

**THE JAPANESE OBSERVER PROGRAM FOR LONGLINE FISHERY
IN ACCORDANCE WITH THE RECOMMENDATION ON BIGEYE ADOPTED BY THE 1996
ICCAT COMMISSION**

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1. Introduction

Data which is available to the ordinary stock assessment process are obtained through filters such as fishing log sheet or observation at landing site. Therefore, it is not necessarily true that these data reflects actual situation which takes place through fishing process. Moreover, situation can be completely misinterpreted if there are no proper description on how such fishing was conducted, how fish were selected to measure, why some catches were dumped at sea and so on. The only way to solve this problem is to send scientific observers to where fishing is operated to monitor and record what is going there.

During the past several years, the assessment conducted on the Atlantic bigeye stock indicated the stock declined considerably due to the increased catch for both adults and juveniles which are caught by longline and purse seine gears, respectively. The adverse effect of increased catch of juveniles over fisheries, which exploit large size of fish, can not be precisely assessed due to the lack of knowledge on natural mortality rate, movement pattern, spawning, etc. It is unfortunate that the biology of this species is less known compared to other tuna species in spite of the fact that the largest production has been recorded for this species among tunas. In consideration to this situation, the last ICCAT adopted a Bigeye Year Program which aimed at the better understanding of biology of this species in the Atlantic. Although the largest benefit is expected from a large-scale tagging experiment, other activities such as observer program is also essential, especially for getting actual and detailed information on FADS operation by purse seiner which is said to be responsible for the recent increase of bigeye juvenile catch.

As already stated in the letter from the ICCAT SCRS chairman, prompt action is highly required to meet the above-mentioned recommendation. The purpose of this paper is to construct concrete observer program for longline fishery. Although the contents of program described here are prepared for the Japanese longline fishery, they can also be applied to other tuna longline fisheries as there are not much difference in the modes of operation.

2. Area of Survey

Commission's recommendation on tropical tunas states "in order to obtain data on the composition of the catch of spawners in relation to the fishing areas and seasons". The meaning of this phrase, however, is not clear but it could be interpreted to investigate when, where and how often spawning takes place by size of fish. For this purpose, it is planned to cover major spawning areas of bigeye; i.e., Cape Verde area, Equatorial zone and Angola area, whose area definition is indicated in the BETYP program included in the SCRS report.

3. Coverage

Although BETYP program was approved by the Commission, no fund is available from it. Therefore, there is no way to have a unified observer program unless there are other source of funding. This means each fishing nation should implement her own program. ICCAT Recommendation of tropical tunas set the coverage at 20 % for purse seine fishery and 5 % for other types of fishery. This means, for example, for Japan that this target level of coverage in terms of fishing days corresponds to about 1250 operations, if it can be assumed that the total number of operations for above-mentioned three areas in 1997 is similar to the level during the past two years (26600 and 24700 for 1993 and 1994, respectively). In order to attain this amount of operation, it is required to cover at least 6 to 7 boats which have an observer throughout this year.

4. Data Collection

Observers should be trained and instructed before their departure on the observer's duties such as how to fill data forms, species identification, how to take photos and biological samples, how to measure catches, etc. including how to behave on board of longliner. After the completion of their trip, de-briefing by observers to the scientists is recommended so that the scientist can have better understanding. In the case of the Japanese observers, most of them have experienced in tuna longlining as crew member except the scientists of National Research Institute of Far Seas Fisheries (NRIFSF).

Data, which observers collect on board of longliner, are classified into several categories. They are information on observer trip, vessel and gear characteristics, gear setting and meteorological information at each operational level and biological information regarding catches. The details of these information are explained below.

4.1. Information on vessel, gear characteristics and observer trip

Observers are requested to submit these information only once. Some of these can be obtained by the interview to crew member. However, it is recommended that, when it is possible, observers should actually check or measure by himself.

An example form is given in Appendix 1 (Vessel Record Form). Items which should be collected in this form are listed below with explanations on how to fill in the form.

[Observer information]

Observer name : Full name of observer.

Dates and places of embarkation and disembarkation : Use dd/mm/yy format for dates.

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[Vessel characteristics]

Vessel name : Fill vessel name.

Call sign : International radio call sign.

Country registered : Name of country the vessel registered.

License number : License number issued by the Government in which the vessel registered.

Names of captain and fishing master : Full names of captain and fishing master.

Duration of experience for Captain and Fishing Master : Years of experience for captain and fishing master at those position.

Total length : Length (m) of vessel.

Gross tonnage : In metric tons.

Engine power : Maximum engine horse power (PS).

Fuel capacity : Maximum fuel capacity in tons (?).

Year of construction : Calendar year of construction in four digits.

Total freezer capacity : Maximum freezer capacity in tons (?).

Brast freezer capacity : Maximum daily capacity for frozen product in metric tons (?).

Number of crew members : Number of crew members.

[Electronic navigation and fishing equipment]

Mark presence (Yes) or absence (No) of following equipment : NNSS, GPS, omega, direction finder, radar, weather facsimile, track plotter, NOAA weather satellite monitor, Doppler current meter, SST gauge, BT.

Fish sounder : If present specify type of device using code (1:Color monitor, 2:Black and white, 3:Printed on paper). If not, mark "No".

Sonar : If present specify type of device using code (1:Scanning sonar, 2:PPI sonar ?). If not, mark "No".

[Gear configuration]

Mainline length : Total length of mainline in km.

Branch line length : Length of branch line (m) from the snap to the hook.

Float line length : Length of float line (m).

Material for main line, branch and float lines : Specify material for these lines by codes (1:Nylon, 2:Curalon 3:Others).

Presence or absence of bird mitigation pole and bait casting machine : If present, print "Y" else print "N".

4.2. Information on set including meteorological data

Information under this item should be collected when observation is made. Meteorological information is also recorded at noon. Example forms are shown in Appendix 2 (Daily Observation Form) and 3 (Set Record Form).

[Daily observation]

This item records what portion of daily operation are covered by observers. They include time, beacon number, and its position (when possible) of start and end of observation. If observers can not make full

observation during one operation (normally hauling process) and its duration exceeds more than 10 minutes, observers are requested to specify when they start and end their observation. Summary catch by species is also included.

Vessel name and Call sign : Already explained under 4.1.

Date of operation : Record date when operation is started in dd-mm-yy format.

Observation start and end : Record start beacon number, start time (local), end time (local), position (degree and minutes, if possible), number of beacons covered, time not observed and number of hooks observed. Time is specified in *day-hour-minutes* format.

Total hooks observed : Record total number of hooks observed.

[Observed catch data]

Record *catch (number and processed weight) by species for bluefin, southern bluefin, albacore, bigeye, yellowfin, swordfish, white marlin, blue marlin, black marlin, sailfish, shortbill spearfish, skipjack, Gasterochisma, all sharks combined and others*. Other shark species (*blue shark, other requiem sharks, porbeagle shark, mako shark, great white shark, thresher shark, hammerhead shark, others*) is also recorded if possible.

[Sea bird observation]

This observation is undertake while the line is set, since most of the sea bird by-catch is believed to occur during that time.

Use of bird pole : Fill Y (yes) if bird mitigation pole is used during set otherwise print N (no).

Use of bait thrower : Fill Y (yes) if bait casting machine is used during set otherwise print N (no).

Bait condition : Select bait condition from frozen, half thawed and thawed.

Albatross : Select number of albatross observed from 0-5, 5-10, 10-15, 15-20, 20-30, and >30.

Other bird : Select number of other birds observed from 0-5, 5-10, 10-20, 20-50, 50-100, and >100.

Observation start and end time : Record time when observation is started and ended.

Day or night : Mark day or night when observation is made.

Moon : Select brightness of moon light from gloom (+), medium (++) and bright (+++).

Range : Record observation range in meter.

Comments : Fill any comments observers may have.

[Set information]

Vessel name and Call sign : Already explained under 4.1.

Date of operation : Record date when operation is started in dd-mm-yy format.

Record time and position when set is started and ended as well as haul is started and ended. Time is recorded in *day-hour-minutes* format. Sea surface temperature is also recorded if possible.

[Noon position]

Noon position : Position is recorded up to minutes at noon.

SST : Sea surface temperature is recorded with one decimal point.

[Meteorological data]

Following information is collected at noon.

Wind direction : Use one of 16 directions.

Wind speed : Record wind speed in meter per second.

Wave direction : Use one of 16 directions.

Wave height : Record height in meter.

Swell direction : Use one of 16 directions.

Swell height : Record height in meter.

Atom. press. : Record atmospheric pressure in hecto-pascal.

Air temp. : Air temperature in °C with one decimal point.

Weather : Use Beaufort's weather scale.

Cloud form : 10 cloud forms (Ci, Cs, Cc, Ac, As, Ns, Sc, St, Cu, Cb).

Cloud amount : Specify amount of cloud from 0 to 10.

[Gear specification]

No. Beacons used : Total number of radio beacons used.

No. of basket used : Total number of basket (total number of floats used minus one).

Hooks between floats : Number of hooks between floats. If this number is not the same, choose most frequent one.

Total hooks used : Total number of hooks used.

Shallowest hook depth : Record depth of shallowest hook set, if possible. Observers may Infer or ask crew member.

Deepest hook depth : Record depth of deepest hook set, if possible. Observers may Infer or ask crew member.

Length from mainline to hook : Record branch line length in meter from snap to hook.

Number of baskets between beacons : Number of baskets (number of floats minus one) between neighbouring beacons.

[Bait information]

Kind of bait : List all kind of bait used. Bait codes are 1:saury, 2:squid, 3:mackerel, 4:horse mackerel, 5:sardine, 6:other.

Kind of bait by branch No. : Specify most commonly used kind of bait by branch number. Smaller the branch number, shallower the depth.

4.3. Biological data

4.3.1. Species identification and measurements.

Biological data are collected from all catches as much as possible including some catches which escape or drop during the hauling. Measurements or observations which observers can not undertake directly, such as

measurements taken by crew members in the absence of observer, should be handled separately. An example form is given in Appendix 4 (Biological Data Form).

Information should be collected from tunas and billfishes as well as other species. When species identification is difficult, especially for other species, take photos and keep it frozen as an scientific specimen. As for sharks, number of embryos or presence of sperm are counted or checked when possible.

Time : Record time when catches are hauled on the deck in the format of *day-hour-minute*.

Species : Print common name and its code. List of these names and codes are given in Table 1 and 2.

Life : Record the condition of a species when it is hauled on the deck using the following codes. 1:Live (vigorous), 2:Live (not vigorous), 3:dead, 4:shark damaged, 5:unknown.

Return : Record whether catch is retained or discarded. Use following codes ; 1:retained, 2:boarded but discarded, 3:line cut-off, 4:drop-out, 5:shaken-off, 6:finned and discarded (only fins are kept).

Fork length : Length is measured by 1 cm interval (rounded up). Use following types of length ; 1:fork length, 2:eye-fork length (from posterior edge of eye orbit to fork of the tail), 3:precaudal length, 4:disc length, 5:wing length, 6:carapace length.

Whole weight : Record how the measurement is taken ; 1: measured as whole, 2:composite (cut it down and measured separately).

Processed weight : Record types of processed weight in kg

Sex : Record Sex using the following codes ; 1:male, 2:female, 3:unidentified, 4:not checked.

Catch serial number : Assign catch serial number starting from 1 for that observer cruise. This number can be used when photos or samples are taken.

Samples : When samples are taken, mark that part from whole, tail, scale, otolith, vertebra, stomach, muscle and gonad.

Comments : If there are any comments, write it down here. Other information such as gonad weight, stomach contents, photo number, any events occurred, etc. can be included.

4.3.2. Biological samples

Tissue sample for genetic studies, gonad sample and otolith are taken out for bigeye and for other species as well on request (such as yellowfin and swordfish). The amount and the method of process is shown below.

Sample	Amount	Method of process
Otolith	a pair	clean it and keep dry
Tissue	about 1-2 gram	in ethanol or frozen
Gonad	take a cross section (3-5 cm width) at the central part of left ovary	frozen

Table 1. List of possible fish species which may be captured by the longline fishery in the Atlantic Ocean and its adjacent waters. Group, scientific and common names are given. The likely degree of occurrence in the longline catch is indicated in the last column ; + : rare, ++ : less common, +++ : common.

Tunas and Billfishes

Group name	Family name	Scientific name	English name	Capture by longline		
Tunas	<i>Scombridae</i>	<i>Thunnus alalunga</i>	Albacore tuna	+++		
		<i>Thunnus albacares</i>	Yellowfin tuna	+++		
		<i>Thunnus atlanticus</i>	Blackfin tuna	++		
		<i>Thunnus maccoyii</i>	Southern bluefin tuna	+++		
		<i>Thunnus obesus</i>	Bigeye tuna	+++		
		<i>Thunnus thynnus</i>	Bluefin tuna	+++		
		<i>Thunnus tonggol</i>	Longtail tuna	+		
		<i>Katsuwonus pelamis</i>	Skipjack tuna	+++		
Billfishes	<i>Istiophoridae</i>	<i>Istiophorus albicans</i>	Atlantic sailfish	+++		
		<i>Istiophorus platypterus</i>	Indo-Pacific sailfish	+		
		<i>Makaira indica</i>	Black marlin	+		
		<i>Makaira mazara</i>	Indo-Pacific blue marlin	+		
		<i>Makaira nigricans</i>	Atlantic blue marlin	+++		
		<i>Tetrapturus albidus</i>	White marlin	+++		
		<i>Tetrapturus angustirostris</i>	Shortbill spearfish	+		
		<i>Tetrapturus audax</i>	Striped marlin	+		
		<i>Tetrapturus belone</i>	Mediterranean spearfish	++		
		<i>Tetrapturus pfluegeri</i>	Longbill spearfish	+++		
			<i>Xiphiidae</i>	<i>Xiphias gladius</i>	Swordfish	+++
		Bullet tuna	<i>Scombridae</i>	<i>Auxis rochei</i>	Frigate tuna	+
<i>Auxis thazard</i>	Bullet tuna			+		
Little tuna	<i>Scombridae</i>	<i>Euthynnus affinis</i>	Kawakawa	+		
		<i>Euthynnus alletteratus</i>	Little tuna	+		
Bonito	<i>Scombridae</i>	<i>Sarda orientalis</i>	Striped bonito	+		
		<i>Sarda sarda</i>	Atlantic bonito	+		
Wahoo	<i>Scombridae</i>	<i>Acanthocybium solandri</i>	Wahoo	+++		
Slender tuna	<i>Scombridae</i>	<i>Allothunnus fallai</i>	Slender tuna	+		
Butterfly kingfish	<i>Scombridae</i>	<i>Gasterochisma melampus</i>	Butterfly kingfish	+++		
Plain bonito	<i>Scombridae</i>	<i>Orcynopsis unicolor</i>	Plain bonito	?		
Spanish mackerel	<i>Scombridae</i>	<i>Scomberomorus brasiliensis</i>	Serra spanish mackerel	++		
		<i>Scomberomorus cavalla</i>	King mackerel	++		
		<i>Scomberomorus commerson</i>	Narrow-barred Spanish Mackerel	++		
		<i>Scomberomorus maculatus</i>	Atlantic spanish mackerel	++		
		<i>Scomberomorus plurilineatus</i>	Kanadi kingfish	++		
		<i>Scomberomorus regalis</i>	Cero	++		
		<i>Scomberomorus tritor</i>	West African spanish mackerel	++		

Other Teleost Fishes

Group name	Family name	Scientific name	English name	Capture by longline
Lancetfishes	<i>Alepisauridae</i>	<i>Alepisaurus ferox</i>	Longnose lancetfish	+++
		<i>Alepisaurus brevirostris</i>	Lancetfish	+++
Opahs	<i>Lampridae</i>	<i>Lampris guttatus</i>	Opah	+++
		<i>Lampris immaculatus</i>	Opah	+++
Crestfishes	<i>Lophotidae</i>	<i>Lophotus capelleri</i>	Crestfish	+
Oarfishes	<i>Regalecidae</i>	<i>Regalecus russellii</i>	Oarfish	+
Ribbonfishes	<i>Trachipteridae</i>	<i>Trachipterus ishikawae</i>	Slender oarfish	?
		<i>Trachipterus trachipterus</i>		+
Barracudas	<i>Sphyraenidae</i>	<i>Sphyraena barracuda</i>	Barracuda	+++
Pomfrets	<i>Bramidae</i>	<i>Xenobrama microlepis</i>		?
		<i>Brama brama</i>	Pomfret	+++
		<i>Brama dussumieri</i>	Pomfret	?
		<i>Taractes asper</i>		?
		<i>Taractes rubescens</i>		?
		<i>Taractichthys spp.</i>	Bigscale pomfret	?
Jacks	<i>Carangidae</i>	<i>Seriola lalandi</i>	Yellowtail	+
Dolphin fishes	<i>Coryphaenidae</i>	<i>Coryphaena equiselis</i>	Pompano dolphin	++
		<i>Coryphaena hippurus</i>	Dolphin fish	+++
Cobias	<i>Rachycentridae</i>	<i>Rachycentron canadum</i>	Cobia	+
Louvars	<i>Luvaridae</i>	<i>Luvarus imperialis</i>	Louvar	+
Snake mackerels	<i>Gempylidae</i>	<i>Gempylus serpens</i>	Snake mackerel	+
		<i>Rexea prometheoides</i>	King barracouda	+
		<i>Rexea solandri</i>		+
		<i>Thyrstites atun</i>		+
		<i>Nesiarchus nasutus</i>		+
		<i>Lepidocybium flavobrunneum</i>	Escoler	++
<i>Ruvettus pretiosus</i>	Oilfish	++		
Butterfishes	<i>Centrolophidae</i>	<i>Centrolophus niger</i>		+
		<i>Hyperoglyphe antarctica</i>		+
		<i>Hyperoglyphe moselii</i>		+
Driftfishes	<i>Nomeidae</i>	<i>Cubiceps caeruleus</i>	Cigarfish	+
Molas	<i>Molidae</i>	<i>Masturus lanceolus</i>	Blueback puffer	?
		<i>Masturus lanceolatus</i>	Sharptail sunfish	?
		<i>Mola mola</i>	Ocean sunfish	?
		<i>Ranzania laevis</i>	Slender mola	?

Sharks and Rays

Group name	Family name	Scientific name	English name	Capture by longline
	<i>Squaliformes</i>	<i>Scymnodon squamulosus</i>	Dogfish sharks	++
		<i>Scymnodon albigula</i>	Whitetail shark	?
	<i>Odontaspidae</i>	<i>Carcharias ferox</i>	Sandtiger sharks	?
		<i>Odontaspis taurus</i>	Smalltooth sand tiger	?
			Sandtiger shark	?
	<i>Pseudocarchariidae</i>	<i>Pseudocarcharias kamoharui</i>	Crocodile sharks	?
			Crocodile shark	?
	<i>Alopiidae</i>		Thresher sharks	
		<i>Alopias superciliosus</i>	Bigeye thresher	+++
		<i>Alopias pelagicus</i>	Pelagic thresher	+++
		<i>Alopias vulpinus</i>	Thresher shark	+++
	<i>Lamnidae</i>		Mackerel sharks	
		<i>Carcharodon carcharias</i>	Great white shark	+
		<i>Isurus Oxyrinchus</i>	Shortfin mako	+++
		<i>Isurus Paucus</i>	Longfin mako	+++
		<i>Lamna ditropis</i>	Salmon shark	?
	<i>Carcharhinidae</i>	<i>Lamna nasus</i>	Porbeagle	+++
			Requiem sharks	
		<i>Carcharhinus acronotus</i>	Blacknose shark	?
		<i>Carcharhinus albimarginatus</i>	Silvertip shark	?
		<i>Carcharhinus altimus</i>	Bignose shark	?
		<i>Carcharhinus amblyrhynchoides</i>	Graceful shark	?
		<i>Carcharhinus amblyrhynchus</i>	Grey reef shark	?
		<i>Carcharhinus amboinensis</i>	Pigeon shark	?
		<i>Carcharhinus borneensis</i>	Borneo shark	?
		<i>Carcharhinus brachyurus</i>	Copper shark	?
		<i>Carcharhinus brevipinna</i>	Spinner shark	?
		<i>Carcharhinus cautus</i>	Nervous shark	?
		<i>Carcharhinus dussumieri</i>	Whitecheek shark	?
		<i>Carcharhinus falciformis</i>	Silky shark	+++
		<i>Carcharhinus fitzroyensis</i>	Creek shark	?
		<i>Carcharhinus galapagensis</i>	Galapagos shark	?
		<i>Carcharhinus hemiodon</i>	Pondicherry shark	?
<i>Carcharhinus isodon</i>	Finetooth shark	?		
<i>Carcharhinus leucas</i>	Bull shark	?		
<i>Carcharhinus limbatus</i>	Blacktip shark	?		
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	+++		
<i>Carcharhinus macloti</i>	Hardnose shark	?		
<i>Carcharhinus melanopterus</i>	Blacktip reef shark	?		
<i>Carcharhinus obscurus</i>	Dusky shark	?		
<i>Carcharhinus perezi</i>	Caribbean reef shark	?		
<i>Carcharhinus plumbeus</i>	Sandbar shark	?		
<i>Carcharhinus porosus</i>	Smalltail shark	?		
<i>Carcharhinus sealei</i>	Blackspot shark	?		
<i>Carcharhinus signatus</i>	Night shark	?		
<i>Carcharhinus sorrah</i>	Spot-tail shark	?		
<i>Carcharhinus wheeleri</i>	Blacktail shark	?		
<i>Galeocerdo cuvieri</i>	Tiger shark	?		
<i>Prionace glauca</i>	Blue shark	+++		
	<i>Sphyrnidae</i>		Hammerhead sharks	
		<i>Sphyrna lewini</i>	Scalloped hammerhead	?
		<i>Sphyrna mokarran</i>	Great hammerhead	?
		<i>Sphyrna zygaena</i>	Smooth hammerhead	?
Rays	<i>Dasyatidae</i>		Stingrays	
		<i>Dasyatis violacea</i>	Sting ray	+++
	<i>Mobulidae</i>		Devil rays	
		<i>Mobula japonica</i>	Davil ray	?

Table 2. List of sea turtle and seabird species which may be encountered during longline operation.

Group, scientific and common names are given.

Sea Turtles

Group name	Scientific name	English name
	<i>Caretta caretta</i>	Loggerhead turtle
	<i>Chelonia agassizii</i>	Eastern Pacific green turtle
	<i>Chelonia mydas</i>	Green sea turtle
	<i>Eretmochelys imbricata</i>	Hawksbill sea turtle
	<i>Lepidochelys kempii</i>	Kemp's ridley turtle
	<i>Lepidochelys olivacea</i>	Olive ridley turtle
	<i>Natator depressus</i>	Flatback turtle
	<i>Dermochelys coriacea</i>	Leatherback turtle

Seabirds

Group name	Scientific name	English name
Albatrosses	<i>Diomedea exulans</i>	Wandering albatross
	<i>Diomedea epomophora</i>	Royal albatross
	<i>Diomedea irrorata</i>	Waved albatross
	<i>Diomedea albatrus</i>	Short-tailed albatross
	<i>Diomedea nigripes</i>	Black-footed albatross
	<i>Diomedea immutabilis</i>	Laysan albatross
	<i>Diomedea melanophris</i>	Black-browed albatross
	<i>Diomedea bulleri</i>	Buller's albatross
	<i>Diomedea cauta</i>	White-capped albatross
	<i>Diomedea cauta salvini</i>	Salvin's albatross
	<i>Diomedea cauta eremita</i>	Chatham island albatross
	<i>Diomedea chlororhynchus</i>	Yellow-nosed albatross
	<i>Diomedea chrysostoma</i>	Grey-headed albatross
	<i>Phoebastria fusca</i>	Sooty albatross
	<i>Phoebastria palpebrata</i>	Light-mantled sooty albatross
Fulmars	<i>Macronectes halli</i>	Northern giant petrel
	<i>Macronectes giganteus</i>	Southern giant petrel
Petrels & Shearwaters	<i>Fulmarus glacialis</i>	Northern fulmar
	<i>Fulmarus glacialisoides</i>	Antarctic fulmar
	<i>Daption capense</i>	Cape petrel
	<i>Pterodroma macroptera</i>	Great-winged petrel
	<i>Pterodroma lessonii</i>	White-headed petrel
	<i>Pterodroma hasitata</i>	Black-capped petrel
	<i>Pterodroma incerta</i>	Atlantic petrel
	<i>Pterodroma rostrata</i>	Tahiti petrel
<i>Pterodroma alba</i>	Phoenix petrel	
<i>Pterodroma inexpectata</i>	Mottled petrel	

	<i>Pterodroma solandri</i>	Providence petrel
	<i>Pterodroma brevirostris</i>	Kerguelen petrel
	<i>Pterodroma ultima</i>	Murphy's petrel
	<i>Pterodroma neglecta</i>	Kermadec petrel
	<i>Pterodroma arminjoniana</i>	Herald petrel
	<i>Pterodroma mollis</i>	Soft-plumaged petrel
	<i>Pterodroma phaeopygia</i>	Hawaiian petrel
	<i>Pterodroma externa</i>	White-necked petrel
	<i>Pterodroma cooki</i>	Cook's petrel
	<i>Pterodroma leucoptera</i>	Gould's petrel
	<i>Pterodroma hypoleuca</i>	Bonin petrel
	<i>Pterodroma nigripennis</i>	Black-winged petrel
	<i>Pterodroma axillaris</i>	Chatham island petrel
	<i>Pterodroma longirostris</i>	Stejneger's petrel
	<i>Pterodroma pycrofti</i>	Pycroft's petrel
	<i>Pterodroma macgillivrayi</i>	Macgillivray's petrel
	<i>Halobaena caerulea</i>	Blue petrel
	<i>Procellaria cinerea</i>	Grey petrel
	<i>Procellaria aequinoctialis</i>	White-chinned petrel
	<i>Procellaria parkinsoni</i>	Parkinson's petrel
	<i>Procellaria westlandica</i>	Westland petrel
	<i>Colonectris leucomelas</i>	Streaked shearwater
	<i>Colonectris diomedea</i>	Cory's shearwater
	<i>Puffinus creatopus</i>	Pink-footed shearwater
	<i>Puffinus carneipes</i>	Flesh-footed shearwater
	<i>Puffinus gravis</i>	Great shearwater
	<i>Puffinus pacificus</i>	Wedge-tailed shearwater
	<i>Puffinus bulleri</i>	Buller's shearwater
	<i>Puffinus griseus</i>	Sooty shearwater
	<i>Puffinus tenuirostris</i>	Short-tailed shearwater
	<i>Puffinus nativitatis</i>	Christmas shearwater
	<i>Puffinus puffinus</i>	Manx shearwater
	<i>Puffinus gavia</i>	Fluttering shearwater
	<i>Puffinus huttoni</i>	Hutton's shearwater
	<i>Puffinus newelli</i>	Newell's shearwater
	<i>Puffinus opisthomelas</i>	Black-vented shearwater
	<i>Puffinus auricularis</i>	Townsend's shearwater
	<i>Puffinus assimilis</i>	Little shearwater
	<i>Puffinus lherminieri</i>	Audubon's shearwater
Tropicbirds	<i>Phaethon aethereus</i>	Red-billed tropicbird
	<i>Phaethon rubricauda</i>	Red-tailed tropicbird
	<i>Phaethon lepturus</i>	White-tailed tropicbird
Pelicans	<i>Pelecanus occidentalis</i>	Brown pelican
Gannets & Boobys	<i>Sula bassana</i>	Northern gannet
	<i>Sula capensis</i>	Cape gannet
	<i>Sula serrator</i>	Australasian gannet
	<i>Sula nebovicii</i>	Blue-footed booby
	<i>Sula variegata</i>	Peruvian booby
	<i>Sula abbotti</i>	Abbott's booby
	<i>Sula dactylatra</i>	Masked booby
	<i>Sula sula</i>	Red-footed booby
	<i>Sula leucogaster</i>	Brown booby
Frigatebirds	<i>Fregata andrewsi</i>	Christmas frigatebird
	<i>Fregata magnificens</i>	Magnificent frigatebird
	<i>Fregata minor</i>	Great frigatebird
	<i>Fregata ariel</i>	Lesser frigatebird
Skuas	<i>Catharacta maccormicki</i>	South polar skua
	<i>Catharacta antarctica</i>	Antarctic skua
	<i>Stercorarius pomarinus</i>	Pomarine skua
	<i>Stercorarius parasiticus</i>	Arctic skua

Terns

<i>Stercorarius longicaudus</i>	Long-tailed skua
<i>Larus dominicanus</i>	Kelp gull
<i>Larus tridactyla</i>	Black-legged kittiwake
<i>Chlidonias nigra</i>	Whiskered tern
<i>Chlidonias leucopterus</i>	White-winged black tern
<i>Chlidonias nigra</i>	Black tern
<i>Sterna nilotica</i>	Gull-billed tern
<i>Sterna caspia</i>	Caspian tern
<i>Sterna hirundo</i>	Common tern
<i>Sterna paradisaea</i>	Arctic tern
<i>Sterna vittata</i>	Antarctic tern
<i>Sterna forsteri</i>	Forsters tern
<i>Sterna dougallii</i>	Roseate tern
<i>Sterna striata</i>	White-fronted tern
<i>Sterna sumatrana</i>	Black-naped tern
<i>Sterna lunata</i>	Grey-backed tern
<i>Sterna anaethetus</i>	Bridled tern
<i>Sterna fuscata</i>	Sooty tern
<i>Sterna albifrons</i>	Little tern
<i>Sterna bergii</i>	Crested tern
<i>Sterna maxima</i>	Royal tern
<i>Sterna bengalensis</i>	Lesser crested tern
<i>Sterna sandvicensis</i>	Sandwich tern
<i>Procelsterna cerulea</i>	Grey noddy
<i>Anous stolidus</i>	Brown noddy
<i>Anous tenuirostris</i>	Lesser noddy
<i>Anous minutus</i>	Black noddy
<i>Gygis alba</i>	White tern
<i>Rynchops niger</i>	Black skimmer

VESSEL RECORD FORM

Vessel Details

Vessel Name				Call Sign			
Country registered			Date of Embarkation				
License Number			Date of Disembarkation				
	First Name	Last Name	Years Experienced				
Captain							
Fishing Master							
Total Length (m)				Year of Construction			
Gross Tonnage				Total Freezer Capacity (tons)			
Engine Power (PS)				Brast Freezer Capacity (tons)			
Fuel Capacity (tons)				Number of Crew			

Electronic Navigation and Fishing Equipment

	Yes	No		Yes	No
NNSS			NOAA Receiver		
GPS			Fish sounder (Code)		
Omega			Sonar (Code)		
Radio Direction Finder			Doppler Current Meter		
Radar			SST Gauge		
Weather Facsimile			Bathy-Thermograph		
Track Plotter					

Equipment and Procedure of Measurement

[Length]		
[Weight]		
[Comments]		
Observer Name		

Gear Configuration

Mainline Length (km)	
Branch Line Length (m)	
Float Line Length (m)	
Mainline Material	
Branch Line Material	
Float Line Material	
Bird Mitigation Pole (Y or N)	
Bait Casting Machine (Y or N)	

- | | | |
|--------------|-------------------|---------------|
| Fish sounder | Sonar | Gear material |
| 1: Color | 1: Scanning sonar | 1: Nylon |
| 2: B and W | 2: PPI sonar | 2: Curalon |
| 3: Paper | | 3: Other |

DAILY OBSERVATION FORM

Vessel Name				Call Sign			
Date of Operation							

Observed Haul

	Beacon No.	Time				Latitude*			Longitude*			No. of Beacons	Time Not Observed				Hooks Observed
		d	d	h	m	d	d	m	N/S	d	d		m	E/W	h	h	
Start																	
End																	
Start																	
End																	
Start																	
End																	
Start																	
End																	
Total Hooks Observed																	

Observed Catch Data

Species	Number	Processed WGT (kg)	Species*	Number*	Processed WGT (kg)*
Bluefin			Blue Shark		
Southern Bluefin			Other Requiem Shark		
Albacore			Porbeagle Shark		
Bigeye			Mako Shark		
Yellowfin			Great White Shark		
Swordfish			Thresher Shark		
White Marlin			Hammerhead Shark		
Blue Marlin			Other Sharks		
Black Marlin					
Sailfish					
Shortbill Spearfish					
Skipjack					
Gasterochisma					
Total Sharks					
Others					

Sea Bird Observation

Bird Pole							Bait Thrower						
Bait Condition	Frozen		Half Thawed		Thawed		Comments						
Albatross	0-5	5-10	10-15	15-20	20-30	>30							
Other Bird	0-5	5-10	10-20	20-50	50-100	>100							
Obs. Start Time					End Time								
Day	Night	Moon	+	++	+++	Range							
Observer's Name													

