Annex 1

Description of Work

(Best Practice Networks)

[ECP 518001]

Biodiversity Heritage Library for Europe
BHL-Europe

e*Content*plus

Table of contents

0 Project Summary

The lack of access to the published biodiversity literature is a major obstacle to efficient research and a broad range of other applications, including education, biodiversity conservation, protected area management, disease control, and maintenance of diverse ecosystems services. This literature also has cultural importance as a resource for the study of the history of science, art and other non-science applications. Currently, a large number of small projects are digitising biodiversity material in numerous institutions across the EU to make access more open, but the corpus will still be seriously fragmented. These projects do not use common standards or interfaces and are not interoperable. In alignment with the EC i2010 initiative, BHL-Europe aims to make the biodiversity knowledge available to everybody who is interested by improving the interoperability of European biodiversity digital libraries.

BHL-Europe will review and test different approaches for such libraries based on the experiences of the partners involved in the project. The consortium will establish a best practice approach and promote the adoption of standards and specifications for the large-scale implementation in a real-life context. BHL-Europe will provide a multilingual access point for search and retrieval of digital content through EUROPEANA. In addition, it will provide a robust multilingual portal with sophisticated search tools to facilitate the search for taxon-specific biodiversity information. The project will also develop operational strategies and processes for long-term preservation and sustainability of the data produced by national biodiversity digitisation programmes. BHL-Europe will generate activities to raise awareness and to ensure that the project outputs are known and used by the target users and that the proposed approach directly addresses user needs. BHL-Europe experience and best practice will be shared with the wider digital library community.

1 Rationale and Objectives

1.1 Description of the issue addressed and the current situation (baseline)

1.1.1 Background: the importance of biodiversity literature

The libraries of the European natural history museums and botanical gardens collectively hold the majority of the world's published knowledge on the discovery and subsequent description of biological diversity. As yet this wealth of knowledge is only currently available to those few people who can gain direct access to these collections. The body of biodiversity knowledge is thus effectively withheld from use for a wide range of scientific applications, which include research, education, taxonomic study, biodiversity conservation, protected area management, disease control, and maintenance of diverse ecosystems services. Much of the early published literature is rare or has limited global distribution and is available in only a very few libraries. From a research perspective, these collections are of exceptional value because the domain of systematic biology depends – more than any other natural science – upon historic literature. The cited "half-life" (period of relevance) of natural history literature is longer than that of any other scientific domain and its "decay-rate" (rate at which it becomes irrelevant) is much slower than in other fields (cf. biotechnology). In order to positively identify a rare specimen, a working biologist may still have to consult a 100 year-old text, because that was the last time the organism was found and described.

Once the collections of biodiversity literature are freely available on the Internet, this will be of great value to scientists, and also to a much wider public. Amateur naturalists (citizen scientists) who lack affiliation with major research institutions will be able to search, read, download, and print articles that were previously unavailable to them. Designers and artists will be able to use the detailed illustrations integral to many taxonomic works as motifs or design concepts in their work. Educators guiding students in how to do biological research will have access to a wealth of examples to incorporate into lesson plans and assignments. Historians and social scientists will have access to the stories and background information on the development of the natural sciences and to ever-developing scientific theories and understanding.

The greatest diversity of the biota exists in tropical and developing countries, yet the literature documenting this biodiversity is overwhelmingly held in a small number of European and North American libraries. Digitising this literature and making it freely available on the Internet is an act of significant knowledge transfer, thus helping the EU to achieve its commitments under Article 17 of the Convention on Biological Diversity (CBD).

In addition to the scientific value of this literature, the taxonomic literature is also part of our cultural heritage. Taxonomists study and describe the organisms and biodiversity of particular areas. These areas

commonly are cultural landscapes or parts of cultural landscapes. Cultural landscapes "represent the combined works of nature and of man" and reflect the evolution of human society over time in relationship to its ecological context. Thus cultural landscapes are part of the cultural heritage according to Article 1 of the UNESCO World Heritage Convention. As part of this cultural landscape, information on nature and biodiversity will be combined with information on archaeology and ethnology through the lead project of the European Digital Library Foundation, EUROPEANA. Descriptions and documentations of natural phenomena, of plants, and of animals, should be considered as part of the European cultural heritage.

BHL-Europe directly addresses the overall aim of *e*Content*plus*, *"to make digital content in Europe more accessible, usable, and exploitable"* and to do this in the context of key information sources for biodiversity. More specifically it focuses on **Action 5.1. Best Practice Networks for interoperability of digital libraries** with the objective of improving the interoperability of digital libraries held by 15 natural history museums and botanic gardens and two institutional archives, and libraries across 13 EU Member States, and will be progressively extendable. We will establish standards-based interoperability between digitised documentation and the collections, ensuring the interoperability of the systems and multilingual and cross-cultural search and retrieval of the digital content, and facilitate user access through the common user interface of EUROPEANA.

1.1.2 EUROPEANA and the European Digital Library Foundation

EDLNet has created EUROPEANA – a single cultural portal for digital materials for Europe. The European Digital Library Foundation has been set-up to develop a sustainable and secure future for this portal and the underlying digital objects. EDLNet has taken the lead in establishing best practice and standards for the creation of digital objects and for the development of appropriate metadata, leading to a large-scale distributed Portal model. We will integrate fully with this model using best practice and standards from EUROPEANA and BHL.

Currently, the majority of material in EUROPEANA is from the arts and humanities. However, the European Digital Library was set up to also include science. The biodiversity heritage literature is an excellent candidate for the first major corpus of science material to join EUROPEANA – the literature has both scientific value and major cultural importance. These biodiversity texts are the core to any study of the history of the development of scientific thought in Europe over the last three centuries.

BHL-Europe will cooperate closely with EUROPEANA at a technical level – database systems, metadata schemas, harvesting protocols, interface development, etc. – to ensure full transparent interoperability. Additionally, the NHM will provide IPR advice and support for both projects, ensuring a consistent relationship with Rights Holders across the major EU digital library initiatives.

By developing BHL-Europe systems, EUROPEANA will be able to significantly augment its holdings of digital biodiversity content because the application will be developed to interface with and ingest from the current Biodiversity Heritage Library Portal. This implies that the European content currently digitized as part of the American-UK led BHL will be able to be incorporated as part of the application development. These will be European biodiversity texts that will not have to be rescanned by European libraries.

1.1.3 Background to the global Biodiversity Heritage Library (BHL) Project

Since 2007, ten major biodiversity libraries have collaborated in digitising the biodiversity literature (main focus on English language literature) in an open access manner via the Biodiversity Heritage Library (BHL) project. Two European institutions are participating in the BHL project: Natural History Museum (London, UK) and Royal Botanic Gardens, Kew (Richmond, UK). Preliminary commitments have also been received from the Australian government and Chinese Academy of Sciences to digitise their own biodiversity literature. The global BHL project is predominantly funded by grants from large US foundations and the operating budgets of the member institutions.

The main aim of the BHL project is to make the biodiversity knowledge accessible on an open access Creative Commons basis to a wide spectrum of end-users. Optical Character Recognition (OCR) techniques will be used to extract the relevant information from digitised objects. Taxonomic intelligence tools are used to overcome the issue of changing names, names using local languages and plurality of names for the same object (synonyms). A research scientist, student or member of the public, who has access to the Internet anywhere in the world, will be able to search for specific information in all of the literature relevant to biodiversity and transparently link the documentation to taxonomic, geographic, biographic, or other relevant databases.

It is essential that BHL should be a global partnership because, while many libraries have collected biodiversity materials, no single library holds the complete corpus of legacy literature. The BHL Portal is available at www.biodiversitylibrary.org.

1.1.4 Issues addressed by BHL-Europe

The BHL is a global project and it is vital that Europe contributes its biodiversity literature to the project and that European users have access to the global BHL project. Some of the important English language literature of Europe is already part of the BHL. It is essential that the very significant amount of biodiversity literature held in other European languages – German, French, Dutch, Spanish, and others – is also integrated and becomes far more widely accessible to users. This requires a European effort to establish BHL-Europe as a dynamic component that will be both valuable in itself and also contributes to a global effort.

We will manage the acquisition, digitisation, and hosting of the material contained in European institutions and will significantly improve the interoperability of these currently disparate and developing European digital libraries. The material in each European nation will be made accessible through **EUROPEANA** (European Digital Library Foundation). We will manage the process by which each nation digitises its biodiversity material and ensure that this is done efficiently and effectively. The efficient coordination and management of 'commitments to digitise' is vital (some of the material is available in several different locations in Europe) and duplication must be avoided.

We will review and test different approaches, standards and specifications for biodiversity digital libraries based on the experiences of the partners involved in the project. The consortium partners will agree on a best practice approach to be used for the large-scale implementation in real-life context.

We will manage the relationship with the global BHL project and with the national and European partners. European experience in multilingual and multicultural database technology will add considerable value to the BHL Portal by providing multilingual access. Our experience in distributed data management will be vital to the long-term sustainability of the whole BHL project.

BHL-Europe is a project that will mobilise funding in individual EU nations in order to undertake and complete essential scanning work. Several of the partners have already indicated that their government will promote national scanning initiatives once a large coordinating project like BHL-Europe is in place.

1.1.5 Benefits of BHL-Europe

1) Enabling access to ~25 million pages of scientific literature on biodiversity to EUROPEANA will have a significant impact on the breadth and depth of European culture covered. Specifically, the action will:
   - begin the fulfilment of the scientific dimension of the EUROPEANA cultural arena
   - demonstrate the global importance of European scientific endeavour in biological sciences
   - provide tools and information for the study of the history and sociology of European science
   - provide access to culturally-important documents – from Darwin, Linnaeus, von Humboldt, Wallace, Cuvier, Merian, etc.
   - provide access to many beautiful and culturally-important images – botanical drawings, zoological drawings, watercolours, etc.
2) Providing access to the biodiversity literature (images and text) using a common global portal with integrated and sophisticated search tools will produce a number of long-term benefits for the European and global biology communities. These outcomes include:
   - improving the efficiency of research in the biology domain
   - improving access to biodiversity information for non-museum biologists
   - repatriation of species information in developing countries back to those countries via the Web
   - capacity building in the developing world (reducing taxonomic knowledge gaps, supporting taxonomists training programmes)
   - preservation of rare and fragile materials
3) The project mobilises 28 partners (23 of which may be literature providers) from 13 EU countries (of which 3 are New Member States). It is a consortium of museums, botanic gardens, universities, commercial companies, the BHL (represented by the Smithsonian Institution Library – SIL), the EDL

Foundation, and other EU projects e.g. EDIT (European Distributed Institute of Taxonomy), SYNTHESYS (Synthesis of Systematic Resources), etc.

1.2 Description of the project objectives

The project aims to make Europe's biodiversity information, which is locked in many disparate libraries or scattered in many digital repositories, available for everybody with interest in biodiversity through a global portal (BHL) with specific biological functionality (e.g. taxonomic intelligence) and to a wide European cultural audience through EUROPEANA.

More precisely, BHL-Europe aims to:

(1) review and test approaches for the establishment and management of multilingual biodiversity digital libraries

(2) improve the interoperability of European biodiversity digital libraries by the innovative application of proven technologies

(3) promote the adoption of best practice, standards and specifications for the large-scale implementation of such repositories

(4) facilitate the open access to taxonomic literature for a large number of target users including the general public

(5) provide a multilingual access point for the search and retrieval of biodiversity content through at least two portals (EUROPEANA and BHL)

(6) raise awareness and ensure that the project outputs are known and used by the target users and that the proposed approach directly addresses user needs

(7) develop operational strategies and processes for long-term preservation and sustainability of the data produced by national biodiversity digitisation programmes

(8) facilitate and enable the initiation of scanning initiatives in European countries not yet involved in digitisation programmes and improve the infrastructure for digital libraries in all EU countries

(9) negotiate with Rights Holders to enable access to in-copyright content

1.3 Expected results

The proposed project will produce the following specific and measurable results:

(1) a robust biodiversity community portal with open, distributed architecture to provide multi-language access to the digital content

(2) ~ 25 million pages of biodiversity literature from a large number of EU Member States for display through the EUROPEANA Portal

(3) tested and validated best practice methods, standards and specifications for technology platforms, digitisation and image storage

(4) tested and validated methodology for content enrichment

(5) tested and validated best practice workflow on implementing BHL-Europe architecture

(6) sustainable and persistent digital curation of biodiversity heritage literature; preservation and conservation of rare and fragile material

(7) the integration of Taxonomic Intelligence Web tools to facilitate the search for taxon-specific biodiversity information

(8) improved efficiency of research in the biology domain; improving access to information to non-museum biologists; building public engagement, awareness and participation

(9) permission from publishers to digitise previously published in-copyright content

(10) a metadata repository and collection analysis tool for all the leading libraries involved

(11) strategies, plans and processes for long-term preservation and sustainability of the data produced by national biodiversity digitisation programmes as part of BHL-Europe

1.4 List of participants

The partners for BHL-Europe include most important natural history museums and botanical gardens in Europe because they have large biodiversity libraries. All are domain experts, and will be disseminators of the project's outcomes through their extensive participation in related community networks and their contacts with the target user groups. Several of the selected partner institutions combine their domain and library expertise with a strong expertise in biodiversity informatics and related IT issues making them ideal for the technological implementation of the project (e.g. NHM, FUB-BGBM, NAT, RMCA, and NHMW). The IT expertise of BHL-Europe is completed by two commercial companies (AIT, ATOS), both of whom are highly experienced in the development, adaptation, and implementation of digital archives and libraries. These commercial companies are full partners of the network and are responsible for most of the technical integration of the digital content.

List of Participants

AP No[1]	Participant name	Partic. short name	Country	Role in the project[2]	Date enter project	Date exit project
1	Museum für Naturkunde - Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin	MfN	DE	Project coordinator, (Content provider), Technology provider, Disseminator, Domain / Language expert	M1	M36
2	Natural History Museum	NHM	UK	Content provider, Technology provider, Disseminator, IPR expert, Domain / Language expert	M1	M36
3	Narodni muzeum	NMP	CZ	Content provider, Disseminator, Domain / Language expert	M1	M36
4	European Digital Library Foundation	EDL Foundation	NL	Technology provider, Disseminator	M1	M36
5	Angewandte Informations-technik Forschungs-gesellschaft mbH	AIT	AT	Technology provider	M1	M36
6	ATOS Origin Integration France	ATOS	FR	Technology provider	M1	M36
7	Freie Universität Berlin	FUB-BGBM	DE	(Content provider), Technology provider, Disseminator, Domain / Language expert	M1	M36
8	Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts	UGOE	DE	Content provider, Domain / Language expert	M1	M36
9	Naturhistorisches Museum Wien	NHMW	AT	(Content provider), Technology provider, Domain expert	M1	M36
10	Land Oberösterreich	LANDOE	AT	Content provider, Domain expert	M1	M36
11	Hungarian Natural History Museum	HNHM	HU	Content provider, Domain / Language expert	M1	M36
12	Museum and Institute of Zoology, Polish Academy of Sciences	MIZPAS	PL	(Content provider), Domain / Language expert	M1	M36
13	University of Copenhagen	UCPH	DK	Content provider, Domain / Language expert	M1	M36
14	Stichting Nationaal Natuurhistorisch Museum Naturalis	NAT	NL	Content provider, Disseminator, Domain / Language expert	M1	M36
15	National Botanic Garden of Belgium	NBGB	BE	Content provider, Domain / Language expert	M1	M36
16	Royal Museum for Central Africa	RMCA	BE	Content provider, Technology provider, IPR expert, Domain / Language expert	M1	M36
17	Royal Belgian Institute of Natural Sciences	RBINS	BE	Content provider, Disseminator, Domain / Language expert	M1	M36
18	Bibliothèque nationale de France	BnF	FR	Content provider, Domain / Language expert	M1	M36

[1] Participant number 1 is the Coordinator. The remaining participants are beneficiaries.

[2] The main operational role that the participant plays in the proposed project. For example: content provider, technology provider, pedagogical expert, standardisation body, evaluation, dissemination etc.

19	Museum national d'histoire naturelle	MNHN	FR	Content provider, Disseminator, Domain / Language expert	M1	M36
20	Consejo Superior de Investigaciones Cientificas	CSIC	ES	Content provider, Domain / Language expert	M1	M36
21	Università degli Studi di Firenze	MSN	IT	(Content provider), Domain / Language expert	M1	M36
22	Royal Botanic Garden Edinburgh	RBGE	UK	Content provider, Domain expert	M1	M36
23	Species 2000	Sp2000	UK	Domain expert	M1	M36
24	John Wiley & Sons limited	Wiley	UK	(Content provider)	M1	M36
25	Smithsonian Institution	SIL	USA	Content provider, IPR expert, Disseminator, Digital library expert	M1	M36
26	Missouri Botanical Garden	MOBOT	USA	Technology provider, Digital library expert	M1	M36
27	Helsingin yliopisto	UH-Viikki	FI	Content provider, Domain / Language expert	M1	M36
28	Humboldt-Universität zu Berlin	UBER	DE	Disseminator, Digital library expert	M1	M36

Potential content providers that have no digital content at the moment but potentially in the future are given in brackets.

2 Contribution to programme objectives

BHL-Europe focuses on **Action 5.1. Best Practice Networks for interoperability of digital libraries** with the objective of improving the interoperability of digital libraries currently held by 15 natural history museums and botanic gardens, two institutional archives, and libraries across 11 EU Member States and will be progressively extendable.

We will

- establish standards-based interoperability between digitised documentation, text, metadata and the collections, thus ensuring the interoperability of the systems for
  - enabling the use of the multilingual and cross-cultural search and retrieval of the content
  - facilitating user access through EUROPEANA
- establish highly interoperable databases of the biodiversity-related content held by museums, archives and libraries
- enable the actual content to be accessible and retrievable at item level by users across the European Research Area (ERA) and beyond in developing countries
- take full account of the users and their needs and extend the range of users

We will bring a large amount of new material to EUROPEANA – and this material will be from a major science domain.

The biodiversity literature collections in Europe are spread across a large number of institutions. Inevitably, there is much duplication of content. While each national government will be expected to fund scanning in their own country, it will be critical that we avoid scanning the same material in multiple locations. Duplication would waste European financial resources and deliver a very confusing set of Web sites for the user. Coordinating the scanning process at the European level will maximise the benefit of the funds for scanning, and amortise the cost of developing this collection across the whole of the community. The BHL project will be scanning materials globally and it is critical that overlap and duplication is avoided in BHL-Europe. Technical solutions for duplication control will be established using in particular the experiences of present large scanning initiatives at NHM, UGOE, LANDOE, BnF, and SIL.

Established skills in database creation and the Web site development, currently only available in a few partner institutions (e.g. AIT, ATOS, EDL Foundation, FUB-BGBM, NAT, NHM, RMCA, UBER), will be shared across the project. This will lead to rapid development of the project, and skills development in all partner institutions.

The BHL has already agreed full access to content (including in-copyright material) with over 50 organisations. A project of this scale will be able to negotiate with rights holders to obtain more material for integration into BHL-Europe and EUROPEANA on an open access basis.

It is critical that this material – once scanned – is maintained in a sustainable way and is available in perpetuity. It is unlikely that any one country or institution will be able to manage this. Sustainability will be achieved by a consortium of major European and international institutions committed to work as a group to provide a sustainable infrastructure in the long-term.

BHL-Europe addresses the objectives of the i2010 digital library initiative of the European Commission. It represents a key link between our cultural heritage and our scientific heritage. The digital material available through BHL-Europe directly complements the digital content of EUROPEANA. The project also addresses the objectives of the Action Plan for Biodiversity of the European Commission. In which the Commission considers it vital to substantially strengthen the knowledge-base for conservation and sustainable use of biodiversity, which requires strengthening the European Research Area (ERA) and communication and interoperability of data. We will make research data on biodiversity interoperable and accessible to all interested parties. Interoperability and accessibility of existing environmental data and information is a challenge addressed by the Shared Environmental Information System (SEIS). SEIS is a collaborative initiative of the EC and the European Environment Agency to establish an EU-wide environmental information system. According to the SEIS Task Force, they are currently preparing a legal instrument to underpin the development of the EU eReporting module of SEIS. The current objectives of the legal instrument includes a provision for the set up of a scheme allowing other information systems like BHL-Europe to connect to the SEIS infrastructure. Details of the connections will be discussed during the technical set up of BHL-Europe.

3 European dimension

The project has the premise of making large amounts of scanned biodiversity literature freely available over the Web, and indexed with semantic tools. The outlets for this material will include national portals, the BHL Portal and, most importantly, EUROPEANA. The process of making significant scientific content 'more accessible and usable and exploitable' will transform EUROPEANA from a predominantly arts and humanities portal into a broad European cultural resource incorporating a, currently under-represented, scientific dimension. An improved understanding of multi-language documents and multi-language OCR techniques will also result from work in this project, and will be available to all similar projects.

We will adopt and use established standards wherever possible to ensure full interoperability of biodiversity literature with other systems and services. Established standards are produced by EUROPEANA, the BHL and international standards bodies like TDWG (for biodiversity informatics standards), OCLC/RLG (for bibliographic standards), or DRIVER (for digital library standards). The consideration and integration of these standards is facilitated by many consortium partners being involved in TDWG (e.g. NHM, FUB-BGBM), OCLC/RLG (e.g. UBER, NHM, BnF), and DRIVER (UBER, RBINS). Metadata standards and file formats for scanned literature are already well established – NHM data is already harvested by both BHL and EUROPEANA – and these standards need consolidating and communicating within BHL-Europe.

The addition of biodiversity materials in many European languages will point to the significance of European science over the centuries. The 18th and 19th century tradition of scientific investigation and expeditions, together with our colonial history, means that our literature collections contain some of the most significant and important material in the world. These collections contain vast amounts of material on the biology of the developing world, and making this material freely available on the Web will enable people in the developing world to gain access to this knowledge for the first time. This will help the EU respond to its commitments to the Convention on Biological Diversity (CBD) – a key aspect of the CBD is the exchange of information 'that shall include exchange of research results and repatriation of information' to the developing world.

4 Content

The content providers within the consortium will create a critical mass of high quality digital content representing the biodiversity domain. The content providers have been selected on the basis of their ability to contribute key biodiversity and taxonomic literature (zoology, botany, palaeontology).

The content will not be restricted by proprietary third-party rights or any other constraints, which would limit its use in an open access environment using Creative Commons http://creativecommons.org/ licences. The digital content must either be in the public domain or else the content contributors must have permission from IP owners to give open access under Creative Commons.

The initial focus on public domain material is not a limitation of the project because systematic biology depends more than any other natural science upon historic literature (see section 1.1.1). Another reason to focus on historical literature is that many old and important monographs are themselves inherently very rare, fragile or in need of conservation. This makes "hands on" access very difficult. This project will substantially reduce the need for handling of these rare and valuable materials.

Several tools will be used for the selection of content to be included in BHL-Europe. We will analyse such major indexes as *Index Kewensis,* Sherbourne's *Index Animalium,* and Neave's *Nomenclator Zoologicus*. The BHL is also in discussions to obtain permissions to mine the *Zoological Record* to determine those journals that have been most cited in the literature of species identification and description. This will provide a priority list of journals and monographs. Another tool is the Virtual Taxonomic Library (ViTaL) developed in the EU EDIT Programme. ViTaL is facilitating the discovery and accessibility of taxonomically relevant literature through the provision of four main services, two of them are important for the content selection of BHL-Europe. (1) ViTaL will include a bibliographic reference aggregator, which will harvest references from a range of sources and to provide a centralised bibliographic resource. (2) ViTaL will provide a facility that will enable users of taxonomic literature to nominate suitable materials for digitisation. The components making up ViTaL are currently under development at the NHM. ViTaL is being developed by staff at the Museum in consultation with the EDIT applications development team based in Berlin at the Botanical Gardens (FUB-BGBM). As part of WP2, a database will be created in cooperation with the ViTaL development team to include the results of all analyses. This will ensure an agreed priority list of biodiversity content to be provided by European libraries.

In addition to the content provided by the consortium members during the project's lifetime, we expect new partners to provide further of content. These new partners may be other important libraries in countries not yet engaged in the project or learned societies. Following the establishment of the harvesting procedures and the development of the Memorandum of Understanding, this will be an important task of WP2. Attraction of new partners and the initiation of national scanning projects will be particularly important in mobilising the very significant amount of biodiversity literature in Spanish, Italian, and Portuguese that currently is scarcely available on the Web.

In the following table, the digital content identified as available reflects the situation as it exists in February 2009. As many consortium partners are just beginning the digitisation of their biodiversity literature, the amount of digital content will increase significantly during the project lifetime. Therefore, an estimate of the number of pages available at the end of the project is given in brackets. This indicates the rate of development of European biodiversity scanning initiatives. Detailed information of the individual scanning projects and their roadmaps for the digitisation of items are given in footnotes at the end of the table. Some countries have not yet started digitisation, but are preparing to start during the first or second year of the project and will contribute a significant quantity of digital content. Currently, the Museum für Naturkunde Berlin (MfN) and the Botanical Garden Berlin (FUB-BGBM) are preparing a mass digitisation project to digitise all botanical, zoological, and palaeontological literature published before 1910 available in German language. At the moment, a funding of this project can not be guaranteed although the German Research Foundation (DFG) and the Ministry for Education and Research (BMBF) both have strong commitments to support digitisation initiatives. MfN and FUB-BGBM are in contact with both organisations to define the framework and the extent of a large German scanning project.

Not included in the following table is the contribution of Species 2000 as Sp2000 do not provide actual literature. This partner provides a MySQL/PHP database of more than 1 million species that will be used for the taxonomic intelligence tools of BHL-Europe.

4.1 Underlying content

The following table provides a list of the digital objects which the consortium undertakes to make available:

Quantity and Quality of the Content								
Provider[1]/ Location	**Type[2]**	**Quantity & Definition[3]**	**Format & Quality[4]**	**IPR[5]**	**Current Use[6]**	**Existing Metadata[7]**	**Language**	**Additional comments**
NHM / London, UK	Page images of biodiversity texts used in the identification and description of biological species; metadata	~800,000 pages	TIFF, JPEG, OCR ; colour, 600 dpi	Creative Commons/ Science Commons, or public domain; some in-copyright materials mounted with copyright holders' permissions for open access and re-use (~5%)	Mainly scientists; historians and artists; 200,000 visitors per year (750,000 page views)	Taxonomic metadata for occurrences of taxon names in text pages; bibliographic MARC metadata for monographs, serials, and series	English	
NMP / Prague	Page images of rare books and old prints on biology, particularly botany, entomology and palaeontology; metadata	1,000 pages (19,000 pages)[1]	JPEG, TIFF; colour, 300-600 dpi	Creative Commons/ Science Commons, or public domain (reproduction only with owner's permission)	Mainly scientists; historians, 50 scholarly visits	bibliographic MARC metadata (MASTER – potentially by the newly scanned books)	German, Czech, French, Latin	
UGOE / Göttingen, Germany	Page images of texts and figures of original descriptions	160,000 pages (450,000 pages) – 2000	TIFF, JPEG, PDF; colour and greyscale	Public domain	Mainly zoologists; 250,000 requests	Taxonomic metadata (taxon names in text	32% German, 22% French, 18% Latin, 12%	

[1] Short name of the participant who provides the content

[2] E.g. Text, image, movie, sound, music, etc.

[3] E.g. 1,000 film clips, 2 million pages, 20,000 books etc.

[4] E.g. Format - JPEG, MPEG, QuickTime, HTML, PDF etc., Quality – Resolution, sampling rate, colour/greyscale, etc.

[5] Access rights to use the content in the proposed project e.g. public domain or license

[6] Describe current users of the content, including the number (e.g. registered users)

[7] Describe fields, languages and structure of the metadata

	of zoological species and genera, metadata	books. Early zoological literature (1770 – 1830)[2]			per year for bibliographic data and digitised literature; 6,000,000 requests for taxonomic data; 75% Europeans, 10% North Americans, 7% South Americans, 4 % Japanese	pages, type localities); bibliographic metadata (authors, titles, pages, publication dates)	English, 6% Swedish, 5% Danish, 2% others (Dutch, Italian, Icelandic, Spanish, Russian)	
LANDOE / Linz, Austria	Page images, text, metadata	400,000 pages of zoological literature (550,000 pages)[3]	PDF, OCR; colour, greyscale	75% of the content is accessible free through the OOELM portal; other search engines may link to the OOELM repository to allow users downloading from OOELM; 25% of the content are subject to charges	Mainly scientists	Format not standardised: Series, number within series, title of book, author(s) of book, title of article, pages of article, author(s) of article, keywords, article PDF file	German	
HNHM / Budapest, Hungary	Page images, metadata	~20,000 pages (~50,000 pages)	TIFF, PDF, OCR; bw – 600 dpi, greyscale and colour – 300 dpi	Free access for scientific and education purposes	Mainly scientists	Bibliographic metadata	English, German, Italian, French, Latin	
UCPH / Copenhagen, Denmark	Page images, metadata	~5,000 pages (~100,000 pages)[4]	TIFF, JPEG ; 800 x 534 (pictures), 800 x 225 (text)	Public domain	Mainly scientists	Bibliographic and taxonomic metadata	Danish, English, German, French	
NAT / Leiden, The Netherlands	Images of species, text describing species, metadata	100,000 pages (200,000 pages)	JPEG2000, PDF, OCR-PDF; up to 600 dpi; colour	Most content owned by NAT; no restrictions for private and educational usage; restrictions for commercial use	Popular science and education: amateur scientists and scientists: 250,000 visitors per year	extended Dublin core; taxonomic metadata; bibliographic metadata; ISBD standard (IFLA)	English, ~10% Dutch	Additional content: Over 40.000 Web pages in XML (biological texts, species descriptions, taxonomic information)

NBGB / Meise, Belgium	Page images, text metadata	1,500 pages (~50,000 pages)[5]	TIFF, JPEG, OCR ; colour, 600 dpi	Creative Commons/ Science Commons, or public domain	Internal use, stakeholders of the wider public	Bibliographic metadata	French, Dutch, English	
RMCA / Tervuren, Belgium	Page images, text, metadata	~100,000 pages in full ; metafro-catalogue have approx: 18,794 books, 3,347 titles of journals, 11,974 other documents and 33,668 papers	TIFF, OCR, PDF, Doc, PNG, JPG ; SQL database; use Plone/zope as interface	Creative Commons; property of the institution but as public institution considered as public domain; 67,508 hits between December 2007 and December 2008 on http://www.metafro.be/libraries	External and internal use by scientists and other stakeholders of the wider public	MARC21	French, English, Dutch, German, Danish, African local languages In the catalogues the references are in the language of the publication in general	We also have the archives of large sampling expeditions in Africa
RBINS / Brussels, Belgium	Page images, text, metadata	~100,000 pages (167,987 pages)[6]	TIFF, OCR, PDF		Scientists, internal use	Bibliographic and technical metadata	French, English, Dutch	
BnF / Paris, France	Page images of botanical and zoological texts mainly in periodicals between 1801 and 1920 used in the identification and description of biological species	>500,000 pages (~1,000,000 pages)	TIFF, JPEG ; 300 dpi	Public domain	200,000 visitors per month; researchers and general public	XML / Dublin Core	French	
MNHN / Paris, France	Page images, metadata	100,000 pages, (~200 000 pages)[7]	TIFF, JPEG ; colour, greyscale, 300 dpi	Public domain	2,500 users since March 2008 (portal opening)	Bibliographic metadata DC, harvestable via OAI-PMH; already interoperable with EUROPEANA through BnF	French	
CSIC / Madrid, Spain	Text, images	2,500 pages (50,000 pages)[8]	TIFF; PDF min 300 dpi with OCR, greyscale and colour when necessary	Public access but restriction to commercial use	Mainly scientists but also amateur scientists	Bibliographic metadata (MARC)	Spanish (80%); English, French (20%)	

RBGE / Edinburgh, UK	Page images, images of published texts, page images of archival items, illustrations, metadata	15,000 pages (~100,000 pages)	TIFF, JPEG PDF, 300-600 dpi. Colour and greyscale.	Freely available but RBGE retaining copyright and restrictions apply for commercial use. Some in-copyright materials mounted with copyright holders' permissions for open access and re-use (c. 60%)	Mainly scientists historians and artists: 500 per year	Taxonomic metadata for occurrences of taxon names in text pages; bibliographic MARC metadata for monographs, serials, and series.	English	
SIL / Washington, USA	Page images of biodiversity texts used in the identification and description of biological species; metadata	~11,600,000 pages (22,600,000 pages)[9]	TIFF, JPEG, OCR ; colour, 600 dpi	Creative Commons/ Science Commons, or public domain; some in-copyright materials mounted with copyright holders' permissions for open access and re-use (~5%)	Mainly scientists; 200,000 visitors per year (750,000 page views)	Taxonomic metadata for occurrences of taxon names in text pages; bibliographic MARC metadata for monographs, serials, and series.	Mainly English; ~9% German, Spanish	
UH-Viikki / Helsinki, Finland	Page images, text, metadata	~40,000 pages (60,000 pages)	TIFF, PDF, OCR; colour, 400 dpi	Public domain or public access but restriction to commercial use or Creative Commons	Scientists and general public	Dublin core	Finnish (60%), Swedish (16%), Latin (12%), German (10%), French (2%),	
TOTAL		**13,945,000 pages (26,396,987 pages)**						

[1] Scanning equipment present in NMP library; relation with a commercial company through Manuscriptorium project; 5,000 (2009), 7,000 (2010), 7,000 (2011) pages guaranteed
[2] Project EZOOLO 2 , 2-year project of German Research Foundation, ~600,000 EUR for digitisation, at least 450,000 pages, actual number of pages depends on workflow and coordination with BHL
[3] Current budget approved for 2009 ensuring at least 150,000 pages in 2009; negotiations in progress to continue digitisation in 2010 und 2011
[4] Four months per year digitisation work for the next three years (33,000 pages per year)
[5] Director of NBGB support scanning operations with institutional money continuously for several years, no detailed roadmap
[6] 67,987 pages of six RBINS-journals to be digitised in 2009, project DI/00/03 in cooperation with Belgian State Archives, plans for 2010 and 2011 not confirmed yet
[7] BnF grant for digitisation approved, more support requested from French Department of Education, details and roadmap available in April 2009

[8] 21,000 pages in 2009 (journal EOS, CSIC funds), 15,000 pages in 2010 (journal Graellsia, funds from Dpt. of Biodiversity at MNCN), ~14,000 pages in 2011 (journal Estudios Geologicos, various Spanish zoological publications, MNCN funds)
[9] Digitisation progress per year in pages: 2009 – 4,166,667; 2010 – 3,756,538; 2011 – 3,076,923; 2012 – 3,076,923; MacArthur Foundation is funding at least until 2011

4.2 IPR issues

The consortium has the necessary licensing and clearing arrangements in place for the Intellectual Property Rights (IPR) arising from the proposed project and this will ensure the far wider use and dissemination of the project output across all 27 EU Member states.

The NHM has extensive experience of managing IP issues in a range of EU and other projects – for example SYNTHESYS, EDIT, BHL, etc. – and has a dedicated IP officer, who will work on this project, and will also provide IP support to WP2 of EUROPEANA. We have pro forma documents and agreements available already, and would be able to start making further agreements with rights holders as soon as the project starts. The NHM IP Officer will work with BHL-Europe, EUROPEANA and the BHL to ensure that all IPR issues are managed in a consistent way, with consistent documentation, and identical statements about the Rights. All these open access projects will use one of the common open access licensing approaches – probably the Creative Commons Share Alike (CC by-sa) licence http://creativecommons.org/about/license/.

All digitised material will have associated metadata showing the IPR status of the object and where it was digitised. BHL-Europe will digitise material that comes under two main groupings/categories:

Public domain – where the IPR on the material has expired. Conditions vary from country to country within the EU and we will ensure that material is definitely out of copyright before digitising it. We will ensure that any public domain materials will remain public domain and available on an open access basis. Public domain material can be reused or exploited by anyone who wishes to use it including educational, non-commercial, and commercial users.

Rights held by other organisations – where the IPR for material is still owned by an organisation or individual. The English language BHL project has already been successful in persuading 49 not-for-profit organisations, learned societies, and institutional publishers to allow 50+ different journals containing many thousands of pages to be made available through the BHL. This material will be available on an open access basis. Many more titles are currently under negotiation. Rights agreements reached by BHL-Europe will be for global open access – thus including BHL and EUROPEANA – and will be managed through Creative Commons (CC) licences. The Rights Holder will retain some rights in the material – as managed by the CC license agreed – but this will only set conditions on commercial reuse in a few cases e.g. CC by-nc-sa.

Sustainability beyond the life-time of the project:

In the nature of open access cultural repositories and portals (such as EUROPEANA and BHL), it is difficult to develop a sustainable business model which is dependent on income from the content and services created. It is the very nature of this content model that opportunities for exploitation will lie with the users, not the creators of the service. We will look closely at the options for a sustainable business model. Possible solutions might include:

- establish an EEIG – European Economic Interest Grouping. The purpose of the grouping is to facilitate or develop the economic activities of its members by a pooling of resources, activities, or skills. This will produce better results than the members acting alone
- obtain commitments from natural history institutions to pay a ‘fee’ or subscription to sustain the service for their scientists and others
- seek committed funding from national governments or the EU (facilities such as EMBL, ESA, etc.)
- establish an endowment and use the income to maintain access

There is a strong dependency with WP3 to ensure that these activities are aligned with the long-term storage and service concept for BHL-Europe. Following Month 24, work in WP2 on service costs and WP3 on technical costs will lead to a cost model and enable WP1 to begin to assess the options for sustainable funding.

Assuming none of the above possible solutions will work and the search for other options fail, the backup option for sustainability is institutional funding. The two leading partners of the project (MfN, NHM) would be responsible for the financial support of the BHL-Europe after the end of the Community funding. NHM has a strong commitment to ensure the technical sustainability as NHM has the technological lead during the project (WP3) including the establishment of an efficient hardware system. The Museum für Naturkunde Berlin has the option to negotiate for governmental funding due to its integration in the well established German biodiversity network from 2009 onwards. Thus, MfN would maintain the work of WP2 in the future by ensuring the delivery of new content and monitoring the work of all other connected scanning projects and digital repositories.

4.3 Multilingual and/or multicultural aspects

The biodiversity literature is available in many languages – predominately European in origin. This is particularly true for the old literature, which is the core of the current project. For instance, before 1829 the most common languages in biodiversity literature are Latin (28%), German (28%), French (14%), Swedish (9%), English (9%), Danish (6%), Dutch (3%), Italian (2%), and Spanish (1%) (n=1787, taxonomic publications before 1829 considered for EZOOLO/AnimalBase project at UGOE). Besides being available in these original languages, this corpus of literature must now be made retrievable in many more European languages. Local users of the literature will, wherever possible, use the EUROPEANA or BHL Portal in their own language in order to gain full access to the literature (which will remain in its original language). Differences in language, geography, population, and social and economic conditions are significant factors affecting the ability of users to exploit the BHL resource. European skills and experience in managing multi-language and multilingual resources gives BHL-Europe the ability to make this material available as widely as possible. The following key multilingual components are foreseen to make the literature retrievable in many European languages: Multilingual Web sites, Multi-language OCR, Multilingual indexes (Taxonomic Intelligence).

Multilingual Web sites

The most immediate impact will come from translating the Portal interface into other languages. Portal languages anticipated by the end of the project are Czech, Danish, Dutch, English, French, German, Hungarian, Italian, Polish, Portuguese, Spanish, and Swedish. The same languages are already considered for the EUROPEANA Portal. However, the ability to exploit documents in multiple languages will need the design and development of excellent portal tools and improved optical character recognition (OCR) systems (see below for details on OCR). OCR processing of scanned images will identify key words, names, relevant terms, etc. and these will be stored as metadata. Therefore, the search and other Portal utilities will be multi-language, but results will be returned in the original language of the document. It is not the intention to translate original texts into multiple languages at this stage, but this may be technically possible later.

A deep level of language integration is also necessary within the indexing system, such that a user will have the facility to search for a biological species, say *fox*, in either Latin = *Vulpes vulpes* or their local language i.e. Dutch = *vos* and return a page originally written in Portuguese = *raposa* (see below for details on multilingual indexes).

Multi-language optical character recognition (OCR)

Currently the parsers for OCR work in a single language. It is possible to load two languages into a parser – for example, English and Latin – but this becomes unmanageable with the large number of languages used within the EU. We will have to ensure that the metadata for each document contains appropriate language markers and that the appropriate, separate language parsers are used to OCR each document. This approach is not in widely used at present, and we will work with partners in related networks and projects to investigate how to optimise this approach to OCR. We will have the opportunity to test and use a variety of appliances and services developed by the EU-funded IMPACT project (Improving Access to Text), as part of their outreach activities from 2010 onwards. Effective use of OCR will enable 'deep' access to documents through the actual text of the original. Successfully implemented, this technology will have high value to other EUROPEANA projects that encompass digitisation and OCR of large quantities of material.

Multilingual indexes

The digitisation of a major corpus of biodiversity literature will advance world biodiversity initiatives significantly, but only to the extent that users can find relevant content. In biodiversity, the key elements of the searchable metadata are the names of organisms, biological groups, and named locations. Names of organisms annotate content about species. Unfortunately, the use of names for information retrieval is impeded because names are neither stable nor consistent. One organism may have more than one name. Indeed, about 1% of names change each year, such that the many-names-for-one-organism (synonyms) problem accumulate with time and will be particularly severe with heritage literature. This prevents simple automated indexing services from bringing together complementary data. Moreover, ecological and taxonomic class names represent scientific concepts, thus parallel partly-overlapping hierarchies may exist between different semantic and ontological sets. Visitors to traditional biodiversity scanning projects who know organisms by their colloquial (common) names may be unable to find content unless they know the names used in the source documents. These issues will reduce the utility of the millions of pages of primary

biodiversity information generated by the BHL without the addition of tools. The uBio team www.ubio.org/index.php?pagename=general from the Marine Biological Laboratory/Woods Hole Oceanographic Institution – a partner in the BHL Project – has assembled an array of taxonomic services called '**Taxonomic Intelligence**' (TI) designed to overcome these problems. These open access tools are a form of thesaurus that provides a common resource for both indexing of content and for the Portal's user interface (e.g. a convenient taxonomic browser instead of free text fields). The thesaurus will be powerful enough to deal with various semantic relations such as synonyms and hierarchies. Currently, TI has a preponderance of scientific Latin binomials and some vernacular names, mainly English. It is critical that a true multilingual version should now be developed. BHL-Europe, through its many language partners, will be able to add many more local non-English names to the TI database. AIT and ATOS, for example, will support these language partners with their proven expertise in the implementation of multilingual thesauri. Eventually, we will enable the corpus of biodiversity material to be searched in any European language using local names for species and locations.

5 Impact

5.1 Analysis of demand

A conference in London in 2005 identified the lack of access to the published literature of biodiversity as one of the principal obstacles to efficient and productive research, outreach, and education. As most of the biodiversity literature is held in a few specialist libraries, and is only available to a few scientists, this literature is effectively unavailable for wider use by a broad range of potential users (research, education, taxonomic study, biodiversity conservation, protected area management, disease control, and maintenance of diverse ecosystems services).

Currently the study of these distributed collections is difficult, time-consuming, and expensive. Requests for help and support in obtaining access to literature are frequently received by partner libraries, which do not have the facilities to meet them. Researchers and students from developing countries are particularly disadvantaged, yet in many ways their need is greater since both biodiversity, and the threats to it are much higher in developing countries than anywhere else.

Recent analysis of demand (Deliverable 5.18 of EU-funded EDIT project) indicates that biodiversity and biological scientists need a multilingual interface to the literature, with sophisticated search and filtering functionality providing an online repository of references together with the original text content of articles. Users clearly want to have access to the literature itself. This is also indicated by numerous BHL user comments. As species names are an integral part of the biodiversity information in the literature, search, and filter functions of the interface should include name-finding tools. At the moment, other European projects and networks established in the biodiversity community focus on species names (GBIF, Species 2000), data standards for biodiversity information (GBIF, TDWG) or catalogues of content (EDIT – ViTaL).

In addition to these large-scale projects, smaller digitisation projects exist in a number of EU states (see content analysis above). Users of this digitised material are appreciative of the service, as demonstrated by the tenfold increase of visitors to related Web sites (e.g. Naturalis, AnimalBase). The BHL Portal at www.biodiversitylibrary.org has over 13,000 unique visitors per month. BnF reports of 200,000 visitors per month for Gallica www.gallica.bnf.fr. However, to date there is no coordinated effort in Europe which combines the above approaches while providing full-text access to taxonomic literature via a multilingual Web interface.

At the moment, a quantitative analysis of demand for non-scientists is not available. However, user feedback and statistics for the BHL Portal indicate an increased use of this service by non-scientists. The percentage of users referred to the portal by Google and Wikipedia increased significantly during 2008 (from 24% to 58%), whereas the percentage of direct traffic remained fairly constant. The access of the portal via Wikipedia particularly suggests the involvement of a wider audience of non-science users.

5.2 Target users and their needs

Two main user groups have been identified as beneficiaries of the project.

The first group of users (content users) – European citizens – will be interested in the content itself. They will include natural scientists interested in taxonomic information and the distribution of species through space and time. Social scientists and historians interested in the history of science, and background information about famous and significant scientists of the past. Artists may adapt the artistic representations

of plants and animals. For hobby scientists, hobby gardeners, and regional conservation organisations the literature is an inexpensive and easy available resource of information about animals, plants, and fossils occurring in their area. Policy makers on various levels (from local to governmental) need the literature as base and background information for their decisions (through SEIS, for example). Students and learners on various levels (from school to university) need the content as a primary source for their studies. Teachers will now be able to complement the content of textbooks by downloading historical and original texts of Charles Darwin, for example. These texts may be used as a teaching resource, since many of those historical texts contain important biological concepts and theories still valid today. These classic and scientifically important contributions help to put the results of modern research projects into context. Eventually, every European citizen who is interested in biodiversity, and has access to the Web is a potential user. These target users are manifested by the visitors to the large natural history museums that are now able to get background information on topics and objects present in museum exhibitions. The need for such background information is illustrated by the Darwin Year 2009. Many museums will have exhibitions highlighting various aspects of the life of Darwin, the cultural and sociological frameworks for his research, and the scientific arena of the 19th century including numerous historical documents and information that may be retrieved by every visitor of these exhibitions through BHL-Europe and EUROPEANA.

The museums that are consortium partners will identify user groups amongst their visitors and engage this large group of target users with the project. The selection procedure for this user testing group will be defined as part of the user evaluation activities (WP5).

The second group (technology users) – in particular libraries, digitisation centres, and digital library networks – are interested in the technological outputs from the project, the best practice approach, and the quantity and quality of content. Thus, BnF as a large and esteemed library is an end-user of the consortium's technical output, as well as a content partner. New partners, to be involved in a later stage of the project, are also end-users of the technological solutions and best practice guidelines. They will be able to adopt our established standards and best practice; ensuring efficient scanning, and enabling their connection with EUROPEANA and BHL. Digital library networks like OA-Netzwerk and DELOS may adopt our approach and distribute to partners in other domains of digital libraries.

In addition to target users in Europe, the content of BHL-Europe is also available for users in the developing world. We expect access to this material to provide substantial benefit to scientists, teachers, policymakers and other groups in developing countries. This material has never before been available to developing countries, and will have a huge impact on capacity building and development. The open access to taxonomic primary literature via the Web will reduce current knowledge gaps and will help to support training programmes for taxonomists. This will help to overcome the "taxonomic impediment" through the GTI (Global Taxonomy Initiative) thus fostering the implementation of the CBD www.cbd.int/.

WP5 will focus on communicating the existence of this new biodiversity content to a range of potential users. EUROPEANA and the natural science networking projects (EDIT and SYNTHESYS www.synthesys.info/) will give us access to a wide number of potential users. However, it will be a challenge to reach the general public and education communities and we will be developing a detailed exploitation plan to reach all these user communities.

One of the tasks of the BHL-Europe Communications Working Group (see section 9.1.5) will be to establish a communications strategy, so as to assure that the project will reach all its target users. In addition to contributing to the communications plan, each project partner will be expected to exploit the content and results locally, and help identifying related networks or organisations that might be interested in using BHL-Europe content or services.

Target user description	Needs	Involvement & Role	Country coverage
1.1) European citizens	Direct online access to comprehensive information not currently publicly accessible to help raise the awareness and appreciation of biodiversity heritage	End users included in the user testing group	Consortium member states
1.2) Scientists (e.g. Biology)	Taxonomic descriptions of species; biodiversity data of specific regions in the last centuries; full-text searching; taxonomic intelligence	Involved as partners of the consortium	Consortium member states, ERA, global

1.3) Scientists (e.g. History, Cultural heritage)	Historical information on science and scientists	End users accessing biodiversity literature through EUROPEANA	Consortium member states, ERA, global
1.4) Citizen scientists / Hobby scientists	Search, read, download, and print articles about biodiversity in their area	End users included in the user testing group	Consortium member states, global
1.5) Students of different levels (primary to academic)	Reliable and meaningful information and relevant images on biodiversity; minimal time to aggregate information from different sources; research resource	Academic students working in the partner museums will be included in the user testing group. Non-academic students will be targeted through dissemination activities.	Consortium member states
1.6) School teachers	Resource for teaching materials as complement to textbooks	Targeted through dissemination activities	Consortium member states
1.7) Environmental and Conservation agencies / Government officials / Policy makers	Information on impact of climate change, environmental deterioration and human interventions	Directly involved after the establishment of the connection between BHL-Europe and SEIS	Consortium member states, ERA
1.8) Artists	High quality images of animals and plants	End users included in the user testing group	Consortium member states, global
2.1) Libraries	Information on the distribution of heritage material (metadata), new platform for presentation of content	Involved as partners of the consortium	Consortium member states, global
2.2) Digitisation centres	Best practice guidelines for the digitisation of heritage literature	Current and new content providers of the consortium	Consortium member states, global
2.3) Digital library / Open Access networks	Best practice guidelines for the establishment of digital library networks, information about digital repositories (distribution, availability)	Already involved through the networking activities of some of the consortium partners. More networks will be targeted through dissemination activities.	Consortium member states, global

5.3 Critical Mass

BHL-Europe will include a variety of content providers representing different institutions, countries, and languages. They are ready to provide digital content (see Table in section 4) subject to a wide range of workflows and processing techniques. This helps to draw valid conclusions from the implementations planned during the proposed project. BHL-Europe is poised to find best practice guidelines for data standards, semantic enrichment, multi-language issues, and integration of digital content in BHL-Europe. Once the system is working and ingestion procedures are established, further increase of digital content will be significant.

5.4 Added Value

BHL-Europe's added value lies in its integrative role. There are currently a large number of small projects digitising biodiversity material in numerous institutions across the EU. These projects are not using common standards or interfaces and are currently not interoperable. This is extremely confusing for the user and is a very inefficient use of resources, since it is certain that the same text is being scanned in a number of different centres.

BHL-Europe will provide integration and interoperability by:

- establishing, and communicating common standards for the digitisation of biodiversity materials in Europe
- making that material available through at least two portals – EUROPEANA and the BHL – and thereby simplifying the situation for end-users
- developing value added tools – taxonomic intelligence, multilingual interfaces, improved OCR, etc. – and making these tools available to the community

- supporting European institutions in their national bids for funding for digitisation of biodiversity materials
- linking with the global BHL project to ensure that these biodiversity materials are available globally, and availability is sustainable in the long-term

6 Networking

6.1 Networking Capacity

At present, the BHL-Europe consortium brings together 28 institutions from 13 EU Member States and the USA. The most important European institutions for the scientific community and the public interested in biodiversity (i.e. large national history museums) are included from the beginning in the consortium. This significantly helps to raise awareness and promotes the uptake of the project results from the majority of the 27 EU Member States.

Major players in other domains and specific digital library networks, initiatives or projects are already included in the consortium. These networks or projects include EUROPEANA (EDLNet – European Digital Library Network), CETAF (Consortium of European Taxonomic Facilities), GBIF (Global Biodiversity Information Facility), TDWG (Biodiversity Information Standards), ENBI (European Network for Biodiversity Information), EDIT (European Distributed Institute of Taxonomy), SYNTHESYS (Synthesis of Systematic Resources), Catalogue of Life (Species 2000), STERNA (Semantic Web-based Thematic European Reference Network Application), ENRICH (European Networking Resources and Information Concerning Cultural Heritage), DINI (Deutsche Initiative für Netzwerkinformation), DRIVER (Digital Repository Infrastructure Vision for European Research), BHL (Biodiversity Heritage Library), and EOL (Encyclopedia of Life). In addition to this existing integration of the proposed project, we are already in contact with other important projects like Key2Nature and IMPACT (Improving Access to Text). The further development of our networking capacity is driven by the extensive network of contacts brought by the project partners. Some partners have accumulated large contact lists during their involvement in national and international projects, and integration with existing networks and activation of existing contacts will guarantee BHL-Europe an effective dissemination of project results.

BHL-Europe builds on biodiversity literature and should be a comprehensive resource for biodiversity information. Thus, the increase of content and the attraction of further content providers is an essential component. There is an important task in WP2 dealing with that issue (see section 8). Based on the analysis of content, gaps in the record of biodiversity literature corpus will be identified. Using the network and contacts mentioned above, institutions and organisations which hold the missing corpus of literature will be identified. WP2 will assist these potential partners in the sourcing of funds and implementation of their scanning operations to enable their contribution of content to our digital repository. At the moment, we are in contact with several institutions that are interested in contributing at a later stage in the project. These institutions include the Stockholm University, the Swedish Museum of Natural History, the National Herbarium of the Netherlands, the Conservatoire et Jardin botaniques de la Ville de Genève, Amsterdam University, the National Library of Latvia, and the National Natural History Museum and Botanical Garden of Portugal. Additional travel expenses are foreseen in the current budget for the 2nd and 3rd year of the project to allow future content providers attending BHL-Europe meetings. This travel and subsistance budget is managed by the Project Coordinator.

6.2 Clustering Activities

The BHL-Europe project has a strong interest in a number of the broader agenda items being addressed by the Commission and can contribute to clustering activities through:

- supporting the work of European scientists by making resources and expertise more readily available through the Web. This could be achieved by providing support for training of taxonomists in the EDIT and SYNTHESYS projects.
- establishing standards for Web access to biodiversity and related cultural materials. These will be disseminated through EUROPEANA and other digital library programmes at a European and national level.
- providing expertise in developing models for sustainability of important datasets; hosting critical scientific datasets at the European level. This will involve working with large-scale projects which

will need to store substantial quantities of data for the long-term e.g. LifeWatch, ESA, D4Science, etc.

- providing experts to assist with capacity building and information sharing with the developing world. We will link with key institutions in developing countries to optimise and sustain this process, and also with individual government-supported capacity building activities. Many consortium partners are also actively involved in the implementation of the GTI, facilitating the link between BHL-Europe and various capacity building activities in developing countries.
- exploiting European skills in languages to improve the communication of Web sites with non-English speakers. We will engage with developing trans-national clusters of language groups, where our experience is relevant.

7 Performance monitoring

7.1 Success indicators

The success indicators 1 and 6 are quantified using the experiences and Web statistics of consortium partners (SIL, MOBOT, BnF, UGOE, and NAT). Indicator 2 and 7 are based on data available from EDL Foundation. Indicator 3 is estimated based on the nature of the repositories of the partners and the languages present. Indicator 4 is based on our contact with potential content providers that are not ready yet to join the consortium. Indicator 5 is based on the language providers present in the consortium and the common languages of historic biodiversity literature. Between 1526 and 1829 a significant amount of literature (18%) is published in languages not important in science currently (Dutch, Swedish, and Danish).

Indicator No.	Objective/expected result	Indicator name	Expected Progress		
			Year 1	Year 2	Year 3
1	Robust biodiversity community portal	Number of accessible pages of biodiversity literature	17,000,000	21,000,000	25,000,000
2	Biodiversity literature for display through EUROPEANA	Percentage of literature available through EUROPEANA	20%	50%	100%
3	Improve the interoperability of digital libraries	Number of interconnected repositories	7	20	30
4	Facilitate and enable the initiation of scanning initiatives	Number of content providers	20	25	30
5	Provide a multilingual access point	Number of portal languages	1[1]	7[2]	12[3]
6	Ensure that the project outputs are known and used by the target users	Page views through BHL Portal	1,000,000	2,000,000	5,000,000
7	Ensure that the project outputs are known and used by the target users	Page views through EUROPEANA Portal	250,000	1,000,000	3,000,000
8	Ensure that the project outputs are known and used by the target users	Case studies of successful usage of the material by non-scientists	5	10	15
9	Negotiate with Rights Holders	Agreements with Rights Holders / Publishers	2	4	6

[1] English; [2] + French, German, Italian, Portuguese, Spanish; [3] + Danish, Dutch, Czech, Hungarian, Polish, Swedish

7.2 Performance measurement and evaluation

The most difficult part of performance measurement is the target user evaluation and the use of the project results (indicators 6-8). BHL-Europe is targeting a large number of different users ranging from libraries over various types of scientists to the general public. There is no universal evaluation method to cover this range of target users in detail. However, two instruments will be established for a general survey of project results and their use:

(1) Web analytics will be used to quantify the use of the portal (visits, unique visitors, page views, referring sites, country coverage).

(2) We will encourage the users to drop feedback messages either using our online discussion forum or using the online contact form. These two instruments will be used continuously during the project.

In addition to this general evaluation procedure, specific evaluation will be carried out twice during the project, the first time at the end of Month 12 to enable the analysis of demand and service elements of the project. This will be fed into WP3 to ensure that we focus on those key components that support user needs. The second evaluation in Month 24 will test and validate the impact of the project. It will identify key features which are highly valued by users and will feed into the final revised set of best practice guidelines and components, implemented by WP3 and published by WP2. We will develop (online) questionnaires for this user evaluation procedure to identify user requirements, preferences, experiences, benefits, and unmet needs. We will identify the characteristics and needs of the different target user groups during this process.

Libraries and digital library networks are targeted individually (ideally using existing contacts of consortium partners) to fill the questionnaire and to evaluate and validate the project approach in interviews. A large number of professional scientists will be encouraged to fill the online questionnaire. The two evaluation periods will be announced to the scientific community through the staff members of the consortium partners and the existing networks e.g. EDIT to reach a large number of people and get a sound evaluation result. In addition, we will identify test users and request quantitative and qualitative feedback from them. Test users among scientists may be easily recruited for example from a group called "Junge Systematiker" that is established in the "Gesellschaft für biologische Systematik" in Germany. This group of young scientists are already users of the BHL Portal and are easily accessible through staff members at MfN.

The most complicate target user group to evaluate is the group of non-scientific users (citizen scientists, artists, students, wider audience). Therefore, a PR campaign, a number of public events, demonstrations in schools and natural history museums will mark the beginning of the two evaluation periods. This will help to encourage people to investigate and test the Portal. In addition, we will randomly select a number of visitors of the museums involved in the project as user testing groups for the evaluation and validation of the project approach. These people will perform defined tasks using the BHL Portal, and evaluate the experience and the outputs. User interaction logging will be used, supplemented by the completion of our questionnaire, in order to better understand the usage patterns.

8 Project work plan

8.1 Description of work and roles

The project life cycle encompasses four phases, which are described below in more detail.

Phase 1: Horizon scanning and analysis of current technical environment (Months 1-3)

Initial work will consist of evaluation of the technological solutions available, and assessment of the requirements of each content provider. We need to review the state-of-the-art technologies used by EUROPEANA and BHL for processing digital content, and we will include some of our experienced technology partners (e.g. NHM, AIT, ATOS, NAT, RMCA, UBER) in that process. Simultaneously, each content provider will provide their specific requirements: what do they expect from BHL-Europe; how the digital content should be handled (technically, scientifically, and legally); what data standards and specifications they use. This information will fill out the data provided already in 4.1. This technology and content-related information will be analysed in order to get a comprehensive picture of the variety of implementation approaches, their advantages, and their disadvantages. A Technology Management Board (TMB) will be established with responsibility for recommending technical standards, processes, technology solutions, and implementation plans.

In Phase 1, we also need to start developing the prerequisites for the management of the content, i.e. the content analysis tools and bibliographic databases. These databases will show the current position of each of

the national scanning initiatives and, by merging the metadata from each partner, create a virtual taxonomic library database.

While WP2, WP3, and WP4 are analysing the state-of-the-art technologies and content holder requirements, WP5 will be working on the communication plan. As a result of the first phase, the project's Web site will be published including a multimedia presentation and newsletter. Furthermore, a Communications Working Group (CWG) will be established, responsible for revising dissemination strategies and deciding on activities related to communication of project's outcomes.

Phase 1 will end with a meeting of all content providers, the TMB and the PMG to agree upon the constitution of the two special working groups (TMB, CWG) and to summarise the content holder requirements to prepare for the consensus building in phase 2 of the project (M1.3).

Phase 2: Consensus building, standards, and processes agreement (Months 4-6)

In the second phase, the recommendations identified in the previous analysis, will be discussed in the consortium. During discussions with each partner, we will establish: a consensus of best practice guidelines; how to process biodiversity literature metadata; and how to ingest the metadata and files into the Portals. Ultimately, we will have identified the best practice workflow and data model, interoperability standards, and we will agree the Memorandum of Understanding (MoU), technical hardware and software standards, and IPR working documents. Consensus building is also important for the communication activities. Therefore, a plan will be developed during this phase and consortium partners will agree the communication plan at the end of Phase 2. Phase 2 will end with a consensus on content and technology to start content enrichment (M2.1, M3.1). At this point we have our first set of best practice guidelines for internal use and test procedures.

Phase 3: Initial content aggregation and test of implementation approach (Months 7-24)

With our best practice guidelines in place, we can start harvesting content from the content providers. We will build a prototype system, based on the data from the consortium partners who have large amounts of German language content available now (e.g. UGOE, LANDOE, HNHM, UCPH, BnF, and SIL). This will test that the implementation approach works for metadata and digital content which has been subjected to a wide range of workflows and processing techniques. This will be the first test of the model in a real-life context (M3.2). The German language prototypes key technical components (including hardware and software) will be delivered at month 18. There will be a status review and progress report delivered at month 12. The review at month 12 will allow for the assessment of current designs and progress against the plan so that issues may be addressed before finalisation.

It is important to eliminate duplication during the scanning process. Therefore, several tools and databases including technical solutions for duplication control will be developed to analyse the content and support the management of the scanning initiatives of each partner. Recent analyses have shown that existing tools are insufficient for the scale required by BHL-Europe. Thus, the adaptation and enhancement of these tools and databases will take about nine months before a working prototype is delivered to the project. Eventually, a bibliographic database will contain information on monographs and serials that have been scanned in the past and are available in the format defined in the MoU, which are to be included in EUROPEANA and BHL-Europe. In addition, information will be provided about biodiversity literature in the process of being digitised and identifying who is the partner responsible for scanning that material. Eventually, the database will contain information on all relevant literature that needs to be scanned, and will identify the partner who will be responsible for providing the material in the future. If there is no consortium partner with some of the critical content, appropriate content holders will be identified and encouraged to join the consortium to provide this content. This system ensures that every content provider and even potential content providers can check before they start digitisation to see if the material is already in the queue. The local digitisation processes can be planned accordingly and duplication is reduced to a minimum, ensuring the effective use of the local resources available in each partner institution.

The partner network will need to be extended to fill gaps in the biodiversity literature corpus. In addition, learned societies and commercial publishers that are interested in providing their content or parts of their content through EUROPEANA and BHL-Europe will be identified. This process will start after we have a first overview of content already present in each partner library and the content required but not present in any of the consortium libraries (gap analysis). The content analysis and content management processes will continue through Phase 4 of the project.

A first user evaluation will be carried out before the release of the German prototype. The results of the review of the evaluation report (M5.2) will be used for the implementation of the prototype.

Phase 4: Evaluation, validation, exploitation, and demonstration (Months 25-36)

Although there will be some continuation of the work in Phase 3 (notably continuing scanning and data ingest of new scanned texts, Phase 4 will mainly focuses on evaluation, validation, exploitation, and demonstration of BHL-Europe. This work will be based on preliminary work done in Phase 1 of the project with the establishment of the communications strategy, and the development of online evaluation questionnaires. After the release of the key components, the online questionnaires will be completed by a number of users from all target user groups. The evaluation of the questionnaires will help to validate the best practice agreed, and show where to improve the outputs (from a user perspective) of the partners (M5.3). The results of the evaluation process will be fed into the subsequent development of the EUROPEANA and BHL Portals. Having reviewed the practical implementation, we will publish our tested and validated best practice approach and technical solutions for use in other projects. Large-scale demonstration activities at important conferences and public events, as well as workshops for particular target users, will increase the community and public awareness of BHL-Europe. Based on the sustainability strategy, technical solutions will be developed to ensure long-term sustainability and accessibility of the metadata and content beyond the end of the project.

8.2 Technologies and Standards

We have encapsulated the main themes for consideration for the technical interpretability and aggregation below. This is not designed to be an exhaustive list, but principles that should extend into global considerations.

Purposes for Metadata

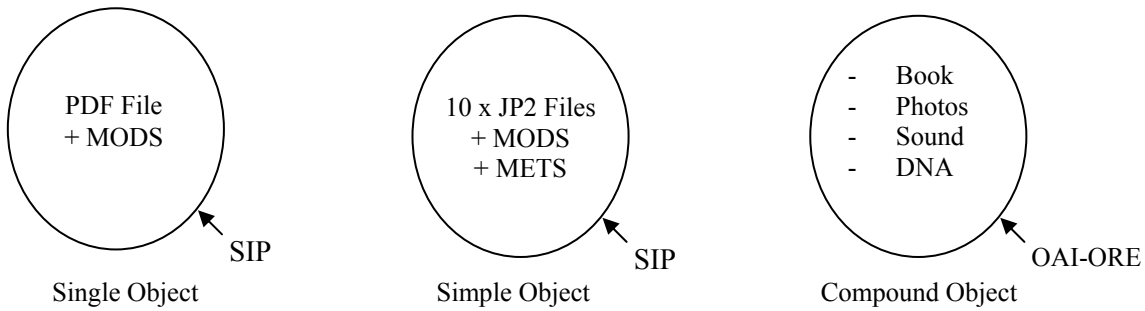
There are many reasons to create and store metadata; the main purposes are outlined below:

Purpose	Standard
Descriptive	MODS
Administrative	Existing BHL Framework
Technical	EXIF, XMP, VRA Core
Preservation	PREMIS
Resource Discovery	MODS, Dublin Core
Security	MD5
IPR	Existing BHL Framework

The main reason for adopting standards is to provide interoperability between systems and organisations.

Creating Metadata

Metadata can be created a number of ways, where ever possible standards should be employed to develop automated processes. JHOVE provides functions to perform format-specific identification, validation, and characterisation of digital objects.



MODS: Metadata Object Description Schema
SIP: Submission Information Package
METS: Metadata Encoding & Transmission standard
OAI-ORE: Open Archives Initiative – Protocol for Object Reuse and Exchange
OAI-PMH: Open Archives Initiative – Protocol for Metadata Harvesting

Submitting Objects and Metadata

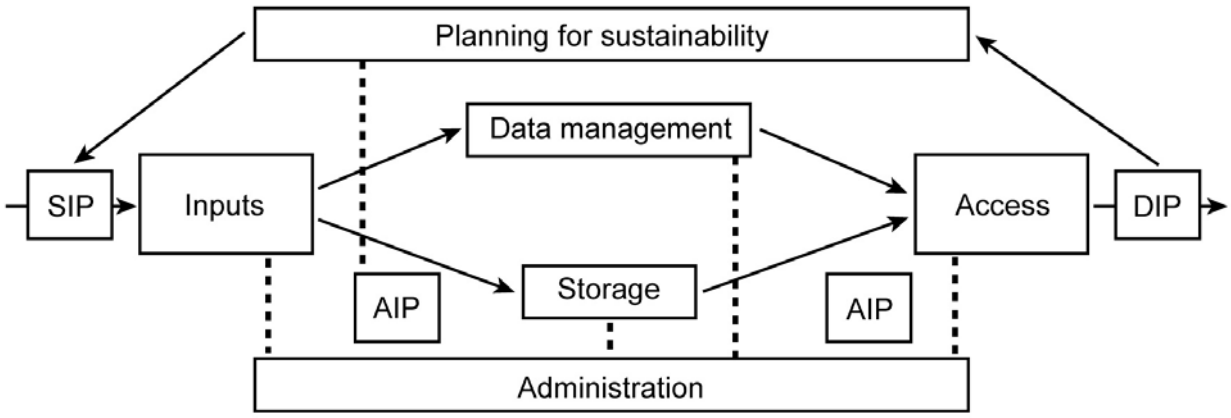
The process for submission of an object into a repository must include the appropriate metadata as outlined above. The level of metadata required is dependant on the object being submitted and must meet the mandatory minimum. There are 3 levels for metadata information.

1. **Mandatory**: The object will be rejected if it does not meet this requirement; it has insufficient contextual information to be of subsequent use or will not be found during a search.
2. **Recommended:** The preferred level of metadata that will enhance the objects use within searches; the object will not be rejected if it does not meet this requirement.
3. **Optional:** This provides data capture opportunity for existing metadata that exceeds or is different to the requirement of the Mandatory or Recommended informational level for metadata.

An Application Profile (AP) will be published by BHL that will allow all participating organisations to comply with the object submission process (Ingest) into the repository.

Storing Metadata

Once the object and metadata have been transformed into the appropriate format the information (object and metadata) must be stored in an appropriate repository. The ISO 14721:2003 specifies a reference model for an open archival information system (OAIS). The purpose of this ISO 14721:2003 standard is to establish a system for archiving information, both digitalised and physical, with an organisational scheme composed of people who accept the responsibility to preserve information and make it available to a designated community such as BHL and EUROPEANA.



OAIS Compliant Storage Model:

SIP: Submission Information Package
AIP: Archival Information Packages
DIP: Dissemination Package

The standard ISO 14721:2003 compliant storage platform is the Fedora platform; it is logically divided into four major functional areas that reflect its first principles: (1) Repository services, (2) Preservation services, (3) Semantic services, and (4) Enterprise services.

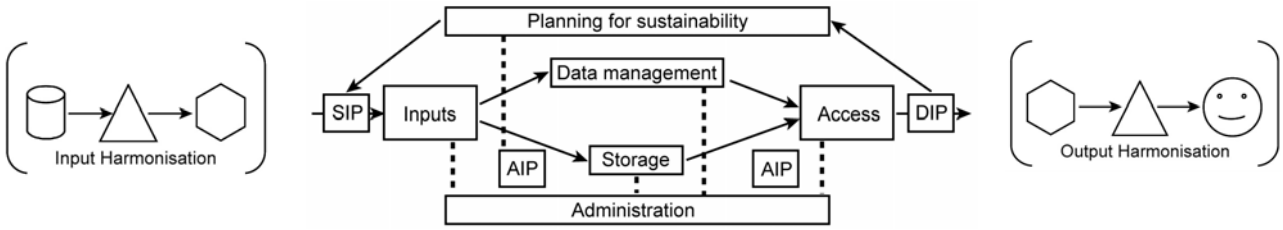
Using a standards-based, service-oriented architecture, the Fedora platform provides an extensible framework of service components to support features such as Open Archives Initiative – Protocol for Metadata Harvesting (OAI-PMH), search engine integration, messaging, workflow, format conversion, bulk ingest, and others. In addition, features such as authentication, fine-grained access control, content versioning, replication, integrity checking, dynamic views of digital objects, and more are incorporated into the Fedora repository service. Fedora provided services can be seamlessly integrated into an organization's existing infrastructure, protecting and prior investments.

Fedora integrates semantic technologies into its services for describing and inter-relating digital objects, providing a simple, practical way to begin using these new capabilities.

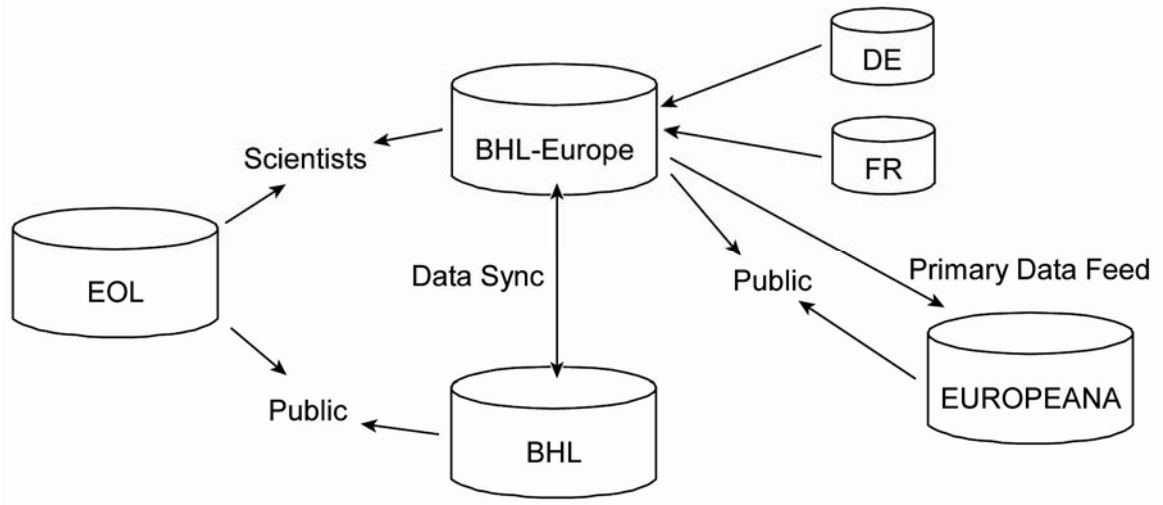
Metadata Harmonisation

The technical details of the 3 stages within the input harmonisation process depend on the format and volume of data to be ingested. Extract, Sort and Preparation are the 3 stages required to create the SIP for ingest into the repository from the submitting organisation. The preparation stage is based on the published ingest Application Profile (AP) of BHL-Europe. Input harmonisation will be an ongoing process due to the volumes and diversity of current formats of metadata stored within Europe. New object creation will be standardised using the technical standards laid out elsewhere in this document.

Output harmonisation will be required in the short-term, however as systems are constantly revised and updated, harmonisation of the output requirements will be driven to only a few formats. The standardisation of output formats and requirements will provide the highest levels of interoperability.



Metadata Input and Output Harmonisation



BHL-Europe Interconnect Relationships

Technical/operational framework

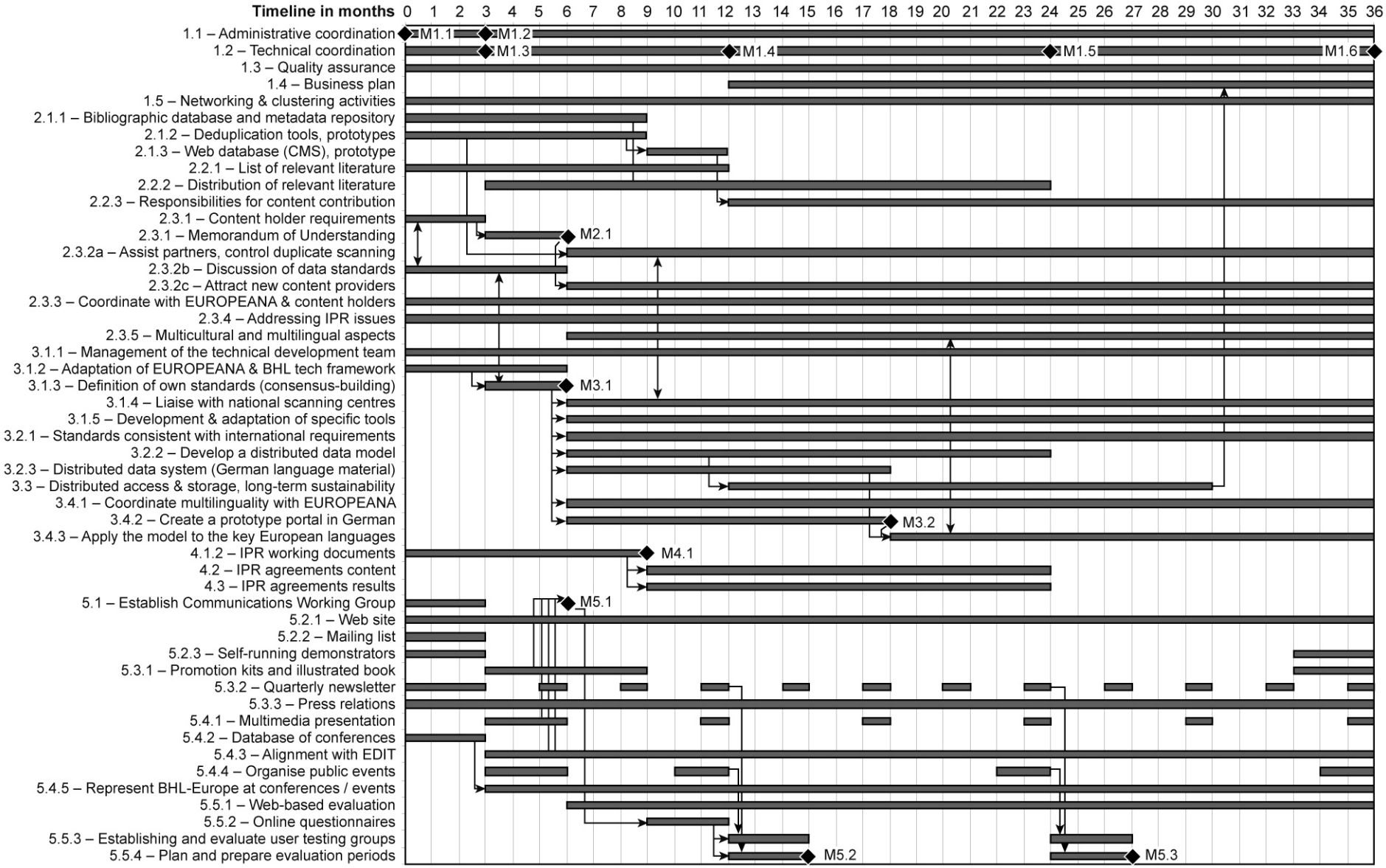
Each nation or language group may have one or more scanning centres where original material will be scanned and then processed. OCR and various tools will extract and match relevant data in order to build a set of metadata that will allow for the development of multilingual and taxonomic intelligence tools within various portals.

The data will then be harvested and stored in an aggregated data centre, which provides resilience for the service and copies of all data for disaster recovery purposes. In addition to the aggregated data, Web services will be utilised or developed to allow access to this data for inclusion in various portals including EUROPEANA and BHL. This model would allow for any future, and as yet undefined, portals or Web sites

to access these Web services and the data. This will also allow maximum flexibility in the delivery of services from either national centres or the aggregated repository. Thus, on a case-by-case basis, it would be possible for the aggregated repository to either directly provides the data and content or to act as a broker (aggregator) and request the data from one or more national centres for display through the portals.

Sustainability considerations, including cost and technology-related local and global economic variables, as well as current technology formats, will play a major role in the technology decision-making process. Depending on the prevalent economic circumstances, it may be more favourable to rent, buy or lease hardware and/or facilities – leading to **the potential for sub-contracting**. Data transformation processes will have to be carried out from time-to-time to provide continued access to the data in the repository, as formats and standards change over time.

8.3 Project plan



8.4 Work package and labour effort overview

Work Package and Labour Effort Overview

WP No[1]	Work package title	Lead AP No[2]	Start[3]	End[4]	Total PM[5]	Person months effort per work package per applicant													
						AP1	AP2	AP3	AP4	AP5	AP6	AP7	AP8	AP9	AP10	AP11	AP12	AP13	AP14
1	Project coordination	1	M 0	M 36	**39**	27	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	Content management	1	M 0	M 36	**221.5**	58	25	6	2	0	0	7.5	12	3	12	7.5	3	6	9
3	Technological implementation	2	M 0	M 36	**202.2**	1	42	0.2	22	51	13	27	0.2	12	6	0.2	0	0.2	1
4	IPR issues	2	M 0	M 36	**17.9**	1	12	0.2	0	0	0.3	0.5	0.3	0.2	0.3	0.2	0.2	0.2	0.3
5	Dissemination & Exploitation	3	M 0	M 36	**59.2**	1.5	0.5	32	1	0.5	0.5	1	1	0.3	1	0.3	0.3	0.3	1
				Total	**539.8**	**88.5**	**80**	**38.9**	**25.5**	**52**	**14.3**	**36.5**	**14**	**16**	**19.8**	**8.7**	**4**	**7.2**	**11.8**

WP No	Work package title	Person months effort per work package per applicant (continued)													
		AP15	AP16	AP17	AP18	AP19	AP20	AP21	AP22	AP23	AP24	AP25	AP26	AP27	AP28
1	Project coordination	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0	0.5	0.5
2	Content management	6	7.5	9	7.5	9	7.5	3	9	1	0	0	0	7	4
3	Technological implementation	0.2	4.5	0.2	0.3	4.5	0.3	0	0.2	1	0	0	0	0.2	15
4	IPR issues	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0	0	0	0	0.2	0
5	Dissemination & Exploitation	0.3	1	12	0.3	1	1	0.3	0.3	1	0	0	0	0.3	0.5
		7.2	**13.8**	**21.9**	**8.9**	**15.3**	**9.6**	**4**	**10.2**	**3.5**	**0**	**0**	**0**	**8.2**	**20**

[1] Work package number: WP 1 – WP n.
[2] Number of the applicant leading the work in this work package.
[3] Relative start date for the work in the specific work packages, month 0 marking the start of the project, and all other start dates being relative to this start date.
[4] Relative end date, month 0 marking the start of the project, and all ends dates being relative to this start date.
[5] The total number of person-months allocated to each work package.

8.5 Work package description

Work package Description

Work package number :	1	Start date:	M1	End date:	M36
Work package title:	Project Coordination and management				

Objectives

Administrative objective: Ensure adherence of the consortium to the rules, regulations, and financial guidelines of the *e*Content*plus* programme; establish the project in the European biodiversity community.

Technical objective: Implement the project as set out in the work plan; ensure exchange of information and communication between partners; ensure progress of the project; guarantee timely deliverables.

QA objective: Ensure verifiable progress of the project and be committed to high quality output that has tangible impact on *e*Content*plus* programme objectives.

Description of work

Task 1.1 – Administrative coordination

1.1.1 – Resource planning (financial, personnel, material), monitoring and controlling.

1.1.2 – Liaison between the Commission, consortium members, EUROPEANA, BHL, and external experts; effective communication with the consortium members, Work Package leaders, the Commission, and interested external parties; coordination of meetings and progress reviews.

1.1.3 – Production and consolidation of periodic external reports, including cost-statements; internal quality assurance; set-up of the Web-based project management portal.

1.1.4 – representing the project.

Task 1.2 – Technical coordination

1.2.1 – Work-package and task coordination.

1.2.2 – Project plan maintenance; monitoring of project progress and milestones; identification and trouble shooting of technical and organisational problems.

1.2.3 – Timely production of deliverables.

1.2.4 – Quality control against the technical and contractual aspects; coordination with EDL Foundation Office.

Task 1.3 – Quality assurance: Definition and communication of quality assurance procedures via project management portal, coordination of quality assurance process (internal as well as external review procedures for the various project results and deliverables).

Task 1.4 – Business plan

1.4.1 – Investigate services that help the sustainability of project results

1.4.2 – Identify related networks or organisations interested in the implementation of project results

1.4.3 – Develop a business plan for long term sustainability with WP2 and WP3

Task 1.5 – Networking and clustering activities

1.5.1 – Coordinate with relevant partner networks; Identification of new important networks as potential disseminators of project results; Identification and analysis of stakeholders

1.5.2 – Contribute to the clustering activities of the EC.

Milestones[1] and expected result
Responsibility: MfN (Project Coordinator) and all other consortium partners M1.1 Kick-Off Meeting (M 0) M1.2 Project management portal including agreed quality assurance procedures (M 3) M1.3 Agreement on TMB and CWG (M 3) M1.4 Annual (Technical) Review 1 (M 12) M1.5 Annual (Technical) Review 2 (M 24) M1.6 Final Review (M 36)

Deliverables
D1.1 Progress Report 1 (M 6) D1.2 Progress Report 2 including pre-financing request (M 12) D1.3 Annual Report 1 including first ideas for BHL-Europe business plan (M 12) D1.4 Progress Report 3 (M 18) D1.5 First overview of the business plan for long-term sustainability (M 24) D1.6 Progress Report 4 including pre-financing request (M 24) D1.7 Annual Report 2 (M 24) D1.8 Progress Report 5 (M 30) D1.9 Business plan for long-term sustainability (M 36) D1.10 Implementation of results of BHL-Europe in other projects (M 36) D1.11 Progress Report 6 and Final Report including Financial Statement (M 36) D1.12 Final Report (M 36)

Work package Description

Work package number :	2	Start date:	M1	End date:	M36
Work package title:	**Analysis of domain content and management of the content acquisition process**				

Objectives
IT objective: Establish bibliographic database systems, metadata repositories and Web-based content management systems. **Management objective:** Ensure that all relevant biodiversity literature is listed to be scanned following a priority list; ensure that all content providers agree on the technical architecture of the project; ensure effective scanning in all content providing institutions; ensure linkage to EUROPEANA; ensure extension of the content providing network.

[1] A milestone is a scheduled event marking the completion of a major part of the project work. It is used as a project checkpoint to validate how the project is progressing and revalidate work. Milestones numbers indicate the work package they relate to (e.g. M2.1 is the first Milestone of work package 2).

Description of work

Task 2.1 – IT Development

2.1.1 – Establish a bibliographic database system and metadata repository for monographs and serials based on the Virtual Taxonomic Library developed in EDIT, and also the experiences of the BHL.

2.1.2 – Develop and enhance deduplication tools for monographs and serials based on BHL technologies.

2.1.3 – Develop a Web database to support analysis of domain content and management of the scanning process based on 2.1.1 and 2.1.2 (database of the taxonomic literature that indicates (a) the portion that is already available in digital form, (b) the portion that is in the process of being digitised, and (c) the portion for which plans have been created for digitisation).

Task 2.2 – Analysis of domain content

2.2.1 – Establish a list of monographs and serials that are relevant for the biodiversity community.

2.2.2 – Use of the Web-database to identify the distribution of this relevant literature in the libraries of the content providers.

2.2.3 – Identify responsibilities for content contribution (which institution should provide the identified content under consideration of technical qualification, data standards, IPR).

Task 2.3 – Management of the content acquisition process:

2.3.1 – Identify content holder requirements; develop the Memorandum of Understanding.

2.3.2 – Assist partners in implementation and evaluation of scanning operations; control duplicate scanning of literature (using results of task 2.2); discussion and distribution of data standards and specifications; work with individual donors and governments to facilitate the funding of the scanning; attracting new content providers.

2.3.3 – Coordinate with EUROPEANA, BHL and national scanning projects to ensure that material scanned by BHL-Europe is available through these portals.

2.3.4 – Addressing IPR issues in cooperation with WP4.

2.3.5 – Take into account multicultural and multilingual aspects.

Milestones[1] and expected result

Responsibility: MfN (Work Package Leader) and all consortium content providers. The labour effort distribution among the partners was calculated mainly based on the amount of content and the current status of the digital repository of the particular consortium partner. Partners with large but less well developed repositories have more hours on the project than partners with small but easy to harvest repositories. However, once the connection between the repositories is established, it is not very time-consuming to maintain the connection and to ensure a constant delivery of content to the portal. In addition to this task, each content provider contributes to the enhancement of the content database. Depending on the extent of own scanning initiatives this is more or less time-consuming.

M2.1 Memorandum of Understanding signed by all content providers (M 6)

Deliverables

D2.1 Catalogue of content holder requirements (quality, quantity, accessibility, standards and specifications of content and metadata) (M 3)

D2.2 Prototypes of deduplication tool and bibliographic database system for monographs and serials (M 9)

D2.3 Prototype of Web-database for content management and collection analysis (M 12)

D2.4 Content analysis and management status report 1 (metadata, page numbers, content providers) (M 12)

D2.5 Final and enhanced Web-database for content management and collection analysis (M 24)

[1] A milestone is a scheduled event marking the completion of a major part of the project work. It is used as a project checkpoint to validate how the project is progressing and revalidate work. Milestones numbers indicate the work package they relate to (e.g. M2.1 is the first Milestone of work package 2).

D2.6 Delivery of the first version of the approved best practice guidelines and standards (M 24)
D2.7 Content analysis and management status report 2 (metadata, page numbers, content providers) (M 24)
D2.8 Content analysis and management status report 3 (metadata, page numbers, content providers) (M 36)
D2.9 Delivery of the final revised best practice guidelines and standards (M 36)

Work package Description

Work package number :	3	Start date:	M1	End date:	M36
Work package title:	Technological implementation				

Objectives

Management and coordination of technological development and associated standards to allow for a pan-European, distributed and multilingual BHL-Europe. The technological implementation will concentrate on the innovative application of proven technologies to deliver stable and sustainable solutions.

Description of work

Task 3.1 – Technological implementation (Overall Coordination)

3.1.1 – Management of the technical development team.

3.1.2 – Adaptation of EUROPEANA and BHL data model, workflow, harvesting procedure, standards, specifications.

3.1.3 – Definition of own standards for images, metadata, harvesting according to partner requirements (consensus-building).

3.1.4 – Liaise with scanning centres of the national initiatives for post-processing of content.

3.1.5 – Development and adaptation of specific tools; implementation and adaptation of taxon finder and name recognition tools; improvement and implementation of OCR techniques.

Task 3.2 – Technical integration with EUROPEANA, BHL and national platforms

3.2.1 – Ensure that the standards for data management and image formats are consistent with international requirements and specifically the EUROPEANA and BHL, adoption of EUROPEANA Semantic Elements (ESE).

3.2.2 – Develop a distributed data model which will allow countries to retain control of their data, while enabling the material to be available through EUROPEANA, the BHL Portal (with Taxonomic Intelligence tools), and any national portals.

3.2.3 – Build a prototype distributed data system for the German language material, and integrate with the BHL Portal.

Task 3.3 – Addressing distributed access and storage – long-term sustainability: Develop a distributed access and storage system to enable national and international storage of the scanned materials; to develop the storage system in such a way that long-term sustainability of the data is secured.

Task 3.4 – Enabling BHL Portal access in European languages – interfaces, usability, and mobility

3.4.1 – Work with the EUROPEANA to create multiple language access to the BHL Portal.

3.4.2 – Create a prototype portal in German to allow access to the BHL Portal.

3.4.3 – Apply the model to the key European languages (English, French, German, Italian, Portuguese, Spanish, Danish, Dutch, Czech, Hungarian, Polish, Swedish), enabling access to the BHL Portal throughout Europe.

Milestones[1] and expected result

Responsibility: WP3 will be led by NHM London. It is important that this work package is led by a partner institution that has capacity and experience in delivering this type of technical project. The NHM's leadership role in BHL and EOL as well as its contribution to other related projects e.g. EUROPEANA, EDIT, SYNTHESYS, Key2Nature, makes it a suitable candidate.

Each sub-work package in WP3 will have a specific structure, starting with production of an options appraisal and assessment papers that will review standards and technologies. This will enable the technology development team/board to agree standards policy or implementation plans for specific products under each heading.

M3.1 All sub-work packages produce options appraisals for all products/work streams and detailed implementation plans agreed for years 2 and 3. This would include the issuing of all standards, data models, technology standards, preferred technologies, etc. required for implementation (M 6)

M3.2 Technology review based on German prototype instantiation (M 12)

Deliverables

D3.1 Deliver composition of Technology Management Board and initial meeting (M 3)

D3.2 Document agreed standards, best practice and system components (M 6)

D3.3 Plan for managing interoperability issues, data harmonisation and the integration of the content into BHL-Europe, EUROPEANA and the BHL (M 6)

D3.4 Implement plans for all components in WP3, incl. data models, technology standards etc. (M 9)

D3.5 Technical architecture status and progress report with particular focus on the development of the German prototype (M 12)

D3.6 Release of German prototype (M 18)

D3.7 Key components documented for output of D3.5 e.g. BHL-Europe Portal, OCR demonstrators, distributed storage model, etc. (M 24)

D3.8 Sustainability policy for continuation of service e.g. hosting, future development, helpdesk provision for service users/content providers etc. (M 30)

D3.9 Live BHL-Europe system, with distributed storage and management and appropriate tools for the continued development of services and ingress of multilingual content (M 36)

Work package Description

Work package number :	4	Start date:	M1	End date:	M36
Work package title:	**Intellectual Property Rights**				

Objectives

Management and coordination of the intellectual property rights (IPR) framework for BHL-Europe and agreements with Rights Holders. Ensure that BHL-Europe, EUROPEANA, and the BHL are using common approaches and common agreements, such that data can be exchanged between these partners without further Rights activity.

N.B. The majority of the material being digitised by partners is public domain, and where the Rights have expired. This material will remain public domain and be freely available to all users.

[1] A milestone is a scheduled event marking the completion of a major part of the project work. It is used as a project checkpoint to validate how the project is progressing and revalidate work. Milestones numbers indicate the work package they relate to (e.g. M2.1 is the first Milestone of work package 2).

Description of work

Task 4.1 – IPR Framework: Establish IPR working documents – including best practice guide, due diligence guide, pro-forma agreements, and process for formally agreeing rights management with rights holders; align the approach with EUROPEANA and BHL and maximise level of interoperability including Rights metadata exchange.

Task 4.2 – IPR Agreements with Data Providers: Complete formal IPR agreements with data providers identified in WP2; keep records of all agreements secure.

Task 4.3 – IPR Agreements on projects results and outcomes: Develop IPR framework for long-term sustainability and long-term access to the digitised content of BHL-Europe, and ensure that EUROPEANA and BHL have long-term access to the material and associated Rights.

Milestones[1] and expected result

Responsibility: WP4 will be led by the NHM. The NHM has a dedicated IPR Officer and access to the advice of a law firm (Farrer and Co.) who are experts on IPR, together with pro bono service from the Electronic Freedom Foundation lawyers in San Francisco, USA.

M4.1 A working agreement on IPR will be in place with EUROPEANA and BHL (M 9)

Deliverables

D4.1 Delivery of IPR working documents, including best practice guide, due diligence guide, pro forma agreements and process for formally agreeing rights management with rights holders. Complete agreement with EUROPEANA and BHL for reciprocal access and Rights metadata. (M 9)

D4.2 Complete signed agreements with first group of rights holders to enable material to be used in the BHL or EUROPEANA, and establish process for addition of further material. (M 24)

D4.3 Deliver IPR framework to support long-term access and sustainability of the digitised material (M 24)

Work package Description

Work package number :	**5**	**Start date:**	**M1**	**End date:**	**M36**
Work package title:	**Dissemination, Exploitation and Evaluation**				

Objectives

Dissemination objective: Develop dissemination strategy; raise awareness, understanding and action of the project among the community and stakeholders in EU member states; ensure effective dissemination of project goals and results to the target users; ensure good communication within the European scientific community

Presentation and demonstration objective: Ensure dissemination of project results at conferences, public events and among the networks of the consortium members

Exploitation objective: Ensure implementation of project results in other projects, initiatives, institutions, and countries

Evaluation objective: Monitor the level of use of BHL-Europe; survey the users of the Web Portal

[1] A milestone is a scheduled event marking the completion of a major part of the project work. It is used as a project checkpoint to validate how the project is progressing and revalidate work. Milestones numbers indicate the work package they relate to (e.g. M2.1 is the first Milestone of work package 2).

Description of work

Task 5.1 – Establish BHL-Europe Communications Working Group

Task 5.2 – Develop and establish Web environment

5.2.1 – Plan, design, publish, maintain, and update BHL-Europe Web site for internal and external communication with publication of all relevant results and links to partner networks.

5.2.2 – Develop a mailing list to facilitate communication of new developments (internal and external); update the list regularly to include all relevant parties.

5.2.3 – Develop self-running demonstrators to illustrate BHL-Europe use and functionality.

Task 5.3 – Develop and prepare promotional materials and newsletters, press relations

5.3.1 – Develop, prepare, and update target group specific promotion kits (fact sheets, flyers, posters, presentations) and related printed matters (e.g. illustrated book on best practice guidelines and standards for the public).

5.3.2 – Prepare a quarterly newsletter to be published online.

5.3.3 – Ensure proper press relations; maintain the press review; distribution of articles for various types of print and online media (journals, newspapers, blogs).

Task 5.4 – Demonstration and awareness raising

5.4.1 – Prepare and update multimedia presentation (automatic demonstrator) as information about the project for the general public.

5.4.2 – Maintain and update the database of conferences and public events relevant for BHL-Europe; identify consortium members to present the project at selected events.

5.4.3 – Alignment of public awareness activities of related projects (e.g. EDIT).

5.4.4 – Organise public events and talks.

5.4.5 – Represent BHL-Europe at conferences and special events (responsibilities depend on conference location and theme).

Task 5.5 – Plan and organise user evaluation activities

5.5.1 – Put in place Web-based evaluation tools to survey users (to determine target group of the users, country of the users, most interesting content, page views, etc.).

5.5.2 – Develop online questionnaires to identify user requirements, preferences, experiences, benefits, and un-met needs; document case studies of non-science usage of content.

5.5.3 – Establishing user testing groups; evaluation of this group using interaction logging.

5.5.4 – Plan and prepare the two special evaluation periods during the project.

Milestones[1] and expected result

Responsibility: WP5 will led by National Museum Prague. This museum has an experienced team for communications, public relations, and related issues. RBINS supports the alignment with EDIT dissemination and public awareness activities.

M5.1 Agreed dissemination plan (M 6)

M5.2 Review of the 1st evaluation report (M 15)

M5.3 Review of the 2nd evaluation report (M 30)

[1] A milestone is a scheduled event marking the completion of a major part of the project work. It is used as a project checkpoint to validate how the project is progressing and revalidate work. Milestones numbers indicate the work package they relate to (e.g. M2.1 is the first Milestone of work package 2).

Deliverables
D5.1 Web site, including multimedia presentation (M 3)
D5.2 BHL-Europe newsletter and mailing list (M 3)
D5.3 Database of relevant conferences/events and ownership for BHL-Europe presentations (M 3)
D5.4 Deliver composition of Communications Working Group and 1st dissemination plan (M 3)
D5.5 BHL-Europe dissemination plan (M 6)
D5.6 BHL-Europe promotion kit (M 6)
D5.7 Online questionnaires for user survey (M 12)
D5.8 First user evaluation report (M 15)
D5.9 Second user evaluation report (M 30)
D5.10 BHL-Europe multimedia presentation, final version (M 36)
D5.11 Illustrated book on best practice guidelines and standards for the public (M 36)

8.6 Deliverables List

Deliverables List

Deliverable No[1]	Deliverable title	Delivery date[2]	Nature[3]	Dissemination level[4]
1	D2.1 Catalogue of content holder requirements (quality, quantity, accessibility, standards and specifications of content and metadata)	M 3	R	PP
2	D3.1 Deliver composition of Technology Management Board and initial meeting	M 3	O	PU
3	D5.1 Web site, including multimedia presentation	M 3	D	PU
4	D5.2 BHL-Europe newsletter and mailing list	M 3	D	PU
5	D5.3 Database of relevant conferences/events and ownership for BHL-Europe presentations	M 3	O	PP
6	D5.4 Deliver composition of Communications Working Group and 1st dissemination plan	M 3	O	CO
7	D1.1 Progress Report 1	M 6	R	CO
8	D3.2 Document agreed standards, best practice and system components	M 6	R	PP
9	D3.3 Plan for managing interoperability issues, data harmonisation and the integration of the content into BHL-Europe, EUROPEANA and the BHL	M 6	R	PU

[1] Deliverable numbers in order of delivery dates: D1 – Dn. Deliverable numbers must indicate which work package they relate to, e.g. D2.1 for the first deliverable from work package 2).

[2] Month in which the deliverables will be available. Month 0 marking the start of the project, and all delivery dates being relative to this start date.

[3] Please indicate the nature of the deliverable using one of the following codes:

R = Report
P = Service/Product
D = Demonstrator/Prototype
O = Other

[4] Please indicate the dissemination level using one of the following codes:

PU = Public
PP = Restricted to other programme participants (including Commission services and project reviewers).
CO = Confidential, only for members of the consortium (including Commission services and project reviewers).

10	D5.5 BHL-Europe dissemination plan	M 6	R	PP
11	D5.6 BHL-Europe promotion kit	M 6	P	PU
12	D2.2 Prototypes of deduplication tool and bibliographic database system for monographs and serials	M 9	D	PP
13	D3.4 Implement plans for all components in WP3, incl. data models, technology standards etc.	M 9	O	PP
14	D4.1 Delivery of IPR working documents, including best practice guide, due diligence guide, pro forma agreements and process for formally agreeing rights management with rights holders. Complete agreement with EUROPEANA and BHL for reciprocal access and Rights metadata.	M 9	R	PU
15	D1.2 Progress Report 2 including pre-financing request	M 12	R	CO
16	D1.3 Annual Report 1 including first ideas for BHL-Europe business plan	M 12	R	PU
17	D2.3 Prototype of Web-database for content management and collection analysis	M 12	D	PP
18	D2.4 Content analysis and management status report 1 (metadata, page numbers, content providers)	M 12	R	PU
19	D3.5 Technical architecture status and progress report with particular focus on the development of the German prototype	M 12	R	PU
20	D5.7 Online questionnaires for user survey	M 12	O	PU
21	D5.8 First user evaluation report	M 15	R	PU
22	D1.4 Progress Report 3	M 18	R	CO
23	D3.6 Release German prototype	M 18	D	PU
24	D1.5 First overview of the business plan for long-term sustainability	M 24	R	PP
25	D1.6 Progress Report 4 including pre-financing request	M 24	R	CO
26	D1.7 Annual Report 2	M 24	R	PU
27	D2.5 Final and enhanced Web-database for content management and collection analysis	M 24	P	PP
28	D2.6 Delivery of the first version of the approved best practice guidelines and standards	M 24	R	PU
29	D2.7 Content analysis and management status report 2 (metadata, page numbers, content providers)	M 24	R	PU
30	D3.7 Key components documented for output of D3.5 e.g. BHL-Europe Portal, OCR demonstrators, distributed storage model, etc.	M 24	P	PU
31	D4.2 Complete signed agreements with first group of rights holders to enable material to be used in the BHL or EUROPEANA, and establish process for addition of further material.	M 24	P	PP
32	D4.3 Deliver IPR framework to support long-term access and sustainability of the digitised material	M 24	R	PU
33	D1.8 Progress Report 5	M 30	R	CO
34	D3.8 Sustainability policy for continuation of service e.g. hosting, future development, helpdesk provision for service users/content providers etc.	M 30	R	PP
35	D5.9 Second user evaluation report	M 30	R	PU

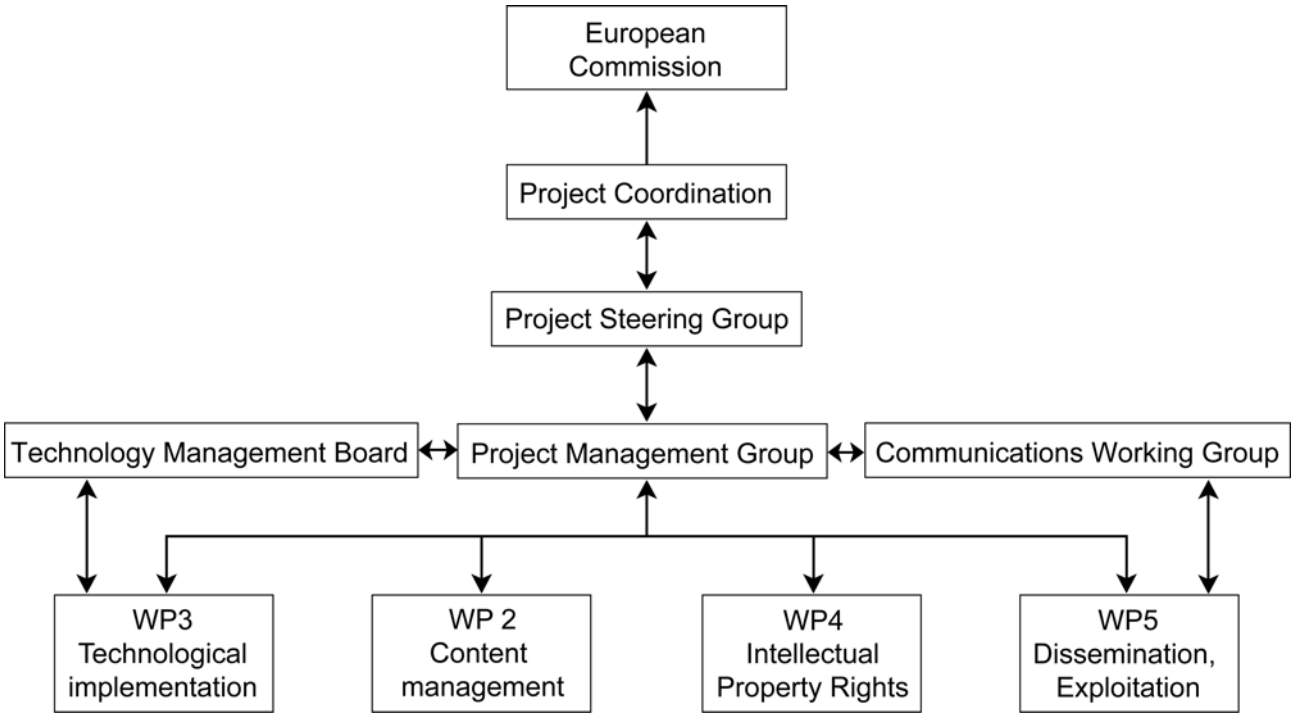
36	D1.9 Business plan for long-term sustainability	M 36	R	PP
37	D1.10 Implementation of results of BHL-Europe in other projects	M 36	P	PU
38	D1.11 Progress Report 6 and Final Report including Financial Statement	M 36	R	CO
39	D1.12 Final Report	M 36	R	PU
40	D2.8 Content analysis and management status report 3 (metadata, page numbers, content providers)	M 36	R	PU
41	D2.9 Delivery of the final revised best practice guidelines and standards	M 36	R	PU
42	D3.9 Live BHL-Europe system, with distributed storage and management and appropriate tools for the continued development of services and ingress of multilingual content	M 36	P	PU
43	D5.10 BHL-Europe multimedia presentation, final version	M 36	D	PU
44	D5.11 Illustrated book on best practice guidelines and standards for the public	M 36	P	PU

9 Project management

9.1 Project Management Structure and Responsibilities

BHL-Europe includes a considerable number of partners and the consortium will grow more in the lifetime of the project. To ensure an effective management of the project, working documents and decisions will be prepared at different levels. The BHL-Europe management structure consists of five different levels:

- The project coordination (PCO)
- The Project Steering Group (PSG)
- The Project Management Group (PMG)
- The Technology Management Board (TMB) and Communications Working Group (CWG)
- The Work Packages (WP)



9.1.1 Project Coordination (PCO)

BHL-Europe will be coordinated by Dr. Henning Scholz based at the Museum für Naturkunde Berlin (MfN). The museum has been involved in the management of the EU I3 SYNTHESYS project since 2004. SYNTHESYS aims to create an integrated European infrastructure for researchers in the natural sciences. In addition, the museum is involved in the development of numerous national and international projects funded by the EU (EDIT), BMBF (BIOTA, GBIF), BMU (Acoustic monitoring of breeding birds at wetlands in the region of the River Peene), DFG (Graduate Research Program 503, Research Group 533 and 736). The coordinator also benefits from the vast experience of the Humboldt-University in managing EU projects. In its role as coordinator, MfN will be responsible to ensure that the project is run in accordance with the work plan and the overall contract. MfN will be responsible for all administrative and technical matters of BHL-Europe.

The administrative coordination includes:

- resource planning (financial, personnel, material), monitoring and controlling
- liaison between the Commission, consortium members and external experts
- effective communication with the consortium members, Work Package leaders, EU officials and interested external parties
- coordination of meetings and progress reviews
- production and consolidation of periodic external reports, including cost-statements
- internal quality assurance

The technical coordination includes:

- work package and task coordination
- work plan maintenance
- monitoring of project progress and milestones
- identification and trouble shooting of technical and organisational problems
- timely production of deliverables
- quality control of technical and contractual aspects

9.1.2 Project Steering Group (PSG)

The Project Steering Group will consist of one representative from each partner of the BHL-Europe consortium, including the project coordinator:

- Henning Scholz (MfN, Project Coordinator) – Chair of PSG
- Graham Higley (NHM), Jiri Kvacek (NMP), Jill Cousins (EDL Foundation), Walter Koch (AIT), Roger Essoh (ATOS), Walter Berendsohn (FUB-BGBM), Francisco Welter-Schultes (UGOE), Ernst Vitek (NHMW), Fritz Gusenleitner (LANDOE), Laszlo Peregovits (HNHM), Robert Turlej (MIZPAS), Henning Knudsen (UCPH), Kees Hendriks (NAT), Elmar Robbrecht (NBGB), Patricia Mergen (RMCA), Patrick Grootaert (RBINS), Hervé Colinmaire (BnF), Michelle Lenoir (MNHN), Antonio Valdecasas (CSIC), Luca Bartolozzi (MSN), Jane Hutcheon (RBGE), Frank Bisby (Sp2000), Philippa Scoones (Wiley), Thomas Garnett (SIL), Christopher Freeland (MOBOT), Teodora Oker-Blom (UH-Viikki), Susanne Dobratz (UBER).

The PSG will be responsible for providing direction and the policy making role for the project. It will also be the ultimate body to resolve with conflicts and disputes that may arise in the consortium. The PSG will also be responsible for discussing, communicating, and deciding on any contractual amendments and issues concerning the European Commission, including changes in funding allocation or work plan. The PSG will also decide on the overall communication and dissemination strategy of the project. The group will convene twice a year in regular meetings or through e-meetings, and will call additional meetings if needed.

Decisions of the PSG will be often by consensus but when necessary decisions will taken by a straight majority vote with the chair having a casting vote in the event of a tie.

9.1.3 Project Management Group (PMG)

The Project Management Groups is formed by the Work Package leaders (WPL) of the BHL-Europe project. A Project Manager from the European Digital Library Foundation and the Chair of the BHL (Graham

Higley) will attend the PMG to assist the operational collaboration with EUROPEANA and BHL. Its prime tasks are the overall operational management of BHL-Europe, which includes supervising and monitoring the actual work carried out in the work packages, reviewing deliverables, and ensuring that the (technical) objectives and goals are fulfilled. The PMG serves as the first instance for resolving conflicts in the consortium (the PSG only gets involved, if disputes cannot be settled on the level of the PMG). Depending on the issues to be discussed, the PMG may be temporarily enlarged by additional key personnel working on particular work package tasks. The group will convene four times in the first year and at least twice in each of the following years in ordinary meetings or through e-meetings, and will call additional meetings if needed.

Decisions of the PMG will be often by consensus but when necessary decisions will taken by a straight majority vote of the full members with the chair having a casting vote in the event of a tie.

Members of the PMG are:

- Henning Scholz (MfN, Project Coordinator) – Chair of PMG
- Michael Ohl (UBER, WP2)
- Adrian Smales (NHM, WP3)
- Nancy Chillingworth (NHM, WP4)
- Jiri Kvacek (NMP, WP5)
- Graham Higley (NHM, Chair of BHL)
- Jill Cousins (EDL Foundation)

9.1.4 Technology Management Board (TMB)

The Technology Management Board will be responsible for agree on standards policy and implementation plans. The members of the TMB will also revise the results of the project and help in the technical evaluation of project's outcomes. In addition to the members of the WP3 doing the actual work (NHM, AIT, ATOS, EDL Foundation, FUB-BGBM, NHMW), several other partners have a strong IT and digital library expertise that is helpful in the preparation of work. These partners include UBER (Susanne Dobratz), LANDOE (Michael Malicky), NAT (Berry van der Hoorn), RMCA (Danny Meirte), and MOBOT (Christopher Freeland) and are foreseen as potential contributors to TMB. In addition to the personal meetings they will have e-meetings several times a year. They will regularly report to the PMG through the chair of the TMB, which is the leader of WP3 (Adrian Smales, NHM).

9.1.5 Communications Working Group (CWG)

The Communications Working Group will be responsible for revising and discussing dissemination strategies and agree on related activities. In addition to the two institutions mainly responsible for all activities related to dissemination and exploitation (NMP, RBINS), members of other consortium partners are invited to attend the board. Although consensus building is the main aim of the activities, discussions with all partners involved might be difficult because of the large consortium. To ensure an effective management at this level, working documents will be developed first in the CWG before they are revised in the PMG and PSG. The final selection of CWG members is done in the first months of the project. At the moment, members from MfN, NHM, EDL Foundation, RMCA, NAT, MNHN, and SIL are foreseen as potential contributors to the CWG. In addition to the personal meetings they will have e-meetings several times a year. They will regularly report to the PMG through the chair of the CWG, which is the leader of WP5 (Jiri Kvacek, NMP).

9.1.6 Work Packages (WP)

The Work Package leaders are responsible for coordinating and managing their work packages. In particular, this includes the detailed planning of the work that needs to be carried out, the coordination and division of work among the project partners, the responsibility to ensure that enough resources are allocated to get the work done, and finally, the delivery of the result within the agreed upon schedule. The Work Package leaders will report on a regular basis to the PMG and the PCO on work progress, and give due notice about any potential delay to achieving the deliverables set out in the work plan. In addition, they are also responsible for scheduling meetings of the Work Package members and relevant members of other work packages to discuss the technical issues of their work packages.

9.2 Project communication mechanisms

The primary method for information exchange between the consortium members will be through project meetings at various management levels (Project Steering Group, Project Management Group, and Work Packages). Meetings will be announced and scheduled at least four weeks in advance; virtual meetings can be scheduled on shorter notice. Agendas, proposed resolutions, and working documents will be made available to all attendees at least one week before the meeting. For meetings of the PSG and PMG, responsibility for preparing the meeting rests with the project coordinator. For Work Package meetings, the Work Package leader who calls the meeting will be responsible for preparation. Draft minutes of a meeting will be issued within two working days after the meeting.

In addition to meetings at various management levels, small scale work meetings are necessary. As a best practice network, we need to review different state-of-the-art approaches for the establishment and management of multilingual biodiversity digital libraries in order to implement validated best practice methodologies and workflows. Therefore, intensive communication in special working groups and bilateral meetings with various partners are important. Members of WP2 and WP3 need to visit the individual content providers to learn from each other, study workflows in detail und discuss necessary adaptations. These meetings are not listed in the table (section 10.1) but included in the travel & subsistance budget of partners (in particular MfN, NHM, ATOS, AIT, UBER). The travel expenses of our US partners (SIL, MOBOT) to allow them attending BHL-Europe meetings are managed by the Project Coordinator (MfN).

An additional platform for communication between the consortium members will be a Web-based project management portal with restricted access for consortium members which will be established within three months after the start of the project. On this platform, the PCO provide management information and guidelines, the work plan, templates for reports and the quality assurance procedure. The PCO is responsible for regular updates (every three months) of the management information and to provide a status report as an internal review of the project. Consortium members may discuss specific problems, get all relevant information on upcoming meetings and new developments, and publish drafts of deliverables for internal review. Once deliverables with public status have been approved, they will be published on the BHL-Europe Web site in an open public area. The project management portal also contains the documentation of internal communication throughout the life-time of the project. The portal will also have specific tools and functionalities that facilitate and optimises book-keeping. In addition to the portal, a newsletter will be established to inform the members of the consortium, and other interested parties, about important developments in BHL-Europe. Various mailing lists adapted to the project management structure are provided to every member of the consortium in order to facilitate communication within larger groups of members.

Reporting to the European Commission will be done according to contractual requirements, providing a status report on activities as well as finances. All partners report to the PCO who will send an aggregated report to the EC Project Officer. The templates for official reporting are provided by the European Commission.

9.3 Risk Analysis and Risk Management

Risk analysis requires risk identification, risk evaluation, the identification and selection of appropriate responses. During risk management the selected responses will be planned thoroughly and the allocation of resources is verified. The risk management further is a feed-back control system of monitoring, evaluation of responses and modification of the responses, if necessary. The PCO will keep a risk log through the entire cycle to record the risks and all associated background information, including impact, probability, countermeasures, and current status.

Risk management is a balance of judgement so that the risks are minimised without over-emphasising the potential problems. Controlling the risks will help us to manage our project to achieve properly the objectives on time and to budget. Risk management will be an integral part of the BHL-Europe lifecycle management process. In this sense, risk assessment methods will be applied, where needed, in order to minimise possible deviations from the expected results and schedule.

With regards to risk management, the PMG will have the responsibility to review and evaluate different situations which may lead to some kind of risk. To facilitate this procedure, the regular reporting via the project management portal will be used to consider and evaluate risk factors. Work package leaders will report apparent and imminent risks immediately, and the PMG will decide upon and immediately carry out

remedial actions. If conflicts cannot be resolved in the PMG, they will be brought into the PSG who either can settle the conflict or suggest/decide strategies to further deal with the conflict.

At the moment, several risks are already identified that may have an significant influence on the project. Risk management is already in progress before the actual start of the project in order to evaluate the effects on the project results and to adapt the work plan accordingly.

One risk identified is the lack of content to reach the ~25 million pages of biodiversity literature at the end the project. We have to rely on the progress of the various national scanning projects to achieve this important aim of the project. However, the most important content provider have confirmed the availability of funding to deliver the number of pages indicated in the table in section 4 of this document. Although not all partners really have money to continue for the entire period of three years, the promised number of ~25 million pages is rather a conservative number and it is likely that BHL-Europe will deliver even more pages at month 36 of the project. This view is supported by the plan to enlarge the number of content provider during the project lifetime. In addition, some of the current partners not involved in actual scanning projects may profit from the enabling function of BHL-Europe to establish a scanning project before the end of the project and contribute content.

Another risk is related to strong dependency of BHL-Europe and EUROPEANA: if problems or risks cause EUROPEANA to modify the project significantly, it will significantly influence the progress of BHL-Europe. However, we don't have to stop or modify our aims and can work parallel on other aspects of the project until EUROPEANA has solved the issues. Otherwise we will communicate intensively to discover problems as early as possible and together work on solutions. Communication mechanisms are already in place as illustrated by two examples. Personnel from NHM and NMP will be directly involved in several work packages of EUROPEANA v.1.0. From the technology perspective, our technology advisors at UBER are working in the same group together with technology experts of EUROPEANA. This procedures will help us effectively manage the risks together.

From the project management perspective the most important risk category is the human factor. The size of the consortium is high (28 partners). Many experts in various fields (biodiversity, library, technology) are involved and contribute their views and experiences. This may slow down or even stop the consensus building process and the development of the Memorandum of Understanding during the first two phases of the project. To reduce this risk we are operating with various sets of documents and guidelines developed before in other projects (EUROPEANA, BHL). These documents will be used as our starting point for the consensus building process. It is very unlikely that one of the partners will not accept these documents as a base for further discussions as all partners are aware of the principle working procedures of EUROPEANA and BHL. From the technology perspective, we are intending to use technologies that are proven to be flexible enough (e.g. Fedora) to deal with various partner requirements to accomplish the aim of BHL-Europe. If the adaptations of the technological solution required by individual partners may delay the overall progress of the project, the specifications of the partners will be duly documented but fixed later while the procession of the data of the other partners is initiated already.

9.4 Quality Assurance

Quality assurance is applied to all deliverables of the project. We will keep a quality log to document the quality assurance procedures and the actual quality control of each deliverable. Depending on the type of deliverable, different methods are used in order to control quality. For the main products (e.g. Live BHL-Europe system) we will set quality criteria and document these criteria together with quality control and audit processes in the product description, which will be developed in the individual stages of the project. The actual test of the products will be performed by the target users of the project. The feedback of the users will be collected continuously but particularly during the three evaluation periods. The results of the evaluation will be discussed during review events. The deliverables of WP5 will mainly be tested by feedback cycles using comments of the scientific community and the target users addressed. All reports and documents will be reviewed by experts of the topics concerned. These experts are not members of any of the consortium partner institution and will be recruited during the project depending on the nature and content of the deliverables. The following experts are currently identified to review BHL-Europe deliverables:

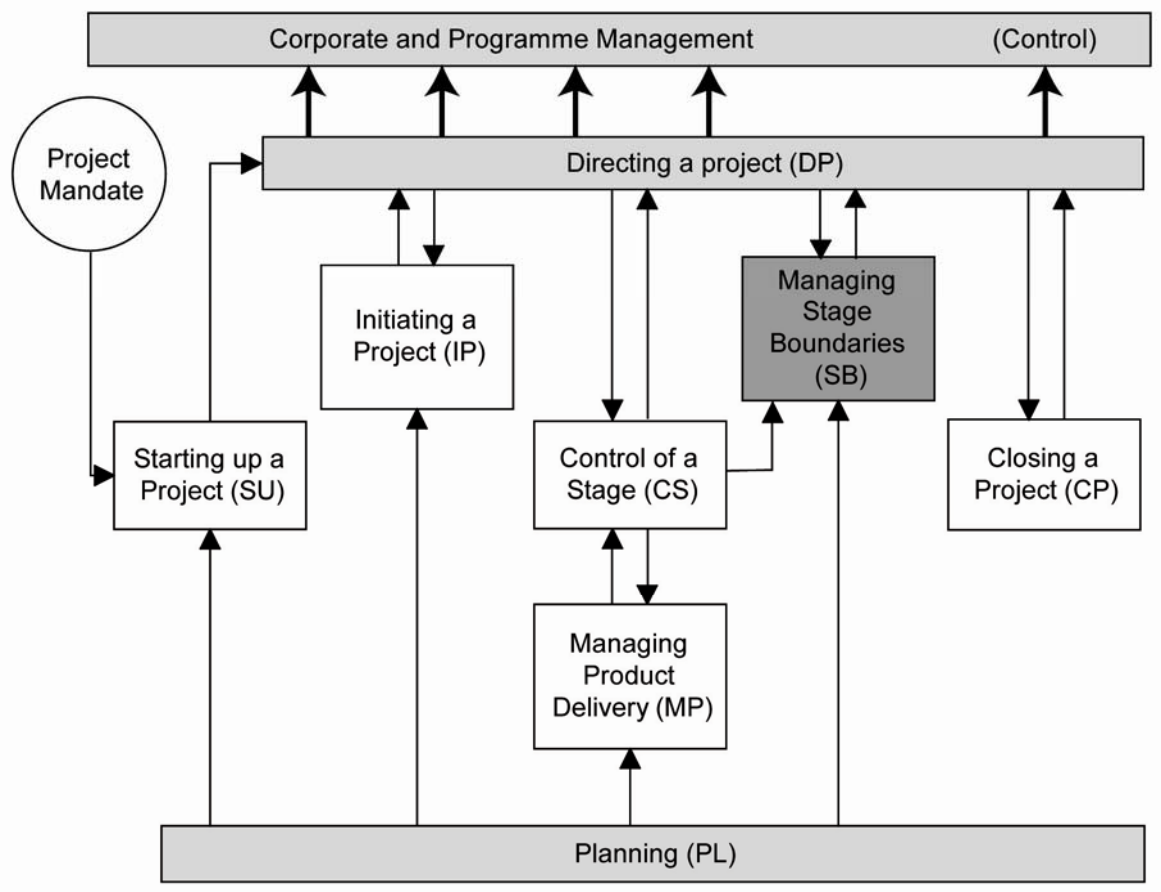
- Martin Gordon, Project Manager in the *e*Content*plus* DISMARC project
- Robert Zepf, Head of Academic Services at Berlin State Library

- Alexander Firyn, Scientific Consultant at Fraunhofer Institute for Software- and Systems Engineering ISST

The quality assurance aspects of the technical aspects of the BHL-Europe project will be managed by a coherent and established methodology. PRINCE2 (which stands for Projects in Controlled Environments) was first developed by the UK government in 1989 as the standard approach to IT project management for central government. Since then, the method has been enhanced to become a generic, best practice approach suitable for the management of all types of projects, and has a proven record outside both IT and government sectors. PRINCE2 is a process approach to project management, fitting each process into a framework of essential components which need to be applied throughout the project. Method and QA statements of work will be required from all parties involved.

PRINCE2's formal recognition of responsibilities within a project, together with its focus on what a project is to deliver (the why, when and for whom) will provide us with:

- A common, consistent approach
- A controlled and organised start, middle and end
- Regular reviews of progress against plan
- Assurance that the project continues to have a business justification
- Flexible decision points
- Management control of any deviations from the plan
- The involvement of management and stakeholders at the right time and place during the project
- Good communication channels between the project, project management, and the rest of the organisation
- A means of capturing and sharing lessons learned
- A route to increase the project management skills and competences of the staff at all levels



PRINCE2 Process Methodology and Stages

10 Dissemination and awareness

BHL-Europe will produce a consistent set of communication activities to ensure that project results become known and used by the target users identified above. The experienced team from the National Museum in Prague will be responsible for leading the dissemination activities. Eight people from that partner with various qualifications ranging from biodiversity and IT experts to PR specialists will be involved. All dissemination activities are aligned with the activities of the EDIT program to ensure maximum efficiency. We are offered the use of EDIT communication tools (Web site, newsletter) and infrastructure (e.g. booths at special events) to ensure maximum awareness of the project message, goals and results. Colleagues at RBINS and – to a minor extent – MNHN will be responsible for this alignment with EDIT and the support of NMP in their dissemination activities for BHL-Europe. Communication will take place at three different levels to ensure dissemination for awareness, dissemination for understanding and dissemination for action. At the beginning of the project, a dissemination plan will be developed, which will define all dissemination activities in detail. This plan will be updated regularly, to incorporate new opportunities to disseminate the project results. Reaching the target groups of the project and stakeholders, we foresee various mechanisms for dissemination and awareness raising activities:

- dissemination of the project results through consortium members (using already existing networks of European scientific organisations included in the BHL-Europe consortium and within the considerable number of professional and special interest organisations where they are members, see 6.1)
- dissemination through BHL-Europe Web site and other promotional materials for all target users and the European Commission (fact sheets, flyers, self-running demonstrators / multimedia presentations, posters, newsletter, etc.)
- dissemination through papers in professional journals, short articles in newspapers, texts in various online encyclopaedias and information services (Wikipedia) and blogs
- dissemination through presentations and demonstrations at conferences and other relevant events (see below).

What	When	Where	Responsibilities
IMPACT Conference: OCR in Mass Digitisation	06.-07.04.2009	The Hague, NL	MfN, NHM
ECIR 2009 – European Conference on Information Retrieval	06.-09.04.2009	Toulouse, FR	tbd
e-Biosphere 09 Biodiversity Informatics Conference	01.-05.06.09	London, UK	NHM
The IADIS e-Learning 2009 conference	17.-20.06.2009	Algarve, PT	tbd
World Academy of Science, Summer Conference (ICBCB, ICET, ICOLDE)	24.-26.06.2009	Paris, FR	tbd
24th annual meeting of the Society for the Preservation of Natural History Collections	06.-11.07.2009; and annually	Leiden, NL	NAT
ELPUB 2009 – 13th International Conference on Electronic Publishing	10.-12.07.2009	Milan, IT	MSN
11. GEO-Tag der Artenvielfalt	13.07.2009	Berlin, DE	MfN
European BioSyst Meeting (GfBS, Systematics Association)	11.-15.08.2009; and annually	Leiden, NL	MfN, NAT
World Library and Information Congress – 75th IFLA General Conference and Assembly	23.-27.08.2009	Milan, IT	NHM
The 12th ESEB congress	24-29.08.2009	Torino, IT	MfN
ESERA 2009 Conference – European Science Education Research Association	31.08.-04.09.2009	Istanbul, Turkey	tbd
ECCB 2009 – European Congress of Conservation Biology	01-05.09.2009	Prague, CZ	NMP
Southeast Asian Gateway Evolution	14.-17.09.2009	London, UK	MfN, NHM

Jahresversammlung der Deutschen Zoologischen Gesellschaft	25.-28.09.2009; and annually	Regensburg, DE	MfN
ECDL 2009 – 13th European conference on digital libraries	27.09.-02.10.2009	Corfu, GR	tbd
Berlin7 – Open Access Conference	autumn 2009	tbd	UBER
Jahrestagung der Paläontologischen Gesellschaft	Oct. 2009; and annually	Bonn, DE	MfN
The Palaeontological Association Annual Meeting	Dec 2009; and annually	tbd, UK	MfN
Inauguration of the International Year of Biodiversity	tbd	Paris, FR	MNHN
IADIS International Conference e-Society 2010	Feb 2010	tbd	tbd
The 6th International Scientific Conference eLSE – eLearning and Software for Education	Apr 2010	Bucharest, RO	tbd
12th International Conference on EDUCATION	May 2010	Athens, GR	
Open Repositories 2010	tbd	tbd	NHM, SIL
FESPB 2010 – XVII Congress of the Federation of European Societies of Plant Biology	04.-09.07.2010	Valencia, ES	FUB-BGBM
World Congress of Malacology	tbd	Phuket, Thailand	MfN
WEBIST 2010 – 6th International Conference on Web Information Systems and Technologies	tbd	tbd	tbd
COP10 – 10th Conference to the CBD	18.-29.10.2010	Nagoya, Japan	NHM, SIL
CeBIT	March 2011	Hannover	FUB-BGM

The dissemination concept will work towards enhancing the image and awareness of BHL-Europe, its products, and services using structured campaigns to reach the target audiences. The expertise will include: corporate communications, media relations, product publicity, event management, exhibitions, print production and Web site development, workshops, and training.

We will develop the following major items:

- Web site for internal and external communication – implementation will be in cooperation with WP3. This Web site will be updated quarterly and act as the central access point to the project, its activities and results, and all aspects related to the project (including links to relevant portals and partner networks). Several parts of the promotion kit will be published here, e.g. the multimedia presentation and the newsletter. We will offer particular tools and services through the project Web site to facilitate newcomers to join the project (contact and registration forms, FAQ, discussion list). The Web site will also link to the EU and related activities and networks in the *e*Content*plus* programme to facilitate the clustering activities of BHL-Europe. Every consortium partner may submit content to the Web site in agreement with the Project Coordinator. NMP will be responsible for the maintenance of the project Web site and also the update of the project information published through the *e*Content*plus* Web site.
- Design and produce project promotion kit (flyers, folders, posters, multimedia presentations)
- Design and development of a newsletter and mailing list
- The BHL-Europe promotion kit will be used at conferences and public events to present BHL-Europe. An online database will be created to identify relevant events and to identify the relevant consortium member to attend the event and present the project and its result. Some travel expenses are included in the travel & subsistance budget of the project to facilitate the identified partners to attend meetings. Several relevant events that are already known and fixed today are listed above. This list will be developed continuously, also including suggestions of the European Commission. Workshops and Symposia will be organised for newcomers / potential new partners and the European digital library / open access community to explain the workflow of BHL-Europe to illustrate the functions of the portal, and to communicate the best practice approach. Newcomers are

particularly encouraged to participate and we will help them in joining these events. Public events (talks, demonstrations) will be offered for the actual end-users of the content. The preparation of these events will be aligned with the intentions of EUROPEANA in this respect to ensure the relevant target users are addressed consistently. Public events as well as workshops for the science or digital library community may be integrated in the annual project meetings (see section 10.1).

Eventually, we will also identify institutions for educational development and teacher training (e.g. the State Institutes for School and Media in Germany) and establish cooperation with BHL-Europe. This will enable the involvement in training courses for teachers and contact to schools and universities to introduce the project results to this target user group.

10.1 Events and Meetings

List of Events & Meetings

Meeting	Date (Project month)	Participants	Location
Kick-off meeting	Month 1	All partners	Berlin
Technology Workshop	Month 1	Technology providers	Berlin
WP2 Meeting	Month 3	Content providers	London
Technology Workshop	Month 3	TMB	London
PMG Meeting	Month 3	PMG	London
MoU-Agreement	Month 6	TMB + Content providers	Prague
Dissemination Workshop	Month 6	CWG	Prague
Technical review	Month 6	PMG + PSG	Prague
PMG Meeting	Month 9	PMG	Berlin
Technical review (including project presentation and exhibition for the public)	Month 12	PMG + PSG	Vienna
PMG Meeting (review 1st evaluation report)	Month 15	PMG	London
Technical review	Month 18	PMG + PSG	Brussels
Dissemination Workshop	Month 24	Communication Working Group	Paris
Technology Workshop	Month 24	Technology Management Board	Paris
Technical review (including project presentation and exhibition for the public)	Month 24	PMG + PSG	Paris
PMG – TMB – CWG Meeting	Month 27	PMG + TMB + CWG	The Hague
Technical review (including review 2nd evaluation report)	Month 30	PMG + PSG	Copenhagen
PMG – TMB – CWG Meeting	Month 33	PMG + TMB + CWG	Prague
Final review (including project presentation and exhibition for the public)	Month 36	All partners	Berlin

11 Other Contractual Conditions

11.1 Subcontracting

See below.

11.2 Other specific costs

Applicant 1 (MfN):

The Kick-Off Meeting and the Final Review meeting will take place in Berlin (Museum für Naturkunde). The considerable number of applicants and people involved require a proper event management including catering and equipment. The costs given below are based on experience with similar events.

Kick-Off Meeting	10,000 EUR
Final Review	10,000 EUR
Total	**20,000 EUR**

Applicant 2 (NHM):

The principle hardware and proprietary software components related to this project are the provision of the centralised aggregated storage of scanned images and related metadata together with the provision of Web services and downloadable tool sets. This will require a dedicated storage solution, tape library, operating software, backup management software, and servers to host Web services, etc. Currently, we plan to buy and install this equipment at the NHM in London (internally hosted). However, a more cost effective solution may be the rental of storage and servers from a third party, in which case a sub-contractor may supply the service and we would comply with art. II. 5 Subcontracts of the Grant Agreement.

The initial size of the SAN (Storage Area Network) solution will be in the order of 1000 Tb (1 Petabyte). However, it is initially difficult to size the overall system, since this will depend on the mix of temporary and permanent storage. The disk storage will be split into two halves and a hot standby is required to mitigate a local SAN failure. Due to the volume of information gathered over time a tape backup solution becomes increasingly impractical. If a tape library was required to restore 1000 Tb of information it could take many weeks to accomplish. This is the primary reason for a disk based hot standby.

A tape library is a valuable tool for bulk uploading of information into the repository or at the front end of the ingest process. Depending on the local conditions for each institution it may not be practical to transmit the volumes of data generated over a WAN (Wide Area Network). To mitigate WAN limitations a tape solution could be employed as a bulk ingest/upload device.

The hardware spend profile is based on the project development cycle. In the first year their is a modest requirement for hardware. In the second year the German Prototype is deliverable and in the final year the remaining BHL-Europe system is built. As such the following yearly estimate of hardware cost has been developed.

Year 1	50,000 EUR
Year 2	150,000 EUR
Year 3	495,000 EUR
Total	**695,000 EUR**

In using this break down we will also benefit from the progress of technology as it is commonly accepted that computing performance doubles every 18 months. By delaying the spend we will have the benefit of either a significant increase in performance cost ratio or more hardware for the same cost.

It is of great importance to develop a solution that is in keeping with green and environmental requirements. Wherever it is practical, lower energy technology will be employed to reduce the impact to the environment.

However, we will need to deal with 3 separate issues: mirroring the BHL store in MOBOT for European users via BHL-Europe and EUROPEANA; buffering and storage of distributed digital objects and metadata; enabling a fast server ‘production’ site with high bandwidth network to sustain heavy user loading (EUROPEANA’s recent launch highlights the importance of getting this right). These technical component issues will be resolved as part of WP3 D3.3. The BHL system in MOBOT currently has multiple terabytes of storage and a fast server set-up, but we expect to use more capacity than this in Europe due to our greater complexity. The initial estimated cost breakdown for these components is:

Storage Solution	480,000 EUR
Tape Library (for bulk ingest)	100,000 EUR
Servers	45,000 EUR
Operating/backup software	70,000 EUR
Total	**695,000 EUR**

The storage solution consists of the usual infrastructural components, racking system to house the hardware, disk tray subsystems to house the physical hard disks, and storage controllers that connect the servers to the storage. Load balancing will be employed at the frontend so that greater performance will be delivered for the system as a whole.

Applicant 3 (NMP):

Some expenses will be incurred in relation to the effective implementation of the communication activities. These expenses are related to Web site hosting and publication of the BHL-Europe promotion kit. For further explanations see section 10.

Web site hosting	500 EUR
Web site design	7,000 EUR
Printing (e.g. brochures, posters, leaflets, postcards, gadgets)	7,000 EUR
Translation of Web site, brochures, posters, leaflets	5,000 EUR
BHL-Europe journal	4,000 EUR
Instruments to support newcomers to join (e.g. workshops / courses, information material incl. current version of best practice guidelines and other important deliverables)	2,500 EUR
Total	**26,000 EUR**

11.3 Indicative budget distribution & pre-financing schedule

Part. No.	Participant Short Name	Total Costs	Community Contribution	Community pre-financing		
				First instalment	Second instalment	Third instalment
1	MfN	558,182	446,545.60	119,078.83	119,078.83	119,078.83
2	NHM	1,151,584	921,267.20	245,671.25	245,671.25	245,671.25
3	NMP	191,382	153,105.60	40,828.16	40,828.16	40,828.16
4	EDL-Foundation	184,120	147,296.00	39,278.93	39,278.93	39,278.93
5	AIT	383,042	306,433.60	81,715.63	81,715.63	81,715.63
6	ATOS	215,150	172,120.00	45,898.67	45,898.67	45,898.67
7	FUB-BGBM	204,878	163,902.40	43,707.31	43,707.31	43,707.31
8	UGOE	79,247	63,397.60	16,906.03	16,906.03	16,906.03
9	NHMW	94,310	75,448.00	20,119.47	20,119.47	20,119.47
10	LANDOE	96,890	77,512.00	20,669.87	20,669.87	20,669.87
11	HNHM	28,982	23,185.60	6,182.83	6,182.83	6,182.83
12	MIZPAS	34,800	27,840.00	7,424.00	7,424.00	7,424.00
13	UCPH	62,353	49,882.40	13,301.97	13,301.97	13,301.97
14	NAT	69,303	55,442.40	14,784.64	14,784.64	14,784.64
15	NBGB	73,553	58,842.40	15,691.31	15,691.31	15,691.31
16	RMCA	95,650	76,520.00	20,405.33	20,405.33	20,405.33
17	RBINS	150,400	120,320.00	32,085.33	32,085.33	32,085.33
18	BnF	74,723	59,778.40	15,940.91	15,940.91	15,940.91
19	MNHN	85,790	68,632.00	18,301.87	18,301.87	18,301.87
20	CSIC	66,813	53,450.40	14,253.44	14,253.44	14,253.44
21	MSN	24,502	19,601.60	5,227.09	5,227.09	5,227.09
22	RBGE	53,447	42,757.60	11,402.03	11,402.03	11,402.03

23	Sp2000	37,332	29,865.60	7,964.16	7,964.16	7,964.16
24	WILEY	10,950	8,760.00	2,336.00	2,336.00	2,336.00
25	SIL	0	0.00	0.00	0.00	0.00
26	MOBOT	0	0.00	0.00	0.00	0.00
27	UH-Viikki	52,355	41,884.00	11,169.07	11,169.07	11,169.07
28	UBER	120,046	96,036.80	25,609.81	25,609.81	25,609.81
Maximum Community contribution			**3,359,828.00**	**895,953.92**	**895,953.92**	**895,953.92**

The coordinator may request the payment of the pre-financing instalments subsequent to the first according to the following schedule:

- Second instalment as of month 12
- Third instalment as of month 24

12 Appendices

12.1 Consortium description

12.1.1 Museum für Naturkunde - Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin (MfN)

With more than 30,000,000 objects, the MfN is the largest natural history museum in Germany. The library of the MfN holds 175,000 items and about 1,000 currently subscribed journal titles in the fields of zoology, palaeontology, and mineralogy. The museum is involved in the management of the EU I3 SYNTHESYS and will soon be leading WP7 of EDIT. In addition, the museum is involved in the development of numerous national and international projects funded by the EU, BMBF (Biota, GBIF), BMU, and DFG (e.g. Graduate Research Program 503). There is a dedicated grant administration team at UBER who assist grant holders at MfN with the delivery of the project including contractual and financial management and reporting.

Dr. Henning Scholz: Henning's broad biodiversity expertise comes from his scientific work on the zoology and palaeontology of marine and freshwater molluscs and amphibians. Since 2002 he has worked for MfN in various functions. From 2002 to 2004 he was project manager of the Graduate Research Program 503. Since 2004 he mainly works as a curator of Invertebrate Palaeontology and assistant of the Head of the Department of Collections. In 2007 he was part of the management team responsible for the development of the new permanent exhibition of the MfN.
Manja Voß, MSc: Manja is DE-TAF administrative officer (SYNTHESYS) at MfN since 2005. She is responsible for day-to-day administration, and has extensive experience with the coordination of the project-oriented workflows (e.g. planning of conferences, communication and arrangement with international scientific visitors, qualitative and quantitative assessment of collection data).
Dr. Michael Ohl: Michael is Head of the Entomological Collections and the Library Committee: Besides being a biologist, he also studied philosophy and history of sciences at the universities of Kiel and Göttingen, which makes his work interests closely connected to libraries and historical books. He is also engaged in building up the German initiative to scan biodiversity literature.
Tasks: WP1, WP2, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.2 Natural History Museum (NHM)

The Natural History Museum is one of the world's great museums, with over 3,900,000 visitors, and 13,000,000 online visitors per year. The NHM is also an international leader in the scientific study of the natural world. NHM has a strong track-record in EC funded research and training. It currently leads the €13m EU I3 Programme SYNTHESYS project, which provides access and training in 20 natural history museums and herbaria. NHM is currently in negotiation on nine FPVII projects across a range of research disciplines. In addition, NHM has led training networks and infrastructure projects in the last three frameworks; currently leads a FP6 RTN project, ORIGINS and is a partner in a further 15 FP6-funded projects. The NHM Library has the largest collection of natural history materials in the world, with over 1,000,000 books (from 1469 onwards), 25,000 journal titles, and 600,000 works of art. The NHM is a leading participant in the BHL and an active player in the EOL Project. NHM has a large number of staff members with good background in Library Management Systems and strong IT skills including programming and database creation.

Graham Higley: Graham is Head of Library and Information Services and his experience of EU and global project management is extensive, and includes multi-million Euro IT programmes and large building projects. He is the Coordinator for the I3 FPVI funded SYNTHESYS contract, the Chair of the BHL and on the Steering Committee for the EOL Project. He is also a member of Science Group (which sets policy for all NHM Science) and Chair of the NHM Information Strategy Group.
Adrian Smales: Adrian is Head of ICT and has successfully delivered IT infrastructure projects valued up to £3 million. His previous technical roles focused on database technologies and system development.
Chris Sleep: Chris is Head of Infrastructure and Systems and has worked at the NHM for over 10 years in various technical roles and is Head of systems and infrastructure. He has extensive experience in the UK academic environment and has support a number of similar projects including SYNTHESYS and EDIT. His expertise includes system integration and system design.
Nancy Chillingworth: Nancy is an experienced IPR professional. She is also advising the EUROPEANA project on IPR issues.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.1, 2.2, 2.3, WP3, WP4, 5.4.5

12.1.3 Narodni muzeum (NMP)

The National Museum is a public scientific institution which systematically enriches its collections consisting of objects of natural and historical sciences all over the world, with particular interest to the Czech Republic. It conducts research in various fields of natural and historical sciences and has a large exhibit activity. The National Museum is the most distinguished and the largest museum in the Czech Republic. It consists of five professional institutions: Natural History Museum, Historical Museum, The Náprstek Museum of Asian, African and American Cultures, Czech Museum of Music, National Museum Library. At present the National Museum houses almost 20 million items from the area of natural history, history, archaeology, arts, music, and librarianship.

Dr. Jiří Kvaček: Jiří is Head of the Department of Palaeontology and holds a PhD in Palaeontology. His scientific work is focused on palaeobotany. From 2005 to 2008 he was science director of NMP. He was involved in management of several scientific projects in palaeontology, a project of Scientists night and three exhibitions. In 2007 he organised the management team responsible for the development of the new permanent exhibition of NMP.
Pavel Stastný: Pavel is a qualified designer. He worked in various companies and state organisations. He is specialised in production of PR materials for state (e.g. Academy of Sciences of the Czech Republic) and private subjects (Datart). He developed corporate design for journals of the NMP, produced numerous exhibits (e.g. Architecture Week, Prague 2007). He was involved in several design projects for web portal Seznam.cz. He also works as an independent designer and exhibited his design in London, Paris, New York, and Mexico.
Petr Zrustek and Lukas Zvolanek: Both are IT specialists at NMP and are involved in the development of IT services and Web programming and development.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.1, 5.2, 5.3, 5.4.1, 5.4.5, 5.5

12.1.4 European Digital Library Foundation (EDL Foundation)

The Stichting European Digital Library (EDL Foundation) is a cross domain foundation, under Dutch law, set up for the purpose of fostering collaboration between Museums, Archives, Libraries, and Audiovisual Collections in Europe. It aims to provide access to Europe's cultural heritage by facilitating formal agreement across museums, archives, audio-visual archives, and libraries on how to cooperate in the delivery and sustainability of a joint portal. It also provides a legal framework for use by EU funded projects to bring their research or content into the EUROPEANA. Its current Board of Participants is made up of pan-European Associations from the 4 sectors able to represent and mobilise their members to contribute and form part of EU funded projects aimed at realising a European Digital Library. These are EURBICA, FIAT, ACE, EMF, ICOM Europe, CENL, CERL, LIBER, MICHAEL, the Koninklijke Bibliotheek, INA, the Bundesarchiv, and the BnF.

Dr. Jill Cousins: Jill is the Executive Director of EDL Foundation and the Programme Director for The European Library (TEL) and EUROPEANA. She was responsible for creating the operational service The European Library. Its success has led to the EU giving their strategic backing to TEL for the creation of the EDL. She has a strong Web publishing background, having worked for VNU as their European Business Development Director and then working for Blackwell Publishing.
Catherine Lupovici: Catherine has many years of experience in digital libraries, being Director of the Digital Library Department at the BnF prior to joining EUROPEANA Net Office. Catherine was involved in

the development of the Web archiving services in the BnF, in the development of the trusted digital repository and in the contribution of BnF to the definition of what a European Digital Library might be through the French EUROPEANA maquette and prototype as well as in the Gallica project. She also worked in Jouve SA French printed company involved in data capture and electronic publishing were she led several European Research and Development projects bringing together libraries, publishers, and research laboratories specialised in information technologies.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.3.1, 2.3.3, 3.1.2, 3.1.3, 3.2.1, 3.2.2, 3.4.1, 5.4.5

12.1.5 Angewandte Informationstechnik Forschungsgesellschaft mbH (AIT)

AIT is an Austrian software and research company founded in 1979. Research work is done primarily in the field of information management (e.g. distributed databases, collection management, and knowledge engineering). AIT has been involved with research projects such as MOSAIC (Museums Over States and virtual Culture; TEN-Telecom), COVAX (Contemporary Culture Virtual Archives in XML; IST-Programme), REGNET (Cultural Heritage in REGional NETworks), Media.Alp (Setting up an integrated communication platform for achieving a cultural community in the Alpine space; Interreg Alpine Space Programme), and DISMARC (DIScovering Music ARChives; *e*Content*plus).* Within DISMARC OAI technology and protocols are used to create a common catalogue of distributed archives metadata. At regional level AIT is the technical provider for the DIS project, where a virtual content catalogue for museums, archives, libraries and other institutions is being created using OAI technology and international standards (Dublin Core).

Prof. Dr. Walter Koch: Walter is Director of AIT Ltd and is chairperson of the CSC Europe EEIG and head of the Steinbeis Transferzentrum (IMCHI – Information Management and Cultural Heritage Informatics). He is consultant and contractor to various national and international organisations (e.g. UNESCO, DFG, EC, ESA, Austrian ministries, Graz municipality) and member of several national and international scientific associations (e.g. ICOM, ONORM, VÖB). His 10 years project experience includes: bibliographic information, information systems, IT-management; EU Projects (TAP, Raphael, TenTelecom, IST, Interreg IIIB, eContentplus): COVAX, OpenHeritage, CULTIVATE, CIMI, MEDIA.ALP.
Odo Benda: Odo specialises in the development of XML database applications for diverse international and national research projects (e.g. REGNET, MEDIA.ALP, MODOK, DISMARC, and DIS). Currently he is working on the implementation of thesaurus Web services for the cultural heritage domain (based on international standards such as ANSI and SKOS vocabulary).
Mag. Gerda Koch: Gerda is Managing Director of AIT Ltd and was responsible for the financial and administrative coordination of the EU IST-Project REGNET (23 partners in 12 European states), coordinating also the legal framework for the project continuation. For DISMARC and DIS she works on the metadata and vocabulary mapping, user interface presentation, system validation and coordinating regional management issues.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 3.1, 3.2, 3.4, 5.4.5

12.1.6 Atos Origin System Integration (ATOS)

Atos Origin is a leading international IT services provider. Atos Origin is the Worldwide Information Technology Partner for the Olympic Games. At Atos Origin, Systems Integration is not just about integrating new solutions, but includes getting the most out of legacy applications to prolong returns from existing IT investment. Successfully combining new solutions with established ones can transform the complete enterprise architecture into a single, seamless business system. Our extensive experience in integrating people, processes, and technologies enables us to design, build, and operate practical and robust solutions.

Roger Essoh: Roger is Atos Public Sector Business Developer and Head of Innovation and in charge of relations with FEDORA Commons. Driving several innovations in digital content preservation and archive, member of the Stanford University "Enterprise Repositories and Federated Archives" working group. Managing the R&D team for the BnF Preservation and Archive Distributed System (SPAR).
Lee Namba: Lee is ATOS Technical Architect and has defined the global architecture of SPAR based on FEDORA. Sets up the development and integration environments (software configuration management, continuous integration, development frameworks, etc.) and best practices.
Gautier Poupeau: Gautier is SPAR functional consultant with the Ecole nationale supérieure des sciences de l'information et des bibliothèques (ENSSIB). Defines all the rules to manage the data handled by BnF. Expertise in Semantic Web, XML, OAIS, and specific schemas (such as METS, TextMD, MIX, etc. defined by the Library of Congress).
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.4, 1.2.3, 1.5.1, 3.1.1, 3.1.2, 3.1.3, 3.2.1, 3.2.2, 3.3, 5.4.5

12.1.7 Freie Universität Berlin (FUB-BGBM)

The Botanic Garden and Botanical Museum Berlin-Dahlem (BGBM), with its extensive scientific collections of herbarium specimens (about 3.5 million) and living plants, is a centre of biodiversity research in Europe. It houses the most complete botanical library in the Germany. The library holds a wide range of literature on plants from all over the world, in all printed languages and from five centuries, among them many precious and very rare books. BGBM has a separate department of Biodiversity Informatics with, at present, 20 staff members. Focal point of research and development activities are taxonomic information systems and networking of distributed primary biodiversity information.

Prof. Dr. Walter Berendsohn: Walter is Director of Dept. of Biodiversity Informatics and Laboratories and his efforts have been primarily devoted to information systems in biodiversity research. He has authored several information models and coordinated numerous EU projects or project work packages. He has acted as coordinator for federal programs in biodiversity informatics research in Germany, and is a member of the German delegation to the GBIF governing board.
Anton Güntsch, MSc: Anton is Head of the Biodiversity Informatics and Documentation Section and focuses on design and implementation of collection and taxonomic databases at the meta and object levels; design of cooperative networks of distributed biodiversity information systems. Present project and committee memberships include: GBIF Germany IT commission (chair), Euro+Med computer working group, and EDIT Information Science and Technology Commission.
Dr. Norbert Kilian: Norbert is Head of the section Library, Archives, and Publications of BGBM and focuses of his research activities on exploring the possibilities of the Web for the cooperative production and user-friendly presentation of taxonomy.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.1, 2.3.4, 3.2.3, 3.4, 5.4.5

12.1.8 Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts (UGOE)

The EZOOLO/AnimalBase project is located at the Georg-August-Universität of Göttingen and was initiated as a joint venture of Göttingen University Library (SUB) and the Zoological Institute of the university to provide free access to digitised versions of all taxonomically relevant early zoological works. In a first step (2003-2005) more than 100,000 pages were digitised from the earliest beginnings of scientific zoology in the 1550s until the year 1770, and 10,000 animal names were extracted and transferred to AnimalBase. In a second step from 2008 onwards the literature shall be covered until the 1820s, with approximately 50,000 animal names.

Dr. Francisco Welter-Schultes: Francisco has worked since 1992 as a zoologist specialised in European non-marine mollusc taxonomy, and systematics. His research projects included compiling bibliographies for mollusc faunas in SE Europe, in the course of which he gained profound experience with early zoological literature. In 2003 he initiated the EZOOLO/AnimalBase project.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.4.5

12.1.9 Naturhistorisches Museum Wien (NHMW)

The collections with more than 30 million specimens including hundreds of thousands of types are the basis for any taxonomic work. AT-TAF (SYNTHESYS) is one of the "first addresses" for taxonomic work. Additional a library with many historically important volumes is available. The library with c. 6000 scientific journals and tens of thousands of books complement with the National Library of Austria and the University's libraries nearby.

Dr. Ernst Vitek: Ernst is Interim Director of Department of Botany, Head curator of phanerogams and since 1997 is the editor of the "Annalen des Naturhistorischen Museums, Serie B". Together with his colleagues, he is member of the Austrian working group for long-term storage.
Heimo Rainer: Heimo is a Botanist and Zoologist and strongly involved in the TDWG (Biodiversity Information Standards). Since 2000 he is responsible for database management and digitisation aiming to digitise the herbaria of the University of Vienna and the NHMW.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 3.3, 5.4.5

12.1.10 Land Oberösterreich (Oberoesterreichisches Landesmuseen) (LANDOE)

The Biology Centre in Linz-Dornach, with its more than 6 million objects, represents the 2nd largest in Austria. It currently publishes the series Stapfia and Denisia and three other journals. It holds the biodiversity database ZOBODAT, founded in 1972 as ZOODAT. The database today includes more than 3.3 million records, literature citations (more than 33,000), OCR scanned books (~150,000 pages) and bibliographies from about 4,000 biologists until now.

Dipl.-Ing. Michael Malicky: Michael is Head of IT at LANDOE and started his career as IT Administrator of the Biodiversity Database ZOBODAT in 1991 at Linz University. He has participated in ENBI (2002-2005, WP Coordinator), Sp2000, several projects within GBIF Austria, and since 2006 in the Project "Digitisation of Upper Austrian and Austrian Natural History Literature" with F. Gusenleitner.
Mag. Fritz Gusenleitner: Fritz is Deputy Director of the Biology Centre at LANDOE and is curator for Entomology at LANDOE since 1981. He is editor/chief editor of many publications of LANDOE.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.2.3, 3.4.3, 5.4.5

12.1.11 Hungarian Natural History Museum (HNHM)

HNHM holds more than 10 million natural history items. HNHM Library contains more than 300,000 volumes. The catalogue of the library is available on the Internet. Several natural history journals and books published by the HNHM during its 200 years of history. During the last years these are available via the internet but there is a strong commitment by HNHM to digitise and provide free access to its own journals and books.

Angéla Matuszka: Head of Library and Science History Collection at HNHM
László Peregovits: László is Chief Museologist Dept. of Zoology and has several decades of experience in editing and publishing including conceptual and technical aspects. He was involved in various research projects including: Digitisation of Insects of Mongolia (GBIF), BioCASE, FaEu (Fauna Europe), SYNTHESYS, EDIT. Since 2002 he is member of CETAF.
Dr. Miklós Rajczy: Miklós is Head of Information Technology Group and has been involved in various projects, including: MUSoNET, Digitisation of HNHM mushroom herbarium data, Digitisation of HNHM herbarium data, Database of Hungarian published data on algae.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.12 Museum and Institute of Zoology, Polish Academy of Sciences (MIZPAS)

The library collection is of national importance with holdings of zoology, especially systematic and zoogeography, entomology and ornithology. Recently it has increased by publications concerning molecular biology. At present the Library comprises 243,271 volumes and 5,378 archival.

Robert Turlej: Robert is EU Programs Coordinator and before joining the MIZPAS as PL-TAF (SYNTHESYS) and EDIT coordinator he worked as Sales Director for Qui-Tech Sp. z.o.o. and IT expert for Com-Tech.
Monika Malcher: Monika is Library Manager and holds a Masters degree of the Faculty of Animal Sciences of Warsaw University. She is managing the library activities of MIZPAS since 2000.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 3.4.3, 5.4.5

12.1.13 University of Copenhagen (The Natural History Museum of Denmark) (UCPH)

The museum holds an estimated 12 million specimens of animals, plants, books, archives, fossils, minerals, and other natural history related items. Part of the museum are three libraries, a botanical, a zoological, and a geological. The libraries hold more than 250,000 bibliographic entities (books, journals, reprints). The museum hosts the GBIF and the Danish GBIF node.

Henning Knudsen: Henning is Collections & Library Manager and has taken the initiative to digitise important Danish botanical works like Flora Danica and Flora Agaricina Danica.
Christian Lange: Christian is IT-coordinator at UCPH and is responsible for digitisation and the database programming in UCPH, for photographing, for running our scanning equipment etc. He is also responsible for the homepage of the Danish mycological society.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.14 Stichting Nationaal Natuurhistorisch Museum Naturalis (NAT)

Naturalis was founded in 1820 and much of its collection dates back to the 19th and 20th century. Naturalis has a staff of about 160 people, which include scientists, collection managers, exhibition designers, information officers, educators, etc. The collections of zoological, palaeontological, and geological objects are estimated about 12 million objects. With reference to the BHL-Europe project Naturalis can rely on a strong and innovative department of information services backed by natural history collections and archives which cover nearly 200 years of research and collecting.

Kees Hendriks: Kees is Head of Information Services, Acting deputy director of Public Engagement and studied medicine at the University of Leiden. Before starting to work at the national museum of Natural History Naturalis in 2000 he worked for various employers as project assistant, project manager, department

manager and vice director. The focus in all the jobs fulfilled is information exchange. He is responsible among other things for the policy development in science communication both geared to popular audiences as well as to scientific target groups.
Tom Gilissen: Tom has a degree in Information Sciences and works for the library of Naturalis.
Berry van der Hoorn: Berry is Project Manager Information Services and studied biology and worked for nine years as a project manager and advisor at the largest insurance company of the Netherlands, where he was responsible for the development and implementation of several Web based information systems. Most of his projects involve development of Web sites and applications.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.15 National Botanic Garden of Belgium (NBGB)

NBGB is a 'complete' botanical garden, integrating a living collection ('Hortus'; 18,000 species in cultivation) and a large museum ('Herbarium'; more than 3 million plants incl. fungi). The library holds 50,000 monographs including 2,500 valuable historical books, 5,000 periodicals, and 25,000 reprints. Historical literature on Central African flora was kept in NBGB since 1890. Data repatriation to partners both in Africa and Latin America is a priority for NBGB. Drawings and colour paintings of flowering plants and fungi were digitised and linked to specimens kept in the BR herbarium. NBGB is an institutional member of CETAF and is active in the EC projects ENBI, EDIT, and SYNTHESYS. It also collaborates as a training provider to GTI (Global Taxonomy Initiative) capacity building activities with developing countries.
Prof. Dr. Elmar Robbrecht: Elmar is Head of Department 'Vascular plants' and has been working at NBGB since 1974. He holds an MSc and PhD in Botany from the State University of Ghent (Belgium). Since 1994, he is a Member of the Belgian *Royal Academy for Overseas Sciences* (section Natural and Medical Sciences; president of the section in 2001).
Régine Fabri: Régine holds a PhD in Botany and an MSc in library. She is working in NBGB since 1982. In 1994 she was transferred to the library as responsible of the computerising of the catalogue. Since 2004, she is scientific responsible of the library and is also in charge of the library administration.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.4.5

12.1.16 Royal Museum for Central Africa (RMCA)

RMCA is a multidisciplinary institution with a special focus on Sub-Saharan Africa. The museum manages collections of about 10 million specimens of animals and 56,000 wood specimens of 13,600 different botanical species. The RMCA maintains an extensive library on African biodiversity, including the top scientific journals, but also a unique collection of rare, old colonial publications. The institution has about 1.2 km of Archives. Information on biodiversity is repatriated to African partners, towards which also training in taxonomy is provided. RMCA is an institutional member of TDWG and is involved in initiatives like GBIF, ENBI, EDIT, CETAF, and SYNTHESYS. It collaborates to GTI capacity building activities with developing countries.

Dr. Patricia Mergen: Patricia (External Relations and project management at RMCA) holds a PhD in Biological Sciences from University of Namur in Belgium. From 2002 to 2005 she was project manager of the Belgian Biodiversity Information Facility (BeBIF). She then served as an independent expert for the evaluation of FP6 proposals. Other memberships include the GBIF ICT Advisory Group, WP13 of ENBI, and TDWG. From 2002 to 2005 she was a member of the Belgian Delegate of the GBIF Nodes Committee and the GBIF DADI subcommittee.
Additionally the project will benefit from input of the biodiversity information unit (Danny Meirte, Bart Meganck, Garin Cael, Franck Theeten and Kim Jacobsen), from the staff of RMCA's Metafro-Infosys, our History department and Central library.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.17 Royal Belgian Institute of Natural Sciences (RBINS)

The RBINS houses a diverse and exceptionally rich collection, comprising about 37,000,000 specimens. The scientific library of the RBINS is the biggest documentary resource of natural history in Belgium. It offers a vast range of books (695,368 volumes) and has very specialised, often unique scientific magazines. Its catalogue is available online. RBINS has started the digitisation of the catalogue of the library and more than 185,000 titles are online.

Dr. Patrick Grootaert: Patrick is Head of Department of Entomology and Vice-Director of the Institute, and holds a PhD with a specialisation in Nematology and also obtained a Doctor in Science degree in Entomology. As BE-TAF manager he ensures the links between the NBGB, the RMCA, and RBINS.

Laurent Meese: Laurent is Head of the Library at RBINS and obtained a master degree in Communication Sciences and later specialised in library sciences. He coordinates the digitisation of the catalogue of the library as well as the pilot project of the digitisation of the Dautzenberg reprint collection. He is involved in the Driver2 programme coordinated by the University of Ghent.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5

12.1.18 Bibliothèque nationale de France (BnF)

BnF is one of the largest public and research libraries in the world and holds more than 50,000 monographs and around 3,000 titles of periodicals published in the natural sciences field between 1801 and 1920. The BnF offers access to its digital library Gallica www.gallica.bnf.fr, created through the library's commitment to the digitisation of selected items of its collections. In spring 2008, the BnF launched a new version of Gallica with new and modern functionalities drawing upon the most recent Web 2.0 experience. At a European level, the BnF is a founding member of The European Library consortium and is involved in the TELplus and IMPACT projects and is also a member of the EDLnet thematic network.

Eva Fuentes: Eva is Head of the Unit 'Sciences de la vie, sciences de l'ingénieur' and is in charge of the management of this collection and its digitisation.
Frédérique Joannic-Seta: Frédérique is Head of the Unit 'Associated Centres-Gallica' and is in charge of the management of the digital library Gallica as well as the coordination of the cooperation with the French libraries and organisations in order to implement a policy of sharing and complementing document holdings and digitisation.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.4.5

12.1.19 Museum national d'histoire naturelle (MNHN)

The main activities of MNHN are research, education, and training, enrichment of its collections (around 68 million specimens), providing expertise, and diffusion of scientific knowledge. MNHN was and is heavily involved in various European programmes related to biodiversity: The European Topic Centre on Biological Diversity of the European Environmental Agency; the French GBIF, GTI and CBD nodes, the French Focal Point for the EU-funded BioCASE project; leading partner in several past and on-going EU projects, including ParSyst, ColParSyst, Fauna Europaea, ENBI and EuroCAT/Sp2000 Europa, SYNTHESYS, EDIT, MarBEF, EUMon, and PESI. The central Library Department holds the world's third collection of literature, original drawings, and manuscripts relating to natural history. The print collections include 20,000 periodical titles and 600,000 books. Digitisation plans are already on-going in full collaboration with BnF.

Mrs Michelle Lenoir: Michelle is Head Librarian of the MNHN and graduated the National High School for Information Sciences and Librarianship in 1971. Since 2003 she is in charge of implementing the Museum collections development policy. Previously in her career, she played a key role as an expert in heritage collections for the French Ministry of Culture.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.3, 5.4.5

12.1.20 Consejo Superior de Investigaciones Científicas (CSIC)

CSIC is the largest National Research Institution in Spain. The participant institute, Museo Nacional de Ciencias Naturales (MNCN) houses the biggest natural history collections, library, and archives in Spain. Relevant national project for the proposal lead by MNCN is Fauna Ibérica. MNCN is founding member of CETAF, partner of SYNTHESYS, EDIT, LifeWatch and coordinates the Spanish GBIF node. The public library of MNCN contains more than 62,000 volumes and more than 6,400 scientific journals as well as access to more than 9,000 electronic journals.

Antonio G. Valdecasas: Antonio is a senior researcher at the MNCN. He has worked in computer applications to taxonomy, building the first truly hierarchical taxonomist database (1989) and the first Web page of a Spanish Museum (1994). Other developments are in image processing for taxonomy. In 2006 he has developed the first iconic online database for water mites.
Marian Ramos: Marian is Vice-Director for Research at MNCN and is ES-TAF Leader (SYNTHESYS), the Spanish Focal Point for the GTI, Chair of the Bern Convention Group of Experts on Invertebrates (Council of Europe) and WP leader of EDIT and of LifeWatch.
Isabel Morón: Isabel is Head of the Library at MNCN and has participated in numerous national digitisation and diffusion projects of bibliographic holdings. Regular trainer in cataloguing courses. She has published articles on the holdings of the MNCN library.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.21 Università degli Studi di Firenze (Museo di Storia Naturale) (MSN)

With more than 10 million specimens, it is the most important natural history museum in Italy. The Museum houses specimens of extraordinary scientific and natural history value: XVI century herbaria, valuable XVIII century waxes, fossil elephant skeletons, brightly coloured butterflies, huge tourmaline crystals, Aztec artefacts, imposing wooden sculptures and the world's largest flower. A lot of ancient and rare books are also preserved in the Library (Biblioteca di Scienze).

Luca Bartolozzi: Luca is Head of Zoology, Curator of the Entomology Department and holds an MSc in Biological Sciences from the University of Florence. He is a specialist in tropical insect biodiversity (systematics, taxonomy, and faunistics of Lucanidae and Brentidae (Coleoptera)). He has published more than 100 scientific papers.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 3.4.3, 5.4.5

12.1.22 Royal Botanic Garden Edinburgh (RBGE)

RBGE is an internationally renowned centre for botanical research and conservation work and holds one of the largest collections of living plant species in Europe, together with large collections of preserved plant and fungal material. It has one of the most important botanical libraries in the UK.

Jane Hutcheon: Jane is Head Librarian Royal Botanic Garden Edinburgh and a chartered librarian with over 30 years experience in academic and research librarianship.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.23 Species 2000 (Sp2000)

Species 2000 is a Network organisation that creates an index of the world's known organisms. The programme reached production scale as an EC scientific infrastructure under the FP5 EuroCAT project. Its Catalogue of Life is a global service (www.catalogueoflife.org) recognised by the UN Convention on Biological Diversity, and presently comprising a synonymic species checklist of 1.1 million plants, animals, fungi and micro-organisms, about 2.5 million names, and a comprehensive taxonomic hierarchy. It contributes content and the taxonomic hierarchy used by the taxonomic intelligent tool.

Prof. Dr. Frank Bisby: Frank is Executive Director of Species 2000 and a founding member of TDWG, instigator of one of the first global species databases, the International Legume Database and Information Service (ILDIS), and leader of Species 2000 since it's launch in 1996, as well as a leader/co-coordinator in EC projects such as ERMS, Euro+Med, ENBI, EuroCAT and EDIT.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 3.1.3, 3.1.5, 3.4.3, 5.4.5

12.1.24 John Wiley & Sons limited (Wiley)

Wiley is a global publishing company founded in 1807 that markets its products to professionals and consumers, students and instructors in higher education, and researchers and practitioners in scientific, technical, medical, and scholarly fields. Through the 2007 acquisition of Blackwell Publishing, Wiley has gained the Blackwell Synergy platform home to over 850 Blackwell journals. Also during 2007 the company completed an initiative to digitise its entire historical journal holdings, making 8.2 million pages of content dating back to 1799 available on Wiley InterScience.

Philippa Scoones: Web Publishing Director
Liz Ferguson: Associate Publishing Director
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.4.5

12.1.25 Smithsonian Institution (SIL)

The Smithsonian Natural History Museum is dedicated to inspiring curiosity, discovery, and learning about the natural world through its unparalleled research, collections, libraries, exhibitions, and education programs. At the centre of the Museum's exhibition and research programs are its expertly documented collections of more than 125 million natural science specimens and cultural artefacts. Over 3.5 million specimens are out on loan each year; over 15,000 visitor days are spent in the collections; and there are almost 600,000 additional visits to collection data bases available on the Web. The BHL is led from SIL.

Thomas Garnett: Tom is Program Director of the BHL and was Associate Director for Digital Library and Information Systems at SIL. He has over 20 years experience creating, scoping, implementing, and managing major digital library projects. He is interested in networking biological data, literature, institutions, and projects to enable investigation of complex systems.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 5.4.5

12.1.26 Missouri Botanical Garden (MOBOT)

The mission of MOBOT is to discover and share knowledge about plants and their environment, in order to preserve and enrich life. Founded by Henry Shaw and opened to the public in 1859, the Garden is a National Historic Landmark and widely considered one of the top three botanical gardens in the world. MOBOT is a founding member of the BHL and is supporting the development of the system's infrastructure, application layers, and interfaces.

Chris Freeland: Chris is Director of Bioinformatics at MOBOT & Technical Director of BHL and has worked as a technologist in scientific organisations for more than 10 years. He has been a project manager for several large informatics projects, including the development of the Tropicos botanical information system (www.tropicos.org), and the BHL.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, WP3, 5.4.5

12.1.27 Helsingin yliopisto, University of Helsinki, Viikki Science Library (UH-Viikki)

Viikki Science Library is the campus library in biosciences of the University of Helsinki. The library is the largest resource library in Finland in bioscience, agriculture and forestry, pharmacy and veterinary medicine. The library also serves the Finnish Museum of Natural History. The library has digitised old Finnish forestry literature which is made available in the DViikki open research archive. The library has printed collections of roughly 12,000 shelf meters.

Teodora Oker-Blom: Teodora (Service manager) holds an MSc in Genetics from University of Helsinki and MPhil in Information Science from City University of London. She works with e-publishing and open access policy issues of the University of Helsinki and with digitisation projects at Viikki Science Library.
Sini Kärki: Sini holds a degree in botany and works as information specialist with the management of the e-resources and digitisation projects of the Viikki Science Library.
Kimmo Koskinen: Kimmo holds a degree in horticultural science. As development manager he is working on digital library projects, such as developing the institutional repository of the University of Helsinki, Viikki campus based on DSpace. He also participates in a large Finnish consortium developing ontology services for digital libraries and cultural heritage applications.
Tasks: 1.1.1, 1.1.2, 1.1.3, 1.2.3, 1.5.1, 2.2, 2.3.1, 2.3.3, 3.1.3, 3.1.4, 3.2.2, 3.4.3, 5.4.5

12.1.28 Humboldt-Universität zu Berlin (UBER)

The University Library and the Computer and Media Services of UBER have carried out several projects within the fields of e-publishing, digital preservation and the digital library. Both institutions have been involved in several EU projects during the last 5 years: Open Archives Forum (EU-IST Programme); reUSE (eContentplus project); Digitisation-on-Demand (eTEN project).

Prof. Dr. Peter Schirmbacher: Peter is Director of the Computer and Media Centre at UBER and is a graduate in economic science and holds a PhD in applied information science. Since 2006 he is additionally Professor for Information Management at the Institute of Library and Information Science of UBER. He led several projects in the area of "electronic publishing", multimedia applications, "e-Learning", and "e-Science". His current or recently concluded projects are OA-Netzwerk, HyperImage, e-kokon; reUSE; SCOPE.
Susanne Dobratz: Susanne studied Informatics at the Technical University of Berlin, with emphasis on artificial intelligence, machine learning, and database systems. She was project coordinator for the Electronic Publication of Dissertations project (DiDi) of UBER. She is currently working on the Proprint – Printing on Demand Project. She set up the Open Archives compatible server for UBER.
Tasks: 2.1, 2.3.1, 3.1, 3.2, 5.4.5