



Yolanda Sagarminaga

Research investigator (PI) at Marine Research Division- AZTI (Spain)

Biology Graduate and Master in Integrated Land Spatial Management.

Since 1998 she works on spatial "**Marine Data Management**" and "**Oceanographic applications of Earth Observation systems**".

Concerning the **Marine Spatial Data Management** she has worked in the design and implementation of several data models and infrastructures to manage marine environmental data. She has experience in implementing international specifications and standards like OGC, ISO, CF Conventions, and INSPIRE. She works with open-source tools like Thredds, Geoserver, Geonetwork, Openlayers, leaflet, QGIS, etc. Participates in several

In the field of **Earth Observation applications to oceanography**, she has worked with several sources of satellite data (NOAA-AVHRR, SEAWIFS, MODIS, VIIRS, SENTINEL-3, etc.) and applications (fisheries ecology of tuna and small pelagics, biological oceanography and physical oceanography).

RECENT PROJECTS

2017-ongoing. Operation, development and maintenance of a European Marine Observation and Data Network (EMODNET). LOT NO: 6 – HUMAN ACTIVITIES

2019-ongoing. European Topic Center (ETC) on inland, coastal and marine waters.

2017-2018. CHLO4MSFD. Chlorophyll-a from satellites to support the Marine Strategy Framework program across EU marine waters.

2013-2015. Development of a shared data and information system between the EU and the Regional Sea Conventions. DG Environment contract.

2017-2019. Implementation and Updating of Marine Monitoring Programs, Assessment of Environmental Status and Development of a Marine Database System in Malta.

2016-2019. Status Assessment of the Saudi Arabian Waters of the Arabian Gulf. King Fahd University of Petroleum & Minerals. KFUPM.

2012-2016. DEvelopment Of innovative Tools for understanding marine biodiversity and assessing good Environmental Status (DEVOTES). CP FP7-ENV-2012-two-stage G.A.308392

2018. MEDCIS. Support Mediterranean member states towards coherent and coordinated implementation of the second phase of the MSFD. DG ENV/MSFD 11.0661/2016/748067/SUB/ENV.C2

2009-2013. Monitoring and Evaluation of Spatially Managed Areas (MESMA). EU FP7-ENV-2008-1.Project No:226661

EMODNET- Human activities : steps forward for INSPIRE compliance

presenter: Yolanda Sagarminaga, AZTI



BACKGROUND & OBJECTIVE

This work, is a follow-on of the work "**EMODNET human activities data models: towards compliance with INSPIRE DATA Specifications.**" published in February 2018 and available in (<https://webgate.ec.europa.eu/maritimeforum/en/node/4147>).

- 17 different INSPIRE application schemas potentially applicable to the 66 EMODnet human activities datasets with more or less direct alignment depending on the themes.
- Uncomplete codelists and Inconsistent semantic definitions across themes.

Consequently, the harmonisation to these INSPIRE application schemas would be conceptually and technically complex and the result would probably not meet the interoperability objectives sought by INSPIRE.

Based on the approach proposed in the MArSP project,

- **Try to harmonise all human activities datasets using the INSPIRE Land Use theme models**

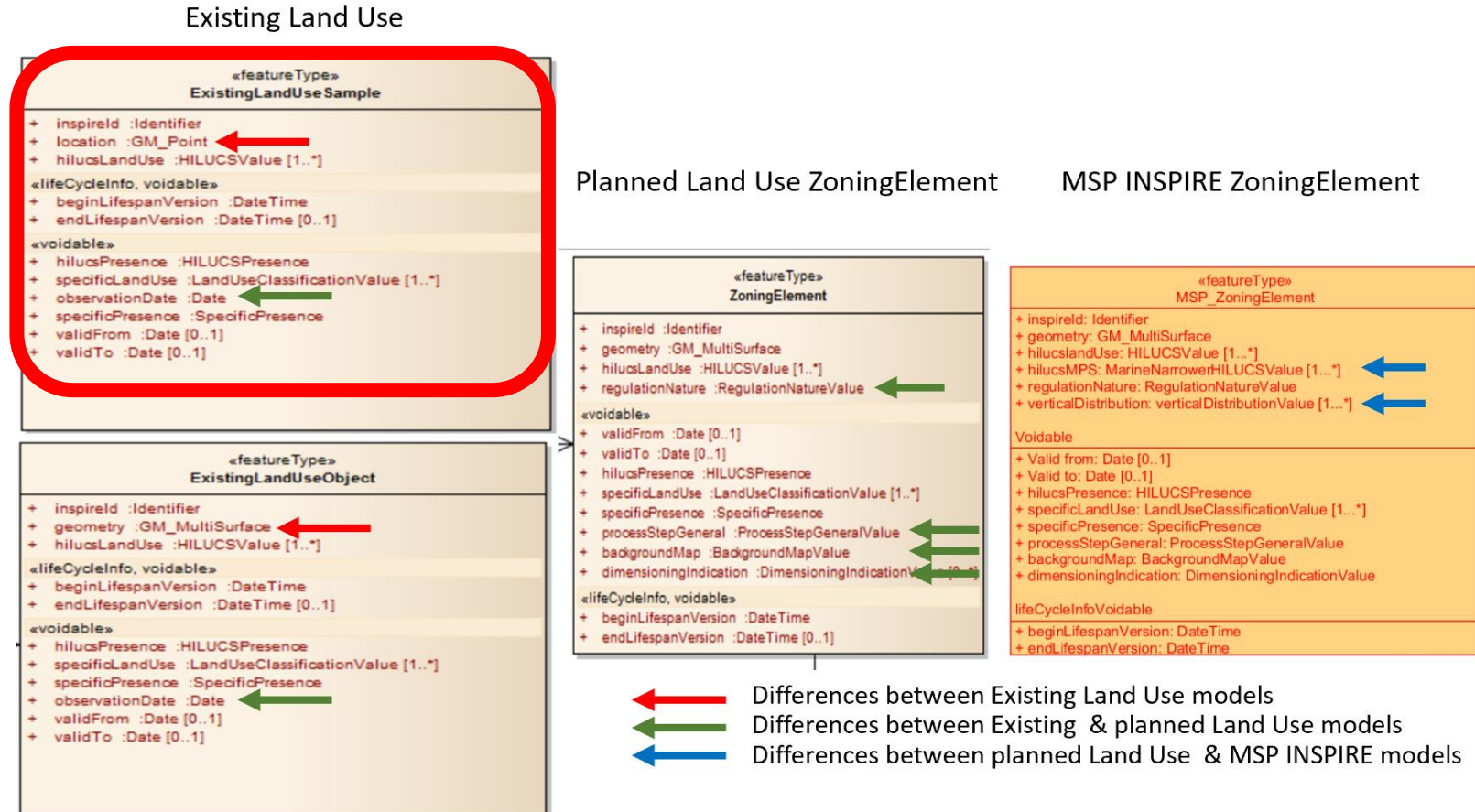
MODEL SELECTION

The INSPIRE Land Use theme includes 5 application schemas (or data models):

- Existing Land Use (elu:)
- **Sampled Land Use (selu:)**
- Gridded Land Use (gelu:)
- Planned Land Use (plu:)
- Land Use Nomenclature (lunom:)

Selected model for EMODNET:

- Existing activities vs planned.
- Point geometries (polygon and polyline datasets converted to points with centroids and vertex).
- Requires HilucsLandUse codelist.
- Only info on location and time range is retained by this model. Other information on activity intensity or associated info is not contemplated in INSPIRE model thus omitted in harmonised dataset.



HARMONISATION PROCESS

DATA MODEL:

- Geometrical transformations to points: centroids from polygons and vertices from polyline datasets + Merge all datasets into a single one.
- Map and select dataset names to **HILUCSLandUse** elements. The "specificLandUse" attribute has been filled in with **MSP HILUCS extended codelist** if a specific enough item was found. If not, a "specific land use" value was created to clearly identify the record and add important information from original fields.
- Creation of INSPIRE attribute fields and transfer the mapped information from original datasets. In this step, "localid" and "specificlanduse" attributes have been filled in with values concatenating several original attributes with important information to minimize the loss of information from original datasets. (approach to be revised if better solution is found).
- Whenever available in the original dataset, "validfrom" and "validto" have been fulfilled with information on starting and ending activity dates. Conversion from String to Date format was needed.

ENCODING:

The resulting harmonised file (shapefile*) has been encoded to complex gml3 format using: Geoserver WFS + Geoserver app-schema plugin + handmade mapping xml file.

* Geoserver app-schema is not able to transform from geopackage source.

HARMONISATION RESULT & CONCLUSIONS

DATA MODEL:

- ✓ Improvement in coherence related with location and temporal information.
- ✓ Gets closer to integration and/or interoperability with other human activities datasets.
- ✗ HILUCSLandUse codelist not specific enough for some datasets.
- ✗ Not room for important information related to activities.

EMODNE's HA Layer name	geometric processing	localid	HILUCS Value	SpecificandUse
Aggregate Extraction Areas	polygons Centroids,	concat("country";/,"areaid")	1 3 3 OtherMiningAndQuarrying	concat('Marine sediments extraction for "end use"')
Aggregate Extraction			1 3 3 OtherMiningAndQuarrying	
Dredging		concat("country";/,"areaid")	1 3 3 OtherMiningAndQuarrying	concat("extraction type";/end use";/end use")
Dredge Spoil Dumping (Polygons)	polygon centroids		4 3 3 WasteTreatment	
Dredge Spoil Dumping (Points)		concat("country";/,"objectid")	4 3 3 WasteTreatment	concat('dredge dumping site';/status')
Dumped Munitions (Points)	polygons Centroids,	to_string(\$id)	4 3 3 WasteTreatment	concat('munition dumping site: munition type';/munition type')
Dumped Munitions (Polygons)		to_string(\$id)	4 3 3 WasteTreatment	concat('munition dumping site: munition type';/munition type')
Main Ports (Locations Only)	Merge points and	"port id"	4 1 4 3 CruisesFerriesPort	4 1 4 3 CruisesFerriesPort and/or 4 1 4 2 CommercialPort
Main Ports (Goods Traffic)				4 1 4 2 CommercialPort
Main Ports (Passengers Traffic)				4 1 4 3 CruisesFerriesPort
Waste at Ports				4 1 4 3 CruisesFerriesPort and/or 4 1 4 2 CommercialPort
Pipelines	polyline vertices	concat("country";/,"operator";/,"status";/,"objectid")	4 3 Utilities	concat('Pipeline';/medium')
BSH CONTIS Cables	polyline vertices	concat('Submarine cables/BSH_contis_cables';/,\$id)	3 2 3 InformationAndCommunicationServ	4 3 5 2 SubmarineCableTelecom *
MaltaCables		concat('Submarine cables/Malta_cables';/,\$id)	3 2 3 InformationAndCommunicationServ	4 3 5 2 SubmarineCableTelecom *
SIGCables Submarine Cables		concat('Submarine cables/SIG_cables';/,\$id)	3 2 3 InformationAndCommunicationServ	4 3 5 2 SubmarineCableTelecom *
Telecommunication Cables		concat('Submarine cables_schematic/Telegeography';/,"owners";/,"id")	3 2 3 InformationAndCommunicationServ	4 3 5 2 SubmarineCableTelecom *
Cables - Landing Stations		concat('Submarine cables landing stations';/,"source";/,\$id)	3 2 3 InformationAndCommunicationServ	4 3 5 2 SubmarineCableTelecom *
Wind Farms (Points)		concat("country";/,"status";/,"power_mw";/,"mw"/,"format_number("dist_coast"/1000)	2 4 4 RenewableEnergyProduction	2 4 4 1 RenewableEnergyProductionWind *
Ocean Energy - Test Sites		concat("country";/,"status";/,"capacitykw";/,"kw"/,"testsite")	2 4 4 RenewableEnergyProduction	2 4 4 4 RenewableEnergyProductionWave', 2 4 4 1 RenewableEnergyProductionWind', or 2 4 4 5 RenewableEnergyProductionTidal'
Ocean Energy - Project Locations		concat("country";/,"status";/,"project_ca";/,"kw"/,"facid")	2 4 4 RenewableEnergyProduction	"Hydrocarbon"
Boreholes		concat("country";/,"status";/,"purpose";/,"code")	2 4 2 FossilFuelBasedEnergyProduction	'Active licences for hydrocarbons'
Active Licences		concat("country";/,"operator";/,"type";/,"code")	2 4 2 FossilFuelBasedEnergyProduction	concat('Offshore installation';/function';/,"primary_pr")
Offshore Installations		concat("country";/,"operator";/,"type";/,"code")	2 4 2 FossilFuelBasedEnergyProduction	concat('nuclear energy production';/model';/,"type";/,"fuel")
nuclear		concat("country";/,"reactor_nm";/,"operator";/,"status";/,"the_cap_mw_tot";/,"mw")	2 4 1 NuclearBasedEnergyProduction	
Finfish Production		concat("country";/,"owner name";/,"status";/,"finid")	1 4 1 Aquaculture	concat('finfish';/,"species_detailed";/,"production_meth";/,"production")
Shellfish Production		concat("country";/,"owner";/,"status";/,"site id")	1 4 1 Aquaculture	concat('shellfish';/,"species";/,"prod_method";/,"purpose")
Macroalgae (seaweeds)		concat("country";/,"owner name")	1 5 OtherPrimaryProduction	concat('macroalgae';/,"prod_meth")
Microalgae		concat("country";/,"owner name")	1 5 OtherPrimaryProduction	concat('microalgae';/,"prod_meth")
State of Bathing Waters		concat("country";/,"bname";/,"objectid")	3 4 4 OpenAirRecreationalAreas	concat('Bathing waters/state';/,"class")
Lighthouses		concat("country";/,"arhls number")	3 4 1 CulturalServices	concat('Lighthouses/status';/,"status")
UWWTD Treatment Plants		"uwwCode"	4 3 3 WasteTreatment	concat('Urban waste treatment plant';/,"treatment";/,"capacity";/,"capacit_pe")
UWWTD Discharge points		"uwwCode"	4 3 3 WasteTreatment	concat('Urban waste discharge point';/,"dcpWBType";/,"dcpState")

ENCODING:

- ✗ Time consuming and painful process for transforming to complex GMLs.
- ✗ Serving complex GML by Geoserver worsen the Service performance.
- ✗ Not all clients are capable of Reading correctly complex GMLs.
- ❖ Strongly recommend use of flat GMLs generated from commonly use GIS data formats (I,e shapefile, geopackage)

```
<?xml version="1.0" encoding="UTF-8"?>
<as:AppSchemaDataAccess xmlns:as="http://www.geotools.org/app-schema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.geotools.org/app-schema AppSchemaDataAccess.xsd">
  <namespaces>
    <Namespace><prefix>gml</prefix><uri>http://www.opengis.net/gml/3.2</uri></Namespace>
    <Namespace><prefix>base</prefix><uri>http://inspire.ec.europa.eu/schemas/base/3.3</uri></Namespace>
    <Namespace><prefix>lunom</prefix><uri>http://inspire.ec.europa.eu/schemas/lunom/4.0</uri></Namespace>
    <Namespace><prefix>selu</prefix><uri>http://inspire.ec.europa.eu/schemas/selu/4.0</uri></Namespace>
    <Namespace><prefix>xlink</prefix><uri>http://www.w3.org/1999/xlink</uri></Namespace>
    <Namespace><prefix>xsi</prefix><uri>http://www.w3.org/2001/XMLSchema-instance</uri></Namespace>
  </namespaces>

  <sourceDataStores>
    <DataStore>
      <id>shapefile</id>
      <parameters>
        <Parameter>
          <name>url</name>
          <value>file:EMODNET_HA.shp</value>
        </Parameter>
      </parameters>
    </DataStore>
  </sourceDataStores>

  <targetTypes>
    <FeatureType><schemaUri>http://inspire.ec.europa.eu/schemas/selu/4.0/SampledExistingLandUse.xsd </schemaUri></FeatureType>
  </targetTypes>

  <typeMappings>
```


All the resources produced by this task (report, dataset and mapping file) will be online soon:

Thanks for your attention!



INSPIRE Land Use - EMODnet's Human Activities Locations Dataset.

This page provides access to the newly created "INSPIRE Land Use - EMODnet's human activities locations dataset" and to the documents and resources used to generate it.

The map shows this dataset published through a WMS Serviced "INSPIRE Land Use - EMODnet's human activities locations dataset" and to the documents and resources used to generate it.



[Task Report](#)



[Dataset File - Complex GML3 INSPIRE \(selu\)](#)



[Dataset File - GEOPACKAGE PRE-INSPIRE \(selu\)](#)



[Dataset File - SHAPEFILE PRE-INSPIRE \(selu\)](#)



[Geoserver app-schema mapping file \(XML\)](#)



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