tori line in use simultaneously
- Availability of back-up tori lines ready for immediate use if needed
- Offal discharge from the port side only
- Use of thawed bait only
- Reduced deck lighting at night
- Use of a sonic gun and 'bird frighteners'
- A catch limit for 'at risk' species of birds

In addition, vessels are encouraged to try out mitigation methods they believe may be effective.

Measures under development

Blue-dyed bait

In 2004, a pilot experiment was undertaken to test the potential effect of blue-dyed bait on incidental seabird mortalities and on fish catch rates in the New Zealand domestic tuna longline fishery (Lydon and Starr 2004). The East Cape region on the east coast of the North Island of New Zealand was chosen as the area to conduct the experiment because fisheries in this area are known to have a relatively high rate of interactions with seabirds and this high rate potentially would maximise the probability of observing encounters between fishing gear and seabird species.

Seven longline sets were observed over an eleven day trip. A total of 10,040 hooks were set, 4,999 of which held control baits (undyed squid) and the other 5,041 hooks held blue-dyed squid. Two juvenile male Antipodean wandering albatross (*Diomedea antipodensis*) were caught in the first set on the control bait section of the longline, but no bird strikes were observed for the remainder of the experiment. In a report on the experiment, observations on how dyed bait affects seabird interactions with the longline are reported and recommendations are made for future research. An aversion response by seabirds, rather than a camouflage effect of bait, is put forward as a possible mechanism for how the use of blue-dyed bait might reduce the attractiveness of longline baited hooks.

Fish oil

In 2004/05, the efficacy of shark liver oil in reducing seabird bycatch was examined. This possible solution to seabird – fisheries interactions was proposed by a New Zealand longline fisherman (http://www.birdlife.org/news/features/2004/04/albatross_comp.html), and involved dripping school shark *Galeorhinus galeus* liver oil on the ocean surface behind fishing vessels. A pilot study of the efficacy of shark liver oil in reducing the numbers of seabirds attending fishing vessels and the number of dives seabirds executed in pursuit of pilchard *Sardinops neopilchardus* baits was conducted (Pierre and Norden, unpublished).

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Trials were conducted in northern New Zealand where seabird assemblages include the globally vulnerable black petrel *Procellaria parkinsoni*. Shark liver oil was effective in reducing both seabird numbers and dives on baits, compared to canola oil and seawater control treatments. Comparisons of seabird responses to shark liver oil and vegetable oil suggest that shark liver oil acts as an olfactory deterrent for seabirds.

Further work should include testing the oil with additional seabird species and investigating habituation of seabirds to the oil in order to assess wider opportunities for long-term use of shark liver oil to reduce seabird bycatch.

8. Public Relations and Education Activities

Southern Seabird Solutions (http://www.doc.govt.nz/Conservation/001~Plants-and-Animals/004~Seabirds/001~Southern-Seabird-Solutions/index.asp), formed in 2002, continued their work in education and awareness of seabird conservation through the intersessional period. For 2006, there are three priority areas for this organisation:

- Trawling: Promote and support efforts to mitigate the capture of seabirds by trawlers.
- New Zealand outreach programme: Strengthen and expand existing networks among New Zealand's fishers to ensure the culture and behaviours of fishing in seabird-safe ways spreads throughout fishing fleets, and that there is an effective transfer of information and good practices to empower companies, skippers and crew to minimise their impacts on seabirds. This includes promoting the efforts of New Zealand's fishing industry to further avoid the incidental capture of seabirds.
- International outreach programme: Raise awareness and change the behaviours of fishers in priority countries – this includes fisher exchanges, advisory officers, supporting the establishment of multi-stakeholder groups and advocating the goals of Southern Seabird Solutions' in international forums.

Recent activites have included a seabird photo competition geared towards fishers, awarding the 'Seabird Smart award' for seabird-friendly fisheries practices, and formalising agreements to cooperate with Instituto del Mar del Perú.

9. Information on Other Ecologically Related Species (non-bycatch)

Since 1994, MFish observers aboard tuna longline vessels in New Zealand waters have recorded data on stomach contents of fish taken in longline operations. A preliminary examination of these data has been made for STN and eight other ecologically related species. Proportions of empty stomachs did not appear to show significant trends through time for any of the nine species, but did vary among species. Observers reported that for most samples, only one prey type was evident in the stomach. Prey-type occurrence appeared to differ between the species. Sampling protocols may account for these findings. The full report is provided as CCSTN-ERSWG document: CCSTN-ERS/0602/8

10. Reporting of data on Ecologically Related Species

For several years there have been discussions within the Commission and its subsidiary bodies regarding the provision of observer data, and most recently there was an agreement for intersessional discussions of observer data (and analyses of these data) which may regularly be exchanged in support of the work of the SAG and SC.

The Commission has a clear responsibility to collect and accumulate data and information on both STN and ecologically related species (Article 8(1) of the Convention). Such data and information provides the basis for recommendations from the Scientific Committee to the Commission on measures it is required to adopt on the conservation, management and optimal utilisation of STN and other additional measures including those related to ecologically related species that are associated with, and taken in the fisheries for, southern bluefin tuna. Clearly, to be effective and fulfil its obligations under the Convention, the Commission (and its subsidiary bodies) must have all available data for its consideration.

From our own analyses described in summary within this report, and more fully in papers CCSTN-ESR/0602/6 and CCSTN-ESR/0602/7, it is clear that observer data is critical for estimating catches and interactions with less desirable catches (e.g. protected species and those other species which are caught, but commonly discarded), while commercial data provides the best estimates of catches of the more desirable bycatch species.

Based on these insights, we believe that the ERSWG should make the following recommendations to the Commission for consideration at CCSTN-13:

1. Members and Cooperating Non-Members should provide, at a resolution of 5x5 degree square by fleet and month, catch and effort data as recorded by observers. Catch data will be in numbers and include all species (both fish and non-fish) taken in these fisheries;
2. the current standards for the provision of catch and effort data should be expanded to include the provision of catch data on other fish species taken in these fisheries;
3. Members should report data on the use of mitigation devices or fishing practices used to reduce impacts on ecologically related species.

In making these recommendations, the following points should be noted that:

- these recommendations should only apply to catch and effort data from fleets that target southern bluefin tuna or catch them as bycatch in other tuna fisheries. For example New Zealand would not supply total commercial and observer catch and effort for the deepwater trawl fleet which catches only very small amounts of STN; and
- some members may not be able to have data on bycatch species available for the current Data Exchange deadlines (e.g. end of April to early May of the following year), so the date for the exchange of these data will most likely be later than for the exchange of STN data.

National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries

The NPOA is the principal framework for mitigating the impact of fisheries mortalities on seabirds. Its purpose is to set out a long-term strategy to reduce the incidental catch of seabirds in New Zealand fisheries. The Minister of Conservation and the Minister of Fisheries jointly approved the NPOA in April 2004.

The goals of the NPOA are:

- To ensure that the long-term viability of protected seabird species is not threatened by their incidental catch in New Zealand fisheries waters or by New Zealand flagged vessels in the high seas; and

- To further reduce incidental catch of protected species as far as possible, taking into account advances in technology, knowledge and financial implications.

A range of management measures to reduce seabird bycatch is set out in the NPOA. These include codes of practice (CoPs), input controls, economic instruments, legal action against individual vessels, and bycatch limits. A mix of voluntary and mandatory measures can be used.

The NPOA requires all fisheries with known seabird interactions to implement a voluntary CoP. CoPs are a management tool that set out the way in which a fishery wants to operate and can be used to set industry standards for achieving a reduction in the incidental catch of seabirds.

The overall philosophy of the NPOA is to allow fishers to take responsibility for managing their seabird interactions through a CoP, but that regulatory controls will be introduced if a voluntary approach is considered inadequate for achieving the goals of the NPOA.

The NPOA also states that mandatory input controls will be implemented where research identifies that a particular mitigation measure has significant benefits that warrant its implementation on a mandatory rather than voluntary basis.

We suggest that ERSWG6 develop **recommendations** to CCSBT on the following:

- goals for managing seabird bycatch

- the development and monitoring of a CoP for the STN fleet as a whole

- the potential for further mandatory mitigation measures to reduce seabird bycatch.

National Plan of Action Sharks

New Zealand is soon to consult stakeholders on a framework for a NPOA-sharks for New Zealand fisheries waters. A number of management actions have been taken in recent years to ensure the sustainable management of NZ shark fisheries outside of the context of the NPOA. These include introducing a range of shark species into the QMS and providing complete protection for some vulnerable species.

In the context of the ERSWG, members could consider developing recommendations to the CCSBT on a risk management approach for shark bycatch species in the context of the STN fishery as a whole. This could include an assessment of the risk from STN bycatches with respect to other target fisheries, evaluation of current knowledge on stock productivity and practical measures to mitigate any risk (eg live release of juveniles).

Literature Cited

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Lydon, G. and Starr, P 2004. Effect of blue dyed bait on incidental seabird mortalities and fish catch rates on a commercial longliner fishing off East Cape, New Zealand. Department of Conservation, Wellington, New Zealand. http://www.doc.govt.nz/Conservation/Marine-and Coastal/Fishing/010~Conservation-services-programme/pdf/Effect-of-blue-dyed-bait1.pdf

Pierre, J. P. and Norden, W.S. unpublished report. Reducing seabird bycatch in longline fisheries using a natural olfactory deterrent.

Table 1. The annual southern bluefin tuna catch (tonnes whole weight) for calendar years 1999 to 2004, by fishing method. Annual total catch estimates are scaled to Licensed Fish Receiver returns for 1999 to 2001, and to Monthly Harvest Returns since 2002, 0.0 = less than 100 kg.

Fishing method	1999	2000	2001	2002	2003	2004
Longline	453.3	375.6	355.8	460.0	387.2	384.4
Troll	4.3	2.2	0.1	0.5	0.1	1.7
Handline	2.0	0.3	0.0	0.0	0.0	1.3
Other	1.1	2.3	2.5	2.1	1.4	5.8
Total (t)	460.6	380.3	358.5	462.6	388.7	393.3

Table 2. New Zealand southern bluefin tuna catches (tonnes) by calendar year and fishing year (1 October to 30 September).

Calendar year	t.	Fishing year	t.
1980	130		
1981	173		
1982	305		
1983	132		
1984	93		
1985	94		
1986	82		
1987	59	1986/87	60
1988	94	1987/88	94
1989	437	1988/89	437
1990	529	1989/90	529
1991	164	1990/91	165
1992	279	1991/92	279
1993	217	1992/93	216
1994	277	1993/94	277
1995	436	1994/95	435
1996	139	1995/96	140
1997	334	1996/97	333
1998	337	1997/98	331
1999	461	1998/99	458
2000	380	1999/00	381
2001	358	2000/01	362
2002	463	2001/02	452
2003	389	2002/03	388
2004	393	2003/04	397

Table 3. Total allowable catches of the main fish bycatch species associated with the STN surface longline fishery within the NZ EEZ (2003/04).

Fish species	TAC (tonnes)
Bigeye tuna	740
Yellowfin tuna	358
Pacific bluefin tuna	120
Swordfish	919
Moonfish	527
Blue shark	2080
Mako shark	512
Porbeagle shark	249
Ray's bream	1045

Table 4. Seabirds species identified by experts, caught during fishing for southern bluefin tuna in New Zealand waters in 2003 and 2004.

Species	*Scientific name*	*IUCN classification*	*Number threat 2003*	*Number caught in 2004*	*Total*
Buller's albatross	*Thalassarche bulleri*	VU D2	17	22	39
Black-browed albatross	*Thalassarche melanophris*	EN A4bd		1	1
Campbell albatross	*Thalassarche impavida*	VU D2	4	1	5
Grey petrel	*Procellaria cinerea*	NT	2	3	5
Grey-faced petrel	*Pterodroma macroptera gouldi*	Not assessed	1		1
Light-mantled albatross	*Phoebetria palpebrata*	NT	-	1	1
Southern Royal albatross	*Diomedea epomorphora*	VU D2	3	-	3
Gibson's wandering albatross	*Diomedea exulans gibsoni*	Not assessed	4	-	4
White-chinned petrel	*Procellaria aequinoctialis steadi*	VUA2bcde+3bcde	3	2	5
White-capped albatross	*Thalassarche steadi*	Not assessed	1	16	17
Westland petrel	*Procellaria westlandica*	VU D2	1	1	2
Unidentified species			26	24	50
Total			62	71	133

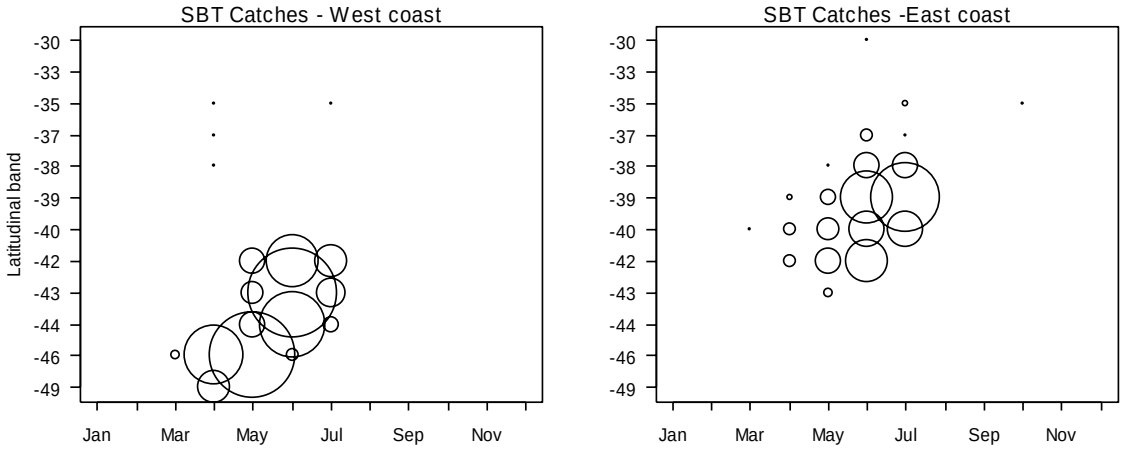

Figure 1: The spatial and seasonal distribution of southern bluefin tuna catches (whole weight) in 2003/04, off the west coast of the South Island and off the east coast of the North Island, New Zealand. The largest circle, (west coast in June) represents 64 t of STN.

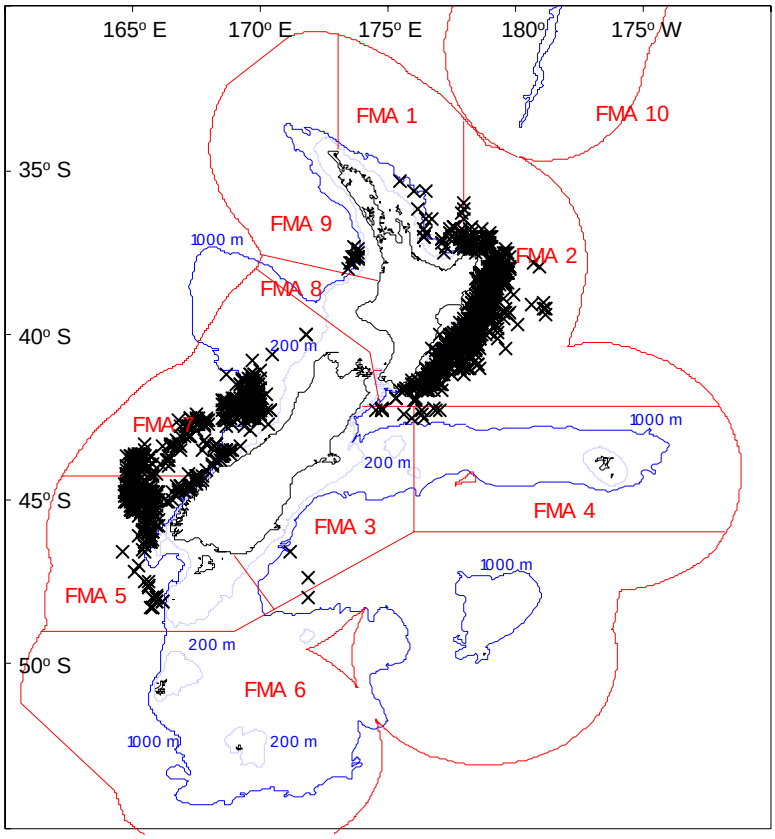

Figure 2. Distribution of longline sets targeting STN in fishing year 2003/04 (Charter and owner-operated vessels combined).

Appendix – Abstracts of New Zealand Meeting Papers for ERSWG6

DISCUSSION PAPERS

Title **Fish bycatch in New Zealand's southern bluefin tuna longline fishery, 2002-03 and 2003-04**
(CCSTN-ERS/0602/06).

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Abstract This report summarises fish catches taken in tuna longline sets that either targeted or caught southern bluefin tuna. Most of the effort was attributed to the New Zealand domestic fleet, but it was noted that effort from this fleet decreased considerably from 2002-03 to 2003-04. Observer coverage rates were good for all fleets, but the coverage in the domestic fishery was not representative leading to problems estimating catches of less commonly reported bycatch species.

For the Japanese charter fleet, Ray's bream and blue shark were the most commonly caught species followed by southern bluefin tuna, while for the domestic fleet and the Philippine fleets albacore was the most commonly caught species.

Ray's bream, blue shark, and dealfish were the most discarded fish species by number while most of lancetfish, deepwater dogfish, rudderfish, and dealfish caught were subsequently discarded. There were some differences between the domestic and Japanese charter fleet, with the domestic fleet far more likely to discard sharks. Most discards were alive, and the most commonly discarded species had relatively low rates of dead discards, e.g. Ray's bream and the pelagic sharks. The relatively high discard rates of pelagic sharks in the domestic fishery, in particular live discards, indicates a general practice across this fleet which should act to reduce the impact of the fishery on sharks.

Title **Incidental capture of seabirds in fishing for southern bluefin tuna in the New Zealand waters in 2003 and 2004.**
(CCSTN-ERS/0602/07).

Authors Susan Waugh and Darryl MacKenzie**,** Ministry of Fisheries and Proteus Wildlife Research Consulting

Abstract Incidental catch rates and estimated total captures of seabirds in New Zealand, Japanese charter and Philippines flagged vessels are

reported for fishing in New Zealand waters for southern bluefin tuna *Thunnus maccoyi.*

Title **Preliminary analyses of diet of nine fish species including southern bluefin tuna and ecologically related species**
(CCSTN-ERS/0602/08).

Authors Ministry of Fisheries**,** New Zealand

Abstract We conducted a preliminary examination of fish stomach data from around 36,000 fish collected by Ministry of Fisheries observers during 1994 – 2004 in sets that caught Southern Bluefin Tuna (STN). For STN and eight other ecologically related species, we examined the frequency of occurrence empty stomachs and the frequency of occurrence of prey types. Proportions of empty stomachs did not appear to show significant trends through time for any of the nine species, but did vary among species. Observers reported that for most samples, only one prey type was evident in the stomach. Prey-type occurrence appeared to differ between the species. The data were collected opportunistically and we describe the many potential biases that limit the inferences that can be made from analysis of these data.

Title **A review of methodologies aimed at avoiding and/or mitigating incidental catch of seabirds in longline fisheries.**
(CCSTN-ERS/0602/09).

Authors Leigh S. Bull

Abstract Information on methods aimed at mitigating incidental mortality resulting from fisheries interactions have been released in a variety of local, national and international media. This report presents the results of a review to reduce contacts and mortalities of seabirds due to interactions with longline fishing gear. The application of these mitigation methods to New Zealand fisheries were assessed, recommendations for the fisheries management made, and areas for further research in New Zealand identified. While having a New Zealand fisheries focus, the results of this review are likely to be applicable to longline fisheries worldwide. Factors influencing the appropriateness and effectiveness of a mitigation device include the fishery, vessel, location, seabird assemblage present and time of year (i.e. season). As such, there is no single magic solution to reduce or eliminate seabird bycatch across all fisheries. Realistically a combination of measures is required, and even within a fishery there is likely to be individual vessel refinement of mitigation techniques in order to maximise their effectiveness at reducing seabird bycatch.

Retention or strategic management of offal and discards are has the potential to avoid seabird bycatch. Other methods recommended to mitigate against seabird bycatch include paired bird-scaring lines, line weighting and night setting.

INFORMATION PAPERS

Title **Summary of recent New Zealand research into tunas and tuna-related species**
(CCSTN-ERS/0602/Info/05).

Authors Shelton Harley and Neville Smith, Ministry of Fisheries, Wellington, N.Z

Abstract The paper summarizes recent and on-going research into tunas and tuna-related species in New Zealand. This research is undertaken under contract to the New Zealand Ministry of Fisheries (MFish) and through other funding sources.