

iMarine

Supporting data driven scientific
advice workflows

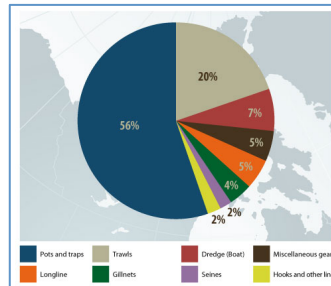


Donatella Castelli
(CNR-ISTI)

Data Infrastructure supporting the implementation of the principles of the Ecosystem Approach to Fisheries Management and Conservation of Marine Living Resources

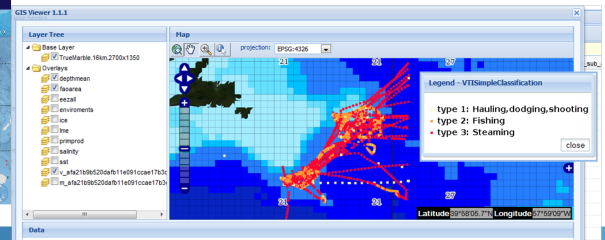
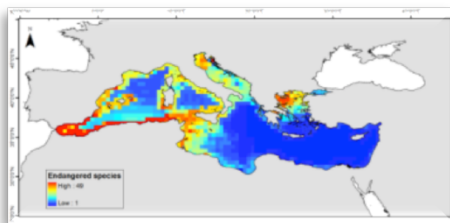
Interdisciplinary & multifacets collaboration

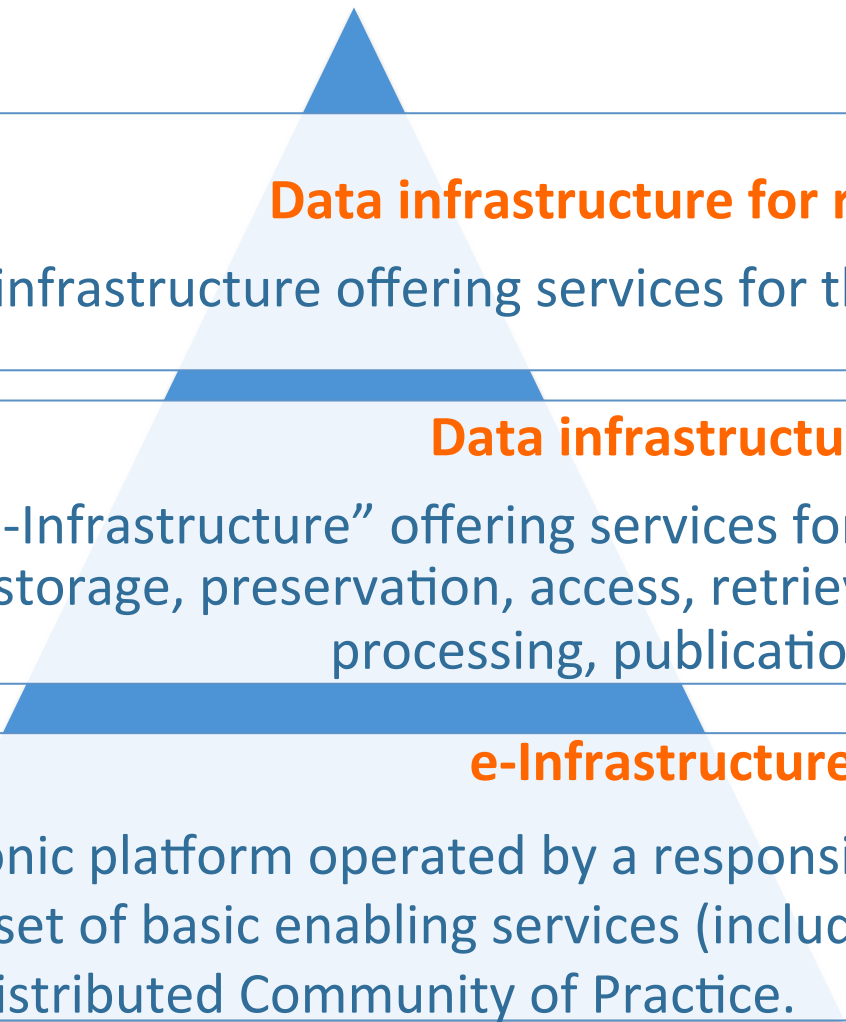
at the local, national, regional and international levels



Knowledge generation

- Access to large amount of heterogeneous, distributed, across-domain data
- Rich data mining, analysis and processing capabilities





Data infrastructure for research

Data infrastructure offering services for the research communities

Data infrastructure

“e-Infrastructure” offering services for collection, deposition, storage, preservation, access, retrieval, analysis/mining/processing, publication, etc.

e-Infrastructure

Electronic platform operated by a responsible entity offering an open set of basic enabling services (including access to resources) to a distributed Community of Practice.



Parthenos

The Community of Practice
(the community)



D4SCIENCE
INFRASTRUCTURE

The e-infrastructure
(the operational platform)

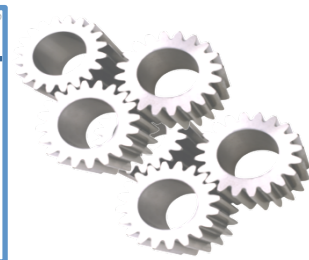
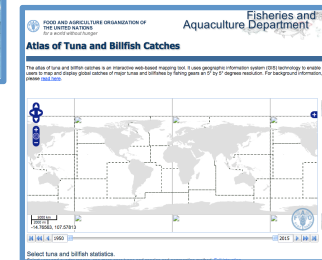
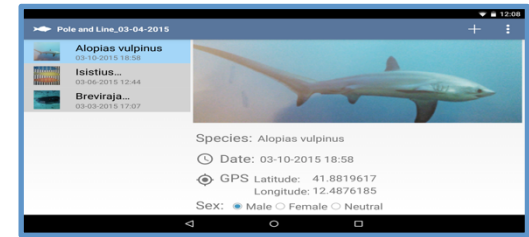
gCUBE
Framework

The system
(the enabling sw system)

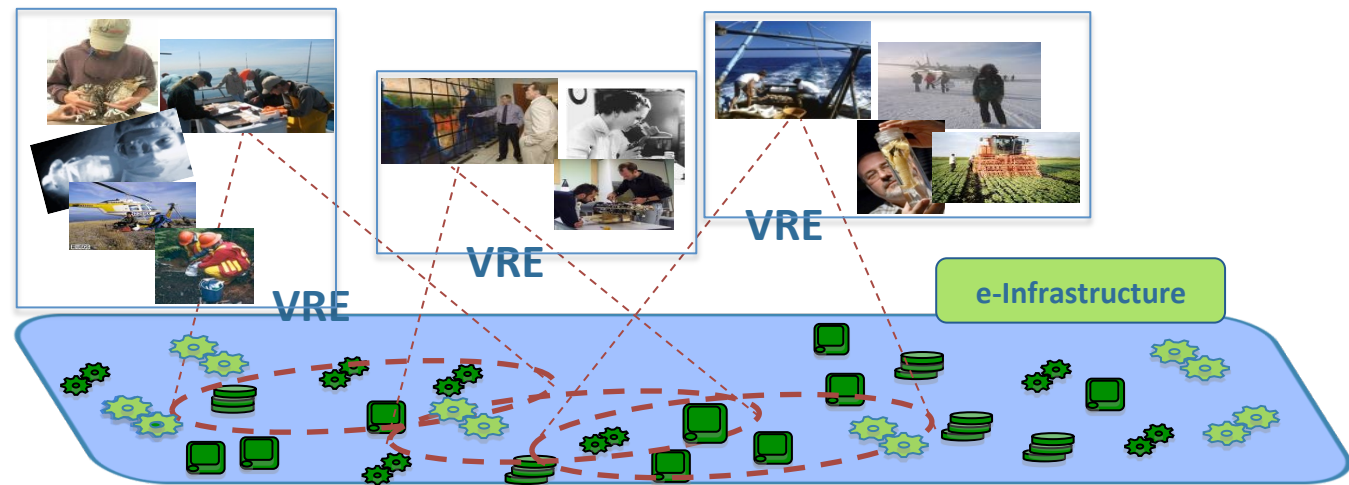
i-marine gateway



Third-party portals & applications



- **Distributed and dynamically created** environment
- where **subset** of data, services, computational, and storage **resources**
- regulated by **tailored policies**
- are **assigned to a subset of users** via interfaces
- for a **limited timeframe**
- at **very little cost** for the providers of the participatory data e-infrastructures



Name: MyPersonalVRE

Designer: Pasquale Pagano (pasquale.pagano)

VRE Manager: Leonardo Candela (leonardo.candela)

Description: The environment for my research

Life time

From: November 22, 2014

To: November 22, 2015

1. Specify VRE metadata (including policies)



2. Select applications

Available Resources for Occurrence and Taxonomic Data Discovery

Name	Description	Se
CatalogueOfLife	A virtual biodiversity repository of Catalogue of Life data.	
GBIF	A virtual biodiversity repository of GBIF data.	
BrazilianFlora	A virtual biodiversity repository of List of Species in Brazil.	
ITIS	A virtual biodiversity repository of ITIS data.	
WoRDS	A virtual biodiversity repository of WoRDS data.	
OBIS	A virtual biodiversity repository of OBIS data. The...	
WoRMS	A virtual biodiversity repository of WoRMS data. Th...	
ASFIS	Runtime Resource for ASFIS Plugin	
IRMNG	A virtual biodiversity repository of IRMNS data. The...	

Reset Commit changes

4. Select data collections

Available Resources for Statistical Service

Name	Description	Se
SPECIES_OBS...	Algorithm returning most observed species in a sp...	
OBIS_SPECIES_OBSERVATIONS_PER_MEOW_AREA	Algorithm returning most observed species in a specific years range (from OBIS database).	
STDBSCHEMA	Algorithm that allows to view the schema names of...	
Intersection	GIS intersection process. The native algorithm is i...	
Spread	Spread	
SPECIES_OBSERVAT...	Algorithm returning most observed species in a sp...	
OCCURRENCES_DU...	A transducer algorithm that produces a duplicate fr...	
XYEXTRACTOR_TABLE	An algorithm to extract values associated to a table...	

Reset Commit changes

3. Configure applications

Software deployment and hardware setup completely hidden

Evolving needs of its users completely supported

The screenshot shows the iMarine Gateway website, which is a Data e-Infrastructure Initiative for Fisheries Management and Conservation of Marine Living Resources. The website is powered by gCube 3.5.0 and lists various Virtual Research Environments (VREs) organized by category.

Must Have:

- BiodiversityLab:** Public, Free Access.
- TabularDataLab:** Public, Free Access.

Recommended:

- Gudus morhua BiOnym:** Public, Free Access.
- EcologicalModelling:** Public, Free Access.
- ScalableDataMining:** Public, Free Access.

Exclusive:

- AquaMaps:** Request Access.
- BOBLME_HilsaAWG:** Request Access.
- BlueBridgeProject:** Request Access.
- FAO_TunaAtlas:** Request Access.
- TBT_VRE:** Request Access.
- TCom:** Request Access.
- VME-DB:** Request Access.
- iMarineBoardVRE:** Request Access.

Demonstrative:

- DocumentsWorkflow:** Public, Free Access.
- VesselActivitiesAnalyzer:** Public, Free Access.
- iSearch:** Public, Free Access.

The footer of the website includes links for Marine Website, Contact Us, Terms of Use, and Privacy, along with a note about funding from the European Union's Research Programme for Research, Technological Development and demonstration under grant agreement No 283644.

iMarine Gateway

<https://i-marine.d4science.org/>

- *Public VREs* (used to offer an application environment to a subset of users of a community)
- *Private VREs* (used for experiments, data access and preparation, and data analytics)

A single point to

- Get status and updates from applications and other users they are interested in;
- Get notifications about messages, jobs completion, new generated products, etc.

The screenshot shows the iMarine Gateway web application. Handwritten annotations with arrows point to various UI elements: 'Workspace' points to the 'ws' icon in the top navigation bar; 'Messages' points to the envelope icon; 'Notifications Page' points to the speech bubble icon; 'Search in your Workspace' points to the search bar; and 'Home Social' points to the home icon. The main content area is divided into several sections:

- Share updates:** A section with a user profile picture, a text input field for sharing updates, a 'Share Updates' button, and a privacy level dropdown set to 'My VREs'.
- News feed:** A section titled 'All Updates' with a toggle for 'Only Me'. It displays a news item about Facebook's new Graph Search tool, including a link, a photo, and a brief description.
- My Virtual Research Environments:** A grid of icons representing different VREs, including AquaMaps, BiodiversityResearchEnv, DocumentsWorkflow, EcologicalModelling, and others. A red box highlights the text 'VREs user is a member of'.

Feed from Users →

Feeds from Applications →

News feed

All Updates ▮ Only Me

Luca Frosini shared a link.

 iMarine @ EUBrazilOpenBio and Brazilian Virtual Herbarium joint workshop in Recife, Brazil - i-marine.eu
http://i-marine.eu
Representing the overview of the w
fisheries manage
coming...

Reply - Favorited - Message Jan 21, 6:30 PM

Massimiliano Assante
result of many natural a
affecting the functioning
January 21, 6:30 PM

AquaMapsDataManagement A


 Import_fabio
/group/devvre/ai
Imported csv file

Reply - Favorite - go App [devVRE] January 17, 7:49 PM

StatisticalManager The operator Hспен Filter has been added: An algorithm
producing a HSPEN table with only some selected species

Reply - Favorited - go App [devVRE] January 16, 6:00 PM 1 ★

Gianpaolo Coro Good!
January 16, 6:03 PM

Compose Message

To: Luca Frosini

Subject:
select from workspace

Body:

Cancel Send

A single point to

- Manage data, store and preserve them
- Share data

Workspace ▶ My Shared Projects ▶ iMarine ▶ Meetings ▶ Internal Project Meetings ▶ 2013.06.17-20 6th TCom @ Skiathos ▶ Day 2

Search in workspace

☒ Tree ☐ Smart Folder

- ▶ Castilla
- ▶ Corso Patente Nautica
- ▶ MOST_OBSERVED_SPECIES_param(10_1800_2020)
- ▶ My Articles
- ▶ My Data
- ▶ My Shared Projects
 - ▶ 2013.09 iMB4
 - ▶ Completed Projects
 - ▶ ENVRI
 - ▶ ENVRI Meetings
 - ▶ EUBrazilOpenBio
 - ▶ iMarine
 - ▶ Clusters Supporting Material
 - ▶ Deliverables
 - ▶ Graphics
 - ▶ Meetings
 - ▶ External Dissemination Events
 - ▶ Internal Project Meetings
 - ▶ 2011.11.16-18 Kick-off Meeting
 - ▶ 2012.01.17 CNR-FAO Meeting
 - ▶ 2012.03.14-16 1st TCom Meeting
 - ▶ 2012.03.19 1st Advisory Council Meeting

Documents

Name	Owner	Type	Creation Date	Size
VirtualRepository@TCom.pdf	Fabio Simeoni	application/pdf	Mon Jun 17 15:...	2,991...
6th TCom - Statistical Data Analysis.pptx	Gianpaolo Coro	application/vnd....	Mon Jun 17 15:...	7,994...
T10.4_XSearch_iMarine_6th_TCOM_nocomments.pptx	Yannis Marketa...	application/vnd....	Tue Jun 18 08:...	1,146...
WP10_Data_Fusion_Federated_Search.pptx	Alex Antoniadis	application/vnd....	Tue Jun 18 10:...	483 KB
Visualisation_6thTCom.pptx	Nikolas Laskaris	application/vnd....	Tue Jun 18 10:...	1,657...
WP8_PE2ng.pptx	Test User	application/vnd....	Tue Jun 18 13:...	385 KB
ASL&WP6.pptx	Panagiota Kolts...	application/vnd....	Tue Jun 18 13:...	436 KB
WP6 - Social Portal@Skiathos.pptx	Massimiliano A...	application/vnd....	Tue Jun 18 14:...	1,630...
T10.4_XSearch_iMarine_6th_TCOM.pdf	Yannis Marketa...	application/pdf	Wed Jul 03 12:...	586 KB

- The Social Portal extended with

Share an update or a link, use "@" to mention and "#" to add a topic

Discussion topic

Notification to a user

 Loredana Liccardo Would you like to connect to a database in the Infrastructure to improve your data investigation? Lack of connection information and databases heterogeneity are managed, but our system solves them!

DatabaseManag...

See More

iMarine Gateway - i-marine.d4science.org

<https://i-marine.d4science.org/group/gcubeapps/dbs-manager>

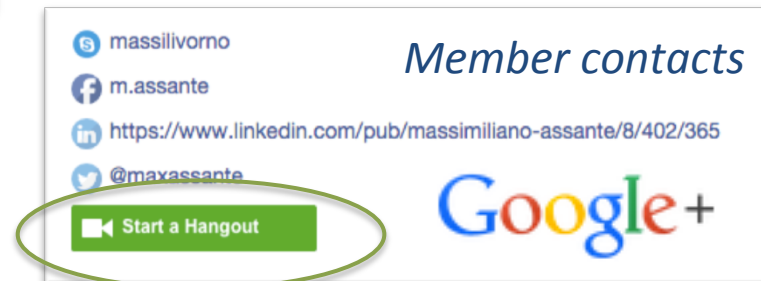
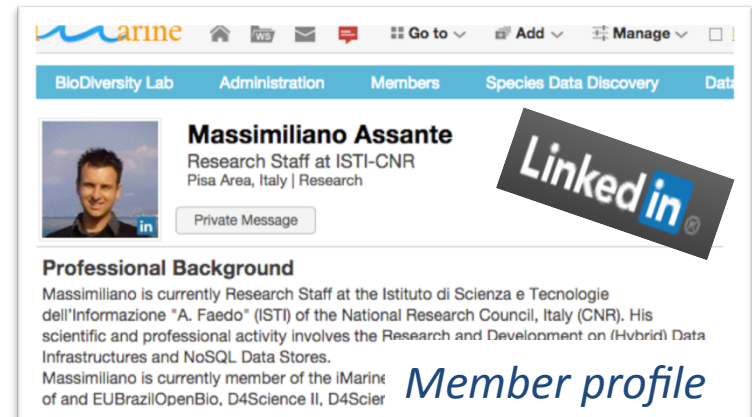
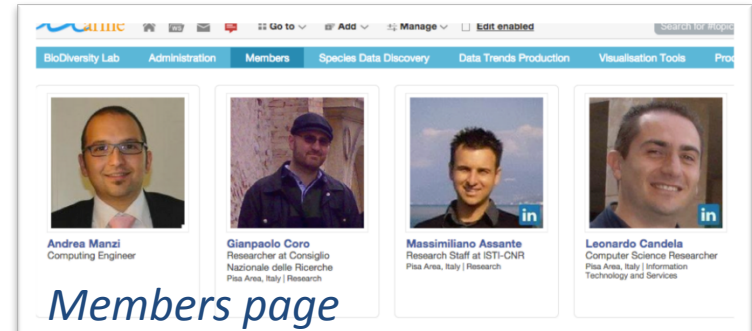
Reply - Favorited - Message November 21, 2:53 PM 6 2

 Pasquale Pagano This is what Nicolas Bailly was looking for.
November 21. 3:13 PM

Top Topics

#gcubefeature

#softwarequality





Management and interpretation of biological and ecological data in the environment



Complete full life-cycle data framework, from observational data to aggregated data repositories enriched with validation and analytical tools

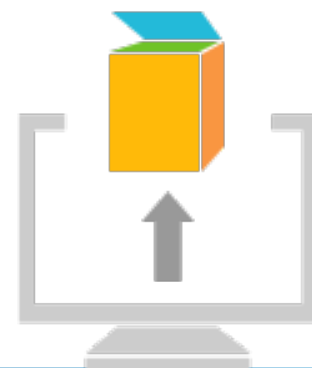


Storage and interpretation of geospatial explicit information, including WPS processing



Flexible sharing, storage, reporting, search and retrieval, aggregation and projection facilities

A BUNDLE is
a set of
services and
technologies
grouped
according to
a family of
related
tasks for
achieving a
common
objective



- ✓ Collaboration
- ✓ Sharing
- ✓ Visualization
- ✓ Publication
- ✓ Storage
- ✓ Processing
- ✓ Analysis
- ✓ Modeling
- ✓ Integration
- ✓ Enrichment
- ✓ Transformation
- ✓ Validation
- ✓ Access
- ✓ Discovery
- ✓ Collection



Occurrence and Taxonomic Data Discovery
Occurrence Data Processing
Species Distribution Modeling
Species Distribution Maps Discovery
Taxonomic Data Comparison
Taxonomic Data Matching



Code List Discovery
Code List Management
Statistical Engine
Tabular Data Discovery
Tabular Data Enrichment
Tabular Data Management
Tabular Data Processing



Geospatial Data Discovery
Geospatial Data Processing

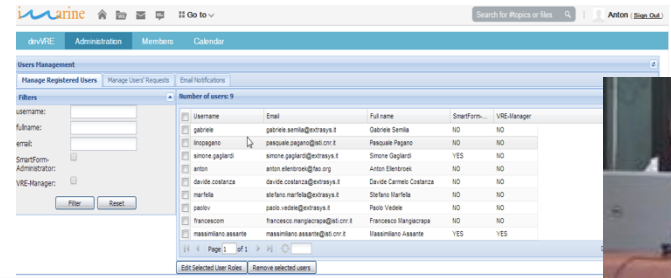
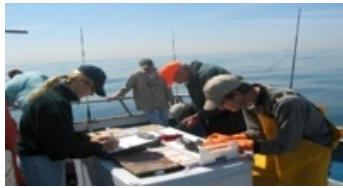


Enhanced Documents Management
Fact-sheets Management
Information Object Discovery
Messaging
Shared Workspace
Social Networking Facilities



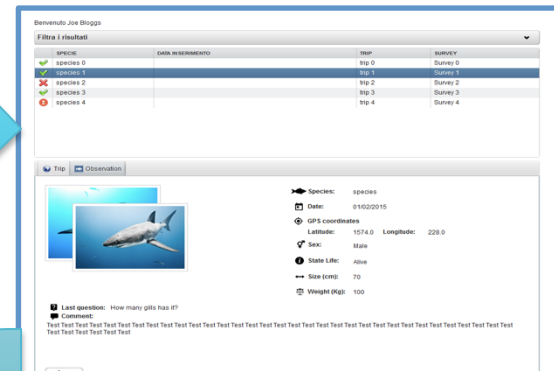
On Board Bycatch recording

- Dutch Elasmobranch society
- SEAFO RFB,



Define forms, controlled vocabularies, ...

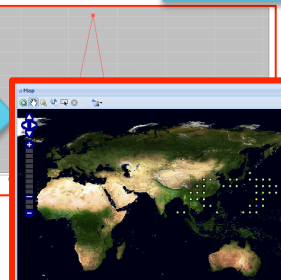
Select a Fishery survey



Validate & Enrich

Deposit

Analyse



marine Data curation & integration: Tuna Atlas VRE



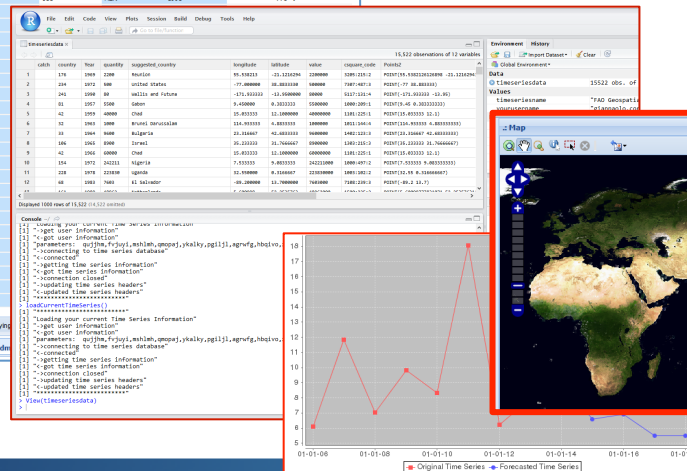
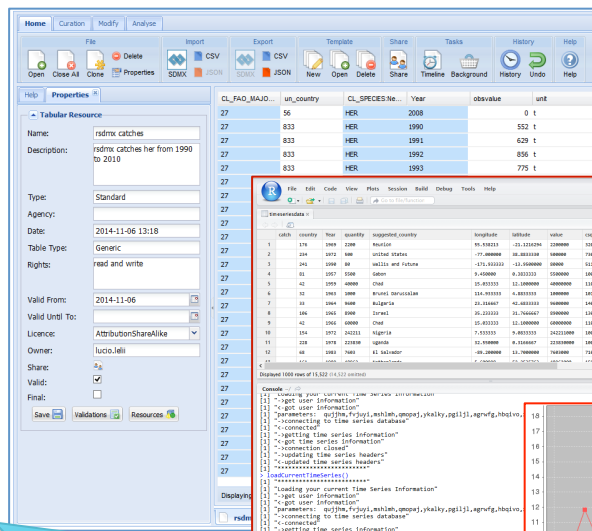
Data collected by RFBs maintained in FAO managed DBs

- The Atlas of Billfish Catches
- The Global Tuna Catches by Stocks

Curation

Normalise data, delete columns and aggregate catch, delete duplicated records, aggregate valid duplicates, aggregate time dimensions, apply reference data codes, discovery error in codes, fix errors in codes, simple preprocessing, ...

RFMOS



Tuna Atlas

Access to the Data Space

The data space contains the set of input and output data sets of the users. It is possible to upload and share tables. Data sources can be chosen from those hosted by the infrastructure. Outputs of the computations can be even saved in this space.



Execute an Experiment

This section allows to execute or prepare a Niche Modeling experiment. The section is endowed with a list of algorithms for training and executing statistical models for biological applications. Evaluation of the performances is possible by means of several kinds of measurement systems and processes.



Check the Computations

This section allows to check the status of the computation. A list of processes launched by the user is shown along with meta-information. By clicking on the completed jobs it is possible to visualize the data set contents.

[illegible]

- 100+ statistical models
- Transparent use of cloud computing
- Automatically generated interfaces
- Integration with R

Data preparation & access

The screenshot displays the STATISTICAL MANAGER interface. At the top, navigation links include 'About Scalable Data Mining', 'Administration', 'Statistical Manager', and 'Trendalyzer'. The main header 'STATISTICAL MANAGER' is prominently displayed. Below the header, a 'Computations' section shows a table of tasks. The table has columns for 'Cat.', 'Name', 'Operator', 'Infrastructure', 'Start Date', 'End Date', 'Status', and 'Action'. Five tasks are listed, all with a 'Complete' status. To the right of the table, a 'Computation Viewer' section shows a 'Time Series' plot for 'Selected species observations per LME area(NORTH SEA)'. The plot shows a line graph with data points and error bars, indicating a general upward trend with some fluctuations. A large blue box on the right side of the image contains the text 'Monitoring the status of the, computa'.

Cat.	Name	Operator	Infrastructure	Start Date	End Date	Status	Action
1	Species Observation Line Area Per Year-2013-10-08 11:31	Species Observation Line Area P...	LOCAL	10/08/2013 11:31:44	10/08/2013 11:31:47	Complete	
2	Aquaparks Suitable-2013-09-10 15:14	Aquaparks Suitable	D4SCIENCE	09/10/2013 03:15:28	09/10/2013 03:16:00	Complete	
2	Maps Comparison-2013-09-12 09:37	Maps Comparison	LOCAL	09/12/2013 09:37:40	09/12/2013 09:43:40	Complete	
2	Taxonomy Observations Trend Per Year-2013-09-09 10:21	Taxonomy Observations Trend Pa...	LOCAL	09/09/2013 10:22:04	09/09/2013 10:22:06	Complete	
2	Fin Taxa Match-2013-09-09 10:20	Fin Taxa Match	LOCAL	09/09/2013 10:20:32	09/09/2013 10:20:32	Complete	

Computation Viewer
Selected species observations per LME area(NORTH SEA)

Time Series

The time series plot shows a line graph with data points and error bars. The y-axis represents the number of observations, ranging from 0 to 2,250. The x-axis represents time. The data shows a general upward trend with some fluctuations, peaking around 2,250 observations.

Monitoring the status of the, computa

Monitoring the
status of the, computation

iMarine

Search for #topics or files | Donatella (Sign Out)

BioDiversity Lab | Members | Species Data Discovery | Data Trends Production | Visualisation Tools | Processing Tools | Search

Search: Taxon By: Scientific name Term: sarda sarda Search Example Text query

Advanced Option Filter by Source Filter by BBox Filter by Date Synonyms From Expand

Filter your results

By Classification

Group by: class

- Biota
 - Animalia
 - class - actinopteri(3)
 - class - actinopterygii(2)

Scientific Name	S.N. Authorship	Data Source	Citation	Rank	Status ...	Status Remarks
Sarda sarda	(Bloch, 1793)	OBIS	Intergovernmental Oceanographi...	Species	ACCEP...	not found
Sarda sarda	(Bloch, 1793)	CatalogueOfLife	Bisby F., Roskov Y., Culham A., ...	Species	ACCEP...	accepted name
Sarda sarda chilensis	(Cuvier, 1832)	CatalogueOfLife	Bisby F., Roskov Y., Culham A., ...	Infraspecies	SYNON...	synonym
Sarda sarda chilensis	(Cuvier, 1832)	CatalogueOfLife	Bisby F., Roskov Y., Culham A., ...	Infraspecies	SYNON...	synonym
Sarda sarda	(Bloch 1793)	ASFIS	Accessed through: ASFIS List of			
Sarda sarda	(Bloch, 1793)	WoRMS	Baillly, N. (2015). Sarda s			
Sarda sarda chilensis	(Cuvier, 1832)	WoRMS	Baillly, N. (2015) S			
Sarda sarda chilensis	(Cuvier, 1832)	WoRMS	Baillly, N. (2015) S			

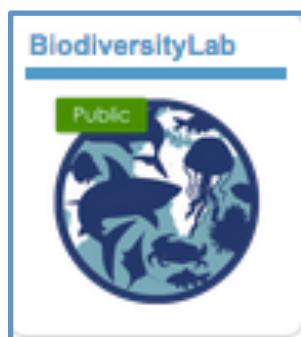
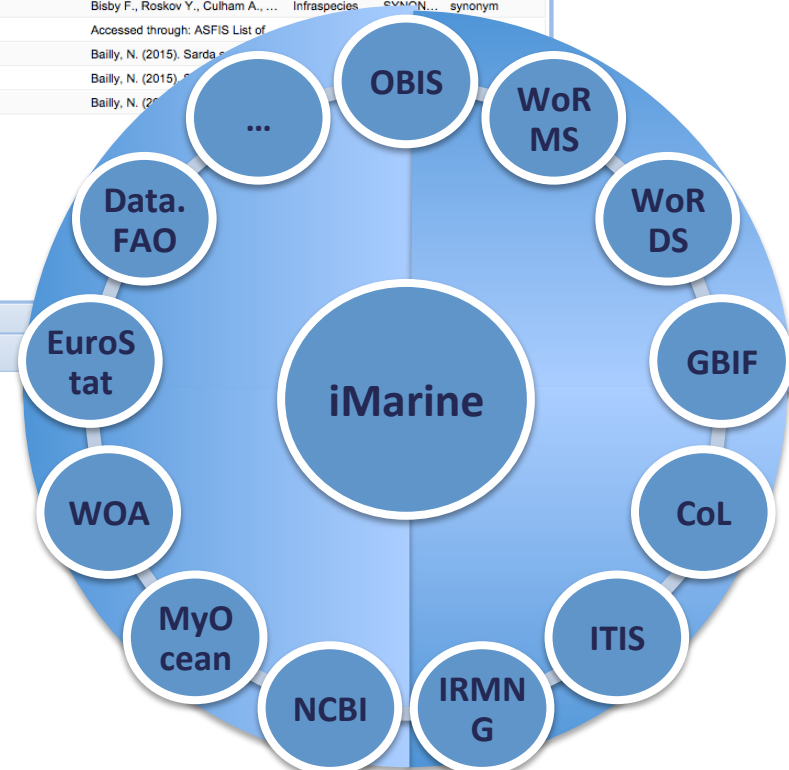
By Data Provider +

By Data Source +

By Rank +

Page 1 of 1

Species Taxonomy Jobs | Species Occurrence Jobs

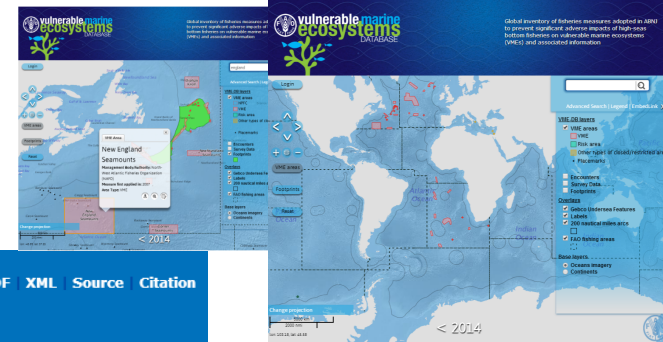


VME-DB



The **International Guidelines for the Management of Deep-Sea Fisheries on the High Seas**. VME database to assist in informed decision making and the development of further **measures to increase sustainability** and reduce impacts.

Time



Corner Seamounts

Selected year: 2012

Print PDF XML Source Citation

Description

Map

Management

Regional overview

Meeting reports

Media

Measures specific to this VME area

Area closed to bottom fishing until 31 Dec 2014, with exploratory fishing option. Vessels fishing this area shall have a scientific observer onboard. (Art 16.1-3)

Period in force: 2007 – 2014

Source of information

NAFO Conservation and Enforcement Measures 2012 (NAFO FC Doc 12/1 Serial No. N6001) Fisheries Commission 2012

General measures

Fishing areas

The comprehensive map of existing bottom fishing areas (as delineated by the coordinates shown in Table 1 and illustrated in Figure 4) shall be revised regularly to incorporate any new relevant information. Contracting Parties may, in the future, consider the possibility of refining the comprehensive map on the basis of haul by haul information, if available. (Art.17)

Exploratory fishing protocol

Exploratory fishing covers all bottom fishing activities (a) outside of the existing bottom fishing area and (b) to fisheries within the existing bottom fishing area that show significant change. (Art 15.8). Exploratory fisheries must be conducted according to an exploratory fisheries protocol (Art 18; Annex 1E.I-IV) and are subject to review FC and SC. Exploratory fisheries will be allowed only if there are adequate mitigation measures to prevent SAI to VMEs (Art 19).

Encounter protocols

In existing bottom fishing areas, encounters with VME indicator species above a threshold value are reported to the Executive Secretary and trigger a 2 nmile move on rule. In new fishing areas, such encounters also result in temporary closures of 2 nmile radius and require a more detailed report

Management Body/Authority

Northwest Atlantic Fisheries Organization (NAFO)

The Northwest Atlantic Fisheries Organization's (NAFO) overall objective is to contribute through consultation and cooperation to the optimum utilization, rational management and conservation of the fishery resources of its area of competence, and to ensure the long term conservation and sustainable use of the fishery resources and, in so doing, to safeguard the marine ecosystems in which these resources are found.



Web site

<http://www.nafo.int/>

Regional Fishery Body fact sheet

<http://www.fao.org/fishery/rfb/NAFO/en>

Historical information on fishing areas and closed areas

Meetings & other Sources of Information

General Measures

RFMO

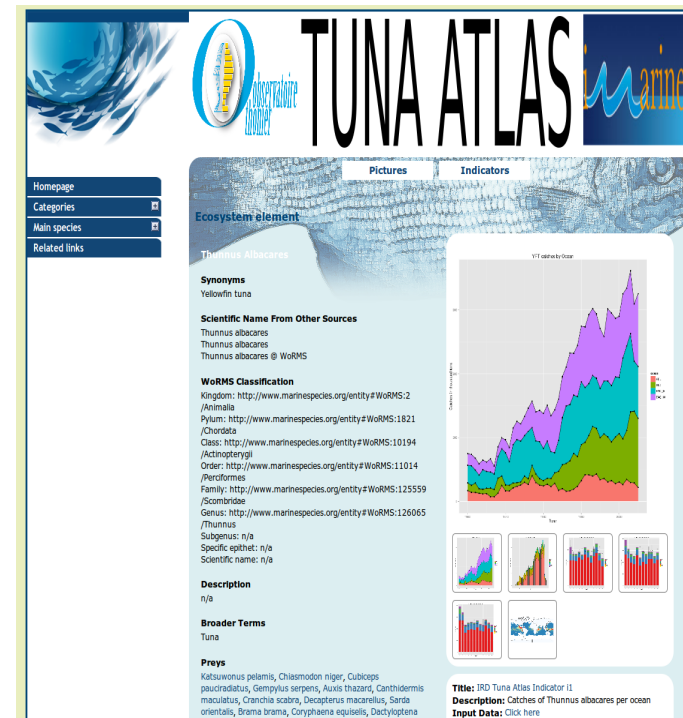
VME record

Description (Habitat & Biology)

Specific measures

The Tuna Atlas factsheet

Fact sheet: describes an entity (species, vessel..) and its **characteristics** (including relationships with other entities) as well as **linked data** (images, publications, indicators...) coming from different sources.



1. Blue Assessment

Assessing the status of fish stocks and producing a global record of stocks and fisheries

2. Blue Economy

Analysing socio-economic performance in aquaculture

3. Blue Environment

Fisheries & habitat degradation monitoring

4. Blue Skills

Boosting education and knowledge bridging between research and innovation in the area of protection and management of marine resources

5. Blue Commons

Publishing & re-use of scientific outcomes



APPLIFISH



www.i-marine.eu

