| FIRMS Technical Working Group Meeting |
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| Fifth Session |
| Rome, Italy, 29 February – 1 March 2016 |
| REPORT |
| Author: FIRMS Secretariat |

## EXECUTIVE SUMMARY

The fifth session of the Fisheries and Resources Monitoring System (FIRMS) Technical Working Group (TWG5) offered the opportunity to discuss the on-going activities and developments of the FIRMS Secretariat to the five members, two associated members and one observer organization that were represented (Food and Agriculture Organization of the United Nations [FAO], Fishery Committee for the Eastern Central Atlantic [CECAF], Western Central Atlantic Fishery Commission [WECAFC], Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Inter-American-Tropical-Tuna-Commission [IATTC], Northwest Atlantic Fisheries Organization [NAFO], South East Atlantic Fisheries Organization [SEAFO]; Organisation for Economic Co-operation and Development [OECD]).

In the introductory discussion on the future perspective of the FIRMS partnership it was highlighted: the need to recall and reaffirm the original commitment made to contribute to FIRMS, the need to be adaptive at regional and country level for specific purposes while satisfying the FIRMS mandate, the need of a strategic multi-disciplinary collaboration in order to harmonize objectives of multiple stakeholders. A recent example is in the deep-sea fisheries where FIRMS standards and methods can be exploited by FAO for updating that set of information.

The Technical Working Group (the TWG) recognized that the FIRMS Secretariat has initiated follow-up activities regarding the FSC9 decisions on: 1) timelier reporting of partners' contributions, 2) expansion of reporting coverage 3) responding to target audience needs with new appealing and friendly interfaces. In particular the TWG discussed the following activities:

i. Minimum data requirements to facilitate reporting to FIRMS and to streamline the workflow with Partner's established reporting procedures;
ii. FIRMS stocks and fisheries map viewer, a new web interface to ease access to information on stocks and fisheries;
iii. Dashboard of stock status indicators for regions - the traffic light approach based on FIRMS standards descriptors for state and trend;
iv. Overall collaboration and data provision to the Global Record for Stocks and Fisheries (GRSF) under the Horizon 2020 EU funded BlueBRIDGE (BB) project. This item was discussed jointly with the BlueBRIDGE colleagues in overlap with the BB-TWG meeting (1-2 March 2016).

Guidelines were provided to continue such activities during the intersessional period, and further interactions with partners will be held through TWG e-meetings.

The discussion on minimum data requirements for stocks highlighted the need to add catch data, when available, for being evaluated together with state and trend indicators.

The traffic light approach (which makes use of coloured icons associated to state and trend indicators) is expected to be operational in the coming months and activated upon partners' requests. A first public release of the stocks and fisheries map viewer is expected by the end of the year.

The discussion on the development of the Global Record of Stocks and Fisheries (GRSF) identified requirements for the development team; the data providers are expected to consolidate such requirements in the coming months and to drive the implementation. A list of activities is provided to drive the work in the next months.

Among any other business, a revision of the FIRMS brochure was submitted, feedback are expected from partners. Due to the resignation of Mr Neil Campbell (FIRMS chairperson) who left NAFO in March 2016, the TWG proposed to nominate Ms Nancie Cummings as chairperson and Ms Dayna Bell as deputy. FSC will be contacted and asked for final approval. Regarding the next FIRMS Steering Committee meeting (FSC10), it was proposed to be held in the WECAFC area and a Doodle poll will be made to investigate the partners' availability for May 2017.

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

1. The TWG fifth session (TWG5) was held at FAO headquarters in Rome, Italy, 29 February - 1 March 2016. The meeting was opened by Mr Marc Taconet, FIRMS Secretary, at 13.45 hours on Monday 29 and welcomed the meeting participants.

2. The session was attended by five members, two associated members and one observer organizations, the list of participants is provided in Annex 2. Explanations were provided for those partners that could not attend, some due to overlap in other meetings or training and some coping with funding constraints.

3. FIRMS members present:

   - Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR);
   - Food and Agriculture Organization of the United Nations (FAO);
   - Inter-American Tropical Tuna Commission (IATTC);
   - Northwest Atlantic Fisheries Organization (NAFO);
   - South East Atlantic Fisheries Organization (SEAFO).

   FIRMS associated members present:

   - Fishery Committee for the Eastern Central Atlantic (CECAF);
   - Western Central Atlantic Fishery Commission (WECAFC).

   FIRMS observers present:

   - Organisation for Economic Co-operation and Development (OECD).

   Members or associated members not present:

   - Commission for the Conservation of Southern Bluefin Tuna (CCSBT);
   - European Union (EU);
   - General Fisheries Commission for the Mediterranean (GFCM);
   - International Commission for the Conservation of Atlantic Tunas (ICCAT);
   - International Council for the Exploration of the Sea (ICES);
   - Indian Ocean Tuna Commission (IOTC);
   - North Atlantic Salmon Conservation Organization (NASCO) (new partner in 2013);
   - North East Atlantic Fisheries Commission (NEAFC);
   - Southeast Asian Fisheries Development Center (SEAFDEC).

4. FIRMS TWG5 Chairperson: Mr Marc Taconet was nominated as Chair with Nancie Cummings (as Vice Chair of the Steering Committee) to provide support to the Chair, assisting as needed.

## 2. ADOPTION OF THE AGENDA (AGENDA ITEM 2)

5. The agenda was reviewed, within the any other business section (agenda item 8) also added was a discussion item on the FIRMS brochure revision, the new FIRMS SC chairperson nomination and the proposal for the next FIRMS SC meeting (FS10). The agenda was adopted.

## 3. FUTURE PERSPECTIVES FOR THE FIRMS PARTNERSHIP (AGENDA ITEM 3)

6. Mr Taconet delivered a presentation on future perspectives for the FIRMS partnership. The FSC9 recognized FIRMS as a mature framework with strong foundations for global reporting on fisheries status and trends and noted that expectations were met from most of the partners. FSC9 has also urged the Secretariat to consider the following challenges: 1) need for timelier reporting of partners' contributions, 2) expansion of reporting coverage 3) respond to target audience needs with new appealing and friendly interfaces.

In response to the FSC9 request, this TWG meeting is expected to discuss and provide guidelines on the following activities: i) Minimum data requirements to facilitate reporting to FIRMS and mechanisms to streamline the workflow with Partner's established reporting procedures; ii) FIRMS stocks and fisheries map viewer, a new web interface to facilitate access to information on stocks and fisheries; iii) Dashboard of stock status indicators for regions - the traffic light approach based on FIRMS standards descriptors for state and trend; iv) Overall collaboration and data provision to the Global Record for Stocks and Fisheries (GRSF) under the Horizon 2020 EU funded BlueBRIDGE project.

7. Relating to the concern of expanding the reporting coverage, the following activities of the FIRMS secretariat were mentioned: attendance at the CECAF SSC7 meeting (Oct 2015) to re-engage the CECAF scientific commission and the countries for stocks and fisheries reports; the FIRMS-WECAFC Data workshop (Jan 2016) for initializing activities towards development of a regional data base for three pilot resources (conch, lobster, flying fish) in the WECAFC region, ; attendance at the CLME+ Project kick-off meeting (Jan 2016); and attendance at the GFCM SAC18 meeting (March 2016), to re-engage the GFCM scientific commission in further contributing with new updates.

8. "Dormant partners" were also noted - this was specifically addressed at FSC9 - however no definitive decisions were recommended beyond contacting them (e.g., DG Mare, NEAFC, SEAFDEC) with the aim to re-engage them in the current FIRMS activities as well as to obtain their data contribution. Mr Van Zyl also reminded the secretariat that the Benguela Current Commission (BCC) made request to join the partnership. Mr Sedzro (CECAF) pointed out that a continuing outreach activity is necessary to re-invite those partners who have indicated interest but not yet become committed.

9. The FIRMS target audience was discussed: i) Regional Fishery Bodies(RFBs) - to increase visibility beyond their area of competence - e.g., NAFO; to provide a dissemination capacity when no other dissemination mechanism exists - e.g.; CECAF; to foster information exchange in context where data sharing is a sensitive issue- e.g., RECOFI or would require long learning curve; to be functional to needs of Fishery Management Plans - e.g., WECAFC; regional dashboard of indicators for the State of environment - e.g., CLME+; ii) National agencies of governments dealing with fisheries reporting; iii) Analysts and instruments (e.g., Sustainable Development Goals (SDG) (SDG14.4) working on global monitoring of state of fishery resources; iv) NGOs promoting sustainable fisheries and keen to report on progress in fisheries management, and to promote traceability of fish products (e.g. Marine Stewardship Council (MSC), Sustainable Fisheries Partnership (SFP), Ocean Trust); v) General public, to whom fishery data should be made available in more immediate and easily understood forms.

10. In terms of FIRMS branding, FIRMS is promoted as a shared reporting and web-dissemination system as well as a data collation and sharing mechanism. Particularly in the WECAFC context, FIRMS has also been branded to encompass the function of a Regional DataBase supporting backbone of data collection (but not actually conducting the data collection- that is done by the countries) and analysis for stock assessment and to support adaptive fishery management in an EAF approach.

11. Mr Hinton (IATTC) noted that over time FIRMS purpose "*may have changed",* from the original intent in which the initial target were governments, the UN etc. demanding data and information from FIRMS partners (as data providers) thus more enabling partners in

the data provision capacity, now on the contrary it seems that FIRMS is aiming to provide services to the partners themselves.

12. Also, the technological aspect, at the time of FIRMS inception, there were advantages offered by FIRMS which today are less relevant due to the wide spreading of advanced IT technologies. To this end, it was anticipated briefly that FIRMS is endeavouring in new web services and semantic technologies which, once implemented, can be of great use by the partners. Including easing the burden of partner's reporting to FIRMS.

13. IATTC expressed appreciation on how the information is disseminated in FIRMS but also affirmed the need to attract and drive the audience to the IATTC website rather than in FIRMS. In this respect the fact sheets embedding capacities already offered by FIRMS were recalled to reutilize FIRMS products within the partners' websites.

14. Mr Ramm (CCAMLR) concurred with Mr Hinton about the change in focus in which RFBs are data providers rather than the primary audience. He also mentioned that one positive benefit is the increase of visibility of the RFBs at global scale when their information is posted in FIRMS.

15. On a question posed by Mr Ye (FAO) as to whether the 'environment' information was one objective for FIRMS to become more involved, the Chair clarified that the aim is to contribute to 'supporting' information as opposed to being a primary 'provider' of this type of content. Therefore contributing to the state of the marine environment with the component state of fisheries and resources.

16. Mr Ye also highlighted that FIRMS, being a global reporting tool on fisheries and resources status and trends, can be instrumental to the Sustainable Development Goals (SDG). In particular FIRMS can provide the RFBs' backbone to support a live monitoring of indicator SDG 14.4.1 "Proportion of fish stocks within biologically sustainable levels", for which the FAO Fisheries and Aquaculture Department is responsible. Ms Cummings (WECAFC) noted importance in tracking some of these SDG indicators for the wider Caribbean region as the economic dependencies are critical to understanding the total dynamics of the small island states (SIDS). Ms Cerasa (OECD) mentioned her organization's activities on dataset of fisheries subsidies which can be also of support to the SDG indicators.

17. Considering the small scale coastal fisheries (SIDS), IATTC noted that those fishermen contributes with small amount of catches with probably a low impact on the stock status and not significant to the target audience of IATTC. FIRMS acting at national level (NatFIRMS) can be relevant in that context. However, IATTC does have and funds outreach programs and provide some capacity to assist in monitoring, i.e., sending scientists to help collect data and analyze data (e.g., Pargo fishery in Panama thus expanding technical capacity). Another area of collaboration could be on sharks. The Chair recalled the Chimaera portal which combines three sources (FIRMS, StatBase, WIOFish) and it targets small scale fisheries in the Southwest Indian Ocean.

18. Mr Sedzro (CECAF) highlighted the need of financial and technical support to carry out activities in the CECAF area. The Chair recalled that FIRMS is contributing the information framework, and after a difficult period in West Africa now there are different opportunities to support stock assessment and working groups (EU, GEF, etc.). Mr Ye

(FAO) stressed out that so far FAO is monitoring 500 species globally but the new SDG system will require each country to report on this indicator, which is expected to be difficult since no funds are available and the SDG indicators are in fact very difficult to respond because of lack of capacity.

19. Ms Cummings (WECAFC) illustrated the on-going efforts involving countries and sub-regional organizations (CRFM, OSPESCA) of the WECAFC Caribbean region to develop a regional database with a minimum set of information in concert with collecting data for fulfilling FMP objectives, with conducting stock assessment and also by enabling FIRMS stocks and fisheries status and trends inventories. It was noted in the WECAF Caribbean region the existence of the political willingness through the CLME++ Strategic Action Plan (SAP) to synergize the efforts between multiple groups to improve data and information on stocks and fisheries.

20. Mr Sedzro indicated that also in the CECAF area there are sub-regional commissions (FCWC, COREP) and FAO should have a role stimulating the cooperation among the various entities including the countries. Mr Taconet mentioned a small component of a project with FCWC and FIRMS might provide its support. Also the recent mission of the FIRMS Secretariat at the CECAF SSC meeting provided an opportunity to stimulate countries, and in the follow-up new updates will be requested to those country representatives who attended the meeting.

21. In an exchange between Ms Ye and Ms Cummings it was clarified that the role of a reporting system is critical for the development of a regional database with the involvement of countries. Also this would contribute to conduct stock assessments and to produce FMPs. Ms Cummings also indicated that policy managers of NOAA, CRFM, OSPESCA are also possible target audience and are key to supporting data collection and management needs.

22. Mr Taconet suggested that some of the SDG objectives could fit for FIRMS, and with more cross-disciplinary capacities different aspects can be brought together, in the WECAFC example the FIRMS inventories are already a step into the regional database.

23. Mr Hinton highlighted that the return to RFBs in terms of data stored in FIRMS is negligible (for those bodies having a certain capacity), but the value is in the submission of information compliant with specific standards which were mostly developed during the TWG2 (2008) and refined during the following years. This partners' data submission (ultimately the FIRMS partnership) was initially envisaged to contribute to the General Assembly of the United Nations (UNGA) portfolio of available information, and COFI should be the right place where to reaffirm such needs and to get the proper recognition. FAO is also in connection with many other groups and the value of FIRMS standard information easy accessible should be put up-front in those relations.

24. Mr Ramm agreed that the primary audience for FIRMS are the UN and instruments such as SDGs. Secondary are Regional Organizations (e.g., RFBs) with their specific needs. The outstanding question is how do we encourage more partners, and how do we retain the Partners active in FIRMS. The partial answer from the Secretariat is the re-engagement process through regular interventions in RFBs committees, and the efforts to develop value added services (e.g., the Dashboard under development, the FIRMS stocks and fisheries map viewer, the WECAFC regional database).

25. In the wrap-up summary, the Chair highlighted the need to recall and reaffirm the original commitment made to contribute to FIRMS; the need to be adaptive at regional and country level for specific purposes while satisfying the FIRMS mandate; the need of a strategic multi-disciplinary collaboration in order to harmonize objectives of multiple stakeholders. A recent example is in the deep-sea fisheries where FIRMS standards and methods can be exploited by FAO for updating that set of information.

## 4. INVENTORIES MINIMUM DATA REQUIREMENT (AGENDA ITEM 4)

26. Mr Taconet introduced the agenda item by describing the overall objective of the discussion. Minimum data requirements are envisaged i) for an effective communication on stock state or fishery status at global level (also considering the FIRMS target audience); ii) to give proper guidelines in data poor situations; iii) to facilitate data submission and to reduce duplication of work and thus minimizing burden in reporting; iv) to enable automatic reporting based on a standard minimum set of information. There is a need to distinguish minimum requirements for stock or fishery identification, from minimum requirements for global level reporting. And beyond minimum requirements for global purpose, FIRMS can also accommodate specific needs for selected data collections or geographic regions.

27. In order to increase timeliness and coverage ratio, the FIRMS reporting template can be simplified by identifying the minimum information requirement for global level reporting. Partners can choose to contribute in a simplified manner with relevant, valuable and focused information, i.e., on stock state or fishery status. Links to source reports should be part of such minimum contribution so that users can always access the broader knowledge.

28. It was clarified that such approach is not aiming to exclude any partner being not able to report on some of the required information. Rather to identify the key elements the partners could focus on when reporting to FIRMS.

29. The discussion converged on catch information which is presently stored as numeric indicator within the fishery module (“Fishery indicators” section), and in the form of narrative in the marine resource module (“Exploitation” section).

30. Mr Ye indicated that minimum data needs for a quantitative evaluation of a marine resource is the time series of catch. State of stocks can also be provided through empirical approaches or expert judgement. Mr Hinton expressed his concern for potential changes in the data model and in requesting to partners additional work. It was clarified that no substantial data model modification is envisaged, rather adding in the Excel based inventory what is somehow already available in the marine resource fact sheets although in a narrative form. This would facilitate also those partners not reporting on fisheries because out of their mandate or due to lack of data.

31. From a communication view point, the ICES scientific advice was taken as example on how the dissemination strategy evolved across time, separating the advice ‘per se’ from

the scientific background information. Similarly, FIRMS is attempting a more effective communication according to the target audience.

32. Beyond the catch data, the full list of Fishery Indicators could be object of a TWG e-meeting for identifying other possible core information relevant to report at global level.

33. Links to exploiting fisheries, assessment method(s), and scientific advice were also considered critical for the marine resource inventory and could be submitted when available.

34. The new FAO terminology on state of exploitation was also tentatively discussed and the matter is more comprehensively addressed in the next agenda item 5.

35. Regarding Fishery minimum requirements, Mr Hinton stressed that what is essential is the total catch from stock, and whether species are target or non-target.

36. The group concluded that for stocks, minimum requirements concern the stock identification descriptors (as per current inventory requirements), and 'catches at stock level' and 'state of stocks' for the purpose of global reporting. Based on the TWG5 discussion, the Secretariat will prepare list of mandatory and recommended fields. For fisheries, the Secretariat will initiate the process which will also be fed by the GRSF developments.

## 5. TRAFFIC LIGHT APPROACH FOR THE FIRMS STATE & TREND STANDARD DESCRIPTORS

37. Mr Gentile introduced the traffic light approach giving a background on the development of the FIRMS state and trend standard descriptors, bi-dimensional indicator "Abundance level" and "Exploitation rate". Dating back to TWG2 (2008), FIRMS partners agreed to enter and disseminate their own indicators together with the standard ones, selected upon specific mapping rules established at each partner level. Some of the partners are utilizing only the standard descriptors. Initially, and for a long time, the standards were utilized only for the search interface and were not publicly displayed in the fact sheets. Finally, since FSC9, the standard descriptors are available in the fact sheets and coupled with the partners' indicators as appropriate.

38. The online TWG e-meetings TWG5.1 and TWG5.2 (July and December 2015) provided directions on how to associate visual indicators to the state and trend standard descriptors, the traffic light approach (red-yellow-green, grey for uncertain or not applicable). Mapping rules were configured and several tests were made and discussed.

39. Alternative and additional proposals made by FAO (one icon for each dimension) and CCAMLR (multiple icons per multiple indicators, trend icons) were also discussed and positively considered for later implementation. The single traffic light icon was however preferred for a more effective communication to the general public audience.

40. Mr Gutierrez (FAO) expressed his concern about different meaning of the colours according to the reference points of each partner. It was further clarified that the partners' indicators are mapped against the standards, then mapped to coloured icons according

to specific rules, elaborated and tested during the TWG e-meetings. See Annex 3 for final traffic light matrix. In addition it was also noted that the fact sheets allow textual information which can complement and provide more explanations on the selected state and trend descriptors and the traffic light icon.

41. Mr Hinton suggested to provide a facility over the red-yellow-green icon so users can click on it and get the full matrix to better understand from which combination the selected icon comes from. He also suggested to place the traffic light icon upfront in the fact sheet and on the right of the main descriptors. Keeping in mind the objective of a very simple message to a general public audience, and of transparency, the group agreed on that and the next TWG e-meeting will also elaborate a disclaimer to accompany the matrix.

42. With regards to FAO status of fishery resources, Mr Ye noted that these changed, and as explained in the State of World Fisheries and Aquaculture (2014), the new controlled terms are: “Overfished”, “Fully fished”, “Underfished”. See Annex 3 for the mapping rules applied to these new values. However for communication purpose FAO also adopted the two terms “Overfished” and “Not Overfished”.

43. The group agreed that at input level must reflect the three fundamental categories, taking into consideration FIRMS standard descriptors and their mapping to above FAO terms. For dissemination, the group agreed that two colours (green and red) will provide a simpler message, also considering that ‘Fully fished’ shouldn’t be in yellow. There was some discussion as to whether the two colours should be accompanied with the three input terms, or the two terms “Overfished” and “Not Overfished”. The group finally concluded on the latter.

44. Mr Taconet raised also the possibility to aggregate state and trend indicators at regional level based on the traffic light approach (i.e. with pie charts displayed over maps). This would require data consistency at regional level, a pilot example could be provided for further discussion. It was noted that such regional dashboard of indicators are also time dependant and this need to be considered when building an interface dealing with such type of information. In terms of data coverage, it was noted that not all marine resources under the mandate of the bodies are regularly assessed and this may lead to biased evaluations on aggregated indicators. Possible aggregations were also considered, e.g. by species, by main taxonomic group.

45. Mr Ye supported the view that users like to see aggregation by species for a region. The approach FAO has adopted for such aggregation is to weight each stock by its stock biomass. Across species, although it would make sense to take into account the importance of the stock by applying a weighting factor defined by its abundance or landings, it is more feasible (considering data availability) and biologically justifiable to go for a simple count by number of stocks as every species has the same importance in an ecosystem.

46. Mr. Hinton pointed on the need to also add the indicator of the percentage of stocks which are assessed in a region, since this is increasingly used to assess the performance of RFMOs (number monitored, number not monitored). The FIRMS comprehensive inventory approach would in principle enable to produce such indicator and the principle was supported by the group.

47. The group concluded that the FIRMS Secretariat will work to conclude the implementation of the traffic light icons and final discussions will be held through online e-meetings. Eventually the activation will be at partner/collection level upon data owner's clearance.

## 6. FIRMS STOCKS & FISHERIES MAP VIEWER (AGENDA ITEM 6)

48. Mr Gentile, Mr Carocci, and Mr Blondel (FAO) presented the Stocks and Fisheries Map Viewer, a new Web application which development is coordinated by the FIRMS Secretariat. This application was agreed at FSC9, a mock-up and a prototype were revised by the partners attending the TWG e-meetings TWG 5.1 and TWG 5.2. This new tool represents the follow-up to the recognized need of an enhanced interface with FIRMS data and information, ultimately easing the users' access to FIRMS content.

49. The Fisheries Map Viewer application is expected to display stocks, fisheries and other relevant layers in a given area, upon user requests. The interface is built to show maps and selected contents extracted from databases (e.g. reference data, geospatial information) and from the FIRMS fact sheets.

50. With regard to the continuum aspect between stocks and fisheries (see FSC7 report), the application is expected to provide ways to clearly visualize and navigate across the varying categories of resources and fisheries.

51. Colours and shape of the icons were asked to be sharper while reflecting clearly selected indicators. The mechanism for clustering resources and fisheries was asked to improve in its logic and functionality, where possible. When a search is performed the results list, could be combined with a filtered display of only those icons in the map relevant to the results. Export functionalities were also suggested, including cumulative information (e.g., analysis of all species). Pop-ups were generally found good, it was suggested that they relate resources to fisheries, and that they could provide coverage indication (i.e. how much the stock represent in terms of catch (or landing) or percentage of overall capture production.

52. Similarly to the Vulnerable Marine Ecosystem (VME) Database (http://www.fao.org/in-action/vulnerable-marine-ecosystems/vme-database/en), it was asked that the stocks and fisheries map viewer provides share link and embed capacities, for the Partners to use within their own sites.

53. Regarding the species distribution layers, it was clarified that FAO is maintaining that information under the FAO FishFinder program (http://www.fao.org/fishery/fishfinder/en). Updates and amendments can be requested anytime possibly by indicating relevant references. Other sources of information could be considered, e.g. Ocean Biogeographic Information System (OBIS).

54. With regard to the FIRMS branding, the Secretariat reported that the new application and the FIRMS website itself could fall under the new FAO web dissemination corporate policy, which implies a prominent presence of FAO identity elements. Beyond what was already affirmed at FSC9, the group also stated that the collective wisdom of 'multiple

partners' /laid the foundation of FIRMS, and this is critical to maintain and represent in any of the FIRMS products including the new map viewer and FIRMS brochure. The group affirmed that partners need to be consulted before any decision, not excluding the possibility to move the FIRMS website under other IT platforms and under other responsibilities.

55. Finally the group supported the release of the STOCKS AND FISHERIES MAP VIEWERonce finalized, and will note to the absent partners the release and relevant suggestions' as to future modifications worth considering.

## 7. GLOBAL RECORD OF STOCKS AND FISHERIES (GRSF) (AGENDA ITEM 7)

56. This FIRMS-TWG5 agenda item was discussed together with the BlueBRIDGE colleagues in a joint session with the BlueBRIDGE-TWG1 meeting (1-2 March 2016). FIRMS is one of the source of information for the Global Record for Stocks and Fisheries (GRSF), a task under the Horizon 2020 EU funded BlueBRIDGE project. Other data providers to GRSF are RAM Legacy Stock Assessment Database, and FishSource (owned by the Sustainable Fisheries Partnership). FishBase is potentially another complementing source of information. All data providers rely upon public data.

57. Mr Taconet welcomed the BlueBRIDGE TWG participants joining the FIRMS session. The schedule of the discussion on GRSF started jointly with FIRMS partners on Tuesday afternoon, and continued in the session of Wednesday morning with the participation of some FIRMS representatives being also member of the BlueBRIDGE TWG. More details are available in the BlueBRIDGE TWG1 meeting report and the list of additional Participants for this agenda item is provided in annex 2b.

58. Mr Taconet was elected as Chair for the BlueBRIDGE TWG and gave a presentation on the GRSF vision, objectives, and target audience.

**GRSF vision, objectives, and target audience**

59. The overall vision of the GRSF was presented and discussed, final version is: "an innovative environment supporting the collaborative production and maintenance of a comprehensive and transparent global reference set of stocks and fisheries records that will boost regional and global stocks and fisheries status and trend monitoring as well as responsible consumer practices".

60. The objectives for the GRSF were also discussed and finalised as follows:

A global platform:

i. For compiling and sharing stock assessment results and fisheries management data for all of the world's fisheries;
ii. To facilitate access to information on status & trends of stocks and fisheries;
iii. To offer services to compute regional/global state of stocks indicators;
iv. To offer services to public and private actors involved in ecolabelling, traceability and sustainable fisheries;
v. To foster improvement of data collection, assessment and governance (with guidelines) in data poor contexts;
vi. To improve visibility and quality of the data provided by the sources.

61. The potential audiences were identified: RFBs and their member states; Seafood industry (from suppliers to retailers); National agencies of governments dealing with fisheries reporting; Researchers and Officers working on global analyses on state of fishery resources; NGOs promoting sustainable fisheries; and eventually the General public; each audience will require own requirements, however existing source systems will act as gateways to their respective audience.

62. In terms of benefits, it was clarified that within the project time frame the organizations providing sources of information are the first beneficiaries. After that, if successful, other needs can be satisfied according to priorities with additional resources and in compliance with the GRSF overall vision.

63. While briefly describing the sources of information contributing to the GRSF, the RAM and the FishSource representatives highlighted the overall strategy to provide complementary information towards a global coverage while avoiding duplications. The stocks and fisheries, once uniquely identified would be associated with unique Identification Descriptors (IDs) which would be also functional for traceability purposes. Timeliness was also considered an important factor for the success of the initiative.

64. In terms of sustainability to support content updates, FishSource leverages on its industry sponsors, while RAM is funded through foundation grants and looks for teaming up with regional partners. FIRMS is supported by FAO's regular programme, and voluntary contributions from its Partners.

65. Other sources including Fisheries Linked Open Data (FLOD), iMarine Top Level Ontology (TLO), Geospatial databases, iMarine data (from providers) were mentioned for possible contribution to the GSRF. A pool of applications through GRSF could be instrumental as well, including COMET (mapping services), COTRIX (Code lists management), GRADE (FLOD maintenance), iMarine data mining and annotations capacities, MatWare.

**Data structure and GRSF overall logic**

66. A pre-meeting activity was carried out mainly by FIRMS and FishSource colleagues prior to this joint FIRMS and BB TWG to analyse and compare the data structure of the three sources (FIRMS, FishSource, RAM), and to formulate proposals for the GRSF overall logic (see meeting documents FIRMS/TWG5/2016/5a and FIRMS/TWG5/2016/5b). Results were presented by Mr Gentile.

67. The RAM Legacy Stock Assessment Database and FishSource are mostly compatible as to their data structure on stocks. In addition FishSource maintains also a fisheries database (seafood industry primarily oriented) which is mostly compliant with the FIRMS Fishery data model. Among main differences, the univocal relation in FishSource between a stock and its management unit(s) which is not the case for FIRMS. With the consequence that a FIRMS fishery may encompass more than one fishery in FishSource, and not all stocks in FIRMS have their exploiting fishery. Furthermore, FIRMS collect fisheries information from various approaches and viewpoints (including jurisdictional and socio-economic aspects) while FishSource is mostly oriented on fishing activities and the management unit type of fisheries.

68. Mr Gutierrez highlighted the possible nuance between a recognized stock and assessment conducted in specific areas which does not necessarily imply the identification of a stock. In this regard it was stated that the governing board of the GRSF should pay attention to cases like that for their inclusion in the database.

69. The GRSF Database will contain mandatory elements, optional elements and will be complemented by the extended knowledge base with information harvested in the data providers' websites. With this view a discussion on minimum data requirement was held identifying potential fields of the database for stocks and fisheries, see Annex 5 for details.

70. Standards will be identified for each field of the database, where possible it was recommended to adopt international classifications recognized and/or maintained by FAO (e.g. ISO3 country code, ASFIS 3-Alpha code, ISSCFG).

71. The Chair suggested to consider also the notion of environment which is particularly important for coastal fisheries. He also noted that the concept of management unit is not limited to a management authority, but also includes its area of competence.

72. Mr Ramm noted that fishery data for stock assessment or for management not necessarily include flag state information, and more in general information could be accessible in different resolutions according to data availability. Hence the need to identify the core elements of the database which will be then utilized for building unique identifiers (IDs). Participants concurred that fisheries information is so heterogeneous and dependent to many variables that the minimum data requirement should be kept as simple as possible.

**Unique identifiers**

73. Unique identifiers options were formulated and discussed. It was suggested to have human readable identifiers made of sub-components based on standard codes. The discussion on unique identifiers was associated to the criteria to uniquely identify stocks and fisheries. Mapping rules and algorithms may be supporting the process but it was noted that some human interventions with fishery competences are needed to finally approve and store a record in the GRSF.

74. Two options were presented: 1) separate identifiers differentiating stocks from fisheries based on the minimum requirement logic, 2) a minimal elements approach, a unique identifier applied at single species level, in fishing area(s), under a single management unit, including one geartype and one flagstate and specifying the type of production system. The option 2 is "species centric" and with growing information (sub-components of the unique ID) the record becomes a stock then a fishery, or multiple fisheries. It was noted that the second option would be too "market oriented" and would not cover some fisheries inventories under different viewpoints than the management unit/fishing activities. Nonetheless, a mechanism to flag sub-sets of unique identifiers for traceability purpose should be provided in the GRSF and offered as web service. See Annex 6 for details on the two options.

75. After further thoughts and building upon option 2, the Chair presented a scenario that explained how FIRMS stocks and fisheries would be processed against the unique

identifiers that would also allow reconciling various expectations and approaches to stocks and fisheries definitions. The process starts with the generation of a set of traceability UUIDs from the source records, enables the discovery of related source records which share similar traceability UUIDs, highlights the need for a verification process before validating the generated traceability UUIDs, and suggests the need for a mechanism to cluster stock or fishery records from various sources perceived to describe the same entity ("UUID perceived"). See Annex 6b for the scenario presented.

76. From an IT view point, Mr Viparthi (FAO) highlighted the importance to maintain consistent coding with no mixed characters and formats, and that long strings are however difficult to read. In case of missing data, relevant information need to be substituted with "not applicable" standard code for consistency across the system. Finally the unique identifier will be expressed in form of a Uniform Resource Names (URN).

77. In case of fisheries targeting multiple species, it was debated if this would generate multiple records in the GRSF. A clustering option was also considered to keep together records of the database with similar core components. The discussion remained open and the GRSF team will further analyse the matter and propose solutions.

78. Mr Spear (FishSource) pointed out that currently there are no global standards that industry can adopt for defining a fishery. This work on unique identifiers and the services offered by the GRSF would be very helpful with multiple functions (research, management, certification, etc.).

79. Mr Lefebure (MSC) evidenced the need of proper definitions for the terms which the GRSF will utilize, also to avoid confusing end users. He also recognized the need of building new logic for the traceability purpose since so far this is not figured out in the sources of information.

80. Mr Melnychuk (RAM Legacy Stock Assessment Data Base) noted that geospatial information would be relevant to some stakeholders including differentiating real stocks distribution from local/specific management areas.

81. Expected activities to complete the work on this topic are: i) Standards identification for each code system, ii) Fisheries eligibility criteria to enter the GRSF are to be finally determined, iii) Logic for machine readable internal UIDs, iv) Logic for human readable UIDs - Specific activation for traceability purposes (coupled with labels - full names of stock or fishery).

**Content Management System (CMS)**

82. Mr Gentile delivered the section of the GRSF presentation on Content Management System (CMS). The CMS should enable authorized users to approve or reject the draft records in the GRSF database, to handle the publishing workflow, and to flag for traceability purposes when appropriate.

83. About standards and data editing through the CMS, it was clarified that so far the idea is that the knowledge base - built by harvesting the three sources of information (FIRMS, RAM, FishSource) - produces stock and fisheries records which can be ultimately approved and published but not altered.

84. While at first the CMS will be designed for providing services to be consumed by external systems, the Chair put in evidence that in a possible second phase the CMS may enable a user interface with the goal to foster data collection: enabling users to find data possibly with the involvement of additional sources (e.g. FishBase), and enabling other stakeholders to submit new information.

85. For the administration of the CMS it was stated that this is an issue to be elaborated within the discussion on governance, and however should be handled by officers with adequate competencies appointed in agreement with the data owners. Options are part time persons from the three sources working together, or a separate entity that makes decisions on behalf of the sources.

86. In conclusion the CMS in phase 1 will not enable a specific public user interface but it will provide webservices and a utility site for data providers. The following functions are envisaged for the CMS: i) Approve-Reject incoming records; ii) Publishing workflow; iii) Manage code lists and mapping; iv) Activate traceability unique identifiers.

**GRSF Knowledge Base**

87. The GRSF Knowledge Base is built harvesting information in the source databases. With three levels of knowledge: i) For feeding the GRSF core repository; ii) For accessing content of the entire source datasets; iii) For accessing content stored in the PDF/HTML of the referenced information. Users can explore content against competency questions, also to get information which would not have been obtained by interrogating separately the single sources.

88. Mr Minadakis (FORTH) presented the “Knowledge Base for Global Registry of Stocks and Fisheries“. He ran through the construction process with semantic technologies, the possible integration with the iMarine top level ontology, and the progress made so far. The list of key elements of the GRSF database and the mapping rules among the three sources elements need to be finalized to finally build the GRSF knowledge base.

89. Mr Pasquale Pagano (CNR) expressed concern about the deployment architecture and invited to set specific meetings to proper design the components and their relationships. The use of MatWare owned by FORTH needs also to be clarified since, a priori, it is not an open source software.

90. Mr Taconet introduced the main concepts of the Extended Knowledge Base, how this encompasses, beyond the core data requirements, all other data fields and information accessible from the sources of information stored in the GRSF database. This extended information can be partially structured in order to accurately respond to most commonly identified competency questions. The Chimaera project and its website are examples how it could work. Among lessons learned from that development there were mentioned the importance of dealing with well-structured information for good indexing (including at PDF level), with well-defined data sharing and access policies, and with ensuring proper visibility to partners by offering easy access to the owners’ websites for accessing original documentation.

91. FishSource was reminded to provide means to access its database, and this will be accomplished while completing the renewal of the FishSource website. The final list of

key elements will also enable the FishSource developer to expose the appropriate web services.

92. The Chair recalled the scanning process of the PDF files stored in the data owners' websites to feed the extended knowledge base which would be exploited by users through a set of competency questions. The draft list of such questions is available in the GRSF Wiki and will be further discussed and completed. CCAMLR and NAFO were invited to contribute to this activity as data provider as well as tester.

93. For better communicating what is the Extended Knowledge Base and for verifying the consistency of the relations, a browsing facility was deemed critical and FORTH was invited to provide it.

**Governance and Sustainability**

Mr Taconet introduced the matter on governance and sustainability by discussing principles inherent to the following aspects: i) Content governance (data policy for access, managing and dissemination, citation, terms of use, ownership and infringements); ii) System governance (software policy, storage, data preservation, VRE management); iii) Data sharing policies (formats, interoperability, protocols, open data); and iv) Sustainability business model.

94. For content and system governance:

- Sources - maintained by contributing partners
- Data sharing artifacts (master data, mappings, ontologies) – managed by the 'GRSF Secretariat' (to be defined)
- Core system - under iMarine general Governance
- Interoperable bridges – under source systems responsibility
- GRSF specific tools (Master Data Management, Ontology, LOD) – under GRSF specific provisions

95. The data sharing policies can be formulated along the work done for the iMarine Data Access and Sharing Policies which support the data sharing among different contributors. Extension to these policies can be elaborated as required for the GRSF VRE.

96. Regarding the sustainability business model, the iMarine White Paper was described as a possible approach envisaging a public-led Partnership, MoU's to operationalize collaborations, and a core legal entity.

97. In general a vision for sustainability includes in-kind inputs, sponsors, membership fees, subscription fees, pay-per-use. It was noted the possibility to attract sponsors if the GRSF will offer reliable content and services. I.e. Mr Spear mentioned a potential use of a fisherman wanting to submit a product into the system which can be validated or not according to the availability of that specific stock/fishery.

98. The Wiki will be used to regularly collect all the feedback and discussions around this topic to mature ideas and strategies which will enable the sustainability of the GRSF database after the end of the BlueBRIDGE project.

**GRSF Workplan**

99. The following list of activities matured during the GRSF discussion and was presented at the BlueBRIDGE Advisory board meeting (Friday 4th March 2016).

Data providers

- Finalize matching strategy for single stock/fishery across data providers
- Finalize criteria of eligibility for GRSF inclusion
- Finalize requirements and standards for GRSF content
- Compile requirements for the Content Management System
- Formulate competency questions (users oriented searches)
- Compile Wiki pages on governance and sustainability issues, and recommendations
- Provide guidelines to access information through application of semantic harvesting and mining technologies (3rd level of GRSF KB)

Developers

- Design applications architecture and identify the software components and actors
- Build the GRSF knowledge base - Master Data Management - CMS - Web services, etc. according to above design

## 8. ANY OTHER BUSINESS (AGENDA ITEM 8)

100. FIRMS Brochure: Mr Hinton kindly volunteered for a first revision of the FIRMS brochure, see the new draft text in Annex 4. Partners are kindly invited to provide comments within a month starting from the circulation of this report. NAFO confirmed to digitalize the new content assembled with images once this will be finalized and translated.

101. New Chair: Mr Neil Campbell left NAFO in March 2016, the TWG proposed to nominate Ms Nancie Cummings as chairperson and Ms Dayna Bell as deputy. FSC will be contacted and asked for final approval.

102. Regarding the next FIRMS Steering Committee meeting (FSC10), it was proposed to be held in the WECAFC area and a Doodle will be made to investigate the partners' availability for May 2017.

103. Mr Gentile is further invested with secretariat responsibilities (FIRMS Secretary delegated) since Mr Taconet needs to cover ad interim also the CWP Secretariat.

**ANNEX 1**

**Meeting agenda**

| |
|---|
| **FIRMS Technical Working Group Meeting** |
| **Fifth Session** |
| **Rome, Italy, 29 February and 1 March 2016** |
| **ANNOTATED AGENDA AND TIMETABLE** |
| **Author: FIRMS Secretariat** |

***Meeting place: FAO HQ, India Room A327***

**DAY 1, MONDAY 29-02-2016**

FROM 13:45 HOURS TO 17:30 HOURS
COFFEE BREAK: 15:30-15:50

1. **Opening session and Welcome address**

2. **Adoption of agenda**

3. **Future perspectives for the FIRMS partnership**

   *Ten years passed, what next? FSC9 (Feb. 2015) recognized that FIRMS had built strong foundations for global reporting on fisheries status and trends and that it had met expectations of most partners. FSC9 has also urged the Secretariat to cope with the following challenges: a timelier reporting of partners' contributions; expand reporting coverage; respond to target audience needs.*
   *With a bottom-up approach, TWG members are invited to discuss these topics and propose specific actions, also considering the ongoing activities listed hereafter.*

4. **Inventories minimum data requirement**

   *In order to increase timeliness and coverage ratio, a general consensus is required on identifying the minimum information requirement for global level reporting so that partners can choose to contribute in a simplified manner with relevant, valuable and focused information, i.e. on stock state or fishery status. Links to source reports should be part of such minimum information contribution so that users access the broader knowledge.*

*TWG members are invited to evaluate the proposed identified inventory fields as minimum data requirement.*
*Wiki documentation (Login required):*
*http://figisapps.fao.org/FIGISwiki/index.php/FIRMS_Minimum_Data_Requirement*

**DAY 2, TUESDAY 1-03-2016**

ALL DAY: 09:00 HOURS TO 17:30 HOURS
COFFEE BREAKS: 10:40-11; 15:30-15:45
LUNCH BREAK: 12:30-13:45 HOURS

## Tuesday morning (09:00 – 12:30)

### *5.* Traffic light approach for the FIRMS State & Trend standard descriptors

*Following the display of the FIRMS State and Trend standard descriptors together with the partners' indicators (approved as FSC9/D7.1 and implemented on April 2015), during FSC9 it was also agreed to move towards the "traffic light approach" where possible (approved as FSC9/D7.2). TWG 5.1 and 5.2 discussed the proposal and provided guidelines on its implementation. The secretariat implemented the underlying logic for the colour scheme and examples are provided.*
*TWG members are invited to evaluate the scenario proposal and the examples for final discussion; and to provide guidance for aggregated regional summaries based on traffic light.*
*Wiki documentation (Login required):*

*Proposal:*
*http://figisapps.fao.org/FIGISwiki/index.php/FIRMS_Fishery_Resources_Standard_descriptors_for_State_and_trend#Traffic_light_approach*

*Discussion:*
*http://figisapps.fao.org/FIGISwiki/index.php/Talk:FIRMS_Fishery_Resources_Standard_descriptors_for_State_and_trend#Traffic_light_approach*

### 6. FIRMS Stocks & Fisheries map viewer

*The development of the FIRMS Stocks & Fisheries map viewer is related to FSC9 decision D9.4, in the context of renewing the FIRMS website. The initial discussions took place at TWG4 and FSC9, a mock-up and a first prototype were discussed at TWG 5.1 and 5.2.*
*TWG members are invited to evaluate the prototype and to advice for further development. They are also invited to propose other FIRMS website improvements.*
*Wiki documentation (Login required):*
*http://figisapps.fao.org/FIGISwiki/index.php/Renewing_the_FIRMS_website#Stocks_.26_Fisheries_map_viewer*

**Tuesday afternoon (13:45 – 17:30)**

7. **Global Record of Stocks and Fisheries (GRSF)**

*The GRSF is a task (5.2) of the work package Blue Assessment within the BlueBRIDGE project. The overall vision is: "an innovative environment supporting the production of a comprehensive and shared global reference set of stocks and fisheries records that will boost regional and global environmental status monitoring as well as responsible consumer practices".*

*TWG members are invited to evaluate the scenario proposal in the interest of FIRMS partnership.*

*This session is overlapped with the BlueBRIDGE TWG meeting (Tuesday afternoon 1 March – Thursday morning 3 March). The following topics will be discussed:*

- *Overall vision of the Global Record of Stocks and Fisheries (GRSF)*
- *Objectives GRSF (Task 5.2)*
- *Identifying the nature of GRSF*
    - *List of key concepts/data fields of the 3 sources of information FIRMS, RAM, FishSource and relationships*
    - *Comparison of list of stocks (pilot cases)*
    - *Unique identifiers*
    - *Code lists and ontological representation*

8. **Any other business**

## Joint FIRMS TWG-5 - BlueBRIDGE TWG-1 meeting

**DAY 3, WEDNESDAY 2-03-2016**

ALL DAY: 09:00 HOURS TO 17:30 HOURS
COFFEE BREAKS: 10:40-11; 15:30-15:45
LUNCH BREAK: 12:30-13:45 HOURS

**Wednesday morning (09:00 – 12:30)**

**9. Global Record of Stocks and Fisheries (GRSF) (cont.)**

*The GRSF discussion continues in the BlueBRIDGE TWG meeting (Tuesday afternoon 1 March – Thursday morning 3 March). The following topics will be discussed on Wednesday morning.*

- *CMS (scope definitions), other supporting tools, workflow*
- *Extended knowledge base*
- *Governance and sustainability*

## ANNEX 2

## List of participants

### Annex 2a. List of participants to the FIRMS TWG5 meeting

## FIRMS Members

**Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)**
Mr David RAMM
Data Manager
CCAMLR
P.O. Box 213
North Hobart
Tasmania 7002
Australia
Tel.: +61 3 62310556
E-mail: david.ramm@ccamlr.org

**Food and Agriculture Organization of the United Nation, Fisheries and Aquaculture Department (FAO-FI)**
Mr Yimin YE
Senior Fishery Resources Officer
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 57054592
E-mail: yimin.ye@fao.org

**Inter-American Tropical Tuna Commission (IATTC)**
Mr Michael G. HINTON
Data Collection and Database Program
8604 La Jolla Shores Drive
La Jolla, CA 92037-1508
United States of America
Tel.: +1 858 546 7100
E-mail: mhinton@iattc.org

**Northwest Atlantic Fisheries Organization (NAFO)**
Ms Dayna BELL
Science Information Administrator
2 Morris Drive, P.O. Box 638
Dartmouth, Nova Scotia
Canada B2Y 3Y9
Tel.:(+1-902) 468-5590 ext. 203
E-mail: dbell@nafo.int

Mr Mark HARLEY
Database manager
2 Morris Drive, P.O. Box 638
Dartmouth, Nova Scotia
Canada B2Y 3Y9
Tel.: (+1-902) 468-5590 ext. 210
E-mail: mharley@nafo.int

**South East Atlantic Fisheries Organization (SEAFO)**
Mr Ben van ZYL
Executive Secretary
Strand Street No. 1
Swakopmund
P.O. Box 4296
Walvis Bay, Namibia
E-mail: bvanzyl@seafo.org

## FIRMS Associated Members

**Western Central Atlantic Fishery Commission (WECAFC)**
Ms Nancie CUMMINGS
WECAFC regional focal point for FIRMS
Department of Commerce, National Marine
Fisheries Service, Southeast Fisheries
Science Center
Florida, United States of America
Tel.: (+1) 305 3614234
E-mail: Nancie.Cummings@noaa.gov

**Fishery Committee for the Eastern Central Atlantic (CECAF)**
Mr Kossi SEDZRO
Chair of the Scientific Sub-Committee (CECAF SSC)
Division de la Promotion des Pêches et de l'Aquaculture
Ministère de l'agriculture, de l'élevage et de la pêche
Lomé
Togo
E-mail: ksedzro69@hotmail.com

## Observers - Invited persons

**Food and Agriculture Organization of the United Nation, Fisheries and Aquaculture Department (FAO-FI)**

Mr Fabio CAROCCI
Fishery Information Assistant
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: +39 06 570 55176
E-mail: Fabio.Carocci@fao.org

Mr Anton Ellenbroek
Fishery officer (Marine)
BlueBRIDGE – Blue Assessment Work Package leader
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 57054029
E-mail: Anton.Ellenbroek@fao.org

Mr Nicolas L. GUTIERREZ
Fishery Resources Officer
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 57056563
E-mail: Nicolas.Gutierrez@fao.org

Mr Kiran VIPARTHI
Fishery Systems Developer
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 57053439
E-mail: Kiran.Viparthi@fao.org

**Organisation for Economic Co-operation and Development (OECD)**

Ms Fabiana CERASA
Statistician
Trade and Agriculture Directorate, Natural Resources Policy Division, Fisheries
2, rue André Pascal - 75775 Paris Cedex 16
Tel.: +33 1 45 24 95 60
E-mail: Fabiana.CERASA@oecd.org

## FIRMS Secretariat

E-mail: FIRMS-Secretariat@fao.org

Mr Marc TACONET
FIRMS Secretary
Chief, Statistics and Information Branch (FIPS), FAO
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 57053799
E-mail: marc.taconet@fao.org

Mr Aureliano GENTILE
Information Manager
Statistics and Information Branch (FIPS), FAO
Via delle Terme di Caracalla
00153 Rome
Italy
Tel.: (+39) 06 570 53754
E-mail: aureliano.gentile@fao.org

Mr Emmanuel Blondel
FAO Consultant GIS Scientist
E-mail: Emmanuel.Blondel@fao.org

Mr Tony Jarrett
Fishery Data Officer
Statistics and Information Branch (FIPS), FAO
Viale delle Terme di Caracalla
00153 Rome ITALY
Tel.: (+39) 06 5705 5964
E-mail: Tony.Jarrett@fao.org

**Annex 2b. List of additional participants to the joint session FIRMS TWG5 – BlueBRIDGE TWG1 on GRSF**

| *Name* | *Institution* | *eMail* |
|---|---|---|
| Mr BARDE Julien | IRD | julien.barde@ird.fr |
| Ms DAVIES Anna | ICES | anna.davies@ices.dk |
| Ms GRAZIANO Mariagrazia | JRC | mariagrazia.graziano@jrc.ec.europa.eu |
| Mr HARLEY Mark | NAFO | mharley@nafo.int |
| Mr LEBRAS Jean-Yves | CLS | jlebras@cls.fr |
| Mr LEFEBURE Robert | MSC | Robert.lefebure@msc.org |
| Mr MACMILLAN LAWLER Miles | GRID-Arendal | Miles.Macmillan-Lawler@grida.no |
| Mr MELNYCHUK Michael | Univ. Washington | mmel@u.washington.edu |
| Mr MINADAKIS Nikos | FORTH | minadakn@ics.forth.gr |
| Mr PAGANO Pasquale | CNR | pasquale.pagano@isti.cnr.it |
| Ms SEGURADO Susana | SFP | susana.segurado@sustainablefish.org |
| Mr SPEAR Braddock | SFP | braddock.spear@sustainablefish.org |

## ANNEX 3

## FIRMS State and Trend descriptors – Traffic light approach, mapping rules

| | | | | |
|---|---|---|---|---|
| High fishing mortality |  |  |  |  |
| Moderate fishing mortality |  |  |  |  |
| No or low fishing mortality |  |  |  |  |
| | Pre-exploitation biomass or high abundance | Intermediate abundance | Low abundance | Depleted |

| | | | |
|---|---|---|---|
| Uncertain / Not assessed |  | Not applicable |  |

For **FAO status of fishery resources indicators** the following equivalence would be in place:

| | |
|---|---|
| Overfished |  |
| Fully fished |  |
| Underfished |  |

| | | | | |
|---|---|---|---|---|
| High fishing mortality | *Fully fished* | *Overfished* | *Overfished* | *Overfished* |
| Moderate fishing mortality | *Underfished* | *Fully fished* | *Overfished* | *Overfished* |
| No or low fishing mortality | *Underfished* | *Underfished* | *Fully fished* | *Overfished* |
| Uncertain / Not assessed | Pre-exploitation biomass or high abundance | Intermediate abundance | Low abundance | Depleted |

For communication purpose FAO also adopted the two terms "**Overfished**" and "**Not Overfished**".

| | |
|---|---|
| Overfished |  |
| Not Overfished |  |

Applying the two terms approach "Overfished" / "Not Overfished" approach (red / green) to the FIRMS standard Exploitation Rate / Abundance Level matrix, the following colour scheme would be produced:

| | | | | |
|---|---|---|---|---|
| High fishing mortality |  |  |  |  |
| Moderate fishing mortality |  |  |  |  |
| No or low fishing mortality |  |  |  |  |
| | Pre-exploitation biomass or high abundance | Intermediate abundance | Low abundance | Depleted |

More information at:
http://figisapps.fao.org/FIGISwiki/index.php/FIRMS_Fishery_Resources_Standard_descriptors_for_State_and_trend#Traffic_light_approach (FIRMS Wiki, login required)

**ANNEX 4**

**FIRMS Brochure revision**

**Original version**: ftp.fao.org/FI/brochure/FIRMS/

Table of Content



# Fisheries and Resources Monitoring System (FIRMS)

## *WHAT IS FIRMS?*

### Partnership

The Fisheries Resources Monitoring System (FIRMS) provides decision-makers and others with high-quality, authoritative information on global marine fisheries resources. This information provides them the means to develop informed fisheries and marine resource policies in accordance with the Code of Conduct for Responsible Fisheries.

FIRMS is a partnership of intergovernmental fisheries organizations with competence for resource assessment and conservation. The partners have committed to ensuring that the information that they develop and validate are published or linked on the FIRMS website, thus providing a single point from which to obtain information and to link to original source materials.

Fisheries are a global fundamental source of food, livelihood and trade. Conservation and protection of aquatic resources requires cooperative, careful stewardship. The good news is that nearly half of all stocks are fully-exploited and producing catches close to their maximum sustainable limits. However, there are indications that overall the state of world fishery resources and their ecosystems are deteriorating. To stop and reverse this trend – achieving sustainable harvest of all fisheries resources – coordinated action must be taken by national, regional, and international institutions and organizations. FIRMS provides the reliable, relevant and up-to-date information on the global scale that is required to make this possible.

FIRMS was established in February 2004 to meet this need for information. In so doing, FIRMS participates in the development and promotion of global standards for collection, compilation, validation and dissemination of data and information on management of marine resources. The success of FIRMS with partners responsible for assessment and management at the international level has fostered a desire for an analogous formal partnership of national fisheries management and scientific institutions agreeing to report and share information on fisheries resources for which they have competence.

*CODE OF CONDUCT FOR RESPONSIBLE FISHERIES*

The Code of Conduct for Responsible Fisheries, adopted by FAO Members on 31 October 1995, contains a broad set of principles and methods for developing and managing fisheries and aquaculture. A voluntary, nonbinding instrument, the Code is widely recognized as the global standard for setting out the aims of sustainable fisheries and aquaculture for the coming decades.
Within the framework of the Code, International Plans of Action on Seabirds, Sharks, Fishing Capacity and Illegal, Unreported and Unregulated Fishing, as well as the Strategy for Improving Information on Status and Trends in Capture Fisheries, have been developed as complementary instruments to promote further the objectives of responsible fisheries.

## ***WHAT DOES FIRMS OFFER?***

### Inventory of stocks and fisheries

FIRMS works as a monitoring system for capture fisheries. It is conducted under the general framework of the 2003 FAO Strategy for Improving Information on Status and Trends of Capture Fisheries (Strategy-STF), which was endorsed by the United Nations General Assembly.

The unique fisheries resources monitored by FIRMS partners ranges from pan-Oceanic stocks and fisheries, to those occurring on smaller, more localized scales. Each partner agrees to provide regularly on the information needed by decision makers for species and fishing areas for which they have primary responsibility. In this way, FIRMS contains a unique and comprehensive vision of the current state of the world's international fisheries. As the partnership has grown and is growing, so has the number of marine resources included in the global inventory.

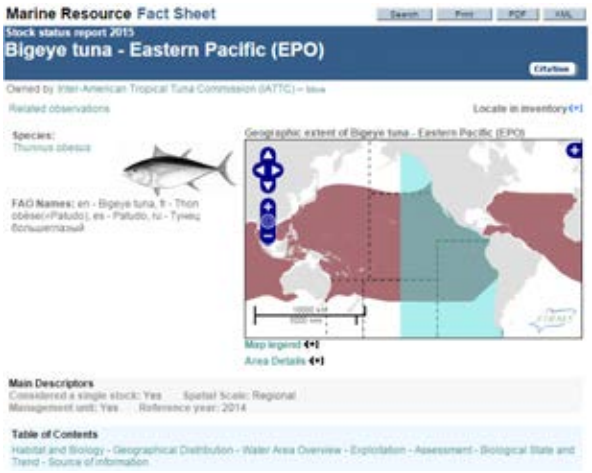

FIRMS information is presented in synthesized "Fact Sheets" and "State of Resources Summaries" in a common format that makes information of interest to be easily located for any resource in the inventory. For each resource, the FIRMS website pages include images and species descriptions, maps of geographical distributions, general biological and habitat characteristics, scientific assessment results, statements of status and trends, and management and conservation considerations. Every Fact Sheet is sourced with a partner's relevant links, providing transparent traceability, and when validated by the partner, they may also include related references and observations from other sources.

## ***HOW DOES FIRMS WORK?***

### Shared concepts and standards

FIRMS has established core concepts, definitions and data presentation formats and standards to ensure consistency and to provide a basis for a common understanding of the information

presented on the FIRMS website. These protocols and standards in reporting were developed by the Partners in order to enhance the overall authoritative value and quality of the information shared in FIRMS.




FIRMS is powered by the Fisheries Global Information System (FIGIS) and benefits from its content management system and information exchange protocol features. Information provided by Partners through streamlined protocols is published on the Web for general access. FIRMS provides partners with the appropriate tools and training to ensure controlled dissemination of high-quality and updated information.

Partners are committed to providing the best scientific evidence on the status and trends of fishery resources and fisheries and to provide statements on the quality of any data posted. For each collection of Fact Sheets, the FIRMS Data Quality Assurance statements describe the set of criteria applied, enabling users to evaluate FIRMS information content.

*STRATEGY FOR IMPROVING INFORMATION ON STATUS AND TRENDS IN CAPTURE FISHERIES*

Strategy-STF, adopted by FAO in 2003 and supporting the principles of the Code of Conduct, provides a framework, strategy and plan to improve the knowledge and understanding of fishery status and trends as a basis for fisheries policy-making and management for the conservation and sustainable use of aquatic resources.

## ***WHAT IS FIRMS' FUTURE?***

### National partners

A partnership of national management and scientific institutions is needed to provide compiled, consistent, quality information on the status of marine resources that do not fall under the competence of an international body or regional fisheries management organization. This partnership, a National FIRMS, would fulfill the need for easily accessed, consistent, and validated data on marine resources not reported in FIRMS. When in place, the total of

information in the International- and National-FIRMS also would highlight resources which are unmonitored, and thus providing policy-makers the starting points for identifying new areas for action and priority. With both International- and National FIRMS partnerships in place would directly support both international and national plans of action for responsible fisheries, as well as bolstering actions needed to achieve the UN Millennium Development Goals.

The FIRMS secretariat and system maintenance are both part of the FAO Regular Programme. However, strengthening and expanding the FIRMS concept to include partnerships with national level management and scientific resources will require additional financial resources to fund necessary conferences and workshops, and to keep systems infrastructure up to date and maintained.

The experience gained through establishing the FIRMS partnership of regional fishery bodies with FAO as secretariat has provided the experience and basis from which to build a strong and trusted platform that will serve well at the national level.

***For more information, contact:***

FIRMS Secretariat
Fisheries and Aquaculture Department
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy
E-mail: FIRMS-Secretariat@fao.org
http://firms.fao.org

***FIRMS partners***

Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

Directorate-General for Maritime Affairs and Fisheries (DG MARE)
FAO Fisheries and Aquaculture Department
General Fisheries Commission for the Mediterranean (GFCM)
Inter-American Tropical Tuna Commission (IATTC)
International Commission for the Conservation of Atlantic Tuna (ICCAT)
International Council for the Exploration of the Sea (ICES)
Indian Ocean Tuna Commission (IOTC)
Northwest Atlantic Fisheries Organization (NAFO)
North Atlantic Salmon Conservation Organization (NASCO)
North-East Atlantic Fisheries Commission (NEAFC)
Southeast Asian Fisheries Development Center (SEAFDEC)
South East Atlantic Fisheries Organisation (SEAFO)

## ANNEX 5

## GRSF - Elements of the database

### Stock

| Stock Name & ID | Species Scientific name | Area | Exploiting Fisheries | Management Units | Assessment Method | Scientific Advice | State of Marine Resource (Exploitation rate, Abundance level) | DataBase Source | Source of Information | Data Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| Unique Identifier | ASFIS | FAO EEZ … | List of fisheries | Management Authorities and competence areas | Type of model/name of the model | Narrative | F Mortality and B biomass (numeric values or descriptions) and set of fields for target limits or indicators | FIRMS/RAM/FishSource | Citation | RFB & other institutions |
| | X | X | | X | | | | X | X | X |

X = Elements of the database functional for the identification of a stock among multiple sources

### Fishery

| Fishery Name & ID | Species Scientific name | Area | Exploited stocks | Management Units | Production System Type | Flag State | Fishing Gear | Annual catch | DataBase Source | Source of Information | Data Owner |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unique Identifier | ASFIS | FAO, EEZ… | List of stocks | Management Authorities | Types: Industrial, Artesanal.. | ISO3 country code | ISSCFG | Tonnes | FIRMS/RAM/FishSource | Citation | RFB & other institutions |
| | X | X | | X | X | X | X | | X | X | X |

X = Elements of the database functional for the identification of a fishery among multiple sources

## ANNEX 6

### 6a. Options for unique identifiers

Option 1 *(differentiating stocks from fisheries)*

- Stocks unique identifier for human understanding
    - What makes a stock unique? ➔ Species + area
- **<FAO3AlphaCode> + <FAO Area Code / EEZ / RFB Area code / LME / Local Code> + <Management Unit Acronym>**

    - Fishery unique identifier for human understanding *(multiple entries per stock code)*
        - What makes a fisheries unique? ➔ Species + Area + Geartype + Management Unit +…
- **<FAO3AlphaCode> + <FAO Area Code / EEZ / RFB Area code / LME / GRSF Code> + <Management Unit Acronym> + <ISSCFG> + <Prod System Type>**

The outcome would be at least two labels one for stocks and one for the underlying fishery

Option 2 *(minimal elements approach)*

- A unique identifier applied
    - at single species level
    - in fishing area(s)
    - under a single management unit
    - including one geartype and one flagstate
    - specifying the type of production system
- **<FAO3AlphaCode> + <FAO Area Code / EEZ / RFB Area code / LME / Local Code> + <Management Unit Acronym> + <ISSCFG> + <ISO3CountryCode> + <Prod. System type>**

*Example: Caribbean spiny lobster:SLC+FAO:31_EEZ:BHS+DMR-HS+20.0.0+BHS+Ind_Art*

The outcome would be one single label identifying the specific fishery elements

*Example: "Caribbean spiny lobster caught with miscellaneous gear in the national water of Bahamas by local industrial and artisanal fleets and managed by Department of Marine Resources Bahamas"*

## 6b. scenario for processing UUIDs from the various sources

| | | | | | | Management Unit | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fishery name** | **UUID perceived** | **UUID traceability** | **SourceID** | **Species** | **Fishing area** | **Competence area** | **Authority** | **Gear** | **FlagState** | **ProdSystem** | **Source system** | **Reporting Year** |
| Cod Baltic | AAAAAAAA | | A | COD | 27.3 | | | | | | FIRMS | |
| Baltic cod | AAAAAAAA | | 1 | COD | 27.3 | | | | | | RAM | |
| shrimp - Guinea | BBBBBBBBB | | B | SHR1 | 34.2.1 | | | | | | FIRMS | |
| shrimp - Guinea | | | B | SHR2 | 34.2.1 | | | | | | FIRMS | |
| Guinea - Foreign cephalopod fishery | GGGGGGGG | | G | OCT | 34.2.1 | GUI | MPA | Trawl | Spain | Ind | FIRMS | |
| Guinea - Foreign cephalopod fishery | | 1111111 | G | SHR1 | 34.2.1 | GUI | MPA | Trawl | Spain | Ind | FIRMS | |
| Spain Freezer bottom trawl shrimp fishery - Guinean to Senegal waters | CCCCCCCCC | 1111111 | C | SHR1 | 34.2.1 ] 34.2.2 | GUI | MPA | Trawl | Spain | Ind | FIRMS | |
| Spain Freezer bottom trawl shrimp fishery - Guinean to Senegal waters | | | C | SHR1 | 34.2.1 ] 34.2.2 | GUI | EU | Trawl | Spain | Ind | FIRMS | |
| Spain Freezer bottom trawl shrimp fishery - Guinean to Senegal waters | | | C | SHR1 | 34.2.1 ] 34.2.2 | SEN | EU | Trawl | Spain | Ind | FIRMS | |
| Spain Freezer bottom trawl shrimp fishery - Guinean to Senegal waters | | | C | SHR2 | 34.2.1 ] 34.2.2 | GUI | EU | Trawl | Spain | Ind | FIRMS | |
| Spain Freezer bottom trawl shrimp fishery - Guinean to Senegal waters | | | ~~C~~ | ~~SHR2~~ | ~~34.2.1 ] 34.2.2~~ | ~~SEN~~ | ~~EU~~ | ~~Trawl~~ | ~~Spain~~ | ~~Ind~~ | ~~FIRMS~~ | |
| | | | | | | | | | | | | |
| NAFO fisheries | DDDDDDDD | | D | | 21 | NAFO | NAFO | | | | FIRMS | |
| | | | | | | | | | | | | |
| Senegal artisanal fisheries sub-sector | EEEEEEEEE | | E | | 34.2.2 | SEN | DRP | Net | Sen | Art | FIRMS | |
| Senegal artisanal fisheries sub-sector | | | E | | 34.2.2 | SEN | DRP | Line | Sen | Art | FIRMS | |
| Senegal artisanal fisheries sub-sector | | | E | | 34.2.2 | SEN | DRP | Trap | Sen | Art | FIRMS | |
| | | | | | | | | | | | | |
| Jamaican lobster artisanal | FFFFFFFFF | | F | LOB | 31 | Jamaica | DMR | Trap | Jam | Art | FIRMS | |
| Jamaican lobster artisanal | | | F | LOB | 31 | Jamaica | DMR | Spear | Jam | Art | FIRMS | |