

**New Zealand Country Report: Ecologically Related Species in the
Southern Bluefin Tuna and Related Tuna Longline Fisheries in the
New Zealand 200 n. mile EEZ,
2000-01 to 2001-02**

February 2004

1. INTRODUCTION

Southern bluefin tuna (*Thunnus maccoyii*) and related tuna species such as bigeye tuna (*T. obesus*) caught in commercial fisheries in New Zealand waters are taken mainly on longlines. Domestic owner-operator vessels also take a small percentage of these species by trolling and handlines (Murray *et al.* 1999). Other tuna species targeted by domestic longlines include albacore (*T. alalunga*), and yellowfin (*T. albacares*).

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, less effort has been expended by these vessels in these northern waters, 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.

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 targets southern bluefin tuna in southern New Zealand waters and often fishes 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. All vessels operate under a voluntary code of practice relating to catch size, fishing strategy, and bycatch.

Protected non-fish species such as seabirds, marine mammals, and marine reptiles have been recorded as bycatch to tuna longline fishing operations in New Zealand waters. New Zealand fur seals (*Arctocephalus forsteri*) were also caught on tuna longlines set in southern waters, most of which were released alive. Occasional captures of dolphins, various whale species, and turtles have been observed. Non-target fish species such as sharks are caught in large numbers as bycatch on tuna longlines.

2. REVIEW OF SOUTHERN BLUEFIN TUNA FISHERIES IN THE NEW ZEALAND EXCLUSIVE ECONOMIC ZONE

Fleet size and distribution

The primary method of targeting southern bluefin tuna in New Zealand waters is by longline. Historically, the Japanese foreign-licensed fleet conducted most longline effort in New Zealand waters. Effort by this fleet declined sharply, especially after 1991–92, and there has been no fishing by this fleet since 1994–95. Japanese vessels operating under charter agreements have fished in New Zealand waters since 1989, and domestic owner-operator vessels began targeting tuna species by longlines in 1990–91. Thus, the domestic fleet, which comprises domestic owner-operator vessels and chartered Japanese vessels, was the only tuna longline fleet fishing during 2000–01 to 2001–02 in the New Zealand 200 n. mile EEZ (Ministry of Fisheries 2004, Appendix 1). The spatial distribution of the effort by these vessels is shown in Figure 1.

Domestic owner-operator vessels

The effort by domestic owner-operator vessels has increased from about 1.5 million hooks in 1993–94 to at least 9.7 million hooks in 2001–02, with about 150 vessels in the fishery. The majority of these vessels are small and set between 300 and 1200 hooks per longline for albacore, bigeye, and southern bluefin tunas predominantly in waters north of 42° S (Figure 1). They operate throughout the year and account for about 95% of the total hooks set by domestic vessels. One large vessel targets southern bluefin tuna in southern waters in March to June and sets more than 3000 hooks per longline.

Chartered Japanese vessels

The annual effort of the chartered Japanese vessels has decreased in recent years, with about 621 000 hooks set in April-June 2001 and about 726 500 hooks in March-June 2002. Five chartered Japanese vessels operated in 1997–98, but in the last four years, four vessels have fished here. The same four vessels fished both the 2001 and 2002 seasons. During 2001 and 2002, fishing was restricted primarily to waters south of 40° S, with a few sets in 2002 off the west coast of New Zealand north of 38° S at the end of the season (see Figure 1).

Distribution of Catch and Effort

New Zealand domestic fleet longline catches of southern bluefin tuna peak during May to July. The New Zealand national allocation of southern bluefin tuna is 420 tonnes. Annually the catch limit varies as any over catch in the previous fishing year is deducted from the limit for the following year. Further up until 2001 catches of Pacific bluefin tuna were counted against the New Zealand catch limit for southern bluefin tuna. The total catch against the catch limit for southern bluefin tuna in 2000–01 was 362 tonnes (against a catch limit of 395 tonnes), in 2001-02 was 452 tonnes (against a catch limit of 420 tonnes) and in 2002-03 was 388 tonnes (against a catch limit of 387 tonnes).

3. FISHERIES MONITORING

Biological information has been collected by New Zealand Ministry of Fisheries Scientific Observer Programme since 1987. Scientific observers record the catch of all fish and non-fish species during the haul. Further requirements include taking samples for genetic and ageing work. A full description of the data collection activities is given in Appendix 2.

Domestic owner-operator vessel observer coverage, 2000–01 to 2001–02

Observer coverage on the domestic owner-operator vessels decreased from about 5% of the 9.1 million hooks set in 2000–01 to 2% in the following year, largely as a result of the continued huge increase in effort and the difficulties in placing observers on these vessels, which are small and generally undertake short trips.

Chartered Japanese vessel observer coverage, 2000–01 to 2001–02

Observers were placed on the four chartered Japanese vessels during these fishing years. All sets on these vessels were observed: 199 in April-June 2001 and 234 in March-June 2001. Despite the length of the haul (often longer than 12 hours) and the requirement for observers to take breaks and work for less than 12 hours in 24 hours, observers covered 96% of the hooks set in 2000–01 and 93% in 2001–02 (Ministry of Fisheries 2004).

Non-observed data collection

Chartered Japanese vessels and large domestic owner-operator vessels are required to report weekly data on catch weight, number of southern bluefin tuna caught, number of seabirds caught, and the number of hooks to the Ministry of Fisheries. The remainder of the southern bluefin catch is monitored by the collection of weekly reports (daily towards the end of the season) from Licensed Fish Receivers.

4. SEABIRDS

Seabird captures have been observed in all areas of effort except off the west coast of the North Island (Area 4), and the highest seabird capture rates come from the east coast of the North Island (Area 1).

Seabird bycatch on domestic owner-operator longlines, 2000–01 to 2001–02

Seabirds observed caught on longlines of domestic owner-operator vessels are generally caught on the haul. During 2000–01 and 2001–02, the lack of data due to the low observer coverage precluded any estimation of seabird bycatch for the domestic owner-operator tuna longline vessels (Ministry of Fisheries 2004). Seabirds (38) were reported caught in 15% of observed sets in the main fishing area (Area 1) off the east coast of the North Island north of 40° S in 2000–01. In 2001–02, 87 seabirds (59 released alive) were caught on 26% of observed domestic longlines set in the same area (Ministry of Fisheries 2004). Seabirds returned for identification from these vessels included four albatross and four petrel taxa (Table 1).

Seabird bycatch on chartered Japanese longlines, 2000–01 to 2001–02

A total of 15 seabirds were observed caught during chartered Japanese tuna longline sets in April-June 2001 (Ministry of Fisheries 2004). This total was the lowest annual record for these vessels. Numbers increased in 2001–02, with 76 observed captures reported from the March-June 2002 fishery. Seabirds returned for identification from these vessels included five albatross and two petrel species (Table 2). These vessels concentrated all their fishing effort away from the northern waters and fished all but 28 sets off the west coast of the South Island where seabird capture rates are lower and the “at-risk” seabirds contribute little to the seabird capture numbers. The remaining sets were in southern waters off the east coast of the South Island (Area 2) and in northern waters off the west coast of the North Island (Area 4).

5. OTHER NON-TARGET FISH

The species most commonly recorded by observers in the tuna longline fishery were blue shark (*Prionace glauca*), albacore tuna (*Thunnus alalunga*), and Ray's bream (*Brama brama*) (Ministry of Fisheries 2004).

Other important non-target species were porbeagle (*Lamna nasus*) and mako (*Isurus oxyrinchus*) sharks, followed by smaller numbers of dealfish (*Trachipterus trachipterus*), moonfish (*Lampris guttatus*), oilfish (*Ruvettus pretiosus*), "deepwater dogfish", swordfish, lancetfish (*Alepisaurus ferox* and *A. brevirostris*), butterfly tuna (*Gasterochisma melampus*), rudderfish (*Centrolophus niger*), school shark (*Galeorhinus galeus*) and escolar (*Lepidocybium flavobrunneum*). Deepwater dogfish consists of a number of squaloid dogfish species including *Centroscymnus squamosus*, *C. owstoni*, *Dalatias licha*, and *Zameus squamulosus*.

Catch per unit effort in 2000–01 and 2001–02 did not differ greatly from those of previous years, though there appears to be a decline in catch rates during recent years for most species (Ministry of Fisheries 2004). For all data from 1988–89 to 2001–02, catch rates in the northern region were generally higher than in the southern region. Dealfish (*Trachipterus trachipterus*), deepwater dogfish species, and Ray's bream clearly showed the opposite trend. Catch rates for school shark (*Galeorhinus galeus*), mako shark (*Isurus oxyrinchus*), porbeagle shark (*Lamna nasus*), and blue shark were similar in both regions.

Analysis of the maturity of sharks was carried out using length frequency data, combined with length at maturity information. This indicated that throughout the zone, female blue, porbeagle, and mako sharks were immature (96 – 97% immature). For male blue and porbeagle sharks, most were immature in southern New Zealand, while 65% of male mako sharks were mature in this region. However, in the north, significant proportions of males were mature with 39% of blue sharks, 27% of porbeagles, and 25% of makos being mature. The number of striped marlin reported by fishers has decreased in the last two years, after reaching a peak of 1651 in 1998–99. The number reported in 2000–01 was 507 and in 2001–02, 156 fish. Observers report that all marlins are discarded, with the exception of a few that are lost off the line. Most striped marlin were brought alongside alive.

Most blue shark, mako shark, school shark, deepwater dogfish, Ray's bream, moonfish, oilfish and rudderfish were alive when landed. Most dealfish were dead in 2000–01, whereas nearly half were alive in 2001–02. About 50% of the porbeagle sharks and lancetfish, and 25% of the butterfly tuna were alive when landed.

Most blue, mako, porbeagle and school sharks, butterfly tuna and moonfish were processed in some way. Almost all of the deepwater dogfish, dealfish, lancetfish, and most of the oilfish and rudderfish were discarded. About two thirds of Ray's bream were discarded. Blue and porbeagle sharks that were processed were generally finned only, with the rest of the carcass discarded. School sharks were mainly processed for the flesh. In addition, mako sharks were mainly retained for their flesh by the Japanese chartered vessels, but were also finned whereas domestic owner-operator vessels mainly finned those processed, and discarded up to 50% of their observed catch of mako sharks.

Shark National Plan of Action

New Zealand has yet to complete a National Plan of Action for the Conservation and Management of Sharks. While initial preparations have commenced, resources are currently devoted to implementing measures to ensure that shark fisheries within New Zealand fisheries waters are sustainably utilised. New Zealand national policy is to manage fisheries that require active management under the Quota Management system (QMS). Shark species are progressively being introduced into this management regime. Once in the QMS each species is subject to catch limits which, in the case of commercial fishers, are allocated to individual fishers as individual transferable quota.

There are ninety-five species of sharks recorded from New Zealand fisheries waters, however, commercial and recreational fishers in NZ waters utilise only about thirty of these species. Six species, or assemblages, of sharks have dominated commercial landings: spiny dogfish (*Squalus acanthias*), school shark, rough (*Raja nasuta*) and smooth skate (*R. innominata*), ghost sharks (*Hydrolagus spp.*), rig (*Mustelus lenticulatus*) and elephant fish (*Callorhynchus milii*). These contribute over 90% of total shark landings. They are caught primarily as bycatch although target fishing does occur for some species. All of these species are currently managed within the QMS.

The key shark bycatch species of tuna longline fisheries in New Zealand fisheries waters are blue shark, mako shark and porbeagle shark. These species are to be introduced into the QMS on 1 October 2004. The New Zealand Ministry of Fisheries is currently consulting with fisheries stakeholders on the catch limits and other management controls that will apply within New Zealand fisheries waters as of that date.

The stock status of species managed within the QMS is reviewed annually or as new information comes to hand. Current information suggests that, at current levels of fishing, catches of blue shark, mako shark and porbeagle shark are sustainable (bearing in mind that the stocks of these species extend beyond New Zealand fisheries waters). The New Zealand Ministry of Fisheries has commissioned independent research to assess the age and growth of blue, mako and porbeagle sharks to assist in the determination of sustainable catches in the future.

New Zealand notes that the objective of the National Plan of Action for sharks (sustainable management) is being achieved for key shark species taken commercially in New Zealand fisheries waters. It is intended to complete preparation of a National Plan of Action for sharks in 2004 to address issues that may not be resolved by QMS management and the management of species that may remain outside of this management regime.

6. MARINE MAMMAL AND MARINE REPTILE BYCATCH

Captures of New Zealand fur seals have been reported from observed chartered and domestic owner-operator tuna longlines set in waters south of 40° S in most fishing years since 1988–89. All but one of the reported captures in 2000–01 and 2001–02 came from off the west coast of the South Island (Ministry of Fisheries 2004). One fur seal was captured off the east coast of the South Island. Observed captures totalled 44 fur seals during 2000–01 (40 released alive) and 46 (44 released alive) during 2001–02.

Six turtles were reported captured on domestic longlines in 2000–01 and 2001–02 (Ministry of Fisheries 2004). All but one of these turtles were released alive. Five were caught in waters north of 40° S and one was caught south of 45° S off the west coast of the South Island. Observers identified three turtles as leatherback turtles (*Dermochelys coriacea*), one as a small loggerhead (*Caretta caretta*), and the remaining two were unidentified.

7. MITIGATION MEASURES TO MINIMISE SEABIRD AND OTHER SPECIES BYCATCH

Current measures

Mandatory measures

The use of tori lines continues to be a requirement on both domestic New Zealand and foreign licensed tuna vessels. This requirement is enforced via legislation. Tori lines must be available for inspection by scientific observers. Observers document the presence, use, and design of tori lines.

Compliance with the use of tori lines on Japanese charter vessels continued to be 100%, as reported by observers. Rates of compliance among domestic owner-operated vessels are significantly lower. The Ministry of Fisheries acts to address compliance issues with domestic fishers. In addition, liaison between fishers and the Department of Conservation Tuna Advisory Officer (see below) has been very positive in promulgating tori lines and advocating their use.

Voluntary measures on the domestic owner-operator vessels

Nightsetting continues to be used by the domestic tuna fleet in New Zealand. Nightsetting appears to be the norm, with vessels seldom setting lines during daylight hours.

Voluntary measures on the chartered (joint venture) vessels

Japanese charter vessels also continue to set lines at night, and have done so since 1994-95 (Baird and Bradford 2000). As reported at the 2001 CCSBT-ERSWG, these vessels apply the voluntary Code of Practice instigated in 1997-98 in response to concerns about seabird mortality in the fishery. Important components of the Code of Practice include nightsetting, regular and timely updates of seabird bycatch, retention of all seabirds caught on vessels regardless of observer presence, and bycatch limits for specific species of birds. The Code of Practice also advocates that fishers take an active role in mitigation, by employing mitigation devices beyond the 'requirements' and testing new mitigation methods. The Code of Practice maintains previously observed successes in reducing seabird bycatch.

Measures under development

The Government of New Zealand is currently engaged in the development of policy relating to reducing interactions between seabirds and fishing vessels, including bycatch. Both the Government and the New Zealand fishing industry are also involved in research on seabird – fisheries interactions, including the mitigation of negative effects of fisheries on birds.

Draft National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries (see CCSBT-ERS/0402/10)

The draft National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries has progressed significantly since the 2001 CCSBT-ERSWG. The plan is being developed by the Ministry of Fisheries and the Department of Conservation. It will apply to commercial and non-commercial fishing in New Zealand fisheries waters, with an initial focus on commercial fisheries. The Plan will also apply to high seas fisheries in which New Zealand flag carrying vessels participate. In its current draft form, the plan presents both voluntary and mandatory measures aimed at reducing seabird bycatch.

Important components include the development of economic incentives and penalties, input controls, and voluntary Codes of Practice. Codes of Practice will specify fishing practices that will be adhered to, bycatch limits, and methods to monitor compliance and promote education and public awareness. Codes will be developed in accordance with guidelines and standards to be set by the Government in consultation with stakeholders. Specific fishing practices and bycatch limits will be made mandatory where there is sufficient information to put effective measures in place. The New Zealand government will make final decisions on the plan in early 2004, following discussions with stakeholders.

Line sink rate experiments

In 2000, hook sink rates were examined on a Japanese charter vessel targeting southern bluefin tuna via pelagic longlining. Results showed no statistically detectable effects of branchline type (different proportions of monofilament, lead core and nylon materials) on hook sink rates, however branchline lengths and location of branchline weight in relation to hooks are expected to be important in determining sink rates. Bait type did affect sink rates however, with squid sinking more slowly than other fish. Interactions between the above factors, as well as line setting speed and length of tori lines are also expected to be important in determining the risk longlines present to seabirds (Anderson and McArdle, in prep.).

Blue dyed bait

Research is currently underway to examine the effects of blue dyed bait on the incidental capture of seabirds and fish catch rates on a domestic Tuna vessel. This work will be completed in August 2004.

8. PUBLIC RELATIONS AND EDUCATION ACTIVITIES

Southern Seabird Solutions

Southern Seabird Solutions was established in July 2002 to promote fishing practices that avoid the incidental capture of seabirds in the Southern Hemisphere. (A separate information paper provides more details on Southern Seabird Solutions).

One of the key ways the group is promoting good practice is through education and public awareness activities. These activities include:

- regular media releases describing progress being made by fishing companies
- stories in every issue of the New Zealand Seafood industry magazine about Southern Seabird Solutions projects, and the efforts of fishers to avoid catching seabirds
- the keynote speaker at the annual Seafood Industry Council conference was an internationally renown seabird bycatch expert, Mr Ed Melvin

- television stories and interviews about seabird bycatch and the progress being made on this issue
- a quarterly newsletter on the activities of Southern Seabird Solutions and its members

This year a number of education projects have been initiated by Southern Seabird Solutions. These include a crew exchange programme between New Zealand and Chile to share knowledge about mitigation measures between the two countries, production of a video on mitigation measures used by NZ fishers, and securing of funds to employ an advisory officer in the South African domestic tuna fleet.

Southern Seabird Solutions has a number of new activities planned for the next 2 years, including a South American fisher's forum, more crew exchanges between countries and port side workshops for fishers in New Zealand.

Fisheries Advisory Officers

Levies collected from fishers by the Government were used, through the Conservation Services Programme, Department of Conservation, to employ three fisheries advisory officers. These officers visit fishing vessels in the ling, snapper, and (domestic) tuna fisheries, to talk with skippers and crew. Materials advisory officers distribute to fishers include tori lines, identification posters and books, and questionnaires. Advisory officers have been well received by industry, and the link that officers provide between Government and fishers in the field has proven valuable. Officers are able to communicate up to date information on fishing methods, fisher attitudes, bycatch issues, and developments in fishing fleets to Government, as well as discussing and assisting fishers with bycatch mitigation.

International Fishers' Forum

Thirteen New Zealanders attended the second International Fishers Forum in Hawaii in November 2002. Representatives from the New Zealand fishing industry, government and scientific institutions participated in this event. The forum provided an important opportunity for people in different countries to share expertise and knowledge on the seabird issue, and a number of new initiatives resulted from the forum. A New Zealand fisher (John Bennett of Sanford Ltd) was awarded the Golden Albatross award for his commitment to using mitigation measures that avoid catching seabirds.

9. INFORMATION ON OTHER ECOLOGICALLY RELATED SPECIES (NON-BYCATCH)

Ministry of Fisheries observers collected information on stomach contents of southern bluefin tuna during 2000–01 to 2001–02 which showed that fish and bait are the prey items most often found in stomachs, followed by salps and squid (Table 3, Figure 2).

Approximately half of southern bluefin tuna stomachs sampled were empty. Some stomachs contained more than one type of prey. Where stomachs contained some prey, the proportions are given in Figure 2, for the two fishing years combined.

Literature Cited

Baird, S. J. and Bradford, E. 2000. Factors that may have influenced the capture of seabirds in New Zealand tuna longline fisheries. NIWA Technical Report 93. 61pp.

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Murray, T.E., Richardson, K., Dean, H. and Griggs, L. 1999. New Zealand tuna fisheries with reference to stock status and swordfish bycatch. Unpublished report prepared for the Ministry of Fisheries as part of TUN9701. 126 pp.

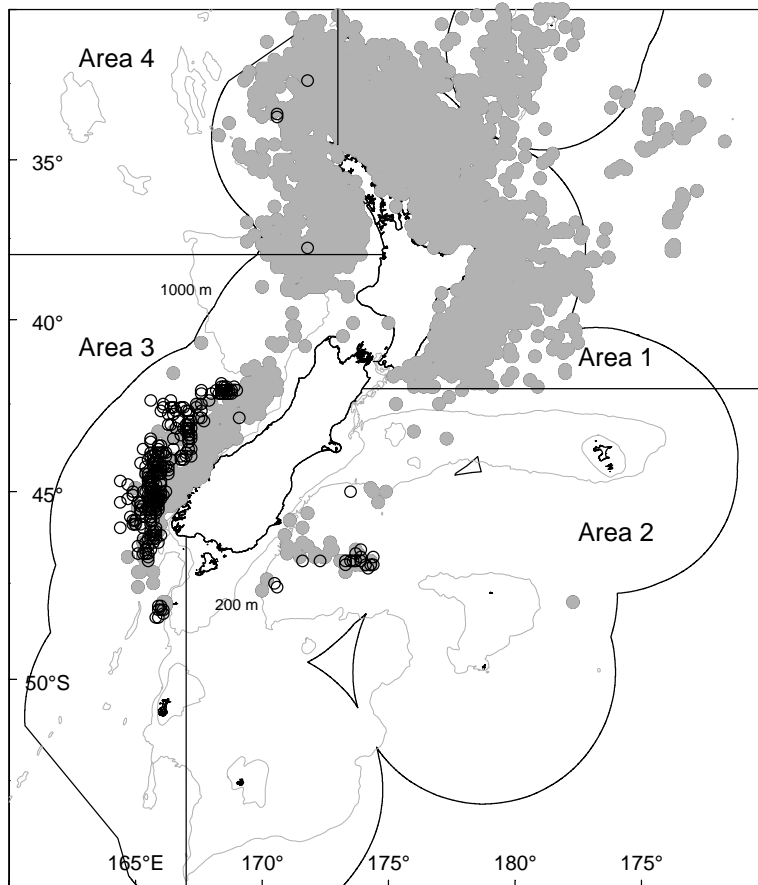


Figure 1: Start positions of tuna longline effort during 2000–01 and 2001–02 by domestic owner-operator vessels (●) and chartered Japanese vessels (○).

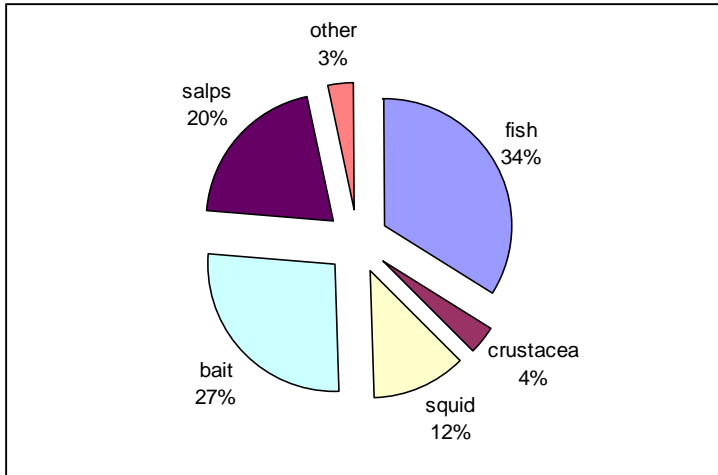


Figure 2: Summary of data presented in Table 3.

Table 1: Number of each seabird species landed dead and returned for autopsy from observed domestic tuna longlines in Area 1 (see Figure 1) during fishing years 2000–01 and 2001–02.

Common name	Scientific name	No. males	No. females	Total
2000–01				
Salvin's albatross	<i>Thalassarche salvini</i>	1	–	1
Black petrel	<i>Procellaria parkinsoni</i>	–	2	2
White-chinned petrel	<i>Procellaria aequinoctialis</i>	1	–	1
Grey-faced petrel	<i>Pterodroma macroptera</i>	1	–	1
2001–02				
Antipodean albatross	<i>Diomedea antipodensis</i>	0	1	1
Black-browed albatross	<i>Thalassarche melanophrys</i>	1	0	1
Buller's albatross	<i>Thalassarche bulleri</i>	0	2	2
Salvin's albatross	<i>Thalassarche salvini</i>	0	4	4
Black petrel	<i>Procellaria parkinsoni</i>	1	2	3
White-chinned petrel	<i>Procellaria aequinoctialis</i>	1	1	2
Grey-faced petrel	<i>Pterodroma macroptera</i>	0	1	1
Flesh-footed shearwater	<i>Puffinus carneipes hullivanus</i>	3	7	10

Table 2: Number of each seabird species landed dead and returned for autopsy from observed chartered tuna longlines, by area (see Figure 1), 2001 and 2002.

Common name	Scientific name	Area	No. males	No. females	Total
April-June 2001					
Campbell albatross	<i>Thalassarche impavida</i>	2	–	1	1
Buller's albatross	<i>Thalassarche bulleri</i>	3	1	6	7
White-capped albatross	<i>Thalassarche steadi</i>	3	1	2	3
White-chinned petrel	<i>Procellaria aequinoctialis</i>	3	1	–	1
March-June 2002					
Southern royal albatross	<i>Diomedea epomophora</i>	3	1	–	1
Buller's albatross	<i>Thalassarche bulleri</i>	3	6	3	9
Salvin's albatross	<i>Thalassarche salvini</i>	2	1	–	1
White-capped albatross	<i>Thalassarche steadi</i>	3	4	6	10
Westland petrel	<i>Procellaria westlandica</i>	3	1	–	1
White-chinned petrel	<i>Procellaria aequinoctialis</i>	3	2	1	3

Table 3: Frequency of prey items in southern bluefin stomachs (Ministry of Fisheries observer data), 2000–01 to 2001–02

Fishing year	No. of fish sampled	No. of stomachs with each prey item					
		Fish	Crustacea	Squid	Bait	Salps	Other
2000–01	749	114	9	73	81	70	11
2001–02	2340	418	92	153	312	281	69

Appendix 1

Ministry of Fisheries. 2004: Incidental capture of seabirds, marine mammals, and marine reptiles in tuna longline fisheries in New Zealand waters, 2000–02. Summary paper prepared for ERSWG5. 12 p.

Abstract

Ministry of Fisheries observers reported the incidental capture of seabirds, New Zealand fur seals (*Arctocephalus forsteri*), and turtles from domestic owner-operator and chartered Japanese tuna longline vessels in New Zealand waters during the fishing years 2000–01 and 2001–02. At least 93% of the effort by the four chartered vessels in their main area (Area 3) of fishing was observed. About 6% of observed chartered sets in Area 3 caught seabirds in 2000–01 compared with 22% in 2001–02. Thus, annual mean seabird catch rates for this area were substantially different, with 0.026 seabirds per 1000 hooks (95% confidence intervals of 0.011–0.042) in 2000–01 compared with 0.117 (0.082–0.154) in 2001–02. For this fleet, the total (observed) numbers of each seabird taxa are given for the 15 seabirds reported in 2000–01 and 76 seabirds in 2001–02. These numbers are given as the total captures for each season because of the very high observer coverage. At least five albatross taxa and two petrel taxa were reported from all observed chartered longlines during these two seasons. The numbers of seabird species reported from observed domestic owner-operator tuna longline vessels are reported by area. With less than 5% of the 7 million domestic hooks set in the main area of fishing (Area 1) in 2000–01 and about 2% of the 7.7 million hooks set here in 2001–02, the very poor observer coverage of these vessels has precluded any further analysis of the data for this area. In 2000–01, 38 seabirds were reported from domestic owner-operator vessels, and 91 seabirds were reported in 2001–02. Four albatross and four petrel taxa were reported from these vessels. As in previous years, no seabirds were reported from observed sets off the west coast north of 40° S.

All New Zealand fur seal captures were reported from observed chartered and domestic sets south of 40° S, with 44 fur seals reported in 2000–01 (91% released alive) and 46 in 2001–02 (96% released alive). Six turtles were observed caught on domestic longlines; five off the east coast north of 40° S (four released alive) and one (released alive) from a set off the west coast south of 45° S.

Appendix 2

Data collection priorities for scientific observers on tuna longline vessels in New Zealand waters

Introduction

The primary objective of the Scientific Observer Programme run by the Ministry of Fisheries is to provide accurate data on catch and effort in fisheries in New Zealand waters. Through the monitoring of tuna longlining activities, assessment of the following can be made: the state of the fisheries, the biological characteristics of the target and bycatch species, and the interactions between non-fish species and tuna fisheries.

The observer programme has been operating in the tuna longline fishery since 1987. The primary responsibility of the observers is to collect fisheries data and the associated biological and gear operation data. The latter provides validation of vessel logbooks and radio catch and position reporting. Observers are also required to report on any features of the vessel operation, such as fish and non-fish bycatch, fishing strategies, environmental issues, or safety incidents. Observers record observations of nearby vessels, surveillance aircraft, and conditions on board the vessel. All data are confidential and are the property of the Ministry of Fisheries.

The type of data collected has developed over the years in response to knowledge gained about tuna fishery operations in New Zealand waters. Since 1991, observers have been required to collect more data on non-fish species and tuna longlining fisheries interactions, especially since the introduction of the requirement to use tori poles and/or night setting.

Other data provide information on the adherence to the Billfish Moratorium which prohibits foreign-licensed and chartered tuna longline vessels in the Auckland Fisheries Management Area from 1 October to 31 May each year. Samples are taken from northern bluefin tuna for genetic analysis, and otoliths are collected from southern bluefin tuna for ageing. Swordfish samples are collected for determination of maturity.

In more recent years, the data collection has been extended under the Conservation Services Levy to collect further data relating to the bycatch of protected non-fish species. The Department of Conservation monitors this data collection.

Data collection

The information recorded on the data sheets which observers fill in for each trip is summarised below, under the relevant data sheet headings. Observers also record events and observations in diaries. Forms, diaries, and trip summaries are presented at the debriefing at the end of each trip.

Trip log

Each trip is assigned a unique number. Observer name and vessel name, nationality, and fleet (Northern, Southern, or Domestic) the vessel operated in, and capacity are recorded on the trip log.

Set log

The observer is required to fill out a set log for every observed set and haul. When an observer is present for the haul only, as a result of being transferred from one vessel to another, he/she is required to fill in the set log with information where possible (i.e., set number, set date, etc.). Each observed set is numbered in sequence.

The following information is recorded.

1. Set date and set time (NZ Standard Time, 0000–2359 h).
2. Target species.
3. Line set information: line length, number of baskets, number of hooks, vessel speed, hook depth, line feeder rate, and buoy length.
4. Use of a tori pole. If a tori pole is used, further information is recorded:
 - a. whether it is a CCAMLR type tori pole — this refers to the design developed by the Convention for the Conservation of Marine Living Resources and is described in Appendix A; if the design differs observers are requested to give a detailed description and illustration of the design on the set log form and any further notes (including a photographic record) should be added to the observer's diary;
 - b. number of branch streamers attached down the length of the tori line;
 - c. total length (m) of the tori line;
 - d. height (m) from the water line to the top of the tori pole;
 - e. whether the tori line is above the bait entry point or not;
 - f. distance (m) between where the bait enters the water and the tori line; and
 - g. whether the bait lands inside the vessel wake.
5. Weather, including wind force (Beaufort scale) and wind direction.
6. Bait condition (thawed or frozen).
7. Use of a mechanical bait-throwing machine.
8. Number of vessels on the ship's radar within 24 n. miles.
9. Time of observation of the set information.

Snood log

The observer is required to fill out a new snood log form every time the snood arrangement is changed and to record the numbers of the first and final sets for each arrangement. The snood number starts at '1' at the beginning of a basket. Snood length (m) and hook colour are recorded.

Bait log

The observer is required to fill out a new form every time the bait type and/or order are altered and to record the numbers of the first and final sets for each bait strategy. The snood number recorded must correspond with that on the Snood Log. Bait type is recorded. Bait types include: squid, lure, jack mackerel, herring, sardine, scad, saury, pilchard, and mullet.

Hourly haul log

An hourly haul log is filled out for every haul observed and each has a corresponding set log. The required data must be recorded hourly during the entire haul. The following information is recorded, where possible.

1. The end of the line which is hauled first; whether it is the end which was set last or the end which was set first.
2. Time (NZ Standard Time).
3. Position.
4. Ocean bottom depth.
5. Sea surface temperature.
6. Vessel speed (kn.).
7. Heading (001–360°).
8. Wind force (Beaufort scale).
9. The start and finish of the haul.

Events log

This form is used to record any disruptions to hauling or to data recording (i.e., line breaks, line tangles, radio calls, meal breaks, etc.). The set number associated with the haul is recorded alongside the time at which hauling or data recording stopped and resumed and the total time taken for the event.

Deck log

This form is used to record the catch from the haul and any sample material taken from the catch. The following information is recorded.

1. Set number associated with the haul.
2. Species code, time landed, and status code are recorded for all species (fish and non-fish) caught, whether hooked or tangled. Everything must be recorded, including catch that is unprocessed, cut off, pulled off, or has fallen off. If the observer has problems identifying the species caught, then he/she should photograph the specimen and leave the species code blank. The whole non-fish species specimen should be retained if it is dead.
3. Damage. Fish, especially albacore and southern bluefin tuna, are checked for the incidence of driftnet damage. Other types of damage: sharks, seals, orca, etc. are also recorded. Where a specimen has been damaged by a predator, observers are required to record weight and length (which may be inaccurate because of the amount of damage) only for those with cookie-cutter shark damage.
4. Status code. Observers record the landing status (e.g., whether a specimen is alive, dead, killed by crew, unobserved when it is landed) and the subsequent handling status (e.g., whether it is retained, discarded, lost, finned (sharks only), or unobserved).
5. Fork length. All lengths are recorded in centimetres (rounded down to the nearest whole centimetre). Observers record the nose tip to fork length for all fish other than billfish and the lower jaw to fork length for billfish.
6. Length. For this second length category, observers record the behind-eye to fork length for billfish and the pre-caudal length for all sharks.
7. Green weight (kg, rounded down to the nearest whole kilogram).
8. Processed weight. Observers record the processed weight (kg, rounded down to the nearest whole kilogram) and the processing type (e.g., whether it is filleted, headed and gutted, southern bluefin tuna processed, fins trimmed only, or other).
9. Sex. The sex of each fish or non-fish specimen caught is recorded as male, female, unknown, unobserved.
10. Sample number. A unique sample number is assigned to each specimen or sample (from specified fish and non-fish taxa) collected or recorded. All retained samples are labelled with the observer's name, sample number, vessel, set number, time landed, and haul date. Sample code numbers are supplied to the observers to describe the sample type taken from the specimen. For dead bird and rare fish species the entire specimen may be kept. Observers must fill out a permit for the transportation to, and landing of, samples at designated depots. If the observer is unable to retain the specimen a photographic record is made (*see* below). Stomach samples are also taken, and the contents are recorded but not retained.
11. Bird samples. All dead birds are labelled with the following information: vessel name, observer name, date, vessel position, haul number, sample number, time landed, and depth (m). The birds are then bagged and frozen.
12. Bird information. For all birds (alive or dead), observers record the sample number, vessel, set number, haul date, and time landed on non-fish bycatch forms. Any additional information, such as birds with colour marks, radio/satellite tags, or bands, is recorded. If the bird is alive, it is photographed before being released. Band information is collected with the associated observer, vessel, set number, position, haul date, and time landed record.

13. Photographic record. Observers are required to take a photograph of unusual species. The photograph should be of the left side of each cleaned specimen, alongside the measuring board. The photographic log includes the following information: camera number, frame number, vessel name, set number, sample number, and a description of the subject.

All fish are checked for tags; the tag number, haul date, time landed, position, vessel, green weight, fork length, and sex of the tagged fish are recorded in the observer's diary. Observers fill out a Tag Return Form for any CSIRO tagged fish. Observers record a postal address for the fishing master so that a reward can be provided.

Shark sampling

Observers are required to weigh, measure, and sex all shark species when time allows. For white pointers, porbeagle, and all species of mako and thresher sharks, observers are required to check for embryos in sharks. For pregnant females, the following information is collected:

- a. weight and length, as safety allows,
- b. number, weight, length, and sex of pups [where practical, observers retain as many as possible, labelled and frozen],
- c. vertebrae from blue, porbeagle, and mako sharks, and
- d. reproductive data for maturity estimation.

The pups are photographed as a litter (all lying left-side up facing the same direction with the stomach regions in view so that the amount of stomach distension, i.e., the egg sack developmental stage, can be determined).

Stomach samples

Observers are required to sample stomachs of all species; there is a minimum of 10 of each species per vessel trip. The following information is recorded:

1. percentages of fish, crustaceans, squid, bait, and unknown contents present in the stomach,
2. stomach fullness,
3. presence and type of ingested plastic, e.g., bait strapping, plastic rubbish bags, clear plastic bag wrap, monofilament line, nylon rope, netting, or other, and
4. presence of external plastic, e.g., bait strapping.

Age and growth study requirements

The following samples are collected:

1. otoliths from Ray's bream,
2. fin rays from moonfish and swordfish, and
3. reproductive data for maturity estimation for Ray's bream, moonfish, and swordfish.

Biological samples for other agencies

Observers collect 300 samples of southern bluefin tuna otoliths for ageing work undertaken by CSIRO, Australia.

Further data collected under the Conservation Services Levy

The following additional information is collected by Ministry of Fisheries Scientific Observers.

1. Use of weights and location on the mainline and branchlines.
2. Safety measures used when lines are weighted.
3. Tissue samples for DNA analysis and photographs of marine mammals.
4. Presence and abundance of different seabird species during setting and hauling.
5. Mitigation methods used (e.g. sonic cannon, deck hose, dyed bait, etc.).
6. Observations of cetaceans and marine reptiles.

Appendix 3

List of New Zealand Papers for ERSWG5

Meeting Papers

CCSBT-ERS/0402/10

Draft National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries.: Randall, D. (Ministry of Fisheries) and Nicolson, J. (Department of Conservation)

Abstract

The New Zealand government has released a draft National Plan of Action to reduce the incidental bycatch of seabirds in New Zealand fisheries. The plan will apply to commercial and non-commercial fishing in New Zealand fisheries waters. It will also apply to high seas fisheries in which New Zealand flag carrying vessels participate. The plan proposes a mix of voluntary and mandatory measures for reducing seabird bycatch. Proposals include the development of voluntary Codes of Practice in key fisheries. The Codes will specify fishing practices that will be adhered to, bycatch limits, and methods to monitor compliance and promote education and public awareness. Codes will be developed in accordance with guidelines and standards to be set by the Government in consultation with stakeholders. Specific fishing practices and bycatch limits will be made mandatory where there is sufficient information to put effective measures in place. Economic incentives and penalties will also be considered. The New Zealand government will make final decisions on the plan in early 2004, following discussions with stakeholders.

CCSBT-ERS/0402/11

Incidental Capture of Seabirds, Marine Mammals and Marine Reptiles in Tuna Longline Fisheries in New Zealand Waters, 2000-01 and 2001-02. Ministry of Fisheries, Wellington.

Abstract

Ministry of Fisheries observers reported the incidental capture of seabirds, New Zealand fur seals (*Arctocephalus forsteri*), and turtles from domestic owner-operator and chartered Japanese tuna longline vessels in New Zealand waters during the fishing years 2000–01 and 2001–02. At least 93% of the effort by the four chartered vessels in their main area (Area 3) of fishing was observed. About 6% of observed chartered sets in Area 3 caught seabirds in 2000–01 compared with 22% in 2001–02. Thus, annual mean seabird catch rates for this area were substantially different, with 0.026 seabirds per 1000 hooks (95% confidence intervals of 0.011–0.042) in 2000–01 compared with 0.117 (0.082–0.154) in 2001–02. For this fleet, the total (observed) numbers of each seabird taxa are given for the 15 seabirds reported in 2000–01 and 76 seabirds in 2001–02. These numbers are given as the total captures for each season because of the very high observer coverage. At least five albatross taxa and two petrel taxa were reported from all observed chartered longlines during these two seasons. The numbers of seabird species reported from observed domestic owner-operator tuna longline vessels are reported by area.

With less than 5% of the 7 million domestic hooks set in the main area of fishing (Area 1) in 2000–01 and about 2% of the 7.7 million hooks set here in 2001–02, the very poor observer coverage of these vessels has precluded any further analysis of the data for this area. In 2000–01, 38 seabirds were reported from domestic owner-operator vessels, and 91 seabirds were reported in 2001–02. Four albatross and four petrel taxa were reported from these vessels. As in previous years, no seabirds were reported from observed sets off the west coast north of 40° S.

All New Zealand fur seal captures were reported from observed chartered and domestic sets south of 40° S, with 44 fur seals reported in 2000–01 (91% released alive) and 46 in 2001–02 (96% released alive). Six turtles were observed caught on domestic longlines; five off the east coast north of 40° S (four released alive) and one (released alive) from a set off the west coast south of 45° S.

CCSBT-ERS/0402/12

Southern Seabird Solutions – an Update. Janice Molloy (Department of Conservation)

Abstract

This note describes the activities of an alliance of New Zealand government, fishing industry and environmental groups that has formed to promote fishing practices that avoid seabird capture by fishing fleets in the southern hemisphere.

CCSBT-ERS/0402/15

New Zealand Northern Tuna Fleet: Report of Advisory Officer - Seabird/Fisheries Interactions 2001/02. Department of Conservation Science Internal Series 99. Department of Conservation, Wellington, New Zealand. 2003. Kellian, D. (Department of Conservation)

Abstract

The Department of Conservation (DOC) employed the author from July 2001 to July 2002, to work alongside skippers and crew in the northern domestic tuna fleet. The seabird/fisheries advisory officer position focused on ensuring skippers and crew were aware of the range of measures available to them to fish without incidentally catching seabirds. The position was funded from the Conservation Services Levy. During the year 13 skippers operating 108 vessels were visited. A further six skipper in the southern fleet were interviewed by Tuna New Zealand president, John Gallagher (114 boats in total). Tuna fishers experienced in seabird-friendly fishing practice were observed and the methods they used to mitigate the incidental capture of seabirds were noted. From these observations some best practices, including a best practice design for tori lines, and holding offal on board until the line hauling process is complete, were identified. Tori lines were built based on the design developed by Auckland fisherman, Laurie Hill, and distributed to each of the vessels visited. A folder of information on seabirds and practical advice on seabird-friendly fishing practices was updated and distributed. Many skippers included in the project are aware of issues around the incidental capture of seabirds and mitigation measures. Specific follow up is suggested for new skippers who may benefit from repeat visits to encourage and reinforce the adoption of good practices.

Information about minimum mitigation requirements needs to be passed on to skippers working on behalf of permit holders. Further recommendations for skipper training and providing incentives for best practice are given.

Information Documents

CCSBT-ERS/0402/Info13

Longline sink rates of an autoline vessel, and notes on seabird interactions. Science for Conservation 183, Department of Conservation. 2001. Wellington, New Zealand. Smith, N.W.McL.

Abstract

A series of longline sink-rate trials were conducted with and without weights, from an autoline fishing vessel working the New Zealand ling (*Genypterus blacodes*) longline fishery on the Chatham Rise, New Zealand during July and August 1998. The autoline equipment is designed to sink without weights, and non-weighted longline line sink data were collected first to provide baseline information. Further trials were conducted with weights added to the longline as in normal fishing operations. A robust attachment method for Time Depth Recorders was developed. A tori line was used at all times by the vessel, and the design was refined during the voyage. The aerial section of the tori line appeared to provide an effective deterrent to most seabirds. Statistical analyses of the data from the line sink rate trials indicate that the weighting regimes used (5 kg per 400 m) had no effect on line sink rate. However, direct observations at sea indicated that weights did have an effect on line sink for 20–40 m either side of the attached weights. Data on line sink rate and tori line coverage suggest that quicker line sink rates could help decrease the incidental mortality of seabirds during autoline fishing. Seabird incidental mortality rate for the voyage was 0.0093 seabirds per 1000 hooks set. Grey petrels (*Procellaria cinerea*) accounted for 90% of the observed incidental catch; of which 90% were foul hooked rather than having swallowed a baited hook. Fourteen species of large seabird and 5 species of small seabird were observed interacting with the vessel. The seabird community constantly changed in size, species composition, and relative proportion of each species present. A large proportion of the seabirds present at any one time were Cape pigeons (*Daption capense*). Seabird behaviour about the vessel varied with fishing activity. Four distinct community behaviours were noted: set behaviour, haul behaviour, steaming (no offal) behaviour, and steaming (offal) behaviour. A night vision scope was trialled and found to be of limited benefit because of ineffective range, and the mono-colour vision.

CCSBT-ERS/0402/Info14

Sink rate of baited hooks on New Zealand pelagic tuna vessels. Department of Conservation Science Internal Series 123, Department of Conservation, Wellington, New Zealand. 2003. Keith, C. (Department of Conservation)

CCSBT-ERS/0402/Info15

Fish bycatch in New Zealand tuna longline fisheries, 2000–01 and 2001–02.
Ministry of Fisheries, Wellington.

Abstract

Effort by domestic owner-operator and chartered Japanese tuna longline vessels in New Zealand waters continued to increase, with at least 9.3 million hooks set in 2000–01 and about 10.5 million in 2001–02. Observer coverage (as a percentage of the total effort) was greatest on chartered Japanese vessels in southern waters. The species most commonly recorded by observers in the tuna longline fishery were blue shark (*Prionace glauca*), albacore tuna (*Thunnus alalunga*), and Ray's bream (*Brama brama*). Dealfish (*Trachipterus trachipterus*), deepwater dogfish species, and Ray's bream clearly showed the opposite trend. Catch rates for school shark (*Galeorhinus galeus*), mako shark (*Isurus oxyrinchus*), porbeagle shark (*Lamna nasus*), and blue shark were fairly consistent throughout both regions.

CCSBT-ERS/0402/Info16

Changes to the CCAMLR Conservation Measure Relating to Minimisation of Incidental Mortality of Seabirds in the Course of Longline Fishing or Longline Fishing Research in the Convention Area.: Molloy, J. (Department of Conservation)

Abstract

In 2003 a number of changes were made to the Conservation Measure relating to minimisation of incidental capture of seabirds in CCAMLR waters. Of particular interest to the ERSWG are changes to the tori lines specifications, and use of a device to deter seabirds during hauling. These changes are described in this paper.

CCSBT-ERS/0402/Info17

Tori line designs for New Zealand domestic pelagic longliners. Conservation Advisory Science Notes 248, Department of Conservation, Wellington, New Zealand. 1999. Keith, C (Department of Conservation)

CCSBT-ERS/0402/Info18

Developmental stages of the underwater bait setting chute for the pelagic longline fishery. Conservation Advisory Science Notes 246, Department of Conservation, Wellington, New Zealand.: Molloy, J., K. Walshe and P. Barnes (compilers) (Department of Conservation)

Abstract

Time Depth Recorders (TDRs) were used to determine the rate at which baited hooks sunk on four pelagic tuna longline vessels in New Zealand waters. TDRs were successfully deployed 21 times. Using no extra weight and no line shooter, at a vessel speed of approximately 7 knots (3.6 m/s), baits were recorded at a mean (\pm SD) depth of 1.83 ± 1.67 m (range 0.6 m) at a point 50 m astern of the vessel. Possible causes of the variation and the implications for effective incidental seabird catch mitigation measures, such as tori line deployment, are discussed.

CCSBT-ERS/0402/Info22

Seabird/fisheries interactions – Final report of advisory officer. Conservation Science Advisory Notes 295, Department of Conservation, Wellington, New Zealand. 2000.
Keith, C. (Department of Conservation)

Abstract

In November 1998 participants of a tuna longline stakeholders meeting recommended that a technical officer be appointed to the domestic tuna fleet in order to meet with fishermen and provide assistance, advice and information on how to minimise seabird bycatch in the pelagic longline industry. This position initially commenced in March 1999, and continued until September 1999. During the course of the project, 41 fishers were successfully contacted, and productive conversations held. Tori lines were constructed for those vessels that required them. Five sea trips were undertaken during which time seabird observations were made, tori lines tested and modified, and TDRs were deployed to study the sink rate patterns of the longline. An informal information folder was created to provide fishers with a basic reference guide to seabird mitigation.

CCSBT-ERS/0402/Info23

Video – Fishing the Seabird Smart Way – the New Zealand Experience.: Molloy, J.
(Department of Conservation)

Abstract

This video, recently been produced by Southern Seabird Solutions, outlines methods that reduce the incidental capture of seabirds during fishing.

CCSBT-ERS/0402/Info 24

The Tuna Fishers Folder. Department of Conservation, Wellington, New Zealand.
2001

Abstract

This is a folder of information on seabirds and practical advice on seabird-friendly fishing practices.