Towards Semantic Data Management in LifeWatch Italy: the Phytoplankton Study Case

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LIFEWATCH ITALY

10th International Conference on Ecological Informatics

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LifeWatch ERIC

LifeWatch-ERIC is the **European Infrastructure** supplying **e-Science research facilities** for **scientists** seeking to increase the knowledge and deepen the understanding of **Biodiversity organisation**, **Ecosystem functions** and **services**, with the goal of **supporting civil society** in addressing **the key planetary challenges**.

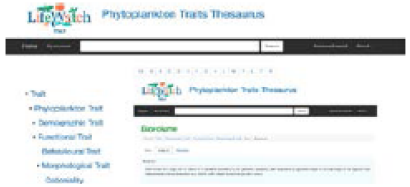
What LifeWatch-ERIC can do for you?

- Provide **unique access to ICT resources, services & tools** for all researchers.
- Enhance **computational power** through remote resources.
- Improve & facilitate **data management** through **semantic resources & tools.**
- Increase **knowledge** of the **domain** & make it **accessible.**

Services

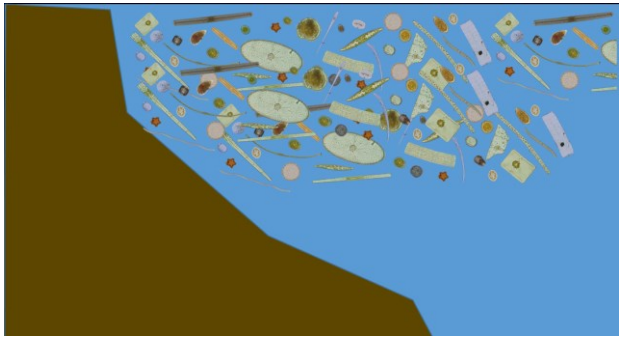
Computing Power

Controlled Vocabularies & Ontologies

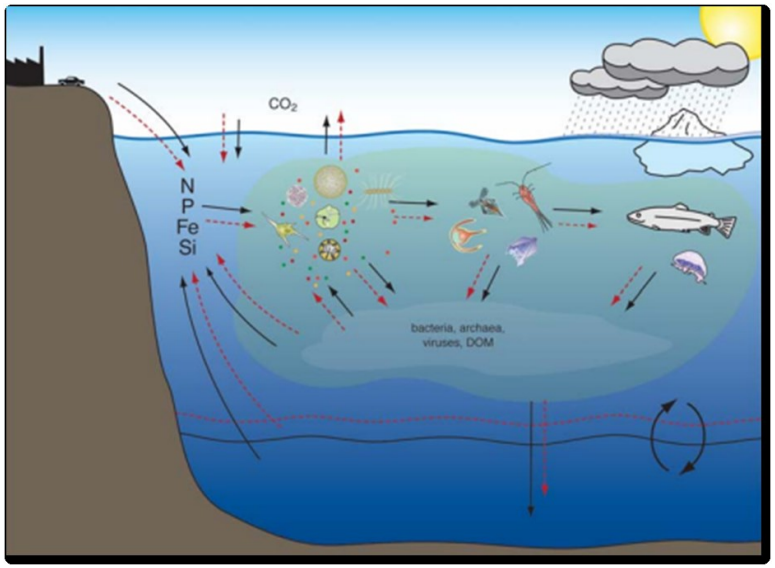


Phytoplankton Study Case

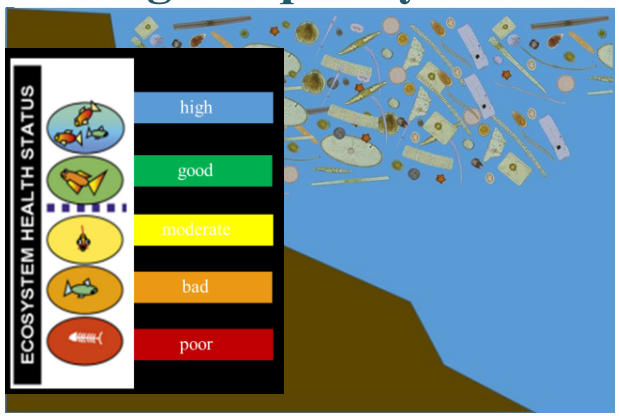
Critical to maintaining biodiversity and supporting aquatic life



Highly efficient primary producers

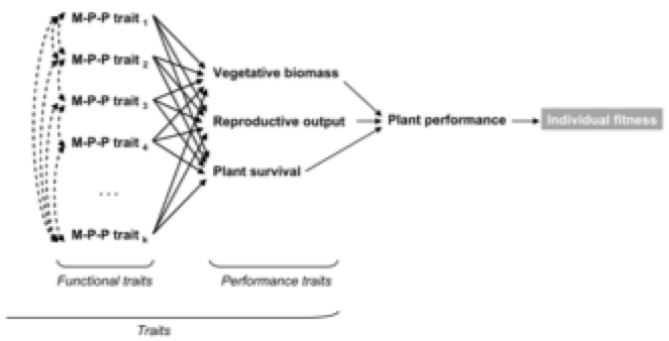


Useful indicators, "Biological quality element"



Water Framework Directive, WFD 2000/60/EC
Marine Strategy Framework Directive, MSFD 2008/56/EC

Phytoplankton Study Case



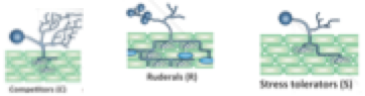
at the individual level that influence individual performances via its effects on growth, reproduction and survival in relation to the environment and to other species
(Diaz & Cabido, 2001; Violle et al., 2007; Mouillot et al., 2013).

Morphological
- **SIZE**
- **SHAPE**

Physiological
- **NUTRIENT REQUIREMENT**

Behavioural
- MOTILITY

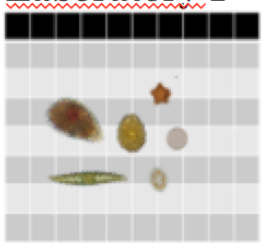
Phenological
- PHENOTYPE



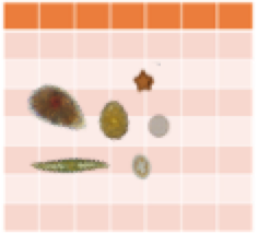
Phytoplankton Study Case

Taxonomy

Laboratory 1



Laboratory 2

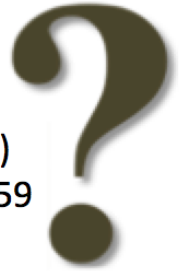


Scientific name

Ceratium furca (Ehrenberg) Claparède & Lachmann 1859

or

Tripos furca (Ehrenberg) F.Gómez



Not harmonized

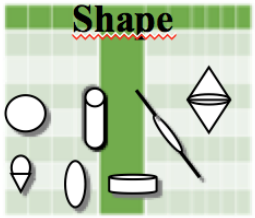
Not standardized

Heterogeneous

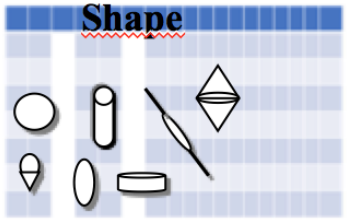
Distributed

Traits

Laboratory 1



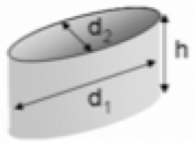
Laboratory 2

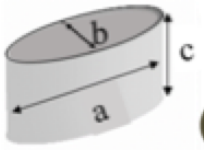


Shape

Oval cylinder
or
ellipsoid
or
prism on elliptic base

Linear dimensions





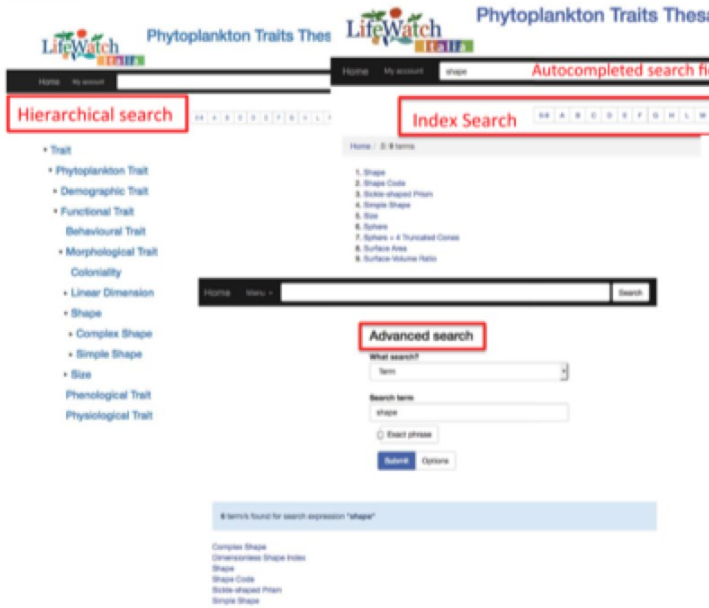
Phytoplankton Thesaurus

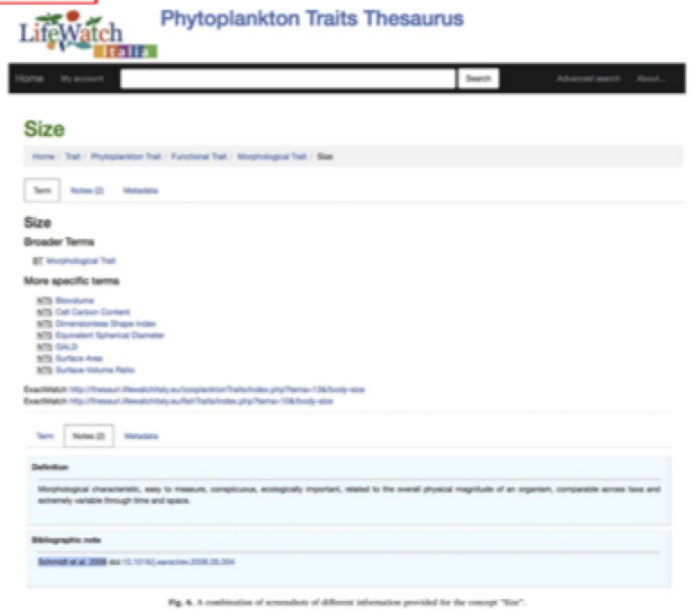

Contents lists available at ScienceDirect
Ecological Informatics
journal homepage: www.elsevier.com/locate/ecolinf

A thesaurus for phytoplankton trait-based approaches: Development and applicability

Ilaria Rosati[a,b,c,*], Caterina Bergami[a,b,d], Elena Stanca[c], Leonilde Roselli[c], Paolo Tagliolato[a,f,g], Alessandro Oggioni[a,f], Nicola Fiore[a,e], Alessandra Pugnetti[a,f], Adriana Zingone[a,b], Angela Boggero[a,c], Alberto Basset[a,c]

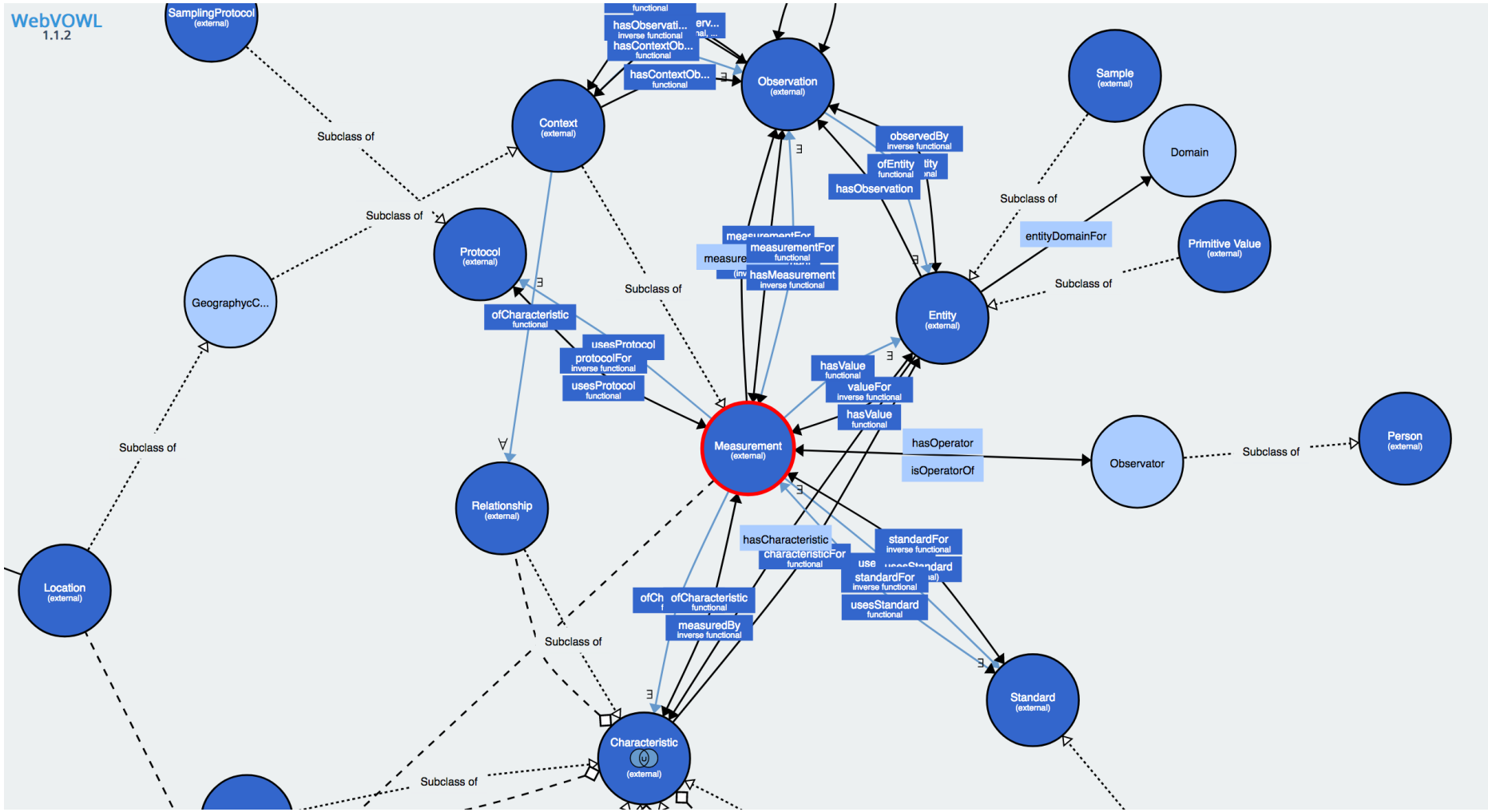
- **defines procedures and develop tools for data harmonization, aggregation and analysis**





PhytoTraits is freely available on the web at the URL http://thesauri.lifewatchitaly.eu/PhytoTraits/index.ph and it could be utilised for different purposes.

LIFEWATCH-ITA CORE ONTOLOGY



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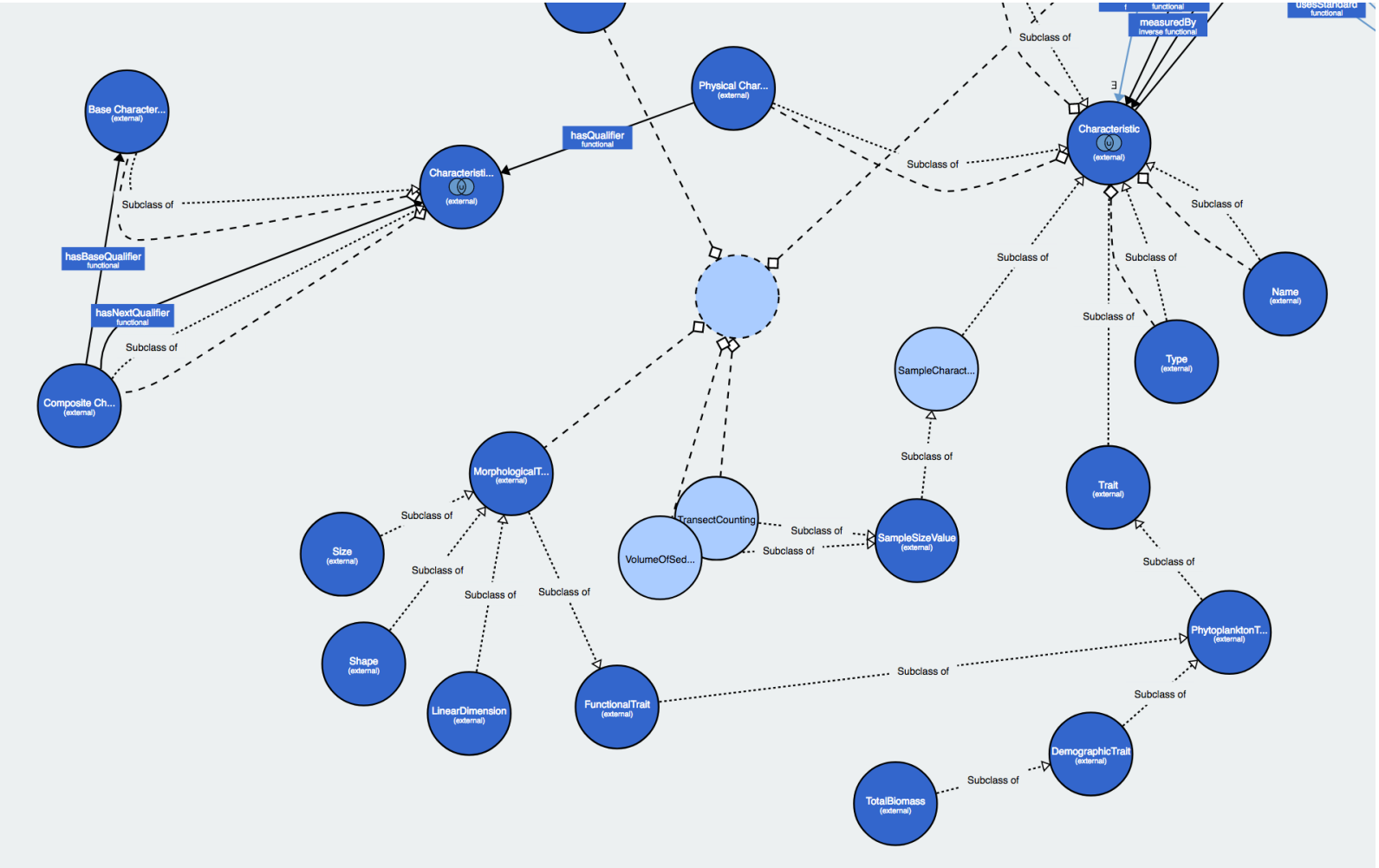
LIFEWATCH-ITA ONTOLOGY (Phytoplankton)



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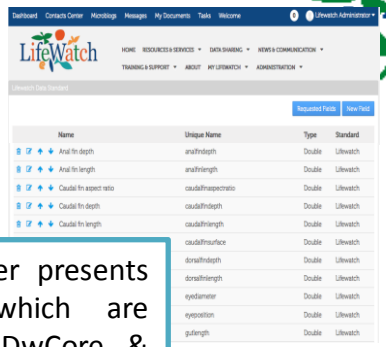
Phytoplankton Data Life Cycle



Data is generated, collected or received

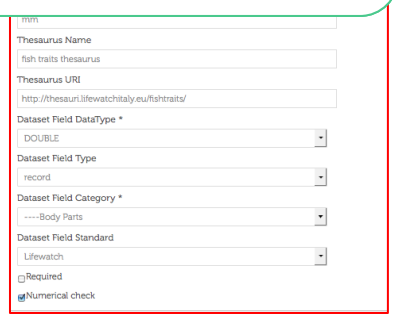
Each parameter presents information which are imported by DwCore & LifeWatch-ITA Thesauri.

Acquisition

Curation

Data is curated by adding metadata like: originating experiment, persistent identifiers, QA annotations, etc.

- Follows the INSPIRE metadata regulation and the ISO 19115 metadata standard
- Contains 31 elements of which 20 are mandatory



Publishing

Data is published, making it accessible to the environmental research community

- LifeWatch-ITA Data Portal
- Semantic Search

Processing

Services for transformation, collation, and analysis of data are provided

Phytoplankton VRE

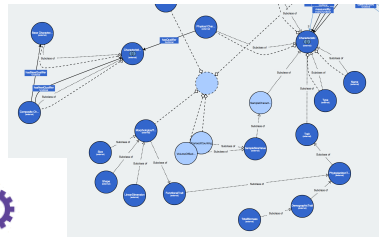
Use

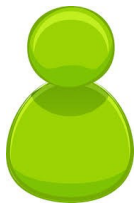
Researchers use the data, potentially producing new research data

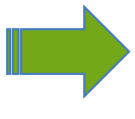
RESEARCH DATA

Semantic Data Management

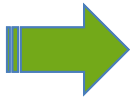
SEMANTIC ANNOTATION







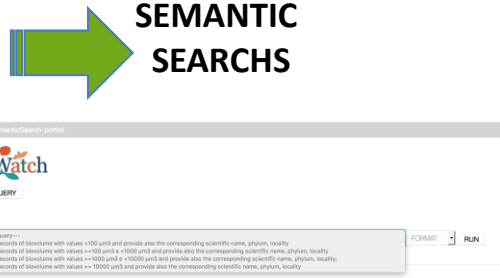
MongoDB

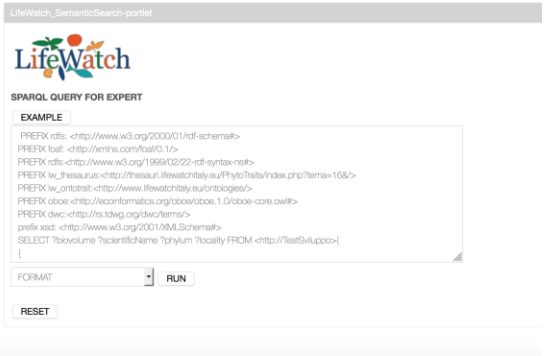


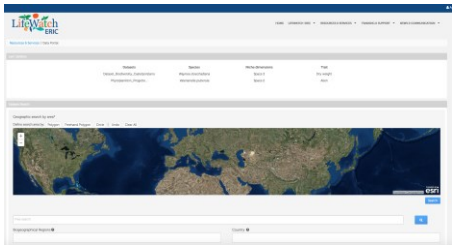
VIRTUOSO TRIPLE STORE

SPARQL

SEMANTIC SEARCHS

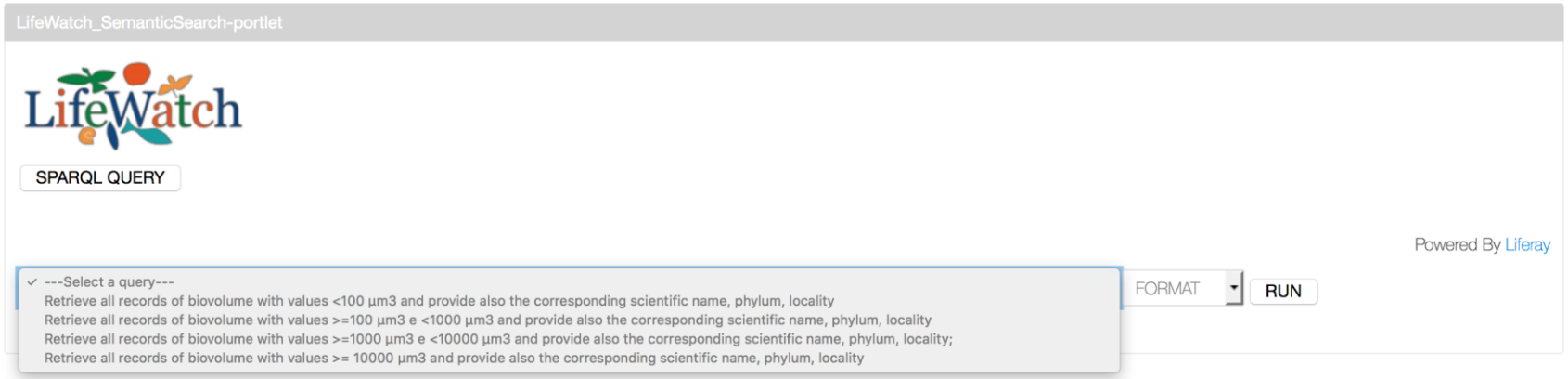






LW_ITA DATA PORTAL

Semantic Navigation



http://193.204.79.111:8080

Conclusion & Future Work

The approach facilitates data discovery and integration, and can provide guidance for, and automate, data aggregation and summary

NEXT STEPS

- **STRENGHTNESS THE USER EXPERIENCE**
- **EXTEND THE MODEL TO OTHER DOMAINS**
- **ONTOLOGY ALIGNMENT**
- **ONTOLOGY MARKET PLACE**

Semantic Navigation

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