



ECP-CULT 038261-AquaRing

AQUARING

Accessible and Qualified Use of Available Digital Resources about Aquatic World In National Gatherings

AquaRing Cross-border Digital Content Space : Structure and Design

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<i>Keywords</i>	
<i>Abstract (for dissemination)</i>	<p>AquaRing targets the gathering, under semantic web architecture, of a wide array of digital contents related to the aquatic domain distributed across European Institutions. Furthermore, it aims as providing multilingual support to retrieve the documents.</p> <p>To that purposes, an analysis of the contents gathered by the initial partners was carried out. We have identified the proportions of types of documents, languages, aquatic realms and expected users. Following the analysis of contents and</p>

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	<p>type of resource, five main categories have been identified:</p> <ul style="list-style-type: none">• Aquatic And Marine Activities And Technology• Marine Biology/Aquatic Sciences/Environment• Marine Culture And Leisure• Law• Education & Awareness <p>We have tentatively described the subjects of the overall cross-border collection, in order to identify guidelines for the next steps: development of ontology and content annotation tools.</p> <p>In its present state, AquaRing mainly deals with images of marine organisms, although text documents and movies are well represented.</p>
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1 Introduction

1.1 Scope of the document

This deliverable describes the cross-border digital content space of the AquaRing project. The report provides analyses of the obtained collection of digital contents in order to:

1. evaluate the difference between the original expectations and the findings
2. analyze the contents according to different angles: language, digital format, aquatic realm, type of use, service by users' profile
3. define the main subjects of the portal in its initial state in order to provide information to the next steps of the project (WP3 ontology development, WP4 content annotation tool and WP5 Global content space set-up and validation)

1.2 Applicable and reference documents

This document refers to the following documents:

- [1] eContent contract ECP-CULT 038261-AquaRing, Annex 1: "Description of Work"
- [2] Deliverable D2.1 "AquaRing User Segments, Profiles and Needs"
- [3] Meeting reports: October 2006 kick off meeting in Genoa, ADG-WP1-T1.2-tech 1-V1.0 January 2007 meeting in Brussels, AR-WP1/T1.2-ADG-TECH 3.0-V1.0 March 2007 in ZAMUDIO, AR-WP1/T1.2-ADG-TECH 4.0-V1.0 June 2007 in Rotterdam).

1.3 Revision History

Version	Date	Author	Description
draft	15/05/2007	NAUSICAA	1st draft for coordinator
draft	17/07/2007	NAUSICAA	2 nd draft for circulation to partners
draft	26/07/2007	ADG RBINS SOFTECO	Comments on the 2nd draft
draft	30/07/2007	NAUSICAA	3rd draft incorporating comments from ADG/RBINS/ SOFTECO
draft	01/08/2007	ADG RBINS RZOO	Comments on the 3rd draft
draft	02/08/2007	NAUSICAA	4 th draft incorporating comments from ADG/RBINS/RZOO
draft	07/08/2007	RBINS	Comments on the 4 th draft
draft	08/08/2007	NAUSICAA	5 th draft
draft	16/08/2007	ADG	Comments on the 5 th draft
0	18/08/2007	NAUSICAA	Final version

2 Executive Summary

The goal of Task T2.2 was to describe and analyse the individual collections of content providers. At first the contents have been described and organised according to their language, digital format, aquatic realm, IPR policy, foreseen user profiles and subjects. The result is a detailed inventory and a structured view of the existing contents in participating centres. (See Excel files in Annex C)

A detailed work has been done internally by each partner in order to check if the data that they could provide on the portal were relevant to the aquatic domain, could be disseminated with respect to Intellectual property right (IPR) policy adopted and could be provided outside the departments of providers, and were accessible and ready to be used. This description shows that the collections are of similar interest than the first description in the project application, but they are now structured in a different way

The analysis highlight some differences in the digital content collection compared with the projections made on the application “description of work”.

Globally, the expectations are met for what regards relative amounts of digital contents, with an overall dominance of images and, to a lesser extent, documents and movies.

The goal of Task T2.2 was also to gather the individual data collections of the participating aquaria, museums and science centres and provide an analysis showing the possibilities offered by the aggregated collection: a diversity of resources, a multilingual source of knowledge and medias about marine and aquatic domain relevant for the five targeted audience defined in D2.1 which include: “general public, science centres, children (through adults), media and teachers”.

An analysis of the contents of the aggregated collection has been provided. The content providers identified the proportions of types of documents, languages, aquatic realms and expected users. (See sections 4 and 5)

In its current status, images of marine organisms are the bigger part of the digital documents collection. This analysis was also relevant to compare the existing collection and the expectations of the audiences developed in the scenarios of D2.1 mainly in terms of services and type of resources: media resources and knowledge. It was important to see if the content providers could offer relevant and different contents for each of the five target audiences. It can be anticipated that a large part of the AquaRing portal will be of interest for our five targeted audiences: the general public, the aquariums, museums and science centres, the children, the media and the teachers.

Given the high heterogeneity of subjects dealt within the proposed contents, establishing an overall conceptual framework appears as a complex challenge. All content providers tentatively described the subjects and themes addressed by the overall cross-border collection. The global aggregated collection covers various aspects of Aquatic and Marine domains (See Section 5.3.1), leading the partners to research useful thesauri for the preparation of the ontology to be adopted to enable content annotation tools. (WP3)

Annotating various contents with different people and organization from different countries will require very precise annotation rules. (WP4)

Commentaire [B1] :

I would write something like: images of marine organisms are the bigger part of the digital documents collection

Having described the aggregated collection also allows promoting its content to potential users. (WP6 and WP7)

3 Objectives

The aim of Task 2.2 and 2.3 has been to analyse the content collections available at the participating institutions and to develop an overall high level model of their structure. According to Description of Work, the specific goals have been:

Task 2.2: Analysis of individual digital data collections

This task will involve the analysis of the individual digital data collections of the participating aquaria, museums and science centres. Contents will be described and organised according to their semantic areas and themes, type of resources, relevance with respect to users' profiles, etc. The analysis will be carried out taking into account the relevance of the data, their availability, access and actual infrastructure support (technical support systems, data formats, languages, etc.). The result will be a detailed inventory and a structured view of existing content at participating centres.

Task 2.3: Structuring the global digital collection space

Based on results from task T2.1 and T2.2, this task will define the target conceptual structure of the global, cross-border aggregated content space. It will provide a conceptual unified view of the semantic areas and themes covered by aggregating the contents from the participating aquaria and science centres, and the conceptual foundation for the semantic modelling work (WP3).

WP2 will contribute to milestones **M1 “Digital Data Collections and User Needs and Evaluation Metrics”** and **M2 “Infrastructure specification, Meta-data and Domain Ontologies, Evaluation Plan”**, by fulfilling objectives foreseen in Tasks T2.2 and T2.3.

4 Methodology

4.1 Global methodology

In order to propose a true pan-European cross-border digital collection, it is fundamental to gather an important mass of the supplied digital contents in terms of quantity, quality, and language, diversity of resources and coverage of the addressed domain.

The composition of the AquaRing Consortium should guarantee, thanks to the scientific profile of its members, the correct fulfilment of the aforementioned objectives. In order to ensure a seamless set-up of the AquaRing Global Content Space, a well assessed procedure has been conceived in order to allow all content providers to align their own data collections with the overall requirements elicited for the AquaRing architecture.

The procedure followed three main steps and was equally adopted by all content providers under the coordination of NAUSICAA:

- 1) to sort out individual collections, according to a common set of criteria;
- 2) to gather the individual collections into one aggregated collection and to analyse it to have an overview of its coverage;
- 3) to build up a thematic view of the interest and coverage of the aggregated collection.

The following figure (figure 1) shows the activities in the context of the whole project work plan:

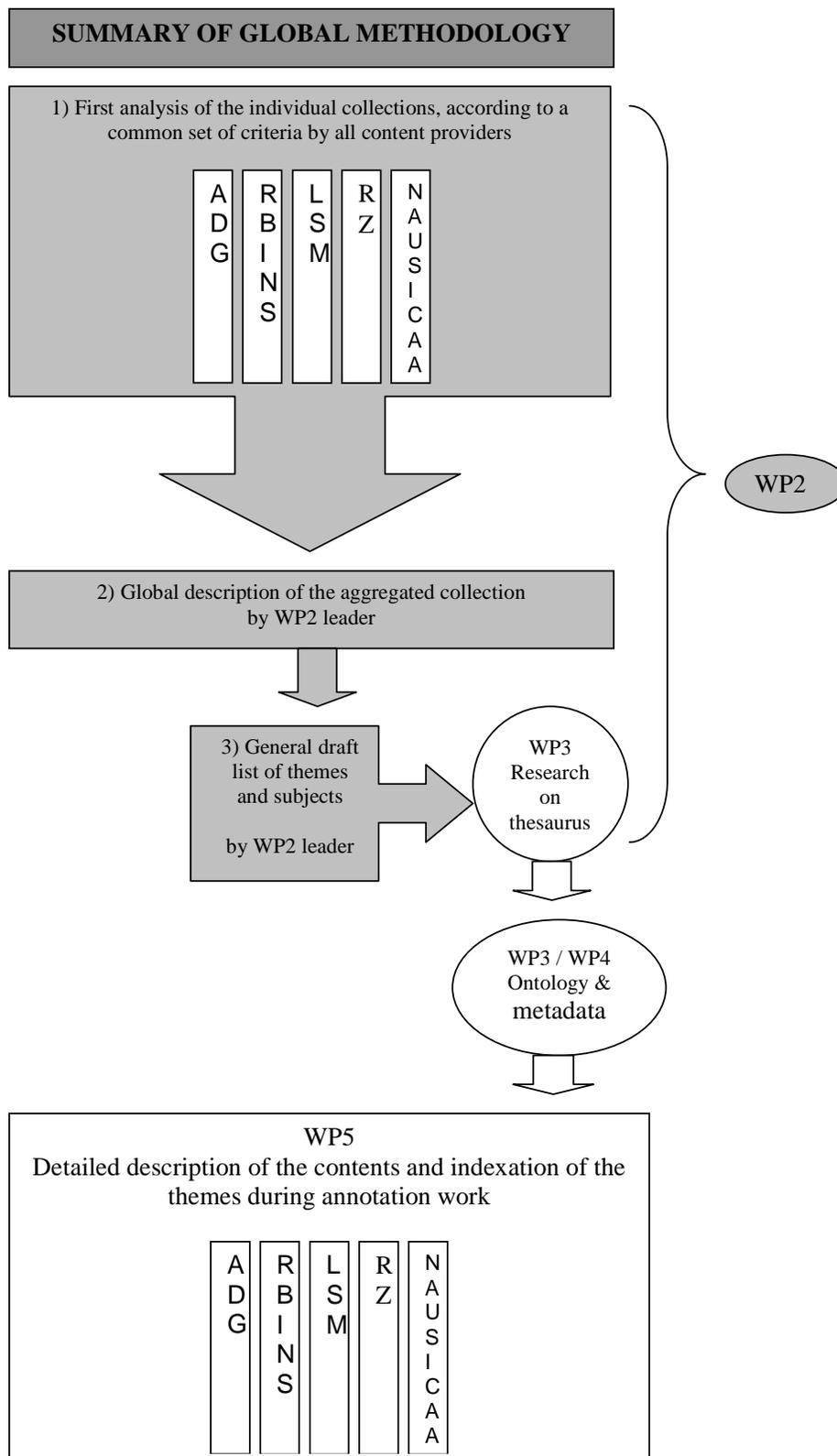


Figure 1. Summary of Global Methodology

4.2 Chronology of analysis

The methodology followed an iterative process at each step of content gathering and analysis. The information gathered allowed to refine the analysis and from there to gather more precise information.

The consortium moved from a global vision of the collection to a detailed description of specific content. This process will last till the end of annotation work.

MEETINGS STEPS OF ANALYSIS

October 2006	Genoa meeting	A pre-existing description of global the collection was presented by the co-ordinator (see Table I in section 4.4.1)	T2.2
November 2007		A first draft was proposed to the content providers by the co-ordinator in order to describe the individual collections	T2.2
		An improved draft was proposed to describe the individual collections by the WP2 leader with different criteria	T2.2
December 2007		The content providers investigated through their organisations, getting the necessary information to fill the form.	T2.2
January 2007	Brussels meeting	A refining of the pre-existing description of the global collection was made (see Table II in section 4.4.1). A more suitable manner of counting the contents was adopted by the content providers	T2.2
		The description of the individual collections was presented by the UNIGE. The description of the collections needed to be completed more precisely in terms of themes.	T2.3
		During the task T2.1 the consortium agreed on five main targeted users for the portal.	T2.1
		During task T2.4 the consortium addressed the IPR issue.	T2.4
February 2007		The WP2 leader proposed a new draft to complete the first one with added columns (type of use, targeted users). These new	T2.2 and T2.3

		criteria were proposed to fit the new advancement of T2.1 and T2.4 in terms of public and IPR. Another column was added to describe more precisely the contents in terms of themes.	
		The WP2 leader provided a structured list of themes to describe the contents. The WP2 leader used this tool to describe the contents of the partners.	T2.3
		The content providers filled the form to complete the description of their collections (type of use, targeted users) and to check the pre-filled themes of their contents.	
		The WP2 leader provided the list of subjects covered by the aggregated collection of AquaRing. The consortium adopted this first structured scheme of the subjects of the aggregated collection.	T2.3
			In parallel, WP2 leader proposed to investigate existing metadata systems and thesaurus of other organisations
March 2007	Bilbao meeting	A refining of the description of the global collection through the analysis was presented by the WP2 leader (see Table III in section 5.1). The description of the contents shows a new amount of the global collection.	T2.2
		The consortium decided to offer two main services to the five targeted users (T2.1):	T2.1
		<ul style="list-style-type: none"> • Information/knowledge (documents, general reports and presentations, news) • Aquatic media centre (images and multimedia content, videos, animations). 	
			WP2 leader got in touch with FAO (ASFA team), EUROCEAN, VLIZ, IODE to investigate

possible sharing of already existing thesaurus

April 2007		The WP2 leader provided a description of the aggregated collection by service for each targeted users.	T2.1 and T2.2
June 2007	Rotterdam meeting	The investigation on thesaurus was launched on the basis of the structured list of subjects of the aggregated collection	T2.3

4.3 Data gathering

4.3.1 First analysis of the individual collections

The Project co-ordinator circulated a first spreadsheet to gather information about the contents to all partners on the 24 October 2006. The WP2 leader proposed to add the following criteria for the analysis: the subject, the document type (aquarium guide, display panel, scientific publication, education tool...), the format of the file (audio file, video, image, PPT, PDF...), the original language of the document, a brief summary of the data, the way the data can be used (for free or not for free) and the place where the document was stored (Figure 2). Multiple entries of a given type of document were allowed through inclusion of a “quantity” column.

THEMATICS	TYPE OF DOCUMENT (i.e. aquarium guide, thematic courses, scientific publications, display panels..)	DIGITAL DATA file format *	LANGUAGE	QUANTITY	SUMMARY	USE		internal depository office
						FREE	NOT FREE	
■The functioning	Worsheets for teachers "Sale Temps"	Documents	FRENCH	1	CLIMATE CHANGE	X		educational service N

Figure 2 Data collection gathering table

In January 2007, at the Brussels meeting, it was decided to go further in the analysis in order to:

1. check that contents were suitable for the five targeted audiences defined in D2.1.
2. deeply analyse the Intellectual Property Rights issue of the contents provided
3. give a global view of the themes covered by the aggregated collection.

To achieve these objectives, the WP2 leader provided partners with an updated version of content spreadsheet which included:

1. Five fields to identify preferential target users: Museum, science centres and aquaria, general public, children, media and teachers.
2. Two fields related to the major types of use foreseen in order to address the IPR issue: *professional* and *private*.
3. One field to annotate the content subject following a list of themes

4.3.2 First observations

A first analysis of the individual digital data collection of the content providers was presented by WP2 leader and D.I.S.A. at the meeting in Brussels (9-10 January 2007). (See [2])

- It showed the need for a rule to count data-sets and data-bases, as these were described in terms of individual records instead of individual data-sets, leading to an over-representation in the overall contents.
- D.I.S.A. highlighted a wide variety of subjects. Content providers provided the first description of their individual collections using free annotation for the themes. This resulted in a total of 70 items, which was still too much to make a proper analysis toward development of the ontology in WP3.

This was a first step to standardize the description of the contents. Using a first common grid confirmed that individual collections were described in many different ways. It also gave useful indications for further analysis.

4.3.3 Choice of a structured list of themes

At the meeting in Brussels it was agreed to use a common list of themes to provide homogeneity in their description.

Some preliminary subject classifications were proposed by the WP2 leader:

- “Atlas de l’Océan Mondial”¹ themes,
- “Passport of the Citizen of the Ocean”² themes,
- Structured list of themes of the multimedia library of NAUSICAA.(See Annex A)

The “Structured List of themes” (Figure 3) used in NAUSICAA multimedia library has been developed by scientists and documentation professionals together, to facilitate the access of

¹ “Atlas de l’Océan Mondial” has been published in 2007 under the auspices of IOC UNESCO. It includes information on the state of the ocean and on human activities in link with the ocean.

² The “Passport of Citizen of the Ocean” is an awareness tool created in 2004 in the framework of the DG Research funded project OCEANICS, according to the centres of interest of the public as measured through the OCEANICS public survey

both general public and specialists to ocean information (books, press articles, CD Rom, photos, videos, news, internet links).

This list has been established taking into account the advice of FAO/ASFA and IFREMER specialists and it has been used to develop NAUSICAA multi-media documentation resources and library and by ACQUARIO DI GENOVA when opening the documentation centre.

It was therefore considered as a helpful tool for structuring the aggregated collection, as it covered a large part of the knowledge domain. (See Annex B)

SUMMARY OF NAUSICCA' STRUCTURED LIST OF THEMES	
A	MARINE ACTIVITIES AND TECHNOLOGY
A 1	EXPLOITATION OF MARINE RESOURCES
A 2	SHIP BUILDING AND HYDRAULIC ENGINEERING
A 3	NAVIGATION – SAFETY ON SEA
A 4	MERCHANT NAVY – MARITIME TRANSPORT
A 5	NAVY
B	MARINE BIOLOGY – SEA SCIENCES – ENVIRONMENT
B 1	GENERALITIES – VARIOUS OCEANS
B 2	MARINE GEOLOGY AND GEOPHYSICS
B 3	CLIMATOLOGY - METEOROLOGY
B 4	MARINE PALEONTOLOGY
B 5	OCEANOGRAPHY – MARINE BIOLOGY
B 6	AQUARIOLOGY
B 7	ENVIRONMENT - POLLUTION
C	CULTURE AND LEASURE
C 1	GENERAL CULTURE
C 2	ART AND LITERATURE
C 3	SPORTS AND LEASURES
D	LAW-POLICY-ECONOMY-SOCIAL
D 1	LAW
D 2	MARITIME ECONOMY AND POLICY
D 3	SOCIAL (SEAMEN)

Figure 3 NAUSICAA' structured list of themes → please refer to complete list in Annex B

4.4 Analysis of the collection

4.4.1 Pre-existing description of the individual collections

During the application process, partners had provided a first gross description of their individual collections, based on preliminary estimation.

A new evaluation of the amount of the initial data-set (Tables I & II) has been done to get a more exact view of the collections (Table III)

Commentaire [B2] :
I would write it in a more soft way

There were incoherencies in the pre-existing description of the individual collections (See table I and table II):

- At first, every data-base record, including library databases, was considered as one “content”, giving a very large amount of data records. Finally it has been decided that data-bases and data-sets should be considered as the unit for content counts, although these are by nature likely to cover a wide array of subjects. This decision does not affect the interest of the collection. It is just a matter of numbers. The annotation tool that will be developed for the metadata’s description will allow a deep description of the records in the data bases.
- Moreover “type” and “format” have not been considered separately for describing the types of contents in the original pre-existing description of the collections (See Table II). For instance a PDF file initially classified in category “A” can be a thesis and can also be classified in category “D”.

Acquario di Genova – Costa Edutainment SpA		Nausicaa, Centre National de la Mer		Royal Belgian Institute of Natural Science		Rotterdam Zoo		Lithuanian Sea Museum	
Classification of data sources	Quantity	Classification of data sources	Quantity	Classification of data sources	Quantity	Classification of data sources	Quantity	Classification of data sources	Quantity
A	800	E and A	25 000 notices indexées	E	100000	A	25	H	1200
B	300	A	21750	H	500	B	1	L	100
D	120	H	3000	E	1000	D	25	B	100
F	2	L	250	N	100	E	1	E	6
I	100	M	1	A	50000	H	500		
H	1500	A	40			L	5		
L	80	A	10						

M	3	L	10						
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Table I: Original table of expected data provided in part 2.1 of the Description of Work

A	Documents (e.g. articles, e-prints, working papers, technical reports, conference papers)
B	PDF files
C	E- Books
D	Theses, thesis projects and dissertations
E	Data sets
F	Computer programs
G	Visualizations, simulations, and other models
H	Images
I	Audio files
L	Video files
M	Multimedia publications
N	Other...

Table II: Original legend for types of documents proposed in the table 1.2. of the description of work.

EXPECTED DATA	ACQUARIO DI GENOVA	NAUSICAA	ARBINS	ROTTERDAM ZOO	LITHUANIAN SEA MUSEUM	TOTAL
Document (A+B+C+D)	1220	50	1000	51	100	2421
Data-sets (E)	0	3	10	1	6	20
Applications (F+G)	2	0	0	0	0	2
Image (H)	1500	3000	500	500	1200	6700
Audio (I)	100	0	0	0	0	100
Video (L)	80	260	0	5	100	445
Multimedia (M)	3	1	0	0	0	4
Others (N)	0	0	100	0	0	100
TOTAL	2905	3314	1610	557	1406	9792

Table III: Revised summary of expected data, according to the new way of counting data sets. The types of documents have been regrouped to simplify analysis.

According to these corrections, a total of **9792** contents is expected, of which 68% wea images, 25% are text documents, 5% are videos and the others of various types. The actually provided contents were grouped according to the same typology so as to evaluate departure from this baseline.

Some additional changes were made to the reviewed table of expected data (Table III) during the process of WP2 while describing the individual collections. The results are explained in section 5.1.

4.4.2 Analysis and Structure of the aggregated collection

4.4.2.1 Criteria defined for the analysis

Once the information was standardized enough, a refined analysis has been carried out at various levels:

- The analysis of the individual collections (See section 5.1)
The final amount of contents was compared with the expected amount of contents and the differences were explained. The analysis was conducted according to the new vision of the aggregated collection (see Table III in section 4.4.1)
- The analysis of the aggregated collection (See section 5.2)
The aggregated collection was analysed by:
 - Language: Dutch, English, French, German, Italian, Lithuanian, Spanish
 - Digital format: photo, video, audio, multimedia and textual files, data sets
 - Realm: aquatic and marine domains
 - IPR: types of use (professional and private) and IPR status (free or not free of right) of the contents
 - Format of contents and themes provided by services (Information knowledge and Aquatic media centre) for each user profile (Aquaria, museums and science centres, children, general public, media and teachers)
- The structure of the global digital space (See section 5.3)
 - The global view of the subjects covered by aggregating collection of AquaRing was presented. It was based on the analysis of the existing contents provided by the content providers.
 - Further suggestions were made to improve the list of subjects
 - A test case analysis about marine biology was proposed to show the complexity of the process of the building of an ontology

4.4.2.2 Discrepancies

Analysing the global aggregated collection was relatively complex.

Some content providers would have preferred to describe their content in details from the beginning in order to possibly transfer the description files directly into the metadata file. This was not the case at this stage because the first analysis was especially meant to give an overview of the collections in order to define suitable ontology and metadata in the following steps. The work consisting in describing in details the contents will be done in a more comprehensive way during the metadata annotation, accordingly to the ontology that will be defined.

While analysing, the following discrepancies were noted:

- The exact meaning of the different fields was not perceived in the same way by the different providers. It resulted in mixing of information types across fields (e.g. “content type” filled with information relevant to file type, subject and physical support and/or target audience).
- Although the use of a standardized list of subjects could be expected to ameliorate the level of standardization of the subjects as compared to the initial free “subject” field, the use of one unique descriptor has led to difficulties in assigning covered subjects. Consequently, while certain providers restricted to one main, high-level concept (e.g. “marine biology” for any pack of pictures dealing with marine animals), others referred to several concepts in the same field.
- For the “preferential target users” fields, content providers followed two distinct procedures: certain content providers identified one “preferential” user, others identified up to 5 potential users.
- Many contents have been grouped in packs by providers in multiple file formats (e.g. packs of images possibly in jpg or tiff formats) and multiple languages. Then, it was impossible to extract one single content at a time from the pack and analyse it individually.
- Some other contents have been grouped by providers in multiple subjects. That is the case for datasets. For example, a dataset of photo can be a mix of several different themes or concepts: a picture of a ship, a picture of a fish and a picture dealing with sustainable development can be part of the same dataset.

Even with these discrepancies, it has proven possible to draft an overview of the global aggregated collection.

5 Results

5.1 Analysis of the Individual collections

Regarding the amount of digital contents types, departure from the pre-existing description of the individual collections (See table III) varies from a partner to another (See table IV).

- Rotterdam Zoo shows perfect agreement with expectations.
- For ACQUARIO DI GENOVA and NAUSICAA, actual amounts of image files are by far exceeding the expectations.
- In RBINS, the lower amount of document was gathered, which was compensated by an excess of images.
- LSM shows results slightly under initial expectations according to refined analysis of collections.

These differences have different causes:

- Some collections have changed since the project application and will change during the project.
- Many contents are not homogeneously recorded in the institutions of the content providers for the moment or they are split between internal departments. It needs a huge effort to aggregate them.
- Following the initial analysis of the individual collections, some content providers will not be able to share some contents because of IPR issues
- Some contents that were considered before the beginning of the project do not seem to have enough interest or relevance for the portal.

The results indicate that the expected trends are generally respected: overall dominance of image, document and video files. (See figure 4)

The total amount of 14,294 (Table IV) contents largely surpasses the expected amount of 9,792 (Table III) and there is an even higher aggregation towards images than expected.

TYPE	ADG	NAUSICAA	RBINS	R ZOO	LSM	Total
Image (H)	6135	4092	1174	500	432	12333
Video (L)	275	3	62	5	6	351
Document (A+B+C+D)	1065	108	265	51	1	1490
Data-sets (E)		4	9	1	2	16
Multimedia (M)	4	5	2		10	21
Applications (F+G)	2		6			8
Audio (I)			2			2
Other (N)	46		27			73
Total	7527	4212	1547	557	451	14294

Table IV: Amounts of digital content types collected by the content providers resulting from the analysis of the individual collections during WP2

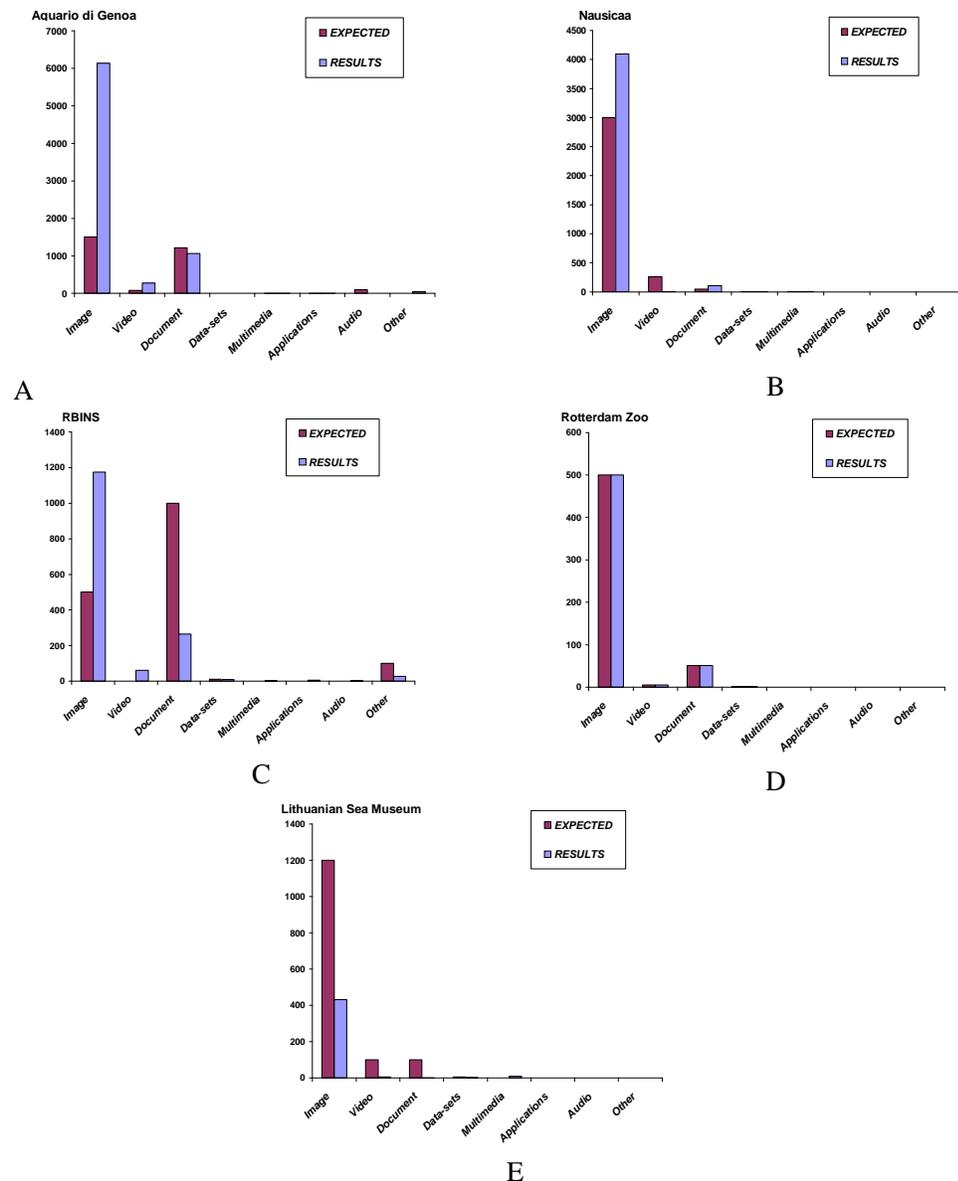


Figure 4: Comparison of expected and obtained collections of digital content types. A: ACQUARIO DI GENOA; B: NAUSICAA; C: RBINS; D: ROTTERDAM ZOO; E: LITHUANIAN SEA MUSEUM.

This relevant number of files is particularly significant, because they are all not available for the public at the moment and they will become available on the web by AquaRing.

This amount should also possibly increase within the timeframe of the project, due to new available contents.

5.2 Analysis of the aggregated collection

According to the table IV, 14,294 individual contents are proposed to build the “cross-border collection”. Content providers provided synthetic results with multiple contents in a table of 414 records, with an average of 35 contents per record (Min=1, Max=3650). For this reason, some parameters, such as languages, will be hard to analyse in details due to multiple entries (see next sections). Multiple contents, in general, have been grouped according to the “content type” field.

5.2.1 Language

Language is absent or unspecified in 84 % of the contents (N=11,559), which is largely attributable to the abundance of images (see section 5.1.).

In the remainders, more than 1000 contents are proposed in multiple languages (figure 5). It was impossible to assess the amount of each language in the multiple contents. These are mostly dealing with Italian/English and, to a lesser extent, French/Dutch and French/English.

There are six languages represented in the collection: Dutch, English, French, German, Italian, Lithuanian and Spanish. Contents in Spanish and German are very few. English is thus a clearly dominant component, followed by Italian and French.

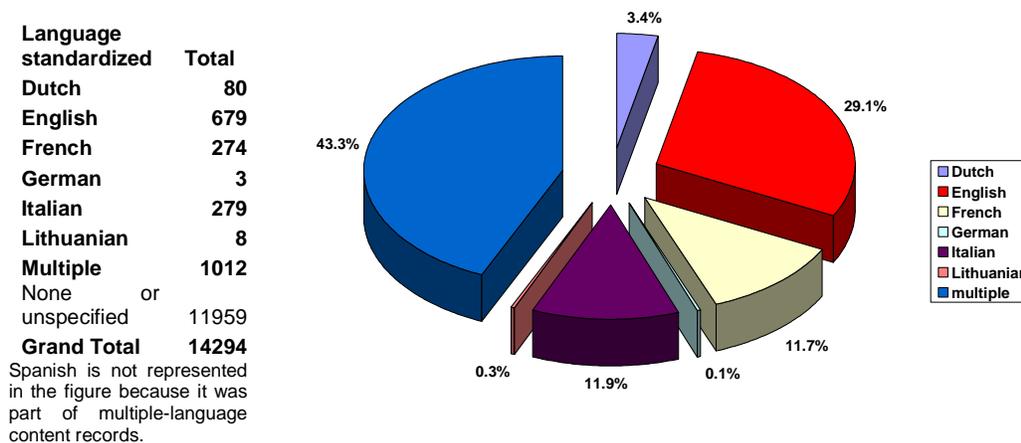


Figure 5:

Relative occurrence of languages in the contents (N=2335), after removal of “none or unspecified”. Multiple-language content packages could not be analysed appropriately, what can influence the overall representation of single languages.

It seems that AquaRing will have a **real possibility to offer a multilingual collection for the European audiences and certainly this will improve after the metadata annotation.**

5.2.2 Digital format

As illustrated on figure 4, images are by far the dominant type of digital content proposed by the content providers (12,333 contents, 86 %). The figure has been removed for analysis of remaining digital content formats (figure 6).

Digital format	Total
Image	12333
Document	1490
Movie	351
Multimedia	21
Slide-show	72
Data-set	16
Applications	8
Audio	2
Unknwown	1
Grand Total	14294

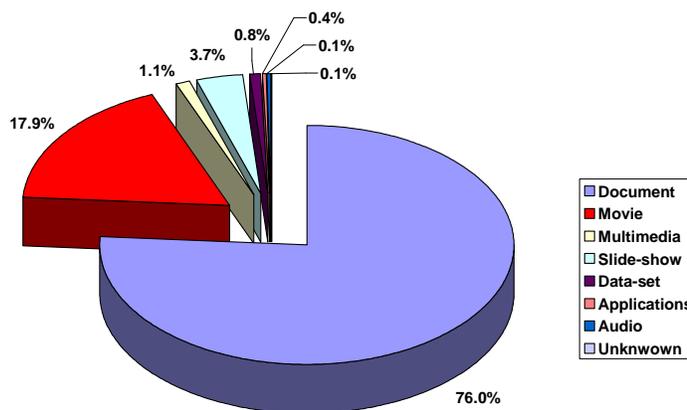
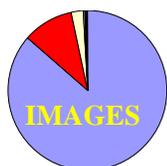


Figure 6, right: Proportions of the different digital formats proposed in the overall collection, after removal of image files (86 % of the collection).

Text documents form the bulk of the remainders. Other formats which significantly contribute to the collection are movies and slide-shows.

5.2.3 Aquatic realm

Ocean-related contents represent **97% of the resources** proposed by the content providers. In its current state, AquaRing is thus mostly a **portal for marine resources**. The other contents (figure 7) mainly deal with freshwater (1.7% of the total), while brackish water is actually represented only in one content.

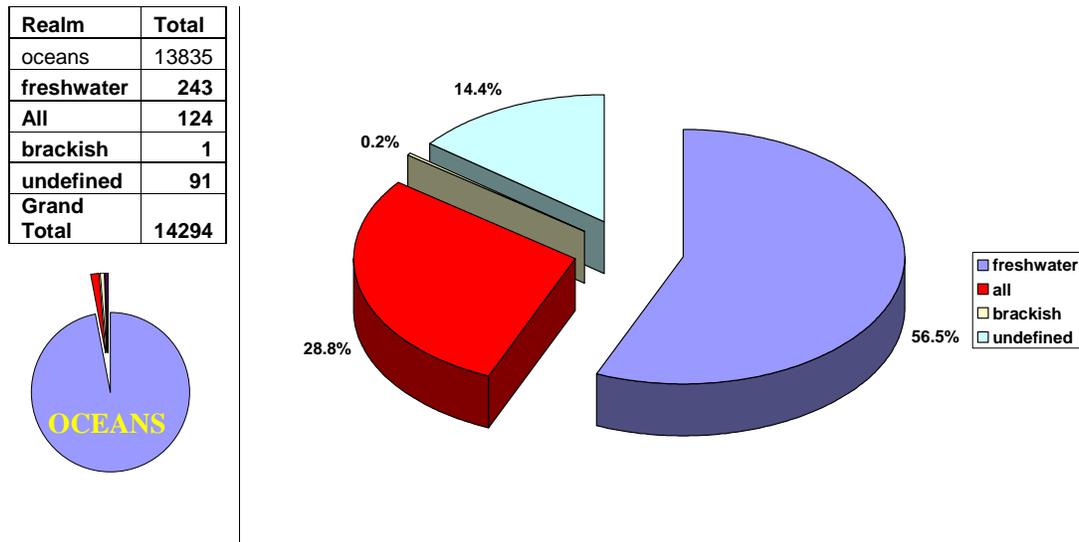


Figure 7, right: Proportions of the aquatic realms represented in the overall collection after the removal of “Oceans” (97% of the collection).

This analysis may be helpful for the WP3. This will obviously lead to decide of a theme to develop first for the ontology. It may be useful to decide which contents should be indexed with the metadata editor at first. The priority themes are obviously the Marine Biology (or Realm or domain), the Aquatic Sciences and the Environment.

This shows also the possibility of extension of AquaRing for the future in terms of developing semantic areas and adding more contents.

5.2.4 IPR: Types of uses and IPR status

At this stage, 61% of the contents have undefined IPR status (figure 8.a). Content providers were not really sure of what status to assign them at this stage of the project. According to these initial estimations, for 28% of the documents (mostly images, see figure 8.b) viewing would be offered but free download would not be possible. In this present state, the collection can be expected to offer 72% contents free of rights to the users.

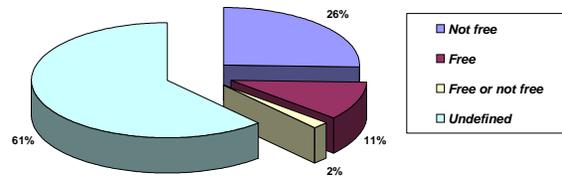


Figure 8.a
Proportions of foreseen IPR policies according to main categories (free of right / not free of right).

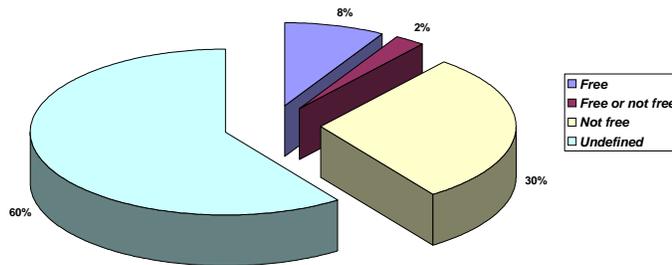


Figure 8.b
Proportions of foreseen basic IPR policies in image contents

33% of the files are specifically addressed to professionals. According to the figures, only 3% of the contents are clearly tagged “private use”. 45% can be used both for private and professional uses.

This means that 78% of all content can be used by professionals and 48% can be used for private use. 19% of the foreseen types of use professional and private were not specified by content providers. (Figure 8.c).

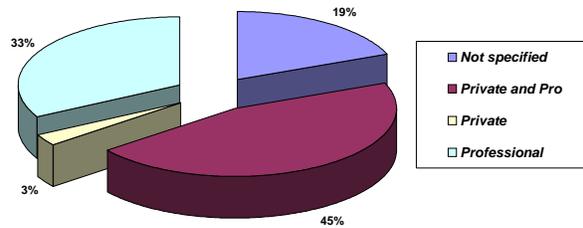


Figure 8.c
Proportion of foreseen types of uses (professional / private) in the overall contents.

It is obvious that content providers will have to address clearly the following IPR issues at the next stage of the work:

- The IPR status of the collection.

It is obvious that rules are necessary to allow content providers to solve internal problem dealing with the Intellectual Property Rights of their collections. Each staff has to check who the author of the contents is and who the owner of the rights attached to them is. They will have to check if the content is “free of right” or “not free of right”.

- The use of the contents

The content providers will have to decide clearly what uses they allow users to make of their contents in terms of “commercial use” or “not commercial use”. That will also help to start thinking of what could be done for a future business plan.

5.2.5 Format of resources and subjects provided by services for each user profile

During T2.2 the aggregated collection has been classified by targeted users, types of resources (videos, multimedia files, databases, documents, audio files, photos and images) and themes.

During D2.1, five user profiles have been defined:

- Aquaria, museums and sciences centres
- Children
- General public
- Media
- Teachers

Two major categories of services were also defined in D2.1 for the users:

- **Information/knowledge** (documents, general reports and presentations, news)
- **Aquatic media centre** (images and multimedia content, videos, animations).

The contents have been gathered by service for each user profile. Contents can be quoted more than once because they can fit several audiences. Therefore, the hits are different from the total amount of the collection. (See figures 9 and Tables V)

It seems that the users will be provided with a diversity of themes and types of resources for those two major services which appear to fit with the user cases developed in D2.1

For the target audience “Museum/Science Centre and Aquaria”, “General public” and “Media” the content providers are able to provide a representative diversity and types of resources available on the portal. (See figures 9.a-c-d and Tables V.a-c-d)

For the second target audience, “Children”, the content providers will provide multimedia applications and a quantity of images. The existing data sets are not directly relevant for the children. It has been decided that services would be provided to children through parents rather than to children directly. (See figures 9.b and Tables V.b)

For the target audience “Teachers”, the content providers are able to provide a quantity of images, educative documents and audiovisual tools. (See figures 9.e and Tables V.e)

5.2.5.1 Museums/Aquaria/Science centres

MUSEUMS / AQUARIA / SCIENCE CENTRES

Type of resource	QUANTITY
Doc	198
Multimedia	6
Data set	10
Audio	103
Videos	74
Images	8535

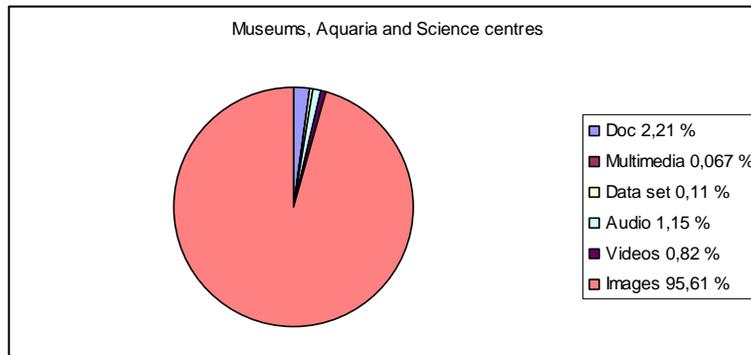


Figure 9.a Quantity of type of resources provided for Museums, Aquaria and Science centres

MUSEUMS/ AQUARIA/ SCIENCE CENTRES		Quantity	THEME ³	description
INFORMATION KNOWLEDGE	Doc	198	A/A3/A1 B/B2/B3/B54/B51 /B544/B7/B544.45 /B545/B546/B6/B 55/B77/B1/B52/B 53 C13/C3/C352 E2/E12/E1	news about the sea brochures on fishing, sustainable fishing abstracts (expeditions, methods in aquarium, aquariology) Klaipeda lighthouse display panels (biology-ecology-species) PowerPoint presentations (pollution, environment, conservation, Antarctic life) quiz about climate change educational documents Posters (marine research-biodiversity) scientific papers-thesis-reports-posters-abstracts (dolphin, coral, frogs, marine litter, climate change, colibri, turtle, sea grass, seal, sustainability, marine resources, penguin) extract of the passport about preservation and actions
	Multimedia	6	B1/B54/B544 C12/C3	CD/mini encyclopaedia/games for children /virtual presentation of NAUSICAA exhibit for teachers
	Data set	10	B/B1/B2/B54/B54 4.46/F545/F6	scientific literature about marine activities and sea websites amphipods of Antarctic waters sediments/Benthos in North Sea fish-mammals-cnidaria-fish fauna in North Sea- Crustacean movies from the world underwater festival fish breeding records fish info

³ In the tables hereafter, themes are quoted according to the structured list of themes described in annex B

				biogeographical regions syngobiotic species
AQUATIC MEDIA RESOURCES	Audio	103	B56	sounds : frog, fish, seal, penguin, dolphin
	Videos	74	A126/A2 B1/B54/B544/B7/ B6 C3/C13 D34 E1/E14	tuna-marine animals-salmon-whale-fish fauna- dolphin-seal-penguin promo and spot passport citizen-environment
	Images	8535	A1/A126/A2/A3/ A36/A4/A5 B54/B6/B544/B55 /B7/B1/B52/B53 C13 D3	journeys and expeditions (Mali, Madagascar...), fishing, boats, coral, molluscs, crustaceans, vertebrates, fish, cetaceans, fauna, spongia, dolphin, seal, Antarctic organisms, frog, colibri, botany, plankton, marine mammals, sea birds, reptiles, turtle, aquariology, marine ecosystems, World ocean day, pollution, environment, marine history and geography

Table V.a Themes of the contents provided by service for Aquaria, Museums and Science centres

5.2.5.2 Children

CHILDREN

Type of resource	QUANTITY
Doc	89
Multimedia	17
Data set	0
Audio	103
Videos	65
Images	4163

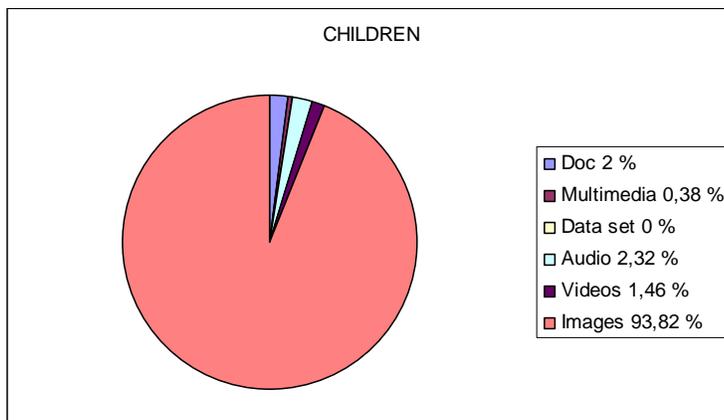


Figure 9.b Quantity of type of resources provided for Children

CHILDREN		Quantity	THEME ³	description
INFORMATION KNOWLEDGE	Doc	89	A1 B/B1/B54/B51/B544/B545/B7 C13/C3 E12/E1/E2	news about ocean fishery resources info about fish, pirates, penguin, abyss, Mediterranean ecosystems, plankton, lagoon, sea lions, coral... actions and conservation virtual aquarium (WAVES project)
	Multimedia	17		screensaver/animated 3D/cartoon/mini encyclopaedia/CD/interactive game/interactive visit
	Data set	0	0	0
AQUATIC MEDIA RESOURCES	Audio	103	B56	sounds : frog, penguin, fish, seal, dolphin
	Videos	65	B1/B54/B544/B545/B6 C3 E14	Sea, marine animals, dolphin, seal, Mediterranean ecosystem, penguin...
	Images	4163	B54/B544/B6B52/B53/B55	fauna, flora, pollution, environment, dolphin, seal, Antarctic organism, coral, frog, expedition (Mali, Madagascar), colibri, penguin, turtle, sea grasses

Table V.b Themes of the contents provided by service for Children

5.2.5.3 General public

GENERAL PUBLIC

Type of resource	QUANTITY
Doc	1169
Multimedia	49
Data set	4
Audio	103
Videos	176
Images	10524

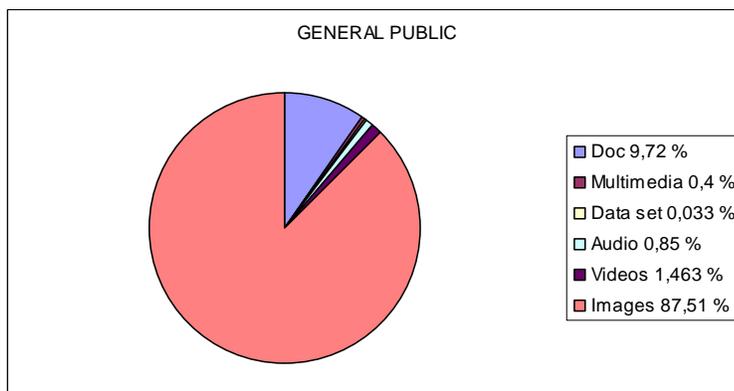


Figure 9.c Quantity of type of resources provided for General public

GENERAL PUBLIC		Quantity	THEME ³	description
INFORMATION KNOWLEDGE	Doc	1169	A/A125/A126/A3/A1 B/B2/B7/B54/B51/B7/B544/B545/B55/B6/B7/B74/B75/B77/B52/B53 C12/C13/C2/C3 D1 E2/E12/E14/E1	technical reports/thesis/working paper/news/display panels/popular info/scientific papers/technical abstracts culturing, husbandry, reproduction, breeding, feeding (fish and crustacean...) pollution, environment, ecosystems, conservation, responsible behaviour, actions of conservation info about fish and marine life biology fishery expeditions
	Multimedia	49	A125.4/B1/B7/B54/B6/B7C3/C12	application : cultivation interactive animation : climate change, visit of NAUSICAA mini encyclopaedia CD : animals, onboard the R/V BELGICA
	Data set	4	A B/B6	scientific literature about marine activities and sea websites fish breeding records fish info
AQUATIC MEDIA RESOURCES	Audio	103	B56	sounds : frog, fish, seal, penguin, dolphin
	Videos	176	A126/A2A1 B1/B46/B5/B54/B544/B6/B7/B3/B76 C3/B/B21/B13 D34 E13/E1/E14	spot TV tuna, shark, hydrothermal vents, animals, coral, penguin, salmon, whale, dolphin, turtle, colibri, seal, seahorse, Mediterranean ecosystem fishing, protected marine areas, climate change, over fishing, mussel party, Titanic, pleasure boating
	Images	10524	A1/A126/A2/A3/A36/A4/A5 B54/B544/B6/B55/B7/B1/B52/B53/B6 C13/C2 D3 E1	journeys and expeditions (Mali, Madagascar...), tuna fishery, fisheries, fishing, boats, coral, molluscs, crustaceans, vertebrates, fish, cetaceans, sponges, dolphin, shrimp, seal, seahorses, Antarctic organisms, frog, colibri, botany, plankton, marine mammals, sea birds, reptiles, aquariology, marine ecosystems,, pollution, environment

Table V.c Themes of the contents provided by service for General public

5.2.5.4 Media

MEDIA

Type of resource	QUANTITY
Doc	135
Multimedia	1
Data set	4
Audio	105
Videos	85
Images	8534

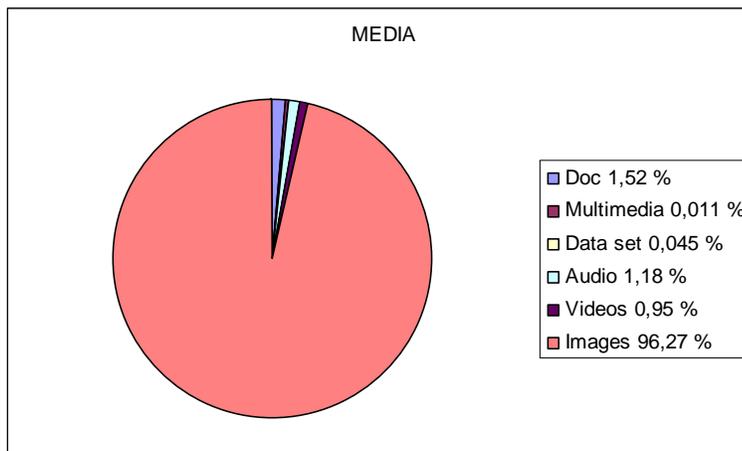


Figure 9.d Quantity of type of resources provided for Media

MEDIA		Quantity	THEME ³	description
INFORMATION KNOWLEDGE	Doc	135	A/A3 B/B2/B54/B51/B544/B7/B6/B55/B77/B52/B53 C12/C352 E12/E14/E1	news about the sea oceanics project fact sheets Klaipeda lighthouse extract of the passport about preservation and actions thesis, scientific papers, poster (dolphin, coral, frog, expeditions, penguin, turtle, sea grass, reproduction, Antarctic organisms, seal, methods in aquarium) general papers (fish, NAUSICAA history, fishery) display panel (biology and ecology)
	Multimedia	1	B54	coral
	Data set	4	B/B54	scientific literature about marine activities and sea websites photos and movies from the world underwater festival
AQUATIC MEDIA RESOURCES	Audio	105	B54/B56	sounds : aquatic, frog, fish, seal, penguin, dolphin, life onboard the R/V BELGICA
	Videos	85	A126/A2 B1/B54/B544/B6/B7 C3 E13	spots and promo fishing, boats, marine animals, penguin, coral, cetacean naturalistic sequence : dolphin, seal, penguin technical spaces behind the scenes expeditions (lake Baikal and Tanganika)
	Images	8534	A1/A125.4/A126/A2/A3/A36/A4/A5 B54/B544/B55/B6/B7/B1/B52/B53 C13 D3 E1	fishing industry, mining of minerals, coastal zone in North Sea, mussels, fishing tackles, Klaipeda lighthouses, guarding ship, cruise and transport, saving ship, port (fishing, trading), foreign navies, military seamen, mollusc, cnidaria, crustacean, vertebrate, fish, spongeia, fauna, flora, pollution and environment, dolphin, frog, plankton, botany, mammals, sea birds, reptiles, marine ecosystems, penguin, sea grass, aquariology, methods in aquariums expeditions, marine history and geography onboard pictures freshwater habitats and animals

Table V.d Themes of the contents provided by service for Media

5.2.5.5 Teachers

TEACHERS

Type of resource	QUANTITY
Doc	504
Multimedia	19
Data set	2
Audio	103
Videos	136
Images	4298

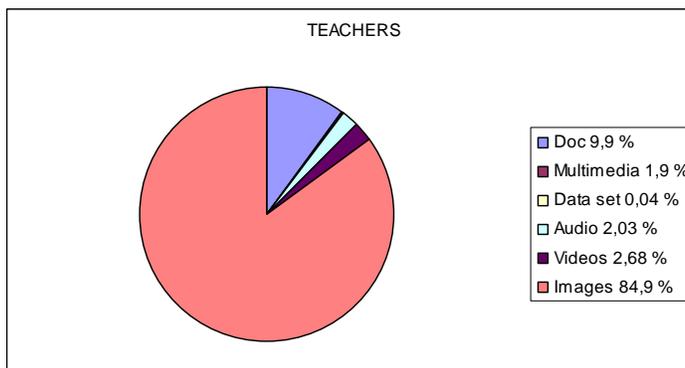


Figure 9.e Quantity of type of resources provided for Teachers

TEACHERS	Quantity	THEME ³	description
INFORMATION KNOWLEDGE	Doc 504	A1 B/B1/B2/B3/B7/B54/B51/B52/B53/B54/B544/B544.45/B544.62/B545/B546/B55/B6/B74/B77 C12/C13/C3 E2/E11/E12/E13/E14/E1	news display panels (migration, reproduction, shark, Mediterranean sea and ecosystems, mussel, molluscs, abyss, sustainable fishery, marine protected areas) scientific posters-reports-abstracts-thesis (dolphin, coral, frog, expeditions, colibri, penguin, sea grass, Antarctic organisms, seal, aquariology, methods in aquariums) general documents (mussel, plankton, dolphin, marine life, penguin, sea lions, coral, climate change, polar seas, fishing, cetaceans, lagoon, abyss, fauna, actions of preservation, water emergency and desertification, over fishing, sustainable development, history of NAUSICAA, pirates, marine protected areas, freshwater habitats) educational documents (pollution, waves, environment) extracts from the passport
	Multimedia 19	B1/B54/B7 C12/C3	cartoons (development of life in the sea) interactive activity (climate change, preservation and environment) CD (visit of NAUSICAA...) mini encyclopaedia
	Data set 2	A B C D	scientific literature about marine activities and sea websites
AQUATIC MEDIA RESOURCES	Audio 103	B56	sounds : frog, fish, seal, penguin, dolphin
	Videos 136	A126/A2 B/B1/B3/B46/B5/B54/B544/B544.45/B544.46/B545/B6/B7 C3/B13 D34/E1	fishing-aquarium-tuna-shark-hydrothermal vents-marine animals-coral-salmon-sea birds-whale-dolphin-penguin-pollution-Madagascar-marine protected area-Titanic promo and spots

	Images	4298	A1 B4/B54/B544/B6/ B55/B52/B53 C13 E1	fish drawings aquarium methods fishing-boats-coral-reproduction of marine organisms- sea grass-turtle-penguin-colibri-frog-Antarctic organisms-dolphin-seal-coastal zone expeditions
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Table V.e Themes of the contents provided by service for Teachers

5.3 Structuring the global collection space

5.3.1 First proposal for the themes of AquaRing

A first analysis was carried out to conceptually describe the subjects represented in the proposed contents.

As aforementioned, the consortium considered the list of themes proposed by NAUSICAA as a starting point to identify the thematic coverage.

This list of subjects was oriented to Ocean-related subjects. It helped to cover a large part of the subjects of the aggregated collection.

However two other subjects emerged:

- Freshwater and Brackish water subjects.
RBINS and ACQUARIO DI GENOVA have some in their collections. The consortium decided on adding these subjects to the list as they are part of the scope of the project.
- Education and Awareness subjects
“Education” deals with contents that can offer an interest for educative experiences either in a formal (school, institutions) or informal (science centres, associations) level of use. “Awareness” deals with contents that are adapted to raise awareness of the public on a specific aspect of the aquatic and marine domain, such as exhibits for instance.

Five main subjects were then listed (See figure 10):

- Aquatic and Marine Activities and Technology
- Marine Biology/Aquatic Sciences/Environment
- Marine Culture and Leisure
- Law
- Education & Awareness

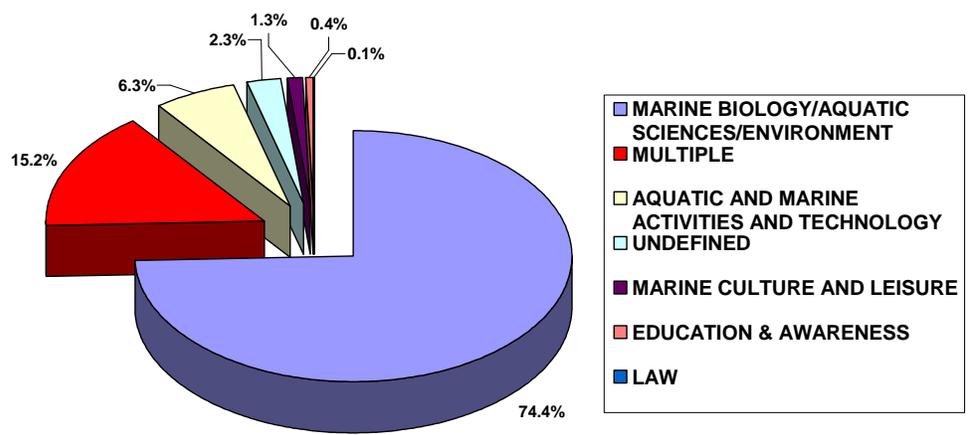


Figure 10. Proportions of themes from the first AquaRing analysis of the contents.

These five subjects were developed in sub-themes and ordered in a logical way to be more understandable. (Table VI)

<u>SUMMARY OF THE LIST OF SUBJECTS COVERED BY THE AGGREGATED COLLECTION OF AQUARING</u>	
AQUATIC AND MARINE ACTIVITIES AND TECHNOLOGY	
EXPLOITATION OF AQUATIC RESOURCES	
SHIP BUILDING AND HYDRAULIC ENGINEERING	
NAVIGATION AND SAFETY ON SEA	
MERCHANT NAVY AND MARITIME TRANSPORT	
MILITARY NAVY	
SOCIAL SEAMEN	
MARINE BIOLOGY/AQUATIC SCIENCES/ENVIRONMENT	
OCEAN	
MARINE GEOLOGY	
CLIMATOLOGY	
MARINE PALEONTOLOGY	
OCEANOGRAPHIC CAMPAIGNS	
MARINE BIOLOGY	
FRESHWATER/BRACKISH WATER BIOLOGY	
AQUATIC ACOUSTIC	
AQUARIOLOGY	
ENVIRONMENT & POLLUTION	
MARINE CULTURE AND LEISURE	

MARINE ARCHAEOLOGY
 MARINE HERITAGE
 MARINE HISTORY AND GEOGRAPHY
 ARTS AND LITERATURE
 SPORTS AND LEASURE

LAW

SEA LAW
 ENVIRONMENTAL POLICY
 FISHING / EXPLOITATION OF AQUATIC RESOURCES POLICY

EDUCATION & AWARENESS

EDUCATION
 AWARENESS

Table VI. Subject areas covered by the aggregated collection of AQUARING
See Annex D for a complete list of the themes of the aggregated collection of AquaRing.

This list of subjects was not understood as a “classification system” but as an overview of the targeted subjects of AquaRing aggregated collection. It is neither a semantic hierarchy nor an ontology draft yet although it can provide useful information to prepare the ontology.

It can be improved if it proves necessary. For instance, in the future steps the aquatic realms should be considered separately: on one side the “marine” disciplines and on the other side the “freshwater (including brackish water)” disciplines. They can not both be included in the “marine biology/aquatic sciences/environment” as presented in the first list of subjects of AquaRing. This may need to be refined in order to avoid confusion and a specific thesaurus must be adopted for both categories and specific ontology must be developed separately.

This unified conceptual view of the subject areas covered by the aggregated collection (See Annex D) has been approved by the WP3 leader as a first step for the semantic modelling task of WP3.

From this proposal, two tasks have been started as part of the WP3:

- the search for a thesaurus for each subject that may provide structured key words

For instance, some taxonomy classification may be used to describe fish. For this domain, we might refer to the “Fishbase” thesaurus.

As another example, some thesaurus should be found for vessels types. FAO could provide us with this thesaurus.

- the building of an ontology that will link one concept with another

For instance, an image of “black cod” has to be indexed. The description of this specific fish can be relevant to more than one discipline. We can describe it with a vocabulary dealing with “biology” then we can index it with another domain as “sustainable resource”.

Another example, one textual document referring to Gulfstream might be described at the same time under “sea current” and “climate” because the two different domains are developed inside it.

A complete ontology dealing with all the themes identified in AquaRing does apparently not exist.

Then, in parallel, the partners investigated and evaluated what already exists in terms of metadata system and thesaurus. This seemed necessary in order not to reinvent what had already been done by others.

They listed Operational systems have been listed and then the interoperability of these systems have been checked. In particular, the ASFA (Aquatic Sciences and Fisheries Abstracts) indexing system of the FAO (Food and Agriculture Organization, United Nations) appeared as a good candidate of existing classification systems, especially since FAO is currently using this classification to develop fishery-related ontologies.

It helped also to find organizations with which cooperate in the future. Those organizations can also be seen as future content providers. If this is the case, it is important that the future system of AquaRing allows transferring data from one system to another. Finally these organizations can help in disseminating information about AquaRing. It is in this context that partners contacted, for example, experts like EUROCEAN and ASFA-FAO staffs.

5.3.2 Further analysis and suggestions for the first list of subjects of AquaRing

At a first stage, content providers have described their contents with one main theme only, even when the contents relate to different themes. That was a first choice of preliminary annotation. This has been helpful for a first evaluation but may lead to some misinterpretation about the subjects actually represented in the collection: after the metadata annotation, some subjects will be more or sometimes less represented than in actual figures.

At a second level, an attempt has been made to examine the distribution of contents of the classification plan for the natural sciences. To do so, RBINS proposed to re-examine the contents classified as “marine biology/aquatic sciences/environment” so as to classify them according to disciplines. Crossing this re-worked level with the type of content proposed, the main domain of AquaRing portal clearly appears as images related to “oceanography – marine biology” field: this category of content and thematic yet represents about 53% of the overall collection and is mainly represented by images (figure 11).

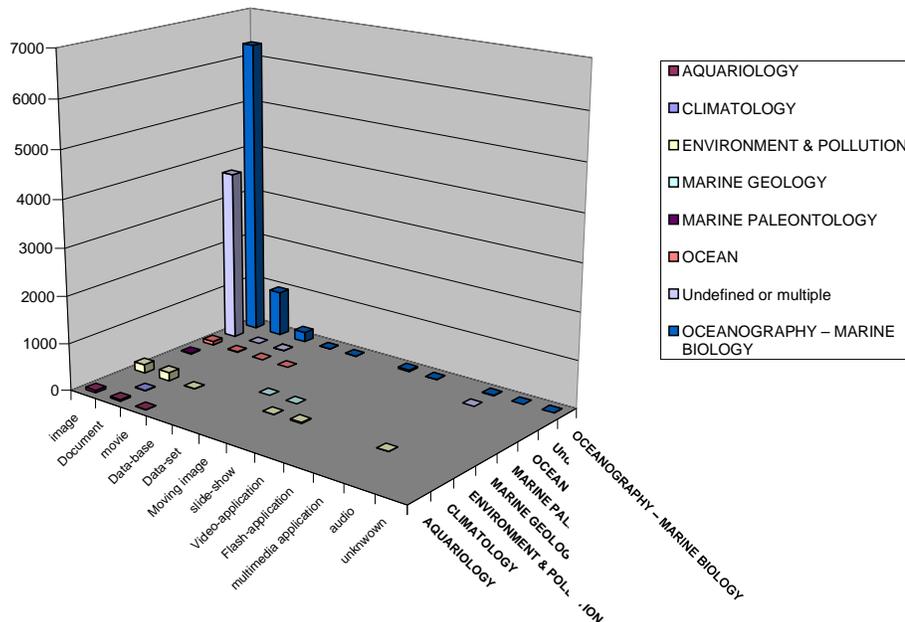


Figure 11. Content counts based on disciplines of “natural sciences” and digital formats.

Classification has been made upon the assumption that each picture of an animal has something to do with the discipline “biology”, what somehow represents a “semantic mixing”. We will need one specific ontology to refer to a discipline, and one ontology to refer to an organism name. The classification of scientific disciplines is semantically a Pandora’s box, because on one hand there doesn’t exist any worldwide commonly agreed classification of disciplines (there are topic-oriented and cross-border disciplines), on the other hand it calls for the creation of ontology related to human activities at a larger level.

It is clear that a large amount of proposed contents deal with images of marine organisms.

5.3.3 Test case: life classification

Here following is presented a test-case to analyze the conceptual frame considered within AquaRing. We only retain the life classification because it provides accurate information of the kinds of animal represented.

This test-case illustrates the complexity of the semantic issues to solve.

However, this exercise has evidenced that the amounts of key-words to browse at the annotation step will be a bottleneck: the more subjects and concepts are to be taken into account, the more keywords are necessary to accurately annotate the contents. By creating large keyword lists to browse in, this could hamper annotation efficiency. This will certainly be a key-topic in the next steps of ontology development and annotation tool development.

5.3.3.1 Overall keyword hits.

Some major keywords counted independently from their hierarchical level can be considered as representative of the knowledge domain for what regards living organisms:

>5000 HITS

Life

1000_5000 HITS

Animals

Undefined (multiple or irrelevant)

500_1000 HITS

Fish

100_500 HITS

Birds

Cetaceans

Crustaceans

Hydras, Jellyfish, corals

Molluscs

Reptiles

Seals, walrus, bear

Sharks, rays, chimera

Toothed cetaceans: dolphins, porpoises, sperm-whales

This exercise evidences that “popular” or flagship animal are largely represented in the collections. In a large amount of contents however, the descriptions is limited to “life”. This is partly due to the fact that many contents are dealing with general environmental questions rather than on a particular animal. Again, the partner’s sensibility and knowledge appears as crucial at the annotation step. Indeed, an image of oiled birds will focus attention on the problem of oil pollution rather than to the concerned species (which might be multiple). The provider will have to provide the best possible identification for the species on display even if initially this aspect was not taken into account. The semantic architecture thus calls for an completeness which might require a very hard work and complex ontologies at the annotation step.

5.3.3.2 Hits at high levels of the ontology:

Only 20% of the collection were considered as “irrelevant” for the life classification, while 80 % of the collection addresses aquatic living organisms at various levels (figure 10). These have been slightly documented since the keyword “Life” (top-level) is relevant for more than 5000 contents (see section 5.3.3.1.). This is thus a key-topic for the portal.

More than 50% of the contents are multi-species (figure 12). This is mainly due to multiple-contents records in which individual contents could not be described yet. 28% of the collection explicitly address animals, and this is likely to be the case for a large part of the “multiple” category, so the animal kingdom thus represents the largest contributor to organisms represented within AquaRing collections.

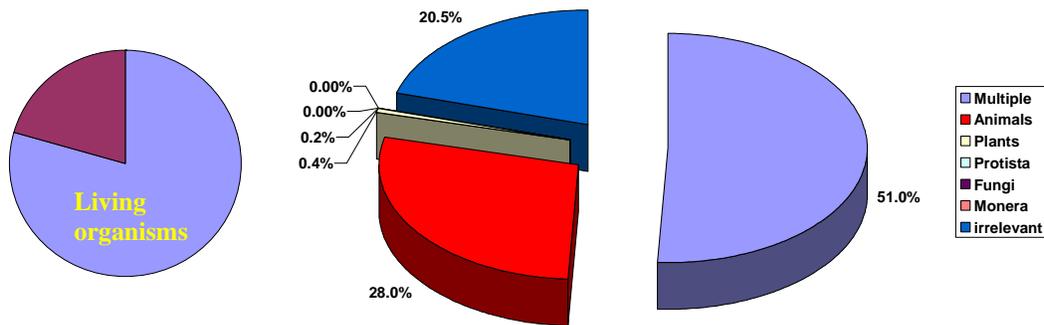


Figure 12 Left: proportions of contents for which “life classification” is relevant to describe the subject. Right: Proportions of the major kingdoms in contents displaying organisms.

An examination of the animal phyla (figure 13) indicates that more than the half of the animals is vertebrates, under phylum Chordata. Nearly one third of the contents could not be documented in more details than “animals” at this stage. Smaller amounts of contents deal with molluscs, coelenterates (jellyfishes, corals, etc) and crustaceans (under phylum “Arthropoda”).

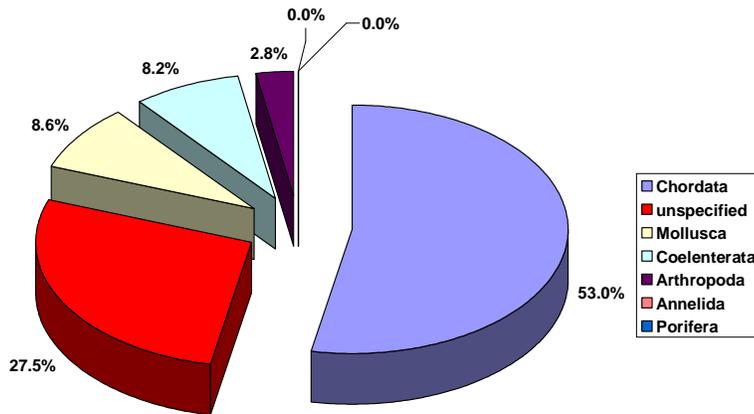


Figure 13. Proportions of animal Phyla represented in the collection

6 Conclusions

The analysis of existing digital data collections has provided some actual facts and relevant findings in regard to the barriers, the opportunities, the solutions and expected outputs as envisaged in the AquaRing work description and objectives.

It also allows to precise some of the questions and future steps to address in WP 3, 4, 5 and 7.

6.1 Main findings

This analysis has given to **each content provider** and to the consortium as a whole a better knowledge of the existing digital data as well as their accessibility and their relevance to the project's objectives and the targeted users.

The content providers achieved providing a general overview of the digital contents held at their institution although their practice of digital archiving is not yet homogeneous.

In this sense, the AquaRing initiative clearly enabled participating organisations to better identify and evaluate their own digital patrimonies, which is the preliminary step toward the integration of their digital collections. Following steps of the project will enable the content providers to analyse their collections in even more depth (WP 3 and 5) and to valorise these contents in an unprecedented way (WP 4), making them available to other users.

The **analysis of the aggregated collection** very clearly confirms the opportunities offered by sharing contents from an organised group of content providers through a joint portal.

The analysis confirms that bringing the contents together ensures achieving a promising mass of contents. The aggregated collection actually offers a very wide range of diverse digital data, at various levels: documents, multimedia resources, sounds, pictures, panels and movies. At this stage, the collection notably offers a unique choice of images.

The aggregated collection offers contents in more than five different languages. This multilingual possibility distinguish AquaRing portal from other existing portals, which are often limited to English as predominant and only language in use.

It also offers contents such as images that do not require any specific language or skill to access them: they can thus easily be consulted by very diverse audiences, also taking into account that each image file will be annotated at least in two languages, to make the search more accessible.

The most important issue will be the effective use of the portal by users.

D2.1 defined the expectations of the main targeted users of the portal through scenarios describing what kind of resources and subjects are relevant for them. A comparison has been made between these scenarios and the riches of the aggregated collection. It appears that content providers will be able to provide relevant contents in terms of level of information, diversity of resources and themes.

In its present state, AquaRing is a portal archiving a large choice of images of marine life, together with other relevant files which are not currently available. This kind of resource will be of interest for all types of users identified.

Commentaire [B3] :

I would add : but there are also a large quantity of other type of documents in order to avoid the impression that the digital collection is not balanced at all

It is important to establish an extensive IPR framework for content providers (see D2.3). The content providers will have to precise in a detailed way the status of the contents they propose and the rights they can allow for the various uses at the annotation step. But, generally speaking and following usual IPR regulations, it seems possible to give at least access for viewing to most of the data, even when uses will be restricted.

The **oceans** form the bulk of the AquaRing knowledge domain, and **living organisms** are the most represented type of subject.

But, referring to the first proposal for the themes of AquaRing portals, it appears that almost all types of resources can be provided to all targeted users in each of the 5 main themes identified:

- Aquatic and marine activities and technology
- Marine biology/ Aquatic sciences/ Environment
- Marine culture and leisure
- Law
- Education & awareness

The analysis finally confirms that involving five content providing organisations allows creating a unique collection that would otherwise simply not exist.

All partners contribute to the quantity and the wide ranges of pictures in the aggregated collection.

RBINS gives access to unique datasets providing biological data.

ACQUARIO DI GENOVA, LITHUANIAN SEA MUSEUM and NAUSICAA supply many educational documents, when ROTTERDAM ZOO offers relevant information in the field of aquariology –ll these data being relevant to professionals working in aquariums and museums.

Information on the Baltic Sea, the North Sea and the Mediterranean Sea will be available, as well as on several other environments, thanks to the main geographical area covered by each of the participating organisations and together they will also provide the portal users with a global vision of the World Ocean.

6.2 Questions and future steps in following WP

6.2.1 Link with WP 3

Given the high heterogeneity of subjects dealt within the proposed contents, establishing an overall conceptual framework appears as a complex challenge at this step of the project, due to the amplitude of the necessary semantic analysis to carry out. A structured list of themes was proposed to identify the main subjects of the aggregated collection. This overview of the themes is used to search for thesaurus. It has already been used by partners to present the main targeted themes of the aggregated AquaRing collection to new possible partners and thesaurus providers such as FAO/ASFA or EUROCEAN.

This identification of themes is a first step in the process of building the conceptual foundation for the semantic modelling work of the WP3.

Partners have enough information to decide which ontology to develop first.

In agreement with the analysis of the digital contents, they decided **to focus first on “marine biology: classification of life and classification of aquatic realms”** in order to prepare the annotation of this major field of the aggregated collection.

In the light of the synthetic results, we can trace the priorities for ontology development for this field:

- Ontology based on the Aquatic Science and Fisheries Abstracts (ASFA, FAO) are currently developed at FAO and could be used
- Life classification ontology will be set-up based on existing taxonomic data-bases (European Register of Marine Species, Species2000, ITIS, Fishbase ...) so as to take into account species represented in the collections
- Marine habitats ontology will have to be considered. An existing classification of freshwater habitats could be considered as an initial point for related ontology, depending on the amount of work necessary to create it.
- In order to document audience-oriented contents, ontology of relevant disciplines will be needed: firstly, scientific discipline so as to include “marine biology”; secondly, cultural activities and education activities; thirdly, leisure activities.

In parallel, partners will also look for thesaurus in following fields:

- Marine activities and technologies – Some of FAO/ASFA findings may be used here also, for instance their ontology of vessels.
- Culture and leisure
- Law
- Education & awareness

This research will lead to define ontology for these fields in AquaRing.

Many different thesauruses will then be gathered and interrelated to create the appropriate ontology for AquaRing.

6.2.2 Link with WP 4 and 5

In order to ensure usability, the annotation will need to be very precise, detailing what is at the heart of the content.

The shape of the content will be described by the metadata but what is more important is to clearly describe the information within the content. The more precise this annotation will be the more the semantic searching tool will offer possibility to the audiences to find relevant contents according to their requests on the portal.

The discrepancies encountered during the description of the contents underlined the challenge of the annotation. Annotating contents with metadata by different people and organisations from various countries is a main issue: indeed everyone has his own manner to understand, describe and annotate contents, even according to the personal cultural and scientific background. This fact points out the necessity of setting up rules for annotation and, at the same time, the need of a detailed analysis work during the metadata annotation of each file. This can be mostly solved by organizing a specific workshop with the people who will be annotating contents so as to build a common approach. The workshop should be completed by setting up a forum open during all the annotation phase.

6.2.3 Link with WP 6 and 7

The description of the aggregated collection can now be used by the consortium to describe the main aspects of the content to the Awareness & Consensus Formation Board and to potential partners and target users. This will allow both evaluating and adapting the final content. It will also feed the dissemination effort.

Finally, as a consortium, AquaRing partners now have a major asset: with the information gathered on their aggregated collection, and knowing the users they target, they have a strong basis to start working on the future sustainability of the portal.

Annex.A Possible tools for indexing themes

Classification plan of NAUSICAA

- **MARINE ACTIVITIES AND TECHNOLOGY**
(Exploitation of marine resources-ship building and hydraulic engineering-navigation-safety on sea-merchan -Navy-maritime transport)
- **MARINE BIOLOGY-SEA SCIENCES-ENVIRONMENT**
(Various oceans-marine geology and geophysics climatology-meteorology-marine palaeontology-oceanography-marine biology and zoology-aquariology-environment pollution)
- **CULTURE AND LEASURE**
(General culture-art and literaturesports and leisure)
- **LAW-POLICY-ECONOMY-SOCIAL**
(Law-maritime economy and policysocial seamen)

ATLAS OF THE OCEAN

- *The functioning of the Ocean*
(Origin of the Ocean-Biodiversity-Habitats-Climate-Circulation)
- *Impacts of People on the Ocean*
(Climate change-Water-Waste-Pollution-Population and Coasts-exploitation of marine resources-Fishing-Mineral Resources - Maritime Transport - Marine Safety)
- *Duties and Rights of People*
(Preservation of the biodiversity-Protection of the Habitats-Social Impact-Source of Work-Geopolitics strategy-International laws-Education and Awareness of the People-Oceanographical Research-Risks predictions-Leisure and culture-Coasts)

PASSPORT of CITIZEN OF THE OCEAN THEMES

- *World Ocean and Us*
- *Air Pollution and Climatic Change*
- *Waste Pollution*
- *Threats to Marine Life*
- *Our leisure activities and the Ocean*
- *Fishing and Fish Product Consumption*
- *Regulations*

Annex.B Annotating the themes of the collection with the tool “ Structured list of themes” of NAUSICAA

R 6 Teaching - Education

A MARINE ACTIVITIES AND TECHNOLOGY

A 1 EXPLOITATION OF MARINE RESOURCES

A 11 Oceanologic Research – Skin diving

A 12 Exploitation of biological resources

- A 121 Generalities
- A 122 Regulation
- A 123 Policy - Institutional et administrative background
- A 124 Economy of biological resources (analysis, statistics)
 - .1 Economic cycle - Development (investments, marketing, delivery...)
 - .2 Sea products' market

- A 125 Aquaculture**
 - .1 Generalities – Aquacultural geography
 - .2 Fish farming
 - .3 Crustacean farming
 - .4 Mollusc farming
 - .5 Other species farming
 - .6 Seaweed farming
 - .7 Pathology
 - .8 Equipments control
 - .9 Aquaculture industry

- A 126 Fishing**
 - .1 Generalities – Fishing geography
 - .2 Different types of fishing
 - .3 Fishing tackles and technology
 - .4 Stock control
 - .5 Halieutic research
 - .6 Fishing industry

A 13 Exploitation of energy and mineral resources

- A 131 Generalities
- A 132 Regulation
- A 133 Policy – Institutional and administrative background
- A 134 Economy and management
- A 135 Technology

- .1 Research and prospecting
- .2 Industrial exploitation

A 14 Other activities of extraction

- A 141 Extraction of sand and gravel
- A 142 Extraction of salt - Desalinization

A 2 SHIP BUILDING AND HYDRAULIC ENGINEERING

- A 21 Generalities
- A 22 Regulation
- A 23 Policy – Institutional and administrative background

A 24 Economy and management

- A 241 Economic cycle
- A 242 Ship market
 - .1 Trade ships
 - .2 Fishing ships
 - .3 Leisure boats
 - .4 Other ships

A 25 Naval engineering

- A 251 Naval architecture
- A 252 Shipyards
- A 253 Amateur shipbuilding – Traditional shipbuilding
- A 254 Different types of vessels
 - .1 Antique vessels
 - .2 Merchant boats
 - .3 Fishing boats
 - .4 Leisure boats
 - .5 Other boats
- A 255 Vessels fittings
 - .1 Hulls
 - .2 Rigging and equipment
 - .3 Engines
- A 256 Maintenance – Repairing

A 26 Hydraulic engineering

- A 261 Ports - Roads
- A 262 Ports fittings
- A 263 Underwater works

A 27 Sciences and technology applied to naval and hydraulic engineering

A 3 NAVIGATION – SAFETY ON SEA

A 31 Generalities

A 32 Regulation

A 35 Maritime navigation

- A 351 Code et signalling
- A 352 Manuals (maps, guides, instruments)
- A 353 Meteorology
- A 354 Optical and electronic fittings
(radar, radio, télécommunication...)
- A 355 Other instruments of geonavigation
(lighthouse, lightships, seamark, buoy, ...)
- A 356 Navigation techniques
- A 357 Handling and seamanship
- A 358 Astronomical navigation

A 36 Security on sea

- A 361 Safety measures – Life saving
- A 362 Health – Life on board
- A 363 Sea events

A 4 MERCHANT NAVY – MARITIME TRANSPORT

A 41 Generalities

A 42 Regulation

A 43 Policy – Institutional and administrative background

A 44 Economy and management

A 45 Maritime transport – Merchant navy

- A 451 Commissioning
- A 452 Fleet
- A 453 Traffic
- A 454 Transport of passengers

A 46 Seaport

- A 461 Status
- A 462 Seaport infrastructure
 - .1 Trade port
 - .2 Fishing port
 - .3 Yachting port
 - .4 Other ports
- A 463 Seaport equipment and tools
- A 464 Seaport exploitation

A 5 NAVY

A 51 Generalities

A 52 Military naval engineering

A 53 National navy

A 54 Foreign navies

B MARINE BIOLOGY – SEA SCIENCES – ENVIRONMENT

B 1 GENERALITIES – VARIOUS OCEANS

B 2 MARINE GEOLOGY AND GEOPHYSICS

- B 21 Geodynamics
- B 22 Geomorphology
- B 23 Tectonics

B 3 CLIMATOLOGY - METEOROLOGY

B 4 MARINE PALEONTOLOGY

- B 41 Generalities
- B 42 Paleobotany
- B 43 Protozoa and simple fossil forms
- B 44 Invertebrate fossils
- B 45 Molluscoïd fossils
- B 46 Fish fossils
- B 47 Marine mammals fossils
- B 48 Seabirds fossils
- B 49 Other animals fossils

B 5 OCEANOGRAPHY – MARINE BIOLOGY

- B 51 Generalities - Instruments – Oceanographic campaigns
- B 52 Chemical oceanography
- B 53 Physical oceanography

B 54 Marine biology

- B 541 Generalities
- B 542 Microbiology - Bacteriology
- B 543 Botany (marine plants)
- B 544 Marine zoology**
 - .1 Generalities
 - .2 Plankton
 - .3 Protozoa
 - .4 Invertebrates
 - .41 Spongies
 - .42 Cnidaria (corals, jellyfish...)
 - .43 Annelids
 - .44 Bryozoa
 - .45 Molluscs
 - .46 Crustaceans
 - .47 Echinoderms
 - .48 Other invertebrates
 - .5 Procordae
 - .6 Vertebrates
 - .61 Fish (Ichthyology)
 - .62 Marine mammals
 - .63 Seabirds
 - .64 Reptiles
- B 545 Marine ecosystems
- B 546 Coastal fauna and flora

B 6 AQUARIOLOGY**B 7 ENVIRONMENT - POLLUTION**

- B 71 Generalities
- B 72 Regulation
- B 73 Marine pollution
 - B 731 Different types of pollution
 - B 732 Waste control
 - B 733 Anti-pollution means
- B 74 Coastal environment
- B 75 Sustainable development – Ecology
- B 76 Protected areas-Natural reserves

C CULTURE AND LEASURE**C 1 GENERAL CULTURE**

- C 11 Marine archeology
- C 12 Marine patrimony
- C 13 Marine history and geography (generalities)
 - C 131 History of seafarers – corsairs – pirates ...
 - C 132 History of fishing
 - C 133 History of merchant navy
 - C 134 History of military navy
 - C 135 History of yachting
 - C 136 History of marine science et technology
 - C 137 Regional history and geography – Misc.
- C 14 Shipping – Relation of explorations and adventures
- C 15 Local fund (Boulonnais)

C 2 ART AND LITERATURE

- C 21 Art of cooking (Gastronomy)
- C 22 Modeling and design
- C 23 Photography - Cinema
- C 24 Music - Painting - Drawing - Engraving - Sculpture
- C 25 Literature - Poetry - Theatre
- C 26 Strip cartoons - Adults
- C 27 Miscellaneous

C 3 SPORTS AND LEASURES

- C 31 Generalities
- C 32 Regulation
- C 33 Yachting – sail and motor
 - C 331 Cruising (coastal and deep-sea)
 - C 332 Racing
- C 34 Aquatic sports
 - C 341 Generalities
 - C 342 Wind surfing - Surfing
 - C 343 Water skiing
 - C 344 Kayak - Canoe
 - C 345 Other aquatic sports
- C 35 Swimming and diving
 - C 351 Swimming
 - C 352 Diving
 - C 353 Aquatic games
- C 36 Fishing and hunting
 - C 361 Amateur fishing
 - C 362 Underwater fishing
 - C 363 Fowling
- C 37 Touring. Travelling
- C 38 Miscellaneous

D LAW-POLICY-ECONOMY-SOCIAL**D 1 LAW**

- D 11 International laws
 - D 111 Law of the sea
 - Sources of the law (ONU, OMI, CNUCED)
 - Marine spaces
 - Marine environment (oceanology, pollution)
 - D 112 European Community Rules
- D 12 Maritime national laws
 - D 121 Navigation
 - D 122 Agreement
 - D 123 Marine insurance
 - D 124 Boarding
 - D 125 Foreign maritime law
- D 13 Maritime and coastal public property
 - D 131 Maritime public property
 - D 132 Seaport property
 - D 133 Public property possession
- D 14 Regulation (see filed of application)
- D 15 Disputes (justice, refereeing)

D 2 MARITIME ECONOMY AND POLICY

- D 21 Generalities et statistics
- D 22 Institutional and administrative background
- D 23 National and regional policy
- D 24 Common policy
- D 25 International relations and cooperation

D 3 SOCIAL (SEAMEN)

- D 31 Generalities
- D 32 Legislation and social regime
- D 33 Social status
- D 34 Professional training - Education
- D 35 Employment – Working conditions
- D 36 Syndicates – Social conflicts
- D 37 Sociology – Ethnology of seamen
 - D 371 Seafaring men
 - D 372 Merchant seamen
 - D 373 Military seamen
 - D 374 Coastal population

Annex.C Description of the aggregated collection

See attachments enclosed

Excel files:

“GLOBAL AGGREGATED final”

“data provided by public for scenarios march2007”

“digital documents –all revised”

“digital documents NAUSICAA”

“RBINS contents revised March 2007”

“digital documents lithuanie »

“digital documents RZOO »

Annex.D Subject areas and themes covered by the aggregated collection of AquaRing

AQUATIC AND MARINE ACTIVITIES AND TECHNOLOGY

EXPLOITATION OF AQUATIC RESOURCES

AQUACULTURE

FISH FARMING
CRUSTACEAN FARMING
MOLLUSCS FARMING
OTHER ANIMAL FARMING
FRESHWATER FARMING

FISHING GEAR

GENERALITIES
TYPES OF FISHING
FISHING TACKLES/TECHNOLOGY
STOCK CONTROL
FISHING INDUSTRY

ECONOMY AND MANAGEMENT

SHIP BUILDING AND HYDRAULIC ENGINEERING

SHIPYARDS
FISHING BOATS

NAVIGATION AND SAFETY AT SEA

INSTRUMENTS OF NAVIGATION
SECURITY AT SEA
SAFETY MEASURES

MERCHANT NAVY AND MARITIME TRANSPORT

FLEET
TRAFFIC
TRANSPORT OF PASSENGERS
TRADE PORTS
FISHERY PORTS
YACHTING PORTS

MILITARY NAVY

EUROPEAN NAVIES
INTERNATIONAL NAVIES

SOCIAL SEAMEN

PROFESSIONAL TRAINING AND EMPLOYMENT
SOCIOLOGY ETHNOLOGY OF SEAMEN

MARINE BIOLOGY/AQUATIC SCIENCES/ENVIRONMENT

OCEAN

MARINE GEOLOGY

CLIMATOLOGY

MARINE PALEONTOLOGY

INVERTEBRATE FOSSILS
MOLLUSCOID FOSSILS
FISH FOSSILS

OCEANOGRAPHIC CAMPAIGNS

MARINE BIOLOGY

MICROBIOLOGY BACTERIOLOGY
MARINE PLANTS BOTANY
MARINE ZOOLOGY
 PLANKTON
 JELLYFISH
 INVERTABRATES
 SPONGIES
 CNIDARIA CORALS
 BRYOZOA
 MOLLUSCS
 MUSSEL
 CRUSTACEANS
 SHRIMP
 VERTEBRATES
 FISH
 SALMON
 TUNA
 SHARK
 EMPEROR FISH
 SEAHORSE
 MARINE MAMMALS
 WHALE
 DOLPHIN
 SEA LION
 SEAL
 SEABIRDS
 PINGUIN
 REPTILES
 TURTLE

MARINE ECOSYSTEMS
 HYDROTHERMAL VENTS

COASTAL FAUNA AND FLORA

FRESHWATER/BRACKISH WATER BIOLOGY

MICROBIOLOGY-BACTERIOLOGY
BRACKISH/FRESHWATER PLANTS BOTANY
BRACKISH/FRESHWATER ZOOLOGY
 PLANKTON
 INVERTABRATES
 SPONGIES
 BRYOZOA

MOLLUSCS
CRUSTACEANS
VERTEBRATES
 FROG
 FISH
 SALMON
 AQUATIC MAMMALS
 AQUATIC BIRDS
 REPTILES
FRESHWATER ECOSYSTEMS
BRACKISH WATER ECOSYSTEMS
BRACKISH/RIVERINE FAUNA AND FLORA

AQUATIC ACOUSTIC

BIOACOUSTIC
ENVIRONMENT NOISE

AQUARIOLOGY

ENVIRONMENT & POLLUTION

ENVIRONMENT
 COASTAL ENVIRONMENT
 OFF-SHORE ENVIRONMENT
 BENTHIC ENVIRONMENT
 PELAGIC/NECTONIC ENVIRONMENT
 LAGOON ENVIRONMENT
 FRESHWATER ENVIRONMENT
 RIVER ENVIRONMENT
 LAKE ENVIRONMENT
 WETLAND ENVIRONMENT
 ESTUARINE ENVIRONMENT
 BRACKISH WATER ENVIRONMENT
POLLUTION
SUSTAINABLE DEVELOPMENT
PROTECTED AREAS
ENVIRONMENTAL ISSUES ECOLOGY

MARINE CULTURE AND LEISURE

MARINE ARCHAEOLOGY

MARINE HERITAGE

MARINE HISTORY AND GEOGRAPHY

HISTORY OF SEAFARERS AND PIRATES
HISTORY OF FISHING AND WHALING
HISTORY OF MERCHANT NAVY
HISTORY OF MILITARY NAVY
HISTORY OF YACHTING
REGIONAL HISTORY

ARTS AND LITERATURE

GASTRONOMY - COOKING
MYTHOLOGY
ARTS (GENERAL)
LITERATURE (GENERAL)

POPULAR CULTURE

SPORTS AND LEASURE

SAILING YACHTING

RACING

DIVING

FISHING

FRESHWATER

SEA WATER

LAW

SEA LAW

INTERNATIONAL LAW

ENVIRONMENTAL POLICY

FISHING / EXPLOITATION OF AQUATIC RESOURCES POLICY

EDUCATION & AWARENESS

EDUCATION

FORMAL EDUCATION

PRIMARY SCHOOL EDUCATION

SECONDARY SCHOOL EDUCATION

HIGHER SCHOOL EDUCATION

UNIVERSITY EDUCATION

TEACHER TRAINING

INFORMAL EDUCATION

PROFESSIONAL TRAINING EDUCATION

ENVIRONMENTAL EDUCATION

OTHER EDUCATIONAL ACTIVITIES

AWARENESS

AWARENESS CAMPAIGNS

LIGHT EXHIBITIONS

TEMPORARY EXHIBITS

SCIENTIFIC EXPOSITIONS

PROFESSIONAL/SECTORIAL ACTIVITIES

OTHER AWARENESS ACTIVITIES

Annex.E Alternative test-case proto-ontology

1. Intellectual activities

- Understanding
 - Topic-oriented disciplines
 - Exact sciences
 - Biology
 - Autecology
 - Zoology
 - Botany
 - Aquariology
 - ...
 - Geology
 - Geography
 - Physics
 - Chemistry
 - Oceanography
 - Oceanology
 - Limnology
 - ...
 - Human sciences
 - History
 - Sociology
 - Psychology
 - Anthropology
 - Philosophy
 - Education sciences
 - Pedagogy
 - ...
 - Beliefs
 - Mythology
 - Theology
 - ...
 - ...
 - Cross-border disciplines
 - Oceanography / oceanology
 - ...
 - ...
- Using
 - Applied sciences
 - ...
- Ruling
 - Policy
 - ...
- Communicating
 - Vulgarisation of knowledge
 - ...
- Multiple or irrelevant

2. Leisure and cultural activities

- Sports
 - Wind-powered sports
 - *Wind-surfing*
 - *Sailing*
 - *kite-surfing*
 - ...

- Wave-powered sports
- Motor-powered sports
- Human-powered sports
 - Canoe-kayak
 - Game Apnea
 - Swimming
 - ...
- Learning
 - Technology-oriented exhibitions
 - Nature-oriented exhibitions
 - Arts-oriented exhibitions
 - Reading
 - ...
- Social events
- Exploration
 - Diving
 - Snorkeling
 - Scuba-diving
 - Scientific explorations
 - ...
- Cooking
- Multiple or irrelevant
- ...

4. Life Classification

- Monera
- Protista
- Fungi
- Plants
- Animals
 - Arthropoda
 - Mollusca
 - Aschelminthes
 - Platyhelminthes
 - Coelenterata
 - Porifera
 - Annelida
 - Echinodermata
 - Ectoprocta
 - ...
 - Chordata
 - Hemichordata
 - Urochordata
 - Cephalochordata
 - Vertebrata
 - Pisces
 - Selachii (*sharks and rays*)
 - ...
 - Amphibia
 - Reptilia
 - Aves
 - Mammalia
- Multiple or irrelevant