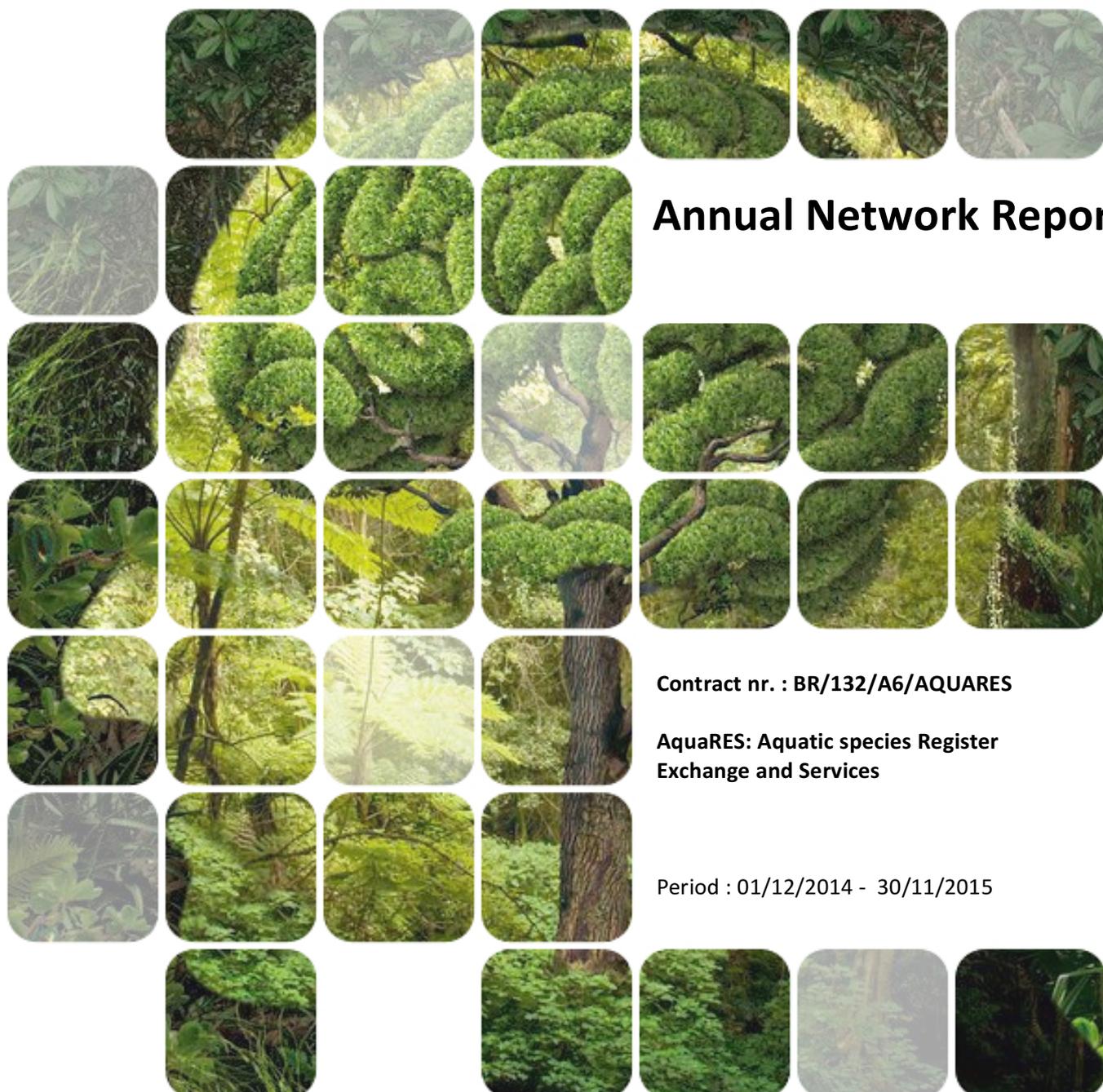


# BRAIN-be

BELGIAN RESEARCH ACTION THROUGH INTERDISCIPLINARY NETWORKS



## Annual Network Report

Contract nr. : BR/132/A6/AQUARES

AquaRES: Aquatic species Register  
Exchange and Services

Period : 01/12/2014 - 30/11/2015

## NETWORK

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### PROJECT WEBSITE:

<http://odnature.naturalsciences.be/aquares/>

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## 1. EXECUTIVE SUMMARY OF THE REPORT

The AquaRES “Aquatic species Register Exchange and Services” project builds on the specialist curated taxonomic databases *World Register of Marine Species* (WoRMS), the *Register of Antarctic Marine Species* (RAMS) and the *Freshwater Animal Diversity Assessment* (FADA), which are hosted in Belgium. The main objective of the AquaRES project is to ensure and enhance the interoperability and public availability of these aquatic species databases through the development of a set of web services. These services envisage data exchange among the 3 partner databases and with other international initiatives including Encyclopedia of Life (EoL), Catalogue of Life (CoL), Global Biodiversity Information Facility (GBIF) and e-Science initiatives such as Biodiversity Virtual e-Laboratory (BioVeL) and LifeWatch.

The activities on the AquaRES project started in May 2014. Activities until November 2014 are covered in the 2014 annual report. The main milestone during the first full year of this 2-year project was the organisation of the editor workshop in September 2015 (Task 2.5: *Workshop to test tools and procedures for checking taxonomic lists, tools to complete distribution data and address identified gaps and overlaps between datasets*). With 29 participants in total, the interest for this meeting surpassed our expectations, and we received very valuable input and feed-back. The full meeting report can be consulted at [odnature.naturalsciences.be/aquares/workshop-report](http://odnature.naturalsciences.be/aquares/workshop-report). Several tools, including the AquaCache ([aquacache.lifewatch.be](http://aquacache.lifewatch.be)), the WoRMS checklist publication tool and distribution entry tool (which can be accessed after logging in at [marinespecies.org](http://marinespecies.org)) were demonstrated during the workshop and are currently available. The development of other tools such as the FADA import tool for processing both Excel files as well as Darwin Core-Archive files is on-going and should be completed early 2016. As a number of tasks, such as the data synchronisation, depend on the availability of this import tool, they have been slightly delayed. Developments in 2016 will focus on the tools targeting users looking to validate species occurrence data. Overall, taking into account the later start of the project and the 6-month prolongation that was requested in December 2015, the progress on the planned tasks is on-track.

We completed Tasks 1.3: *central data cache*, 2.1.2: *checklist publication tool*, 2.4: *interface for distribution information* and 2.5: *workshop to test tools for taxonomic editors*. We did not have a follow-up committee meeting (Task 3.4) during this period, but experts were briefed on several occasions. Data quality control and updating of the participant databases (Task 2.2) is ongoing throughout the project. The work on Tasks 1.4: *synchronise updates*, 2.1.1: *improve data import*, 2.3: *Taxamatch* and Workpackages 3: *user tools* and 4: *international exchange* is still on-going.

## 2. ACHIEVED WORK

*Detailed description of the achieved work and tasks of the past reporting year*

The focus of the AquaRES activities during the period from December 2014 to November 2015 was to organise the editor workshop in September 2015 (Task 2.5: *Workshop to test tools and procedures for checking taxonomic lists, tools to complete distribution data and address identified gaps and overlaps between datasets*). As we wanted to demonstrate and test data entry tools during this workshop, our efforts focussed on preparing these tools for the workshop. This included the demonstration of the AquaCache tool (Task 1.3), the checklist generation tool (Task 2.1.2) and the data entry interfaces (Task 2.1.1) including the geographical data entry tool (Task 2.4). Through the development of these tools, we aim to ensure and enhance the quality, interoperability and public availability of the aquatic species databases FADA, WoRMS and RAMS, and offer these tools to a wide user community to access and actively use the data. Below, we provide a description of the tasks, which were addressed during

this reporting period.

## **WP1: Data exchange and web services to ensure the interoperability among the participating databases FADA, WoRMS and RAMS**

The tasks to **map the database structure** (Task 1.1.1) of the participating databases and to document the **requirements web services and data cache** (Task 1.1.2) were completed during previous reporting period. This resulted in the choice for working with Darwin Core Archive (DwC-A) files as the export format for exchange between WoRMS, RAMS and FADA. Such DwC-A-files can at the same time be used for including selected data in the partner database, (re)building the “AquaRES cache” (or AquaCache) and for the exchange with external initiatives (Task 4.1: Establishing and improving data exchange with international initiatives).

In order to **improve and set up exchange web services** (Task 1.2), test exports were run through the Darwin Core-Archive validator to highlight potential issues, which were corrected. Further issues surfaced after data integration in the AquaCache. RBINS improved the export scripts of the FADA database, creating database views, and setting up data resources in the BioFresh IPT (<http://data.freshwaterbiodiversity.eu/ipt>) that can be automatically updated. This process was completed for selected organism groups that were relevant for data exchange with WoRMS, but will be done for all available checklists, to allow their inclusion in the AquaCache. Following the FADA-database changes as outlined under Task 2.1, the export scripts will require minor modifications, and we will ensure the availability of all taxonomic checklists through the IPT early 2016.

The **design of the data cache** (Task 1.3.1), which was worked out during previous period, and the **implementation of a central cache for common web services** (Task 1.3.2) was completed by VLIZ by September 2015, so the tool was demonstrated at the editor workshop (Task 2.5). The tool is available on-line at [aquacache.lifewatch.be](http://aquacache.lifewatch.be) and allows editors to compare entries in two different ways. The first view is global approach which shows if one or more entries are different or not. The second view goes into detail by doing a one-on-one comparison. The detection of differences is limited at the moment but will be further refined by adding the option to compare environment flags (marine, brackish, freshwater, terrestrial). Implementation of the taxamatch tool on the AquaCache (Task 2.3) is foreseen, and will be done in parallel to loading all FADA, WoRMS and RAMS data in the AquaCache.

The **synchronisation of updates for taxonomic groups managed in one of the participating databases** (Task 1.4) was planned for the current reporting period. VLIZ has initiated the integration of FADA Platyhelminthes in WoRMS. Other checklists are pending, as most FADA editors have not yet supplied environmental flags clearly indicating marine species. For the integration of “freshwater WoRMS data” into FADA, the RBINS team is currently working on the import tool (Task 2.1) to perform this synchronisation. Once this tool is ready, the work on this task will require the highest priority, so data gets imported and processed within the term of this project and any issues arising during the process can still be resolved.

## **WP2 Tools/services for improving taxonomic checklist data**

Overall, activities under WP2 represent the core activities during this reporting period, with the organisation of the editor workshop in September 2015 (Task 2.5: *Workshop to test tools and procedures for checking taxonomic lists, tools to complete distribution data and address identified gaps and overlaps between datasets*) being the biggest task. But, except for the **data management** task (Task 2.2), which runs throughout the project period, all other activities under this WP were initiated in 2015 as well.

As activities under Task 2.1 (*Improving input and data publication services for individual datasets*), RBINS compiled an extensive description of the planned improvements to the import procedure and database structure which is publicly available on [GitHub](#). Since July, RBINS is working with an external developer, Sylvain Renaudier, to produce an import tool for FADA. The availability of this tool is slightly delayed as other tasks intervened, but is currently foreseen for early 2016. VLIZ on the other hand has developed a checklist publication tool (Task 2.1.2), which was demonstrated during the editor workshop. This tool is available to the taxonomic editors using the Aphia system and offers the possibility to include the following information in the checklist: title, subtitle, citation, ranks, synonyms, status, LSID and distributions (see also screenshot below). The output can also be styled a bit by enabling breaks or changing the indentation. In the end the data can be exported in three different formats which are html (shows in browser), pdf and a word document.

**WoRMS**  
World Register of Marine Species

**Aphia Checklist Publication Tool**

You are logged in as:  
**Bovit, Lorenzo**  
[Logout] [My Aphia]

**Search options**

Taxa belonging to

e.g. Mollusca

Limit to marine taxa

Fossil

**Output options**

File type  html  pdf  word

Title

Subtitle

Include citation

Indentation  Number of characters/tabs to indent in front of each child rank

Rankname  Include the rank name in front of the taxon

Synonyms  Include synonymized names underneath each accepted name

Synonym prefix  Symbol preceding a synonym

Status  Include the status name after the synonym

LSID  Include the Aphia LSID after the the accepted name

Break  Include a new line after each accepted taxon block (taxon + synonyms).

Distributions  all  generalized  none (selection this option will considerably increase the generation time)

Website and databases developed and hosted by VLIZ · Page generated 2016-01-19 · contact: [info@marinespecies.org](mailto:info@marinespecies.org)

Under Task 2.2 (*Perform data quality control and updating procedures*), RBINS processed new checklists for several insect groups including beetles (Coleoptera) and flies (Diptera). The following updates were released in July: [Diptera-Chironomidae-Tanytarsini](#), [Diptera-Culicidae](#), [Coleoptera-Psephenidae](#), [Coleoptera-Dytiscidae](#), [Coleoptera-Gyrinidae](#), [Coleoptera-Haliplidae](#), [Coleoptera-Donaciinae](#), [Gastrotricha](#) and the [Halacaridae](#) checklist was updated. For WoRMS, VLIZ has officially launched MolluscaBase in August (<http://www.marinespecies.org/news.php?p=show&id=4270>). and re-launched NeMys in March 2015 (<http://nemys.ugent.be/>). For the Register of Antarctic Marine Species (RAMS), ULB launched an effort to update the checklists (<http://www.marinespecies.org/news.php?p=show&id=4231>), but so far this only resulted in limited

response and efforts focus on the construction of the Register of Antarctic Species and updating the Asteroidea checklist.

Developments on Task 2.3 (*Taxamatch tools and implementation of fuzzy matching algorithms*) were initiated late 2015 and should be finalised early 2016. Task 2.4 (*Develop interface for entering and validating distribution information for species*) has been completed for the Aphia system/WoRMS database and demonstrated during the editor workshop. The possibility to select one of the following geographical units: “FADA faunistic zones”, “IHO areas”, “Economic Exclusive Zones”, “Marine Regions”, “TDWG levels 1-4” and “MEOWs” have been included in this interface. For the selection of geographic regions (Task 2.4.1) RBINS consulted the FADA editors to document which geographic information they are willing to provide and how they plan to do this. The “FADA faunistic zones”, which are currently already included in the database and import template was the most popular option, followed by the Freshwater Ecoregions of the World and TDWG regions, and editors indicated that they are fine with providing such information through the Excel template. Following this feedback, we adapted our procedure to ensure that the information on the TDWG regions is properly stored in the database, this will also facilitate storing subsequent information on geographic regions we might want to add to the template. For FADA, we do not plan a specific visual data entry interface, but will ensure that our database can ingest geographic information that is provided through the Aphia system/WoRMS checklists.

The organisation of the **Workshop to test tools and procedures for checking taxonomic lists, tools to complete distribution data and address identified gaps and overlaps between datasets** (Task 2.5) was coordinated by Quentin Jossart at ULB. Although we investigated several options to organise the meeting back to back to other conferences that might be of interest to the taxonomic editors ( “Aquatic Biodiversity & Ecosystems” conference (<http://www.aquaticbiodiversityandecosystems.org/>) and the Systematics Association Biennial (<http://www.systass.org/biennial2015/>), but eventually organising the meeting at Belspo in Brussels was chosen as the preferred option.

In total we invited around 35 taxonomic experts for the editor workshop, which took place from 28th to the 30th of September 2015 in Brussels. Except for the Molluscs, for which we hope to find another opportunity for discussing with the editors, all target groups were addressed. In addition, in collaboration with Anton Van de Putte, we took the opportunity for linking with taxonomic experts from the Antarctic community and discuss the construction of an Antarctic species register.

With 29 participants in total, the interest for this meeting surpassed our expectations, and we received very valuable input and feed-back. The full meeting report can be consulted at [odnature.naturalsciences.be/aquares/workshop-report](http://odnature.naturalsciences.be/aquares/workshop-report) and is also provided in Annex to this annual report.

Highlights of the meeting include the demonstration of the AquaCache tools, discussion and agreement on future data management and data exchange, the plans for a (series of) joint paper(s) on comparing the colonisation and frequency occurrence of parasites between marine and freshwater environment, and the agreement on a timeline for the creation of a Register of Antarctic Species.

### **WP3: Tools/services to validate species distribution/occurrence data**

The tasks under WP3, except for 3.4 (Consultations with steering committee and its members), were scheduled towards the end of the project. At this stage, much of the work under Tasks 3.1 & 3.2 (*Produce and improve services to perform quality control on species occurrence data & Build tool for visually checking and validating occurrence data based on available distribution information*) is still in early stages, and during the project meeting at the end of October, we agreed to speed up this work

early 2016, starting with the implementation of Taxamatch on the AquaCache in January. This represents a slight delay in the work, but given the prolongation of the project, and the planned user workshop in the course of June, we are confident that these tools will be released during the projects' term.

The organisation of the user workshop towards the end of the project (Task 3.3: *Validate tools during workshops with users: BioFresh, EuroBIS, AntaBIF*) will start early 2016. During the project meeting in October 2015, we preliminary fixed this meeting for mid-June and to couple it with the Follow-up Committee meeting (Task 3.4 *Consultations with Follow-up Committee and its members*). At this meeting we plan to present the project results and demonstrate the developed tools, and offer the users and experts the opportunity to comment on these, so we still have can include their feedback during the final months of the project.

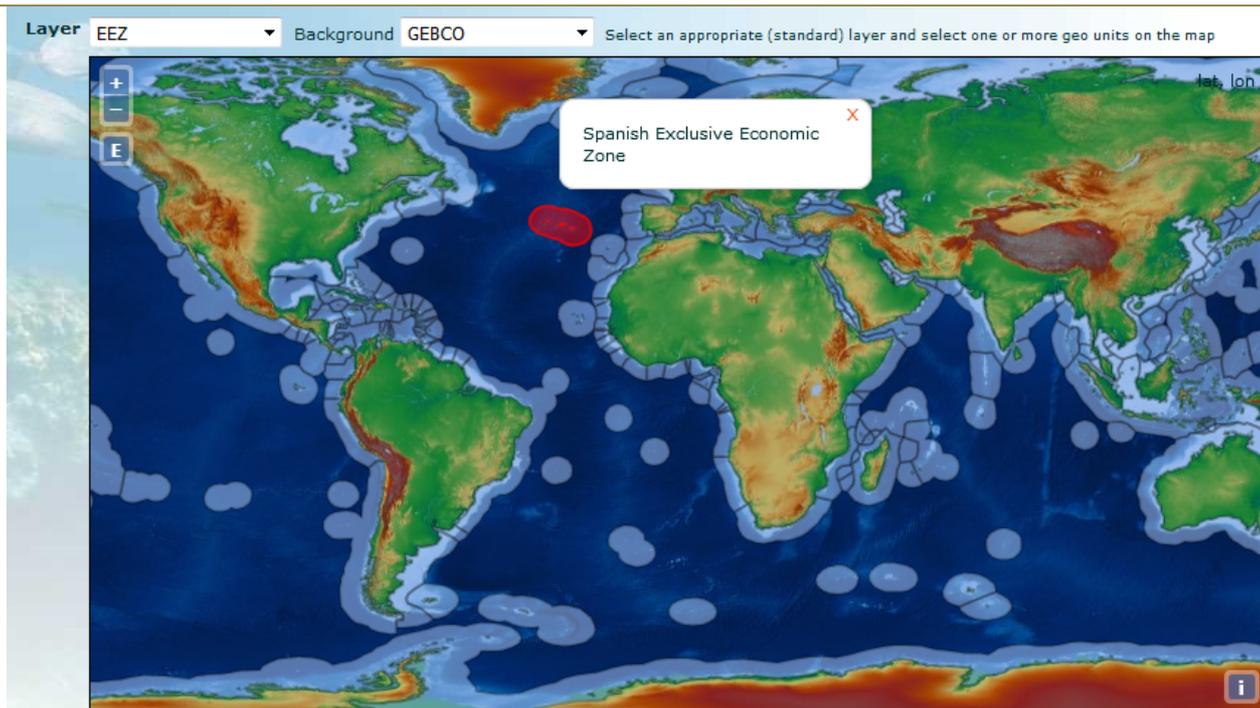
#### **WP4: Data exchange with international initiatives**

The activity of mapping of the web services under Task 4.1: *Establishing and improving data exchange with international initiatives*, was completed during previous reporting period and was discussed at the steering committee meeting. The implementation of these recommendations is planned towards the end of the project, once the internal data exchange and synchronisation is fully implemented.

### **3. INTERMEDIARY RESULTS**

The AquaRES project focusses on the improvement of the taxonomic databases World Register of Marine Species (WoRMS), the Register of Antarctic Marine Species (RAMS) and the Freshwater Animal Diversity Assessment (FADA) and the development of tools to facilitate data entry and usage of the data. As modifications to the databases, web services and tool development are still ongoing, the majority of the products will only be available towards the end of the project. Nevertheless, we have produced the following outputs during this reporting period, which reflect selected tasks described above. These include:

1. Detailed taxonomic editor workshop report (provided in Annex and available at [odnature.naturalsciences.be/aquares/workshop-report](http://odnature.naturalsciences.be/aquares/workshop-report) – Task 2.5)
2. The AquaCache tool, available through [aquacache.lifewatch.be](http://aquacache.lifewatch.be).
3. The checklist generation tool for Aphia/WoRMS is available for taxonomic editors after logging in at [marinespecies.org](http://marinespecies.org).
4. Similarly, the geographic data entry tool is available on [marinespecies.org](http://marinespecies.org) in the edit-interface (see screenshot below).



5. Detailed documentation for the FADA import tool and database changes can be consulted on GitHub (<https://github.com/aaikedw/fada-import-specs>)
6. The updated FADA-template is posted on the new “contribute” page ([http://fada.biodiversity.be/freshwater/contributions?current\\_page=contributions](http://fada.biodiversity.be/freshwater/contributions?current_page=contributions))

The on-line release of the products “Comparison table for output fields” and “Example Darwin Core Archive export data for WoRMS and FADA” from previous reporting period is still pending, but is planned for early 2016 after a final review of the material.

#### 4. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

In September 2015, we organised a very successful editor workshop. The number of participants surpassed our expectations and we had fruitful discussions on how to rationalise data management, made plans to complete new or improve existing checklists, and brainstorm about possible joint scientific papers. During the construction and demonstration of the AquaCache tool, this proved to be a useful tool for comparing data in the different databases and helped us to highlight and resolve minor issues in our data exports. Working through the advanced on-line interface for Aphia/WoRMS was perceived as the most logical choice for new editors. Documenting the requirements and starting the developments of the FADA import tool, which aims to streamline both the import of new data, as well as the synchronisation of freshwater data available through Aphia/WoRMS was more time consuming than anticipated, but is currently advancing well and should ensure smooth execution of FADA-updates once implemented.

## 5. FUTURE PROSPECTS AND PLANNING

*Overview of the foreseen activities and planning for next reporting year, taking into account the actual state of the work and the intermediary results*

As mentioned in previous annual report, we anticipated a project prolongation, since we shifted the project start by 5 months. The additional months until August 2016 will allow us to make up for the slight delays in our developments.

In the course of 2016, we obviously aim to finalise all AquaRES project tasks, but the key activities on which we will primarily focus include:

- Finalise tools/services to validate species distribution/occurrence data (Task 3.1 & 3.2)
- Validate those tools during workshops with users in June: BioFresh, EuroBIS, AntaBIF (Tasks 3.3) and discuss further improvements with the follow-up committee members (Task 3.4)
- Implement synchronisation of databases and have selected data integrated in the partner database (Task 1.4).

As was the case for the editor workshop in September 2015, the planned user workshop in June 2016 will be a second major project milestone. This workshop also sets a deadline for finalising the development work on the envisaged tools, but still allows us to perform minor changes by the end of the project in August.

## 6. FOLLOW-UP COMMITTEE

*Dates of the meetings and overview of the concrete contributions of the follow-up committee*

No follow-up committee meeting was organised in the course of 2015, but we kept the members informed through email and were in contact with them on various occasions. The follow-up committee received our 2014 annual report, was informed about the editor meeting and received the report of this meeting. We had informal contacts with the follow-up committee members at biodiversity informatics events, e.g. with Wouter Los at the “Biodiversity Research Matters” conference organised by the Belgian Biodiversity Platform. In addition, all users and associated partners participated in the editor workshop.

## 7. VALORISATION ACTIVITIES

### 7.1 PUBLICATIONS

Jossart, Q., Moreau, C., Agüera, A., De Broyer, C., & Danis, B. (2015). The Register of Antarctic Marine Species (RAMS): a ten-year appraisal. *ZooKeys*, (524), 137.

Vandepitte, L., Vanhoorne, B., Decock, W., Dekeyzer, S., Trias Verbeeck, A., Bovit, L., Hernandez, F., Mees, J. (2015). How Aphia—The Platform behind Several Online and Taxonomically Oriented Databases—Can Serve Both the Taxonomic Community and the Field of Biodiversity Informatics. *J. Mar. Sci. Eng.*, 3, 1448-1473 doi:[10.3390/jmse3041448](https://doi.org/10.3390/jmse3041448)

## 7.2 PARTICIPATION/ORGANISATION OF SEMINARS (NATIONAL/INTERNATIONAL)

*Oral presentation, poster... and/or organisation of workshops, symposia etc.*

- 20/02/2015: VLIZ young scientist day (Ostend; Quentin Jossart, ULB) – Poster presentation “AquaRES – Aquatic species Register Exchange and Services”
- 02/04/2015: Catalogue of Life mini-symposium (Ostend; Leen Vandepitte, Bart Vanhoorne, VLIZ; Aaike De Wever, RBINS) – Presentations of WoRMS, FADA and the AquaRES project
- 21/05/2015: Empowering Biodiversity Research conference (Brussels; Michel Kapel, Aaike De Wever, RBINS; Quentin Jossart, ULB) – Participation and poster presentations “AquaRES – Aquatic species Register Exchange and Services” and “Assembling Global Freshwater Species Checklists and Species Occurrence Data”
- 30/08-04/09/2015: Aquatic Biodiversity & Ecosystems conference (Liverpool, UK; Leen Vandepitte, VLIZ) – Presentation “Improving the interoperability and public availability of aquatic taxonomic species registers”
- 28-30/09/2015: AquaRES taxonomic editor workshop (Brussels; all; Task 2.5) – See details elsewhere in this report
- 07/12/2015: Data Matters workshop (internal RBINS event, Brussels; Michel Kapel, Aaike De Wever) – Poster presentation “Assembling Global Freshwater Species Checklists and Species Occurrence Data”

## 7.3 SUPPORT TO DECISION MAKING (IF APPLICABLE)

-

## 7.4 OTHER

-

## 8. ENCOUNTERED PROBLEMS AND SOLUTIONS

*Encountered problems/obstacles, adopted and/or envisaged solutions, unsolved problems*

No significant problems were encountered during this reporting period. The project prolongation requested in December 2015 was approved early January 2016. This prolongation will make up for the later actual start of the project and the slight delay due to the sick leave of RBINS' developer December 2014-January 2015.

## 9.2 COMPOSITION OF THE FOLLOW-UP COMMITTEE

The core follow-up committee with external experts consists of:

- Dimitri Brosens, Belgian Biodiversity Platform/Research Institute for Nature and Forest (INBO)
- Wouter Addink, Naturalis/Species 2000 (represented Peter Schalk at meeting 24/06/14)
- Peter Schalk, Naturalis/Species 2000/GBIF Governing board
- Saskia Van Gaever, Federal Public Service Health, Food Chain Safety and Environment - Marine Environment
- Ward Appeltans, Intergovernmental Oceanographic Commission of UNESCO/Ocean Biogeographic Information System (OBIS)
- Wouter Los, University of Amsterdam/LifeWatch

In addition, we involved the following users and associated partners during our follow-up meeting and the project communication:

- Geoff Boxshall, The Natural History Museum/WoRMS Steering committee
- Anton Vandeputte, biodiversity.aq (through Skype)
- Nabil Youdjou, biodiversity.aq
- Koen Martens, Royal Belgian Institute of Natural Sciences (RBINS) / Freshwater Animal Diversity Assessment (FADA)

We also invited Christine Keulen (Département de l'Etude du milieu naturel et Agricole (DEMNA) – Service Public de Wallonie) for the follow-up committee meeting, but she did not join the meeting nor formally confirmed or declined interest in the follow-up committee.

## 10. REMARKS AND SUGGESTIONS

*Concerning for example: the coordination, the use or valorisation of the results, personnel change ...*

-