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TWELFTH SESSION OF THE FISHERIES AND RESOURCES MONITORING SYSTEM (FIRMS) STEERING COMMITTEE MEETING

Virtual Meeting, 18–21 October 2021

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PREPARATION OF THE DOCUMENT

This is the final version of the Report of the Twelfth Session of the Fisheries and Resources Monitoring System (FIRMS) Steering Committee Meeting, Virtual Meeting, from 18 to 21 October 2021.

ABSTRACT

The Twelfth Session of the Fisheries and Resources Monitoring System (FIRMS) Steering Committee Meeting (FSC12) was held online from 18 to 21 October 2021. The FSC12 deliberated to proceed with the publishing of the Global Tuna Atlas developed with active contributions from the five tuna regional fishery management organizations (t-RFMOs), with the Global Record of Stocks and Fisheries (GRSF) towards validation of all records and their public dissemination, and with the integration of national Sustainable Development Goals (SDG) 14.4.1 data into the GRSF. The FSC12 also considered a survey on the use of FIRMS by partners for strategic decisions for the 2020–30 decade.

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ANNEXES

ABBREVIATIONS AND ACRONYMS

ASFIS	Aquatic Sciences and Fisheries Information System
BCC	Benguela Current Commission
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CECAF	Fishery Committee for the Eastern Central Atlantic
CIAC	Cephalopod International Advisory Council
CLME+	Caribbean and North Brazil Shelf Large Marine Ecosystems
CNR	Consiglio Nazionale delle Ricerche [National Council for Research]
COFI	Committee on Fisheries (FAO)
COREP	Regional Commission of Fisheries of Gulf of Guinea
CPPS	Permanent Commission for the South Pacific
CTMFM	Joint Technical Commission of the Maritime Front
CWP	Coordinating Working Party on Fishery Statistics
EEZ	exclusive economic zone
EOSC	European Open Science Cloud
EMODNet	European Marine Observation and Data Network
FAO	Food and Agriculture Organization of the United Nations
FCWC	Fishery Committee for the West Central Gulf of Guinea
FIRMS	Fisheries and Resources Monitoring System
FNS	Food and Nutritional Security
FORTH	Foundation for Research and Technology - Hellas
FSC	FIRMS Steering Committee
GFCM	General Fisheries Commission for the Mediterranean
GRSF	Global Record of Stocks and Fisheries
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ICT	Information and Communications Technology
IWC	International Whaling Commission
ERCIM	European Research Consortium for Informatics and Mathematics
IFREMER	French Research Institute for Exploitation of the Sea
IGO	Intergovernmental Organization
INGO	International Non-Governmental Organization
IOTC	Indian Ocean Tuna Commission
IRD	Institut de recherche pour le développement [Institute of Research for Development]
IPHC	International Pacific Halibut Commission
MSC	Marine Stewardship Council
MOU	memorandum of understanding
NAFO	Northwest Atlantic Fisheries Organization

NAMMCO	North Atlantic Marine Mammal Commission
NASCO	North Atlantic Salmon Conservation Organization
NEAFC	North East Atlantic Fisheries Commission
NGO	non-governmental organization
NPFC	North Pacific Fisheries Commission
OSPESCA	Central America Fisheries and Aquaculture Organization
PSC	Pacific Salmon Commission
RECOFI	Regional Commission for Fisheries
RFB	regional fishery body
RFMO	regional fisheries management organization
RSN	Regional Fishery Body Secretariats' Network
SDG	Sustainable Development Goal
SEAFDEC	Southeast Asian Fisheries Development Centre
SEAFO	South East Atlantic Fisheries Organization
SIOFA	Southern Indian Ocean Fisheries Agreement
SFP	Sustainable Fisheries Partnership
SPC	Pacific Community
SPF	South Pacific Forum
SPRFMO	South Pacific Regional Fisheries Management Organisation
SRFC	Subregional Fisheries Commission
SWIOFC	Southwest Indian Ocean Fisheries Commission
t-RFMO	tuna regional fishery management organization
TWG	Technical Working Group
UNCLOS	United Nations Convention on the Law of the Sea
UUID	universally unique identifier
UW	University of Washington
WCPFC	Western and Central Pacific Fisheries Commission
WECAFC	Western Central Atlantic Fishery Commission
WIOFish	Western Indian Ocean Fisheries Database
WoRMS	World Register of Marine Species
VRE	Virtual Research Environment

EXECUTIVE SUMMARY

The Fisheries and Resources Monitoring System (FIRMS) is a partnership of regional and international organizations which provides access to a wide range of high-quality information on the global status and trend on fisheries and resources, including the Global Atlas of Tuna and Tuna-like Species (Tuna Atlas) and the Global Record of Stocks and Fisheries (GRSF).

The twelfth Session of the FIRMS Steering Committee (FSC12) was held online from 18 to 21 October 2021 and was chaired by Ms Nancie Cummings from the National Oceanic and Atmospheric Administration (NOAA)–Fisheries, serving as WECAFC Regional Focal Point. Eleven of the twenty-one FIRMS Partners participated in FSC12, along with one associated member, two collaborating organizations and two observer organizations. FSC12 reviewed work undertaken during the 2019–2021 intersession period and this included the further development of the Tuna Atlas, the GRSF and FIRMS Terminology and Definitions. FSC12 also considered a proposed survey on the use of FIRMS by Partners for strategic decisions for the 2020–30 decade, the FIRMS partnership was discussed, and the work plan for the forthcoming intersession period was developed.

FSC12 noted the development of the FIRMS database of marine resources and fisheries which currently holds inventories on approximately 1 500 marine resources and 800 fisheries worldwide. These are reported as 836 marine resources and 291 fisheries fact sheets, published on the FIRMS website https://firms.fao.org/ as primary observations in addition to the 928 historical records. Intersessional work conducted in 2019-2021 included the further development of the marine resource and fishery modules and database content, monitoring of web trends, implementation of training or skills development, and promotional and outreach activities. FSC12 also adopted several revised definitions regarding the jurisdictional distribution of fish stocks and maritime area type.

FSC12 reviewed intersessional work on the Tuna Atlas which had been achieved by Partners, observer organisations and the collaborative institution Institute of Research for Development (IRD). The Tuna Atlas is an interactive web-based system which is being developed *inter alia* to monitor fishing capacity and effort, identify changes in fishery strategies, detect common patterns across oceans, quantify the economic value of tuna fisheries, explore global management scenarios, address ecological questions and understand habitat preferences of pelagic populations and communities. Intersessional activities included system updates, description of harmonization steps taken to resolve confidentiality issues, endorsement of the harmonization workflow, drafting of a data exchange format, agreement on progressive transfer of responsibility to tuna regional fishery management organization (t-RFMOs) for the production of harmonized input data, development of the 'fishing fleet' concept, preparation for the release of the updated map viewer and metadata catalogue, and discussions on approaches to assign Digital Object Identifiers to the main datasets.

FSC12 also reviewed intersessional work on the GRSF that had been achieved by Partners, observer organisations and the collaborative institutions Foundation for Research and Technology – Hellas (FORTH), Sustainable Fisheries Partnership (SFP) and University of Washington (UW). GRSF is an interactive web-based system that assigns unique identifiers to stocks and fisheries for an improved and comprehensive stock status data coverage, in support of FIRMS' goal to facilitate the monitoring of the status and trends of all fishery resources. GRSF also aims to be a digital companion of SOFIA's stocks status and support the United Nations Sustainable Development Goals (SDG) Indicator 14.4.1

"Proportion of fish stocks within biologically sustainable levels". GRSF also provides a tool for traceability and ecolabelling schemes with the aim to connect seafood industries and consumers to the status of stocks and fisheries. FSC12 deliberated i) to proceed with the further development of the GRSF application, ii) the inclusion of stocks data stemming from the SDG 14.4.1. questionnaire as fourth source of data provider, iii) the need to further progress on traceability aspects including the formalization of the newly proposed concept of Traceability Unit, and iv) the increased and timeliness contribution of data adapted to the different regional contexts.

FSC12 conducted the regular progress review on performance during the intersession, including new and updated Partners data contributions, and the FIRMS Secretariat work in providing support to Partners for disseminating stock and fisheries status and trends.

Finally, a work plan was elaborated with the objective to continue providing the required support and capacity building to FIRMS Partners, continue work on the Tuna Atlas and GRSF, and develop a survey to inform strategic decisions for the 2020–30 decade.

1. OPENING OF THE SESSION AND WELCOME (AGENDA ITEM 1)

1. The Twelfth Session of the Fisheries and Resources Monitoring System (FIRMS) Steering Committee (FSC12) was held online from 18 to 21 October 2021 and was chaired by Ms Nancie Cummings from the Western Central Atlantic Fishery Commission (WECAFC).

2. The meeting was opened by Mr Manuel Barange (Director, Fisheries and Aquaculture Division, FAO) who welcomed participants to FSC12. Mr Barange reflected on the current challenging period brought about by the pandemic and the growing shortage in the global food supply. In September 2021, the United Nations held a Food Systems Summit under the Decade of Action to achieve the Sustainable Development Goals (SDGs) by 2030 across all 17 SDGs, each of which relies *inter alia* on healthier, more sustainable and equitable food systems. The Summit recognized aquatic resources as part of the global food solution, noting that over 2 400 aquatic species are harvested in capture fisheries and over 600 aquatic species are cultured for food. Global partnerships such as FIRMS facilitate efforts to integrate knowledge and actions across various/numerous spatial scales, fishery sectors and societies. FIRMS' vision of global sustainability and rational use of aquatic resources is an essential component of global efforts to secure food supply and alleviate hunger. Mr Barange looked forward to the discussions and outcomes of FSC12.

3. Mr Marc Taconet (FAO, FIRMS Secretary) thanked Mr Barange and welcomed participating FIRMS Partners and other organizations.

4. Mr Taconet recalled that the FIRMS partnership framework was established in 2004 and aims to support all of its Partners, observer organizations and collaborative institutions in providing information of the highest quality while recognizing the different capacities of each organization and the environment in which they operate. FIRMS knowledge, databases and products serve to inform users on the global monitoring and management of marine fishery resources including the status and trend of fishery stocks. Mr Taconet emphasized the need to better identify the benefits and future needs of this partnership in order to drive future work, and noted that FSC12 participants have the opportunity to share their intersessional activities and report on improvements or shortcomings in agenda item 3b. In addition, agenda item 5 provides an opportunity to discuss and develop a survey on use of FIRMS by Partners, for strategic decisions for the 2020–30 decade.

5. Mr Taconet acknowledged with great pleasure the commitment of FIRMS Partners, with eleven of the seventeen intergovernmental organizations (IGO) partners participating in FSC12. FSC12 also welcomed one associate partner, two observer organizations, and two of the four collaborating institutions. Mr Taconet thanked these organizations for their hard work and contributions during the intersessional period and also noted the support provided by the FIRMS Secretariat. The following organizations participated in FSC12:

- Food and Agriculture Organization of the United Nations (FAO, Partner)
- Fishery Committee for the West Central Gulf of Guinea (FCWC, Partner)
- General Fisheries Commission for the Mediterranean (GFCM, Partner)
- Inter-American Tropical Tuna Commission (IATTC, Partner)
- International Commission for the Conservation of Atlantic Tunas (ICCAT, Partner)
- International Council for the Exploration of the Sea (ICES, Partner)
- Indian Ocean Tuna Commission (IOTC, Partner)
- Institut de Recherche pour le Développement (IRD, collaborative institution)
- Northwest Atlantic Fisheries Organization (NAFO, Partner)
- North-East Atlantic Fisheries Commission (NEAFC, Partner)

- Pacific Community (SPC, Observer)
- Southeast Asia Fisheries Development Centre (SEAFDEC, Partner)
- Sustainable Fisheries Partnership (SFP, collaborative institution)
- Southern Indian Ocean Fisheries Agreement (SIOFA, Partner)
- Western and Central Pacific Fisheries Commission (WCPFC, Observer)
- Western Central Atlantic Fishery Commission (WECAFC, invited by FAO)

6. Mr Taconet noted that this was the first time that a FSC meeting had been held online and further acknowledged the challenges arising from the schedule of the online sessions, which were held across the multiple time zones of Partners and other participating organizations. In addition, the pandemic had caused delays inter alia in organizing the 2021 meeting, which had been intended to be held earlier in the year (e.g. May–June 2021). The timing of FSC12 in October coincided with some Partners' annual meetings and, consequently, some Partners were unable to participate in FSC12; the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the South Pacific Regional Fisheries Management Organisation (SPRFMO) had sent their apologies.

7. Mr Taconet outlined the work planned for FSC12, which included a review of the work undertaken during the 2019–2021 intersession period, further development of the Global Atlas of Tuna and Tuna-like Species (Tuna Atlas), Global Record of Stocks and Fisheries (GRSF) and FIRMS terminology. FSC12 will also consider a proposed survey on the use of FIRMS by Partners for strategic decisions concerning FIRMS for the 2020–30 decade, discuss the FIRMS partnership and develop the work plan for the forthcoming intersession period.

8. Ms Cummings thanked the FIRMS Secretariat for organizing and supporting FSC12, and the Partners, other organizations and collaborative institutions for their ongoing contributions and commitment to the work of FIRMS.

2. ADOPTION OF THE AGENDA (AGENDA ITEM 2)

9. Ms Cummings introduced the agenda (FSC12/2021/1) and provided an overview of the meeting schedule and activities, the agenda was adopted without change (Annex 1).

3. REVIEW OF FIRMS ACTIVITIES DURING THE INTERSESSION (AGENDA ITEM 3)

3a. FIRMS Secretariat report on intersession activities

10. Mr Aureliano Gentile (FAO, FIRMS Secretariat) reviewed the FIRMS activities that occurred during the 29 months of the intersession period June 2019–September 2021. These activities were guided by the decisions of FSC9, FSC10 and FSC11 and involved many contributions by Partners and external collaborators. The work included the implementation of FSC decisions, further development of the marine resource and fishery modules and database content, monitoring of web trends, implementation of training or skills development, and promotional and outreach activities. The review also outlined arising issues, potential future activities, and summarized Secretariat resources in support of FIRMS. These activities are reported in detail in FSC12/2021/2 and some activities are highlighted in the following paragraphs.

11. Since FSC9, FSC has made approximately 55 decisions related to the development of FIRMS, of which 45 decisions have been implemented or were in the process of being implemented. The outstanding work is linked mostly to decisions about the development of the FIRMS website and the underlying infrastructure. Necessity had postponed that work, while the IT infrastructure supporting FAO and FIGIS systems were being upgraded. With the migration to the new system nearing completion, it is expected that the FIRMS website and infrastructure will be migrated to the new system during 2022.

12. Developments of the marine resource and fishery modules includes recent additions and updates from CCAMLR, CCSBT, FCWC, IATTC, ICCAT, ICES, IOTC, NASCO, NEAFC, SEAFO, and SPRFMO. The Secretariat prepared marine resource factsheets, which are pending clearance by the following FAO regional bodies CECAF, GFCM, and SWIOFC. Draft inventories are in progress for RECOFI and SIOFA. Stocks and fisheries case studies were prepared for the North Pacific Fisheries Commission (NPFC). The majority of the FIRMS published factsheets were mapped to the GRSF universally unique identifiers (UUIDs). There is an increasing trend in the number of FIRMS factsheets (18 percent for marine resources and 16 percent for fisheries, mostly for fishing activity and management units) and availability of time series on catches and landings (more than 40 percent of records).

13. Recent analysis of web trends show an overall upward trend in the use of the FIRMS website, with a lower bounce rate indicating the length of time that users remain on a page has increased since FSC11.

14. The FIRMS Secretariat has provided extensive support, training and skills development, including routine support for the submission of data by CCAMLR, CECAF, GFCM, FCWC, ICCAT, ICES, IOTC, NASCO, NEAFC, RECOFI, SEAFO, SEAFDEC, SPRFMO, SWIOFC, and WECAFC. It was noted that some organizations such as CCSBT, IATTC and NAFO usually submit their updates in complete autonomy, while many still require some assistance. Outreach activities included assisting NPFC in the development of draft inventories of stocks and fisheries for the North Pacific to present at the next session of the NPFC SC, an introduction to the FIRMS partnership to CTMFM and discussion on the content of the Annex 2 of that arrangement.

15. FIRMS is also in support to develop Partners' capacity and that of their Member States towards a streamlined reporting from statistical data collection to a regional database of catch and effort, harmonized with the inventory of fisheries, and to disseminate fisheries status and trends. During the intersession, the following capacity building activities were conducted:

- WECAFC: Facilitation of the update of the WECAFC-FIRMS inventories of stocks and fisheries, support to DCRF (Data Collection Reference Framework) in WECAFC-CRFM-OSPESCA Fisheries Data and Statistics Online Working Group (FDS-WG).
- FCWC: Online Regional Workshop and preparatory sessions to strengthen the knowledge and expertise within Member States, in terms of fisheries data collection systems, required for successful data reporting at national, regional and global level. Support development of the FCWC regional fisheries database and to provide support to CECAF working groups. 38 fisheries inventories and 22 factsheets published (rep. year 2020) amongst the 5 member states, with the others in progress.
- RECOFI: Following the 10th session of the RECOFI Commission (July 2019), in close collaboration with the RECOFI Secretariat, a “RECOFI-FIRMS Data Call Workshop: updating stocks and fisheries inventories" was virtually conducted on the 3-4 August 2021.

The focus was on the update of the stocks and fisheries inventories and a brief training on the FIRMS inventory templates. Nominations for regional and national focal points for the region were also addressed. This meeting was included in a three-part series of workshops for the region, the others being the "Minimum Data Reporting Regional Database Workshop" and "An introduction to SDG 14.4.1 and its regional application". Recommendations of these three workshops were conveyed at the 20 RECOFI WGFM12, where propositions were endorsed with comments and were forwarded to the RECOFI Commission.

16. Mr Taconet discussed the Secretariat resources in support of FIRMS, outlining historical trends in funding and human resources in areas of software development, training and management. He highlighted an increase in resources available during the intersession period for capacity building, the Tuna Atlas, GRSF, including thanks to the support of BlueCloud and CLME+ projects, and the recruitment of three new consultants in support of FIRMS. Mr Taconet also acknowledged the significant in-kind contributions provided by Partners.

17. Mr Taconet presented the potential future work, which included *inter alia* expanding the FIRMS coverage and timeliness of reporting, GRSF and Tuna Atlas, support to SDG 14.4.1 requirements, renewal of the FIRMS website, progression of FIRMS standards in certain areas, the publication of FIRMS inventories that are still pending in Excel format, and further promotion of FIRMS. FSC12's consideration of future work and decisions are reported in section 9.

18. Mr Taconet indicated that further capacity building activities were planned, upon available funds, which include the support of data collection for certain FCWC member states as well as support to their regional database, in collaboration with ASFA. The collection and compilation of grey research literature and/or datasets in OpenASFA that can support evidence on the status of fisheries and fishery resources with a focus on data poor countries in Southeast Asia (refer also paragraph 34 on SEAFDEC activity report), will be key to better informed data sets.

19. Regarding the perspectives on processes, issues and resources for the next intersession, Mr Taconet emphasized the importance of timely data submissions from Partners, highlighting the need for an increased content coverage, which is being facilitated by Partners submitting catch data. Further development of new workflows to support this process, and increased geographic coverage through the data collated in the GRSF including SDG 14.4.1 questionnaire submissions, the data call policy adopted at FSC11 being pursued and the expansion of the partnership to potential new Partners such as CTMFM, NPFC, and WCPFC was noted.

20. Mr Taconet discussed the financial resources for the next intersession, noting that the Regular Programme (RP) will continue to support content updates including the national SDG14.4.1 questionnaire cycle, as well as dedicate some resources to support the upgrade and migration of the underlying FIRMS software. He noted that Extra Budgetary Funds (EBF) will continue to be necessary to support the uptake of FIRMS in various regions including BOBLME, WECAFC, CECAF-FCWC, RECOFI; and that the GRSF and Tuna Atlas offer promising additions and expansions to the FIRMS coverage including the SDG14.4.1 national data. However, additional extrabudgetary funding resources and/or partnerships will be necessary for fully supporting this work.

21. Mr Seraphin Dedi (FCWC) expressed appreciation of the training and support provided by FIRMS. In 2019, an agreement between FIRMS and FCWC was made to provide training on fishery statistical data, and fisheries status data for the FCWC region and its Member states. The outcome of

this agreement is for FCWC to achieve the capacity to deliver the best science-based evidence available for decision makers, and more broadly, all stakeholders involved in the management of fishery resources in the region. In particular, the agreement for a strengthened capacity by FCWC and its Member States to maintain and disseminate FIRMS fisheries inventories in line with CECAF-FIRMS policy, strengthened capacity by FCWC to collate, manage and maintain a regional database of Catch and Effort at fishing units level, and strengthened capacity of FCWC Member states to submit such statistics on a regular basis, in ways harmonized and consistent with other reporting duties of these Member states. Building on the success of this collaboration, FAO, CECAF and FIRMS recently supported the establishment of, and provided equipment and online training to, a data collection team in each FCWC Member state.

22. Mr Sylvain Caillot (IATTC) enquired about the new FIRMS website and whether it would be included as part of the migration of systems to the new FAO website.

23. Mr Gentile responded that the new FIGIS engine at the centre of the new system is currently deployed and operating in a restricted environment. When commissioned, the new FIGIS engine would also serve the FIRMS platform. FSC10 had approved the migration of the FIRMS site to a new website with enhanced features including new data services and improved data submission workflow, and this is expected to be completed during 2022.

24. Mr Nicolas Gutierrez (FAO) noted the progress achieved by FIRMS since 2004, and wondered whether the current objectives of FIRMS are much different from those identified when FIRMS was first established in 2004. He noted the importance of identifying the benefits and impacts of FIRMS, and how FIRMS has contributed to the mandates of its Partners and data sharing arrangements in Partner Member states.

25. Mr Taconet pointed to the following agenda item (3b "Partners progress/achievement Reports"), which provides FIRMS Partners with the opportunity to elaborate on the benefits, capabilities and weaknesses of the FIRMS partnership. Consideration of this item allows FSC12 to evaluate how FIRMS and its Partners are using the partnership and products during the intersession. Mr Taconet also noted that some of the features of FIRMS currently have restricted access, or are out-of-public-sight during their development, and this made it more difficult to fully evaluate these aspects of FIRMS.

3b. Partners progress/achievements reports

26. Mr Caillot reported on IATTC's activities in support of FIRMS (FSC12/2021/2c) which included the completion of the assessment of the blue marlin and stock indicators of silky shark, updates of the ICCAT fact sheets, updates of the resource fact sheets with data from 2019 for northern albacore, bigeye, skipjack, Pacific Bluefin, yellowfin tuna, striped marlin and swordfish (north and south stocks), and updates to the eastern Pacific Ocean tunas and billfishes fishery fact sheet. ICCAT maintains links for FIRMS and CWP on its website. Planned activities during the coming intersession period include the development of facts sheets for Pacific blue marlin, silky shark and the eastern Pacific Ocean sailfish stock based on recently completed stock assessments.

27. Ms Cummings reported on WECAFC's activities in support of FIRMS (FSC12/2021/2b), which included updated inventories of marine resources and fisheries for Saint Lucia, Saint Kitts and Nevis, Dominica and French Guiana, and a new marine resource fact sheet for Seabob Coast of French Guiana. Work continued on revisions of an interim Data Collection Reference Framework (DCRF), list of species, fisheries and stocks, spatial units for fishing zones, further revisions of fishing practice and the development of preliminary biological references. Other activities included work on refining data

collection standards, and training and skill development. Planned activities during the coming intersession period include increasing awareness of needs and the importance of updating fisheries marine resource and fishery fact sheets, increasing capacity of national scientists to update fact sheets in a timely manner, identifying bottlenecks and barriers to updating inventories, identifying outreach activities with national scientists and data preparatory training workshops for DCRF and FIRMS data submissions.

28. Ms Ruth Fernández (ICES) reported on ICES's activities in support of FIRMS (FSC12/2021/2d), which included the continued development of ICES' Transparent Assessment Framework and Stock Information Database, the development of a new Regional DataBase and Estimation System to store detailed commercial fisheries sampling data and details about how the sampling was performed to enable statistical estimations to be made, and the continued development and compilation of technical guidelines related with ICES's advisory products. ICES also published 10 fisheries overviews and 10 ecosystem overviews and conducted online workshops and training on fishery stock assessments, fisheries management, and new technologies and methods applied to fisheries and marine ecology data.

29. Ms Cummings mentioned that she would share these ICES updates with the WECAFC colleagues.

30. Mr Darius Campbell (NEAFC) reported on NEAFC's activities in support of FIRMS, which included an updated submission to FIRMS. In terms of stocks, ICES manages the scientific advice and stock status for NEAFC, NEAFC does the management, and FIRMS fact sheets would be updated after these organizations' respective annual meetings. NEAFC's data collection process results in catch data published at an aggregated level, whereby the organization relied on data submitted by contracting parties via email. This submission is now automated as a one-stop-shop using online forms that contracting parties fill out directly into the system. NEAFC is yet to decide whether contracting parties may or may not have their monthly data published.

31. Mr Nathan Taylor (ICCAT) reported on ICCAT's activities in support of FIRMS (FSC12/2021/2f), which included updates of fact sheets for the main stocks on swordfish, mako, yellowfin tuna and white marlin. ICCAT is developing an online open source reporting system, supported by the Global Environmental Fund (GEF), which will replace the present submission of data by email. ICCAT and other partners are collaborating with FAO and the Global Environment Facility (GEF) to develop a project in Areas beyond National Jurisdiction (ABNJ), which aims at improving compliance with ICCAT conservation and management measures, enhancing the ICCAT Integrated Online Management System, testing ecosystem based indicators and management policies and supporting harmonization of commonalities shared by t-RFMOs.

32. Mr Federico de Rossi (GFCM) reported on GFCM's activities (FSC12/2021/2h) in support of FIRMS, which included progress towards a modern dissemination via the GFCM website of Stock Assessment Forms (SAFs), as validated by the GFCM subsidiary bodies for relevant Mediterranean and Black Sea species. Improvements also include the development of a new GFCM framework to organize Stock Assessment Results (STAR), which streamlines and automates the information flow from stock assessments to scientific advice, strengthens quality assurance and data dissemination. Should this framework be endorsed by the Commission session in November 2021, it may also positively affect the provision of information to FIRMS for publishing, of which an internal meeting needs to be arranged with FIRMS Secretariat discussing activities moving forward, including an optimized integration of FIRMS factsheets into the GFCM website. As an additional source of information for FIRMS, GFCM

reported about the latest release of the State of Mediterranean and Black Sea Fisheries (SoMFi) published at the end of 2020, as well as the new 2030 Strategy of the GFCM with its five targets in alignment with the Blue Transformation initiative, a pillar of FAO's new Strategic Framework.

33. Mr Dedi reported on FCWC's activities in support of FIRMS, including ongoing assistance from FIRMS in capacity building, training on fishery statistical data, and the development and submission of FIRMS inventories.

34. Mr Supapong Pattarapongpan (SEAFDEC) reported on SEAFDEC's activities in support of obtaining a better understanding on fish stocks and resources in Southeast Asian waters, noting that SEAFDEC has no mandate to collect data from stocks assessment on a regular basis. However, SEAFDEC's project on the stock assessment of kawakawa and longtail tuna resources in Southeast Asian waters have already shared information with FIRMS. SEAFDEC and FAO are also in the early stages of developing a project to identify and record on OpenASFA the research and/or datasets that can support evidence on the status of fisheries and fishery resources in data poor countries in Southeast Asia. The proposed work is further subject to discussion and SEAFDEC will further communicate with FIRMS on this matter in due course.

35. Mr Tim Jones (WCPFC) reported that WCPFC had contributed data to the Tuna Atlas during the intersession, and that both he and Mr Peter Williams (SPC and science service provider to WCPFC) had participated in the work of the TGW on the Tuna Atlas.

36. Mr Williams reported that SPC had previously produced various public domain data products for WCPFC. These datasets are at various levels of spatial and temporal resolution and included by-catch data collected by fishery observers. SPC is currently developing additional datasets including length-frequency data and cannery processing data. All public domain datasets are available from the WCPFC website.

37. FSC12 also noted the activities reports submitted by CCSBT (FSC12/2021/2g), IOTC (FSC12/2021/2a) and IRD (FSC12/2021/2e).

38. Mr Taconet summarized feedback from the activities reports, noting the importance of capacity building activities in support of stock status monitoring in developing regions, such as WECAFC and FCWC and in Southeast Asia. He further noted that for some Partners with established activities in FIRMS, such as ICCAT, ICES, GFCM and NEAFC, recent developments have focused on streamlining data submission into Partners' databases, as well as into FIRMS.

39. Ms Cummings noted the value in the training and capacity development work done for FCWC and WECAFC, indicating that it is key in the WECAFC (Caribbean) region, and even with setbacks, due to the pandemic, good progress has been made.

4. REPORT OF TECHNICAL WORKING GROUPS (AGENDA ITEM 4)

4a. Report of e-TWG7 on terminology

40. Mr Arturo Muñoz Albero (FAO, FIRMS Secretariat) presented the results of the online consultation on FIRMS terminology (FSC12/2021/5). The objective of the consultation was to agree among members of the TGW on definitions for the jurisdictional distribution of fish stocks and types of maritime areas relevant to the Marine Resource and Fishery information domains. These definitions had been considered at FSC11 and the definitions for "Highly Migratory" and "Straddling between high seas and EEZ" had been revised and agreed upon. FSC11 referred the other definitions relating to

jurisdictions to the TWG for further development. The online consultation considered the following terms and concepts:

Jurisdictional distribution of fish stocks

a) Jurisdictional distribution
b) National
c) Shared between nations
d) Highly migratory (definition endorsed at FSC11)
e) High Seas purely
f) Straddling between High Seas and EEZ (definition endorsed at FSC11)
g) Comments about Jurisdictional distribution concept

Maritime area type

a) Maritime area type
b) High Seas
c) National waters
d) EEZ
e) Territorial sea
f) Archipelagic zone
g) Comments about Maritime Area concept

41. A total of eleven respondents from ten organizations (CCSBT, FCWC, IATTC, ICES, IOTC, RECOFI, SEAFDEC, SEAFO, SIOFA, SPRFMO) participated in the consultation and reviewed the definitions for these terms. The consultation agreed on most points considered. However, four definitions (two on Jurisdictional Distribution and two on Maritime Area, with a focus on defining territorial seas and EEZs) were referred to FSC12 for further discussion.

42. During discussion and email exchanges with participants at the meeting, FSC12 noted:

- The desire to align the definitions with existing definitions in UNCLOS and other global instruments. For example, UNCLOS Article 55 defines the exclusive economic zone (EEZ) in a legal context as the area beyond and adjacent to the territorial sea.
- Consider the use of the term 'national jurisdiction area' (NJA) instead of EEZ, where a national jurisdiction area encompasses all waters under national jurisdiction (including EEZ where present, noting that some countries may only designate territorial waters).
- Partners have used various working definitions for some of the terms under consideration, leading to some gaps and issues in reconciling FIRMS data.
- Definitions under consideration are being developed for use in FIRMS.

43. Ms Anne-Elise Nieblas (FAO, FIRMS Secretariat) elaborated on the part of the consultation regarding management units, which may be generally defined by:

- Areas: the spatial boundaries of areas within which fisheries operate.
- Fleets: set of fishing fleets exploiting a common fish community over their spatial distribution.
- People: a set of fishers responsible for managing a set of species in an area.
- Population dynamics: areas grouped to contain species with similar abundance trends.

44. In 2019, FSC11 agreed to define a management unit in terms of species and management area, i.e. "The area where the fish was caught and which is targeted by a unique set of measures. This unit (i.e. one - or more - species in a particular area) has generally been defined at regional, national or local scale by a management authority including through stakeholder consultation", noting that management units may be used for setting the basis for stock status determination, and may not correspond to the biological stock.

45. However, during the online consultation, respondents further discussed the relation between "Jurisdictional Distribution" and "Management Area", noting that the data sheet of the SDG 14.4.1 questionnaire was unclear about a management unit being an area, or a combination of species and area.

46. In addition, current work on developing standards for traceability units, including work on GRSF (agenda item 4c), indicates the need to define a management unit in relation to a management area or reporting area.

47. Ms Nieblas proposed the following revised definition for a management unit: A group of individuals of one (or more) species in an area where the fish were caught and which is targeted by a unique set of measures. This unit has generally been defined at regional, national or local scale and includes information of the management authorities that set the measure including through stakeholder consultation". The associated note endorsed by FSC11 would be retained.

48. Following further discussion, Mr Taconet noted that definitions agreed by FSC, for use by FIRMS, are recorded in the FIRMS Information Management Policy (IMP). The IMP allowed terms and definitions to be classified under "FIRMS Guidelines" and "FIRMS Draft Guidelines" for testing purposes and refinements.

49. Ms Nieblas noted that management units and management areas are defined in FIRMS and by various RFBs separately, e.g. by ICCAT and IATTC, thereby contributing to the confusion around these matters as a management unit can refer to the assessment area and/or the management area.

50. Mr Campbell noted that this issue of variability in defining a management unit also arises in generic RFMOs, e.g. NEAFC has assessment areas, which are High Seas, management areas that are a part of a single region and specific management areas, such as the Rockall Basin for Haddock.

51. Mr Taconet noted that an activity during the next intersession could further define these concepts on management unit and area from the RFB point of view to ensure existing differences are captured within the global system. An initial overview of how NEAFC and ICES use these concepts was developed during the meeting and is reported in Annex 4.

52. The definitions considered by the online consultation and revisions made by FSC12 are summarized in Annex 3. These definitions were further considered under agenda items 6 (Decisions regarding e-TWG recommendations) and 9 (Intersessional work plan).

4b. Report of e-TWG on the Tuna Atlas

53. Ms Cummings opened the session on the Tuna Atlas. This new FIRMS information system was developed under the BlueBRIDGE project and allows users to explore and visualize tuna and tuna-like fisheries data at regional and global scales. FSC11 endorsed the Tuna Atlas under its Governance umbrella. FSC12 was invited to review the status of development and recommendations of the e-TWG.

The recommendations are further considered under agenda items 6 (Decisions regarding e-TWG recommendations) and 9 (Intersessional work plan).

54. Mr Fabio Fiorellato (IOTC and coordinator of the e-TWG on the Tune Atlas) reported on the work and outcomes of the TWG (FSC12/2021/3). The TWG was established by FSC11. A core group composed of the coordinator and Mr Julien Barde (IRD), Mr Emmanuel Blondel (FAO), Mr Aymen Charef (FAO) and Mr Gentile was established by the FIRMS Secretariat. The core group conducted preparatory activities and convened the e-TWG, inviting the five t-RMFOs (CCSBT, IATTC, ICCAT, IOTC, WCPFC) and FAO in a series of three online meetings and follow-up activities (March–April 2021).

55. The Tuna Atlas is being developed *inter alia* to monitor, at a global scale, fishing activity and dynamics of its spatial distribution, identify changes in fishery strategies (e.g. changes in FAD usage), detect common patterns across oceans (e.g. changes in nominal CPUEs), quantify the economic value of tuna fisheries, explore global management scenarios, address ecological questions and understand habitat preferences of pelagic populations and communities.

56. The objectives of the Tuna Atlas are to:

- develop the datasets and services for tuna fisheries;
- involve t-RFMOs in the harmonization process;
- create partnerships between institutions to maximize the return and reduce duplication of efforts;
- leverage metadata to improve visibility and transparency of data processes;
- facilitate use of global datasets by user communities;
- improve recognition of t-RFMOs as data providers;
- enable the impact analyses of global phenomena (e.g., climate change) on tuna and their associated fisheries.

57. Activities carried out during the intersession by the e-TWG included system updates, description of harmonization steps taken to resolve confidentiality issues, endorsement of the harmonization workflow, drafting of a data exchange format (in line with CWP reference harmonization), agreement on progressive transfer of responsibility to t-RFMOs for the production of harmonized input data, development of the 'fishing fleet' concept, preparation for the release of the updated map viewer and metadata catalogue, and discussions on approaches to assign Digital Object Identifiers (DOIs) to the main datasets.

58. The Tuna Atlas is being developed as a state-of-the-art information system which is:

- using ISO-compliant metadata;
- making consistent use of CWP reference codes (CWP grids, ISSCFG, ASFIS);
- implementing a fully reproducible R-based data harmonization workflow;
- currently populated by four global datasets (level 0[1]). Global annual catch of tuna and tuna-like species; Global monthly catch of tuna and tuna-like species aggregated by 1x1 or 5x5 degrees statistical squares; Global monthly catch of tuna and tuna-like species aggregated

[1] Levels indicate different stages of processing where: Level 0 dataset (harmonized; with no extrapolation) stores nominal catch (and potentially effort) data as close as possible to the primary data collated from countries and made publicly available by t-RFMOs; Level 1 dataset uses Level 0 data as inputs and harmonizes units of measures for catches which are then expressed both in weights and numbers in the same stratum; Level 2 dataset is generated from Level 1 dataset with additional corrections and raising factors (from FSC11 report, paragraph 91).

by 5x5 degrees statistical squares; Global monthly catch of tuna and tuna-like species from surface fisheries, aggregated by 1x1 degrees statistical squares; and

- interactive with a map viewer application and metadata catalogue hosted by the iMarine d4science infrastructure (Tuna Atlas).

59. Mr Blondel gave a live demonstration of the Tuna Atlas map viewer, showing how the database can be accessed and navigated through queries and various filters, whereby the time to retrieve the results depends on the type of query and dataset used. Data may be exported in various formats such as comma-separated values (csv) for regular output and for data analysis using R scripts, Jupyter notebook etc. Data exports are provided via a link, which may be copied and shared among collaborating scientists. It was also noted that DOIs attached to the datasets provide a useful tool to analyse how and where the data are cited.

60. Ms Cummings and other participants congratulated the TWG on the large amount of work done and collaborative effort required to develop the Tuna Atlas, including the data visualization toolbox and the preliminary work done on data queries from the catalogue. They noted the importance of FIRMS in monitoring users of the Tuna Atlas in order to provide web statistics and trends. The potential of applying the Tuna Atlas information system to other datasets and fisheries was recognized, including data-poor and/or small-scale fisheries.

61. Mr Fiorellato explained that the TWG had insisted on the use of DOIs also for the added benefit that publishing platforms have of managing user access statistics and dataset usage.

62. Mr Carlos Palma (ICCAT) congratulated colleagues in t-RFMOs for producing the datasets used by Tuna Atlas. He acknowledged the time constraints placed on all Partners, and indicated that the process of preparing and uploading data to the Tuna Atlas would need further development to alleviate the current workload on t-RFMOs. While t-RFMOs routinely apply quality assurance to the datasets used in their stock assessments, further work is required to prepare datasets for the Tuna Atlas. In addition, the workload is expected to increase when datasets at levels 1 and 2 are used in the Tuna Atlas (refer to footnote 1). Mr Palma also recognised the importance of the Tuna Atlas in providing a global view of selected species (e.g. tuna species, by-catch species, other species) in terms of catches for a specific gear.

63. Mr Gutierrez requested further examples of how the Tuna Atlas has been utilized, for what purposes, and the way the Tuna Atlas is creating value for the t-RFMOs. He noted that the current focus was on the use of data from the nine main tuna species and that the Tuna Atlas allows users to combine and visualize these data. He wondered how this approach may be expanded to include other datasets, including the smaller tuna species.

64. Mr Fiorellato responded from the perspective of a t-RFMO, using a recent example where the Tuna Atlas was used to visualize authoritative public-domain global data on FAD-associated tuna catches across all oceans. In this example, the data used had been verified and officially endorsed by t-RFMOS, thus making it easier to disseminate and publish the information. He further noted that the Tuna Atlas is not only a map viewer and catalogue, but included a data harmonization workflow which allowed validated datasets to be shared amongst the scientific community.

65. Mr Taconet noted that access and use of the Tuna Atlas is currently limited to the group of developers, including the TWG and that it was difficult to evaluate the benefits and impact of the Tuna Atlas prior to its public release. However, the use cases presented indicate that this information system

may be extended to include other species and fisheries and may be used to develop other regional databases. It was important to invest in applications, such as the Tuna Atlas, which may pave the way to future developments and innovations.

66. Ms Cummings welcomed the potential extension of the Tuna Atlas information system to other species and fisheries, as improvements in datasets in FIRMS allow their wider use.

67. Mr Fiorellato outlined the five main recommendations brought forward from the TWG (referred to as the group in the recommendations). These recommendations are detailed in FSC12/2021/3 and outlined below.

68. TWG recommendation 1: 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.

69. TWG recommendation 2: 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 DOI.

70. TWG recommendation 3: the group acknowledged that additional steps are still required to reach the publication stage of the updated Global Tuna Atlas datasets in the shortest time possible (considering the respective workload of all involved stakeholders) and recommended to target end-April 2021 as the deadline[2] 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.

71. TWG recommendation 4: 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. Further, 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 FSC12.

72. TWG recommendation 5: 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”[3] for which reported catches of tuna and tuna-like species exist in any of the t-RFMO. .

73. In further discussion, FSC12 recalled the differences between level 0,1 and 2 datasets (refer to footnote 1). Mr Fiorellato further explained that a level 1 dataset is an augmented version of level 0, and fills data gaps on all the strata by using conversion factors provided by t-RFMOs or by using values

[2] This date tentatively set-up during the TWG in March 2021 afterwards proved unfeasible.
[3] 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).

reported in the literature to estimate catches both in weight and numbers for the same strata. Level 2 dataset corresponds to georeferenced catch data that are representative of total catches by species from the same fleets and fisheries, potentially requiring the use of proxy fleets to derive said information when this is not already available from the source. Mr. Fiorellato recalled how this information might be already available to t-RFMOs for internal usage and that due to the process being used, it might introduce confidentiality aspects that need further consideration.

74. Mr Palma recalled that level 1 datasets required the use of conversion factors to convert product weights to live weights, and to convert numbers to total catches using the mean size or weight of fish at a resolution provided by the catches at a particular scale. The data requirements and feasibility of achieving level 2 datasets needed to be carefully addressed due to the large workload and the complexity of such tasks.

75. Mr Barde noted that a workflow has been developed by IRD for level 1 and level 2 datasets based on conversion factors that deal with weight and numbers of fish. He also noted that in order to generate level 1 data, catches and the effort are required in order to analyse the time series.

76. Mr Yimin Ye (FAO) sought further information on the rationale for developing the concept of fishing fleet, and how this concept may be used in other applications such as FishStat and GRFS where the data are currently aggregated at country level.

77. Mr Fiorellato explained that earlier versions of the Tuna Altas had used the M49 standard country or area codes for statistical use (https://unstats.un.org/unsd/methodology/m49/) however there were peculiarities in the use of ISO-3 country codes in identifying countries and related entities, for e.g. France is both a Member of the EU, and a separate entity in relation to fisheries in its Overseas Territories. The TWG needed to find a way of modelling these peculiarities and the use of the fishing fleet addressed this requirement.

78. FSC12 also noted that the integration and sharing of information between the Tuna Atlas and GRSF may be feasible through the use of the systems' metadata. This possibility was further discussed under agenda item 4c.

79. Mr Caillot noted that the production of stage 1 and 2 datasets may be problematic for small organisations such as IATTC due to time constraints, and he welcomed proposals from IRD on how this may be achieved.

80. Mr Barde acknowledged the increase in workload and noted that the production of stage 1 and 2 datasets would also result in additional work for IRD. Further work needed to be undertaken by the TWG to explore viable solutions.

81. Mr Charef noted that the CWP intersessional meeting will be held on the from 2 to 5 November 2021 at which he will report on developments in the Tuna Atlas, including the implementation of the CWP Reference Harmonization standard. This use case will be of interest to the CWP community and producers of fisheries statistics.

82. Mr Fiorellato also presented recommendations brought forward from the core group, as follows:

- 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 and harmonization within future CWP data exchange formats.

- 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 or regional data exchange formats.
- That t-RFMOs support improvements in the production of Level 1 and 2 datasets through the direct provision of conversion factors and/or raised georeferenced catches (estimated, when necessary), both in numbers and weight, for the species of major interest.

83. Mr Fiorellato concluded his report with a table summarising the recommendations from TWG and the core group.

84. In further discussion, Ms Cummings suggested that these recommendations could be re-ordered in terms of importance so that FSC12 may focus further discussions on the most important recommendations, especially those on the draft exchange formats and data standards.

85. The recommendations, summary table and work plan for the Tuna Atlas were further considered under agenda items 6 (Decisions regarding e-TWG recommendations) and 9 (Intersessional work plan).

4c. Report of e-TWG on the Global Record of Stocks and Fisheries (GRSF)

86. Ms Cummings opened the session on the GRSF, noting that the main objectives of the GRSF are to provide unique identifiers for an improved and comprehensive stock status data coverage, which can help to achieve FIRMS' goal to facilitate the monitoring of the status and trends of all fishery resources. FSC11 endorsed placing the GRSF under its Governance umbrella. FSC12 was invited to review the status of development and the recommendations of the e-TWG on GRSF including future perspectives and proposed work plan. The proposed future work is further considered under agenda items 6 (Decisions regarding e-TWG recommendations) and 9 (Intersessional work plan).

87. Ms Cummings reported on the work conducted during the intersession period 2019–2021 including the outcomes of the e-TWG which met online 30 September 2021 and 1 October 2021 (FSC12/2021/4).

88. The e-TWG on GRFS was organized and delivered by the core GRSF group (FIRMS Secretariat, FORTH, SFP, and the Univ. WA delegation (UW)) to highlight to partners, observers, and other collaborators the work carried out on the GRSF during the intersession period and achievements, and additionally for TWG members to provide feedback and recommendations to the FSC12. Participants in the TWG included FAO, FCWC, GFCM, IOTC, ICES, SEAFDEC, SEAFO, SIOFA, and WECAFC, and the e-TWG on the GRSF was coordinated by Ms Cummings. Discussions were held over two days and included breakout groups which discussed aspects on IT interoperability, stock status and monitoring, and traceability. The TWG formulated recommendations for further evaluation and possible endorsement at FSC12.

89. GRSF has two technical objectives in support of two policy goals: 1) Register a comprehensive list of distinct stocks and fisheries as part of a global repository, 2) Federate knowledge on status and trends of stocks and fisheries across various sources, provisioning for key services to science stakeholders involved in "regional/global state of stocks indicators", and public and private actors involved in ecolabelling, traceability and sustainable fisheries. GRSF relies upon a strong partnership operating under the FIRMS governance umbrella.

90. Mr Gentile continued by presenting the history of the GRSF and introduced the key concepts on UUIDs, semantic identifiers and qualifiers (e.g. assessment unit, biological stock and management unit). He gave a live demonstration of the system, highlighting the use of the console, capabilities of the map viewer, competency queries, and web services (APIs).

91. Ms Nieblas highlighted that the GRSF allows for programmatic access through APIs for simple and advanced analyses of the data in the knowledge base. This may be done using competency queries, using the swagger interface and R APIs. Examples of recent GRSF investigations and analysis include:

- assessing NOAA's StockSmart database to assess data coverage;
- integrating new stocks reported in the SDG 14.4.1 questionnaire towards quality assurance, to stabilize national species lists, reduce reporting burdens via the integration of UUIDs (and stock identity information) in the next questionnaire, increase GRSF data coverage and investigate ways to improve GRSF area standards; and
- mapping GRSF assessment units to FAO's FishStatJ species by area stocks to increase granularity of stock information, assessing data for timeliness and duration of time series.

92. Ms Bracken van Niekerk (FAO, FIRMS Secretariat) presented the status of the GRSF database in terms of statistics on approved, archived and pending records and the way the UUIDs have been utilized within the different data sources (RAM, ICES, FIRMS, FishSource). As of 27 September 2021, the database contained records on 3 288 stocks and 13 527 fisheries, covering 1 211 species. About half of the stock records are pending validation, and a pilot release of around 100 fishing units has been done for demonstrative purposes.

93. Ms van Niekerk also reported on the status of the geographic coverage of the GRSF and the complementarity of the FIRMS, RAM and FishSource databases. The majority of records in the GRSF database are from the oceans and seas around Europe, Africa, North and South America, Australia and New Zealand, while areas in South Asia, South-East Asia, and the Pacific are not as well covered.

94. Ms Nieblas also reported on the results of the SDG 14.4.1 questionnaire relating to the data coverage of stocks, noting that the questionnaire may contribute new information on stocks to the GRSF. Work is underway to integrate the reference lists of stocks proposed by countries, and new stocks will be assigned UUIDs to collate new and existing data via a semi-automated workflow. The SDG 14.4.1 questionnaire represents an additional resource which may increase the geographic coverage of the GRSF.

95. Mr Taconet encouraged new organizations to join the partnership in order to expand *inter alia* the geographic coverage of FIRMS and GRSF. Candidate organizations include NPFC and WCPFC. Geographic coverage can also be increased through capacity building and improving data collections and information in data poor regions such as in Southeast Asian waters. In that regard, SEAFDEC participated in the TWG and may provide insight on how best to contribute regional data to FIRMS.

96. Mr Pattarapongpan stressed the need to develop collaborations on data collection, data analysis and information sharing in data poor situations.

97. Mr Taconet also noted that the information provided under the SDG 14.4.1 questionnaire was subject to confidentiality provisions. The stocks reported in these questionnaires will be provided with UUIDs; however time-dependent data will not be displayed in the reference list of stocks and priority species.

98. Ms Nieblas reported on further enhancements, which had been considered by the TWG regarding FishStat and GRSF, and how these systems may be complementary with GRSF providing increased granularity in data relative to FishStat. GRSF may also contribute other time-dependent data in addition to catches reported in FishStat.

99. Mr Taconet elaborated on further enhancements of traceability units in GRSF and improvements of standards. There was a need for a refined and unambiguous concept of "Traceability unit" (TU), where a "fishing area" is broken down between "Assessment area" and "Management area". Workflow generating TUs can build on the existing GRSF data model (Assessment units and Fishing units), while validation of TUs (including the new Management area field) will be performed by traceability business partners.

100. Mr Pattarapongpan noted the developments related to the traceability unit and enquired about the data requirements aboard fishing vessels. He noted that Thailand had tried to trace a stock back to vessel or fishing fleet level, however this was difficult to implement in data-poor fisheries which did not have clear data collection systems, and there was a need for further training.

101. Mr Taconet noted the need to communicate the difference between the traceability unit and traceability schemes, for example catch documentation schemes (CDS) and the data requirements, such as information about the fishing vessel, gear, flag state and species caught. Adding information on stock status through the use of UUIDs provided a new component of the value chain.

102. Mr Pattarapongpan noted that in the SEAFDEC region and in general all tropical areas where multispecies fisheries occur, data and subsequent stock assessments are often related to groups of species. He asked how traceability schemes are envisaged to operate in such fisheries and/or in cases where a single species assessment is not available.

103. Mr Taconet responded that this is an area that needs to be further discussed and proposed that this matter be considered during the next intersession period. In general traceability operates at the level of species, however flexibility would be required in data poor situations.

104. Mr Braddock Spear (SFP) noted that for multispecies fisheries, the intention is to be able to include this flexibility in order to capture the single species in multispecies fisheries. He explained that if the exact catches per species are not known, estimations of catch can be used, which should not prevent the users from entering multiple species data at a time. The development and testing of traceability units will include case studies from a variety of fisheries and regions, and the inclusion of a multispecies fishery would be welcomed. He used the example of blue swimming crab in the Philippines, whereby SFP have been in communication with the Philippines government, noting the value of the UUIDs which could improve data collection and the resolution of data. Mr Spear offered to further assist SEAFDEC on this matter.

105. In concluding the presentation, Ms Cummings highlighted the power and potential of the GRSF system, especially with enhancements from the SDG 14.4.1 questionnaire data and potential integration with FishStat. She recalled how the use of UUIDs can benefit Partners from a business perspective, and noted the need to reach out and streamline the data inputs.

106. During the presentation, Ms Cummings and Mr Taconet outlined twelve recommendations brought forward from the TWG. These recommendations are detailed in FSC12/2021/4 and outlined below.

107. TWG recommendation 1: Note that classifications of FIRMS stock as Biological, Assessment or Management Units are on-going and will require inputs or validations from FIRMS partners.

108. TWG recommendation 2: Recognition of the importance of the timely submission of updated stock status and fishery reports.

109. TWG recommendation 3: Incorporate FishStat in GRSF and further investigate how FishStat - GRSF relationships can improve global stock status analysis.

110. TWG recommendation 4: Continue working on the integration of SDG 14.4.1 data into the GRSF.

111. TWG recommendation 5: Develop approaches and standards for increased geospatial resolution.

112. TWG recommendation 6: Review the proposed Traceability Unit standard in conjunction with the planned revision of the SDG questionnaire.

113. TWG recommendation 7: GRSF data providers consider how to best complement each other in order to optimize data collection efforts of the Partnership.

114. TWG recommendation 8: Improve and simplify communication and develop guidelines on GRSF data requirements and the streamlining flow to SOFIA. Such could take into account the levels of knowledge on stocks (including data poor situations) to improve guidance to partners on data priorities and to optimize the efficiency of reporting (refer Annex 5 and also FSC12/2021/4 for further detail).

115. TWG recommendation 9: FIRMS Partners: a) Work towards adapting their data reporting on stocks towards such revised GRSF data requirements/guidelines; b) Present their ideas for the use of GRSF; c) Reach out to countries on the use of UUIDs, including for SDG14.4.1 purposes; d) Provide any contribution to the increased geographic resolution.

116. TWG recommendation 10: FIRMS Partners and collaborative Partners present their intended GRSF Content/data use to FIRMS SC for review and approval.

117. TWG recommendation 11: In terms of reaching out: a) Well clarify the concept of "Traceability unit" for further discussions with stakeholders; b) Reach out to external collaborators such as MSC to identify how using UUIDs can bring more knowledge on stock status including in data limited situations; c) Encourage the implementation of pilot field projects by FIRMS Partners for testing the use of GRSF UUIDs for traceability purpose along the value chain, so to inform on stakeholders and countries feedback on the matter.

118. TWG recommendation 12: Tailored training approaches be developed on GRSF including one-to-one meetings or workshops to better communicate on possible GRSF benefits according to the capacities of various partners.

119. The FIRMS Secretariat also proposed two additional recommendations: #13 Capacity building in data poor situations, and #14 *ad interim* GRSF data access and sharing policy.

120. The recommendations and work plan for the GRSF were further considered under agenda items 6 (Decisions regarding e-TWG recommendations) and 9 (Intersessional work plan).

5. SURVEY ON USE OF FIRMS BY PARTNERS, FOR STRATEGIC DECISIONS FOR 2020–30 DECADE (AGENDA ITEM 5)

121. Ms Cummings introduced this item noting that a survey on the current and prospect use of FIRMS by Partners is proposed with the objective to provide a basis for strategic directions for the 2020–30 decade, with considerations for short term (3–5 years) and longer-term (5–10 years) perspectives. The survey is planned to take place shortly after this meeting. FSC12 was invited to consider the elements of a questionnaire and discuss how to formally organize the review of the results.

122. Mr Taconet elaborated on the steps proposed to implement the survey and thanked participants at the meeting for providing initial feedback on FIRMS including through Partners' activities reports (agenda item 3b) and through active, individual interventions throughout the meeting. That information collected under various headings such as benefits (of FIRMS to Partners), weaknesses, enhancements, impacts and concerns (see Annex 7a) has been reviewed by the Secretariat and presented in a summary form to FSC12 (see Annex 7b). The Partners present at the meeting were given further opportunity to review and further contribute to these headings.

123. Mr Taconet also encouraged Partners who had not had an opportunity to contribute information to this initial feedback and wished to do so, to provide that information to the Secretariat shortly after this meeting.

124. FSC12 noted that the survey was primarily intended to reach out to Partners. In addition, some elements of the survey may also be used to canvas the broader community. In further discussion, FSC12 also noted that the survey questions and analysis would need to consider the positive and negative aspects of FIRMS from the point of view of individual partners, as well as from the collective view of the partnership. In addition, the survey would need to be developed in a way which avoided redundancies and confounding in the interpretation of the results.

125. Mr Taylor sought further information on how the survey results would be analysed, especially given the likely subjective-nature of some of the survey questions.

126. Mr Taconet noted that the usefulness or otherwise of certain aspects of FIRMS may be difficult to assess and this matter would be given further consideration during the development of the survey.

127. FSC12 requested that the Secretariat consult with Partners by correspondence during the development of the survey and that a dedicated meeting on this matter was not required.

128. The development of the survey was further considered under agenda item 9 (Intersessional work plan).

6. DECISIONS REGARDING E-TWG RECOMMENDATIONS (AGENDA ITEM 6)

129. FSC12 decisions are reported here and each decision (D) is identified by the FSC meeting, agenda item (a) where the matter was considered, and decision number (n) within that agenda item (i.e. FSC12/Da.n).

6a. Tuna Atlas

130. FSC12 reviewed the recommendations and future work on the Tuna Atlas proposed by the e-TWG (TWG7) and the core group (agenda item 4b). FSC12 decisions on these recommendations are recorded in the table below.

Recommendation	FSC12 supports the recommendation (Yes/No)	With comment
TWG7: #1 Endorse the use of the Fishing Fleet concept (to be aligned with CWP)	**FSC12/D4.1:** Yes	
TWG7: #2 Assign DOIs to individual datasets (Zenodo)	**FSC12/D4.2:** Yes	
TWG7: #3 Publish the map viewer and the metadata catalogue (asap)	**FSC12/D4.3:** Yes	
TWG7: #4 Adopt the draft data exchange format (in collaboration with CWP)	**FSC12/D4.4:** Yes	
TWG7: #5 Agree on the future update schedule (annual FIRMS data calls)	**FSC12/D4.5:** Yes	Reach out to non-present t-RFMOs with a proposed "workable date"
TWG7: #6 Reconvene the TWG	**FSC12/D4.6:** Yes	
TWG7: #7 Continue discussing data exchange standards and additional concepts (CWP)	**FSC12/D4.7:** Yes	
TWG7: #8 Support development of Level 1 and Level 2 datasets (conversion factors)	**FSC12/D4.8:** Yes	FSC12 support given in principle to the development with committed t-RFMO Partners. However, FSC12 is conscious of the need for a stepwise approach and Partners' difficulties in making firm time commitments to this work

6b. GRSF

131. FSC12 reviewed the recommendations and future work on the GRSF proposed by TWG7 (agenda item 4c) and FIRMS Secretariat arising from discussions during the meeting. FSC12 decisions on these recommendations are recorded in the table below.

Recommendation	FSC12 supports the recommendation (Yes/No)	With comment
TWG7: #1 Note that classifications of FIRMS stock as Biological, Assessment or Management Units is on-going and will require inputs or validations from FIRMS partners.	**FSC12/D4.9**: Yes	
TWG7: #2 Recognition of the importance of the timely submission of updated stock status and fishery reports.	**FSC12/D4.10**: Yes	
TWG7: #3 Recommendation to enable FishStat and Tuna Atlas content in GRSF and further investigate how FishStat - GRSF relations can improve global stock status analysis.	**FSC12/D4.11**: Yes	The Tuna Atlas was included based on FSC12 discussions
TWG7: #4 Recommendation to continue working on the integration of SDG 14.4.1 data into the GRSF.	**FSC12/D4.12**: Yes	
TWG7: #5 Recommendation to develop approaches and standards for increased geospatial resolution.	**FSC12/D4.13**: Yes	In agreement with Partners' data sharing policies (confidentiality, etc.)
TWG7: #6 Recommendation to review the proposed Traceability Unit standard in conjunction with the planned revision of the SDG questionnaire.	**FSC12/D4.14**: Yes	
TWG7: #7 Recommendation that GRSF data providers consider how to best complement each other in order to optimize data collection efforts of the FIRMS Partnership.	**FSC12/D4.15**: Yes	
TWG7: #8 Recommendation to improve and simplify communication and to develop guidelines on GRSF data requirements and the streamlining flow to SOFIA. Such could take into account the levels of knowledge on stocks (including data poor situations) to	**FSC12/D4.16**: Yes	

Recommendation	FSC12 supports the recommendation (Yes/No)	With comment
improve guidance to partners on data collection priorities and to optimize the efficiency of reporting. (Refer Annex 5 for full recommendation and table)		
TWG7: #9 Recommendation that FIRMS partners: Work towards adapting their data reporting on stocks towards being compatible with the revised GRSF data requirements/guidelines. Present their ideas for the use of GRSF. Reach out to countries on the use of UUIDs, including for SDG14.4.1 purposes. Provide any contribution to the increased geographic resolution.	**FSC12/D4.17**: Yes	Aims to reduce the duplication of data collection efforts across the data sources while (desirable) meeting various sources requirements, and to redirect collective efforts to regions with poor data coverage "Towards being compatible" relates to the need of Partners to consult their decision making bodies on the ways stock status information is disseminated
TWG7: #10 Recommendation that FIRMS Partners and collaborative Partners present their intended GRSF Content/data use to FSC for review and approval.	**FSC12/D4.18**: Yes	On ad-interim basis, pending validation, consolidation and evaluation of consistency of GRSF content, the use of GRSF remains under FSC control to avoid the use and dissemination of conflicting information on stock status; therefore user access to full content is currently restricted and when authorized, intended use is notified to FSC.
TWG7: #11 In terms of reaching out: Recommendation to well clarify the concept of "Traceability unit" for further discussions with stakeholders. Recommendation to reach out to external collaborators such as MSC to determine if using UUIDs can bring	**FSC12/D4.19**: Yes	

Recommendation	FSC12 supports the recommendation (Yes/No)	With comment
more knowledge on stock status including in data limited situations. Welcomes the implementation of pilot field projects by FIRMS Partners for testing the use of GRSF UUIDs for traceability purposes along the value chain, so as to inform on stakeholders and countries feedback on the matter.		
TWG7: #12 Recommendation that tailored training approaches be developed on GRSF including one-to-one meetings or workshops to better communicate on possible GRSF benefits according to the capacities of various partners.	**FSC12/D4.20**: Yes	
Secretariat: #13 Capacity building in data poor situations. Recognizing the contrasting capacities to participate for the different members, consider the best ways to mobilize capacities and resources in data poor regions (e.g., South-Asia) in order to bring more data and information on stocks. Such may include: - building collaboration towards long-term improvements in data collection as a starting point towards improving reporting in the region - creating an online questionnaire to assess how a FIRMS partner can work with FAO/FIRMS to report the stock status of some species by some "champion" countries whose national data collection have improved recently - identify and publish the research and/ or datasets supporting evidence on the status of fisheries and fishery resources. (Refer slide #45 PPT on GRSF)	**FSC12/D4.21**: Yes	
Secretariat: #14 ad-interim Access and Use of GRSF data and behavior of the GRSF system. (Refer Annex 6 for full recommendation and slide #46 PPT on GRSF)	**FSC12/D4.22**: Yes	"Behavior" relates to how the GRSF system authorises access to a single record, or bulk downloads which including many records

6c. FIRMS protocols and standards

132. FSC12 reviewed the FIRMS terminology and definitions for the jurisdictional distribution of fish stocks and types of maritime areas relevant to the Marine Resource and Fishery Information domains. Revision of this terminology had been advanced through an intersessional online consultation and during FSC12 (agenda item 4a and Annex 3). FSC12 decisions on this terminology are as follows:

- **FSC12/D4.23**: Jurisdiction Distribution and Marine Area type definitions were adopted for FIRMS reporting purposes. The agreed definitions will be added in the Annex of the FIRMS Information Management Policy (IMP) as draft guidelines.
- **FSC12/D4.24**: "Assessment Area", "Management Area" and "Management Unit" working definitions need further discussion during the intersession period, including consideration of Partners' practices relating to the use of management units/areas. As a result, definitions discussed during the meeting will not be included in the IMP for the time being.

133. Mr Campbell recalled the discussion under agenda item 4a and how various organizations use different definitions for management units and management areas.

134. An overview of NEAFC and ICES' practices relating to management units/areas is given in Annex 4.

135. Ms Fernández suggested including the "Assessment Unit" definition (already adopted in previous FSC) together with the working definitions of "Assessment Area", "Management Area" and "Management Unit" to facilitate Partners contributions to the working definitions.

136. Mr Taconet also suggested that "Traceability Unit" should be considered together with these working definitions for consistency.

7. FIRMS MEMBERSHIP – EXPANDING THE PARTNERSHIP (AGENDA ITEM 7)

7a. Prospective new FIRMS partners

137. Mr Taconet recalled that FSC11 had welcomed new Partners FCWC and SPRFMO in 2019 and that the partnership arrangements for these organizations had been completed during the intersession period.

138. The FIRMS Secretariat had also reached out to prospective new Partners CTMFM , NPFC and WCPFC during the intersession period:

- CTMFM had agreed to join the partnership and arrangements were currently being developed.
- NPFC had expressed interest in joining FIRMS however consideration of this matter had been postponed while the newly-established organisation worked on other matters. It was hoped that NPFC would consider the partnership during its annual Commission meeting later in 2021.
- WCPFC had expressed interest in joining FIRMS however consideration of this matter had been delayed during the pandemic. However, WCPFC had been involved *inter alia* in the intersession work on the Tuna Atlas.

139. Mr Taconet also recalled that other organisations (COREP, IPHC, IWC, NAMMCO, PSC, SRFC) had been contacted and invited by FSC in the past to join FIRMS and that the FIRMS Secretariat was available to offer further information and assistance to prospective partners.

140. Mr Taconet advised that the partnership arrangements for each new Partner would be shared, when available, with FIRMS Partners for information and review.

7b. Prospective new FIRMS collaborative institutions

141. Mr Taconet recalled that FSC11 had welcomed new collaborative institutions FORTH, IRD and SFP in 2019 and that the collaborative arrangements with these institutions had been completed during the intersession period.

8. REVIEW OF PROPOSED MODIFICATIONS OF EXISTING PARTNERS IN ANNEX 2 (AGENDA ITEM 8)

142. Mr Taconet recalled that the FIRMS partnership arrangement Annex 2 outlines the type of information which each Partner will contribute to FIRMS. The content of Annex 2 was useful in informing Partners of their respective contributions and in ensuring that these contributions were complementary. Where overlaps in Partners interests may occur, Annex 2 provided Partners' with an opportunity to resolve any potential conflict in sharing information with FIRMS

143. Mr Mauricio Ortiz (ICCAT) noted that ICCAT was in the process of revising its data policy and that this may result in consequential changes to ICCAT's Annex 2.

144. Mr Taconet advised that the FIRMS Secretariat was available to assist Partners in considering changes to their Annex 2 and to determine any action needed to modify or update a partnership arrangement.

9. INTERSESSIONAL WORK PLAN (AGENDA ITEM 9)

145. FSC12 discussed and agreed actions and an intersessional work plan for the Tuna Atlas. The actions and work plan are recorded in the table below.

Decision and recommendation	Action	Timing	Lead / Involved
During FSC12			
FSC12/D4.5 TWG7 #5	Agree on future updates' schedule	Referred to the intersession period for further consideration	t-RFMO data managers, / FIRMS Secretariat (for the data call), IRD
FSC12/D4.1 TWG7 #1	Adopt the "Fishing fleet" concept	Completed	TWG core group / FIRMS Secretariat

Decision and recommendation	Action	Timing	Lead / Involved
Intersession period			
FSC12/D4.2 TWG7 #2	1. Assign DOIs to GTA datasets (Zenodo)	By 15 Nov 2021	FIRMS Secretariat (E. Blondel), IRD (J. Barde)
FSC12/D4.3 TWG7 #3	2. Release the map viewer and metadata catalogue	By 15 Nov 2021	FIRMS Secretariat (E. Blondel, A. Gentile)
FSC12/D4.4 TWG7 #4a	3. Discuss of data exchange standards and new concepts at the CWP	By 5 Nov 2021 (CWP IS meeting)	F. Fiorellato, E. Blondel, A.Charef / CWP Members
NA	4. Outreach and communication	Between 15 Nov - 15 Dec 2021	FAO / t-RFMOs, IRD
	4a. NFI Webinar on Tuna Atlas and CWP Ref harmonization and press release		FAO / t-RFMOs, IRD
	4b. t-RFMOs outreach actions		t-RFMOs / FAO-FIRMS
FSC12/D4.6 TWG7 #6	5. Reconvene the e-TWG	Q2 2022 (tentatively)	F. Fiorellato, FIRMS Secretariat
	5a1. (under TWG) Adopt the ad-interim GTA data exchange format for future updates	Between now and the next scheduled update	TWG core group / TWG reference harmonization (CWP), t-RFMO data managers
	5a2. Develop a data-validation service in support of CWP reference harmanomization use cases (Tuna Atlas included)	Between now and the next scheduled update	FIRMS Secretariat technical team
	5a3. Develop a Tuna Atlas-specific data upload service	Between now and the next scheduled update	FIRMS Secretariat technical team
	5a4. Integrate the ad-interim Tuna Atlas format as part of t-RFMOs dissemination workflow	Between now and the next scheduled update	t-RFMO data managers

Decision and recommendation	Action	Timing	Lead / Involved
	5b. Develop a draft policy for assignment of DOIs across tRFMOs and FAO	2022	TWG core group / t-RFMO, FIRMS Secretariat
	5c. Under TWG: assess the work required and the preconditions to produce: 5c1. FIRMS Level 1 datasets (conversion factors); 5c2. Additional data (effort, LF); 5c3. assess ad-interim possibility to promote IRD Level 1/2 product from Tuna Atlas	Before the 2023 scheduled update	TWG core group / t-RFMO data managers, IRD
	5d1. Under TWG: document the workflow for reproducibility	2022 until next session	IRD - FIRMS Secretariat
	5d2. Code review for proper understanding of data processing	2022 until next session	IRD / tRFMOs

146. FSC12 discussed and agreed actions and an intersessional work plan for the GRSF. The actions and work plan are recorded in the table below.

Decision and recommendation	Action	Timing	Lead / Involved
FSC12/D4.9 TWG7 #1	Classification of FIRMS stocks as Biological, Assessment or Management Units is on-going and will require inputs or validations from FIRMS partners.	By end Q2 2022	FIRMS Secretariat / Partners /e-TWG
FSC12/D4.10 TWG7 #2	Timely submission of updated stock status and fishery reports.	intersession	Partners / FIRMS Secretariat
	2a. Work on streamlined flow between GFCM SAF and FIRMS/GRSF		GFCM
	2b. Work on simplified validation process		FAO article VI bodies
FSC12/D4.11 TWG7 #3	Enable FishStat in GRSF and further investigate how FishStat - GRSF relations can improve global stock status analysis.	By end Q3 2022	FIRMS Secretariat / FAO-NFISS, FAO-NFIFM
FSC12/D4.12 TWG7 #4	Integration of SDG 14.4.1 data into the GRSF	By end Q2 2022	FIRMS Secretariat / FORTH, FAO-NFIFM
	Reconvene e-TWG on GRSF	Tentatively Q3 2022	TWG convener / FIRMS-Secretariat
FSC12/D4.13 TWG7 #5	Under TWG GRSF. Develop approaches and standards for increased geospatial resolution	Starts Nov 2021 and reviewed by end Q3 2022	FIRMS Secretariat / Collaborators, Partners
FSC12/D4.14 TWG7 #6	Under TWG on Terminology: Review the proposed Traceability Unit standard, the management unit/Management Areas / Assessment Area, in conjunction with the planned revision of the SDG questionnaire	By end Q1 2022	FIRMS Secretariat, SFP / TWG members

Decision and recommendation	Action	Timing	Lead / Involved
FSC12/D4.19 TWG7 #11	Under TWG on Terminology: Outreach - clarify the concept of "Traceability unit" for further discussions with stakeholders	By end Q1 2022	SFP, FAO-NFIMV / FIRMS Secretariat, TWG
FSC12/D4.15 TWG7 #7	Under TWG on GRSF: GRSF data providers consider how to best complement each other in order to optimize data collection efforts of the FIRMS Partnership	Intersession	TWG convener / Partners, Collaborators
FSC12/D4.16 TWG7 #8	Under TWG on GRSF: Improve and simplify communication and to develop guidelines on GRSF data requirements and the streamlining flow to SOFIA a.The fields CPUE, Effort and Length Frequencies to be considered for addition in GRSF b. The 10 GRSF data fields to be regrouped into five main categories (Stock status, Abundance, Fishing pressure, Catch/ Landings) including a new category for Length data FIRMS Partners	Intersession	FIRMS Secretariat, FAO-NFIFM With interactions with TWG when appropriate and partners

Decision and recommendation	Action	Timing	Lead / Involved
FSC12/D4.17 TWG7 #9	FIRMS partners: a.Work towards adapting their data reporting on stocks towards being compatible with the revised GRSF data requirements/guidelines. b.Present their ideas for the use of GRSF c.Reach out to countries on the use of UUIDs, including for SDG14.4.1 purposes. d.Provide any contribution to the increased geographic resolution	Intersession	FIRMS partners FIRMS partners FIRMS partners / with assistance from FIRMS Secretariat FIRMS Partners
FSC12/D4.18 TWG7 #10	FIRMS Partners and collaborative Partners present their intended GRSF Content/data use to FSC for review and approval	Intersession when use of GRSF is intended	Partners, Collaborators
FSC12/D4.19 TWG7 #11	Outreach: 1. reach out to external collaborators such as MSC to determine if using UUIDs can bring more knowledge on stock status including in data limited situations	Activity to trigger by end Q3 2022	FIRMS Secretariat / Collaborators-SFP
	2. FIRMS Partners implement pilot field projects for testing the use of GRSF UUIDs for traceability purpose along the value chain, so to inform on stakeholders and countries feedback on the matter.		SFP, FAO-NFIMV \ other interested partners, FIRMS Secretariat

Decision and recommendation	Action	Timing	Lead / Involved
FSC12/D4.20 TWG7 #12	Tailored training approaches be developed on GRSF including one-to-one meetings or workshops to better communicate on possible GRSF benefits according to the capacities of various partners.	Intersession (at least 2 within Q2 2021)	FIRMS Secretariat
FSC12/D4.21 TWG7 #13	Capacity building, including in data poor situations - Currently on-going	Intersession	FIRMS Secretariat, FAO-NFISS / WECAFC, RECOFI.
	- Develop agreements (LoAs)	By 30 Nov 2021	FIRMS Secretariat / FCWC, SEAFDEC
FSC12/D4.22 TWG7 #14	Implement ad-interim Access and Use of GRSF data and Behavior of the GRSF system.	By end of 2021	FIRMS Secretariat / CNR-ISTI, FORTH

147. FSC12 discussed and agreed actions and an intersessional work plan for the revised FIRMS terminology and definitions for the jurisdictional distribution of fish stocks and types of maritime areas relevant to the Marine Resource and Fishery Information domains. The actions and work plan are recorded in the table below.

Decision	Action	Timing	Lead / Involved
FSC12/D4.23	Agreed definitions to be added in the Annex of the FIRMS Information Management Policy (IMP) as draft guidelines.	By end 2021	FIRMS Secretariat
FSC12/D4.24	TWG consultation regarding working definitions for “Assessment Area”, “Management Area” “Management Unit" and “Traceability Unit” and consideration of Partners’ practices related to these areas and units	Intersession	FIRMS Secretariat / Partners

148. FSC12 agreed to a survey on use of FIRMS by Partners (FSC12/D5.1) and associated actions and an intersessional work plan which are recorded in the table below.

Decision	Action	Timing	Lead / Involved
FSC12/D5.1	Develop the survey questionnaire	Q1 2022	FIRMS Secretariat / Partners
	Respond to the survey questionnaire	Q2 2022	Partners / FIRMS Secretariat
	Analyse and report on survey results	By Q2 2022 for mini session of FSC	FIRMS Secretariat

149. In agreeing to these decisions, FSC12 noted that some Partners were eager to further contribute to the work of FIRMS, however the general increasing workload of Partners sometimes makes allocating sufficient time to FIRMS activities difficult.

10. PLANNING FOR THE NEXT SESSION OF FSC (FSC13) (AGENDA ITEM 10)

150. Ms Cummings hoped that FSC would be able to return to its pre-pandemic meeting schedule with FSC13 meeting during May-June 2023, and TWG meeting during the intersession period.

151. Mr Taconet proposed that a mini session of FSC be held May-June 2022 to consider the results of the survey (agenda item 5) and develop strategic directions for FIRMS in the 2020-30 decade.

152. Following further discussion including under agenda item 12, FSC12 agreed to hold the following meetings.

- **FSC12/D10.1**: e-TWG meetings during the intersession period to progress actions in agenda item 9 (intersessional work plan).
- **FSC12/D10.2**: A mini online session of FSC in May-June 2022.
- **FSC12/D10.2**: FSC13 in May-June 2023, hosted by NEAFC in London, UK.

11. ANY OTHER BUSINESS (AGENDA ITEM 11)

153. There was no other business.

12. ELECTION OF CHAIRPERSON AND VICE-CHAIRPERSON (AGENDA ITEM 12)

154. During the meeting, Mr Taconet noted that Ms Cummings' term as Chairperson will end at the close of the meeting. Consequently, he sought nominations for a new Chairperson. Nominations for a Vice-Chair were also sought from amongst the partnership.

155. Mr Taconet noted the varying amounts of work involved in these roles, increasing during meeting times. Further, in pre-pandemic times, FSC meetings had often been hosted in or near the chair's headquarters.

156. Ms Cummings and Mr Gentile provided personal reflections on the development and achievements of FIRMS since it was launched in 2004. The partnership had matured and may now benefit from a FIRMS ambassador to enhance the partnership and promote FIRMS products such as the Tuna Atlas and GRSF. In addition, the partnership was growing and may well benefit from a FIRMS champion to lead and promote capacity development activities.

157. Mr Campbell recalled that he had indicated interest in the role of Chair or Vice-Chair during FSC11. He noted that he is neither a technical nor a legal person, but has experience in the international policy area and working with contracting parties and organizations.

158. Mr Taconet advised that Mr Dedi had also offered his services as either Chair or Vice-Chair. Mr Dedi was unable to attend the session when nominations were made, however his expertise in scientific matters and interest in capacity building were noted.

159. FSC12 was pleased to elect Mr Campbell as the incoming Chair and Mr Dedi as the incoming vice-chair, and participants showed their appreciation in welcoming the incumbents to their new roles.

160. FSC12 thanked Ms Cummings, as outgoing chairperson for her leadership, expertise and dedication to FIRMS during her term.

13. ADOPTION OF THE REPORT AND CLOSE OF SESSION (AGENDA ITEM 13)

161. The decisions and recommendations of FSC12 were adopted on 21 October 2021 and the report was finalized after the meeting and by correspondence.

162. In closing the meeting, Ms Cummings, on behalf of FSC12, thanked all participants for engaging in the work of FIRMS during the intersession period and during the meeting. FSC12 had discussed the progress made during the intersession period and developments in the Tuna Atlas, GRSF and FIRMS terminology, and set a work plan for 2021-2023. FSC was a powerful group which enjoyed great collaboration amongst individuals and Partners. While she was stepping down as Chairperson, Ms Cummings looked forward to her continued involvement in the work of FIRMS including coordination of e-TWG on the GRSF. Ms Cumming also thanked NOAA for providing in-kind support during her period as Chairperson.

163. Mr Taconet on behalf of FSC12 thanked Ms Cummings for her leadership of FSC since 2017. He praised her commitment and dedication to the work of FIRMS, and her ability to integrate topics under consideration and provide clear guidance during discussions. Mr Taconet also thanked Partners and other organizations for their ongoing commitment to supporting FIRMS. He also thanked FIRMS and FAO colleagues for their work during the intersession period and in support of FSC12.

164. The meeting was closed at 17.42 hours CEST.

ANNEX 1 – MEETING AGENDA

Day 1, Monday 18 October 2021
14.00 to 17.00 hours CEST

1. Opening session and Welcome address

2. Adoption of agenda (Doc. FIRMS FSC12/2021/1)

3. Review of FIRMS activities during the intersession
   a. FIRMS Secretariat Report on intersession activities (Doc. FIRMS FSC12/2021/2)
   A live summary report on follow-up to FSC11 recommendations will be delivered
   b. Partners progress/achievement Reports (Doc. FIRMS FSC12/2021/2a-q)
   Each Partner is invited to present its own report of activities, and to provide inputs on the use of FIRMS, benefits, weakness

4. Report of Technical Working Group
   a. Report of e-TWG7 on terminology (Doc. FIRMS FSC12/2021/5)
   FIRMS Information Management Policy (IMP) – FSC11 version (Doc. FIRMS FSC12/2021/6)
   TWG recommendations for final endorsement by FSC12.

Day 2, Tuesday 19 October 2021
14.00 to 17.00 hours CEST

b. Report of e-TWG on the Tuna Atlas *(*Doc. FIRMS FSC12/2021/3*)*
This new FIRMS information system developed under the BlueBRIDGE project allows exploring Tuna fisheries data at regional and global scales. FSC11 endorsed the Global Tuna Atlas under its Governance umbrella (See FSC 11 report http://www.fao.org/3/ca5247en/ca5247en.pdf and report of the Tuna sub-group of CWP-WG on Reference Harmonization http://www.fao.org/3/CA3132EN/ca3132en.pdf)
The meeting will review the status of development and the recommendations of the e-TWG including future perspectives and proposed workplan.

Day 3, Wednesday 20 October 2021
14.00 to 17.00 hours CEST

c. Report of e-TWG on the Global Record of Stocks and Fisheries (GRSF) (Doc. FIRMS FSC12/2021/4)
The meeting will review the status of development and the recommendations of the e-TWG on GRSF (Sept. 2021) including future perspectives and proposed workplan. Main objectives of the GRSF are to provide unique identifiers for a more comprehensive stock status data coverage, which can help to achieve FIRMS goal: "facilitate the monitoring of the status and trends of all fishery resources", FSC11 endorsed placing the GRSF under its Governance umbrella. (See FSC11 report http://www.fao.org/3/ca5247en/ca5247en.pdf and FSC10 report at http://www.fao.org/3/a-bs239e.pdf)

Day 4, Thursday 21 October 2021
14.00 to 17.00 hours CEST

5. Survey on use of FIRMS by Partners, for strategic decisions for 2020–30 decade
   A survey on the current and prospect use of FIRMS by Partners is proposed with the objective to provide a basis for strategic directions for the 2030 decade, with short term (3-5 years) and longer-term (5-10 years) perspectives. The elements for a questionnaire will be presented for partners to comment towards the finalization of such a questionnaire. The survey will take place shortly after FSCS12. The meeting will discuss how to formally organize the review of the results.

6. Decisions regarding e-TWG recommendations
   a. On the Tuna Atlas
   b. On the GRSF
   c. On the FIRMS protocols and standards
   Adoption of FIRMS controlled terms and updated definitions, as well as agreed protocols and workflow, for inclusion in FIRMS Information Management Policy as applicable.

7. FIRMS Membership – expanding the Partnership
   a. Perspective new FIRMS partners
   Invited: CTMFM, NPFC, WCPFC, CPPS, NAMMCO

   b. Perspective new FIRMS Collaborative Institutions

8. Annex 2- Review of proposed modifications of existing partners
   Annex 2 outlines Partner contributions to FIRMS under their Partnership Arrangement; where needed, Partners are invited to submit any proposed modification to their Annex 2 for consideration by FSC12.

9. Intersessional work plan
   Partners are invited to express their expected benefits for their contribution and participation to FIRMS, which will be considered for planning the activities.

10. Planning for the next session of FSC (FSC13)

11. Any other business

12. Election of Chairperson and Vice-Chairperson

13. Adoption of the Report and close of Session

ANNEX 2 – LIST OF PARTICIPANTS

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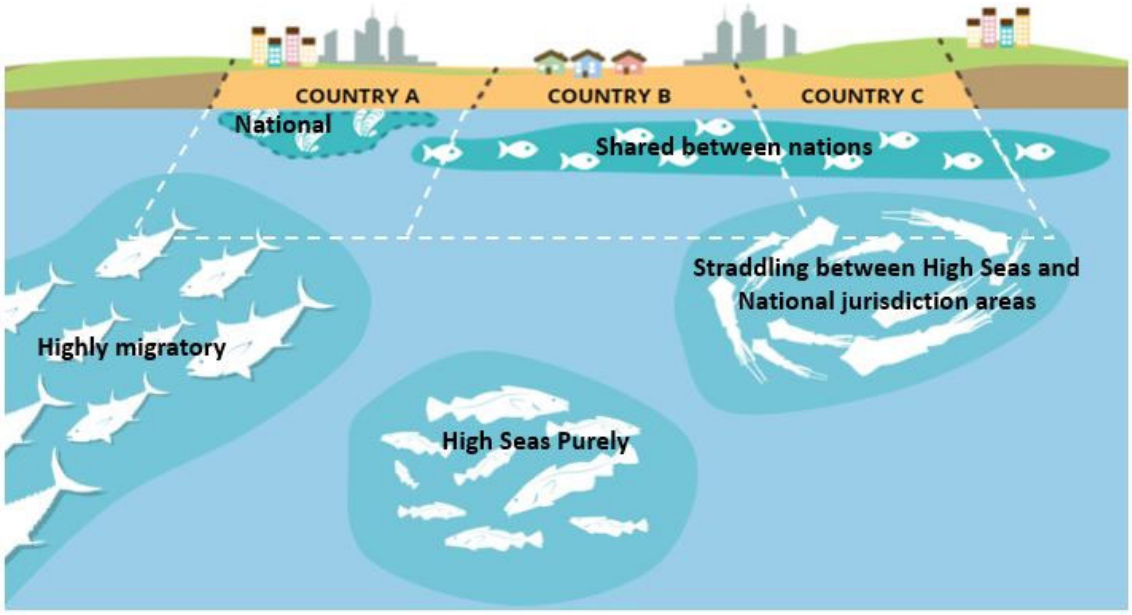
ANNEX 3 – FIRMS TERMS AND DEFINITIONS (ADOPTED DEFINITIONS)

Jurisdiction distribution and marine area types terms and definitions adopted for FIRMS reporting



Jurisdiction distribution diagram. Source: FIRMS FSC12 elaboration based on the FAO, 2020. eLearning course on SDG14.4.1. e-learning Academy

Jurisdiction Distribution terms and definitions

Jurisdictional Distribution of fish stocks
Adopted definition for FIRMS reporting
"Jurisdictional qualifier" (e.g. "national", "shared", "highly migratory", "high seas") of the marine resource or fish stock that describes to which extent and where its spatial distribution overlaps one or more maritime jurisdiction."
National
Adopted definition for FIRMS reporting
"Marine resource whose distribution is exclusively within National jurisdiction* areas."

Shared between nations
Adopted definition for FIRMS reporting
"Marine resource whose distribution overlaps the National jurisdiction* areas of two or more adjacent nations."

Highly migratory
Adopted definition for FIRMS reporting
"Marine Resource capable of migrating relatively long distances, which is likely to occur both within National jurisdiction* areas and High Seas. These are technically straddling stocks but given their peculiar characteristics they are often managed by specific management bodies, and are here kept as a separate category."
High Seas purely
Adopted definition for FIRMS reporting
“Marine resource purely in Areas Beyond National Jurisdiction”

Straddling between High Seas and National jurisdiction areas
Adopted definition for FIRMS reporting
"Marine Resource whose distribution overlaps National jurisdiction* areas and Areas Beyond National Jurisdiction".

**Under UNCLOS with regards to the sea, National jurisdiction includes internal waters, the territorial sea, archipelagic waters of an archipelagic State, the continental shelf, the 200 nautical mile Exclusive Economic Zone (EEZ).*

Maritime area types terms and definitions

Maritime area type
Adopted definition for FIRMS reporting
"Typology of maritime areas according to the type of rights and jurisdiction exerted by States in or over these areas"

High Seas
Adopted definition for FIRMS reporting
"All parts of the sea that are not included within the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State" (UNCLOS)

National waters
Adopted definition for FIRMS reporting
"The waters under the sovereignty or National jurisdiction* of a coastal State (internal waters, territorial sea, archipelagic waters, continental shelf, exclusive economic zone)**"

**Under UNCLOS with regards to the sea, National jurisdiction includes internal waters, the territorial sea, archipelagic waters of an archipelagic State, the continental shelf, the 200 nautical mile Exclusive Economic Zone (EEZ)*

***According to UNCLOS definitions*

EEZ
Adopted definition for FIRMS reporting
"Exclusive Economic Zone 200M from the territorial sea baseline and adjacent to the 12M territorial sea" (UNCLOS)

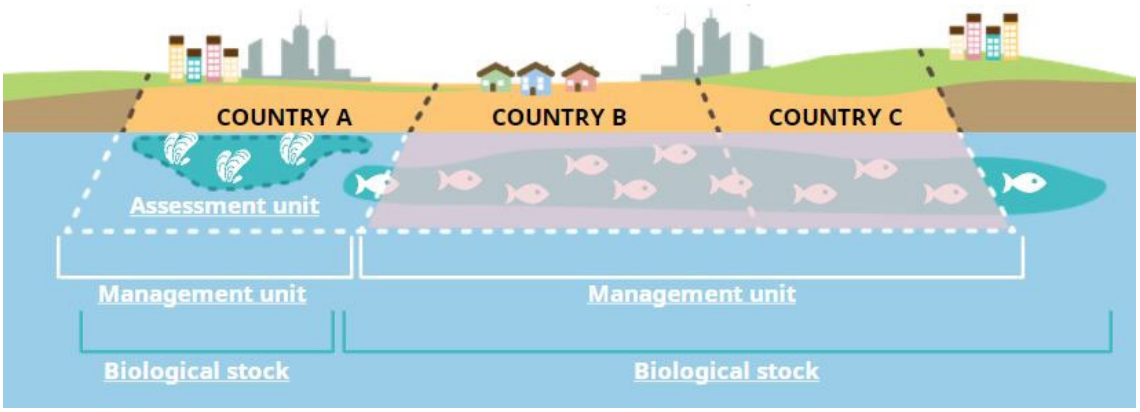
Territorial sea
Adopted definition for FIRMS reporting
“The zone of coastal waters extending at most 12 nautical miles from the baseline (usually the mean low-water mark) of a coastal state (UNCLOS)”

Archipelagic zone
Adopted definition for FIRMS reporting
“The waters enclosed by the archipelagic baselines drawn by an archipelagic State, upon which that State exerts its sovereignty, which extends to the air space and to the bed and subsoil and their resources (UNCLOS)”

National jurisdiction area
Adopted definition for FIRMS reporting
"All waters under National jurisdiction. Under UNCLOS with regards to the sea, National jurisdiction includes internal waters, the territorial sea, archipelagic waters of an archipelagic State, the continental shelf, the 200 nautical mile Exclusive Economic Zone (EEZ)."

WORKING DEFINITIONS FOR FIRMS

Proposed definitions for Assessment Area, Management Area, and Management Unit



Source: FAO, 2020. eLearning course on SDG14.4.1. e-learning Academy

Working definitions

Assessment Area
Proposed definition
"Geographical delineation/boundary* for the area over which the stock is assessed."

**Geographic boundaries based on statistical areas, ecological areas (e.g. LMEs, ecoregions), ICES functional units, etc.*

Management Area
Proposed definition
"Geographical delineation/boundary* for the area where specific management measures apply"

**Geographic boundaries based on RFB competence areas, Jurisdictional areas, species specific management areas (e.g. ICCAT), etc.*

Management Unit	
Original	Proposed definition
"The area where the fish was caught and which is targeted by a unique set of measures. This unit (i.e. one - or more - species in a particular area) has generally been defined at regional, national or local scale by a management authority including through stakeholder consultation."	"A group of individuals of one (or more) species in an area where the fish were caught and which is targeted by a unique set of measures. This unit has generally been defined at regional, national or local scale and includes information of the management authorities that set the measure including through stakeholder consultation."

Note: Management units may be used for setting the basis for stock status determination, and may not correspond to the biological stock.

ANNEX 4 – OVERVIEW OF NEAFC AND ICES PRACTICES RELATING TO MANAGEMENT UNITS/AREAS

During the discussion on working definitions (agenda item 4a), NEAFC and ICES shared their practices regarding the different approaches to Assessment Area, Management Area and Management Unit terms. Other Partners are invited to contribute to this overview.

Mr Campbell shared NEAFC procedures. Prior request from NEAFC, ICES as an independent advisor provides specific scientific advice on Assessment Units definitions.

The Rockall haddock Management Unit was described as an example. The stock is managed within a "box" by TAC and gear restrictions, following Recommendation 4:2021 on Conservation and Management Measures for Rackall Haddock in the NEAFC Regulatory Area (ICES 6b) for 2021. https://www.neafc.org/system/files/Recommendation-04-Rockall-Haddock.pdf

This fits within the ICES 6b area and an existing bottom fishing area under Recommendation 19:2014, but also delineates a "box" by reference to geographic coordinates, within which the restricted measures apply. This box straddles both international and national waters, and the fleet fishing the area/stock is not just one nation. Advice for the stock can be found in ICES https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2021/2021/had.27.6b.pdf

As another example of a Management Unit, Mr Campbel cited Recommendation (7:2021) on Regulatory Measures for the Protection of Blue ling in the NEAFC Regulatory Area (ICES Division XIV) from 2021 to 2023. In this case, area based measures are established to restrict bottom fisheries in order to protect spawning Blue ling.

For exemplifying NEAFC understanding of Management Area, Mr Campbell explained the case of mackerel, a widely distributed stock managed by NEAFC under Assessment Units defined by ICES. ICES Advice for Mackerel mac.27.nea (ices.dk) covers ICES subareas 1-8, 14 and Division 9.a (Northeast Atlantic and adjacent waters). The NEAFC binding recommendations for management of mackerel is Recommendation 20:2021 on Conservation and Management Measures for Mackerel in the NEAFC Regulatory Area for 2021, that sets out the overall catches for the stock of mackerel in the North East Atlantic (i.e. both ABNJ and EEZ). However, this Recommendation only refers to conservation and management measures in the Regulatory Area (i.e. ABNJ) rather than specifying ICES areas. In contrast, NEAFC Scheme of Control and Management does refer specifically to regulated resources being Mackerel in ICES areas 2a, 4, 5, 6, 7 and 12.

After sharing these examples, Mr Campbell shared how the terms would be understood for NEAFC fisheries:

> *Assessment Areas:* As defined by ICES in its specific advice on each stock.
>
> *Management Areas:* the effect of NEAFC binding recommendations on each stock and the binding NEAFC Scheme of Control Regulated Resources tables, which set out the ICES areas where the stock is regulated.
>
> *Management Units:* specific recommendations such as the haddock "box" or the blue ling recommendation.

Mr Campbell also explained that NEAFC has other recommendations, such as on redfish (*Sebastes mentella*), which are divided between those recommendations on the stock in the Irminger Sea and another recommendation on the stock in ICES areas 1 and 2. He suggested these are also agreements by management areas rather than management units, but showed doubts about how to differentiate between management areas and management units in these cases.

Ms Fernández shared two comments regarding the working definitions for "Assessment Area", "Management Area" and "Management Unit":

- As the terms "fish" and "stock" terms were changed by "marine resource" in Jurisdiction Distribution and Marine area types adopted definitions for FIRMS reported, Ms Fernández suggested applying the same criteria in the working definitions.

- The definition of "Management Unit" and its relation with "Management Area" were highlighted for further discussion. Referring to the "Management Unit" definition, Ms Fernández queried the beginning of the definition "*A group of individuals of one (or more) species…*" as it seems to reflect that a Management Unit represents a grouping based on biological information (genetics, tagging, etc.) while, on the other hand, the footnote in the definition states that "*Management Units may be used for setting the basis for stock status determination, and may not correspond to the biological stock*." Ms Fernández also noted that the working definition indicates that a Management Unit "is targeted by a unique set of measures", which could lead to all bycaught species (commercial or not) being excluded from this unit.

Following Ms Fernández comments, Mr Gentile brought into discussion the two examples of Sandeel Functional Unit and Norway lobster Functional Unit, asking Ms Fernández for further clarification about if those two FUs would be defined as Assessment Units, Management Units or both.

Mr Gentile further suggested, based on recent feedback from ICES, that the Sandeel Functional Unit would constitute an area itself, in addition to the other area codes defining the Assessment Unit. Following this criteria, the area codes for Sandeel (*Ammodytes spp.*) in Divisions 4.b and 4.c, and Subdivision 20, Sandeel Area 2r (Skagerrak, central and southern North Sea) would be:

<u>FAO Fishing Statistical Division Areas</u>

27.4.b	Central North Sea (Division 27.4.b)
27.4.c	Southern North Sea (Division 27.4.c)

<u>FAO Fishing Statistical Subdivision Areas</u>

27.3.a.20	Skagerrak (Subdivision 27.3.a.20)

<u>Other areas</u>

2r	Sandeel Area 2r - Eastern area

Therefore, the ICES advice would be issued against:

Assessment Unit: Sandeel (Ammodytes spp.) in Divisions 27.4.b and 27.4.c, Subdivision 27.3.a.20 and Sandeel Area 2r.

Assessment Area: 27.4.b + 27.4.c + 27.3.a.20 + Sandeel Area 2r

Finally, Mr Gentile noted that, following this ICES definition, measures applied (by NEAFC, EU, etc.) may refer to the same species/areas or group them in whatever other ways.

Continuing with the discussion, Ms Fernández shared the Fishing Unit definition (for *Nephrops norvegicus*) that can be found in the report from from WGNEPH (2002):

Functional Units, Management Areas and TAC Areas.

The Functional Units (FU) are defined by the groupings of ICES statistical rectangles given in Table 5.1.2 and illustrated in Figures 5.1.1, 5.1.2 and 5.1.3. The Functional Unit is the level at which the WG collects fishery data (quantities landed and discarded, fishing effort, CPUEs and LPUEs, etc.) and length distributions, and at which it performs analytical assessments.

Functional Units are aggregated into Management Areas (MA) (Table 5.1.1), the level at which the WG recommends management should take place. In the case of some northern stocks, TACs are set for large areas which encompass several MAs (e.g. North Sea), leading to actual and potential problems of management (see ICES, 2001a). In the case of the southern stocks considered at this year's WG, MAs coincide with TAC area.

Ms Fernández noted that an alternative or more streamlined definition could be needed, and offered further input from the ICES Data Centre.

For Sandeel areas, Ms Fernández drafted the following definition:

The North Sea sandeel was delineated into seven areas based on predicted larval mixing among fishing grounds using a biophysical model of larval exchange (WKSand, 2016). Larval mixing was used for delineation because the planktonic phase of the life history appears to account for most exchange among areas of habitat. The agreed sandeel areas constitute separate stock assessment units.

Following these inputs, Mr Gentile thanked participants for all received feedback, and noted that the Secretariat will further elaborate the proposals for definitions and share back with the Partners.

ANNEX 5 – GRSF RECOMMENDATION #8 – IMPROVE AND SIMPLIFY COMMUNICATION AND DEVELOP GUIDELINES ON GRSF DATA REQUIREMENTS AND THE STREAMLINING FLOW TO SOFIA

This recommendation would take into account the levels of knowledge on stocks including data poor situations to improve guidance to Partners on data collection priorities and to optimize the efficiency of reporting.

Proposed main data categories	Time-dependent indicators	Minimum reporting requirement		
		Main typologies		
		FIRMS Reports	RAM reports	SFP reports
Catch/Landings	Time series			
Stock Status Categories	FAO categories or FIRMS standard descriptors	When mapped		
	State and trends			
	Scientific advice			
Abundance	FIRMS standard abundance level	When mapped		
	Biomass time series			
	Biomass reference points			
	CPUE	In cases where essential or desirable data are missing, when available (data poor context)		
Fishing Pressure	FIRMS standard exploitation rate	When mapped		
	Fishing pressure time series			
	Fishing pressure reference points			
	Effort	In cases where essential or desirable data are missing, when available (data poor context)		
Length frequency	Time series	In cases where essential or desirable data are missing, when available (data poor context)		

Legend
Essential
Desirable

ANNEX 6 – GRSF RECOMMENDATION #14 – AD INTERIM ACCESS AND USE OF GRSF DATA AND BEHAVIOUR OF THE GRSF SYSTEM

1. **Publicly available data – only approved records, including:**
   a) Stock identities (stock name, UUID/semantic identifier, location/map, and info on available data) - available via Web interfaces and services as data dumps
      i. will include validated National SDG14.4.1 records
   b) Stock/fishery status, ...? , on a record-by-record query basis (e.g. via QR code)
   c) UUIDs integrated in Partners or external databases, disseminated as per these databases policies

2. **Restricted Access area upon granting authorization to users**
   a) Authorized users: all FIRMS Partners and Collaborative Partners (Ref. FIRMS FSC-TWG contacts)
   b) can access: time-dependent data from published sources available via Web interfaces and services as data dumps
      i. National SDG14.4.1 time-dependent data only available to relevant FAO staff
   c) should indicate to FSC (through the FIRMS Secretariat) their intended use, deemed accepted in absence of FSC's objection within a month from Secretariat notification
   d) Other users can be authorized in absence of FSC objection after a month FSC has been notified of the user and intended use by the Secretariat

ANNEX 7A – SURVEY ON BENEFITS (OF FIRMS TO PARTNERS), WEAKNESSES, ENHANCEMENTS, IMPACTS AND CONCERNS

Partner	Benefits	Weaknesses	Enhancements	Impacts	Concerns
CCAMLR					
CCSBT	The main benefit is having SBT information available to the general public in a global tuna resource.				
FCWC	Regular information sharing among members achieved through support with FIRMS				
FCWC	The outcome of this agreement is for FCWC to achieve the capacity to deliver the best science-based evidence available for decision makers and more broadly all stakeholders involved in the management of fishery resources. In particular: 1. strengthened capacity by FCWC and its Member States to maintain and disseminate FIRMS fisheries inventories, in line with CECAF-FIRMS policy; 2. strengthened capacity by FCWC to collate, manage and maintain a regional database of Catch and Effort at fishing units level; and 3. strengthened capacity of FCWC member states to submit such statistics on a regular basis, in ways harmonized and consistent with other reporting duties of these Member Countries.				

Partner	Benefits	Weaknesses	Enhancements	Impacts	Concerns
FAO					
GFCM	Exchange on respective experiences is enriching. GFCM may benefit from FIRMS GRSF in terms of improved visibility, in a worldwide context, of Mediterranean and Black Seas species related information as managed by the GFCM directly		GFCM advises the preparation of guidelines documenting good practices for the implementation of data flows from RFMOs to the FIRMS/GRSF and ultimately to SOFIA (e.g., required metadata, stocks descriptors and indicators). These should include both technical and general provisions (i.e., to ensure proper elaboration of inbound data and ensure timely inclusion in SOFIA)	GFCM is already considering the use of both unique identifiers and semantic IDs to improve stock assessment data management, hence there is a solid ground to streamline interoperability with the GRSF.	Timely provision of concerned data to FIRMS due to the GFCM workload throughout the year
IATTC	IATTC appreciates the advanced dissemination tools made available through FIRMS. IATTC users are redirected to GTA and FIRMS website. IATTC doesn't raise catches but is interested by exchange of experience and knowledge under FIRMS towards Level1 or 2. Use of harmonized reference standards within our products for interoperability and future data exchange.		Upgrade of the FIRMS portal to the new FIGIS platform with additional features such as an API to access fisheries and resources information. Looking forward to using DOIs for datasets and UUIs from the GRSF. Also interested in the implementation of a Data Collection Reference Framework.	Make our data available to a wider audience in a standardized way.	Provide data in a timely manner due to our workload, limited staff availability.

Partner	Benefits	Weaknesses	Enhancements	Impacts	Concerns
ICCAT	Work on standards contribute to our objective of tRFMOs harmonization	Progress necessarily slow due to limited time availability at Secretariat level, and need to follow process with ICCAT subsidiary bodies		Bring our data in a global context allows a broader view of species across the oceans. This include more small tuna species	Our commitment limited by time availability at Secretariat level
ICCAT	Streamlining/harmonizing makes our work more efficient				
ICES	ICES is incorporating Unique Identifiers to its fish and shellfish stocks for reduced ambiguity Connection with other Fisheries and Marine Science Organizations is enriching and contributes to steer public marine information databases.	Time available for ICES to contribute to FIRMS is limited. It will be beneficial to prioritize the future tasks to be undertaken by FSC.	UUIs to be added to ICES databases; the Stock Information Database and Stock Assessment Graphs database. Enhanced visibility of ICES work and products.	The inclusion of UUIs will contribute to the traceability of the marine resources assessed by ICES.	The current working patterns under COVID19 had resulted in most meetings being online. This increases flexibility but resulted in more FSC/CWP meetings scattered along the calendar, clashes with several other meetings and difficulty to focus in FIRMS work. Also the various time zones around the world do not help the efficiency of remote meetings.
IOTC	The IOTC Secretariat considers with favour the FIRMS GRSF and Global Tuna Atlas, and acknowledges their benefits in terms of increased outreach and visibility/use of the IOTC data and information in a broader global context.		IOTC to support production of Level 1 datasets (GTA) and include references to GRSF in factsheets	GTA used in IOTC FADs study, including for worldwide comparison (also allowed to save time in the analysis)	Time availability of IOTC staff to fully support future activities by the deadline

Partner	Benefits	Weaknesses	Enhancements	Impacts	Concerns
IOTC	The FIRMS Tuna Atlas helps set standards, modern ways to track data use (DOIs), and streamlining data exchange		IOTC to benefit from best-practices in metadata definition and DOIs attribution		Avoid proliferation of DOI-assigned datasets that refer to the same information (e.g., regular datasets from IOTC and harmonized ones for the GTA)
IRD	Now Level 0 processing is a global collaborative work with all 5 tRFMOs, which provides a more trustful platform for the subsequent data elaboration steps Workflow is more reproducible & robust, and better practices for data management	Slow progress; need to better plan and better define roles and responsibilities Data corrections and domain scripts still only reviewed by IRD More review required on Metadata	Need to proceed towards upper level of processing/ additional data (effort, size frequencies, conversion factors..) to better fit the needs of scientists / general public Data calls are essential for good planning		
NEAFC					
SEAFDEC					
SIOFA	Visibility and communications about SIOFA fisheries and data to the Public	SIOFA confidentiality rules and few vessels fisheries prevent many data disclosure	A previsional calendar would be a good thing to improve communication with FIRMS and to plan in advance the different actions to be done during the year	Participation to FIRMS has a small impact on Secretariat and SIOFA committee workload	None identified, besides the risk of disclosing confidential data which should be dealt by the SIOFA Secretariat
WCPFC	Happily contributed to GTA in our Observer role				

Partner	Benefits	Weaknesses	Enhancements	Impacts	Concerns
WECAFC	WECAFC considers the relationship will progress capacity building support and and Spearhead practice of information sharing, increased awareness of need and use of standards in data collection through operationalization of the DCRF, increased visibility of national resources through on-boarding of FIRMS inventories of fisheries and stocks, building capacity for stock evaluations at national/sub-regional and regional levels	slow uptake by most countries, require more capacity building to progress recognition of need for better sharing of information and long term benefits for improvements in stock evaluations at subregional and regional levels		Potential to advance more informed management through progressing quality and quantity of credible data based on accepted standards	
FIRMS Secretariat	Technology such as GTA can be reused for other Partners' catch/effort statistics	Some FAO bodies do not submit updates in a timely manner	Further improve data submission workflow Simplified internal validation processes for fact sheets	2 FAO Publications (AIS Atlas, and WECAFC transformation) made good use of Tuna Atlas GRSF UUIDs added in FishSource and RAM databases, some FIRMS partners expressed interests or intentions for integration	

ANNEX 7B – SUMMARY ANALYSIS OF THE CONTRIBUTIONS BY FIRMS PARTNERS ON BENEFITS / WEAKNESSES / ENHANCEMENTS / IMPACTS / CONCERNS

This table presents harmonized statements together with a count of their occurrences.

Benefits		Weaknesses		Enhancements		Impacts			Concerns	
	Count		**Count**		**Count**	**User processes**	**Science/policy**	**Count**		**Count**
Increased outreach/visibility of RFB Stats/Info in Web Global context	i	Slow progress, due to:		Guidelines for improved/consistent workflow from RFB through/to FIRMS/GRSF and ultimately SOFIA			Supported literature for science/policy	ii	Limited time availability of partner	iiii
FIRMS dissemination tools enable the RFB(s) to extend outreach services		Delayed timeliness, due to internal institutional processes, limited time availability	ii	Simplified internal validation processes			Potential to advance more informed management	i		
Increased authoritativeness of disseminated data (achieved through collaborative work and application of better practices for data management according FAIR principles)		Slow uptake due to insufficient capacity building resources	ii	New FIRMS dissemination tools to facilitate data submission and data access		Improved efficiency for data analysis		i	Coordination and planning is essential to mitigate the risks	i

Benefits		Weaknesses		Enhancements		Impacts			Concerns	
	Count		**Count**		**Count**	**User processes**	**Science/policy**	**Count**		**Count**
Enhanced accuracy of disseminated information on status		broad global undertaking	ii	Stepping into use of DOIs and UUIDs raise expectations (greater interoperability, enhanced data collection)	iii			iii	No concerns – participation in FIRMS has a small impact on Secretariat workload	i
Enriched by exchange of experience and data capacities		internal institutional processes	iii	Data calls essential for better planning	ii					
Improved efficiency for data exchange		limited time availability	ii	Increase spectrum of disseminated data Improve towards a user-ready product (GTA)	i					
Fostering information sharing among Members through inventories		insufficient planning	ii	What provisions for confidentiality rules	i					
Capacity building of Members in Statistics with focus on consistency/standards/harmonization										
Support to RDB harmonized to global standards on Catch/Effort										
Building capacity for stock evaluation at national/sub-regional/regional levels										

The Twelfth Session of the Fisheries and Resources Monitoring System (FIRMS) Steering Committee Meeting (FSC12) was held online from 18 to 21 October 2021. The FSC12 deliberated to proceed with the publishing of the Global Tuna Atlas developed with active contributions from the five tuna regional fishery management organizations (t-RFMOs), with the Global Record of Stocks and Fisheries (GRSF) towards validation of all records and their public dissemination, and with the integration of national Sustainable Development Goals (SDG) 14.4.1 data into the GRSF. The FSC12 also considered a survey on the use of FIRMS by partners for strategic decisions for the 2020–30 decade.

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