FIRMS
FISHERY RESOURCES MONITORING SYSTEM

STRATEGY FOR IMPROVING INFORMATION ON STATUS AND TRENDS OF CAPTURE FISHERIES

Global Partnerships for Responsible Fisheries

Marine Fishery Resources Inventory: Method and Guidelines

Management Summary		
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Revision History		
Date	**Author**	**Summary**
04 March 2005	A. Bensch E. Balestri	Approach and definitions of attributes describing a Marine Fishery Resource
June 2011	M. Taconet E. Balestri A. Gentile	Upgrade of the guidelines following latest feedback from FIRMS partners and FIRMS SC6
February 2013	M. Taconet E. Balestri A. Gentile	Upgrade of the guidelines following feedback collected from TWG3 and FSC8

INTRODUCTION

This document describes the rational, method and the template used to inventory marine fishery resources in a specific area of the world. The key aspect is to acquire a good description of the inventoried fishery resources and to establish extent of knowledge of their state and trend, and thereof to organize and structure the information in a consistent way. The present guidelines intend to provide the required background.

This inventory is connected (however not subordinated) to the developments taking place as part of the Fishery Resources Monitoring System[1] (FIRMS) initiative. In FIRMS, fishery resources are inventoried for reporting purpose, and the inventories constitute the backbone of the FIRMS system. Each partner enumerates the list of fishery resources under its area of competence and mandate, and the system organizes the reporting on status and trends accordingly.

The inventory is implemented using an Excel format for initial data input where each row describes a fishery resource (FR_Templates.xls). Through the FIGIS system, this information is afterwards organized in a database and published as fact sheets (see Annex 2). Each column of the inventory contains data or FIRMS standard descriptors which all together describe the main characteristics of the fishery resource. The full list of descriptors is dynamically available in the template and also provided in the FR_ReferenceTerms.xls file. This set of data can be integrated with other information for obtaining more exhaustive fact sheets.

This document is intended to be a practical instrument for the compilation and following validation of the data stored in the Excel inventory table.

Definitions

The wording “Marine Fishery Resources” describes the scope of the inventory. The underlying concepts are defined below:

1. In context of FAO Fisheries Glossary, “Fishery resources” are those aquatic resources of value to fisheries; the aquatic resources are the "Biotic element of the aquatic ecosystem, including genetic resources, organisms or parts thereof, populations, *etc*. with actual or potential use or value (*sensu lato*) for humanity".

    - A “Stock” is defined as a group of individuals in a species occupying a well defined spatial range independent of other stocks of the same species. It can be affected by random dispersal movements and directed migrations due to seasonal or reproductive activity.

    According to the above definitions, what cannot be identified as “Stock” will be treated in this document as a “Fishery resource”. The reader should be aware that this term is sometimes interchanged with the more commonly used terms “Marine resource” or “Resource”.

Approach recommendations to the inventory

2. The identification of documents related to fishery resources in the region/country is a preliminary task. It is recommended to compare different sources of information in order to establish a consistent inventory.

3. The number of fishery resource units being listed and properly described in the inventory regarding a given region or country is debatable, especially regarding the resources,

[1] see FIRMS at http://firms.fao.org/firms

which can be set as aggregation of biological stocks or sub-part of a biological stock. The basic principle is that a fishery resource should be inventoried as long as it is a unit considered for assessment purpose or other resource monitoring needs. Additionally, as practical criterion, target and associated species listed in the corresponding fisheries inventory can provide a good basis for inclusion of a fishery resource in the inventory.

4. The inventory covers different scales, from local to national, regional and global. Hierarchies among the inventoried fishery resources may be established according to the above definitions of stocks and resources.

Other important recommendations

- ✓ In order to facilitate the integration of the inventory in the FIGIS system, it is requested that the author follows the editing recommendations provided in table 1: **Guidelines for the compilation of a Fishery Resource record.**

- ✓ A standard terminology is to be used for most of the fields, although new terms can be submitted by the author of an inventory in case of specific needs.

- ✓ If the inventory of Fisheries in the same region/country has been compiled, ensure good cross-referencing between column **Exploiting fisheries** of the fishery resources inventory and column **Exploited resources** of the Fisheries inventory.

Table 1: **Guidelines for the compilation of a Fishery Resource record**

The following table provides instructions to describe an inventoried fishery resource with reference to the template **FR_Templates.xls (Excel file,** each row identifying one fishery resource) and the full list of standard descriptors FR_ReferenceTerms.xls. Some cells filled in with **light grey shade** are for internal use.

ATTRIBUTE				DESCRIPTION
MARINE RESOURCE REFERENCE	FIRMS ID			For internal use. Unique numeric code which identifies the marine resource in the database.
	Inventory identifier			A unique alphanumeric code must be assigned to any inventoried marine fishery resource. (e.g. R<countrycode or RFB acronym, or any other abbreviation><progressive number> RBRA001 (Resource Brazil 001)).
	Parent marine resource			Inventory identifier of the parent marine fishery resource. According to the definition of a "stock" provided above, a marine fishery resource qualified as "stock" cannot have another "stock" as child
MARINE RESOURCE TITLE	FIRMS Marine Resource Title			Name of the marine fishery resource in English or French following the FIRMS naming convention (see Annex 1). Titles may be indented to highlight the hierarchical relationships between the marine fishery resources inventoried
	Local title	Title		Name locally given to the marine fishery resource. It can be in any language and it is usually entered for facilitating users to recognize the fishery resource
		Language		Language in which the local title is expressed - see language codification in **Languages (ISO 639)** sheet
Considered a stock				"Yes" if the fishery resource is considered a stock (see above "stock" definition)
MANAGEMENT	Management unit			"Yes" if the marine resource is considered a management unit. A resource formally identified in a management plan is considered a Management unit. Definition: a unit considered by an Authority for a purpose of management, usually within a jurisdiction and/or with established legal rights. Jurisdiction is interpreted here as "the limits or territory within which some authority may be exercised"
	Description			Overview on management if available
AREA OF DISTRIBUTION	Primary Georeferencing System		Georeferencing System Name	Primary geographic classification system chosen for describing the area in which the resource is identified - see **Area of Distribution** sheet. Additional systems can be used by providing relevant information (system name, codes, limits of the areas, shape files, maps, *etc*.)
			Area Codes in this system	Specify the code of the area in this codification system. If more than one, use comma as separator
			Area Name	Additional area specification for the resource location
	Other Georeferencing System		Georeferencing System Name	Other geographic classification system chosen for describing the area in which the resource is identified - see **Area of Distribution** sheet. Additional systems can be used by providing relevant information (system name, codes, limits of the areas, shape files, maps, *etc*.)
			Area Codes in this system	Specify the code of the area in this codification system. If more than one, use comma as separator
			Area Name	Additional area specification for the resource location

ATTRIBUTE				DESCRIPTION
	Spatial scale			Geographic level at which the resource is monitored. See standard terms in **Area of distribution** sheet
	Jurisdictional distribution			Typology of shared stocks considering how the stock distribution overlaps marine jurisdictions. See standard terms in Area of distribution sheet
SPECIES	Order			Taxonomic name for the order. If more than one use comma as separator. Not mandatory if Families are provided
	Family			Taxonomic name for the family. If more than one use comma as separator. Not mandatory if Scientific names are provided
	Genus and species			Taxonomic name for genus and species. If species is unknown use <*Genus*> *sp*. To specify more than one species of the same Genus use <*Genus*> *spp*. If more than one, use comma as separator. Enter Family or Order if such level of detail is not available.
	Marine habitat	Geoform		Type of sea floor physiography in which the fishery resource is distributed. Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one use comma as separator.
		Depth zone		Bathymetric depth range in which a fishery resource is distributed. Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one, use comma as separator.
		Horizontal distribution		Inshore to offshore range in which the fishery resource is distributed (e.g. littoral, neritic, oceanic ...). Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one, use comma as separator.
		Vertical distribution		Type of habitat describing the fishery resource distribution according to its relationship with the sea bottom. Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one use comma as separator.
		Bottom type		Type of bottom substratum in which the fishery resource is distributed. Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one use comma as separator.
		Climatic zone		Type of climate prevailing in the area of distribution of the fishery resource. Use a standard term (see list in **Fishing Ground – Marine Habitat** sheet). If more than one use comma as separator.
		Marine habitat description		Free text to describe all the biotic and abiotic characteristics of the marine habitat.
EXPLOITING FISHERY				Fisheries exploiting this marine resource: use the inventory identifier of the fishery, as entered in the fisheries inventory. If more than one, use comma as separator. In case of no availability of fisheries inventory, please indicate fishery name(s).
ASSESSMENT METHODS	Assessment overview			Free text to introduce the assessment
	Empirical Assessment	Type of Empirical Assessment		Empirical assessment applied (e.g. Expert judgment, Delphi method, etc.)
		Based on		Type of data/information on which empirical assessment is based
		Description		Free text
	Assessment Models	Types of Model		Assessment models applied. If possible, use one of the following suggested terms: Age-structured, Size-structured, Biomass-aggregated, Others.
		Title of Models		Title of the models applied (e.g. VPA, XSA)
		Description		Free text
	Level of uncertainty			Indicator for reliability of assessment results. High, Intermediated or Low depending on the goodness of data and models applied
STATE OF MARINE RESOURCES	Exploitation rate			The proportion of a population at the beginning of a given time period that is caught during that time period (usually expressed on a yearly basis) (Source: FAO Fisheries Glossary). Use a standard term (see list in **State of Marine**

ATTRIBUTE		DESCRIPTION
		fishery resource sheet), a free value is also allowed.
	Exploitation Rate Free Value	Values for Fishing mortality which will appear within the fact sheet. They can correspond or be related to the standard ones
	Abundance level	Degree of plentifulness. The total number of fish in a population or on a fishing ground. Can be measured in absolute or relative terms. (Source: FAO Fisheries Glossary). Use a standard term (see list in **State of Marine Resource** sheet), a free value is also allowed.
	Abundance Level Free Value	Values for Biomass which will appear within the fact sheet. They can correspond or be related to the standard ones
	State	Description of the state of an aquatic resource through the use of one or more standard terms (see list in **State of Marine Resource** sheet).
	Description	Further description of the State of the Marine fishery resource
REFERENCES	**Bibliography**	Bibliographic references of literature consulted and used for identifying and documenting the marine fishery resources inventoried. For each bibliographic reference, a code must be defined and used in the inventory sheet. The code has to be explicit but short, 15 characters maximum, and should not include blank. The bibliographic reference has to be described in the sheet "**Source of Information**". If more than one code, use a comma as separator between the codes. Sort the codes from the most relevant to the less relevant bibliographic reference.
	Link to Bibliography	URL of bibliographic reference(s) if available. If more than one use "|" as separator.
	Source	Bibliographic reference of the source publication for a specific sub-set of data included in the inventory. Please follow the same compilation rules described in the above Bibliography field
	Link to Source	URL of source document(s) if available. If more than one use "|" as separator.
	Reference year	Reference year concerning the information provided for the marine fishery resources inventoried. It corresponds to the year for which the status of the Marine fishery resource has been evaluated
	Reporting year	Reporting year attached to the information provided for the marine fishery resource inventoried. It corresponds to the year in which the scientific meeting (or equivalent scientific validation process) reviewed the status of the Marine fishery resource inventoried
	Start/End Monitoring Year	The year when the resource started to be monitored or when the monitoring has been stopped or suspended. The use of the "Start Monitoring Year" might be coupled with the presence of an "Ancestor Resource" while the use of the "End Monitoring Year" with the presence of "Descendant Resource(s)". Potentially all values can be combined. Incorporating a monitoring unit into another existing one implies the creation of a new object in order to keep track of the monitored resources evolution and for having consistent references. Please adopt the following syntax: [S(Start Monitoring Year) | A(Ancestor Inventory Identifier)] , [E(End Monitoring Year) | D(Descendant Inventory Identifier)]. Example: E(2009)
	Ancestor Monitored Resource	Ancestor: resource(s) which were originally monitored instead of Resource unit under consideration. Example: A(006:0180, 006:0181)
	Descendant Monitored Resource	Descendant: resource(s) which originate from the Resource unit under consideration. Example: D(006:0180, 006:0181)
OWNERSHIP	**Inventoried by**	For internal use
	Collection identifier	For internal use
	Cover page identifier	For internal use
Notes		Any comment regarding the inclusion of this resource in the inventory
Fact Sheet Language		For internal use

ANNEX 1

Marine fishery resources - Rules for naming convention

General Rules

The name of a marine fishery resource is established in English. It should show off both its biotic component and its area component, usually separated by the symbol "-".

- The **biotic component** of the marine fishery resource name should be based on common name used by international classifications (e.g. ASFIS for taxonomic names). If the biotic component includes more than one name, the comma (",") is used as separator.
- The **area component** should be the name used for the area, It implies that the use of codes or acronyms should be avoided, or put at the end in parenthesis. The name of the area should follow international or regional naming classifications and conventions (country names, oceans and seas names, etc.). When the area component includes more than one name, they are separated by a comma (",").

Examples

Source	Local Name	FIRMS English name
CECAF	Sparidés dans la région nord ouest africaine	Seabreams - Northwest Africa
CECAF	Pageot (Pagellus bellottii) au Maroc, Mauritanie, Sénégal, Gambie 35° 45''-12°18''	Red pandora - Morocco, Mauritania, Senegal and Gambia
ICES	North-East Arctic haddock (Sub-areas I and II)	Haddock - Barents Sea, Norwegian Sea, Spitzbergen and Bear Island
ICES	Nephrops in Division IVa, West of 2°E, excluding Management Area F (Management Area G)	Norway lobster - North Sea (Fladen)

Some particular cases

1. Species for which only one stock has been identified

   In this particular case the common name of the species includes sometimes the name of the area delimitating the stock (*e.g*. Pacific Bluefin tuna). In that case, when referring to the whole stock, it is useless to include in the name a specific component for the area. Or sometimes, the name of the species, even if not including the area name is used by authors to designate the whole stock (*e.g.* Southern Bluefin tuna).

   Example

Source	Local Name	FIRMS English name
CCSBT	Thunnus maccoyii	Southern Bluefin tuna

2. Resources at global scale

When referring to all the stocks of a species (or a group of species), the term “global” is used as area component of the resource name.

Example:

Source	Local Name	FIRMS English name
FAO	All Bluefin tuna species	Bluefin tuna species - Global

3. Different stocks of the same species within the same area

Different populations of the same species may be located in the same area at different season. In that case, the biotic component must include an additional qualifier in order to make the name of each stock unique.

Examples:

Source	Local Name	FIRMS English name
ICES	Herring in Sub-divisions 22-24 and Division IIIa (spring spawners)	Spring Spawning Herring - Skagerrak and Kattegat
ICES	Herring in Sub-area IV Division VIId and Division IIIa (autumn spawners)	Autumn Spawning Herring - North Sea, Eastern Channel, Skagerrak

4. All species in one area

To define the resource name representing all the species in one area, the term “Marine fishery resources” is used as biotic component of the resource name.

Example:

Source	Local Name	FIRMS English name
FAO	All resources of the Mediterranean sea	Marine resources – Mediterranean Sea

ANNEX 2 Example of a Fishery Resource presented as FIRMS fact sheet

Marine Resource Fact Sheet

Search | Print | XML

Stocks management recommendations 2010

Northern Prawn - Flemish Cap, 2010

Northern Shrimp in Div. 3M

Citation

Owned by Northwest Atlantic Fisheries Organization (NAFO) More

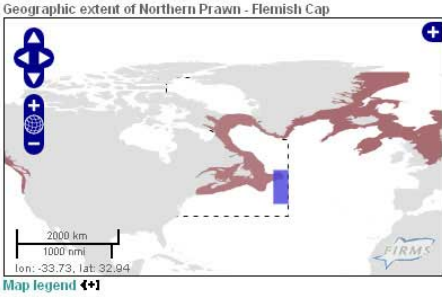
Related observations

Locate in inventory

Species:
Pandalus borealis

Fao Names : en - Northern prawn, fr - Crevette nordique, es - Camarón norteño

Geographic extent of Northern Prawn - Flemish Cap



Map legend

Area Details

Main Descriptors
Considered a single stock: Yes Spatial Scale: Regional
Considered a management unit: Yes

Table of Contents

Habitat and Biology

Climatic zone: Temperate. Bottom type: Unspecified. Depth zone: Unspecified. Horizontal distribution: Oceanic. Vertical distribution: Demersal/Benthic.

Geographical Distribution

Jurisdictional distribution: High Seas Purely

The shrimp fishery in Div. 3M began in 1993. Initial catch rates were favorable and, shortly thereafter, vessels from several nations joined. The number of vessels participating in the fishery has decreased by more than 60% since 2004 to 13 vessels.

Water Area Overview

Spatial Scale: Regional

Geo References

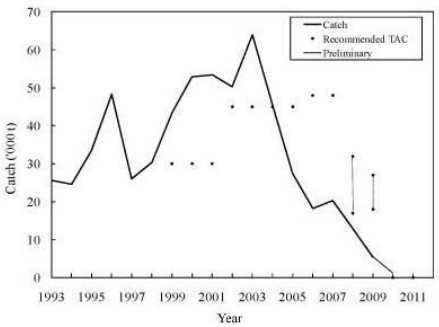
Resource Structure

Considered a single stock: Yes

Exploitation

	Catch ('000 t)		TAC ('000 t)	Effort[3] (days)
Year	NIPAG	21A	Recommended	Agreed
2006	18	15	48	10555
2007	21	18	48	10555
2008	13	12[1]	17-32	10555
2009	5	5[1]	18-27	10555
2010	1[2]		ndf	5277
2011			ndf	0

[1] Provisional.
[2] Preliminary to 10 October, 2010
[3] This stock is effort regulated
ndf- no directed fishery



Assessment

Data

Catch, effort and biological data were available from several Contracting Parties. Time series of size and sex composition data were available mainly from two countries between 1993 and 2005 and survey indices were available from EU research surveys (1988-2010). Only provisional catch data were available for 2010. Reliable catch and effort data were not available for 2010 and therefore the standardized CPUE series was only updated to 2009. This CPUE series accounted for changes in gear (single, double and triple trawl), fishing power and seasonality.

Assessment Model

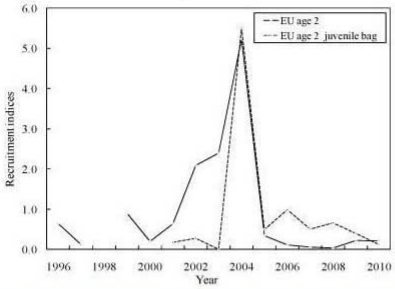
Analytical assessment

Results

No analytical assessment is available and fishing mortality is unknown. Evaluation of stock status is based upon interpretation of commercial fishery and research survey data.

Recruitment

All year-classes since 2002 (i.e. age 2 in 2004) have been weak.

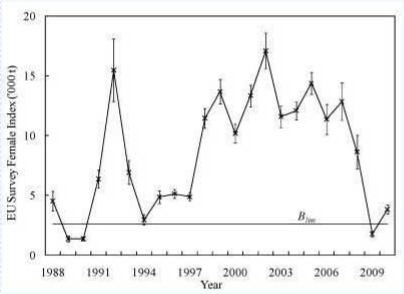


Overall Assessment Results

Assessment Indicator

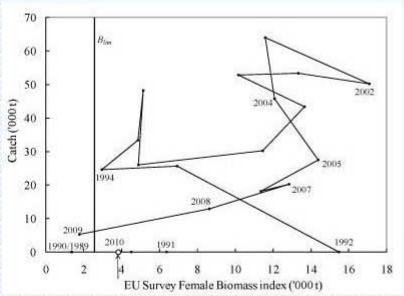
SSB

The female survey biomass index was at a high level from 1998 to 2007 then declined to very low levels in 2009 and 2010.



Reference Point

Scientific Council considers that the point at which a valid index of stock size has declined by 85% from the maximum observed index level provides a proxy for B_{lim}, for Div. 3M shrimp, 2 600t of female survey biomass. The female biomass index was below B_{lim} in 2009, and it is slightly above it in 2010. It is not possible to calculate a limit reference point for fishing mortality.



Scientific Advice

This advice will be reviewed based on updated information in September 2011 when results from the summer survey are available.

Management

Considered a management unit: Yes

Management Advice

The 2009-2010 survey biomass index indicates the stock is around the B_{lim} proxy and remains in a state of impaired recruitment. To favor future recruitment, Scientific Council recommends for 2012 that the fishing mortality be set as close to zero as possible.

Biological State and Trend

In 2009 the female biomass was below B_{lim}, but in 2010 it was slightly above B_{lim}. Due to the continued poor recruitment, there are serious concerns that the stock will remain at low levels.

Source of information

SCR Doc. 04/77, 10/64, 65, 66