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HSBI Catch Quantification Guide

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Voluntary HSBI Regional Guides

TOOLS FOR HIGH SEAS BOARDING AND INSPECTIONS

Voluntary HSBI Regional Guides

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HSBI Catch Estimation Guide

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Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
1.1	31 October	For WCPFC22 consideration	HSBI WG	HSBI WG Chair
1.2	27 November	For WCPFC22 consideration	HSBI WG	HSBI WG Chair

Contents

PURPOSE STATEMENT

1. This document provides guidance to Authorised inspectors conducting WCPFC High Seas Boarding and Inspections (HSBI[1]) on:
   - ~~catch quantification,~~ an estimation on the quantities of fish on board, when direct weighing or weighing by sampling is not possible
   - tools and methods for catch quantifications
   - the minimum standards for analysis.

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2. The development of this Guide also aims to:
   - support the establishment of robust catch estimation methods to quantify and estimate the catch on board
   - ensure that catch estimates are credible and are consistently using appropriate methods and procedures.

[1] HSBI, refers to boarding, inspection, and related activities on the high seas within the Convention Area conducted pursuant to CMM 2006-08 Western and Central Pacific Fisheries Commission Boarding and Inspection Procedures or any successor CMM.

3. This guide refers to general considerations in the application of ~~quantifying~~ estimating the catch[2] on board during a HSBI and the estimation and analysis process, which includes:
   - catch document[3] analysis
   - freezer and Fish Hold inspections
   - verifying Catch
   - quantifying catch
   - weight estimations
   - analysis
   - reporting.

4. The application of this Guide will be voluntary and apply to HSBI activities within the WCPFC area of competence.

5. This guide should be considered a living document and ~~can be~~ modified in response to new information, technical innovations, and perspectives. It is expected that this guide will continue to evolve as the field develops.

~~Quantify and E~~estimate catch weights in WCPFC HSBI activities.

6. The aim of HSBIs is to ensure compliance of a vessel with the WCPFC Convention and all applicable WCPFC CMM obligations.

7. A key function of an authorised inspectors during a HSBI is to identify potential misreporting, unreported transhipment, under reporting or record keeping errors.

8. Inspectors conducting HSBI activities can detect and confirm species on board at the time of inspection. They can do this by comparing the information in catch documents with a visual check, count or estimation of catch on board.

9. The purpose of estimating ~~quantifying~~ catch is to verify what is declared on the log sheets is what is on board the fishing vessel. It is an important tool for Inspectors to assess if the catch is being recorded accurately, and in line with the relevant WCPFC CMMs.

10. The use of catch ~~quantification~~ estimation during HSBI activities can assist with assessing compliance with vessel licensing and reporting obligations, including to:
    - verify catch reporting/ catch log data
    - estimate total catch held on the vessel
    - assist a risk assessment for a more extensive sampling i.e. Port inspection.

11. The general process ~~aim~~ of catch ~~quantification~~ estimation, might very according to the type of fishing vessel, but in general involves the following steps ~~is to~~:
    - In the absence of a certified hold capacity plan, and when possible measure the hold as accurately as possible to calculate the total hold space

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[2] Catch refers to the target, bycatch or non-bycatch species.
[3] Catch documents can include logbooks, log sheets, observer reports, transhipment declarations, captain's notes, engineers' reports - both electronic or written.

- estimate the area of the hold filled with fish to estimate tonnage of fish
- compare estimated tonnage with the amount of fish recorded in the fishing logbook
- assess whether there is reasonable suspicion that non-compliances can be linked to tonnage inconsistency.

12. This is an initial estimate so Authorised Inspectors can check the logbook to identify ~~any~~ significant discrepancies. If significant discrepancies are found:
    - this may inform or call for a more accurate approach, such as a port inspection within the framework provided by WCPFC CMMs, or unload/offload, or;
    - inform the flag State and request an enquiry into the vessel.

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The EU suggest that it seems necessary for the Commission to consider what would be an appropriate margin of tolerance.

HSBI Catch ~~quantification~~ estimation

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Table 1. Methods of estimating catch quantity

Volumetrics	Subsample	Processed unit counts
Estimate fish in the hold where the volume of the hold is known, or can be calculated	weighing a subsample of a species then calculating average fish weight	counting the total number of ~~individual~~ specimens (processed or whole), multiplied by the ~~average weight (or an~~ estimated average weight~~)~~ to find the total weight of the species

13. The most appropriate ~~quantification~~ estimation method will depend on various parameters such as the type of vessel[4], type of fish hold, the type (e.g. whole, processed, frozen etc.) and ~~the~~ amount of catch on board. It may be useful to use two methods in combination. Consider what fish are onboard, how they are stored and what information you have available to help decide what method(s) could assist.

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14. The general principles and procedures for catch ~~quantification~~ estimation in fisheries inspections:
    - documentation and records
    - information gathering
    - hold measurements: density and conversion factors
    - compare catch information to catch estimates.

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a) Documentation and records

15. Authorised inspectors should:
    - document the catch ~~quantification~~ estimation process including analysis, using photographs and videos
    - conduct the catch ~~quantification~~ estimation process with witnesses' present (master and crew), where practicable.
    - ideally work in pairs or as a trio, to cover the tasks:
        - reviewing the logbooks and interviews the master for species, product types, and estimated catch

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[4] The quantification method in paragraph 21 may not be applicable to fresh fish stowed in tuna longliners at this moment.

- performing the necessary physical measurements in each fish hold for fish volume estimation, based on the certified hold capacity plans.

16. The HSBI report should record any catch ~~quantification~~ estimation and analysis. The authorised inspector should record as much as possible, including but not limited to the following information:
    - date of the inspection
    - vessel name
    - vessel coordinates
    - catch ~~quantification~~ estimation methods, measurements (including unit of measurement), estimations, conversion factors and analysis.

17. The master of the vessel must be provided with an interim copy of the report which includes details of any catch quantification analysis. The master must also be given to opportunity to include any objection or comment to be included in the final report.

b) Procedural steps

18. Authorised inspectors should calculate the total cubic capacity of each cargo hold, measured in cubic metres. Information on the vessel cargo holds, freezer or storage areas can be found in various ships documents, and ideally, be certified by the CCM and valid:
    - Vessel Plans or Capacity Plan
    - Hull Survey Certificates
    - General Arrangements
    - Stability Book.

19. Authorised inspectors should check ships beam (width) for verification of vessels principal dimensions. This will confirm information on the plans belongs to that vessel.

c) Measuring the hold – volumetrics

20. To obtain the hold volume by measuring interior dimensions, Authorised inspectors can either, measure the volume occupied by the fish in the hold, or measure the free air space in the hold, and deduct it from the total cubic capacity of the hold (paragraph 18).

21. To obtain fish volume estimation by species, convert the fish volume into fish weight. The factors below are illustrative examples for the inspector's reference:

    i. Apply density factors[5]. ~~An estimate for the average density of whole fish in bulk is 1080kg/m3~~. Some examples (mean values)*:

        - Marlin (MLS): 1080 kg/m^3
        - Bigeye tuna (BET): 1064 kg/m^3
        - Pacific bluefin tuna (PBF): 1070 kg/m^3
        - Albacore tuna (ALB): 1054 kg/m^3

[5] Magnuson, J. J. 1973. Comparative study of adaptations for continuous swimming and hydrostatic equilibrium of scombroid and xiphoid fishes. Fishery Bull. 71:337–356.

Commented [A14]: The EU suggests further work is needed to develop guidelines for physical measurement of fish holds

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Commented [A16]: The EU suggests these factors would need to be further examined and confirmed by the SC and TCC

- Skipjack tuna (SKJ): 1090 kg/m^3
- Swordfish (SWO): 1075 kg/m^3

ii. Apply processing conversion factor[6] if fish is processed, species by species. The following conversion factors are some of the examples:

Species (FAO code)	Whole	Gutted	Gutted + Head off
Marlin (MLS)	1.00	1.10	1.30
Bigeye tuna (BET)	1.00	1.29	1.33
Pacific bluefin tuna (PBF)	1.00	1.16	1.36
Albacore tuna (ALB)	1.00	1.23	1.31
Skipjack tuna (SKJ)	1.00	1.10	1.29
Swordfish (SWO)	1.00	1.31	1.30
Sharks (CWZ)	1.00	1.10	2.00
Yellowfin tuna (YFT)	1.00	1.10	1.36

iii. Apply stacking factors[7], taking into account if stacking is loose (factor 0.45), medium (factor 0.51, mean value for frozen tuna), or tight (factor 0.54).

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Example Calculation

Hold: 8 × 8 × 2.5 m = 160 m^3

Fill rate: 70%

Species: Bigeye tuna (BET), gutted

Density: 1064 kg/m^3

Stacking factor: 0.51

Processing factor: 1.29

Usable volume: 160 × 0.7 = 112 m^3

Gross weight = 112 × 1064 = 119168 kg

Stacked weight = 119,280 × 0.51 = 60775,68 kg

Catch weight = 60775,68 × 1.29 = 78400,6 kg ≈ 78,4 tonnes

[6] The Food and Agriculture Organization's (FAO) Coordinating Working Party on Fishery Statistics (CWP) Handbook of Fishery Statistics: Indicative factors for converting product weight to live weight for a selection of major fishery commodities.

[7] Note that stacking factors vary depending on the type of fishing vessel (e.g. purse seine, longline, trawler).

d) Analysis of Results

22. Compare the estimation result with the fishing logbook, captain's declarations, and any landing or transhipment data. Calculate the data and assess whether there are significant differences between the figures.

- If fishing logbook figure significantly > estimates of catches onboard:
  - look for concealed space where fish could be stored
  - look for evidence that an undeclared transshipment occurred during the fishing vessel trip, where the fishing vessel gave fish.
- If fishing logbook figure significantly < estimates of catches onboard:
  - look for evidence that an undeclared transshipment occurred during the fishing vessel trip, where the fishing vessel received fish
  - look for species that might be underreported.

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Accessibility of cCatch ~~quantification~~ estimation method information

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23. To assist the catch ~~quantification~~ estimation process during HSBI, it may be beneficial for the catch quantification procedures to be translated into languages that are in use on fishing vessels and/or as pictographs to bridge any language barriers.

24. Information accessibility of the HSBI Catch ~~quantification~~ estimation process for the vessel master crew and for the HSBI Authorised inspectors could be supported via:
    - HSBI Multi-language cards
    - the catch quantification procedures given/shown to master of vessel by HSBI Authorised inspectors
    - the voluntary guide translated by CCMs.