Conservation Internship:

Flanders Marine Institute

(Vlaams Instituut voor de Zee)
(VLIZ)

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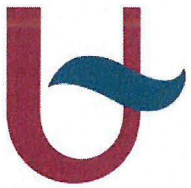

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1 Introduction

1.1 Flanders Marine Institute (Vlaams Instituut vor de Zee (VLIZ))

Located in the docks of Oostende, next to the place were the first laboratory for marine biology was founded by Pierre-Joseph van Beneden, the VLIZ represents a focal point for marine and coastal-related research. It describes itself as the coordination and information platform for marine scientific research in Flanders and was founded in 1999 by the Flemish government in cooperation with the province of West Flanders and the Fund for Scientific Research. However it acts as an autonomous non-profit institute and follows certain strategic objectives, in particular:

- Promoting Flemish marine scientific research and its international impact on a professional but also on a public level
- Serving as an international contact point in the marine scientific field
- Providing marine scientific information to policy makers and other stakeholders in regard to marine affairs

Therefore the VLIZ tries to cover different fields of activities.

On the one hand it's supporting marine scientific research, notably by providing access to its own research vessel RV "Simon Stevin", but also by making use of other equipment and infrastructures. In addition the VLIZ runs its own data-center, namely the Marine Data and information Center (Dutch: Vlaams Marien Data- en Informatiecentrum (VMDC)). It collects and distributes different kinds of data and also contributes to the establishment of international standards of databases. For instance the "World Register of Marine Species (WoRMS)" is providing a worldwide accessible list of marine species and additional information like the scientific name, the environment it occurs in or the source of its first description. The VMDC is an integral part of different international networks, in particular the Intergovernmental Oceanographic Commission (IOC) of the UNESCO, the Ocean Biogeographic Information System (OBIS), the European Science Foundation (ESF) Marine Board, the MarinERA (Marine component of European Research Area), as well as the EurOcean and other European networks.

On the other hand the VLIZ maintains facilities like the "Marine Library" as part of the multimedia center, which is open to the public every workday between 9 am to 5 pm and gives access to a comprehensive collection of marine scientific literature and multimedia. Scientists, policymakers, teachers, students, as well as

interested citizens can make use of the information desk, which provides objective scientific information, but also promotes Flemish marine scientific work throughout, exhibitions, publications, symposia or workshops. The Flemish marine Institute also hosts several conferences, like for instance the annual "Young Marine Scientists Day".

Thus the VLIZ is supporting scientific research and promotion in a broad scale, without being a research institute itself. To accomplish this aims it keeps completely autonomous, neutral and obligates itself to scientific standards, while its provided information is based on evaluated scientific research.

www.vliz.be

1.2 World Register of Marine Species (WoRMS)

The World Register of Marine Species (WoRMS) is a database which aims to provide a reliable and comprehensive list of names of marine organisms. However, not only the current name is included, but also names which are synonymously in use or even names which are outdated. Thus the WoRMS database is promoting standardization and can be used as a guide to interpret scientific literature. WoRMS is based on the consolidated database "Aphia", which was developed by the VLIZ to create a consistent standard. Beside the species name the database can provide additional information about a species, like descriptive literature or biogeographic data. In addition the single registries are all linked to their higher classification. For example the "*Demospongiae*" are linked to their parent taxon, namely the "*Porifera*". Of course, due to ongoing research these classification can't be seen as set taxonomic or phylogenetic relations, however it normally represents the current scientific opinion and it is also easier to maintain a database with a clear hierarchy. Although the database is hosted by the VLIZ, the content is edited and controlled throughout an editorial management system were each group is represented through a specified taxonomist.

Other features are for instance the "Taxon Match Tool", which gives users the possibility to match their own taxon lists with the database of WoRMS. A photo gallery can also be found on the webpage of WoRMS, which contains over 33,531 images.

WoRMS itself developed of the "European Register of Marine Species (ERMS)", which was founded 1998 and financed by the "European Union Marine Science and Technology research programme (MAST)". In 2008 WoRMS was created as a combination of the ERMS database and several other species registers. Today it is mainly funded by different EU Networks, amongst others the "Marine Biodiversity and

Ecosystem Functioning (MarBEF)", whereas the intellectual property rights (until now only the the European part of the database) are managed through the Society for the Management of Electronic Biodiversity Data (SMEBD).

The current number of accepted species is 220 369 of which 92% are reviewed by scientists. But there are still about 10 000 species waiting for entry into the database. As each year more than 2000 species are newly described, the maintenance of the database will be an on-going task.

The webinterface of WoRMS can be found under:

www.marinespecies.org

1.3 "Marine Regions" database

"Marine Regions" is the second large database maintained by the Flemish Marine Institute. Established in 2008 and funded by the Marine Biodiversity and Ecosystem Functioning EU Network of Excellence (MarBEF) and other EU initiatives such as the European Marine Observation and Data Network (EMODnet) or the Lifewatch project, the "Marine Regions" database tries to create a standardized list of geographic names. These names are then linked with several other information, like for example geographic maps, the exact locations or synonymous names. The aim is to also provide a comprehensive and standardized register of the different geographic marine names which makes it easier to distinguish between definitions of sandbanks and reefs. End users can also download the data including "shapefiles" for further data processing, for example with a GIS software packages.

The Marine region database is based on the VLIMAR gazetteer and the VLIZ Maritime Boundaries Geodatabase. In this SQL server database different geographic units can have one or more relations to other geographic features. Due to its open hierarchy multiple marine classifications can be related to each other, like the International Hydrographic Organization (IHO) Ocean and seas limitations or the Exclusive Economic Zones (EEZ) of different countries. The strength of this structure is, that every Marine region entry in the database is attached to a specific ID, the MRGID, which makes it very easy to reference or link to one specific region. Until now the database of "Marine Regions" is maintained by the VLIZ, however on a longterm view the aim is to succeed an international editorial board, which then takes over responsibility for content and quality management.

Currently 30 233 marine georeferenced places are registered in the database, 37 541 marine place names and 9664 polygons of geographic places. It is providing 12 globally valid, marine geographic classifications and also the Maritime Boundaries, namely the EEZs of the world.

The web-interface of the "Marine Regions" database can be found under:

www.marineregions.org

2 Personal Insights

2.1 Research Vessel "Simon Stevin"

RV Simon Stevin: A multidisciplinary coastal research vessel (www.vliz.be/EN/Logistic_Support/RVSimonStevin)

To achieve some of its aims, the VLIZ is running the RV "Simon Stevin". In 2012 this ship replaced the former RV "Zeeleeuw", which was operating between 2000 and 2012. The "Zeeleeuw" was donated by the Flemish government to the Republic of Kenya after more than 10 years of service. In Kenya it is now used by the "Kenya Marine and Fisheries Research Institute (KFMRI)", which is also running a cooperation with the VLIZ.

The RV "Simon Stevin" was build totally from the scratch in 2010. The vessel itself has a length of 36 m , a width of 9,4 m and a draught of 3,5 m. As it is a research ship, which is, beside other topics, focusing on sustainability and conservation issues, particular attention was drawn on keeping the environmental influence of the vessel as low as possible. For example a modern, highly isolated diesel-E-motor combination was build in, to keep acoustic pollution as low as possible and therefore the "Simon Stevin" is a silent ship conforming to the ICE209 standard. Of course modern standards like an oil-separation system is installed too, however run-offs from the deck or the ship propeller can't be fully prevented.

On a personal tour over the ship, it was explained to me, that Simon Stevens is mainly deployed in coastal oceanographic research in the Southern Bight of the North Sea and the eastern part of the English Channel. For these tasks it is equipped with up to date scientific equipment. One of the most important installations of the ship is the Multibeam & Singlebeam echo-sounder, which allows detailed scanning and characterization of the sea floor. The echo-sounders are coupled directly to a GPS responder, which tracks the current position. With the help of the GPS signal, the ship can be hold stationary on its current position, by evaluating depth, swell, current, wind speed, temperature, salinity and other meteorological data. All these measurements are also saved every 10 seconds linked to the current GPS coordinates. The collected data is also used as background information for the scientific research, which is ongoing on the ship. On the vessel two labs are provided. One 16 m^2 "wet lab" and a 12 m^2 "dry lab". These labs are equipped with MILIPORE water filtration systems, a vacuum filtration set, ovens, a fume hood, compressed air pipes, etc.. The vessels provides space for more than ten researchers, in addition to the permanent crew. Additional lab space can be created by installing a container on the quarterdeck. Two different winches are installed to lift different types of research equipment on or over board.

It can be said that the "Simon Stevin" is one of the most modern research vessels in the world and can cover a broad range of current marine research, however it mainly performs one-day journeys and is specialized to shallow coastal waters of the Southern Bight of the North sea.

The overall costs were 11,5 million d' for the vessel itself plus 1 million d' for the scientific equipment, which was financed by the Flemish government.

The RV "Simon Stevin" offers a great opportunity for independent marine research work and test new maritime and marine technologies. However it also serves as a platform for educational excursions for students and pupils.

For more detailed information on the ship:

www.vliz.be/EN/Logistic_Support/RVSimonStevin

2.2 World Register of Marine Species (WoRMS)

As mentioned above, the World Register of Marine Species provides different kind of detailed information about each species and as a part of my placement I helped updating and maintaining the database. At first every species, which is entered into the database, is connected to one specific ID, the AphiaID. Beside that ID,

a registry is containing at least the scientific name and its source, as well as the source of the species first description. In addition the distribution range of a species, information about the type locality or synonymous names are saved. It can be said, that the distribution area is one of the most interesting and important facts of any registry. However a geographic database is not included in the WoRMS database. Therefore it is necessary to link the geographic information to another database, namely "Marine regions" (see above), which provides the information needed. Thus the environmental information about a certain species can be linked directly to one or many specific marine regions. This gives the user a good overview about the species. Most of the distribution areas in WoRMS are already linked to a specific MRGID and therefore to a specific marine region. However many of the type localities still have to be linked to a specific marine region. For example in advance several type localities of species where already linked to an MRGID automatically, however, for example, due to slight difference in the spelling of a region, the type locality often has to be fitted manually. For instance the type locality of a sponge is stated as "Antarctica sea" in the WoRMS database. When the automatic script is searching for this sea region in the database of "Marine regions" it won't find any entrance. However it is clear, that "Antarctica sea" is a synonym for "Antarctic Ocean" and therefore the MRGID for for the Antarctic Ocean must be linked manually to this type locality. On the other hand the given type locality doesn't have to be totally clear. One example here was another sponge species for which the given type locality was stated as "Antilles". In the "Marine Regions" database two entries were found, the "Greater Antilles" and the "Lesser Antilles". These two island groups together are forming indeed the Antilles, but no entry could be found in the database summarizing both entries to the "Antilles". After a short literature research and discussion, we decided to create the new marine region "Antilles" in the Marine Regions database and link this region to the specific Sponge.

To maintain the files easy and quick, "Microsoft Access" was used, due to its different possibilities of data processing. The whole work helps of course to improve the database with regard to its integrity. Therefore the work can be seen as a quality management.

2.3 "Marine Regions" database

The current status of the database of "Marine regions" was introduced before, and up to now, the final state is still not reached, as several specific marine sites are not yet included or up to date. Especially protected areas like for example "Ramsar Wetlands of International Importance" are still missing in the database, but could provide additional, very useful information especially for conversational questions.

Several other databases are already providing these data sets. Namely these can be found on webpages like www.protectedplanet.net, which is the online interface of the World database of Protected Areas (WPDA), a joint project of the "International Union for Conservation of Nature and Natural Resources (IUCN)" and the "United Nations Environment Programme (UNEP)". Additional information can be found directly on the websites of the Conventions (for instances: www.ramsar.wetlands.org).

These kind of databases are providing not only the names of the protected areas, but also "shapefiles" for GIS software applications and specific information of the marine sites, which can be included in the database of "Marine Regions". Especially the "shapefiles" are very useful for further data processes. By using "ArcGIS" for instance, these data files can be fitted to the current geographic standards of the Marine Region database. In addition these "shapefiles" provide an easy opportunity to locate and add the new data to the database. For example the "Hamburgisches Wattenmeer" could be found in the database, but only as a Natura 2000 Special Protection Area (SPA). But beside being a Natura 2000 site the "Hamburgisches Wattenmmeer" is also represented as a "Wetland of international importance (Ramsar Convention)". Thus it was added to the database also as a Ramsar-Wetland. In addition only the German name was existing in the database, therefore the English name "Wadden sea of Hamburg" was added as well to both entries in the database.

This work helps to improve the integrity of the database "Marine Regions" wants to achieve and can be seen as quality management, but also general work on the dataset. The work is mainly done on the web-interface of "Marine Regions", but also includes work with ArcGIS.

For more detailed information:

www.protectedplanet.net

www.protectedplanetocean.org (Beta)

www.ramsar.org

www.ramsar.wetlands.org

www.pegasoproject.eu

www.ec.europa.eu/environment/nature/natura2000/

3 Discussion and Summary

Although the work on the databases of "Marine regions" and WoRMS, which was part of my internship, doesn't seem to play a direct role in conservation issues at the first sight, the information, these kind of databases providing, are the base for marine conservation work. For instances to set up conversational policies, detailed, but easy accessible background information are essential. The databases are a reflection of the current scientific research, but especially nowadays, the fields of research are placed on such a brought scale that especially non-professionals, can easily lose track. Therefore databases like "Marine Regions" or WoRMS represent clustered information, providing a very good starting point for detailed investigations even for non scientists.

The whole work can be seen as a kind of quality management for a database. Although it doesn't introduce totally new working techniques, this work provides me a very good insight to the work with databases and the problems managers have to face. A database like WoRMS, as well as "Marine Regions", is crucial in a professional scientific environment. Therefore the work on these databases gives me, as a student, a good insight in the work, which has to be done as a linking part of the scientific research and the policy making itself. It helps me understanding, what problems people working on these data, have to face, what kind of information they need and were to find these information. Additionally working for example with ArcGIS gives me for the first time the chance to put my theoretical knowledge into use and therefore expand my knowledge and skills.

Beside the work on the database, the internship offered me the chance to get to know the work of the VLIZ. I got the chance to get an overview over the residual offers of the VLIZ, like the Marine library or the information desk and even got the chance to access the RV "Simon Stevin". What for example surprises me was the fact, that in spite of the focusing on building an environmental friendly vessel, that the normal oil run-offs from marine vessels, which can't be prevented, are responsible for more than 80% of the total marine oil pollution and therefore can't only be explained with rare but massive oil spills.

Summing up my experience so far, the internship at the VLIZ provided me with a great experience in applied database work, but also gave an insight on the way the VLIZ is run and how it provides its information and facilities to a broad audience, like researchers, policymakers and even the general public.

4 Appendix

4.1 Log of activities

Date	Time	What
05.08.13	8:30 - 17:00	Introduction to the VLIZ facilities; Introduction and working on the WoRMS database
06.08.13	8:15 – 16:30	Introduction and working on the "Marine Regions" database
07.08.13	8:15 – 16:30	Working on the WoRMS database
08.08.13	9:15 – 17:15	Working on "Marine Regions"; Introduction to the functionalities used in ArcGIS
09.08.13	9:15 – 17:15	Working on WoRMS and "Marine Regions"; Excursion on the "RV Simon Stevin"
12.08.13	9:15 - 17:15	Working on WoRMS, "Marine Regions"; Solving Problems with ArcGIS
13.08.13	9:15 - 17:15	Working on "Marine Regions"
14.08.13	9:15 - 16:30	Working on "Marine Regions"
16.08.13	9:15 - 17:15	Working on WoRMS and "Marine Regions"