Geographic Information Standards

- CWP Harmonization outlooks

Emmanuel Blondel (FAO)
emmanuel.blondel@fao.org
CWP GIS working group – Objectives & activities

GIS data survey – summary & outputs

Activity 1 – Spatial grid systems

Activity 2 – GIS data and metadata standards

Activity 3 – GIS datasets of interest
Technical workshop on global harmonization of Tuna fisheries statistics

CWP GIS working group – Objectives and Activities

• **Background**

Activities & discussions primarily based on the content & recommendations of the *Handbook on GIS Matter* concept note circulated at last CWP 25th Plenary session.

Created together with the *ad-hoc reference data harmonization task group* to discuss about data geo-referencing and geographic information standards.

• **Objective**

To expand and develop a GIS section of the CWP Handbook

• **Three main working areas**

  o *Activity 1 – Spatial gridded systems for fishery data reporting*
  o *Activity 2 – Strengthening promotion and implementation of geographic information standards*
  o *Activity 3 – Establish a list of GIS datasets and layers relevant for fishery*
CWP members involved

- Group members (as listed in the ToRs)
  - FAO, GFCM, ICES, IOTC, NACA, (SEAFO)
- Participation of FAO, GFCM, ICES, IOTC
- Additional information collected from CWP ad-hoc Reference Harmonization Task Group members: ICCAT, CCSBT

Working group activities

- E-meetings with all members, exchanges done on individual basis
- Information shared with/from the ad-hoc reference harmonization task group
- GIS data survey prepared by FAO and shared to group members
- Additional information collected by FAO through the Research Data Alliance (RDA) Fishery Data Interoperability (FDI) working group
  - Technical support: publication of CWP geographic reference datasets

Objective

To collect material from CWP members on the three main working areas and trigger discussions for recommendation proposals

Participating members: FAO, GFCM, IOTC, ICES + ICCAT

Survey template (see working report – annex)

- Scope: survey filled by members for each dataset (or database)
- Geo-referencing characteristics
  - Spatial Reference System
  - Geographic classification system type & characteristics
    - Coordinates / Grid (extent, shape, resolution) / Areas
  - Grid coding system (if any)
  - GIS reference datasets & geo-referenced data access (if any)
    - Data access through web, formats & standards used
    - Metadata availability, formats & standards used
- Outputs available [here]
Survey outputs (1)

- **Spatial Reference System**: World Geodetic System (WGS84, EPSG:4326)
- **Geographic classification systems** used
  - **Grid classification** (reporting) systems
    - **Global extent**: square shape, main resolutions: 1deg, 5deg
      - Use by t-RFMOs and FAO
      - Among t-RFMOs, only IOTC is using CWP areal grid coding system
    - **Regional extent:**
      - *ICES statistical rectangles, GFCM grid system*
      - Compatible with CWP areal grid coding system
      - But custom coding system used
  - **Area classification systems**
    - FAO major fishing areas
    - Regional statistical areas
      - *ICES fishing areas* (breakdown of FAO major fishing areas)
      - *GFCM Statistical Areas* (GSAs)
• **Survey outputs (2)**
  
  • GIS reference datasets & geo-referenced data
    
    • **Data Access**
      
      • Web access: available for GFCM, ICES, FAO. Planned by ICCAT, IOTC
      
      • GIS data **formats**
        
        • Not always used, e.g. PDF format only
        
        • ESRI Shapefile (proprietary format) used + OGC formats
      
      • GIS data **services**: Only FAO & ICES with standard OGC data services
    
  
  • Metadata availability
    
    Note: this survey section was generally not filled, and not well understood, highlighting the need to define well GIS metadata.
      
      • GIS metadata **formats**
        
        Only ICES and FAO are providing metadata resources using standard ISO 19115/19139 (approved OGC standard)
      
      • GIS metadata **services**
        
        Only ICES and FAO with standard OGC metadata services
Activity 1 – Spatial gridded systems for fishery data reporting

Outsuts

• Draft Set of key definitions
  
• Grid classification (reporting) system and its characteristics: extent/scale, grid unit / cell shape, resolution

• Grid coding system

System defined by a regular geo-referenced grid characterized by (i) a maximum geographic extent or scale (global, regional, local), (ii) a grid unit/cell shape (e.g. square, rectangle), (iii) a grid resolution (e.g. 1 x 1deg, 5 x 5 deg). In practice, such system may be used for on-board data collection and underlying data aggregation, specifically for Tuna RFMOs.

Logic associated to a grid classification system, and that allows converting a pair of geographic coordinates (Longitude / Latitude) into a string-based code, and vice-versa. In the computing field, coding will mean both encoding and decoding. Examples: Areal grid system (CWP), C-square. For certain grid resolution, these two coding systems correspond to two different mechanisms to encode/decode for a same Grid classification system.
Activity 1 – Spatial gridded systems for fishery data reporting

Outcomes

- Adoption of current CWP areal grid coding system very limited
  
  - Use by FAO Tuna Atlas. Among t-RFMOs, only IOTC is using it at various resolutions.
  
  - ICCAT mentions it in its maps information (https://www.iccat.int/Data/ICCAT_maps.pdf), but there is no evidence of grid codes in exchanged datasets.

- Use of coordinates:
  
  - square center (IATTC)
  - north-west corner (CCSBT)
  - south-west corner (WCPFC)

- Regional custom grid system used by ICES and GFCM.
**Activity 1 – Spatial gridded systems for fishery data reporting**

**Outputs**

- Adoption of current CWP areal grid coding system very limited

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**Diagram:**

- CCSBT (NW corner)
- IOTC
- CCBT (NW corner)
- WCPFC (SW corner)
- FAO
- IATTC (center)
- ICCAT (closest to 0,0)
- Other grid coding system
- CWP grid coding system

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Technical workshop on global harmonization of Tuna fisheries statistics

Rome, Italy - 19-22 March 2018
Activity 1 – Spatial gridded systems for fishery data reporting

Recommendations proposal

• Main recommendations

  • Refine & Validate key definitions with CWP members

  • Keep the CWP areal grid coding system as single areal grid system. No alternate grid coding system recommended (for now).

  • Encourage the use of CWP areal grid coding system when compatible grid classification systems are used.

• What are the factors explaining that CWP areal grid coding system is not used?

• Is CWP grid coding system not clear enough?

• Is there a lack of common tools to use it?
**Activity 1 – Spatial gridded systems for fishery data reporting**

**Recommendations proposal**

- **Main recommendations**
  - Towards adoption of CWP areal grid coding system in iterative way?

### Long-term
- Requires official adoption by RFMO members
- Technical implementation constraints

### Short-term
- Mappings with other grid coding systems (e.g. GFCM)
- Mapping / Conversion from coordinates
- Material & possible support from CWP
**Activity 1 – Spatial gridded systems for fishery data reporting**

**Outputs**

- *Is there a pathway towards this?*

![Diagram showing spatial gridded systems for fishery data reporting with organizations such as FAO, IOTC, IATTC, CCSBT, ICCAT, WCPFC, GFCM, ICAT, and ICES.]
Activity 2 – Strengthening promotion and implementation of geographic information standards

Outputs

• **Scope:** fishery data including
  
  *Fishery information & knowledge* (GIS references & derivate datasets),
  
  *Fishery dependent or independent data*

• **Need of key definitions** based on 6 levels of geo-referencing

  1- Coordinate Reference Systems
  2- Use of geographic coordinates
  3- Geographic classification systems, with distinction of 3 types: *locations, linear transects & areal classification systems* (grids or irregular areas)
  4- Geographic coding systems, with distinction of 2 types: *coding conventions* (for *locations, transects and irregular areas*) and *grid coding systems*
  5 - Geographic (Meta)data formats
  6 - Geographic (Meta)data services
Activity 2 – Strengthening promotion and implementation of geographic information standards

Recommendations proposal

- **Main recommendations**
  - Refine & Validate key definitions
  - Promote adoption of a single world coordinate reference system (WGS84) and its proper use in geo-referenced datasets
  - Adoption of key geographic classification systems (e.g. CWP grid coding system)
  - Promote adoption of existing geographic information international standards for (meta)data formats and services in support of FAIR principles (*Findable, Accessible, Interoperable, Readable*)
    - ISO 19115/19139 Metadata format for describing datasets
    - OGC Catalogue Service for the Web standard
    - OGC data web-services
  - Strengthen the collaboration with RDA Fishery Data Interoperability WG
Activity 3 – Establish a list of GIS datasets and layers relevant for fishery

Outputs

- CWP geographic reference datasets available
  - Data collections:
    - FAO Major Areas & breakdown
    - Global grids (with areal grid coding)
  - Data & metadata Standards
    - Data: CSV, OGC Formats and Services
    - Metadata: Dataset description using ISO 19115/19139, Catalogue Service for The Web
Activity 3 – Establish a list of GIS datasets and layers relevant for fishery

Recommendations proposal

- Set-up and use of standard Catalogue for CWP
  - Based on standard and interoperable service: OGC CSW – Catalogue Service for the Web
  - Standard metadata format for describing datasets: ISO-OGC 19115/19139
  - Easy way to
    - Find datasets
    - Access datasets
    → Contributes to standardize how/where data can be extracted
    - Harvest resources in interoperable way from another catalogue or tool
    - Re-use data
**Activity 3 – Establish a list of GIS datasets and layers relevant for fishery**

**Recommendations proposal**

- To foster availability of RFMO georeferenced data (starting with reference data) through data & metadata services

*Is the T-RFMO envisaging to set-up his own catalogue?*

*Would the T-RFMO require:*
  - a direct use of CWP catalogue?
  - possible CWP Secretariat technical support?

- **Examples:**
  - ICCAT Sampling Areas and Stocks/Statistical Areas
  - GFCM Statistical Areas & Statistical Grid
**Activity 3 – Establish a list of GIS datasets and layers relevant for fishery**

- T-RFMO Catalogue ?
- FAO Catalogue
- RFMO Catalogue ?
- CWP Catalogue
- Tuna Atlas
- Global Fisheries Statistics
- Regional catalogues
- My catalogue
- Data e-Infrastructure catalogues
Activity 3 – Establish a list of GIS datasets and layers relevant for fishery

Recommendations proposal

- Set-up and use of standard Catalogue for CWP
  - Example of interoperable harvesting for CWP web catalogue.
Thank you for your attention