The Fisheries and Resource Monitoring System (FIRMS) Technical Working Group (TWG)
Seventh Session
TWG on the Global Tuna Atlas Including plenary e-meeting, 22nd, 25th and 26th February 2021
Report
Autor: TWG coordinator (IOTC), T-RFMOs partners, FIRMS Secretariat

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Shortcut link to the Tuna Atlas applications

Global Tuna Atlas Maps viewer https://tunaatlas.d4science.org/faotunaatlas/
Global Tuna Atlas Metadata Catalogue https://tunaatlas.d4science.org/geonetwork

Recalling the framework

This TWG was established by FSC11 in May 2019, with Fabio Fiorellato (IOTC) as coordinator.
A core group composed of the coordinator, Julien Barde (IRD), Emmanuel Blondel (FAO), Aymen Charef (FAO), and Aureliano Gentile (FAO) was established by the Secretariat.
The core group conducted preparatory activities and convened the plenary e-TWG, inviting participants among the five t-RMFOs in a series of three online meetings and follow-up activities (March-April 2021). The t-RFMO participants were:

- Colin Millar (CCSBT)
- Sylvain Caillot (IATTC)
- Carlos Palma (ICCAT)
- Carlos Mayor (ICCAT)
- Fabio Fiorellato (IOTC)
- Emmanuel Chassot (IOTC)
- Tim Jones (WCPFC)
- Peter Williams (WCPFC)

and James Geehan representing FAO fishery statistics.

The full report of the plenary e-TWG, as adopted by participants, can be found from page 7 of this document. Following the guidance provided by the plenary group, the core group finalized the work and produced the report of this TWG for FWC12 considerations.

Summary of key activities conducted by the Tuna Atlas TWG group

Prior to the e-TWG (by the core group)

- 1st major data update (April 2020, with datasets now covering years between 1950 (1918 for nominal catches) and 2019)
- 2nd major data update (October-November 2020, with datasets now covering years between 1950 (1918 for nominal catches) and 2019)

With the plenary e-TWG (meeting of the core group and 5 t-RFMOs in February 2021)

- Agreement, for the future production of harmonized data sets, on the transfer of responsibilities for this activity from the Global Tuna Atlas core group developers to the t-RFMOs through their respective data managers;
- Review of the information of pertinence to each t-RFMO, as currently held by the Global Tuna Atlas, and acknowledgement of its overall alignment with the original data prior to their pre-harmonization;
- Agreement on a generalized approach to resolve potential confidentiality issues within the original data, which requires additional pre-processing steps from the Global Tuna Atlas workflow to be documented within each datasets' metadata;
- Formal endorsement, by the t-RFMOs, of the harmonization process currently implemented by the Global Tuna Atlas for the production of all global public data sets;
- Collaborative review and endorsement of the key descriptive metadata elements for each of the four output datasets;
- First attempt at defining a new concept (initially referred to as "*Reporting / fishing fleet*"), that is expected to replace the previously adopted '*Flag*' dimension, which the group found as being too limited for the purposes of the Global Tuna Atlas;
- Definition of a tentative work plan describing all the outstanding activities required to finalize the release of the updated Global Tuna Atlas and its accompanying tools.

Following the e-TWG (by the core group)

- Finalization of the '*Fishing fleet*' concept definition and scope, in consultation with t-RFMOs and CWP focal points; the group's approved definition for **Fishing fleet**: *a group of fishing vessels authorized to operate in a t-RFMO convention area / area of competence, and whose fishing operations and catches of tuna and tuna-like species are*

responsibility of, and accounted for, by a political entity or sub-entity recognized by the corresponding t-RFMO.

- Revision of internal codelist mappings in order to comply with the newly introduced '*Fishing fleet*' concept;
- Propagation of the '*Fishing fleet*' concept to the back-end and front-end layers of the Global Tuna Atlas (i.e., data import and harmonization workflow, and map viewer, respectively);
- 3rd major data update (July 2021, with datasets now covering years between 1950 (1918 for nominal catches)and 2019);
- Drafting of specifications for a harmonized data exchange format (draft) to be adopted by t-RFMOs to further simplify future data updates; this includes analysis of other CWP reference harmonization pilot use cases, to identify the need / potential of having multiple levels of data exchange formats targeting different types of users;
- Additional testing of the updated Global Tuna Atlas map viewer, with feedback from end-users (t-RFMOs and FIRMS / CWP focal points) prioritized to drive the release and future updates of the product;
- Preparation for the release of the Global Tuna Atlas map viewer, currently accessible through this link:https://tunaatlas.d4science.org/faotunaatlas/ privately shared with the FIRMS partners;
- Discussions on a standardized workflow for the assignment of DOIs to the main Global Tuna Atlas datasets;
- Drafting of dashboards for the interactive comparisons of (by)products of the data import and harmonization workflow, to support IRD exploration of all final datasets across different levels of aggregations and estimations;
- Updates to IRD Level 1 and Level 2 datasets (fully harmonized by catch unit) to reflect recent data submissions as well as the introduction of the '*Fishing fleet*' concept;

Consolidated recommendations of the e-TWG meeting (February 2021) to the FIRMS SC

Para. 11: (...) in consultation with the t-RFMOs data manager, the group **RECOMMENDED** that the data format adopted internally by the Global Tuna Atlas (and consisting of a data structure definition, a series of pre-agreed concepts and a container format for digital data exchange) be adopted in the *ad-interim* period as the standard of choice for future updates to the Atlas, and **RECALLED** that this might be superseded by a CWP-endorsed standard with a comparable purpose, once this is finalized and released;
Para. 21: **CONSIDERING** the positive implications that this approach will have in terms of added discoverability and increased interoperability of the Global Tuna Atlas datasets, the group strongly **RECOMMENDED** that these are assigned a unique *Digital Object Identifier* (DOI).
Para. 25: The group **ACKNOWLEDGED** that additional steps are still required to reach the publication stage of the updated Global Tuna Atlas dataset in the shortest time possible (considering the respective workload of all involved stakeholders) and

RECOMMENDED to target end-April 2021 as the deadline for the publication of the FIRMS Tuna Atlas map viewer (FIRMS Level 0 datasets), pending the finalization of all remaining tasks that still require contribution from the t-RFMOs and / or the FIRMS Secretariat.

Para. 26: The group also **AGREED** to postpone all remaining matters of discussion to future meetings, and for this reason **RECOMMENDED** that important aspects not yet fully covered during this e-TWG such as the finalization of a general purpose data exchange standard and the formalization of additional concepts and dimensions are discussed at the 27th session of the CWP (Q4 2021), while all other aspects related to a long-term plan for the sustainable management of the Global Tuna Atlas, including the agreement on future data update schedule, the support to the production of Level 1 and Level 2 datasets as well as the incorporation of major changes to the workflow and the data collation process are deferred until the 12th session of the *FIRMS Steering Committee* (Q4 2021).

Para. 35: For this reason, the group **RECOMMENDED** that the term "*Fishing fleet*" be adopted in all future documents, reports and dissemination tools related to the FAO / FIRMS Global Tuna Atlas, and that this concept is used to represent the "fleets" for which reported catches of tuna and tuna-like species exist in any of the t-RFMO, **NOTING** that the occurrences of the "*Fishing fleet*" concept do not necessarily correspond to a recognized country (e.g.: *EUR - European Union*, *NEI - not elsewhere identified*), nor to a distinct member / contracting party / cooperating, non-contracting party of any t-RFMO (e.g.: *EU,ESP - EU (Spain)*, *NEI - not elsewhere identified*).

Additional recommendations from the core group to the FIRMS SC (at completion of the work, October 2021)

6. **Proceed with the publication of the FIRMS Tuna Atlas Map Viewer and Catalog in the shortest time possible (no later than 15/11/2021),** by granting access to:

   a) the global nominal catch dataset;

   b) the three geo-referenced catch datasets in weight and / or number, spatially aggregated by 1x1 or 5x5 CWP grids, or a combination of the two depending on the fisheries considered; and

   c) all related Metadata aligned with FAO guidelines for statistical datasets, as available at https://tunaatlas.d4science.org/geonetwork

   Major feedback (if any) on the applications will be duly taken into account before proceeding with the publication, with gradual improvements to be introduced later on, following the initial release.
7. **Approve the principle of annual updates**, following a data call by the FIRMS Secretariat (exact date to be agreed with t-RFMOs);
8. In absence of established FAO policies regarding assignment of DOIs for datasets, **approve the publishing of DOIs in Zenodo** for the Tuna atlas, and encourage the FIRMS Secretariat to promote (within FAO) a solution which will eventually assign referenced ownership to FAO itself. Among the benefits, Zenodo is a well-established component of DataCite, and enables efficient publishing: through the Zenodo API, DOIs can be

automatically published within the D4Science Tuna atlas services workflow, eventually with versioning, and including proper propagation across relevant online resources (eg. Tuna atlas applications links in Zenodo; Zenodo DOI in Tuna atlas applications);

9. **The TWG to be reconducted and mandated to evaluate the possibility of producing "*t-RFMO endorsed*" Level 1 datasets** (data expressed both in weight and in numbers for the same stratum), and optionally to support its development in order to further increase the scientific value of the product and expand its reach;
10. **Forward additional requests to the CWP**:
    i. That the current definition adopted for the *'Fishing fleet*' concept, as well as its accompanying terminology and reference codelist, are formally endorsed for use in the context of the Global Tuna Atlas, and considered for inclusion / harmonization within future CWP data exchange formats specifically dealing with catch and catch-related information in contexts where the '*Flag*' terminology may not be appropriated;
    ii. That preliminary results regarding the specifications of an exchange format for the provision of catch data to the Global Tuna Atlas are considered by the reference harmonization group of the CWP when defining global / regional data exchange formats;
    iii. That t-RFMOs support improvements in the production of Level 1 and 2 datasets through the direct provision of conversion factors and / or georeferenced catches (estimated, when necessary) in both numbers and weight for the species of major interest.

ABBREVIATIONS AND ACRONYMS

ASFIS	List of Species for Fishery Statistics Purposes
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CWP	Coordinating Working Party on Fishery Statistics
DOI	Digital Object Identifier
FAO	Food and Agriculture Organization of the United Nations
FIRMS	Fisheries and Resources Monitoring System FNS Food and Nutritional Security
FSC	FIRMS Steering Committee
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICT	Information and Communications Technology
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
INGO	International non-governmental organizations
IOTC	Indian Ocean Tuna Commission
IRD	Innovation Research Development
MoU	Memorandum of Understanding
NFI	FAO Fisheries and Aquaculture Division
NGO	Non-governmental organizations
RECOFI	Regional Commission for Fisheries RFB Regional Fishery Body
RFMO	Regional Fishery Management Organization
RSN	Regional Fishery Body Secretariats' Network
SDG	Sustainable Development Goal
SLA	Service Level Agreement
SPF	South Pacific Forum
t-RFMO	Tuna Regional Fisheries Management Organization
TWG	Technical Working Group
UNCLOS	United Nations Convention on the Law of the Sea
UUID	Universally Unique IDentifier
WCPFC	Western and Central Pacific Fisheries Commission
WoRMS	World Register of Marine Species
VRE	Virtual Research Environment

FULL REPORT OF THE PLENARY e-TWG (February 2021)

OBJECTIVE

1. The objective of the first FIRMS e-Technical Working Group (e-TWG) on the FIRMS Global Atlas of Tuna and Tuna-like species was to help t-RFMOs data managers familiarize with the current state-of-the-art, collect their feedback (and adjust accordingly) on the consistency between the original datasets and their harmonized versions as held by the Atlas, perform collaborative data and metadata review and initiate the formal release process.

EXPECTED OUTPUTS

2. The expected outputs of the e-TWG were:

    i. To complete consistency checks and incorporation of all requested changes indicated by t-RFMOs with respect to the pre-harmonized datasets and the generated global datasets, including:
        - Verification that all t-RFMO specific codelist mappings are up-to-date
        - Verification that the catch data statistics disseminated through the atlas are a complete and accurate version, although harmonized, of the original t-RFMO datasets

    ii. To jointly review the global datasets metadata and incorporate all recommended changes, in particular those concerning metadata elements targeting data citation and ownership (identifier, title, abstract, contacts / roles)

    iii. To agree on a release plan that will include the following elements:
        - time for applying requested changes (if any) on data and metadata
        - decision regarding the global dataset publication with DOI (probably using the Zenodo e-infrastructure)
        - identification of a sustainable strategy to support propagation of changes to the underlying datasets (e.g. updates to historical time series) in the shortest time possible

ARRANGEMENTS FOR THE MEETING

3. The e-TWG was organized as a series of Zoom calls, split over the course of three days to accommodate the difference in time zones and the availability of the participants. The organization of the daily sessions was as follows:

    First session (plenary)
    Date and time: Monday 22nd February 2021 from 8 AM to 12 AM CET (GMT+1).

Second session (first day)
Date and time: Thursday 25th February 2021 from 7 AM to 10 AM CET (GMT+1).
Second session (second day)
Date and time: Thursday 25th February 2021 from 9 AM to 13 AM CET (GMT+1).
See Annex 1 for the adopted agenda of all sessions.

OUTCOMES AND RECOMMENDATIONS

4. During the first session the group was updated on the current state-of-the-art of the Global Tuna Atlas e-infrastructure, processes and map viewer, including details on the underlying workflow and how this achieves the production of the final datasets by harmonizing the data structure and reference codes originally provided by each t-RFMO.
5. The group **ACKNOWLEDGED** that the current data collation and harmonization processes which constitute an important part of the current FIRMS Global Tuna Atlas workflow, are the result of a collaboration between IRD (a FIRMS Associate Member) and the t-RFMOs.

6. With respect to this, it was also **RECALLED** that the t-RFMOs agreed on progressively becoming responsible (with FIRMS coordination and supervision) of both the collation and harmonization steps, for the sake of improving efficiency of data updates and increasing the overall level of quality control on how their respective data sets are amalgamated within the FIRMS Global Tuna Atlas.

7. The group **ACKNOWLEDGED** that a prerequisite to reach this mid / long term goal is that a common, harmonized standard for data submission is agreed upon and adopted by all stakeholders, and that ongoing discussions and activities performed in the context of the CWP reference harmonization group might be beneficial to this exercise.

8. Eventually, the t-RFMOs **AGREED** on exploring future options and collaborating to the production of new types of data sets (e.g. the IRD / FIRMS Level 2 datasets, that correspond to a full estimation of catches in weight and number for each geographical grid).

9. The group **RECALLED** that the current procedures and exchange formats used by t-RFMOs data managers to provide the last batch of updates to the Global Tuna Atlas are to be considered as *ad-interim*, as work is currently underway - in close collaboration with the CWP technical working group on reference harmonization - to define a common standard (that will include shared concepts, reference codes and data exchange formats) for the provision of interoperable statistical fishery data in the future. In this respect, it was also **NOTED** that the FIRMS Tuna Atlas constitutes an important case study to the CWP for developing implementation guidelines to the standard on reference harmonization.

10. The group **NOTED** that the work schedule of both the CWP and the FIRMS Secretariat was negatively impacted by the pandemic that occurred during 2020, and that for this reason it was not yet possible for the parties to explore all the possibilities leading to the finalization of this important standardization task.

11. For this reason, and in consultation with the t-RFMOs data manager, the group **RECOMMENDED** that the data format adopted internally by the Global Tuna Atlas (and consisting of a data structure definition, a series of pre-agreed concepts and a container format for digital data exchange) be adopted in the *ad-interim* period as the standard of choice for future updates to the Atlas, and **RECALLED** that this might be superseded by a CWP-endorsed standard with a comparable purpose, once this is finalized and released.

12. The group also **NOTED** how the "*Flag state*" element currently included in this data structure, given the current definition applying to its underlying concept, does not accurately reflect the nature of the information managed by the t-RFMOs, and that no comparable concept can be found at this stage among those managed by the CWP in any of its current or proposed standards.

13. Therefore, the group **CONSIDERED** the possibility of referring to said data element as "*Reporting / fishing fleet*" in the ad-interim period, until full consensus is reached among all stakeholders about its name, and define an accompanying reference code list that, while based on the ISO standard 3166-1 (alpha-3), would accommodate custom extensions that will serve as references to those fleets that do not correspond to (or cannot be modeled through) a reference to a specific country.

14. The group **ENDORSED** the proposal for a preliminary version of a non-standard fleet reference codelist (see Appendix 3), and **ACKNOWLEDGED** that while this is fit for the purposes of the Global Tuna Atlas, the definition of its underlying concept (currently referred to as "*Reporting / fishing fleet*") should be further detailed and clearly described in the datasets' metadata, so as to guarantee that end users have a full understanding of the differences this introduces with respect to the original classifications adopted at t-RFMO level.

15. Following the reviewing exercise performed by each t-RFMO on the information of their pertinence as this is currently held by the Global Tuna Atlas, the group **ACKNOWLEDGED** the absence of major discrepancies in terms of total catch levels between the input data (as received by the t-RFMOs) and the harmonized output data (as produced by the Global Tuna Atlas workflow), and therefore **ENDORSED** in principle the validity of the current process to produce the global data sets for future public dissemination.

16. The group **NOTED** that, due to specific confidentiality policies in place at t-RFMOs' level, when producing its outputs the Global Tuna Atlas workflow has to estimate one of the dimensions originally missing from the input data for some sources, and **REQUESTED** that this process is clearly documented and described in the metadata specific to the datasets where this estimation and extrapolation occurs.

17. The group **AGREED** that this is a required step to clearly identify the Global Tuna Atlas as the sole responsible for the (limited) discrepancies between the original input data and the disseminated information introduced for all those strata in which this estimation is deemed as

necessary, and **REQUESTED** that all concerned tRFMOs' data managers work in close collaboration with the IRD and FIRMS Global Tuna Atlas colleagues to draft a disclaimer text to be used for this purpose.

18. After the completion of the data review, the group **ACKNOWLEDGED** the current state-of-the-art for what concerns the metadata currently describing the four output data sets and **AGREED** to collaboratively review the key descriptive elements of these metadata.

19. Eventually, the group **ENDORSED** the preliminary results of the collaborative metadata review exercise applied to each data sets, which are available as working (text) documents at the following links:

    - `global_nominal_catch_firms_level0` - yearly nominal catches
    - `global_catch_firms_level0` - georeferenced monthly catches as 1x1 or 5x5 grids
    - `global_catch_1deg_1m_ps_bb_firms_level0` - georeferenced monthly catches of purse seiners and pole-and-line as 1x1 grids
    - `global_catch_5deg_1m_firms_level0` - georeferenced monthly catches as 5x5 grids

20. And **ACKNOWLEDGED** that work is still required in order to: **a)** provide a better definition of the newly introduced concept with the ad-interim named of "*Reporting / fishing fleet*" which is commonly referenced throughout all current metadata, **b)** agree on the disclaimer text that will clarify the nature of the estimation procedures applied by the Global Tuna Atlas workflow when reconstructing missing dimensions for a fraction of its input data, **c)** provide a clear indication of the roles of FAO / FIRMS, IRD and each distinct t-RFMOs in the production of the Global Tuna Atlas datasets and **d)** identify any semantic element currently not included in the datasets' metadata that will further improve the description of potential limits of applicability, of any existing constraint and support all other relevant information necessary for the consumption of these datasets by their target audience.

21. **CONSIDERING** the positive implications that this approach will have in terms of added discoverability and increased interoperability of the Global Tuna Atlas datasets, the group strongly **RECOMMENDED** that these are assigned a unique *Digital Object Identifier* (DOI).

22. The group **ACKNOWLEDGED** that Zenodo (http://zenodo.org) is a potential candidate for this task, as it is a well-established, open access repository managed by CERN on behalf of the OpenAIRE consortium, comes with a long-term sustainability plan, is specifically devoted to increase transparency in research and science and has a robust ecosystem of libraries and tools for the automated publication of content.

23. The group **REQUESTED** the FIRMS Secretariat to consult the FAO Office for Communications for the corporate guidelines for the production of the DOIs under Zenodo or equivalent platform for the FIRMS Global Tuna Atlas.

24. Regardless of the final decision on the DOI platform of choice, the group **ACKNOWLEDGED** the extremely positive reaction by all t-RFMOs for what concerns the possibility of assigning DOIs to the Global Tuna Atlas datasets, also in consideration of the fact that several of them are already planning to have a DOI assigned to their original data, which will in turn further increase the outreach of their information.

25. The group **ACKNOWLEDGED** that additional steps are still required to reach the publication stage of the updated Global Tuna Atlas dataset in the shortest time possible (considering the respective workload of all involved stakeholders) and **RECOMMENDED** to target end-April 2021 as the deadline for the publication of the FIRMS Tuna Atlas map viewer (FIRMS Level 0 datasets), pending the finalization of all remaining tasks that still require contribution from the t-RFMOs and / or the FIRMS Secretariat.

26. The group also **AGREED** to postpone all remaining matters of discussion to future meetings, and for this reason **RECOMMENDED** that important aspects not yet fully covered during this e-TWG such as the finalization of a general purpose data exchange standard and the formalization of additional concepts and dimensions are discussed at the *27th session of the CWP* (Q4 2021), while all other aspects related to a long-term plan for the sustainable management of the Global Tuna Atlas, including the agreement on future data update schedule, the support to the production of Level 1 and Level 2 datasets as well as the incorporation of major changes to the workflow and the data collation process are deferred until the 12th session of the *FIRMS Steering Committee* (Q4 2021).

27. The group **AGREED** on the need of reaching consensus on the naming convention to adopt for the "*reporting / fishing fleet*" concept, and that this be done intersessionally by creating an electronic poll targeting t-RFMOs data managers.

28. The group **NOTED** that the poll, named "*FIRMS Global Tuna Atlas - Finalization of the Reporting / Fishing fleet concept name*", was eventually set up on the *SurveyMonkey* platform and left open to t-RFMOs' feedback from March 31st to April 12th 2021.

29. The group **NOTED** that the poll presented a list of nine "*concept names*" for which t-RFMOs' data managers were called to express their opinion on how well and accurately, in the context of their own t-RFMO, the proposed names described the concept under definition.

30. The group **NOTED** that the list of proposed concept names included the following choices (in alphabetical order):

    a) *Contracting party / Cooperating non-contracting party*
    b) *Entity*
    c) *Fishing entity*
    d) *Fishing fleet*
    e) *Flag state*
    f) *Fleet*

g) *Member state*
h) *Reporting / Fishing fleet*
i) *Reporting fleet*

and that participants were requested to assign to each of these choices one of the following qualifiers, in increasing order of "score":

a) Conflicts with the name of a different concept defined by my t-RFMO or by the CWP [**-1 points**];
b) Fails in conveying the meaning required by the Tuna Atlas [**0 points**]
c) Partially conveys the meaning required by the Tuna Atlas [**1 point**]
d) Conveys well the meaning required by the Tuna Atlas [**2 points**]
e) Perfectly conveys the meaning required by the Tuna Atlas [**3 points**]
f) Other (please specify) [**No points**]

31. All five t-RFMOs participated to the survey, and the group **ACKNOWLEDGED** the results as summarized by the table below:

Concept name	**Final score**
Fishing fleet	**11**
Fishing entity	9
Reporting fleet	7
Reporting / fishing fleet	7
Entity	5
Contracting party / Cooperating non-contracting party	5
Fleet	3
Flag state	3
Member state	-2

32. The group **NOTED** that**:**

- One t-RFMO did not indicate any of the proposed choices as "*Perfectly conveying the meaning required by the Tuna Atlas*";
- One t-RFMO indicated four of the proposed choices as "*Perfectly conveying the meaning required by the Tuna Atlas*";
- The choice receiving the second highest total score ("*Fishing entity*") has been indicated as "*Conflicting with the name of a different concept defined by a t-RFMO or the CWP*" by one t-RFMO.

and also, that the choice receiving the highest total score ("*Fishing fleet*") has been indicated as:

- "*Perfectly conveying the meaning required by the Tuna Atlas*" by two t-RFMOs;
- "*Well conveying the meaning required by the Tuna Atlas*" by two other t-RFMOs;
- "*Partially conveying the meaning required by the Tuna Atlas*" by one t-RFMO.

33. The group **AGREED** on the results of the poll, **NOTING** that the choice receiving the highest score ("*Fishing fleet*") appears to be in good-to-perfect agreement across all t-RFMOs, and that for this reason it can be considered as adequately representative of the concept it is expected to model.

34. For this reason, the group **RECOMMENDED** that the term "*Fishing fleet*" be adopted in all future documents, reports and dissemination tools related to the FAO / FIRMS Global Tuna Atlas, and that this concept is used to represent the "fleets" for which reported catches of tuna and tuna-like species exist in any of the t-RFMO, **NOTING** that the occurrences of the "*Fishing fleet*" concept do not necessarily correspond to a recognized country (e.g.: *EUR - European Union*, *NEI - not elsewhere identified*), nor to a distinct member / contracting party / cooperating, non-contracting party of any t-RFMO (e.g.: *EU,ESP - EU (Spain)*, *NEI - not elsewhere identified*).

35. For this reason, the group **AGREED** intersessionally to adopt the following definition:

> ***Fishing fleet***: a group of fishing vessels authorized to operate in a t-RFMO convention area / area of competence, and whose fishing operations and catches of tuna and tuna-like species are responsibility of, and accounted for, by a political entity or sub-entity recognized by the corresponding t-RFMO. To be noted that the actual occurrences of the "*Fishing fleet*" concept do not necessarily refer or correspond to a recognized country (e.g.: *EUR - European Union*, *FRAT – French territories*), nor to a distinct member / contracting party / cooperating, non-contracting party of a t-RFMO (e.g.: *EU,ESP - EU (Spain), TWN – Chinese Taipei / Taiwan province of China* – for some t-RFMOs). The proposed list of fishing fleet codes also includes a generic reference that applies to fishing operations and catches from unidentified sources (e.g.: *NEI - not elsewhere identified*).

36. Finally, the group **AGREED** that the revised *t-RFMO to fishing fleet* codes mapping prepared by the FIRMS Global Tuna Atlas task leader, which revises the original mapping from the t-RFMOs' `flag` to the `flag_fao_cwp` coding system by replacing the latter with the new `fishing_fleet_firms` coding system, shall be used *in lieu* of the previous within the Global Tuna Atlas data workflow.

ANNEX 1 – AGENDA of the plenary e-meeting (February 2021)

Session 1 - Plenary Session

Date: Monday, February 22nd , from 8 AM Rome time / 11 AM Seychelles time / 6 PM Canberra and Micronesia time

Tentative duration: 3:15 hrs

1.1 Introduction to agenda, objective & expected outputs (30')

1.2 Overview of the Tuna atlas progress and current workflow (45')

1.3 Presentation of the e-TWG material available to participants for the review of the Tuna atlas, followed by questions/answers:

- Pre-harmonized regional and harmonized global datasets (60')
- Remote coffee break (20')
- Global datasets metadata review (40')

Session 2 - Split in two iterations to account for the different time zone of all participating t-RFMOs)

Date (first iteration): Thursday February 25th, CCSBT, WCPFC, from 7AM Rome time / 5PM Canberra and Micronesia time

Date (second iteration): Friday February 26th , IATTC + ICCAT + IOTC from 9AM Rome time / 12 AM Seychelles time

Tentative duration: 3:00 hrs

2.1 Review of t-RFMOs datasets

2.2 Collaborative review of global dataset metadata

2.3 Wrap-up

- List requested changes for both data and metadata
- Remote coffee break
- Decision to be taken about DOI publication
- Finalization of the release plan

2.4 Possible next steps after the release

ANNEX 2 - LIST OF PARTICIPANTS

Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

- Mr Colin MILLAR
  Database manager

International Commission for the Conservation of Atlantic Tunas (ICCAT)

- Mr Carlos PALMA
  Biostatistician

- Mr Carlos MAYOR
  Database programmer

Institut de Recherche pour le Développement (IRD)

- Mr Julien BARDE
  Data scientist, in charge of IRD Tuna Atlas

Indian Ocean Tuna Commission (IOTC)

- Mr Fabio FIORELLATO
  IOTC data coordinator,FIRMS Global Tuna Atlas task leader

- Mr Emmanuel CHASSOT
  IOTC fishery statistician

Inter-American-Tropical-Tuna-Commission (IATTC)

- Mr Sylvain CAILLOT
  Computer scientist

Western and Central Pacific Fisheries Commission (WCPFC)

- Tim JONES
  ICT manager

Pacific Community (SPC)

- Peter WILLIAMS
  Principal fisheries scientist

FAO Fisheries and Aquaculture Division - FIRMS Secretariat

- Mr Marc TACONET
  Team leader information and knowledge management
  FIRMS Secretary

- Mr Emmanuel BLONDEL
  Geographic Information Systems and R expert, Technical support to FIRMS Secretariat

- Mr Aymen CHAREF
  Fishery statistician, Lead CWP TG on Reference Harmonization

- Mr Aureliano GENTILE
  Information manager, FIRMS Secretariat

- Mr James GEEHAN
  Fishery statistician, Global Capture production statistics

ANNEX 3 - AD INTERIM "*REPORTING FLEET*" CODELIST

Fleet code	ISO-3	English name	Same as ISO-3
ABW	ABW	Same as the official name for the country with the given ISO-3 code	Yes
AGO	AGO	Same as the official name for the country with the given ISO-3 code	Yes
AIA	AIA	Same as the official name for the country with the given ISO-3 code	Yes
ALB	ALB	Same as the official name for the country with the given ISO-3 code	Yes
ARE	ARE	Same as the official name for the country with the given ISO-3 code	Yes
ARG	ARG	Same as the official name for the country with the given ISO-3 code	Yes
ASM	ASM	Same as the official name for the country with the given ISO-3 code	Yes
ATG	ATG	Same as the official name for the country with the given ISO-3 code	Yes
AUS	AUS	Same as the official name for the country with the given ISO-3 code	Yes
BGD	BGD	Same as the official name for the country with the given ISO-3 code	Yes
BEN	BEN	Same as the official name for the country with the given ISO-3 code	Yes
BHR	BHR	Same as the official name for the country with the given ISO-3 code	Yes
BHS	BHS	Same as the official name for the country with the given ISO-3 code	Yes
BLR	BLR	Same as the official name for the country with the given ISO-3 code	Yes
BLZ	BLZ	Same as the official name for the country with the given ISO-3 code	Yes
BMU	BMU	Same as the official name for the country with the given ISO-3 code	Yes

BOL	BOL	Same as the official name for the country with the given ISO-3 code	Yes
BRA	BRA	Same as the official name for the country with the given ISO-3 code	Yes
BRB	BRB	Same as the official name for the country with the given ISO-3 code	Yes
CAN	CAN	Same as the official name for the country with the given ISO-3 code	Yes
CHE	CHE	Same as the official name for the country with the given ISO-3 code	Yes
CHL	CHL	Same as the official name for the country with the given ISO-3 code	Yes
CHN	CHN	Same as the official name for the country with the given ISO-3 code	Yes
CIV	CIV	Same as the official name for the country with the given ISO-3 code	Yes
CMR	CMR	Same as the official name for the country with the given ISO-3 code	Yes
COG	COG	Same as the official name for the country with the given ISO-3 code	Yes
COK	COK	Same as the official name for the country with the given ISO-3 code	Yes
COL	COL	Same as the official name for the country with the given ISO-3 code	Yes
COM	COM	Same as the official name for the country with the given ISO-3 code	Yes
CPV	CPV	Same as the official name for the country with the given ISO-3 code	Yes
CRI	CRI	Same as the official name for the country with the given ISO-3 code	Yes
CUB	CUB	Same as the official name for the country with the given ISO-3 code	Yes
CUW	CUW	Same as the official name for the country with the given ISO-3 code	Yes
CYM	CYM	Same as the official name for the country with the given ISO-3 code	Yes

DDR		*Germany Democratic Republic*	No
DJI	DJI	Same as the official name for the country with the given ISO-3 code	Yes
DMA	DMA	Same as the official name for the country with the given ISO-3 code	Yes
DOM	DOM	Same as the official name for the country with the given ISO-3 code	Yes
DZA	DZA	Same as the official name for the country with the given ISO-3 code	Yes
ECU	ECU	Same as the official name for the country with the given ISO-3 code	Yes
EGY	EGY	Same as the official name for the country with the given ISO-3 code	Yes
ERI	ERI	Same as the official name for the country with the given ISO-3 code	Yes
EUR		*European Union*	No
EUBEL	BEL	*European Union (Belgium)*	No
EUBGR	BGR	*European Union (Bulgaria)*	No
EUCYP	CYP	*European Union (Cyprus)*	No
EUDEU	DEU	*European Union (Germany)*	No
EUDNK	DNK	*European Union (Denmark)*	No
EUESP	ESP	*European Union (Spain)*	No
EUEST	EST	*European Union (Estonia)*	No
EUFRA	FRA	*European Union (France)*	No
EUFRA	REU	*European Union (France)*	No

EUGBR	GBR	*European Union (United Kingdom)*	No
EUGRC	GRC	*European Union (Greece)*	No
EUHRV	HRV	*European Union (Croatia)*	No
EUIRL	IRL	*European Union (Ireland)*	No
EUITA	ITA	*European Union (Italy)*	No
EULTU	LTU	*European Union (Lithuania)*	No
EULVA	LVA	*European Union (Latvia)*	No
EUMLT	MLT	*European Union (Malta)*	No
EUNLD	NLD	*European Union (Netherlands)*	No
EUPOL	POL	*European Union (Poland)*	No
EUPRT	PRT	*European Union (Portugal)*	No
EUROU	ROU	*European Union (Romania)*	No
EUSVN	SVN	*European Union (Slovenia)*	No
EUSWE	SWE	*European Union (Sweden)*	No
FJI	FJI	Same as the official name for the country with the given ISO-3 code	Yes
FLK	FLK	Same as the official name for the country with the given ISO-3 code	Yes
FRAT		*France (overseas territories)*	No
FRO	FRO	Same as the official name for the country with the given ISO-3 code	Yes

FSM	FSM	Same as the official name for the country with the given ISO-3 code	Yes
GAB	GAB	Same as the official name for the country with the given ISO-3 code	Yes
GBR	GBR	Same as the official name for the country with the given ISO-3 code	Yes
GBRT		*United Kingdom (overseas territories)*	No
GEO	GEO	Same as the official name for the country with the given ISO-3 code	Yes
GHA	GHA	Same as the official name for the country with the given ISO-3 code	Yes
GIN	GIN	Same as the official name for the country with the given ISO-3 code	Yes
GMB	GMB	Same as the official name for the country with the given ISO-3 code	Yes
GNB	GNB	Same as the official name for the country with the given ISO-3 code	Yes
GNQ	GNQ	Same as the official name for the country with the given ISO-3 code	Yes
GRD	GRD	Same as the official name for the country with the given ISO-3 code	Yes
GTM	GTM	Same as the official name for the country with the given ISO-3 code	Yes
GUM	GUM	Same as the official name for the country with the given ISO-3 code	Yes
GUY	GUY	Same as the official name for the country with the given ISO-3 code	Yes
HND	HND	Same as the official name for the country with the given ISO-3 code	Yes
HTI	HTI	Same as the official name for the country with the given ISO-3 code	Yes
IDN	IDN	Same as the official name for the country with the given ISO-3 code	Yes
IND	IND	Same as the official name for the country with the given ISO-3 code	Yes

IRN	IRN	Same as the official name for the country with the given ISO-3 code	Yes
ISL	ISL	Same as the official name for the country with the given ISO-3 code	Yes
ISR	ISR	Same as the official name for the country with the given ISO-3 code	Yes
JAM	JAM	Same as the official name for the country with the given ISO-3 code	Yes
JOR	JOR	Same as the official name for the country with the given ISO-3 code	Yes
JPN	JPN	Same as the official name for the country with the given ISO-3 code	Yes
KEN	KEN	Same as the official name for the country with the given ISO-3 code	Yes
KHM	KHM	Same as the official name for the country with the given ISO-3 code	Yes
KIR	KIR	Same as the official name for the country with the given ISO-3 code	Yes
KNA	KNA	Same as the official name for the country with the given ISO-3 code	Yes
KOR	KOR	Same as the official name for the country with the given ISO-3 code	Yes
KWT	KWT	Same as the official name for the country with the given ISO-3 code	Yes
LBN	LBN	Same as the official name for the country with the given ISO-3 code	Yes
LBR	LBR	Same as the official name for the country with the given ISO-3 code	Yes
LBY	LBY	Same as the official name for the country with the given ISO-3 code	Yes
LCA	LCA	Same as the official name for the country with the given ISO-3 code	Yes
LKA	LKA	Same as the official name for the country with the given ISO-3 code	Yes
MAR	MAR	Same as the official name for the country with the given ISO-3 code	Yes

MDG	MDG	Same as the official name for the country with the given ISO-3 code	Yes
MDV	MDV	Same as the official name for the country with the given ISO-3 code	Yes
MEX	MEX	Same as the official name for the country with the given ISO-3 code	Yes
MHL	MHL	Same as the official name for the country with the given ISO-3 code	Yes
MMR	MMR	Same as the official name for the country with the given ISO-3 code	Yes
MNE	MNE	Same as the official name for the country with the given ISO-3 code	Yes
MNP	MNP	Same as the official name for the country with the given ISO-3 code	Yes
MOZ	MOZ	Same as the official name for the country with the given ISO-3 code	Yes
MRT	MRT	Same as the official name for the country with the given ISO-3 code	Yes
MUS	MUS	Same as the official name for the country with the given ISO-3 code	Yes
MYS	MYS	Same as the official name for the country with the given ISO-3 code	Yes
NAM	NAM	Same as the official name for the country with the given ISO-3 code	Yes
NCL	NCL	Same as the official name for the country with the given ISO-3 code	Yes
NEI		*Not Elsewhere Identified*	No
NGA	NGA	Same as the official name for the country with the given ISO-3 code	Yes
NIC	NIC	Same as the official name for the country with the given ISO-3 code	Yes
NIU	NIU	Same as the official name for the country with the given ISO-3 code	Yes
NOR	NOR	Same as the official name for the country with the given ISO-3 code	Yes

NRU	NRU	Same as the official name for the country with the given ISO-3 code	Yes
NZL	NZL	Same as the official name for the country with the given ISO-3 code	Yes
OMN	OMN	Same as the official name for the country with the given ISO-3 code	Yes
PAK	PAK	Same as the official name for the country with the given ISO-3 code	Yes
PAN	PAN	Same as the official name for the country with the given ISO-3 code	Yes
PER	PER	Same as the official name for the country with the given ISO-3 code	Yes
PHL	PHL	Same as the official name for the country with the given ISO-3 code	Yes
PLW	PLW	Same as the official name for the country with the given ISO-3 code	Yes
PNG	PNG	Same as the official name for the country with the given ISO-3 code	Yes
PRI	PRI	Same as the official name for the country with the given ISO-3 code	Yes
PSE	PSE	Same as the official name for the country with the given ISO-3 code	Yes
PYF	PYF	Same as the official name for the country with the given ISO-3 code	Yes
QAT	QAT	Same as the official name for the country with the given ISO-3 code	Yes
RUS	RUS	Same as the official name for the country with the given ISO-3 code	Yes
SAU	SAU	Same as the official name for the country with the given ISO-3 code	Yes
SCG	SCG	Same as the official name for the country with the given ISO-3 code	Yes
SDN	SDN	Same as the official name for the country with the given ISO-3 code	Yes
SEN	SEN	Same as the official name for the country with the given ISO-3 code	Yes

SGP	SGP	Same as the official name for the country with the given ISO-3 code	Yes
SHN	SHN	Same as the official name for the country with the given ISO-3 code	Yes
SLB	SLB	Same as the official name for the country with the given ISO-3 code	Yes
SLE	SLE	Same as the official name for the country with the given ISO-3 code	Yes
SLV	SLV	Same as the official name for the country with the given ISO-3 code	Yes
SOM	SOM	Same as the official name for the country with the given ISO-3 code	Yes
SPM	SPM	Same as the official name for the country with the given ISO-3 code	Yes
SRB	SRB	Same as the official name for the country with the given ISO-3 code	Yes
STP	STP	Same as the official name for the country with the given ISO-3 code	Yes
SUN	SUN	Same as the official name for the country with the given ISO-3 code	Yes
SUR	SUR	Same as the official name for the country with the given ISO-3 code	Yes
SYC	SYC	Same as the official name for the country with the given ISO-3 code	Yes
SYR	SYR	Same as the official name for the country with the given ISO-3 code	Yes
TCA	TCA	Same as the official name for the country with the given ISO-3 code	Yes
TGO	TGO	Same as the official name for the country with the given ISO-3 code	Yes
THA	THA	Same as the official name for the country with the given ISO-3 code	Yes
TKM	TKM	Same as the official name for the country with the given ISO-3 code	Yes
TLE	TLE	Same as the official name for the country with the given ISO-3 code	Yes

TON	TON	Same as the official name for the country with the given ISO-3 code	Yes
TTO	TTO	Same as the official name for the country with the given ISO-3 code	Yes
TUN	TUN	Same as the official name for the country with the given ISO-3 code	Yes
TUR	TUR	Same as the official name for the country with the given ISO-3 code	Yes
TUV	TUV	Same as the official name for the country with the given ISO-3 code	Yes
TWN	TWN	*Chinese Taipei / Taiwan province of China*[1]	Yes
TZA	TZA	Same as the official name for the country with the given ISO-3 code	Yes
UKR	UKR	Same as the official name for the country with the given ISO-3 code	Yes
URY	URY	Same as the official name for the country with the given ISO-3 code	Yes
USA	USA	Same as the official name for the country with the given ISO-3 code	Yes
VCT	VCT	Same as the official name for the country with the given ISO-3 code	Yes
VEN	VEN	Same as the official name for the country with the given ISO-3 code	Yes
VGB	VGB	Same as the official name for the country with the given ISO-3 code	Yes
VIR	VIR	Same as the official name for the country with the given ISO-3 code	Yes
VNM	VNM	Same as the official name for the country with the given ISO-3 code	Yes
VUT	VUT	Same as the official name for the country with the given ISO-3 code	Yes

[1] **RECALLING** the long-standing issues with the official denomination to adopt when referencing *Taiwan* in the disseminated data sets and reference codes, as well as within the front-facing interactive data querying tools (included in the Global Tuna Atlas map viewer) the group **AGREED** on using the dual denomination of "*Taiwan province of China / Chinese Taipei*" whenever the name of the entity identified as TWN has to be displayed.

WLF	WLF	Same as the official name for the country with the given ISO-3 code	Yes
WSM	WSM	Same as the official name for the country with the given ISO-3 code	Yes
YEM	YEM	Same as the official name for the country with the given ISO-3 code	Yes
YUG	YUG	Same as the official name for the country with the given ISO-3 code	Yes
ZAF	ZAF	Same as the official name for the country with the given ISO-3 code	Yes