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# Metadatabase of selected biodiversity databases (M1-18)

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Partners: RBINS, Royal Belgian Institute of Natural Sciences, Belgium  
BOKU, Universität für Bodenkultur Wien, Austria  
ICLARM, International Center for Living Aquatic Resources Management, Malaysia  
IRD, Institut de Recherche pour le Développement, France  
UDE, Universität Duisburg-Essen, Germany  
IUCN, International Union for Conservation of Nature, Switzerland  
UOXF.AC, Oxford University, UK  
UB, Universitat de Barcelona, Spain  
UFZ, Helmholtz Zentrum für Umweltforschung, Germany  
UCL, University College of London, UK  
EAWAG, Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz, Switzerland  
UCBL, Université Claude Bernard - Lyon 1, France  
UPS, Université Paul Sabatier- Toulouse 3, France  
ECOLOGIC, Ecologic GmbH Institut für Internationale und Europäische Umweltpolitik, Germany  
EC-ERC, Commission of the European Communities - Directorate General Joint Research Centre, Italy  
UD, University of Debrecin, Hungary  
NRM, Naturhistoriska riksmuseet, Sweden



## BIOFRESH

Biodiversity of Freshwater Ecosystems: Status, Trends, Pressures, and Conservation Priorities

Project no. 226874


Large scale collaborative project

Deliverable number	D2.2
Deliverable name	Metadatabase of selected biodiversity databases, 1 <sup>st</sup> period (Months 1-18)
WP no.	WP 2
Lead Beneficiary (full name and Acronym)	University of Natural Resources and Life Sciences, BOKU
Nature	Database (DB), written report
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Comments	

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PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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In case the report consists of the delivery of materials (guidelines, manuscripts, etc.)

Delivery name	Delivery file name	From Partner	To Partner

## Introduction

This deliverable corresponds to the Task 2.1 of WP2: **Review of existing biodiversity databases and generation of a metadatabase**. This report summarises the work so far, introduces the structure and the functionality of the metadatabase as well as the current content. Two further reports on the metadatabase will follow in month 36 and 51.

## Aim and approach of the metadatabase

Metadata is loosely defined as “data about data”. A metadatabase therefore should gather information on datasets in order to allow data visibility and assessment. For the data producer/provider metadata are meant to document data to inform prospective users of their characteristics, while for the data consumer/user metadata are used to both discover data and assess their appropriateness for particular needs – their so-called ‘fitness for purpose’.

Regarding BioFresh, the aims of the metadatabase are

- to support the data portal (WP1) in terms of availability, format and quality of datasets
- to help WP3 with the identification of gaps
- to support the science WPs (WP4-7) in terms of availability and comparability of datasets for analysis

The metadatabase consists of two main parts:

- an online questionnaire to fill in data
- an online query page to find data

Both parts can be reached from the main BioFresh website using the menu: results/metadatabase or following this direct link: <http://www.freshwaterbiodiversity.eu/index.php/metadatabase.html>.

The construction of the BioFresh metadatabase was based on the experiences gained during the development of other metadatabases within the framework of other EU funded projects, e.g. WISER ([www.wiser.eu](http://www.wiser.eu)). In a first step biodiversity relevant fields of the WISER metadatabase were used for the construction of the first draft online metadata questionnaire. In a second step these fields were extended with “standard” metadata fields of other relevant biodiversity databases (e.g. GBIF) and those proposed by the GCMD-DIF (Global Change Master Directory, Directory Interchange Format). In a final step fields that reflected the needs of the BioFresh science Workpackages (WP4-7) were included.

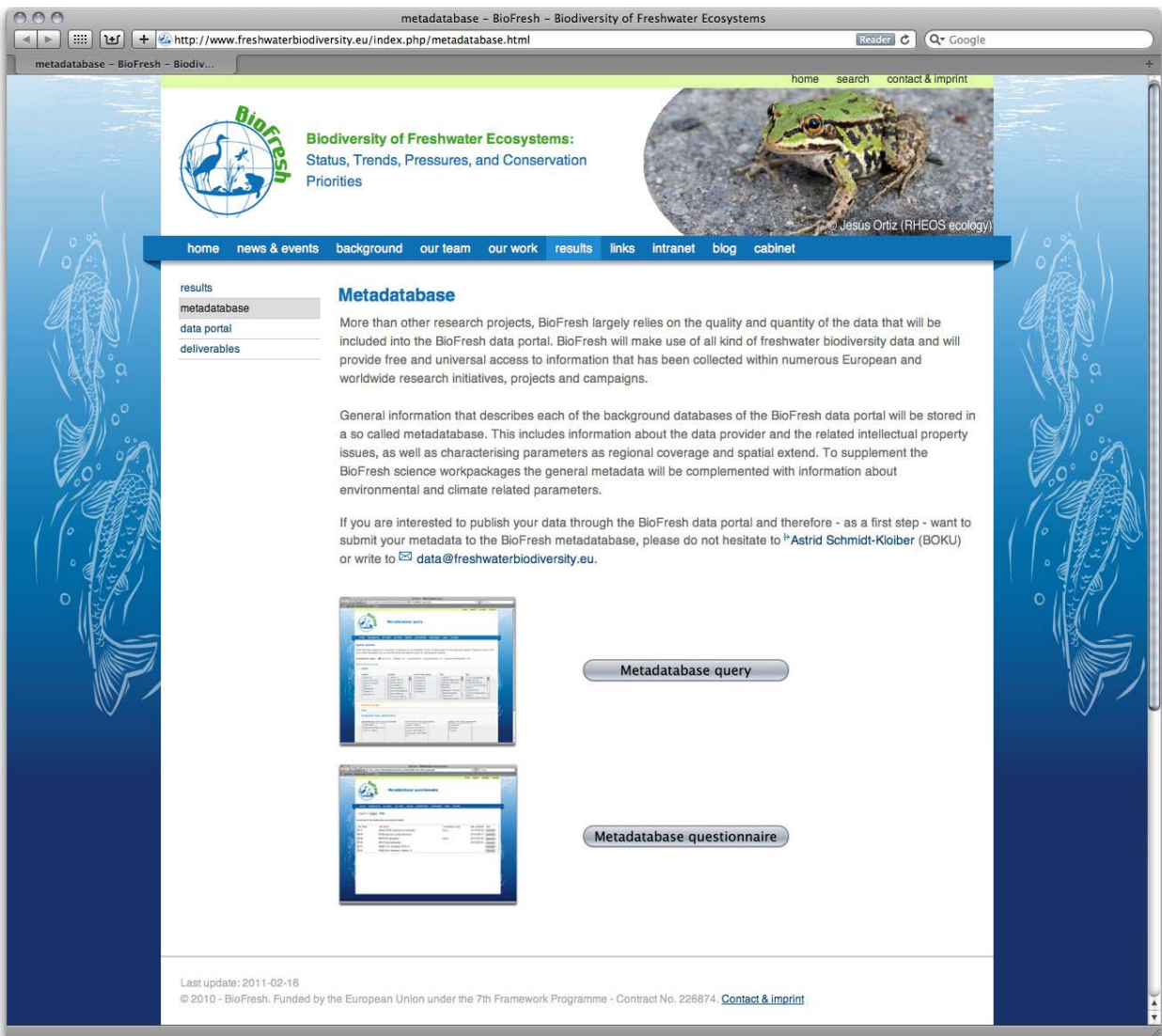


Figure 1. Screenshots of the metadata database website; top: general overview site; bottom left: starting page of the questionnaire; bottom right: starting page of the query tool.

# The metadata questionnaire

## *Structure of the metadatabase*

The final BioFresh metadatabase and the accompanying questionnaire consist of nine main information blocks containing a variety of data characterising fields. The information blocks include:

- general information, e.g. database name, database type, keywords
- technical and administrative specifications, e.g. data format, operating system, data language, update level, contact details
- intellectual property rights and citation, e.g. database owner, citation, criteria for using the data
- general data specifications, e.g. regional coverage, countries, world climatic regions, freshwater ecoregions, ecosystem type
- site specifications, e.g. coordinate system, ecosystem type classification, number of sites, site coding
- climate and environmental data, e.g. climate related data, environmental data, physico-chemistry data, stressors
- biological data, e.g. data origin, organism groups addressed
- sample specifications/sample resolution, e.g. sample information, taxonomic resolution, taxonomic coding, sample specifications
- other specifications, e.g. GIS layers, photos, maps, quality control procedures

Different information blocks are displayed depending on the database type. The following database types can be chosen from a selection list when filling the questionnaire:

- species distribution database
- species (taxonomic group) per site database including environmental information
- biological or ecological traits/information database
- species/taxa database (e.g. red list database)
- environmental characteristics database
- climatic information database
- protected area database
- museum collection data (historical data)
- palaeoecological database
- data evaluation database ("results" database)
- other database type

To facilitate data entry for data providers most of the fields were designed as check boxes, radio buttons or selection lists. For additional information several "comments" fields are placed at disposal. The fields in the questionnaire are categorised into mandatory, recommended and optional fields. Further, tooltips are provided when moving the mouse over a certain field to give help while entering data.

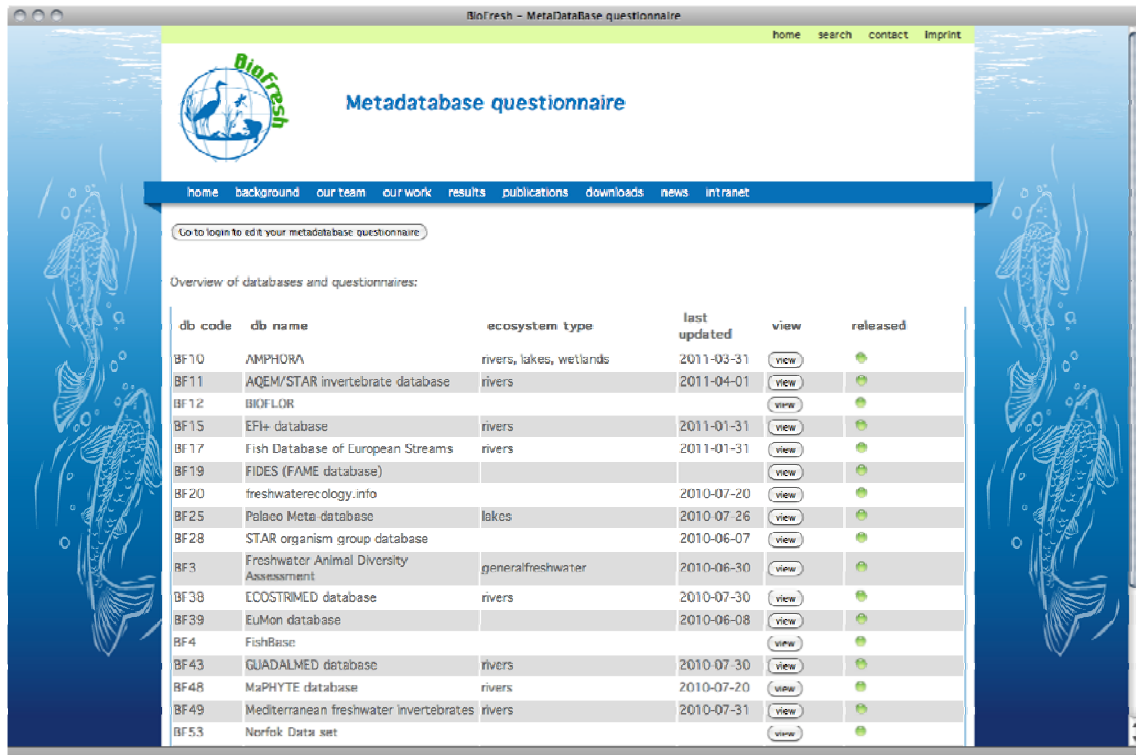


Figure 2. Overview page of the available metadata questionnaires.

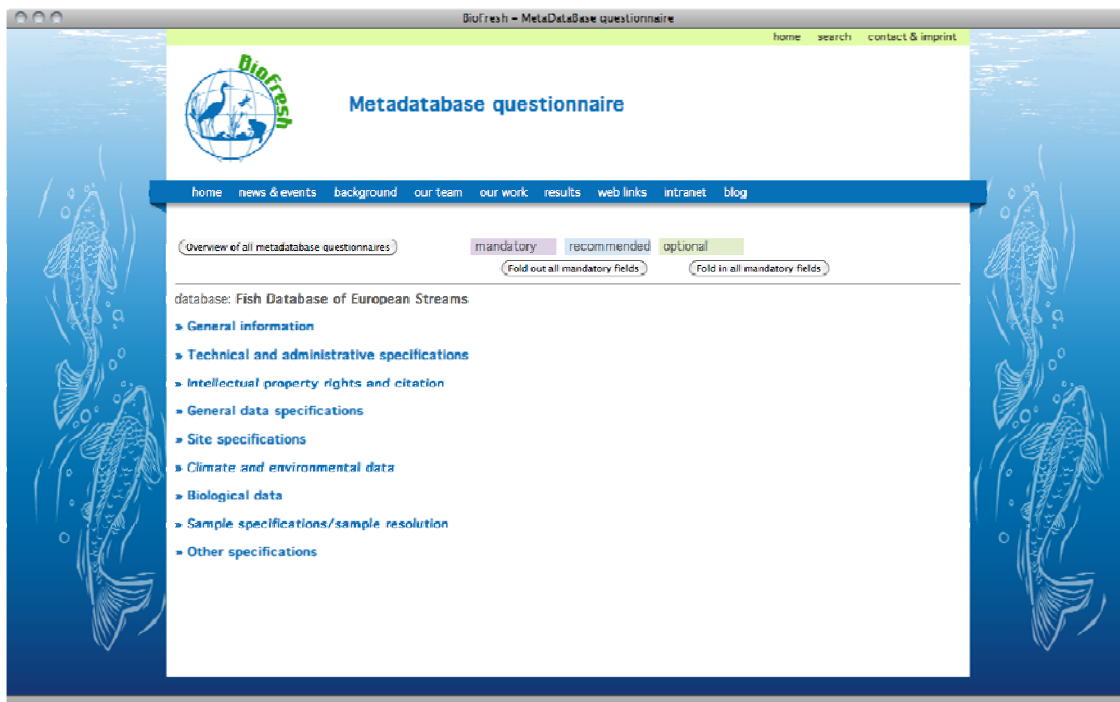


Figure 3. Overview of the main information blocks within the metadata questionnaire.

**Intellectual property rights and citation**

Generally data providers and data users have to comply with the BioFresh data usage agreement. ([BioFresh\\_data\\_usage\\_agreement.pdf](#)).

database owner:  BioFresh project partner  others specify:

contact details:

**citation:**

author(s):

reference title:

year:

version (if applicable):

database related references:

database availability for:  BioFresh scientific purposes  BioFresh data portal (public)

**criteria for using the data in a publication/scientific analysis:**

Data can be used without restrictions, but must be publicly acknowledged and cited correctly.

Data provider must be informed of publication 45 days in advance and can object the use of the dataset within 30 days. Data must be publicly acknowledged and cited correctly.

Data provider must be offered co-authorship for publications using this dataset. Data must be publicly acknowledged and cited correctly.

Data cannot be used in publication.

other/additional criteria (please specify)

**other criteria (please specify):**

**comments:**

[General data specifications](#)  
[Site specifications](#)  
[Climate and environmental data](#)  
[Biological data](#)

Figure 4. Detailed view of the information block "Intellectual property rights and citation".

**General data specifications**

regional coverage of the database:

scale of the database:

continent:  Africa  North America  South America  Asia  Europe  Oceania  Antarctica

Information on spatial coverage, countries, world climatic regions and ecoregions can be auto-generated from database related shape files or point data (coordinates). On demand, this can be done by the BioFresh data coordinator ([Aaiko De Wever](#)), if you send the according information to him.  
 Shape files/coordinate data will be sent to BioFresh:  yes  no (If "yes" is chosen, then the following data fields do not have to be filled.)

spatial extend (bounding coordinates):

southernmost latitude [°]:

northernmost latitude [°]:

westernmost longitude [°]:

easternmost longitude [°]:

minimum altitude:  meters

maximum altitude:  meters

countries:

Europe

<input type="checkbox"/> Åland Islands (ALA)	<input type="checkbox"/> Albania (ALB)	<input type="checkbox"/> Andorra (AND)
<input checked="" type="checkbox"/> Austria (AUT)	<input type="checkbox"/> Belarus (BLR)	<input checked="" type="checkbox"/> Belgium (BEL)
<input type="checkbox"/> Bosnia and Herzegovina (BIH)	<input type="checkbox"/> Bulgaria (BGR)	<input type="checkbox"/> Croatia (HRV)
<input type="checkbox"/> Czech Republic (CZE)	<input type="checkbox"/> Denmark (DNK)	<input type="checkbox"/> Estonia (EST)
<input type="checkbox"/> Faroe Islands (FOI)	<input type="checkbox"/> Finland (FIN)	<input checked="" type="checkbox"/> France (FRA)
<input checked="" type="checkbox"/> Germany (DEU)	<input type="checkbox"/> Gibraltar (GIB)	<input checked="" type="checkbox"/> Greece (GRC)
<input type="checkbox"/> Guernsey (GGY)	<input type="checkbox"/> Hungary (HUN)	<input type="checkbox"/> Iceland (ISL)
<input type="checkbox"/> Ireland (IRL)	<input type="checkbox"/> Isle of Man (IMN)	<input type="checkbox"/> Italy (ITA)
<input type="checkbox"/> Jersey (JEY)	<input type="checkbox"/> Latvia (LVA)	<input type="checkbox"/> Liechtenstein (LIE)
<input checked="" type="checkbox"/> Lithuania (LTU)	<input type="checkbox"/> Luxembourg (LUX)	<input type="checkbox"/> Macedonia (MKD)
<input type="checkbox"/> Malta (MLT)	<input type="checkbox"/> Moldova (MDA)	<input type="checkbox"/> Monaco (MCO)
<input type="checkbox"/> Montenegro (MNE)	<input checked="" type="checkbox"/> Netherlands (NLD)	<input type="checkbox"/> Norway (NOR)
<input checked="" type="checkbox"/> Poland (POL)	<input checked="" type="checkbox"/> Portugal (PRT)	<input type="checkbox"/> Romania (ROU)
<input type="checkbox"/> Russia (RUS)	<input type="checkbox"/> San Marino (SMR)	<input type="checkbox"/> Serbia (SRB)
<input type="checkbox"/> Slovakia (SVK)	<input type="checkbox"/> Slovenia (SVN)	<input checked="" type="checkbox"/> Spain (ESP)
<input type="checkbox"/> Switzerland (CHE)	<input checked="" type="checkbox"/> Sweden (SWE)	<input type="checkbox"/> Switzerland (CHE)

Figure 5. Detailed view of the information block "General data specifications".



BioFresh - MetaDataBase questionnaire

freshwater ecoregions of the world (FEOW) according to WWF:

Europe

<input checked="" type="checkbox"/> Aegean Drainages	<input type="checkbox"/> Arabian Interior	<input type="checkbox"/> Atlantic Northwest Africa
<input type="checkbox"/> Barents Sea Drainages	<input checked="" type="checkbox"/> Cantabric Coast - Languedoc	<input type="checkbox"/> Caspian Highlands
<input type="checkbox"/> Caspian Marina	<input checked="" type="checkbox"/> Central & Western Europe	<input type="checkbox"/> Central Anatolia
<input type="checkbox"/> Coastal Levant	<input type="checkbox"/> Crimea Peninsula	<input type="checkbox"/> Dalmatia
<input type="checkbox"/> Dnieper - South Bug	<input type="checkbox"/> Dniester - Lower Danube	<input type="checkbox"/> Don
<input checked="" type="checkbox"/> Eastern Iberia	<input type="checkbox"/> Esfahan	<input type="checkbox"/> Gulf of Vanice Drainages
<input type="checkbox"/> Isazant - Jan Mayan	<input checked="" type="checkbox"/> Isoux Drainages	<input checked="" type="checkbox"/> Italian Peninsula & Islands
<input type="checkbox"/> Jordan River	<input type="checkbox"/> Kavir & Lut Deserts	<input type="checkbox"/> Kulsan
<input type="checkbox"/> Kura - South Caspian Drainages	<input type="checkbox"/> Lake Omega - Lake Ladoga	<input type="checkbox"/> Lake Van
<input type="checkbox"/> Lower Tigris & Euphrates	<input type="checkbox"/> Namak	<input type="checkbox"/> Northern Anatolia
<input checked="" type="checkbox"/> Northern Baltic Drainages	<input checked="" type="checkbox"/> Northern British Isles	<input type="checkbox"/> Northern Hormuz Drainages
<input type="checkbox"/> Norwegian Sea Drainages	<input type="checkbox"/> Oman Mountains	<input type="checkbox"/> Orontes
<input type="checkbox"/> Orumlyeh	<input type="checkbox"/> Sinai	<input type="checkbox"/> Southeastern Adriatic Drainages
<input type="checkbox"/> Southern Anatolia	<input checked="" type="checkbox"/> Southern Baltic Lowlands	<input checked="" type="checkbox"/> Southern Iberia
<input type="checkbox"/> Southwestern Arabian Coast	<input type="checkbox"/> Thrace	<input type="checkbox"/> Turan Plain
<input checked="" type="checkbox"/> Upper Danube	<input type="checkbox"/> Upper Tigris & Euphrates	<input type="checkbox"/> Vardar
<input type="checkbox"/> Volga - Ural	<input type="checkbox"/> Volga Delta - Northern Caspian Drainages	<input checked="" type="checkbox"/> Western Anatolia
<input type="checkbox"/> Western Caspian Drainages	<input checked="" type="checkbox"/> Western Iberia	<input type="checkbox"/> Western Transcaucasia

European ecoregions according to Iliics (WFD):

<input checked="" type="checkbox"/> Iberic-Macaronesian Region (ER1)	<input checked="" type="checkbox"/> Pyrenees (ER2)	<input checked="" type="checkbox"/> Italy, Corsica and Malta (ER3)
<input checked="" type="checkbox"/> Alps (ER4)	<input type="checkbox"/> Dinaric Western Balkan (ER5)	<input checked="" type="checkbox"/> Hellenic Western Balkan (ER6)
<input type="checkbox"/> Eastern Balkan (ER7)	<input checked="" type="checkbox"/> Western Highlands (ER8)	<input checked="" type="checkbox"/> Central Highlands (ER9)
<input checked="" type="checkbox"/> The Carpathians (ER10)	<input type="checkbox"/> Hungarian Lowlands (ER11)	<input type="checkbox"/> Pontic Province (ER12)
<input checked="" type="checkbox"/> Western Plains (ER13)	<input checked="" type="checkbox"/> Central Plains (ER14)	<input checked="" type="checkbox"/> Baltic Province (ER15)
<input type="checkbox"/> Eastern Plains (ER16)	<input type="checkbox"/> Ireland and Northern Ireland (ER17)	<input checked="" type="checkbox"/> Great Britain (ER18)
<input type="checkbox"/> Iceland (ER19)	<input checked="" type="checkbox"/> Borealic Uplands (ER20)	<input type="checkbox"/> Tundra (ER21)
<input checked="" type="checkbox"/> Feno-Scandian Shield (ER22)	<input type="checkbox"/> Tails (ER23)	<input type="checkbox"/> The Caucasus (ER24)
<input type="checkbox"/> Caspic Depression (ER25)	<input type="checkbox"/> North Africa (ERX)	<input type="checkbox"/> Middle East (ERY)

ecosystem type:  rivers  lakes  wetlands  groundwater  general freshwater

covered timeframe, year from: 1955 year to: 2002

comments:

Figure 6. Detailed view of the information block "General data specifications".

BioFresh - MetaDataBase questionnaire

- Climate and environmental data
- Biological data
- Sample specifications/sample resolution
- Other specifications

GIS layers, shapes related to the database:

<input checked="" type="checkbox"/> species distribution
<input type="checkbox"/> hydrological information (as HydroSHEDS)
<input checked="" type="checkbox"/> catchments, river sub basins
<input type="checkbox"/> land use
<input type="checkbox"/> dams, reservoirs/barriers
<input type="checkbox"/> protected areas
<input type="checkbox"/> population density
<input checked="" type="checkbox"/> environmental variables (freshwater or terrestrial)
<input checked="" type="checkbox"/> climatic variables (current and predictions)
<input type="checkbox"/> others/specify

others (specify):

availability of photos:  yes  no

availability of maps:  yes  no

quality control procedures:

Were any quality control procedures applied to your database?  yes  no

quality control protocols and comments:

[http://www.biofresh.eu/downloads/DB\\_2\\_BIOFRESHManual.pdf](http://www.biofresh.eu/downloads/DB_2_BIOFRESHManual.pdf)

[https://www.biofresh.eu/downloads/DB\\_2\\_metrics\\_and\\_sampling\\_procedure.pdf](https://www.biofresh.eu/downloads/DB_2_metrics_and_sampling_procedure.pdf)

related information:

comments:

Figure 7. Detailed view of the information block "Other specifications".

# The metadatabase query tool

## *Usability of the metadatabase*

The metadata query tool is available via a web interface and should help BioFresh scientists as well as the interested public to find appropriate datasets and to gain information about these datasets.

The tool consists of six main query blocks for specifying the search:

- ecosystem type
- region
- organism group
- time
- ecosystem type classification
- climate and environmental data

The tool is designed as a semi-dynamic query immediately displaying a result table of appropriate datasets after applying the query options. During the query process only available datasets per criterion are displayed. In future the availability of the respective dataset through the BioFresh portal will be indicated in the result table using a traffic light system.

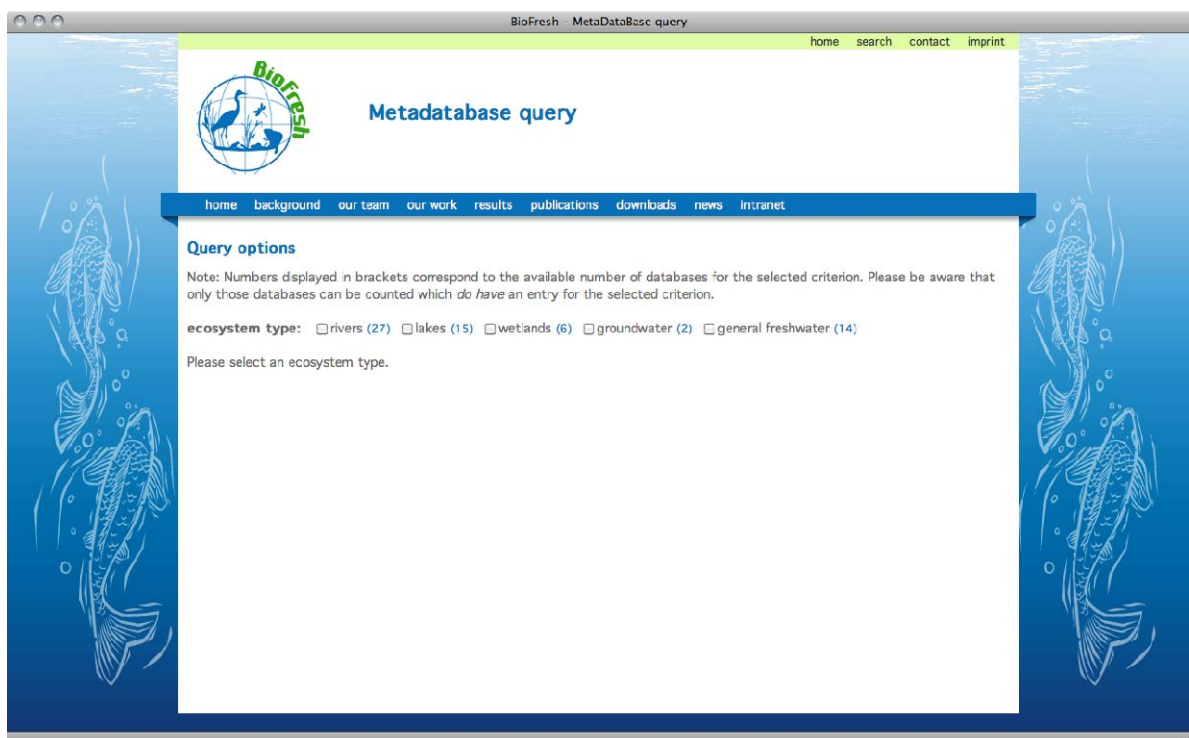


Figure 8. Overview of the BioFresh metadatabase query tool, showing the first query option on the ecosystem type.

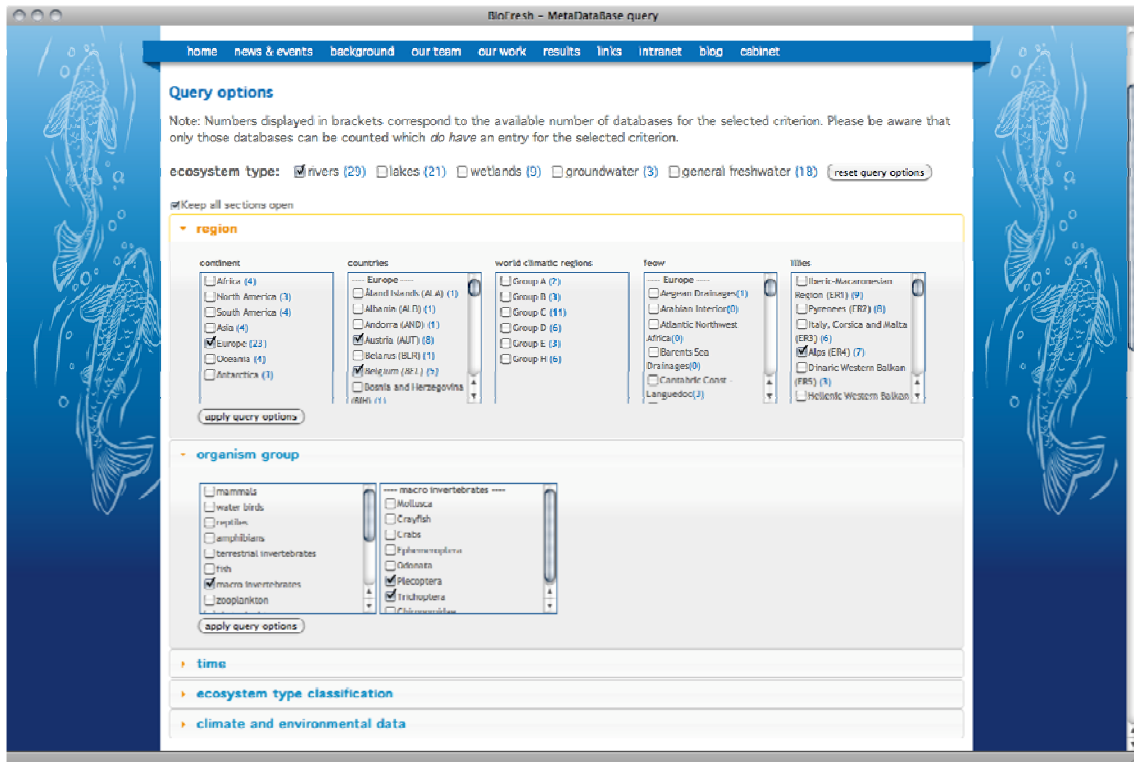


Figure 9. Additional query options for the region and the organism group.

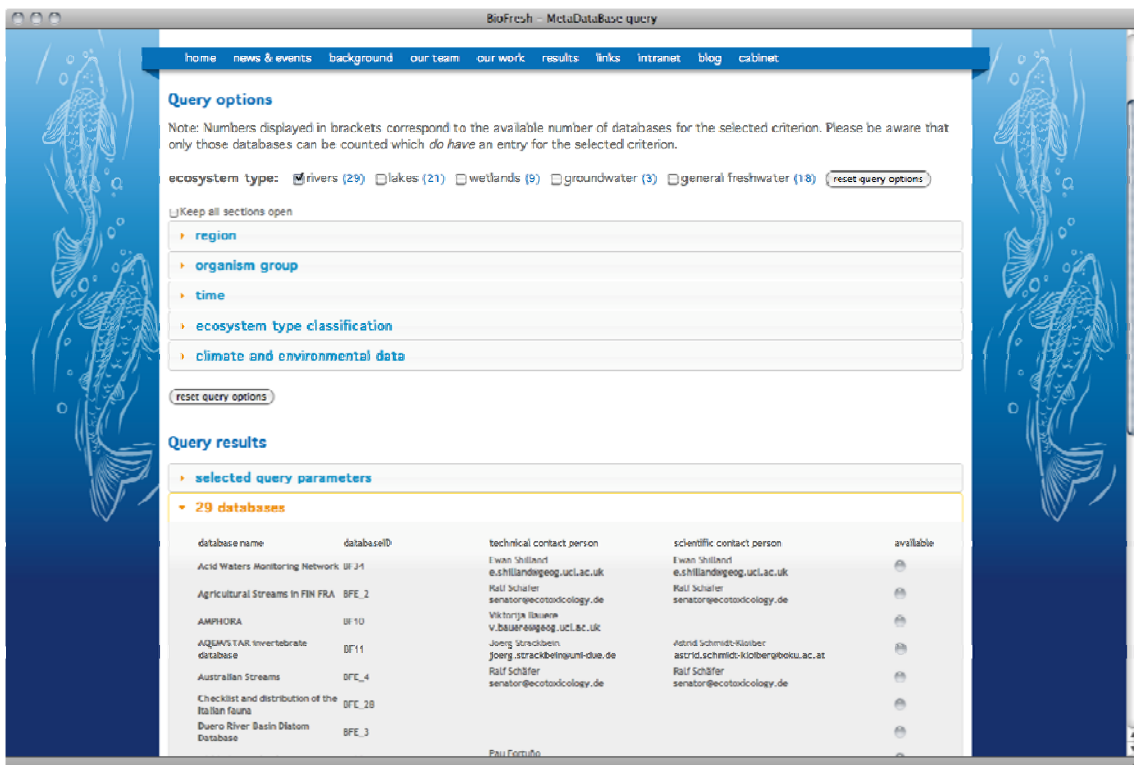


Figure 10. Result table of available datasets corresponding to the query options. The traffic light system indicates the availability through the BioFresh portal.

## Quality control of the metadatabase

Data providers who want to add metadata to the BioFresh metadatabase receive a specific login and password to prevent misuse and accidental data manipulation.

Quality control of entered metadata is done in two different ways:

- The WP1-3 quality control team checks the entered data for completeness and reliability of mandatory fields and addresses the data provider if problems are detected. The quality control team directly corrects spelling and other minor errors. All quality control procedures are documented in a specially designed quality control protocol.
- Data provider themselves have the opportunity to define if and when their metadata are ready for release. This can be done with a ready-for-release-button in the internal section of the data provider.

The screenshot shows the 'BioFresh - MetaDatabase questionnaire' interface. It features a navigation bar with links like 'home', 'background', 'our team', etc. Below the navigation, there is a 'Logged in' status and a 'Help' link. The main content area is divided into two sections:

**Overview of databases and questionnaires:**

db code	db name	ecosystem type	last updated	view	released
BF15	EFIA database	rivers	2011-01-31	<a href="#">view/edit</a>	<a href="#">change</a>
BF17	Fish Database of European Streams	rivers	2011-01-31	<a href="#">view/edit</a>	<a href="#">change</a>
BF19	FIDES (FAME database)			<a href="#">view/edit</a>	<a href="#">change</a>
BF20	freshwaterecology.info		2010-07-20	<a href="#">view/edit</a>	<a href="#">change</a>
BF21	Joint Danube Survey 2001, 2007			<a href="#">view/edit</a>	<a href="#">change</a>
BF37	Ecoprof		2011-04-27	<a href="#">view/edit</a>	<a href="#">change</a>

**Overview of all other databases and questionnaires:**

db code	db name	ecosystem type	last updated	view	released
BF10	AMPHORA	rivers,lakes,wetlands	2011-03-31	<a href="#">view</a>	
BF11	AQEM/STAR invertebrate database	rivers	2011-04-01	<a href="#">view</a>	
BF12	BIOFLOR			<a href="#">view</a>	
BF14	European Diatom Database	lakes	2010-07-29	<a href="#">view</a>	
BF16	European Mountain Lake Database	lakes	2010-07-27	<a href="#">view</a>	
BF25	Palaeo Meta-database	lakes	2010-07-26	<a href="#">view</a>	
BF26	RivFunction			<a href="#">view</a>	

Figure 11. Internal section of a data provider. The upper part shows the datasets of this data provider and offers the possibility to change the release status. The lower part shows all other BioFresh metadata.

## Content of the metadatabase

Currently 93 datasets are registered in the BioFresh metadatabase (Table 1). They are classified into three categories:

- internal datasets: owned, managed or maintained by BioFresh partner
- external datasets: metadatabase information acquired from external data holders
- digitised datasets: gained through digitisation of literature performed by WP3

External data providers either contact the BioFresh WP1-3 team themselves or – in case that a BioFresh partner detects an interesting dataset via web search, scientific paper, etc. – are contacted by the WP1-3 team. In the latter case, the WP1-3 team enters basic metadata information into the metadatabase. Subsequently an adjusted standard invitation letter is sent to the data holders asking to document and promote their database. The data holders then only need to check and amend the metadata.

Table 1. List of the 93 datasets registered in the metadatabase so far.

Dataset Code	Dataset Name
BFE_2	Agricultural Streams in DEU FIN FRA
BFE_39	Alpine GIG Lakes Macoinvertebrates data
BFE_34	Alpine GIG Lakes Macrophytes data
BFE_30	Alpine GIG Lakes Phytoplankton data
BF10	AMPHORA
BF11	AQEM/STAR invertebrate database
BFE_23	Australian Faunal Directory
BFE_4	Australian Streams
BF34	AWMN
BF12	BIOFLOR
BFE_17	Catalogue of Diatom Names
BFE_41	Central Baltic GIG Lakes Macoinvertebrates Chironomid Pupae data
BFE_40	Central Baltic GIG Lakes Macoinvertebrates littoral data
BFE_35	Central Baltic GIG Lakes Macrophytes data
BFE_31	Central Baltic GIG Lakes Phytoplankton data
BFE_49	Central Baltic GIG Rivers Macrophytes data
BFE_28	Ckmap - Distribution of the Italian Fauna
BFE_46	Cross GIG GIG Lakes Fish data
BFE_47	Cross GIG GIG Lakes Phytobenthos data
BFE_48	Cross GIG GIG Rivers Fish data
BFE_51	Cross GIG GIG Rivers Large Rivers data
BFE_3	Duero River Basin
BFE_45	Eastern Continental GIG Lakes Macoinvertebrates data
BFE_38	Eastern Continental GIG Lakes Macrophytes data
BFE_29	Eastern Continental GIG Phytoplankton data
BF37	Ecoprof
BF14	EDDI
BF15	EFI+ database
BFE_6	Elbe Monitoring 2006
BF16	EMERGE database
BFE_27	Ephemeroptera of the World
BF39	EuMon database
BF70	European river catchment database
BF17	FAME database
BFE_21	Fauna Iberica
BFE_25	Faunaltalia
BF19	FIDES (FAME database)
BFE_11	Fish Atlas for Germany and Austria
BF4	FishBase
BF67	FishBase occurrence data
BFE_14	Flemish sport fisheries data
BF69	Fonix
BF3	Freshwater Animal Diversity Assessment
BFE_12	Freshwater Fishes of Colombia
BFE_5	Freshwater fishes of India
BF20	freshwaterecology.info
BFE_16	Friedrich Hustedt diatom collection
BFE_10	German Dragonfly Atlas
BF5	GISD
BFE_26	Global Runoff Data
BF43	GUADALMED database
BF_dig1	Illies Fauna Europaea

Dataset Code	Dataset Name
BEF_15	Intercalibration dataset France
BF72	IUCN environmental data
BF6	IUCN Species Information Service
BF21	Joint Danube Survey 2001, 2007
BEF_9	Lake Balaton
BEF_8	Lake Vortsjarv
BF22	LEDA Traitbase
BF47	Long-term time-series metadatabase
BF48	MaPHYTE database
BF49	Mediterranean freshwater invertebrates
BEF_44	Mediterranean GIG Lakes Macroinvertebrates data
BEF_37	Mediterranean GIG Lakes Macrophytes data
BEF_33	Mediterranean GIG Lakes Phytoplankton data
BF71	Mediterranean Iberian Trichoptera database
BF53	Norfolk Data set
BEF_42	Northern GIG Lakes Macroinvertebrates acidification data
BEF_43	Northern GIG Lakes Macroinvertebrates eutrophication data
BEF_36	Northern GIG Lakes Macrophytes data
BEF_32	Northern GIG Lakes Phytoplankton data
BEF_50	Northern GIG Rivers Macroinvertebrates acidification data
BEF_22	Opiebenthos
BF25	Palaeo Meta-database
BEF_13	PanTHERIA
BF65	Proasellus distributional data base
BF57	RIVA-HABEX database
BF26	RivFunction
BEF_1	SANTANDER
BF27	Shelled Gastropoda of Western Europe
BF59	SIX database
BF8	SPRICH
BF28	STAR organism group database
BF29	Statzner et al. 2007
BEF_7	Swedish lakes and Streams
BEF_24	Swiss Cartographic data on Fauna
BEF_20	Taxa Watermanagement the Netherlands
BEF_19	Terrestrial Ecosystem Monitoring Sites
BF60	UBA Projectdatabase
BF31	WFD Intercalibration database
BF62	WISER lake database (Module 3)
BF61	WISER river database (WP5.1)
BEF_18	World Lake Database

## Outlook

Future activities will include the extension of the metadatabase query tool with a full text search and optimisation of existing features. A continuous enlargement of the number of datasets within the metadatabase is envisaged by further approaching external data holder as well as by linking with other relevant metadata initiatives.