



FIRMS

FISHERIES AND RESOURCES
MONITORING SYSTEM

About FIRMS and latest news

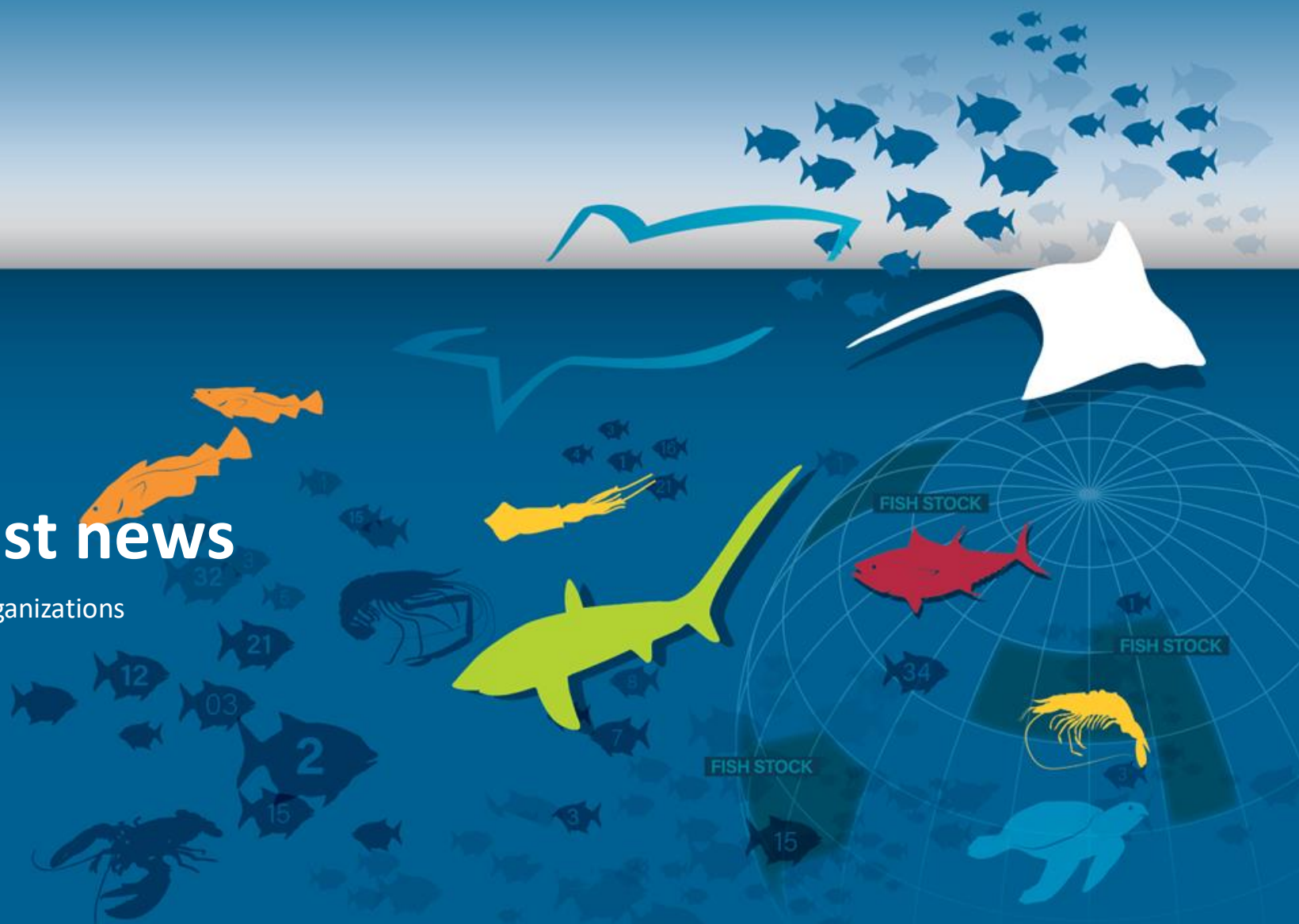
Related to Agenda item 10 - Cooperation with other organizations

Marc Taconet

Aureliano Gentile

FIRMS Secretariat, December 2023

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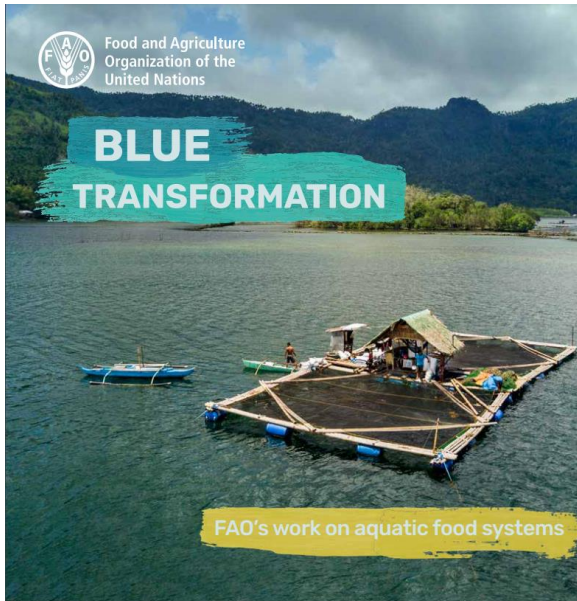


Outline

- **FAO Blue Transformation**
- **FIRMS Historic developments**
- **FIRMS tools, products, assets**
- **Key developments with FIRMS**
- **NPFC data contribution and role in FIRMS**

FAO Blue Transformation

Blue Transformation outlines a vision to expand aquatic food systems and increase their contribution to better production, better nutrition, better environment and better life, especially for those communities that depend on fisheries and aquaculture. Leaving no one behind.



Blue Transformation

<https://www.fao.org/3/cc0458en/cc0458en.pdf>

Blue Transformation
Roadmap 2022-2023
<https://www.fao.org/3/cc0459en/cc0459en.pdf>



Oceans and food security - Manuel Barange, FAO's Director of the Fisheries and Aquaculture Division
<https://youtu.be/2fvLVNH2wtA>

Principles

1. **Aquatic foods are part of the solutions to hunger and malnutrition**
2. **Transformation is happening even without us doing anything**

Objectives

1. Continue to **develop Aquaculture**
2. Make sure all **fisheries** are **placed under effective management**
3. Develop the **value chains of aquatic food**
 - reducing loss and waste,
 - facilitating the access of the product to the markets regional and global,
 - raising awareness to the consumer about the value of aquatic foods,
 - bring aquatic foods as part of the nutritional strategies of countries.

This to produce more and better, for a better use of aquatic foods.

Issues and drivers

- **Overfishing** (1 out of 3 fish species is overfished)
- Issue of **Data** - if you do not know what you are managing you cannot manage it - data collection systems are essential and in the ocean that is difficult because data collection is expensive, and the ocean is vast
- **Political will** understanding of the trade-offs of certain management decisions
- **Climate change** how does this challenge affect our ability to feed the world. (keeping in mind that fish moves changing productivity and seasonality)

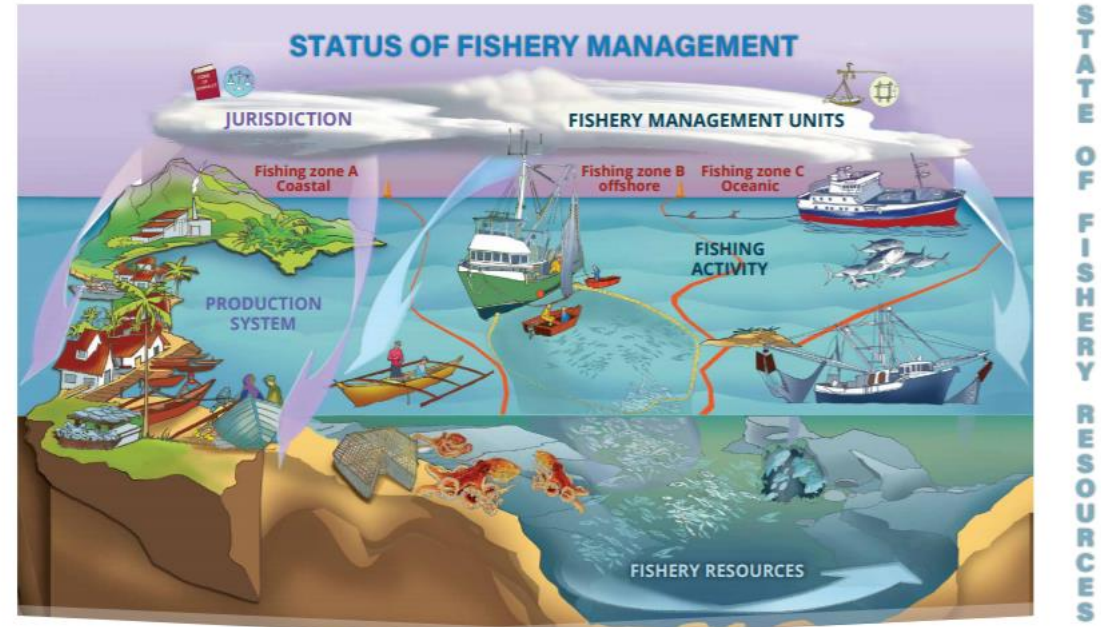
Consumer

- Educate the consumer (great **variety**, 3 000 exploited species fish, mollusks and crustaceans, 600 cultured species)
- Consumer should demand what is eating is **healthy** and **sustainable**
- Need of **transparency** in the value chain

Fisheries and Resources Monitoring System (FIRMS)

provides decision-makers and others with high-quality, authoritative **information** on **global marine fisheries resources**.

This information provides the means to develop informed fisheries and marine resource **policies** in accordance with the **Code of Conduct for Responsible Fisheries**.



<https://firms.fao.org>



an information sharing partnership to facilitate the monitoring of stocks status and fisheries among 18 intergovernmental organizations / 21 RFBs / 4 collaborative organizations



Founded in 2004, about twenty years of experience...

FIRMS historic developments

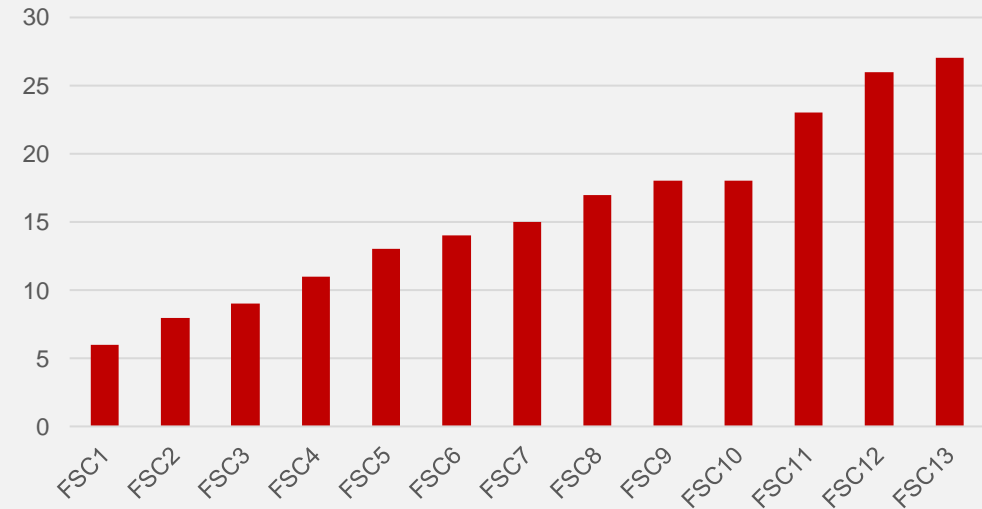
launched in 2004 with 6 founding partners and since then grew up steadily to a partnership including 18 International organizations representing **21 RFMOs/RFBs plus FAO Global** (+ a few Observer IGOs) and **4 associated partner** NGO or national research institutions

with fathers' vision: provide the online backbone of FAO SOFIA (State of World Fisheries and Aquaculture) through collaborative contribution of authoritative stock status reports

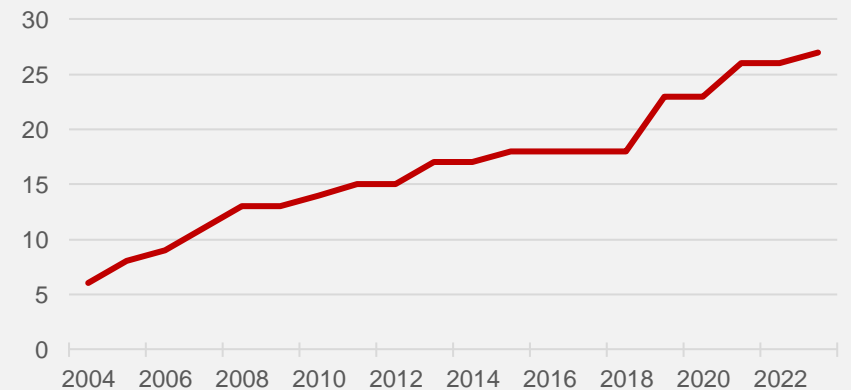
challenges:

- Voluntary – hence push for accommodating desires
- Time to maturity of a functional / standards-based system
- Reaching critical mass RFB membership
- Beyond RFBs: “national FIRMS”
- Outstanding gaps

Number of FIRMS partner RFBs and institutions (at FSCs)



Number of FIRMS partner RFBs and institutions (2004-2023)



FIRMS historic developments

Current Membership -18 IOGs, 21 RFBs, 4 collaborative institutions

FIRMS IGO partner,
including FAO
associated
RFB

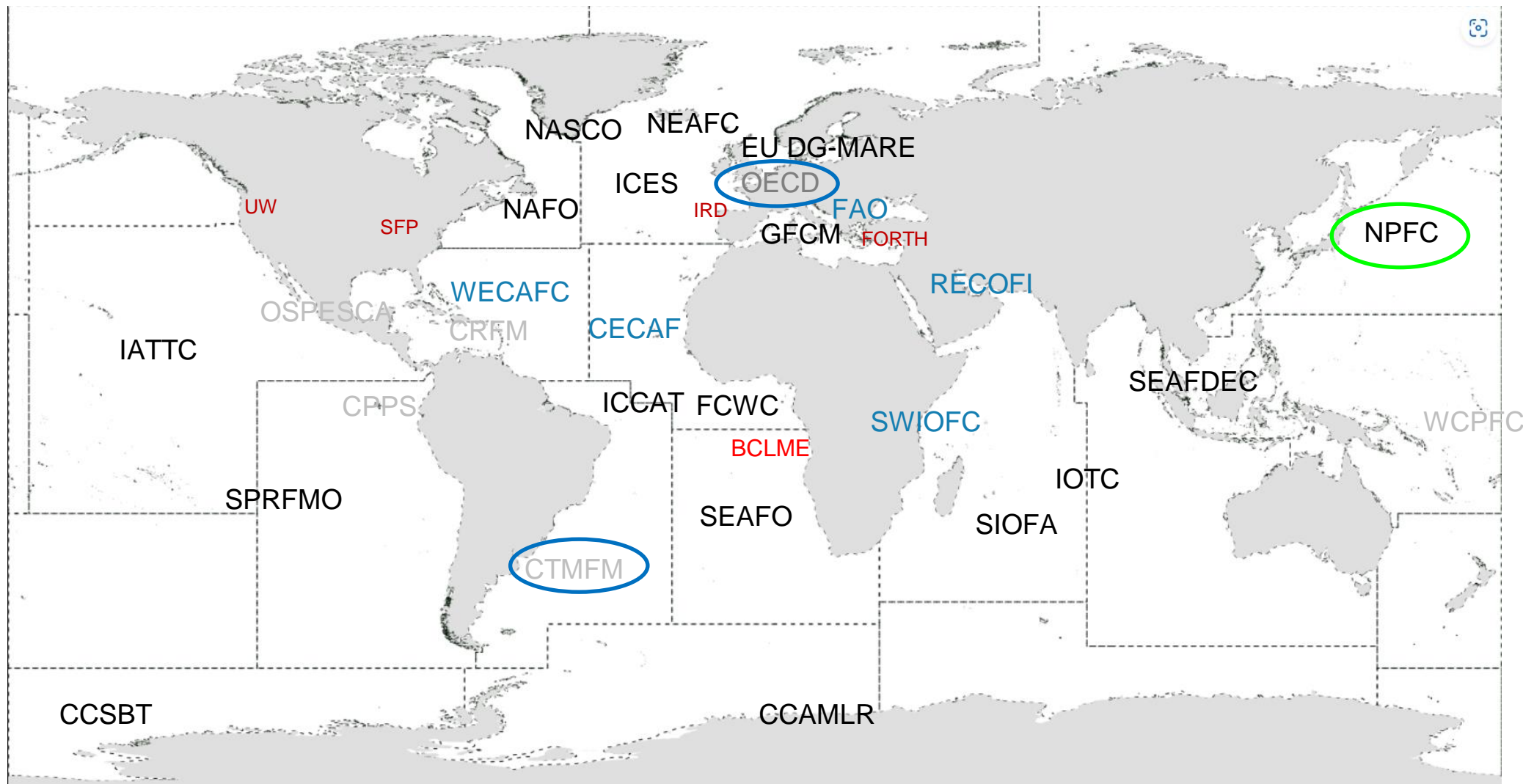
New IGO
Partner

Collaborative
institution

Observer

New
Observer

Partners
Observers

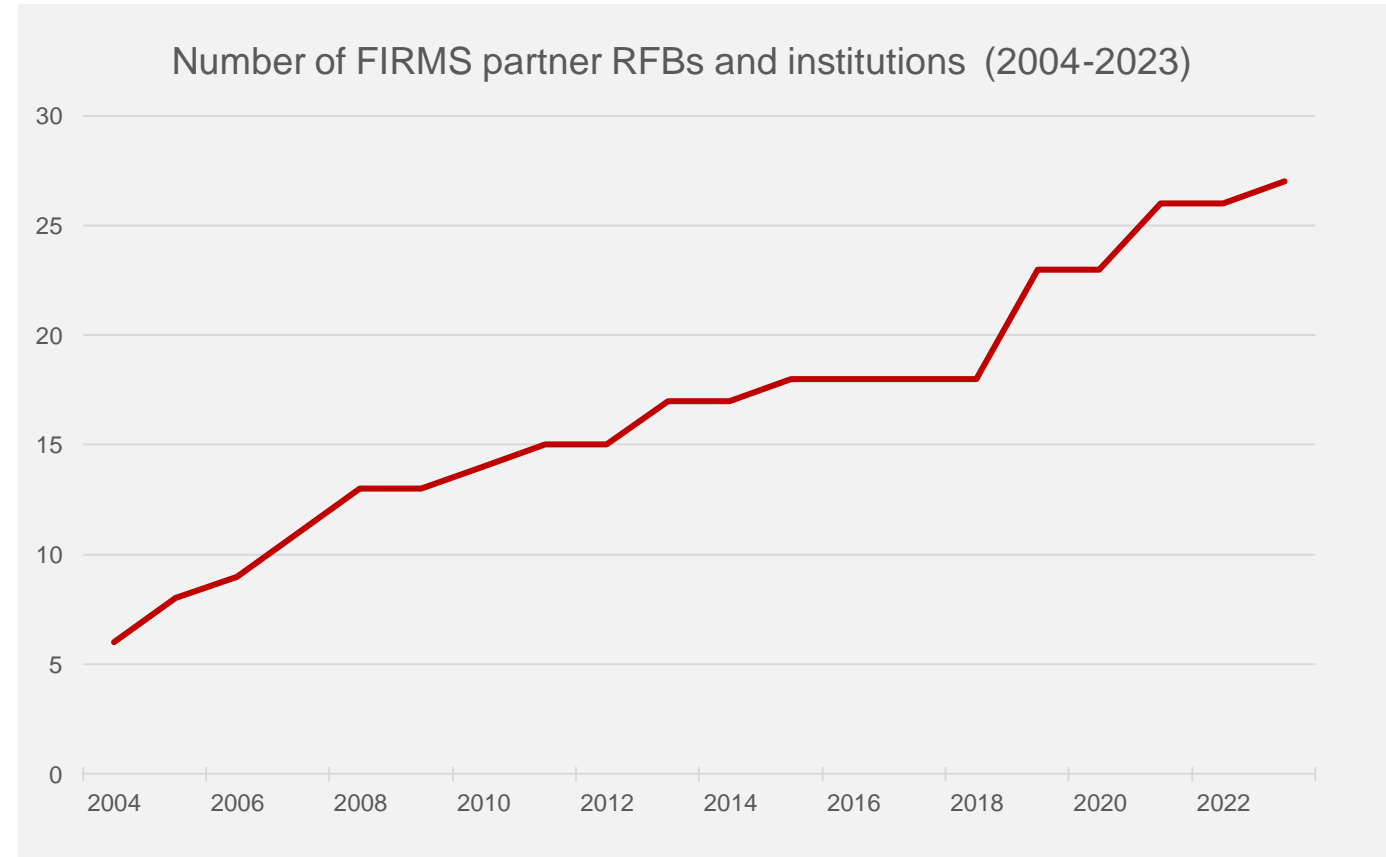


FIRMS historic developments - phases

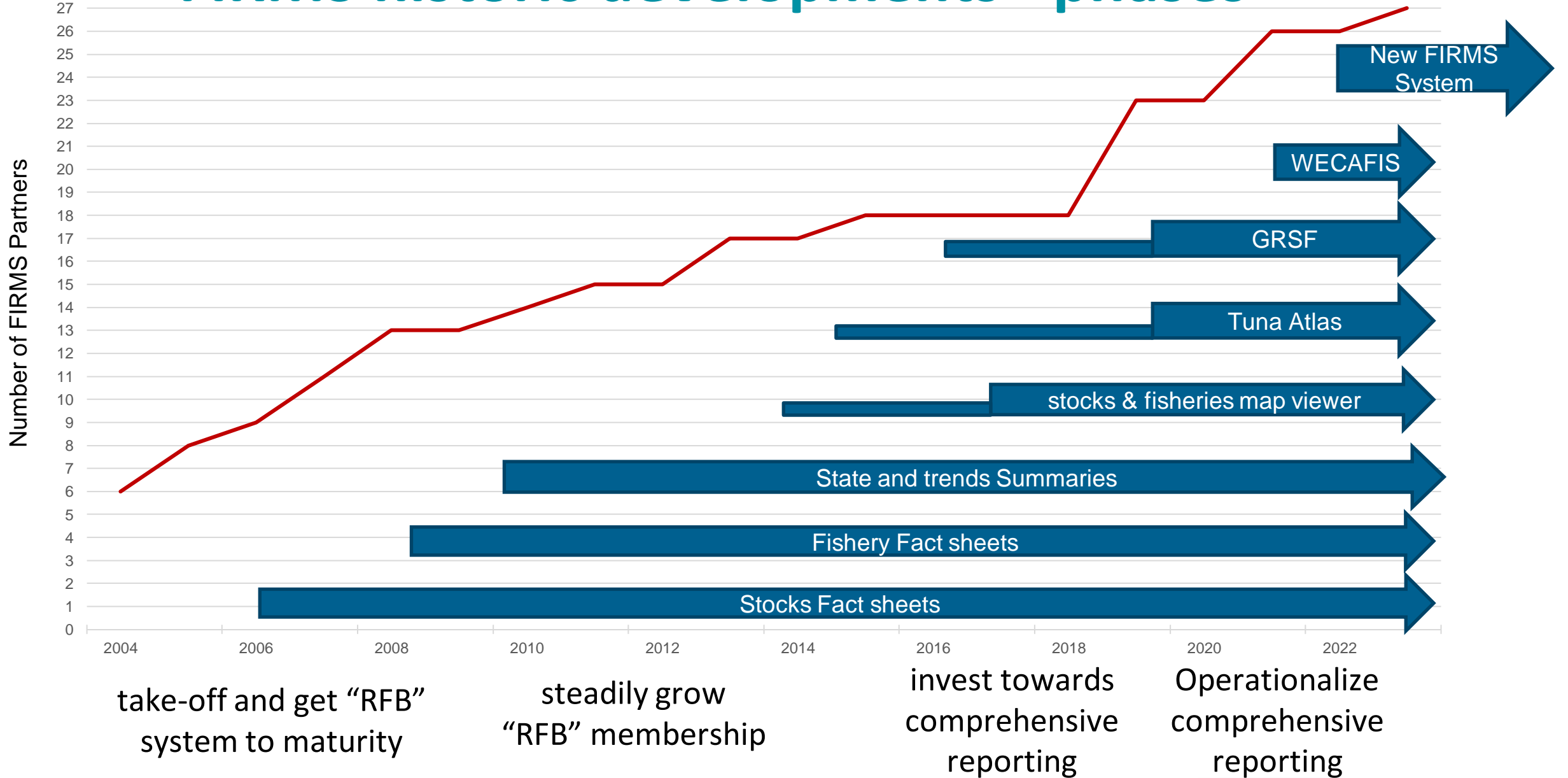
2004 – 2008 - take-off and get “RFB” system to maturity

2009 – 2018 - steadily grow “RFB” membership and invest towards comprehensive reporting

2019 – 2023 - operationalize comprehensive reporting



FIRMS historic developments - phases



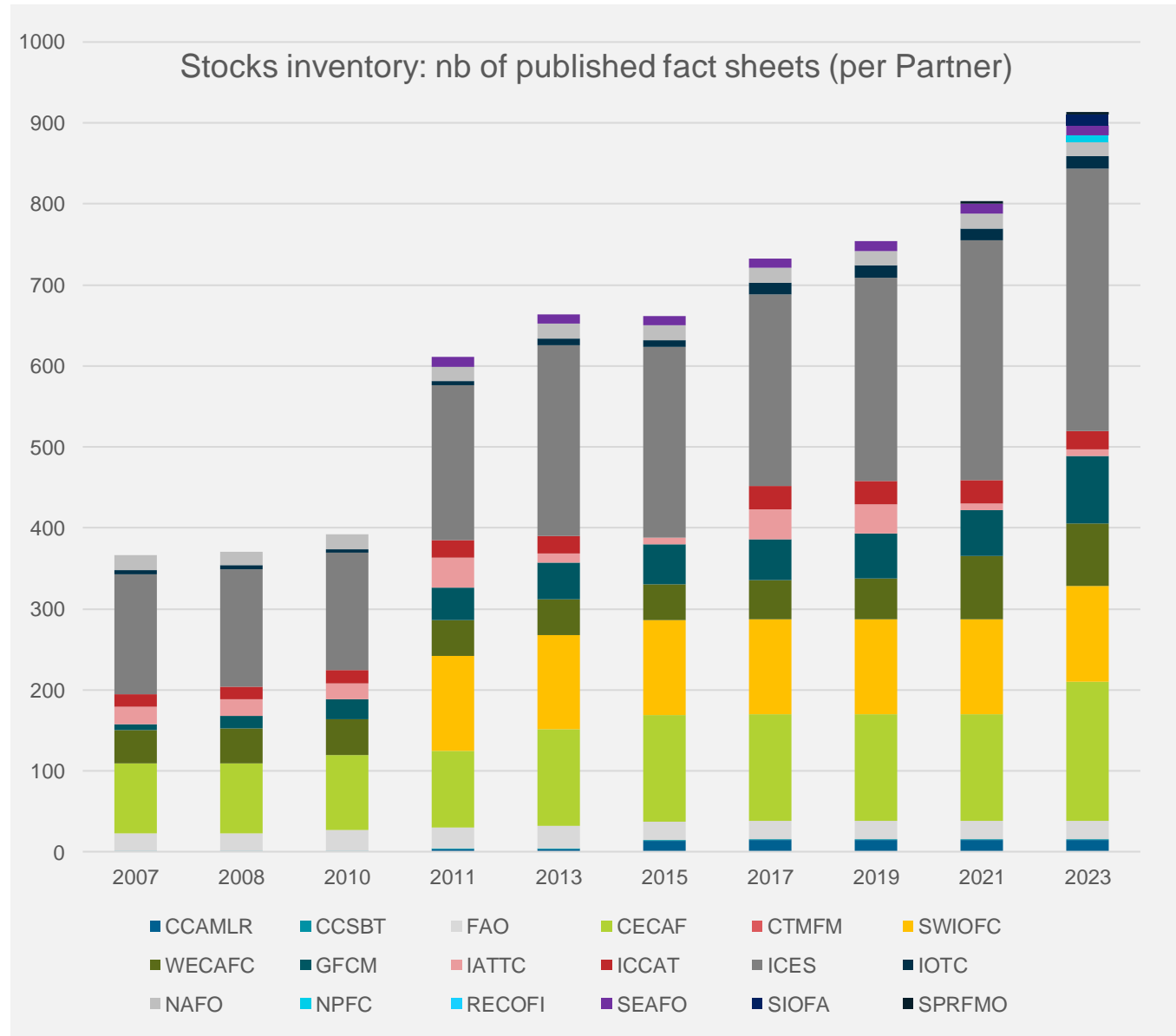
Information growth from the RFB contributions

2006 – 2023 - Information growth from the RFB contributions

2006 (launch at UNFSA): **370 stock status reports**

June 2023: over **900 stock status reports** (mostly high seas/straddling and coastal shared) of which:

- **555 (67%) are with “sufficiently fresh” reports:** i.e. with Ref. year ≥ 2015
- 70 are archives not any more monitored



Information growth - GRSF and SDG14.4.1

Increasing data coverage with

- **Global Record of Stocks and Fisheries (GRSF)**
- **FAO SDG 14.4.1 Questionnaire**

GRSF (since 2021) – collaborative Partners’ contributions (UW and SFP)

GRSF collates stock status information from FIRMS, RAM Legacy, FishSource

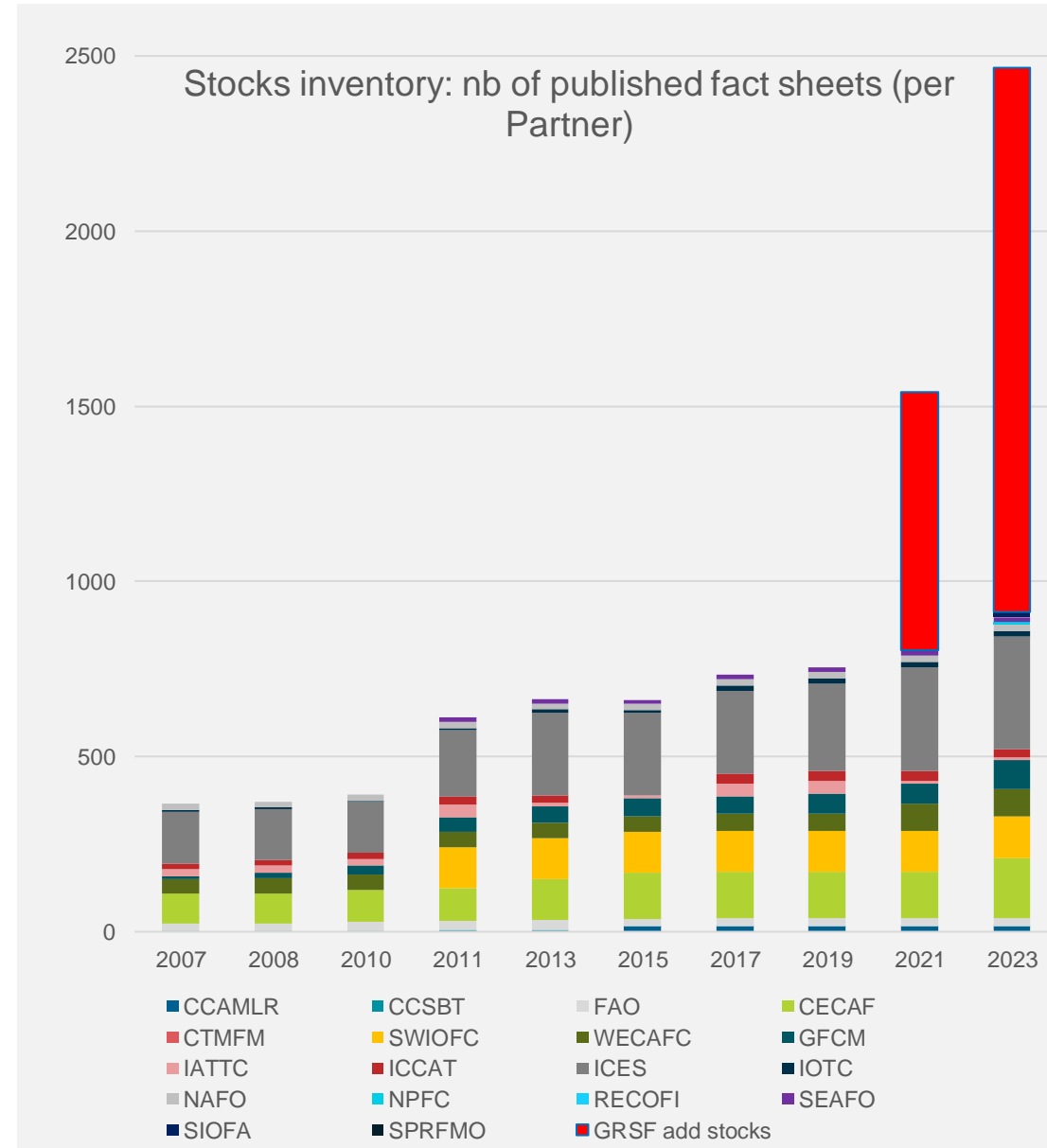
June 2023: **2363 active stocks** with published UUIDs disseminated through GRSF.

Majority of added stocks are national ones

Growth from SDG14.4.1 country questionnaires (2019)

86 of 164 countries reported in 2019-20 (52.4% reporting rate)
 net addition of 302 stocks in GRSF, from 28 validated countries
 (counting total of 468 stocks)

About 96 reported in 2022-23 (58.5% reporting rate)



FIRMS tools, products, assets

Global Record of Stocks and Fisheries (GRSF)

- ✓ GRSF is the **tool** for a critical expansion of FIRMS information towards a **world coverage**.
- ✓ GRSF enables **collation, standardization and harmonization** of data and information across multiple data providers.
- ✓ To facilitate and promote **monitoring** of all world stocks and fisheries status and trends.
- ✓ Four major database sources contribute to GRSF under the **FIRMS governance**:
 - **Fisheries and Resource Monitoring System (FIRMS)**
 - **RAM Legacy Stock Assessment Database**
 - **FishSource database** (program of the Sustainable Fisheries Partnership)
 - **FAO Questionnaire on SDG 14.4.1** “Proportion of fish stocks within biologically sustainable levels”
- ✓ GRSF acts as a global repository of a transparent inventory of **uniquely identified** stocks and fisheries records, offering a comprehensive worldwide coverage of over 2000 fish stock records.
- ✓ **Unique identifiers** are carefully assigned to stocks and fisheries and are published through the GRSF catalogue. Unique identifiers consist of a machine readable universally unique identifier (**UUID**) and a human-readable **semantic identifier** with codes and labels.

GRSF Current Projects

- ❖ **EU Blue-Cloud 2026** (with involvement of CNR-ISTI, FORTH, IRD - FIRMS Collaborative Partners)
- ❖ **SFP Project**, supported by UNDP Ocean Innovation Challenge - **Universal Fishery IDs: Expanding transparency, data flow, and equity for fisheries globally**



FIRMS tools, products, assets

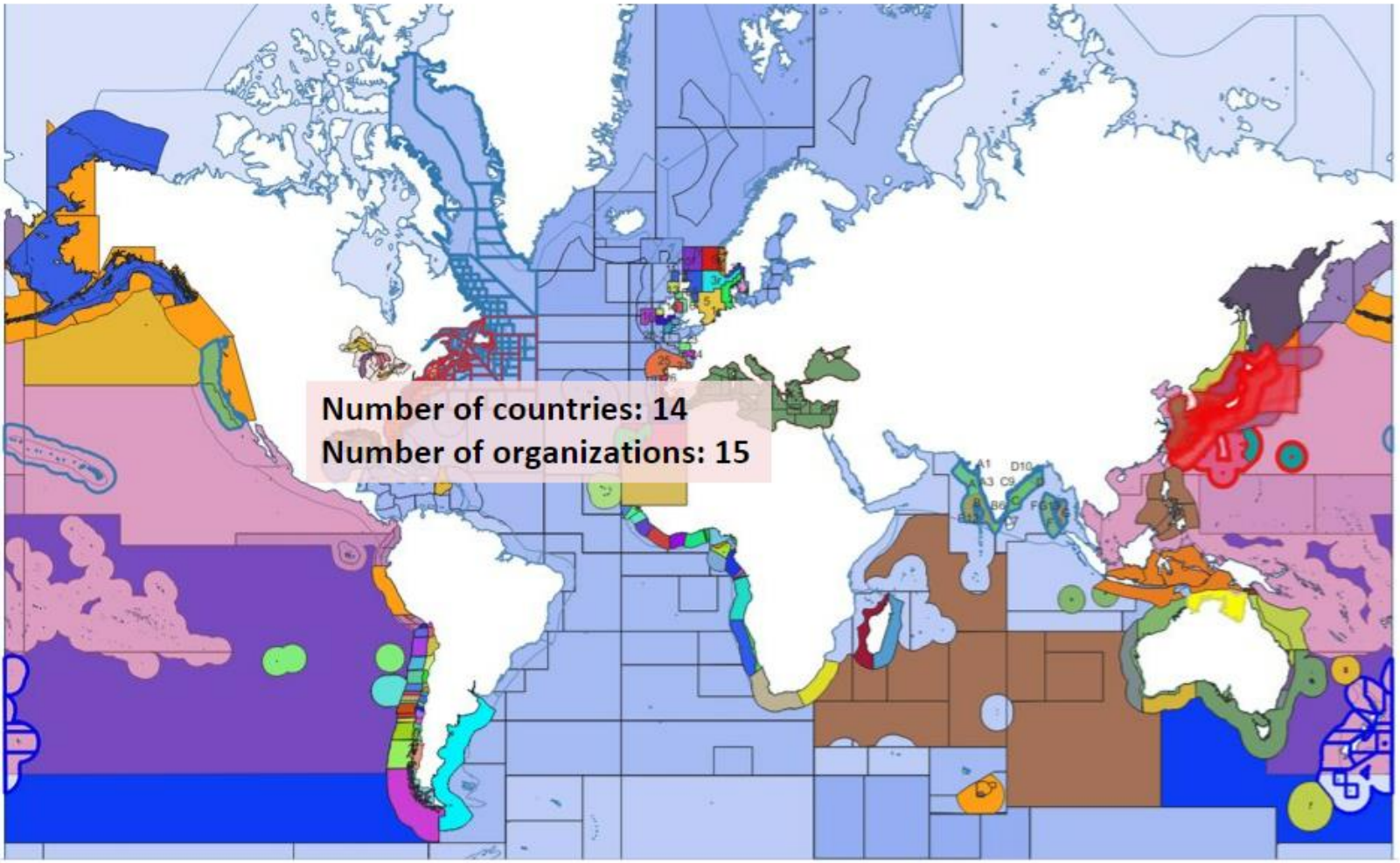
GRSF Water Areas database

GRSF areas database – a joint effort FAO-UW-FishSource

2837 areas inventoried with polygons and used for accurate georeferencing of stocks and fisheries

Work in progress with FishSource

Country/Organization	Number of Areas
Argentina	8
Australia	161
Canada	335
CECAF	3
Chile	42
FAO	324
GFCM	31
IATTC	13
ICCAT	33
ICES	37
Indonesia	11
India	30
IOTC	8
IPHC	12
ISC	6
Japan	56
LME	62
NAFO	2
Namibia	1
NJAs	152
New Zealand	725
Peru	1
Philippines	12
RFBs	61
Russia	48
SIOFA	9
SPC	3
United States of America	603
WCPFC	6
South Africa	42
Total number of Areas	2837



FIRMS tools, products, assets

Status of fisheries management (inventory of fishery management units)

40 reports by 7 RFMOs
 kernel of a management performance module ?

Status of fishing activity (inventory of fishing units)

253 fact sheets on fishery status by 5 RFBs in data poor regions
 Articulated with quantitative Catch and Effort Regional database

- WECAFIS
- FCWC (now include UUIDs for interoperability)
- RECOFI Minimum Data Reporting

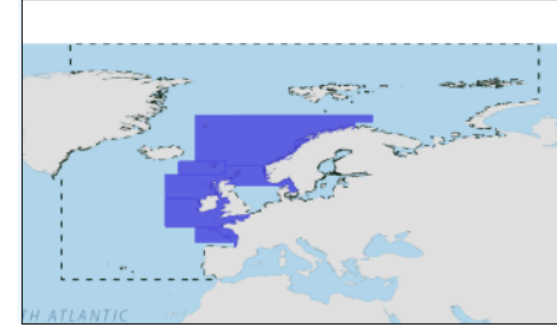
Complemented by FishSource database of Fishing units

Management report 2021 Northeast Atlantic Mackerel fisheries

Mackerel
 Owned by North-East Atlantic Fisheries Commission (NEAFC) – [more>>](#)
 Related observations

Overview: The main pelagic stocks in the NEAFC Regulatory Area are exploited by large trawlers-purse seiners from all the Contracting Parties of NEAFC. The fleets move with the season between the three main stocks and the

Location of Northeast Atlantic Mackerel fisheries



APPROACH: FISHERY MANAGEMENT UNIT

Jurisdictional framework
 Management Body/Authority(ies): North-East Atlantic Fisheries Commission (NEAFC)
 Mandate: Management; Monitoring; [more>>](#)
 Area of Competence: NEAFC Convention Area

Harvested Resource
 Target Species: Atlantic mackerel
 Fishery Area: Northeast Atlantic; Rockall, Northwest ...; Irish Sea, West ...; Bay of Biscay ...; Bay of Biscay ...; [more>>](#)

Rapports des pêcheries du FCWC 2022

Benin Artisanal purse seine small pelagic fishery - (coastal zone within 5nm)

Ghana type Purse seines [FCWC] - ST (Senne tournante)

Appartient à Fisheries Committee for the West Central Gulf of Guinea (FCWC) – [plus>>](#)
 Observations associées

Vue d'ensemble: Ghana type Purse seines [FCWC] - ST (Senne tournante) est de 500 à 1000 mètres de longueur et 50 à 55 mètres de chute (largeur).

Localisation de Benin Artisanal purse seine small pelagic fishery - (coastal zone within 5nm)



APPROCHE: ACTIVITÉ DE PÊCHE

Activité de pêche
 Engins de pêche: Filet tournants avec coulisse
 Type de système de production: Artisanal
 Zone de pêche: Zone côtière des cinq mille nautiques;

Saisonnalité: Toute l'année

Espèces capturées
 Espèces cibles: Orphie plate; Cordonnier bossu; null ... [plus>>](#)

Moyens de production
 Type de navire:

Indicateurs de la pêche
 Effort nominal: Nombre de navires
 Emploi: Nombre de pêcheurs
 Production: Capture

Légende de carte (↔)

FIRMS tools, products, assets



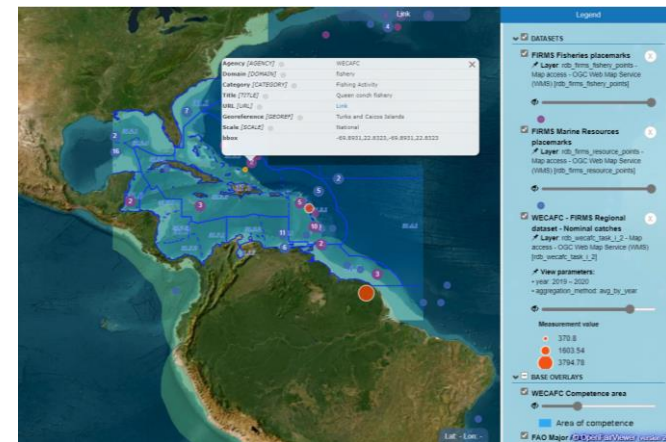
FIRMS Global Tuna Atlas

70 years time series of gridded catch annually contributed by 5 **RFMOs**
 Level 0 updated up to 2021, (level1 ready; level2 with IRD)
 Spearheading streamlined data sharing agreements (i.e. implements the new **CWP** standard for Reference Harmonization)
 Led by FIRMS Partners (**IOTC, IRD**)

WECAFIS


Regional Databases on Catch and Effort

WECAFIS - 8 countries submitted C&E data against WECAFC DCRF in 2022



Access to **FCWC regional database** on Catch & Effort – 6 countries

APIs



fishing_unit	number_of_fishing_days	species_scientific_name	annual_catch_in_tons	CPUE_in_Kg_per_d	grsf_uid	grsf_semantic_id
rpe_Purse seines	3628	Engraulis encrasicolus	3790.8	1044.94	2007ca3b-6dd5-3c2d-934f-d7e414f655cc	asfis:ANE+eez:TGO+authority:NAT:TGO+iso3:TGO+isscfcg:01.1
rpe_Purse seines	16835	Engraulis encrasicolus	10512.8	624.54	2007ca3b-6dd5-3c2d-934f-d7e414f655cc	asfis:ANE+eez:TGO+authority:NAT:TGO+iso3:TGO+isscfcg:01.1
rpe_Purse seines	16835	Engraulis encrasicolus	10514.4	624.54	2007ca3b-6dd5-3c2d-934f-d7e414f655cc	asfis:ANE+eez:TGO+authority:NAT:TGO+iso3:TGO+isscfcg:01.1
rpe_Purse seines	11434	Engraulis encrasicolus	10677	933.77	2007ca3b-6dd5-3c2d-934f-d7e414f655cc	asfis:ANE+eez:TGO+authority:NAT:TGO+iso3:TGO+isscfcg:01.1
rpe_Purse seines	9169	Engraulis encrasicolus	7700.4	839.79	2007ca3b-6dd5-3c2d-934f-d7e414f655cc	asfis:ANE+eez:TGO+authority:NAT:TGO+iso3:TGO+isscfcg:01.1

FCWC RDB



On-going draft **RECOFI-MDR database**

8 countries submit data on RECOFI priority species since 2012

FIRMS

FIRMS tools, products, assets

Shared concepts and standards

FIRMS Partners have 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 FSC13/2023

FIRMS Information Management Policy

FIRMS Controlled terms and definitions for a common language around the world of fishery stocks monitoring and reporting



FIRMS map viewer



Key developments with FIRMS

- FIRMS survey, requested by FSC12 to support **strategic orientation** for FIRMS for the next decade, was presented at FSC13
- It pointed on the urgent need to update the **FIRMS system**
- Along with key decisions to support the **SDG 14.4.1 indicator**

The FIRMS System

The backbone information of FIRMS consists of **Marine Resource and Fishery inventories** (Excel based) where information provided by the partners is organized in a database and published in the form of **Fact Sheets**, under two domains:


- “**Marine Resources**”, the biological domain
- “**Fisheries**”, the exploitation and usage, domain


Swordfish - Northeastern Pacific

Owned by Inter-American Tropical Tuna Commission (IATTC) – More
Locate in inventory

Species:
Xiphias gladius

FAO Names: en - Swordfish, fr - Espadon, es - Pez espada, ru - Меч-рыба





Geographic extent of Swordfish - Northeastern Pacific

Main Descriptors
Considered a single stock: Yes Spatial Scale: Regional
Management unit: Yes Reference year: 2018

Table of Contents
Habitat and Biology - Geographical Distribution - Water Area Overview - Resource Structure - Exploitation - Assessment - Biological State and Trend - Source of information

Biological State and Trend

State & Trend Descriptors	Partner		FIRMS
	Exploitation rate	Moderate fishing mortality	Moderate fishing mortality
Abundance level	Intermediate abundance	Intermediate abundance	(1)
Exploitation state	FAO Categories Moderately exploited		

Management report 2018

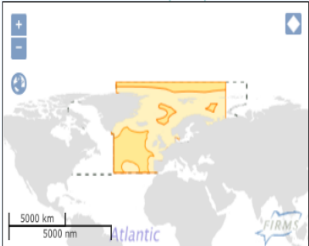
Northeast Atlantic Deep-sea species fisheries

Deep-sea species

Owned by North-East Atlantic Fisheries Commission (NEAFC) – more>>
Locate in inventory

Overview: Fisheries for a number of deep-sea species are conducted in the NEAFC Regulatory Area. A list of all 53 species that are formally classified in the NEAFC Scheme of Control and Enforcement as "Regulated"

Location of Northeast Atlantic Deep-sea species fisheries

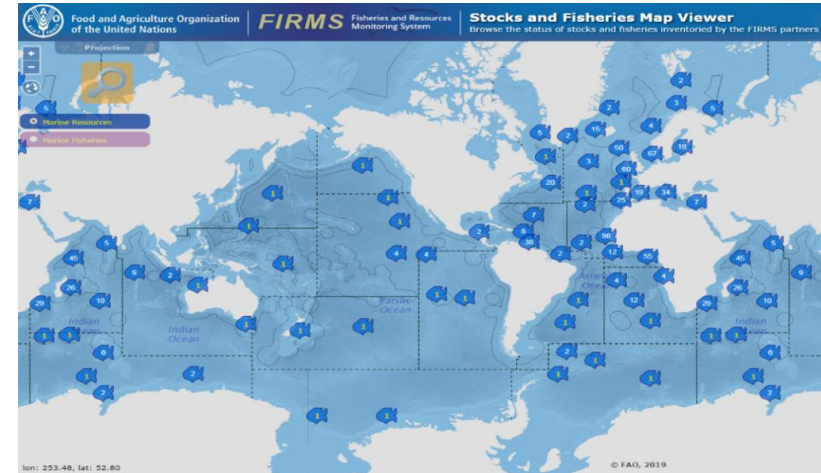


APPROACH: FISHERY MANAGEMENT UNIT

Jurisdictional framework
Management Body/Authority(ies): North-East Atlantic Fisheries Commission (NEAFC)
Mandate: Management; Monitoring; more>>
Area of Competence: NEAFC Convention Area
Maritime Area: High seas

Harvested Resource
Captured Species: Baird's slickhead; Risso's smooth-head; Blue antimora ... more>>
Fishery Area: North East Atlantic; NEAFC Convention Area

Geographic reference: Northeast Atlantic
Spatial Scale: Regional
Reference year: 2018



This system provides tools to ensure **controlled dissemination** of high quality and updated information. The Fact sheets can be accessed through dedicated search interfaces and through the “**Stocks and Fisheries map viewer**”:
<http://firms.fao.org/firms/stocks-fisheries-map-viewer>.

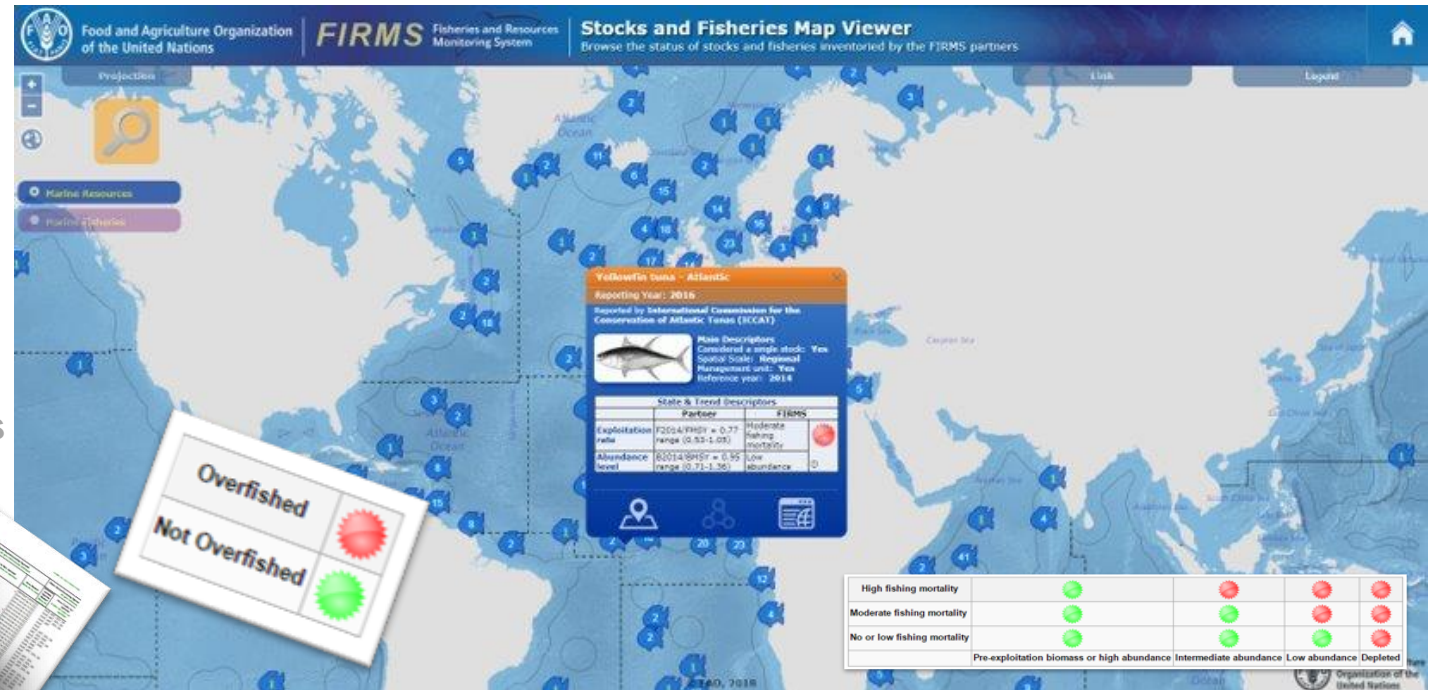
FIRMS is disseminating only **public data** always acknowledging the **provenance and ownership**, and its content can be re-used by the partners.

The FIRMS System

FIRMS database:

- **Highly migratory high seas stocks**
 - **shared stocks under RFBs mandates**
 - **RFMOs' managed fisheries**
- but also, to some extent
- **national stocks / assessment units**
(when under RFBs monitoring)
 - **status of national fisheries**
(within selected RFBs)

FIRMS Products & Services



➤ The Partners contribute with over 1 000 records to the FIRMS inventory of marine resources and more than 300 fisheries that these organizations monitor or manage.

Key developments with FIRMS

FIRMS Steering Committee (London, June 2023) deliberated strategic decisions for the next decade

- Timely data provision in support to SDG indicator 14.4.1 and where applicable to FAO State of Stock
- Contribute to the design and reporting on fisheries management in context of the new FAO COFI sub-committee on fisheries
- Prioritize the strengthening of small-scale fisheries data collection
- Fostering interoperability among partners' databases
 - Support collection, collation, and dissemination of catch and effort through regional and global databases (WECAFC, FCWC, RECOFI, SEAFDEC)
 - Facilitate and promote monitoring of all world stocks status and trends
 - FAO FIRMS and the Global Record of Stocks and Fisheries (GRSF)

Key developments with FIRMS

❖ In progress...

- Revamping of the FIRMS website (currently on-going) which will take into account:
 - requests from FIRMS partners made during the survey
 - FAO's decisions on how FIRMS will disseminate a stock-by-stock breakdown of the SOFIA Global/regional State of Stocks index
- GRSF will inform world users on the knowledge we have on the stock structure, and will play this role of disseminating UUIDs

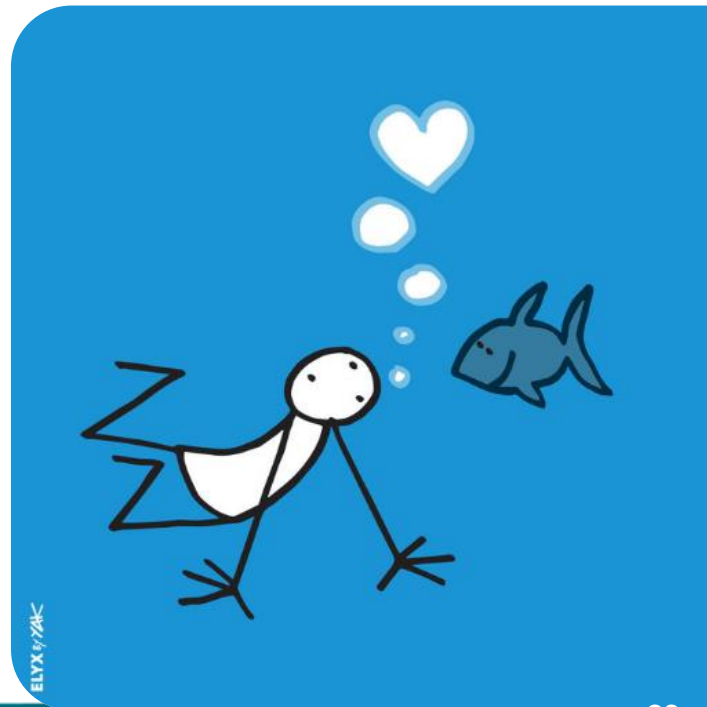
❖ In the workplan...

Among others,

- New session of FIRMS TWG on Terminology
- Collect and disseminate data from new partners and observers (e.g. NPFC, CTMFM)
- Capacity building activities

FIRMS & the Sustainable Development Goals

- ❑ Repository and dissemination of FIRMS Partners contributions on stock and fisheries status
- ❑ Communicate knowledge on world stocks (e.g. GRSF map viewer)
- ❑ Disseminate Global/Regional SDG14.4.1 indicator (SOFIA State of Stocks) at appropriate breakdown level



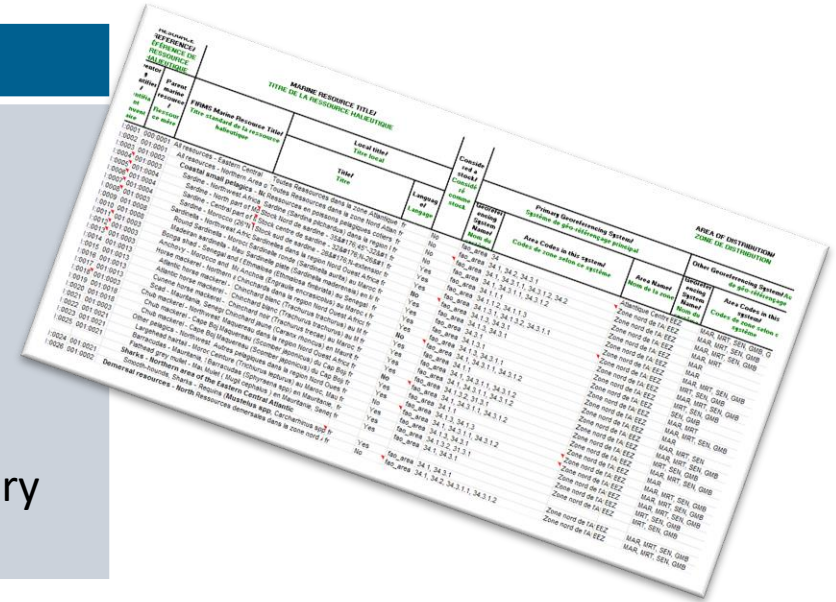
14 LIFE
BELOW WATER



To conserve and sustainably
use the world's oceans, seas
and marine resources

NPFC Stocks & Fisheries inventory - Draft

Marine Resources	Fisheries – Management Unit?
North Pacific armorhead	Bottom trawl fishery
Splendid alfonsino	Bottom gillnet fishery
Pacific saury	Bottom longline fishery
Neon flying squid	Seamount long-line fishery
Japanese flying squid	Pacific saury fishery
Chub mackerel	Chub mackerel fishery
Blue (spotted) mackerel	Neon Flying Squid and Japanese Flying Squid fishery
Japanese sardine	Japanese sardine fishery



- **Stocks and fisheries inventory** (draft) for the North Pacific region
- Eight **marine resources** and eight **fisheries** were drafted within the **FIRMS inventory templates**
- Other species might be additional reported (E.g. Sablefish, Skilfish, Rougheye rockfish)
- The **Excel based inventory** is made of distinct fields allowing the submission of **narrative** texts, or the selections of **controlled terms**
- Not all fields are mandatory and **data availability is the main driver** for the compilation of the inventory
- Once the inventory is built, the effort to **maintain** it is estimated to be between a few hours to a few days according to the number of records and the data availability
- Fisheries – Management Units can contribute to the **TWG on fisheries management**

NPFC role in FIRMS

With FIRMS today more ready to contribute to the FAO SOFIA State of Stocks (SoS)*

- NPFC – as new Partner and data provider – is instrumental to increase the monitoring of the North Pacific region with data coverage and information; with networking and flagging other opportunities for partnership

Taking part of the FIRMS assets, i.e.:

- Assigning unique identifiers to NPFC stocks and fisheries and informing about the North Pacific fish stock structure
- Take part of the FIRMS dissemination of the stock-by-stock disaggregation of the SOFIA index, which will combine public data provided by RFBs and non-public data from the SDG14.4.1 Questionnaire and other national sources
- Contribute to the newly borne FAO sub-Committee on fisheries management
- Contribute to the GRSF Area database - where possible - from the national level
- Contribute to the development of FIRMS information standards

**The FIRMS operational contribution to the new methodology will be for SOFIA 2026, with a data call during fall 2024. To this end, FIRMS Secretariat is preparing the new system and the renewed collaboration with Partners on the basis of a few regional pilots FAO conducted during 2022-23 to test the new methodology for reporting on state of fish stocks.*

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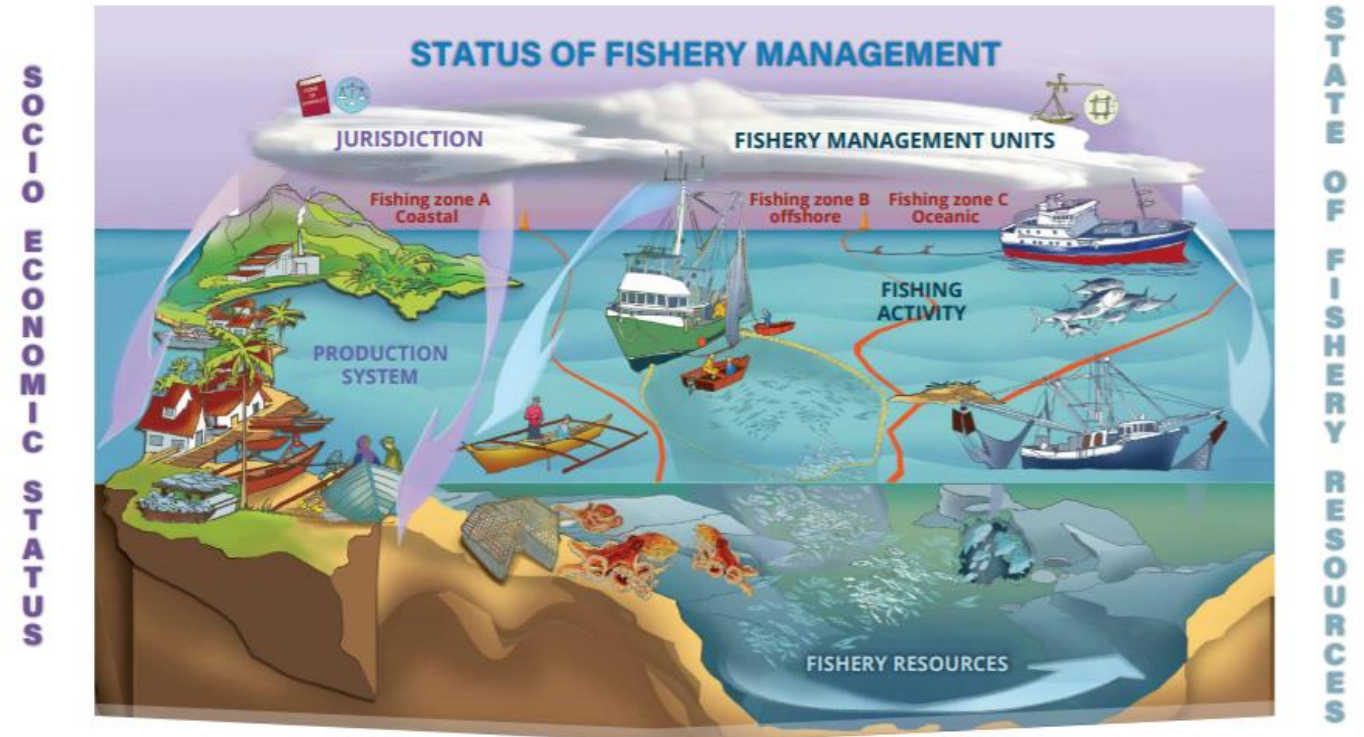
Fisheries are a fundamental source of food, livelihood and trade all around the globe. Conservation and protection of aquatic resources requires cooperative, careful stewardship. Two thirds of all stocks are sustainably fished with catches up to maximum sustainable limits, while 82 percent of catches by weight are from sustainable sources. 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 bodies. FIRMS provides such coordinated action on the global monitoring of fishery resources by collating reliable, relevant and up-to-date information that is necessary to inform evidence-based policies and actions.

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, four International Plans of Action and the Strategy for Improving Information on Status and Trends in Capture Fisheries, as well as voluntary international guidelines and binding instruments such as the Ports State Measures Agreement, have been developed as complementary instruments to promote further the objectives of responsible fisheries.

<https://www.fao.org/3/cc4342en/cc4342en.pdf>



<https://firms.fao.org>



Thank you ▪ Merci
Благодарю ▪ ¡Muchas gracias!
謝謝 ▪ شكرا

FIRMS-Secretariat@fao.org

