



SCTB15 Working Paper

SWG-4

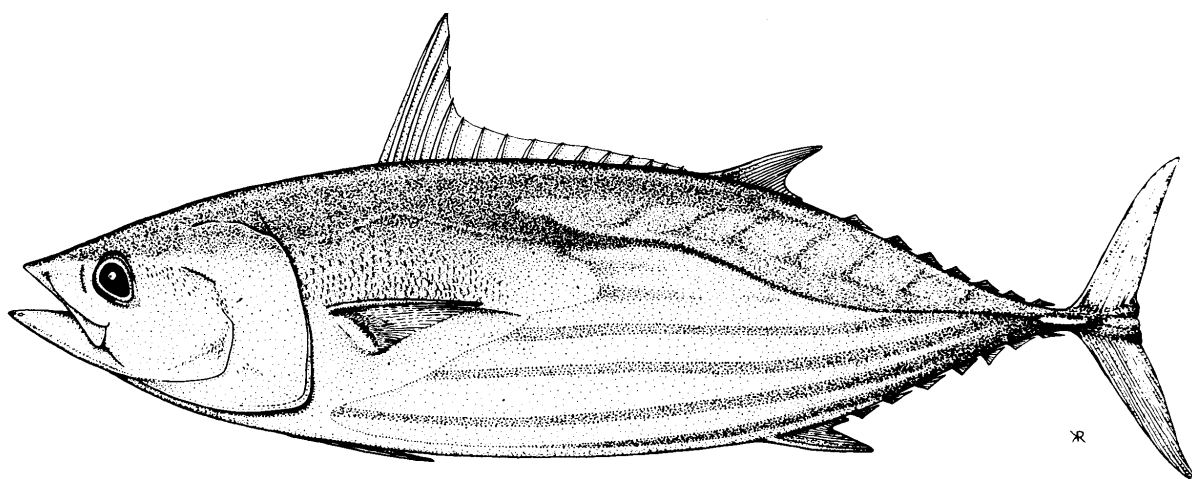
REVIEW OF TAIWANESE CATCH AND EFFORT LOGSHEETS

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INTRODUCTION

The objectives of the Statistics Working Group (SWG) of the Standing Committee on Tuna and Billfish (SCTB) is to coordinate the collection, compilation and dissemination of data on tuna fisheries in the western and central Pacific Ocean. In regard to the coordination of data collection, it was agreed at the eleventh meeting of the SCTB, which was held from 28 May to 6 June 1998 in Honolulu, United States of America, to establish minimum standards for data collection forms and to review data collection forms that are in use in the region (Anon., 1998). The SWG established minimum standards for catch and effort logsheets at the twelfth meeting of the SCTB, which was held from 16 to 23 June 1999 in Tahiti, French Polynesia (Anon., 1999). The minimum standards are presented in Appendix I.

Catch and effort logsheets developed by the New Zealand Ministry of Fisheries and the Australian Fisheries Management Authority were reviewed at the first SWG Session on Data Collection Forms, which was held from 14 to 15 June 1999, immediately prior to SCTB12 (Anon., 1999). Logsheets developed by the SPC/FFA Tuna Fishery Data Collection Forms Committee were reviewed at the second SWG Session on Data Collection Forms, which was held on 3 July 2000, immediately prior to SCTB13 (Anon., 2000). Logsheets developed by the National Research Institute of Far Seas Fisheries of Japan were reviewed following SCTB13 and the results were reported to SCTB14 (Anon., 2001), which was held from 9 to 16 August 2001.

Logsheets maintained by the Overseas Fisheries Development Council of Taiwan were reviewed prior to SCTB14 and the results are reported below. Translations of the Taiwanese logsheets for distant-water longline, offshore longline based in Taiwan, offshore longline based in Micronesia, purse seine and southern bluefin tuna are presented in Appendix II.

COMPARISON OF TAIWANESE LOGSHEETS AND MINIMUM STANDARDS

Appendix III presents a comparison of the Taiwanese logsheets and the minimum standards established by the SWG. The following points are of interest:

“Logbook (Distant-water Tuna Longline Fishery)”

- The format is a logbook, with one page of instructions and one page for vessel attributes and trip information, followed by several pages, each of which is used to record catch and effort data for one set, rather than a logsheet (i.e. a single page, with vessel attributes and trip information at the top of the page and one row to record the catch and effort data for each set).
- The page of instructions presents the purpose of the logbook; the units of measurement for the catches and the lengths of fish; the mailing address for the submission of the logbook; and diagrams illustrating the upper jaw to caudal fork length for tuna and the lower jaw to caudal fork length for billfish. A table of species codes is also included at the back of the logbook.
- The forms are used only by vessels registered in Taiwan; therefore, there is no field for the country of registration. The call sign and license number are not recorded, however, the vessel name and registration number should be sufficient for identifying the vessel.

- Data are recorded only for sets and not for other activities. Hence, there is no activity code to indicate that the vessel is in transit or not fishing due to breakdown or bad weather. However, the number of ‘sailing’ days and the number of ‘operation’ days for the trip are recorded.
- There are fields to record the catches of six species of tuna, four species of billfish and, as species groups, other tuna, other billfish, sharks, sea turtles, seabirds and whales/dolphins. But all other species are recorded under ‘other’. Hence, it is not possible to separately record the catches of other major non-target species, such as wahoo, opah, escolar, lancetfish, etc.
- For each species or species group, there are two columns for the catch including discards, in number of fish and kilograms, and two columns for discards only, in number of fish and kilograms, except for sea turtles, sea birds and whales/dolphins, for which only one column for the number of animals is available.
- Each page has space for recording the species code and length of the first thirty fish caught in each set.

“Logbook (Offshore Tuna Longline Fishery)” for vessels based in Taiwan

- The format is a logbook, with one page for vessel identity and trip information and one page of instructions, followed by several pages, each of which is used to record catch and effort data for one set, rather than a logsheet (i.e. a single page, with vessel attributes and trip information at the top of the page and one row to record the catch and effort data for each set).
- The page of instructions presents the purpose of the logbook; the units of measurement for the catches in weight; the submission of logbooks; and diagrams illustrating the upper jaw to caudal fork length for tuna and the lower jaw to caudal fork length for billfish. A table of species codes is also included at the back of the logbook.
- The forms are used only by vessels registered in Taiwan; therefore, there is no field for the country of registration. The call sign and license number are not recorded, however, the vessel name and registration number should be sufficient for identifying the vessel.
- Data are recorded only for sets and not for other activities. Hence, there is no activity code to indicate that the vessel is in transit or not fishing due to breakdown or bad weather.
- There are fields to record the catches of six species of tuna, four species of billfish, dolphinfish and, as species groups, other tuna, billfish, other marlins and sharks. But all other species are recorded under ‘other’. Hence, it is not possible to separately record the catches of other major non-target species, such as wahoo, opah, escolar, lancetfish, etc.
- For each species or species group, there are columns for the catch in number of fish, the catch in kilograms and the average length (cm). Discards are not recorded.

“Catch Report for Taiwanese Offshore Longline Vessel Operate in the _____ Water”

- The format is a logsheet (i.e. a single page, with vessel attributes and trip information at the top of the page and one row to record the catch and effort data for each set).

- The call sign and license number are not recorded, however, the vessel name and registration number should be sufficient for identifying the vessel.
- There are fields to record the catches of five species of tuna, four species of billfish, dolphinfish and, as species groups, other marlins and sharks. But all other species are recorded under 'other'. Hence, it is not possible to separately record the catches of other major non-target species, such as wahoo, opah, escolar, lancetfish, etc.
- For each species or species group, there are columns for the catch in number of fish and the catch in kilograms.
- Discards are recorded in three columns for the name of the species, discards in numbers of fish and discards in kilograms. The space for the species name is small and cannot contain more than one name.
- There is a column for the number of damaged fish, presumably by sharks or toothed whales.

“South Pacific Regional Purse-Seine Logsheet”

This form was developed by the SPC/FFA Data Collection Committee. The following comments were made when this form was reviewed prior to SCTB13 (Anon., 2000):

- The purse-seine logsheet is missing several vessel and gear attributes that are available on the FFA Regional Register. In particular, it was noted that the presence of sonar, bird radar, and the type and number of FADs were not included. The type of FADs could refer to the use of echosounders and satellite tracking, which is becoming increasingly common.
- It was suggested that consideration be given to including activity codes for planting FADs and for drifting, since the use of FADs has increased considerably and these are now distinct activities for many vessels.
- It was also noted that no environmental data, such as sea surface temperature, are included on the logsheet. Environmental data are known to be correlated to catch rates and so this information may be useful in explaining variation in catch rates.
- The 'set start time' is included on the form, but not the time at which the skiff is onboard, i.e. the time of the end of the set. This information is useful for calculating the searching time and thus to determine a more accurate measure of fishing effort.
- Spanish purse seiners in the Indian Ocean make use of tender vessels to improve searching and to attract fish with lights at night. Some of these vessels are now operating in the Pacific and so consideration should be given to including information on tender vessels.
- It was suggested that a data item concerning the presence of an observer onboard should be included, to allow the logsheet data to be cross-referenced to the observer data.

COMMENTS BY REVIEWERS

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“Logbook (Distant-water Tuna Longline Fishery)”

‘Vessel Identity and Trip Information’

- Vessel identification: The log contains all of the essential information. One has to assume that the country of registration is Taiwan as it is not specifically on the form, but this is a logical assumption since the form is used for Taiwanese vessels only. None of the desirable data items are included.
- Vessel, gear and trip attributes: Port of unloading and date of unloading are not included specifically; only port of arrival. For many U.S. vessels, the port of arrival and date of arrival may not be the unloading port or the unloading date. The number of hooks between floats is not included; however hooks per basket is included.

‘Logsheets’ (catch and effort data for each set):

- Time of set is just morning, noon or evening – the exact time GMT is not.
- Shark catches are not by species. Other species include a wide range of fish that may be useful in future analyses and should be specified, such as wahoo, mahi mahi, etc.

“Logbook (Offshore Tuna Longline Fishery)” (for vessels based in Taiwan)

‘Vessel Identity and Trip Information’

- Vessel identification: The log contains all of the essential information. One has to assume that the country of registration is Taiwan as it is not specifically on the form, but this is a logical assumption since the form is used for Taiwanese vessels only. None of the desirable data items are included.
- Vessel, gear and trip attributes: Port of unloading and date of unloading are not included specifically; only port of arrival. For many U.S. vessels the port of arrival and date of arrival may not be the unloading port or the unloading date.

‘Logsheets’ (catch and effort data for each set):

- Time of set is not included.
- Number of hooks is not specifically in the log, but can be determined from number of hooks per basket and number of baskets.
- Shark catches are not by species.
- Other species include a wide range of fish that may be useful in future analyses and should be specified such as wahoo, mahi mahi, etc.

“Catch Report for Taiwanese Offshore Longline Vessel Operate in the _____ Water”

- Vessel identification: The log contains all of the essential information.
- Port of unloading and date of unloading are not included specifically; only port of arrival. For many U.S. vessels the port of arrival and date of arrival may not be the unloading port or the unloading date.
- Gross registered tons is not included.
- Time of set is not included and it is unclear whether only noon time positions are entered or set positions are also entered.
- Shark catches are not by species.
- Other species include a wide range of fish that may be useful in future analyses and should be specified such as wahoo, mahi mahi, etc

“South Pacific Regional Purse-Seine Logsheet”

- Vessel identification: The log contains all of the essential information.
- Gross registered tons is not included.
- Purse seine sets: All essential items are on the log. One thing has bothered me for a long time is that the Other species column only has room for one entry and there are no instructions on how to enter more than one.

Dr Michael Hinton, Inter-American Tropical Tuna Commission

“Logbook (Distant-water Tuna Longline Fishery)”

‘Vessel Identity and Trip Information’:

- Additional information on expected landings from a trip broadly defined by the departure and arrival dates is needed. I recommend adding fields to indicate the total retained catch (all species) from catches made during the trip, the number of transshipments made during the trip, if any, and total retained catch transhipped; and the total retained catch on board at time of return to port for offloading.
- Additional information on the areas of operation during the trip should be included. These should indicate ocean and where applicable sub-region. When sub-region operations are in areas for which a vessel Registry entry/permit is required for legal operations, then the applicable Registry number should be included.

‘Key of the species name’:

- The abbreviations should be the standard FAO 3-alpha abbreviations. Corrections are needed in codes and scientific names as follows:
 - Southern bluefin tuna: ‘SBT’ should be ‘SBF’.
 - Other tunas: ‘OTT’ should be ‘TUN’, i.e. ‘tunas nei’, with an addition to the scientific name column, ‘Thunnini’.
 - Striped marlin: ‘STM’ should be ‘MLS’.
 - Blue marlin: scientific name should be changed from ‘*M. mazara*’ to ‘*M. nigricans*’. They are now known to be the same species and ‘*M. nigricans*’ takes precedence.
 - Bluefin tuna: ‘BFT’ should refer to Atlantic bluefin only.
 - Sailfish: an abbreviation is not given; it should read ‘SFA’.
 - Other marlins: ‘OTM’ should be ‘BIL’ and scientific name is ‘Istiophoridae’.
 - Shark: ‘SHK’ should be ‘SKX’ and refer to sharks, rays, skates, etc. nei, with scientific name ‘*Elasmobranchii*’.
 - Other fishes: ‘OTH’ should be ‘MZZ’, marine fishes nei.
- Several species should be added:
 - Pacific bluefin tuna: ‘PBF’, with scientific name *Thunnus orientalis*, should be added. This code was discussed at the last ISC Bluefin Working Group and will appear in the next edition of the FAO 3-alpha codes.
 - Atlantic sailfish: ‘SAI’, *Istiophorus albicans*, should be added.
 - Shortbilled spearfish: ‘SSP’, *Tetrapturus angustirostris*, should be added.
 - Longbilled spearfish: ‘SPF’, *Tetrapturus pfluegeri*, should be added.
 - Dolphinfishes: ‘DOX’, Dolphinfishes nei, *Coryphaenidae*, should be added.
 - Wahoo: ‘WAH’, *Acanthocybium solandri*, should be added.
- Several important species of sharks that are taken by longline should be identified to species:
 - Blue shark, ‘BSH’, *Prionace glauca*
 - Thresher sharks nei, ‘THR’, *Alopias spp*
 - Oceanic whitetip, ‘OCS’, *Carcharhinus longimanus*
 - Mako sharks nei, ‘MAK’, *Isurus spp*
 - Shortfin mako, ‘SMA’, *Isurus oxyrinchus*
 - Hammerhead sharks nei, ‘SPN’, *Sphyrna spp*
 - If the Taiwanese scientists see other species of sharks as common in the catches of the fisheries, these too should be added to the list.

- The following are applicable to the bait fish section of the form.
 - Change field name from ‘Common name’ to ‘Abbreviation’, consistent with previous section of form.
 - Replace common name ‘Samba’ with code ‘SAP’.
 - Replace common name ‘Mackerels’ with code ‘MAZ’, Mackerels nei. Scientific name should be ‘*Scomber spp*’.
 - Replace common name ‘Squid’ with code ‘SQQ’, Various squids nei. Scientific name should be ‘*Teuthoidea*’.
 - Replace common name ‘Milkfish’ with code ‘MIL’.
 - Replace common name ‘Moonfish’ with code ‘MOO’.

“Logbook (Offshore Tuna Longline Fishery)” (for vessels based in Taiwan)

‘Logsheets’ (catch and effort data for each set):

- Operation site: It is not clear what are the contents of this field: the start of set position, the end of set position, the start of haul position, or the end of haul position. Previous and recent studies (e.g. Ward et al., 2002) indicate that duration and timing of longline fishing operations have major effects on abundance and mortality estimates of pelagic species. The USA-longline logbook and data processing section in Hawaii has standardized on the start of haul position as the position of record for set, though they record the additional locations and times. Given that the standardization of fishing effort will depend on the time of day that the gear was in the water (night/daylight), the start and end times and positions for sets and hauls should be recorded.
- Temperature: should clearly denote sea surface temperature.
- Depth of deepest hook: Delete the field:: There is no means to know the depth of the deepest hook. It is clear that across the length of the line various segments may fish at different depths, i.e the middle hook on one basket may not fish the same depth as in another basket, thus unless the vessel puts TDRs on all hooks, this data is not available.
- Additional fields on targeting: Targeting may change on every set, so a pair of fields that provide a logical replacement for the field "Depth of deepest hook" are (1) Target Species and (2) Target Depth. The fishermen may well know from electronic detection equipment the depth at which they wish to fish, even if they do not know if the hooks achieved the target depth.
- Additional field on color of lightstick: There is indication that the color of lightsticks (and baits) has an impact on hook rates and on species captured.
- The species codes should be changed to the standard FAO 3-alpha abbreviations. See the remarks above on “Key of the species names” under “Logbook (Distant-water Tuna Longline Fishery)”.
- ‘Dolphin fish’ should be changed to ‘DOX’. See remarks above on ‘Key of the species names’ for “Logbook (Distant-water Tuna Longline Fishery)”.
- SKJ should be moved to the ‘Tunas’ section of the form.

- Marlins: Missing codes for the billfishes should be added. See remarks above on ‘Key of the species names’ for “Logbook (Distant-water Tuna Longline Fishery)”.
- Species: Add a couple of blank lines for entry by the fishermen for species not elsewhere included, e.g. detail on sharks. This gives fishermen the opportunity to comment and record information that would otherwise be missed.
- Average length (cm): Delete field: given the sample data requested (on the “Size sampling for offshore tuna longline fishery” form) and the implication of including units (cm) in the field header that this is an average of fish measured, there is no need to include this on the form.
- Species: Consideration may be given to a second page, used when required, which includes the shark abbreviations and abbreviations of less frequently retained species.
- Fields should be added that refer to (1) Discards: the number of discards of a species should be noted directly on the line with the retained catch on the ‘Logsheets’ page for individual sets, and (2) Damaged: the number of discards due to damaged (not size or species selection) condition (e.g. from shark or toothed whale attack).

“Size sampling for offshore tuna longline fishery”

The samples taken should also include codes for billfishes. I note that the page “Descriptions” [on the “Logbook (Offshore Tuna Longline Fishery)” form] indicates that the lower-jaw fork length should be obtained for marlins. The text under the marlin figure on the “Descriptions” page should read “Billfish, including marlins, sailfish, spearfish, swordfish”. I would also recommend that all, and only, the 3-alpha codes with Chinese names be listed on the page, as the numbers next to the 3-alpha codes might imply they should be used, which can only lead to confusion since codes are already available. The form does not indicate the condition of the fish when weighted: a column should be added. It might do well to have two pages, one for tunas and one for billfishes, with the figures showing how to measure and the codes for each on the respective pages. Codes for condition; e.g. round weight, gilled and gutted, trunk, headed, etc; need be added if the directions to those making measurements do not indicate that the whole, unprocessed fish is to be weighted.

“Catch Report for Taiwanese Offshore Longline Vessel Operate in the _____ Water”

- The form should be re-titled to “Retained and Discarded Catch Report”.
- It is not clear what is intended for this sheet. I interpret it to be a monthly-data-summary sheet in light of the data contained in the Logsheets, which is that needed for summary into format for use in stock assessment and scientific application. Given it is a summary sheet, the following fields are not informative, due to the potential for change on each set: all gear configuration fields; all bait fields. These should be removed.
- Two fields that should be added: (1) Registry number for a regional registry and (2) name of the applicable registry. With cross reference of registry data it will be clear to all RFBs the exact vessel reporting the data.
- An activity code for transshipment should be added. Data on species transhipped should be completed on any line with an activity code for transshipment.

- Discards: This field as it stands is insufficient in space to allow for discards data. A separate summary page for discards should be added and on this page, the total discarded by day by species may be reported. Alternatively, and probably preferably, the discard number (not weight) for each species should be included directly beside the retained catch data, with an additional page added to the form to ensure all species with codes are included, along with space for others noted by crew.
- Other Comment/Questions: It is desirable that this logbook and data collection system be consistent for all native Chinese speakers. To that end: is the measure Hsin = 1.829 m common to vessels of PRC? and are the terms and names for fishes, gear, etc, in these forms common to fishermen of PRC? If not now, could they easily be made so?

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APPENDIX I. MINIMUM STANDARDS FOR TUNA FISHERY CATCH AND EFFORT LOGSHEETS

The following standards for tuna fishery catch and effort logsheets were determined at the SCTB Statistics Working Group Session on Data Collection Forms, held from 14 to 15 June 1999 in Papeete, French Polynesia, during the Twelfth Meeting of the Standing Committee on Tuna and Billfish.

The minimum standards are considered in the context of scientific research and the monitoring of catch and effort, and not in other contexts, such as management or surveillance. Hence, the minimum standards to be considered are not an exclusive set of data items to be included on logsheets. Other data items may be required for other purposes, but these are not considered here.

The data items are classified into two groups: “essential” and “desirable”. For the purposes here, “essential” data items are those that make up the set of minimum standards for the logsheet, while “desirable” data items are those not included in the minimum standard, but which may nevertheless be useful. The identification of a data item as either “essential” or “desirable” will be subjective, but the following approach may be appropriate.

“Essential” data items could be thought of as those which are the minimum necessary for (i) monitoring trends in catch and effort in tuna fisheries in the WCPO and (ii) assessing the stocks of tunas. In contrast, “desirable” data items could be considered as those in whose absence monitoring and assessment could still be carried out. Under these guidelines, the number of “essential” data items will be relatively small, while the number of “desirable” data items may be large.

VESSEL IDENTIFICATION

All gear types

The following items were considered to be *essential*:

Name of the vessel, country of registration, registration number: The registration number is the number assigned to the vessel in the country where the vessel is flagged. Each country has standard formats for registration numbers, which may include codes concerning the port of registration and the size class of the vessel. The SWG also considered the vessel’s Lloyds registration number; however, it was felt that it would not be suitable since (a) it is usually difficult to obtain and (b) many smaller vessels are not registered with Lloyds.

The following items were considered to be *desirable*:

International radio callsign, fishing permit or license number: The fishing permit or license number is the number assigned by the government of the country or territory in whose waters the vessel is fishing. The permit or license number is unique to each vessel and can be used for the purposes of vessel identification. It was noted that for purposes of vessel identification, the vessel name, country of registration and the international radio call sign could be considered equivalent to the vessel name, country of registration and the registration number.

Name of the fishing company that owns the vessel and name of the agent that represents the vessel in the port of unloading: These items may be useful in obtaining corrections or additional information concerning the data recorded on the logsheets.

VESSEL, GEAR AND TRIP ATTRIBUTES

All gear types

The following items were considered to be *essential*:

Port of departure, date of departure, port of unloading, date of arrival in port of unloading: These items can be used to cross-check the period covered by logsheet data and the period covered by landings data, such that landings data can be used to verify logsheet data.

The following items were considered to be desirable:

Time of departure, time of arrival: These items can be used to cross-check the period covered by logsheet data.

Longline

The following items were considered to be *essential*:

Gross registered tonnage: Monitoring of catch and effort is sometimes done separately for coastal, offshore and distant-water longline fleets. Vessel size is an important criterion in determining whether the vessel operates in coastal, offshore or distant-water areas. The SWG noted that GRT is calculated differently between nations. The SWG considered that a vessel's length could be considered equivalent to GRT, although it noted that length measurements are often subject to the similar problems of lack of standardisation.

Number of hooks between floats or number of hooks per basket: This measure is a proxy for average hook depth and, hence, is important in determining the effective effort for a given species. Actual baskets are rarely used nowadays; therefore "hooks between floats" may be preferred. The number of hooks between floats may vary within and between sets and so it was considered that more detail should be provided. However, (a) the number of hooks between floats reported for a given trip has been shown to be significant in determining effective effort, even though lacking in detail, and (b) it is perhaps more appropriate to obtain greater detail through observer programmes, rather than on logsheets completed by the crew.

The following items were considered to be *desirable*:

Length of mainline, number of floats or baskets, length of float line, length of branch line: These items can be used to determine the depth of hooks and, hence, effective effort.

Number of hooks per branch line, number of hooks per float: These items can be used to monitor fishing effort and targeting of sharks.

Mainline material, branchline material, presence of line shooter, engine power, rated speed of vessel, name of the captain or fishing master, reel capacity, number of reels, storage capacity: These items are related to fishing effort.

Storage method: Methods used to store the catch (i.e. ice, refrigerated sea water, air coil frozen, air blast frozen, brine frozen) can be used to determine whether the vessel operates in coastal, offshore or distant-water areas and, hence, can be useful for monitoring catch and effort.

Primary target species: This information can be used to interpret catches and catch rates and, hence, can be useful for monitoring catch and effort.

Pole-and-Line

The following item is proposed as *essential*:

Gross registered tonnage: See *longline* above.

The following items were considered to be *desirable*:

Number of crew, number of automatic poling devices, bait capacity, engine power, rated speed of vessel, presence of bird radar, name of the captain or fishing master, bait species, size of bait, number of poles, storage method: These items are related to fishing effort.

Purse Seine

The following item is proposed as *essential*:

Gross registered tonnage: See *longline* above.

The following items were considered to be *desirable*:

Net length, net depth, storage capacity, presence of helicopter, vessel engine power, skiff engine power, rated speed of vessel, name of the captain or fishing master: These items are related to fishing effort. (Additional information for vessels that engage in group seine operation may be needed; however, this was not considered.)

Amount of fish onboard at start of trip, amount of fish onboard after unloading: These items can be used to verify logsheet data with landings data.

Troll

The following item is proposed as *essential*:

Gross registered tonnage: See *longline* above.

The following items were considered to be *desirable*:

Number of lines, engine power, rated speed of vessel, storage capacity, source of sea surface temperature data, name of the captain, number of skiffs: These items are related to fishing effort.

Sources of sea surface temperature data can include onboard thermometers; weather fax; and real-time satellite transmission

LONGLINE SETS

The following items were considered to be *essential*:

Date of set, time of set, position of set: The date and set time can be local time, ship's time or GMT/UTC, but must be consistent. The set time should refer to the start of setting the longline. The set position should be in at least minutes of latitude and longitude. The use of codes for areas depicted on maps of the fishing grounds, rather than the position in latitude and longitude, may also be appropriate for some fleets. The set position can refer to the start of set, the end of set, or the average position, but should be consistent.

Number of hooks set: This item is a measure of fishing effort.

Number of fish caught per set, by species, total weight or average weight of fish caught per set, by species: The instructions should indicate whether whole weights or processed weights should be used, and for which species, and should be in accordance with the usual practice by the fleet. For example, bigeye and yellowfin are usually gilled and gutted, while albacore are kept whole. All target species and major non-target, associated or dependent (NAD) species, should be recorded. The catch of fish that are discarded dead or in poor condition should also be recorded, in addition to all fish that are retained.

The following items were considered to be *desirable*:

Catch and discards of minor non-target, associated or dependent (NAD) species: These items will allow the estimation of total removals.

Activity: This item can be used to verify the completeness of the data. It should be recorded for each set and for days on which no sets were made. For days on which no sets were made, the date and noon position should also be recorded. Activities can include, for example, "a set"; "no fishing due to gear breakdown"; "no fishing due to bad weather"; "in transit"; "in port", etc.

End of set position, start of haul position, end of haul position (in addition to start of set position): These items can be used to correlate catch rates with oceanographic and bathymetric conditions.

End of set time, start of haul time, end of haul time (in addition to start of set time): These items can be used to determine soak times.

Bait species, use of dead or live bait: These items may affect catch rates.

Sea surface temperature and other oceanographic parameters: These items may affect catch rates.

POLE-AND-LINE DAYS FISHED

The following items were considered to be *essential*:

Activity: This item should be recorded for each day fished or searched and for days on which no fishing or searching took place. This item can be used to distinguish between days on which searching took place, but no fish were caught, and days on which no fishing or searching took place, and to verify the completeness of the data. Activities can include, for example, “a day fishing or searching with bait onboard”; “no fishing due to collecting bait”; “no fishing due to gear breakdown”; “no fishing due to bad weather”; “in transit”; “in port”, etc.

Date, noon position: The date and noon position must be recorded for all days. The noon position should be in at least minutes of latitude and longitude.

Weight of fish caught per day, by species: All target species and major non-target, associated or dependent (NAD) species, should be recorded. The catch of fish that are discarded dead or in poor condition should also be recorded, in addition to all fish that are retained.

The following items were considered to be *desirable*:

Catch and discards of minor non-target, associated or dependent (NAD) species: These items will allow the estimation of total removals.

Amount of bait onboard, hours fished or searched, sighting method: These items are related to fishing effort.

Average weight of fish caught per day, by species: This item may be informative in the absence of sampling by observers or port samplers.

School association: The species composition of the catch and the size of individuals is related to the type of association. All common types of school association should be recorded with specific codes, while uncommon types of association should be recorded with a code for “other” together with instructions to explain the “other” association on the logsheet. Common types of school association may include “drifting log, debris or dead animal”; “drifting raft, FAD or payao”; “anchored raft, FAD or payao”; “live whale or whale shark”; and “free-swimming” or “unassociated” schools.

PURSE-SEINE SETS

The following items were considered to be *essential*:

Activity: This item should be recorded for each set and for days on which no sets were made. This item can be used to distinguish between days on which searching took place, but no fish were caught, and days on which no fishing or searching took place, and to verify the completeness of the data. Activities can include, for example, “a set”; “a day searched, but no sets made”; “no fishing due to gear breakdown”; “no fishing due to bad weather”; “in transit”; “in port”, etc.

Date, position of set or noon position, time of set: If a set is made, then the date and position must refer to the set. If searching occurs, but no sets are made, then the date and noon position must be

recorded. The date and set time can be local time, ship's time or UTC, but must be consistent. The set time should refer to the time that the skiff was put in the water. The set position should be in at least minutes of latitude and longitude.

School association: The species composition of the catch and the size of individuals is related to the type of association. All common types of school association should be recorded with specific codes, while uncommon types of association should be recorded with a code for "other" together with instructions to explain the "other" association on the logsheet. Common types of school association may include "drifting log, debris or dead animal"; "drifting raft, FAD or payao"; "anchored raft, FAD or payao"; "live whale or whale shark"; and "free-swimming" or "unassociated" schools.

Weight of fish caught per set, by species: All target species and major non-target, associated or dependent (NAD) species, should be recorded. The catch of fish that are discarded dead or in poor condition should also be recorded, in addition to all fish that are retained.

The following items were considered to be *desirable*:

Catch and discards of minor non-target, associated or dependent (NAD) species: These items will allow the estimation of total removals.

Well numbers: This item can be used by port samplers to select wells to sample. Port samplers prefer to sample wells containing fish from sets for which the date, position and school association are similar.

Average weight of fish caught per set, by species: This item may be informative in the absence of sampling by observers or port samplers.

Sea surface temperature and other oceanographic and meteorological measures, such as depth of the thermocline, and wind speed or Beaufort wind scale. These items can affect effort and catch rates.

TROLL DAYS FISHED

The following items were considered to be *essential*:

Activity: This item should be recorded for each day fished and for days on which no fishing took place. This item can be used to distinguish between days fished on which no fish were caught and days not fished, and to verify the completeness of the data. Activities can include, for example, "a day fished"; "no fishing due to gear breakdown"; "no fishing due to bad weather"; "in transit"; "in port", etc.

Date, noon position: The date and noon position must be recorded for all days. The noon position should be in at least minutes of latitude and longitude.

Number of fish caught per day and average weight, by species: All target species and major non-target, associated or dependent (NAD) species, should be recorded. The catch of fish that are discarded dead or in poor condition should also be recorded, in addition to all fish that are retained.

The following items were considered to be *desirable*:

Catch and discards of minor non-target, associated or dependent (NAD) species: These items will allow the estimation of total removals.

Number of lines trolled by vessel, number of lines trolled by skiffs, hours fished: These items can be used to measure fishing effort.

School association: The species composition of the catch and the size of individuals is related to the type of association. All common types of school association should be recorded with specific codes, while uncommon types of association should be recorded with a code for “other” together with instructions to explain the “other” association on the logsheet. Common types of school association may include “drifting log, debris or dead animal”; “drifting raft, FAD or payao”; “anchored raft, FAD or payao”; “live whale or whale shark”; and “free-swimming” or “unassociated” schools.

Sea surface temperature, sea condition, wind speed and other meteorological conditions: These items can affect catch rates.

APPENDIX II. TRANSLATED TAIWANESE CATCH AND EFFORT LOGSHEETS

“Logbook (Distant-water Tuna Longline Fishery)”

“Logbook (Offshore Tuna Longline Fishery)” for vessels based in Taiwan

“Catch Report for Taiwanese Offshore Longline Vessel Operate in the _____ Water”

“South Pacific Regional Purse-Seine Logsheet”

APPENDIX III. COMPARISON OF TAIWANESE LOGSHEETS AND MINIMUM STANDARDS

“Logbook (Distant-water Tuna Longline Fishery)”

Upper-case = essential. Lower-case = desirable.

MINIMUM STANDARDS	LOGSHEET	OBSERVATIONS
VESSEL IDENTIFICATION:		
NAME OF THE VESSEL	yes	
COUNTRY OF REGISTRATION	n/a	Only used by Taiwanese vessels, so not applicable.
REGISTRATION NUMBER	yes	
International radio call sign	no	
Fishing permit or license number	no	
Name of the fishing company	yes	Name of company and owner's name.
Name of the agent in the port of unloading	no	
VESSEL, GEAR AND TRIP ATTRIBUTES:		
PORT OF DEPARTURE	yes	
DATE OF DEPARTURE	yes	
PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
DATE OF ARRIVAL IN PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
Time of departure	no	
Time of arrival in port of unloading	no	
GROSS REGISTERED TONNAGE	yes	
NUMBER OF HOOKS BETWEEN FLOATS	yes	"Hooks / basket". Recorded for each set.
Length of mainline	no	
Number of floats or baskets	no	
Length of float line	yes	Recorded for each set.
Length of branch line	yes	Also has "distance between two bouyages". Recorded for each set.
Number of hooks per branch line	no	
Number of hooks per float	no	
Mainline material	no	
Branch line material	no	
Presence of line shooter	no	
Engine power	no	
Rated speed of vessel	no	
Name of captain or fishing master	yes	Name of captain.
Reel capacity	no	
Number of reels	no	
Storage capacity	no	
Storage method	no	
Primary target species	no	
LOGLINE SETS:		
DATE OF SET	yes	
TIME OF SET	partial	"Operation time : morning - noon - evening"
POSITION OF SET	yes	Latitude and longitude to one decimal.
NUMBER OF HOOKS SET	yes	
NUMBER OF FISH CAUGHT PER SET	partial	Rows for 11 species or species groups, including four billfish, sharks, sea turtles, seabirds and whales/dolphins, plus other tuna, other billfish and "others". Discards for each species included.
TOTAL WT OR AVG WT OF FISH CAUGHT PER SET	partial	As above.
Catch and discards of minor NADs	no	One row for shark group. No field for name of other bycatch.
Activity	no	The numbers of sailing days and operation days for the trip are recorded.
End of set position	no	
Start of haul position	no	
End of haul position	no	
End of set time	no	
Start of haul time	no	
End of haul time	no	
Bait species	yes	"Samba - Mackerels - Squid - Milkfish - Others"
Use of dead or live bait	no	
Sea surface temperature	yes	

“Logbook (Offshore Tuna Longline Fishery)” (for vessels based in Taiwan)

Upper-case = essential. Lower-case = desirable.

MINIMUM STANDARDS	LOGSHEET	OBSERVATIONS
VESSEL IDENTIFICATION:		
NAME OF THE VESSEL	yes	
COUNTRY OF REGISTRATION	n/a	Only used by Taiwanese vessels, so not applicable.
REGISTRATION NUMBER	yes	
International radio call sign	no	
Fishing permit or license number	no	
Name of the fishing company	no	
Name of the agent in the port of unloading	no	
VESSEL, GEAR AND TRIP ATTRIBUTES:		
PORT OF DEPARTURE	yes	
DATE OF DEPARTURE	yes	
PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
DATE OF ARRIVAL IN PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
Time of departure	no	
Time of arrival in port of unloading	no	
GROSS REGISTERED TONNAGE	yes	
NUMBER OF HOOKS BETWEEN FLOATS	yes	Recorded for each set, rather than the trip. Also has hooks/basket.
Length of mainline	yes	
Number of floats or baskets	yes	
Length of float line	yes	
Length of branch line	yes	
Number of hooks per branch line	no	
Number of hooks per float	no	
Mainline material	no	
Branch line material	no	
Presence of line shooter	no	
Engine power	yes	
Rated speed of vessel	no	
Name of captain or fishing master	yes	Name of captain.
Reel capacity	no	
Number of reels	no	
Storage capacity	no	
Storage method	no	
Primary target species	no	
LOGLINE SETS:		
DATE OF SET	yes	
TIME OF SET	no	
POSITION OF SET	yes	Latitude and longitude to one decimal.
NUMBER OF HOOKS SET	no	Can be calculated from number of baskets and hooks/basket.
NUMBER OF FISH CAUGHT PER SET	partial	Rows for 13 species or species groups, including four billfish, sharks, plus other tuna, other billfish and "others". No discards.
TOTAL WT OR AVG WT OF FISH CAUGHT PER SET	partial	See above.
Catch and discards of minor NADs	partial	Dolphinfish only.
Activity	no	
End of set position	no	
Start of haul position	no	
End of haul position	no	
End of set time	no	
Start of haul time	no	
End of haul time	no	
Bait species	yes	"Samba - Mackerels - Squid - Milkfish - Others"
Use of dead or live bait	yes	
Sea surface temperature	yes	"Temperature" rather than "Sea Surface Temperature" or "SST"

“Catch Report for Taiwanese Offshore Longline Vessel Operate in the _____ Water”

Upper-case = essential. Lower-case = desirable.

MINIMUM STANDARDS	LOGSHEET	OBSERVATIONS
VESSEL IDENTIFICATION:		
NAME OF THE VESSEL	yes	
COUNTRY OF REGISTRATION	yes	
REGISTRATION NUMBER	yes	
International radio call sign	no	
Fishing permit or license number	no	
Name of the fishing company	yes	
Name of the agent in the port of unloading	yes	
VESSEL, GEAR AND TRIP ATTRIBUTES:		
PORT OF DEPARTURE	yes	
DATE OF DEPARTURE	yes	
PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
DATE OF ARRIVAL IN PORT OF UNLOADING	partial	Port of arrival, not necessarily port of unloading.
Time of departure	no	
Time of arrival in port of unloading	no	
GROSS REGISTERED TONNAGE	no	
NUMBER OF HOOKS BETWEEN FLOATS	yes	
Length of mainline	no	
Number of floats or baskets	no	
Length of float line	yes	
Length of branch line	yes	
Number of hooks per branch line	no	
Number of hooks per float	no	
Mainline material	no	
Branch line material	no	
Presence of line shooter	no	
Engine power	no	
Rated speed of vessel	no	
Name of captain or fishing master	yes	"Name of vessel master".
Reel capacity	no	
Number of reels	no	
Storage capacity	no	
Storage method	no	
Primary target species	no	
LOGLINE SETS:		
DATE OF SET	yes	
TIME OF SET	no	
POSITION OF SET	yes	
NUMBER OF HOOKS SET	yes	
NUMBER OF FISH CAUGHT PER SET	partial	Rows for 13 species or species groups, including four billfish, sharks, plus other marlins and "others". Columns for discard species, number and kilograms.
TOTAL WT OR AVG WT OF FISH CAUGHT PER SET	partial	Total weight. See above.
Catch and discards of minor NADs	partial	Dolphinfish only.
Activity	yes	"At sea but not fishing" and "Setting".
End of set position	no	
Start of haul position	no	
End of haul position	no	
End of set time	no	
Start of haul time	no	
End of haul time	no	
Bait species	yes	"Samba - Mackerels - Squids - Milkfish - Moonfish - Others"
Use of dead or live bait	yes	
Sea surface temperature	yes	

“South Pacific Regional Purse-Seine Logsheet”

Upper-case = essential. Lower-case = desirable.

MINIMUM STANDARDS	LOGSHEET	OBSERVATIONS
VESSEL IDENTIFICATION:		
NAME OF THE VESSEL	yes	
COUNTRY OF REGISTRATION	yes	
REGISTRATION NUMBER	yes	
International radio call sign	yes	
Fishing permit or license number	yes	
Name of the fishing company	yes	
Name of the agent in the port of unloading	yes	
VESSEL, GEAR AND TRIP ATTRIBUTES:		
PORT OF DEPARTURE	yes	
DATE OF DEPARTURE	yes	
PORT OF UNLOADING	yes	Port of arrival, not necessarily port of unloading.
DATE OF ARRIVAL IN PORT OF UNLOADING	yes	Port of arrival, not necessarily port of unloading.
Time of departure	yes	
Time of arrival in port of unloading	yes	
GROSS REGISTERED TONNAGE	no	
Net length	no	
Net depth	no	
Storage capacity	no	
Presence of helicopter	no	
Vessel engine power	no	
Skiff engine power	no	
Rated speed of vessel	no	
Name of captain or fishing master	yes	
Amount of fish onboard at start of trip	yes	
Amount of fish onboard after unloading	yes	
PURSE SEINE SETS:		
ACTIVITY	yes	
DATE	yes	Columns for month and day.
POSITION OF SET OR NOON POSITION	yes	Latitude and longitude to three decimal places.
TIME OF SET	yes	Set start time.
SCHOOL ASSOCIATION	yes	Codes for eight types of school.
WEIGHT OF FISH CAUGHT PER SET, BY SPECIES	partial	Columns for three species and 'others'. Columns for discard species, number and tonnes.
Catch and discards of minor NADs	partial	Minor NADs can be potentially recorded under "Other Species".
Well numbers	yes	
Average weight of fish caught, by species	no	
Sea surface temperature	no	
Depth of thermocline	no	
Wind speed	no	
Beaufort wind scale	no	