Food and Agriculture Organization of the United Nations

COORDINATING WORKING PARTY ON FISHERY STATISTICS

Sixth Meeting of the Aquaculture Subject Group (AS) and
Twenty-seventh meeting of the Fisheries Subject Group (FS)

THE GLOBAL RECORD OF STOCKS AND FISHERIES (GRSF)

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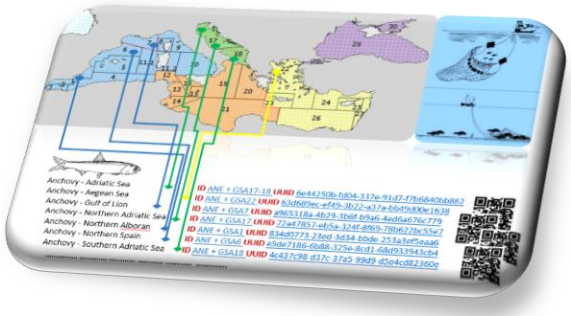
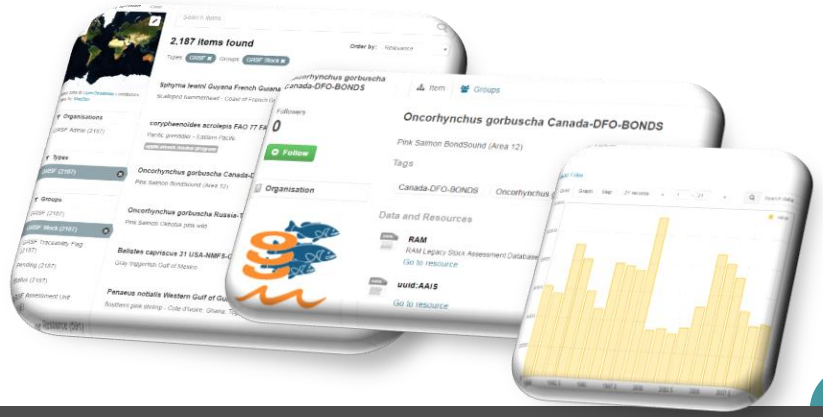




Outline

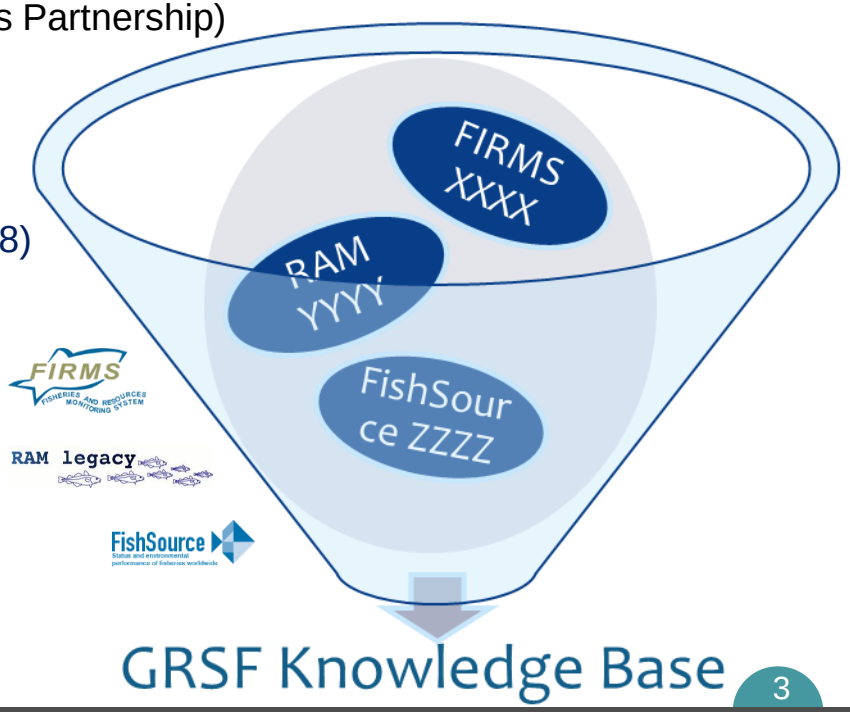
- What is the GRSF
- Why GRSF?
- Background
- The GRSF data model, the standards, the unique identifiers
- Time dependent data
- Pilot release
- Value proposition
- Scenarios
- Public release of GRSF pilot

What is the GRSF?

A comprehensive and transparent inventory of stocks and fisheries records across multiple data providers

- Sources of Information
  - Fisheries and Resource Monitoring System (FIRMS)
  - RAM Legacy Stock Assessment Database
  - FishSource (program of the Sustainable Fisheries Partnership)

An initiative funded by the
European Union Horizon 2020 BlueBRIDGE project (2016- 2018)



Why GRSF?

The GRSF is the digital answer offering key services in support of:

1) stakeholders involved in global/regional/national state of stocks indicators – particularly for **SDG 14.4.1** "Proportion of fish stocks within biologically sustainable levels" (2030 UN Agenda for Sustainable Development A/RES/71/313), and

2) public and private actors involved in **seafood traceability and certification** including catch documentation schemes, ecolabelling schemes, food safety, sustainable fisheries.

The **standard stocks and fishery identifiers** are the pillars of such an initiative, which is aiming to boost connected knowledge on stocks and fisheries.

To date, the GRSF initiative is probably the biggest collation of stocks and fisheries data in the world from national, regional or global sources.

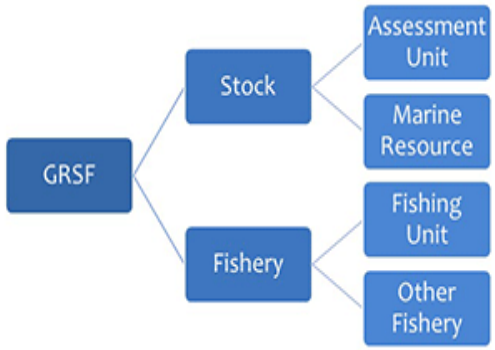
Background

- The Global Record of Stocks and Fisheries (GRSF) stems from a FAO initiative which received support from FIRMS partners and funded by the European Union Horizon 2020 **BlueBRIDGE project** (2016-2018).
- Developed in collaboration with
  - **Food and Agriculture Organization (FAO)**
  - **FIRMS Partnership (Fisheries and Resource Monitoring System)**
  - **University of Washington (UW, RAM Legacy Stock Assessment Database)**
  - **FishSource, a program of the Sustainable Fisheries Partnership (SFP)**
- Technical development:
  - **Italian Consiglio Nazionale delle Ricerche (CNR-ISTI)**
  - **Greek Foundation for Research and Technology - Hellas (FORTH)**
  - Hosted within the **iMarine** e-infrastructure and its software, both open-source (e.g. CKan data catalogue) and proprietary (e.g. MatWare for semantic warehouse)

During the BlueBRIDGE project, the formulation of the requirements and the development of the GRSF was discussed in 7 Technical Committee meetings, 3 Technical Working Group meetings, 2 Advisory Board meetings and more than 60 conference calls.

The GRSF data model, the standards, the unique identifiers

- The GRSF database collects information on two domains: “**stocks**” and “**fisheries**”.
- Types for stock:
  - "**Assessment unit**“: the subset of one (or more) species that is the object of a given stock assessment.
  - "Marine Resource", when the record is generically describing a resource of value to fisheries.
- Types for fishery:
  - 1) "**Fishing unit**", a fishery characterized by: one captured species, fishery area(s)/management area(s), management authority(ies) with associated jurisdiction area(s), one gear type, and one flag state.
  - 2) "Other fishery", includes the identification of other fisheries described under different approaches (e.g. jurisdiction, management unit, fishery resource, production system).



Standards

Data structure definitions

Classification system , Code List and Titles (in multiple languages).
Any non-standard code is treated as a text string and qualified as "unknown".

1. **Aquatic Species**
   ASFIS (FAO 3Alpha code) and WoRMS (AphiaID)
2. **Assessment/Distribution Area – Fishing Area/Management Area**
   FAO Area (and its subdivisions), EEZ (from Marine Regions - MRGID), RFBs geographic systems (ICCAT management unit, GFCM geographical sub-areas, IATTC Pacific tuna reporting area, etc.)
3. **Jurisdiction Area**
   EEZ (from Marine Regions - MRGID), RFBs areas of competence, and additional eligible local standards. "High seas" in case of no management authority (no recognized jurisdiction area).
4. **Fishing Gear**
   ISSCFG and "SFP fishing gear classification".
5. **Flag state**
   ISO3 country code [Ref. to CWP Flag State nationality of the catch]
6. **State and trend of Marine Resource**
   No specific standard
7. **Fishery data/indicators**
   No specific standard
8. **Management authority**
   GRSF convention with name and acronym and the indication if national or international management

Unique Identifiers

- **Universally Unique Identifier**

  - to respond to whatever global IT standard

Example

http://data.d4science.org/catalogue/GRSF/f21113e9-0794-37aa-b7fe-bf49101361f3

- The resolver can be customized
- UUIDs persist in case of changes of the semantic identifiers (i.e. updates of a record)

- **Semantic Identifier** – product labelling, records identification & validation, etc.

  Standard coding system for:

Stocks **<Species> + <AssessmentArea(s)>**

Fisheries **<Species> + <FishingArea(s)/ManagementArea(s)> + <ManagementAuthority(ies)> + <Geartype> + <FlagState>**

Example of semantic identifier, and of its full label

asfis:**COD +** fao:**21.3.M +** authority:**INT:NAFO +** isscfg:**03.12 +** iso3:**LTU**

Gadus morhua - Atlantic, Northwest/21.3.M - Northwest Atlantic Fisheries Organization (NAFO) - Single boat bottom otter trawls - Lithuania

Unique Identifiers

Source FAO, SOFIA, 2018

- ✓ **Harmonizing** information according to agreed definitions and international standards
- ✓ **Storing** collated information on biological ("**stocks**") and fishing activity aspects ("**fisheries**") following specific **standards/protocols**
- ✓ Assigning **unique identifiers** for stock and fishery identification.

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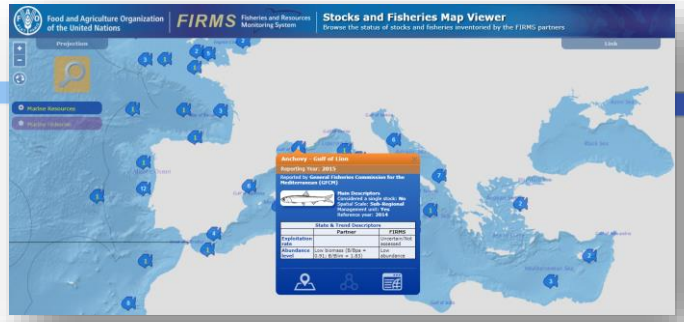
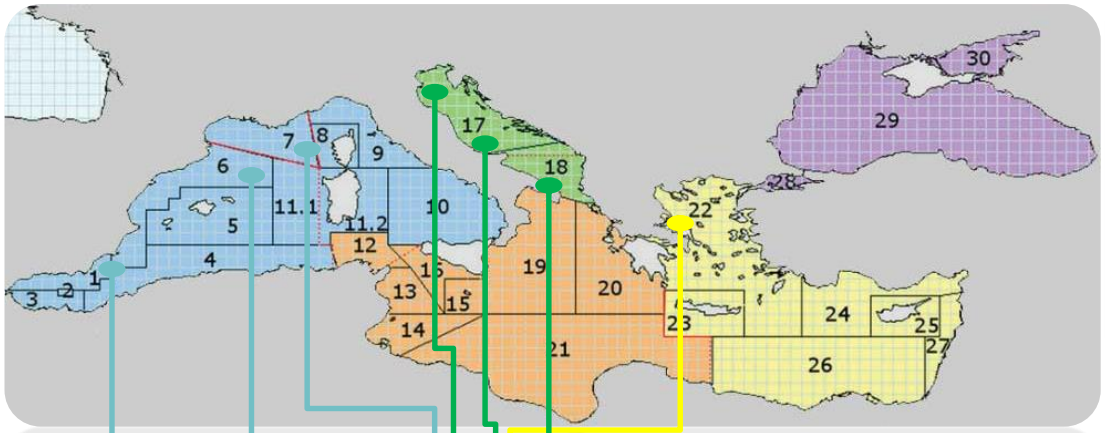
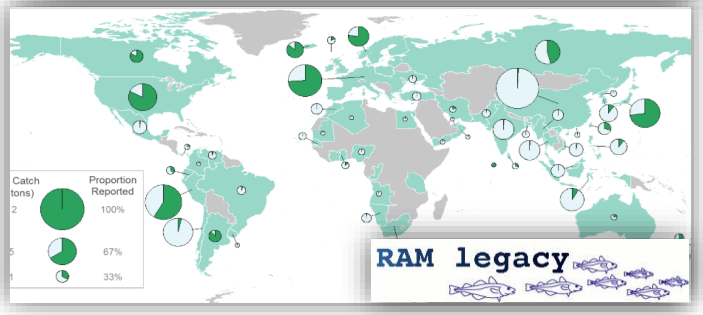
Unique Identifiers

- ✓ Unique Identifiers
- ✓ Collated information







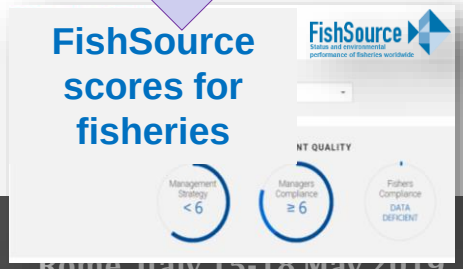
- ➢ Stock status
  (reported at national, regional level)
  - ➢ SDG 14.4.1 indicator
- ➢ Traceability schemes

Anchovy - Adriatic Sea
Anchovy - Aegean Sea
Anchovy - Gulf of Lion
Anchovy - Northern Adriatic Sea
78b622bc55e7
Anchovy - Northern Alboran
Anchovy - Northern Spain
Anchovy - Southern Adriatic Sea
d5e4cd82360e

ID ANE + GSA17-18 UUID 6e44250b-fd04-337e-91d7-f7b6840
ID ANE + GSA22 UUID 63d689ec-ef49-3b22-a37a-bb49d00e
ID ANE + GSA7 UUID a965318a-4b29-3b6f-b9a6-4ed6a676
ID ANE + GSA17 UUID 72a47857-eb5a-324
ID ANE + GSA1 UUID 834d0773-23ed-3d34-bbde-253a3ef5ea
ID ANE + GSA6 UUID e5de7186-6b88-325e-8cd1-68d933943c
ID ANE + GSA18 UUID 4c437c98-d37c-37a5-

Stock name | Human readable semantic code | Machine readable code | QR code

FishSource scores for fisheries



Time dependent data

Data harvested from the database sources (when available) and retrieved in GRSF records:

- **Abundance Level** (FIRMS Standard) (qualitative descriptor)
- **Abundance Level** (quantitative/qualitative descriptor)
- **Fishing Pressure** (FIRMS Standard) (qualitative descriptor)
- **Fishing Pressure** (quantitative/qualitative descriptor)
- **FAO Stock Status Categories** (qualitative descriptor)
- **Biomass** (time series)
- **Catches** (time series)
- **Landings** (time series)
- **Scientifc advice** (narrative)
- **State and Trend** (narrative)

Pilot release

The GRSF is hosted in the **iMarine** e-infrastructure (D4Science.org)

Total amount of collated GRSF stocks and fisheries records

Record types	Total number	Uniquely sourced from			Jointly sourced from			
		FIRMS	FishSource	RAM	FIRMS FishSource RAM	FIRMSRAM	FishSource RAM	FIRMS FishSource
Stocks from source systems	**3179**	732	1156	1291				
Assessment unit	2322	484	518	1156	37	73	25	29
Marine resource	606	76	528	-	-	-	-	2
Fisheries from source systems	**3367**	256	3111	-				
Fishing unit	6596	3526	3070	-	-	-	-	-
Other fishery	242	239	3	-	-	-	-	-

Browse the pilot release at:
https://i-marine.d4science.org/group/grsf (GRSF)

- 956 Approved stocks
- 95 Approved fisheries
- 36 Archived stocks

Parapenaeus longirostris Atlantic, East central / 34.3.13

Short Name: Deep-water rose shrimp - Guinea-Bissau GRSF
Semantic identifier: asfis:DPS+fao:34.3.13
Record URL: http://data.d4science.org/ctlg/GRSF/69244189-fca9-3036-a6d8-7f48355cd01e

Database sources: [FIRMS]

Zearaja chilensis Southern Chile

Short Name: Yellownose skate Southern Chile
GRSF Semantic identifier: asfis:DPV+unk:CHILE-SUBPESCA-CH-S
Record URL: http://data.d4science.org/ctlg/GRSF/f899db5c-43c7-3f07-bc98-bbd23e218557

Database sources: [RAM]

scomber japonicus + Pacific, Southeast / 87.1.11 ; Pacific, Southeast / 87.1.21 + Colombian National Aquaculture and Fisheries Authority + Colombia + 07.5

Short Name: scomber japonicus + Pacific, Southeast / 87.1.11 ; Pacific, Southeast / 87.1.21 + Colombian National Aquaculture and Fisheries Authority + Colombia + 07.5

GRSF Semantic identifier:asfis:MAS+fao:87.1.11;fao:87.1.21+authority:NAT:COL+iso3:COL+isscfg:07.5
Record URL: http://data.d4science.org/ctlg/GRSF/c55773b9-16bd-397e-b667-f1bce35da1dc

Database sources: [FishSource]

- **Sardina pilchardus Portuguese Waters - East (Division 27.9.a) Bay of Biscay - South (Division 27.8.c)**
  Short Name: Sardine - Bay of Biscay and Iberian Basin
  GRSF Semantic identifier: asfis:PIL+fao:27.8.C;fao:27.9.A
  Record URL: http://data.d4science.org/ctlg/GRSF/7e08e45e-432b-35dd-8d25-afc984280a28

Database sources: [FIRMS, FishSource, RAM]

- **Engraulis encrasicolus Northern Adriatic**
  Short Name: Anchovy - Northern Adriatic Sea
  GRSF Semantic identifier: asfis:ANE+gfcm:17
  Record URL: http://data.d4science.org/ctlg/GRSF/72a47857-eb5a-324f-8f69-78b622bc55e7

Database sources: [RAM] – NO LONGER MONITORED – Status: Archived

- **Engraulis encrasicolus Southern Adriatic Northern Adriatic**
  Short Name: Anchovy - Adriatic Sea
  GRSF Semantic identifier: asfis:ANE+gfcm:17;gfcm:18
  Record URL: http://data.d4science.org/ctlg/GRSF/53f7ce3e-2bde-3d62-9177-22a43ff07b5f

Database sources: [FIRMS, RAM]

Potential users, benefits of GRSF, how it can be used

Users

- RFBs and their member states
- National agencies of governments responsible for stocks and fisheries reporting
- Researchers and officers working on global analyses on state of fishery resources
- NGOs promoting sustainable fisheries
- Seafood industry
- Seafood certifiers
- General public

Value proposition

- Stocks - towards global coverage
  - Achieving a critical mass of records on identified Assessment units
  - Digital Companion to SOFIA and SDG14.4.1 summary reporting:
    - the architecture of these indicators
    - access to fine grained evidence of stocks and their status

- Fishing units – standard identifiers available for inclusion in traceability schemes for use as connectors to scientific info on fisheries and exploited stocks
  - Incentive for fisheries sustainability

- A unique resource with high potential for use and visibility
  - Identifiers built on international standards
  - Connecting Catches, Stock Status, and Trade information

Potential users, benefits of GRSF, how it can be used

Scenarios

SDG 14.4.1 and SOFIA stock status indicator

- **Digital Inventories** of national stocks/assessment units under global standards
- Categorization in shared, straddling or national stocks
- **Consistency checks** across the global inventory of stocks
- Detection of duplication, overlapping assessment units among reporting countries
- **Assignment of unique identifiers** for “approved” records
- Handling of unique identifiers as structured and connected hierarchy of national, regional and global stock units to support the **reporting of stock status** (e.g. SOFIA)
- **Web services** to consume GRSF data (e.g. download time series applying customizable filters)
- Advanced **competency queries** including the ability to download some data types for all stocks/fisheries or sub-sets at once (e.g. clusters of assessment units)
- **Connection/link** (and potential mining/harvesting) to **national or regional web-resources** disseminating stock status (upon inclusion of UUIDs in such resources by data owners)

Potential users, benefits of GRSF, how it can be used

Scenarios

Fishing activities monitoring

- Digital inventories of national fishing units under global standards
- Connection/link with national or regional catch and effort statistics databases
- Contextualization of AIS fishing footprint estimates (include UUIDs in AIS algorithms)

Seafood traceability solutions

- A standardized and globally-accepted identifier system for digital Inventories of fisheries/fishing units usable by the fishery industry sector
- Assignment of machine-readable unique identifiers for individual fisheries that other systems can pull from (e.g. via API)
- Starting point for ad-hoc services to add new fishery records and get unique identifiers in return
- Use of unique identifiers for traceability purposes in the seafood supply chain
- Combine GRSF technology and unique identifiers with other technologies (e.g. blockchain) for enriched certification schemes
- Development of a standardized list of fishery management units
- FAO elaboration towards setting up a list of minimum requirements for seafood traceability

Potential users, benefits of GRSF, how it can be used

Scenarios

Food security and nutrition

- Connection of unique identifiers for the:
  - food security
  - food safety
  - nutritional values
- Environmental indicators
- Food Cloud (EU H2020)

Public release of GRSF pilot

The remaining work on GRSF mainly consists of finalizing the following tasks:

1. **Governance documentation** – completions of the agreements with the GRSF stakeholders

2. **Pilot completion and public release**
   - GRSF application – completion of the development/bug fixes
   - GRSF content – a new data harvest
   - GRSF approval – completion of the on-going validation activity by GRSF stakeholders and nominated experts - TWG\FSC to set simple rules
   - GRSF public release – accompanied with a communication plan

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Merci

Thank You

Благодарю

¡Muchas Gracias!