FIRMS Technical Working Group Meeting
First Session
Rome, Italy, 05-08 December 2005
FIRMS INFORMATION MANAGEMENT POLICY: GEOREFERENCING PROPOSED STANDARDS
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1. Introduction

Geographic information is one of the key components of the domains objects managed by FIRMS: area of distribution of a marine resource, fishing zone exploited by a fishery, convention area of a management system. FIGIS Reference Table Management System (RTMS) manages geographic references used in FIRMS application to display maps and perform spatial queries.

2. Definitions

2.1 AREA

An area is the elementary unit of geographic information managed by FIGIS. An area is identified by a name and a code. Its geographical boundaries are known and can be modelled in a Geographic Information System (GIS) by polygonal feature(s).

2.2 GEOGRAPHICAL SYSTEM

A geographical system is the group of areas partitioning a spatial zone. A geographical system is identified by a name and a code. By definition, there is no spatial overlap among areas belonging to the same system. Each area of a system has a distinct code and name.

3. FIGIS references for geographical systems of areas

Geographical systems and areas are referenced in the FIGIS References Management System (RTMS).

3.1 GEOGRAPHICAL SYSTEMS REFERENCES

Within the RTMS, geographical systems are logically organised into geographical system groups, which can be considered as complex geographical systems, and are also given a unique code. High level water area system groups are:

- Fishing statistical areas
- Fishery management areas
- Jurisdiction areas
- Environmental areas
- RFB groups
- Reporting areas

This hierarchical organization is used by different tools of the FIRMS application to facilitate the selection of areas within a filtered sub-set of systems, or to format the table of content associated to a map displaying different geographical systems. The same system might be part of different system groups. A preliminary list of geographical systems and is available in the annex 1 of this document.

The main attributes of a geographical system reference are:

- a name (in English, French and Spanish)
- an alphanumeric code
- the types of the areas part of the system (see section “Area references below”)

The system codes are established using alphabetic characters in lower case. They are composed by a maximum of 3 sequences of alphabetic characters separated by “_”. There is no strict coding convention, but in general:

- When the author of the system is an organization, the first sequence is composed by its acronym. For example, all ICCAT geographical system codes start with “iccat_”.
- The high level system group abbreviation is often part of the code (e.g. “iccat_comp” for the system representing the ICCAT competence area).
- Finally, under a same system group, the last part of the system code includes an abbreviation of the characteristic which makes it distinct from other systems of the same group (“iccat_smu_alb”: ICCAT spatial management units for albacore).

3.2 AREAS REFERENCES

Each area is referenced with a name, a code and a type (meta identifier) which represents the system it belongs to.

Codification of areas is usually based on the codification used by the data provider. When the system has been created especially for FIRMS, the codification of areas follow similar conventions as the ones used for systems codes.

Area reference groupings have been built in the RTMS. These groupings are used to make easier the browsing of area references. For example, it is used to model the inclusion relationship between areas of 2 different geographical systems (e.g. FAO sub-division 37.2 is displayed as a sub-area of FAO major area 37).

4. Use of Geographical Information System in FIRMS

GIS facilities in the FIRMS web-based application rely on the FAO mapping engine called KIDS.

Each geographical system is stored in GIS format as an ESRI polygons shapefile. One attribute of the polygon features is the area code.

The association between a FIGIS geographical system reference and its geographical representation (polygons shapefile) is managed by the KIDS map engine.

All shapefiles are projected in the same equidistant projection. In order to make possible the display of pacific centered maps, two coordinates systems are used: one centered on Greenwich meridian, one centered on meridian 160 W.

We present here below some of the GIS tools implemented in FIRMS.

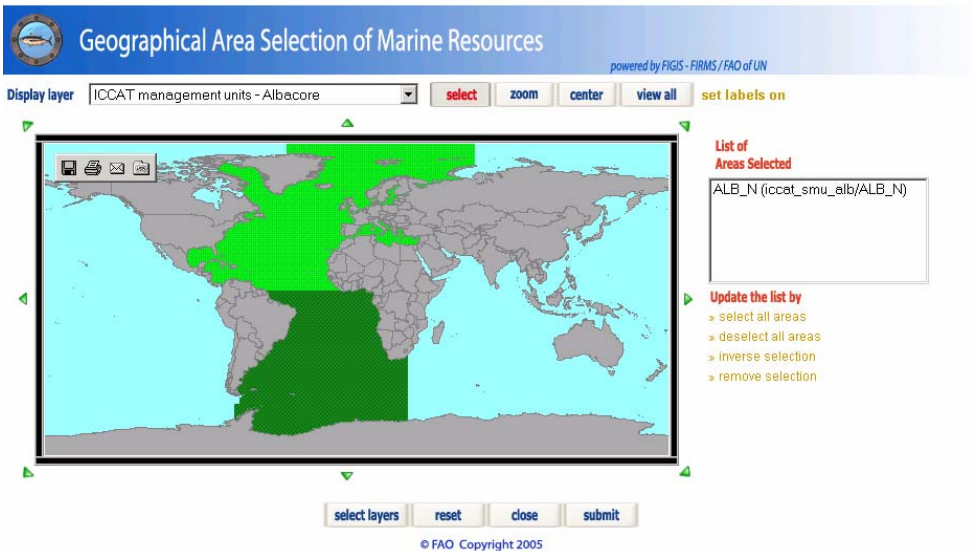
4.1 MARINE RESOURCES GEOGRAPHICAL DISTRIBUTION MAPPING TOOL

The purpose of this tool is to highlight on a map the distribution area of a marine resource, based on the list of areas used to represent its distribution. In addition, FAO major fishing areas intersecting these areas are also highlighted. This intersection is calculated using a relational table which provides the list of FAO major fishing areas for any area referenced in the RTMS.

FAO Fishing Statistical Areas
27.3.a Skagerrak and Kattegat (Division IIIa)
27.4 Subarea 27.4 - North Sea (Subarea IV)
27.7.d 0 Eastern English Channel (Division VIId)

4.2 GEOGRAPHICAL AREAS SELECTION TOOL

The purpose of this tool is to build a list of area codes which intersect a point selected by the user on a map. Examples of client applications which use this tool are (i) the elaboration of a search query string or (ii) the geographical referencing of marine resource distribution in the on-line editing. One single geographical system is displayed (in addition to the background continent layer) but more than one geographical system can participate in the selection process at the same time.



4.3 GEOGRAPHICAL SYSTEMS MAPPING TOOL

This is an interactive mapping tool used to display (or highlight) geographical systems or groups of geographical systems. The user has the control of which geographical systems has to be displayed and highlighted.

Annex 1 – Preliminary list of water area geographical systems referenced in FIGIS

System Name	System Code
Fishing statistical areas	stat
FAO statistical areas	fao_area
FAO major areas	fao_major
FAO sub-areas	fao_sub_area
FAO statistical fishing divisions	fao_div
FAO statistical fishing sub-divisions	fao_sub_div
FAO statistical fishing sub-units	fao_sub_unit
Areal grid	grid
5 degree squares	grid_05
Fishery management areas	man
ICCAT spatial management units	iccat_smu
ICCAT management units - Albacore	iccat_smu_alb
ICCAT management units - Bigeye tuna	iccat_smu_bet
ICCAT management units - Northern bluefin tuna	iccat_smu_bft
ICCAT management units - Sailfish and Spearfish	iccat_smu_sai
ICCAT management units - Skipjack	iccat_smu_skj
ICCAT management units - Swordfish	iccat_smu_swo
ICCAT management units - Yellowfin tuna	iccat_smu_yft
ICCAT management units - Blue marlin	iccat_smu_bum
ICCAT management units - White marlin	iccat_smu_whm
ICCAT management units - Small tunas	iccat_smu_smt
GFCM geographical sub-areas	gfcm_sub_area
Jurisdiction areas	jur
RFB competence areas	rfb_comp
ICCAT competence	iccat_comp
IATTC competence	iattc_comp
CECAF competence	cecaf_comp
GFCM competence	gfcm_comp
CARPAS competence	carpas_comp
CCAMLR competence	ccamlr_comp
CCSBT competence	ccsbt_comp

CIFA competence	cifa_comp
COPESCAL competence	copescal_comp
COREP competence	corep_comp
CPPS competence	cpps_comp
CTMFM competence	ctmfm_comp
FFA competence	ffa_comp
IBSFC competence	ibsfc_comp
ICES competence	ices_comp
ICSEAF competence	icseaf_comp
IOTC competence	iotc_comp
IPHC competence	iphc_comp
LVFO competence	lvfo_comp
MHLC competence	mhlc_comp
NAFO competence	nafo_comp
NAMMCO competence	nammco_comp
NASCO competence	nasco_comp
NEAFC competence	neafc_comp
NPAFC competence	npafc_comp
OAPO competence	oapo_comp
OLDEPESCA competence	oldepesca_comp
PICES competence	pices_comp
PSC competence	psc_comp
RCF competence	rcf_comp
RECOFI competence	recofi_comp
SEAFO competence	seafo_comp
SPC competence	spc_comp
SWIOFC competence	swiofc_comp
SRCF competence	srcf_comp
WCPFC competence	wcpfc_comp
WECAFC competence	wecafc_comp
WIOTO competence	wioto_comp
Country exclusive economic zones	eez
Sub-national areas	ter_wat
Environmental areas	env
Inland/marine	i_m

Oceans	oce
Oceans by latitude	oce_lat
Oceans by longitude	oce_long
Large marine ecosystems	lme
RFB groups	rfb
ICCAT geo-references	iccat_geo
ICCAT spatial management units	iccat_smu
ICCAT management units - Albacore	iccat_smu_alb
ICCAT management units - Bigeye tuna	iccat_smu_bet
ICCAT management units - Northern bluefin tuna	iccat_smu_bft
ICCAT management units - Sailfish and Spearfish	iccat_smu_sai
ICCAT management units - Skipjack	iccat_smu_skj
ICCAT management units - Swordfish	iccat_smu_swo
ICCAT management units - Yellowfin tuna	iccat_smu_yft
ICCAT management units - Blue marlin	iccat_smu_bum
ICCAT management units - White marlin	iccat_smu_whm
ICCAT management units - Small tunas	iccat_smu_smt
ICCAT competence	iccat_comp
Tuna regional fishery bodies convention areas	tuna_conv
ICCAT competence	iccat_comp
IATTC competence	iattc_comp
IOTC competence	iotc_comp
CCSBT competence	ccsbt_comp
WCPFC competence	wcpfc_comp
GFCM competence	gfcm_comp
Pacific Tuna geo-references	pac_tuna_geo
Pacific tuna and tuna-like reporting areas	pac_tuna_rep
Pacific tuna east-west reporting areas	pac_tuna_ew_rep
Pacific tuna north-south reporting areas	pac_tuna_ns_rep
Pacific tuna major reporting areas	pac_tuna_maj_rep
WCPFC competence area	wcpfc_comp
SPC competence area	spc_comp
IATTC competence	iattc_comp

Reporting areas	rep
Pacific tuna and tuna-like reporting areas	pac_tuna_rep
Pacific tuna east-west reporting areas	pac_tuna_ew_rep
Pacific tuna north-south reporting areas	pac_tuna_ns_rep
Pacific tuna major reporting areas	pac_tuna_maj_rep