Activities report WoRMS data management team (DMT) 2014

WoRMS 2014 in numbers

- - 10.213 marine species added, of which 1.527 were published in 2014
- - 47 new editors
- - 113.287 taxonomic edits/additions
- - On average 230 taxonomic edit actions per day

- - 1.134.721 visitors
- - 90.616.441 hits
- - 1.2 TB data traffic
- - 8.151 taxon matches
- - 99.95% uptime

In February 2014, the number of 500.000 taxon names – including all ranks and all statuses - in WoRMS was crossed.

The World Register of Marine Species now (end 2014) contains more than 227.000 accepted species names, of which 96% has been checked by taxonomic editors.

Steering Committee (SC)
- Organisation of the elections of new member of the SC

WoRMS website
- An updated version of the online (pdf) manual was made available.
- The 'advanced search' form has been made available to all the WoRMS users. This used to be restricted to editors, after log-in.
- The WoRMS twitter account (WRMarineSpecies) has reached 1.000 followers in 2014.

WoRMS outreach

WoRMS has been (re)presented by the DMT at several occasions:
- 12-13 February: EMODnet Biology Species Traits Vocabulary Workshop
- 17-21 March: ODINAFRICA training course on marine biodiversity data management.
- 28 April: AquaRES kick-off meeting
- 5-9 May: OBIS Nodes Technical training course
- 2-4 June: Catalogue of Life Global Team meeting
- 8-12 September: European Marine Biology Symposium (EMBS)
- 17-18 September: EMODnet Biology Second General Meeting
- 12-16 October: World Conference on Marine Biodiversity (WCMB)

WoRMS content

- Early 2014, it was decided to transfer NeMys from its original host institute – the Marine Biology Research Group at Ghent University (MarBIOL) – to the Flanders Marine Institute, the host institute of WoRMS. **The World Database of Free-Living Marine Nematodes** – NeMys – has now been fully integrated into WoRMS. NeMys also held 11 identification keys, and all these ID-keys have been transferred too. The complete NeMys library – either full pdfs or snippets of the relevant literature information – has been integrated into WoRMS, thereby opening the taxonomic literature of Nematodes to all interested taxonomists and ecologists. Early 2015, the NeMys editorial board will meet for a 3-day workshop, to discuss the way forward and to get familiar with the online editing interface.

- In February 2014, Mollusca experts have gathered at the Flanders Marine Institute to discuss a strategy to expand the Molluscan component of WoRMS to **MolluscaBase**. MolluscaBase will be a Global Species Database covering all marine, freshwater and terrestrial molluscs, both recent and fossil. The workshop was financially supported by LifeWatch. During 2014, the first steps were taken to make the Molluscan content more complete, e.g. by integrating the content of several existing Mollusca databases into MolluscaBase.

- As a first action with regard to MolluscaBase, the content of **CLEMAM** – Check List of European Marine Mollusca - was transferred. During the transfer, there was a strong collaboration with the responsible editor to make sure that all information was correctly imported into MolluscaBase. This collaboration led to the addition of 5.712 new (basionym) names, 7.977 references of original descriptions and 3.063 type locality notes to WoRMS/MolluscaBase.

- The **FreshGEN database** – Freshwater Gastropods of the European Neogene - contains information on all fossil freshwater gastropod species described from the Miocene and Pliocene of Europe and has kindly offered to share its information with both MolluscaBase and WoRMS. Through this collaboration, no less than 4.360 new taxa have been added. The FreshGEN data can be consulted through their own thematic portal within WoRMS.

- 63 species from the publication of Marshall & Baker 2008 (A revision of the **New Zealand land snails**) were added to MolluscaBase.

- As **fossil taxa** are becoming more and more abundant within WoRMS – and MolluscaBase wants to document all fossil mollusks ever described – there was a need to discuss the fossil part of WoRMS in more detail. A LifeWatch sponsored workshop was organized to discuss improvements and additional functionalities related to the storage, usages and display of fossil taxa and their ranges in the Aphia database. Following this workshop, the existing functionalities to document the stratigraphy or fossil range of fossil species were fine-tuned and are now extensively used within a number of phyla (e.g. Foraminifera, Echinodermata and Mollusca).

- Existing notes on the **type locality** have been 'translated' to an actual type locality distribution. In all cases, the information from the notes is an exact conversion and no information has been deleted from WoRMS. The notes are still available, the DMT has just made sure that their information is also easily searchable as an actual type locality. Through this action, the number of available type localities has raised from 7.119 to 36.391.

- Through the ongoing collaboration between **Catalogue of Life (CoL)** and WoRMS, 7 new Global Species Databases (GSDs) have been added to CoL. The new groups are: Foraminifera, Mysidacea,

Acanthocephala, Cephalochordata, Merostomata, Acoelomorpha and Kinorhyncha. A total of 17.429 new species were delivered to CoL

- As the taxonomic backbone takes great interest in making **links** between different existing (taxonomic) data systems, WoRMS – in collaboration with its editors – has taken an effort in adding and updating its links to the following systems: (1) **Barcode of Life**: there are now 30.686 deep links between the Barcode of Life and WoRMS, (2) **Biodiversity Heritage Library**: an update of the links has been done, bringing the number of deep links to 178.021, and including a publication count on the WoRMS web pages, (3) **Catalogue of Diatom Names** (CAS): direct links to 718 genera and 18.731 species were added to WoRMS.

- A lot of **images** have been added to WoRMS through (semi-)automated processes. More than 10.000 Mollusca images have been added to WoRMS from the Natural History Museum of Rotterdam. The World of Copepods has also added almost 900 Copepod plates from G.O. Sars. 3.173 images from the Mollusca Type Collection of the Natural History Museum in Paris were also added.

- Although the goal of WoRMS is to deal with all marine organisms, **viruses** have been largely overlooked in the past. During 2013-2014, the DMT has collaborated with members of the International Committee on Taxonomy of Viruses (ICTV) and has made the names of 129 marine virus species available through WoRMS, including the link with their host organism(s).

- The **Ostracoda** have long been listed as a gap within the World Register of Marine Species. Recently, this gap has largely been filled, thanks to the work done by one of the Ostracoda editors and the financial support of LifeWatch. During 2014, over 38.000 new Ostracoda species names have been added to WoRMS, and 7.101 existing species names have been updated and verified. This brings the total of Ostracoda species names within WoRMS to 49.209, of which the majority considers marine fossils (39.042 species). In parallel, 1.863 new sources on Ostracoda have been added to the literature module of WoRMS.

- The first steps have been undertaken to move the **Interim Register for Marine and Nonmarine Genera (IRMNG)** from CSIRO to VLIZ. IRMNG is a provisional compilation of genus names – including species names in many cases – and covers both living and extinct biota into a single system to support taxonomic and other queries, dealing with e.g. homonyms and authorities. VLIZ will provide ongoing hosting of the IRMNG data content, in the same environment as the WoRMS database. When the move has been completed, a comparison between WoRMS and IRMNG can help to identify gaps in both databases.

- The classification of mites and ticks (**Acari**) has been updated in WoRMS, to reflect the currently accepted Krantz & Walter 2009.

- An update was done on the **Microsporidia**, leading to 202 new names, 143 new references and 211 new feeding types.

- Within the **World Register of Foraminifera**, more than 7.000 new references have been added. Distributions related to Japan were added based on a list of recent Foraminifera around the Japanese Islands (Nomura, 1997).

- During the World Conference on Marine Biodiversity (October, Qingdao), the **Chinese Register of Marine Species** – ChiRMS – was officially launched. A board of thematic editors has been compiled, and a first list of Chinese species is expected to become available online during 2015.

- The 'Index of living and fossil echinoids 1924-1970' by Kier & Lawson (1978) has been screened by one of the **Echinodermata** editors, which has led to the addition of more than 2.300 fossil (infraspecific) taxa to WoRMS.

- The collaboration with **Fishbase** was continued in 2014. During this year, the focus was on the addition of missing genera and making sure that each genus was associated with the correct authority and year of publication.

- There is a strong and continuous collaboration between the **Ocean Biogeographic Information System** (OBIS) and WoRMS. OBIS has officially adopted WoRMS as its taxonomic backbone, and aims to match all its taxa names with WoRMS. The DMT is helping to clean the OBIS taxon list and during 2014, a lot of non-matching lists were sent out to the WoRMS editors, asking them to check these names and (a) add them to WoRMS if it would be a validly published name or (b) let us know why a name should not be added to WoRMS (e.g. unknown combination). Many editors have been really helpful in this enormous task, thus helping to improve the quality of the taxonomic data in OBIS and making WoRMS more complete.

- In the framework of the **AquaRES** project (Aquatic species Register Exchange and Services), first steps have been taken to optimize the data exchange between FADA (the Freshwater Animal Diversity Assessment) and WoRMS. A comparison has been made on the level of content and editorships and editors of overlapping groups between FADA and WoRMS are currently being contacted to discuss how collaborations can be established and overlap can be avoided.

- Data synchronization between **AlgaeBase** and WoRMS is an ongoing task.

WoRMS technical developments

- The **data transfer from WoRMS to EoL** has been optimized. WoRMS is now providing the full classification to EoL through DarwinCore files.

- A '**reverse taxon match**' has been developed, making it possible to convert AphiaIDs to their corresponding scientific names. This reverse taxon match is available as a web service, through the LifeWatch website.

- The online available **web service instructions for R** have been updated: the 'infinite recursion error' has been fixed.

- The WoRMS database has been migrated to a load-balanced web server. If one server fails, the other one can now take over. This should allow for even less downtime of the WoRMS website.

- Development of the '**journal importer**', allowing editors to semi-automatically import (newly) published names coming from ZooBank and Zookeys. By pasting either a ZooKeys DOI or a Zoobank Reference LSID, the source and the taxon/taxa will be imported in a 'guided' way. The tool also lists the latest available ZooKeys publication, and editors can easily import the chosen publication.

- Upon request, the WoRMS database can now **store references in an atomized manner**. The existing 'source name' field has been split up into 6 fields: DOI, author, year, journal, title & suffix (volume, pages, etc.). Existing sources have been atomized automatically, where possible. The 'source name' field and the atomized fields can be used in parallel. All the atomized sources can now also be exported in the following formats: RIS and BibTeX.

- In parallel, an **automated import of new sources** has been developed. Through external services, the atomized reference fields can be filled in automatically. Currently, this tool makes use of CrossRef, ReFindit and FreeCite.

- Also related to the two above developments, is the development of a tool that lists possible **source duplicates** within the WoRMS database. This 'similar sources' tool allows the editors to clean possible duplicate entries themselves. The cleaning of duplicate sources is limited to the taxon group for which an editor has editing rights.

- **Continuous technical support** to the many users of WoRMS through info@marinespecies.org. this support includes fixing minor bugs brought to our attention, help in modifying specific scripts for R which link to the WoRMS database, help in setting up the possibility for batch uploads of information (e.g. images, deeplinks…).

Actions financially supported by LifeWatch

LifeWatch is the E-Science European Infrastructure for Biodiversity and Ecosystem Research. It is a distributed virtual laboratory which will be used for different aspects of biodiversity research. All of the above mentioned work was supported by staff members provided by VLIZ as part of the Flemish contribution to LifeWatch and is funded by the Hercules Foundation.

The taxonomic backbone of LifeWatch aims at bringing together taxonomic and species-related data and at filling the gaps in our knowledge. In addition, it gives support to taxonomic experts by providing them logistic and financial support for meetings and workshops related to expanding the content and enhancing the quality of taxonomic databases. As WoRMS is a major player in this taxonomic backbone, funds can be made available to support the further development of WoRMS and its related databases, both on the content and technical level.

- Early 2014, a call for applications for small, targeted **data grants** was launched. Through the LifeWatch project, a budget was made available to allow editors to apply for a small grant to fill the gaps within their taxonomic group. In total, 16 LifeWatch grants were assigned covering a wide taxonomic variety: **Mollusca, Gastrotricha, Polychaeta, Hirudinea, parasitic Nematoda, Pisces, Echinodermata, Copepoda, Isopoda and Digenea**. The majority of the work has been completed and is already available through WoRMS. The other grants will be delivered in January 2015. Early 2015, a dedicated web page will be made available on the WoRMS website, listing all the data grants, their goals and final report. In general, the data grants have led to the addition of at least 3.000 new names to WoRMS and a taxonomic revision of at least 5.000 names already in WoRMS.

- With the financial support of LifeWatch, the creation of a **World Register of Introduced Species** (WRIMS) has been initiated. This portal is being developed in collaboration with members of the

IUCN Invasives Species Specialist Group (ISSG). This portal will give access to all the marine alien species worldwide, together with relevant information on their provenance, invasiveness and occurrence. We expect to launch this portal in February 2015.

- The **MolluscaBase workshop** and the **fossil workshop** have been financially supported by LifeWatch.