BioFresh Newsletter

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In this Issue

Impressum

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- www.freshwaterbiodiversity.eu

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- Release date of this newsletter: June 2014

Dear readers, colleagues, and friends,

The BioFresh-Project – the network for global freshwater biodiversity – officially ended 30 April 2014. It means that the actual funding through the EU-FP7 program terminated; however, many project parts are still under progress. First, a major delay effect between invested funding and subsequent output is very common for highly successful projects. In particular, the most exciting tasks require more time than the actual project period allows. Therefore, research activities that started during the BioFresh project will lead to major outcomes in the near future. For example, the global freshwater megafauna analysis, one BioFresh key product, will be completed during the next months. It will provide the first comprehensive summary on the actual state and the global distribution of the most charismatic freshwater species. The results will not only help to identify areas of conservation and management concern but also the key information gaps about the ecology, population dynamics, and spatial distribution of many keystone species. Second, the BioFresh project stimulated new, emerging research activities. For example, at the lead institution of BioFresh – the Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) – global data bases on biological field stations and on future hydropower dams were built up, supported through BioFresh. Biological field stations form a global infrastructure network of strategic importance for research, education, and public information. The more than 1200 biological field stations may play an even greater role in the near future as sentinels of global environmental change. At the same time, we are facing a global boom in hydropower dam construction that is unprecedented in extent and dimension, with most likely major consequences for nature and humans. Linking the hydropower dam database with the BioFresh global freshwater biodiversity database may support sustainable planning in respect to location and operation of future hydropower dams.

To carry out a research project of the dimension of BioFresh is a highly complex and dynamic process. The research plans may and must even change during the course of the project, new research directions emerge, while the originally planned activities need to be continuously adapted. Therefore, it had been a challenge to fulfill the basic requirements of the project on one hand, while allowing and stimulating on the other hand the rise of new research directions. Therefore, in my opinion, the BioFresh project must be assessed not only on the fulfillment of basic deliverables but foremost on the added values that it creates. I am aware that it will take years

before the full value of BioFresh can be assessed and eventually appreciated.

The BioFresh team consisted of highly competent and very motivated people, who developed visions well beyond the scope of the specific project goals. This created a very stimulating atmosphere, making it a pleasure to work. Therefore, I am very convinced that within the BioFresh team new networks have and will be formed, exciting research ideas emerged, and important outcomes have been and will be produced. Finally, it is of utmost importance to consider freshwaters as living entities and not just as a resource for human consumption. Rivers, lakes, wetlands, and ground waters provide more ecosystem services than most other ecosystems; at the same time they contain an immense biological diversity at genetic, species, and ecosystem levels. I am convinced that BioFresh helped to better appreciate both the intrinsic and extrinsic values of freshwater ecosystem.This is the last newsletter of the official BioFresh project. I would like to take the opportunity to thank all colleagues for the fascinating joint journey during the past years. In particular, I would like to thank the BioFresh coordination team and the work package leaders for their enthusiasm and tireless commitment. I wish you all a very successful professional and private future; and I am sure that we may start joint scientific journeys very soon again.

Yours,

Klement Tockner

BioFresh review

Looking back at what BioFresh achieved and opportunities after BioFresh

While BioFresh has come to an end on April 30th 2014, we can proudly look back and enumerate the products and findings which resulted from a motivated, creative and interdependent team of 18 partners as well as the opportunities which are arising from our outputs. In BioFresh we set up the **Freshwater Biodiversity Data Portal** providing a primary source of freshwater data from within and outside the consortium, particularly from the **BioFresh Data Acquisition Fund**: a fund set up to support non-partner organisations for adapting and completing their databases to be integrated into BioFresh, and which provided access to databases with restricted access.

BioFresh investigated on some of this data studying how freshwater fauna and flora responds to global, European and local environmental pressures, creating **predictive biodiversity models, tools and indices** such as the **Climate Vulnerability Index** (see page 11), the **Biodiversity Matrix** and the **Freshwater Key Biodiversity Areas** (KBAs). BioFresh accounts for more than **75 publications** on some of these results in high level journals such as PNAS and Science (see table of achievements).

The joint quest for publicly available (meta)data has led BioFresh to create the **Freshwater Metadata Journal,** a unique opportunity where data registered in the BioFresh metadatabase can be published as a journal article with a full citation and a DOI.

In addition, BioFresh scientific findings are consequently being implemented in the **Global Freshwater Biodiversity Atlas** launched this year. The Atlas is a joint collaboration of several major global players in biodiversity (more on page 10) providing policy-makers, water managers and scientists with an online, open-access and interactive gateway to key geographical information and spatial data on freshwater biodiversity across different scales and scientists with downloadable data for their own studies.

In order to competently inform the public about all BioFresh products, a vast collection of resources to support research, policy and education have been prepared and are available on the **BioFresh Information Platform**.

Our BioFresh **policy briefs** inform why a freshwater biodiversity policy is needed and why water policy regulations need revision. Indeed as part of our **science-policy-interface strategy plan** (SPI), BioFresh research findings on the Freshwater KBAs have led to several meetings with DG ENVIRONMENT of the European Commission on the prioritisation of important freshwater sites providing recommendations for conservation policy implementation and helping to contribute achieving the EU Biodiversity Strategy 2020 targets.

Our **BioFresh blog** is also a major link between the science community and the wider audience and it has proved how projects can raise the profile and visibility of scientific topics and also help strengthening science policy communication.

Furthermore, selected Bio-Fresh results are being illustrated at "**Maps in Action**", a section being prepared as part of the educational resources of the BioFresh platform. This "Maps in Action" section provides a selection of topical use cases related to how these particular products are influencing policy in a variety of different environments.

BioFresh outputs will continue to resonate in the upcoming months when most of the results will be published. These products will accompany us and we are sure that our cooperation through them will lead to mutual benefits in a long term.

The BioFresh team would like to take this opportunity to thank all contributors to the project, both inside and outside the project team for their valuable support. It has been a pleasure working with such highly motivated and visionary colleagues. We wish to acknowledge the financial support provided by the European Commission (EC) through FP7. We thank the professional guidance and encouragement of our EC scientific project officer Adrian Peres and the numerous interactions with other colleagues at the Commission.

With our best regards,

BioFresh

BioFresh achievements & products

Products	Where to look
➲ Publications: more than 75 papers in high-level journals, including Science and PNAS	➲ http://research.freshwaterbiodiversity.eu/index.php/biofresh-publications
➲ BioFresh Information Platform	➲ http://freshwaterbiodiversity.eu
➲ Freshwater Data Portal including a meta-database with about 250 metadatasets	➲ http://data.freshwaterbiodiversity.eu/
➲ BioFresh predictive biodiversity models, tools and indices	➲ http://research.freshwaterbiodiversity.eu/index.php/teaching-engagement/online-manuals-tutorials
➲ Data acquisition fund: additional datasets from institutions that supported BioFresh	➲ http://project.freshwaterbiodiversity.eu/index.php/project/contingency-fund
➲ First online Global Freshwater Biodiversity Atlas in cooperation with international initiatives such as GEO BON, Wetlands International, WWF, GWSP and many others	➲ http://atlas.freshwaterbiodiversity.eu/
➲ Freshwater Key Biodiversity Areas: priority sites for freshwater biodiversity in Europe	➲ http://research.freshwaterbiodiversity.eu/index.php/kbas
➲ BioFresh blog, including special features: meet the BioFresh team, articles on eco-system services, interviews	➲ http://biofreshblog.com/
➲ Science and Policy corner for freshwater biodiversity conversation with Policy briefs, videos, podcats and newsletters	➲ http://research.freshwaterbiodiversity.eu/

The BioFresh freshwater information platform: a central hub for freshwater biodiversity information and data

Building the BioFresh platform

One of the main objectives of the BioFresh project was building a freshwater biodiversity information platform as a gateway to scientific information on freshwater biodiversity. At the project's end, we give you an overview of the past developments, current status and future plans on this information platform.

In 2010, we started off with a project website, launched a blog and the first version of the data portal. The idea for creating the Global Freshwater Biodiversity Atlas as an online product was gradually developed, and connecting the different web products seemed like a logical thing to do.

This led to the creation of a the BioFresh information platform with the following components: (1) **information on the project and network**, (2) the **data portal** including the **metadatabase** with information on freshwater datasets, (3) the **atlas**, (4) a **resource section** with tutorials, teaching material and **research outputs** and (5) the **blog**.

Overall the website not only functions as a gateway to scientific data and information, but also provides a platform for dissemination of the project results and for raising awareness of the urgency for freshwater biodiversity conservation among scientists, policy makers and the public.

The next paragraphs zoom in on the data portal.

The data portal: information on datasets, species and occurrence data

As the name suggests, the data portal is all about "data" and it is primarily targeted towards scientists and water managers who are interested in working with publicly available raw data. It helps them to discover datasets through the metadatabase, search for information and data on species and retrieve occurrence data. In addition, we compiled information on useful shape files and tools to support freshwater biodiversity research, and created a data repository for datasets that are made available 'as is'.

For species information, we rely on the taxonomic checklists available through the Freshwater Animal Diversity Assessment (FADA) database, which was considerably extended in the course of the BioFresh project. This register of species names allows us to further link to existing information on these species available on the web, such as the IUCN Red List of Threatened Species.

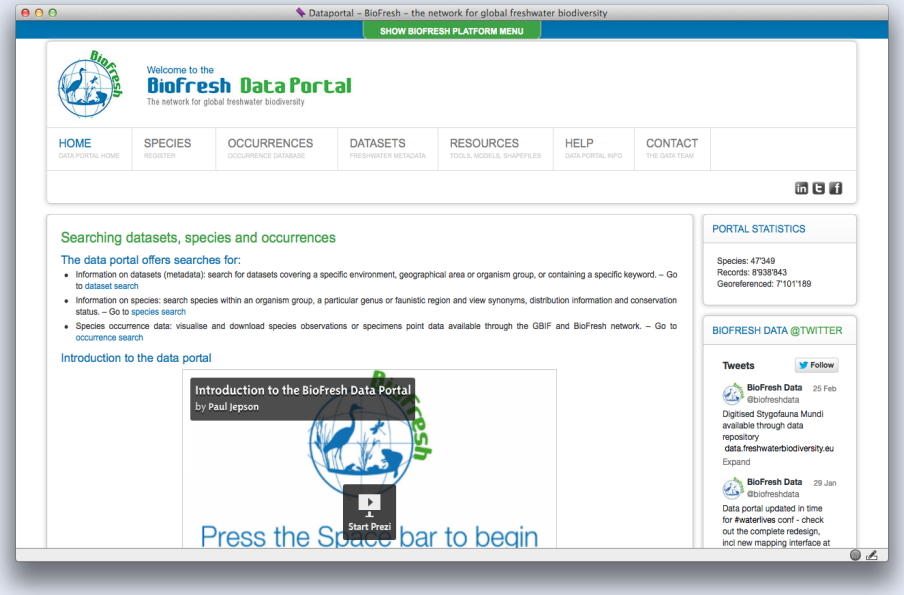

Figure 1: The BioFresh data portal entry page.

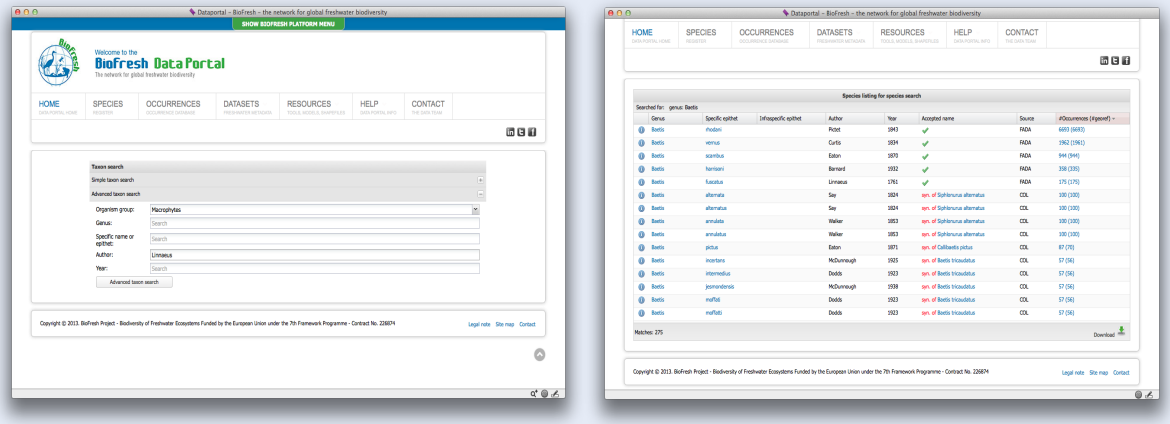

Figure 2: Species search and species listing screenshot.

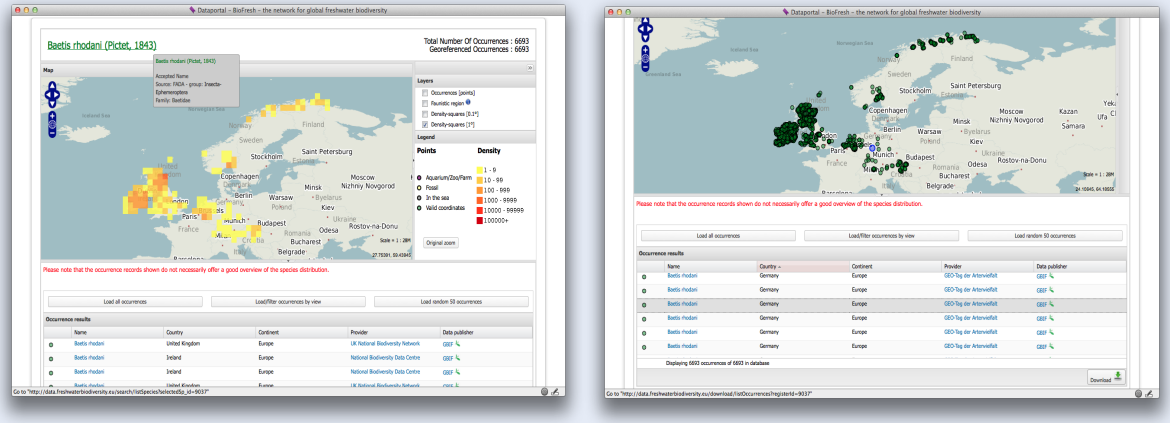

Figure 3: Occurrence results screenshot: density squares (left) and points (right).

When searching for a single species, the user will be presented with information on the species name, synonyms, red list status and availability of distribution and occurrence information. By using the advanced species search, the result may be presented as a species list which can be downloaded.

The occurrence search offers three options: simple search, dataset search and advanced search. Results for a single species (simple search) provide an overview for which area occurrences are available and offer the possibility to load the data on the map and download it. The dataset search offers an overview regarding the distribution of the occurrences and provides the same functionality as for individual species. Advanced occurrence searches allow to visualise data for a selected species group in combination with criteria such as continent/country/faunistic region. The results show an overview of the occurrences that match the query and offer a list of species together with the number of occurrences available for this query. Download options for advanced searches are under development.

Integrating data in the occurrence database

Visitors of the data portal may have noticed that the bulk of data currently originates from the GBIF network. This is correct, but on the other hand not very surprising if you know that one of our aims is to build a thematic GBIF node for freshwater. Obviously, we have been actively mobilising freshwater biodiversity data and we have over 50 datasets at various stages of integration (you can have a peak at some of those at http://data.freshwaterbiodiversity.eu/ipt/). Currently we are building an

on-line tool that will enable us to integrate the data pu-blished through BioFresh and at the same time give us the option to harvest data from other servers using GBIF's Integrated Publishing Toolkit (IPT). This will allow us to act as a node in a network of interoperable databases, in which institutes can choose to publish their data on their own servers.

Data publishing through the data portal

As we are finalising the import tool to integrate data in the portal's occurrence database, we will soon speed up the integration of datasets and warmly invite data holders to document their datasets through the metadatabase and **publish their data through the BioFresh network**. Feel free to contact us if you have any questions on publishing your data.

Future

Several of the partners working on the BioFresh platform have managed to secure funds to continue the activities and developments on the platform in the short term and are actively exploring options for ensuring the long-term sustainability. This includes the establishment of the BioFresh platform as a generic platform supporting freshwater related projects and linked to initiatives such as EU BON and GEO BON.

So, please keep sending new maps and data to us as we will actively be integrating new material in the atlas, the metadatabase and data portal. Apart from this, one of the main activities planned for the coming year is the development of a geoportal. The aim of this visualisation portal is to link the occurrence database to the spatial data available through the atlas and allow the user to visualise these.

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RBINS

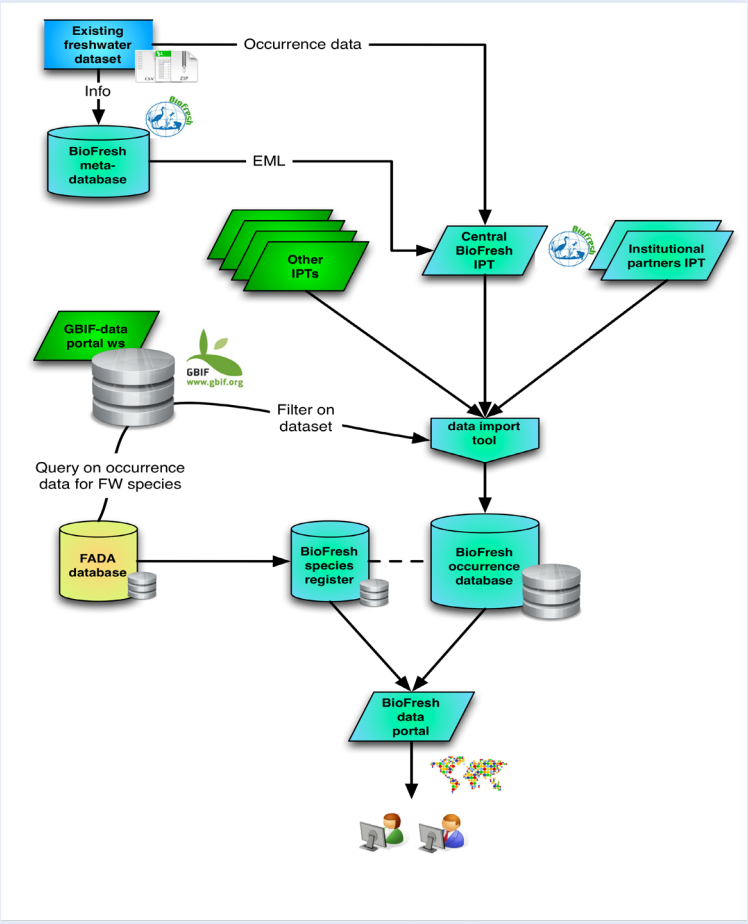

Figure 4: Publishing data on the BioFresh data portal.

The BioFresh metadatabase – state and vision

The importance of data about data

Within the first year of BioFresh we established the BioFresh metadatabase, which is available through the "data portal" section of the BioFresh information platform.

"Metadata" is loosely defined as "data about data". The BioFresh metadatabase collects information on datasets to build a central repository for freshwater related datasets to facilitate their discovery, increase their visibility and permit their 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".

The aim of the BioFresh metadatabase is to bring all possible information on freshwater related datasets together and provide a resource where scientists, conservationists and policy makers can find data relevant for their work.

Offering a questionnaire to easily fill in data in a harmonised way and several query options to find data, the BioFresh metadatabase has become a useful and widely used tool over the years. Basically there are two approaches how datasets are added to the BioFresh metadatabase: (i) the BioFresh data team spots an interesting dataset and fills the questionnaire or (ii) external data holders approach the BioFresh data team to add their dataset to the metadatabase (see Figure 1). Currently the metadatabase holds about 250 registered freshwater related datasets, including those from previous EU funded projects as e.g. WISER (www.wiser.eu).

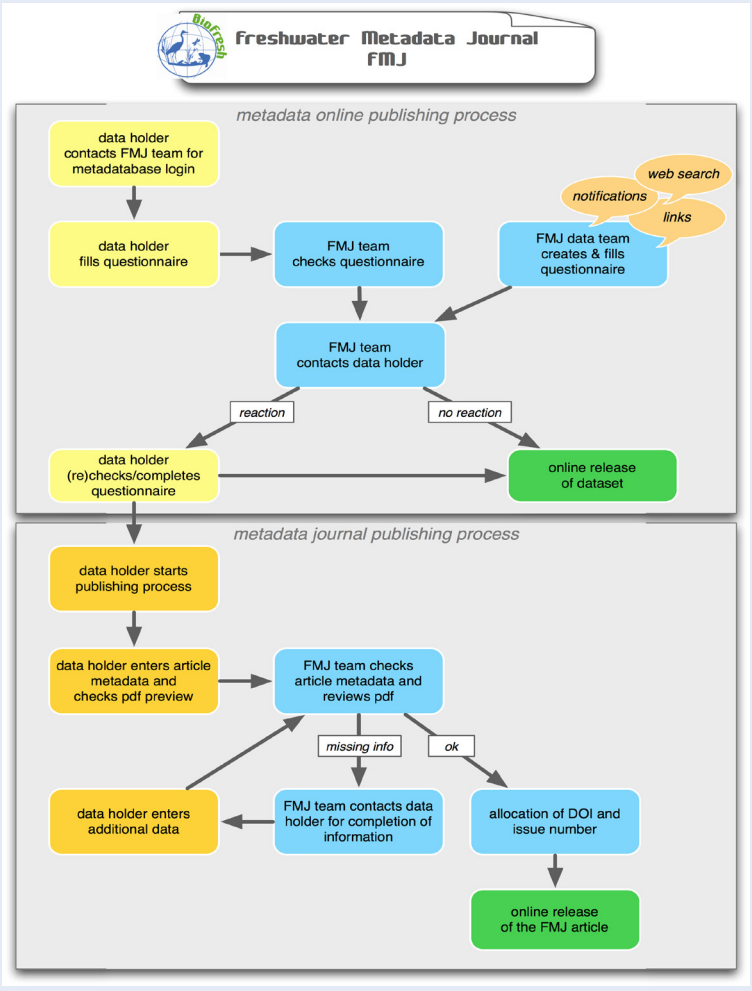

Figure 1: The BioFresh metadata workflow including publication in the Freshwater Metadata Journal (FMJ).

All entered data are subject to quality control and can be exported as pdf or xml files. Help functionalities include a manual, a screencast and tooltips when entering data to identify the content needed for the individual metadata fields.

Visions for the future

For the time after BioFresh the metadatabase was equipped with an administration tool. Though BOKU will maintain the database during the upcoming years – supported through the MARS project (www.mars-project.eu) – this tool allows other persons or institutions to register new users and datasets, to link datasets to the portal or repository as well as to quality control the individual datasets.

Currently the BioFresh metadatabase offers the unique possibility to publish information about your dataset online, to make it more visible to scientists and other interested persons. Now we go a step further and are developing the "Freshwater Metadata Journal" (FMJ). The process of publishing an article in the FMJ will be fully automated based on the entries in the metadatabase (see Figure 1). Each FMJ article will be assigned a DOI and the articles will be accessible through the BioFresh data portal website. Publishing the metadata of your dataset in the FMJ will make it citeable with a unique reference and DOI, it will become traceable for other scientists and therefore more valuable in the sense that it will create recognition of your work.

If you want to publish information about your dataset online in our metadatabase or in the FMJ we are happy to assist the data entry process.

Please visit us:

➲ http://data.freshwaterbiodiversity.eu

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Astrid Schmidt-Kloiber
BOKU

Global Freshwater Biodiversity Atlas

Launch of the first online Global Freshwater Biodiversity Atlas

A new online Atlas of freshwater biodiversity presenting spatial information and species distribution patterns was launched on 29th January 2014 and it is an output of BioFresh.

Freshwaters habitats cover less than 1% of the Earth's surface yet are home to 35% of all vertebrate species! Sadly, freshwater life is declining at an alarming rate, faster than any other component of global biodiversity and it represents a political challenge to manage conservation policies and and pressing demands on freshwater resources from the energy, food and sanitation sectors.

This new Atlas provides policy-makers, water managers and scientists with an online, open-access and interactive gateway to key geographical information and spatial data on freshwater biodiversity across different scales. The Atlas is a resource for better, evidenced-based decision making in the area of water policy, science and management.

The online Atlas adopts a book-like structure allowing easy browsing through its four thematic chapters, on 1) Patterns of Freshwater Biodiversity, 2) Freshwater resources and ecosystems, 3) Freshwater Pressures systems and 4) Freshwater conservation and management. All of the maps are accompanied by a short article with further contextual background information. The interactive map interface allows easy switching between maps, navigation and zooming and the display of information attached to each map feature. Also, unlike a conventional printed atlas this online Atlas can be constantly expanded and up-dated as new maps and data become available. It is edited by a pan-European group of freshwater science and conservation experts from 12 research institutes and supported by key international organisations active in the field of freshwater biodiversity research and conservation, namely GEO Biodiversity Observation Network (GEO BON), DIVERSITAS, the International Union for Conservation of Nature (IUCN), the Global Water System Project (GWSP), Conservation International (CI), Wetlands International, The Nature Conservancy (TNC) and the World Wildlife Fund (WWF).

➲ http://atlas.freshwaterbiodiversity.eu/

Paul Jepson
UOXF.AC

BioFresh results

Priority sites for freshwater biodiversity in Europe

As most of us already know freshwater species are seriously threatened. This is particularly true for Europe where assessments for the IUCN Red List of Threatened Species have found freshwater species to be the most threatened of all those taxonomic groups assessed to date. 44% of all freshwater molluscs and 37% of freshwater fishes in Europe are threatened with global extinction. Given that Europe has pledged to halt the loss of biodiversity in the EU by 2020 these figures present a major conservation challenge. So, what can be done to get us on the right path? A principle threat to these species is identified as the loss and/or degradation of their habitats. Protected Areas, which are focused on protection of species through conservation of their habitats, would therefore seem to be an important tool for improving the status of these threatened freshwater species. Europe already has an extensive network of protected areas, including Natura 2000 which is the first and only regional biodiversity protected area approach in the world. It represents a network of **more than 26,000 sites representing approximately 18% of the land area of the 28 Member States** with the great benefit of being a transnational approach recognising that species and habitats do not recognise political boundaries – this is a major achievement across 28 countries.

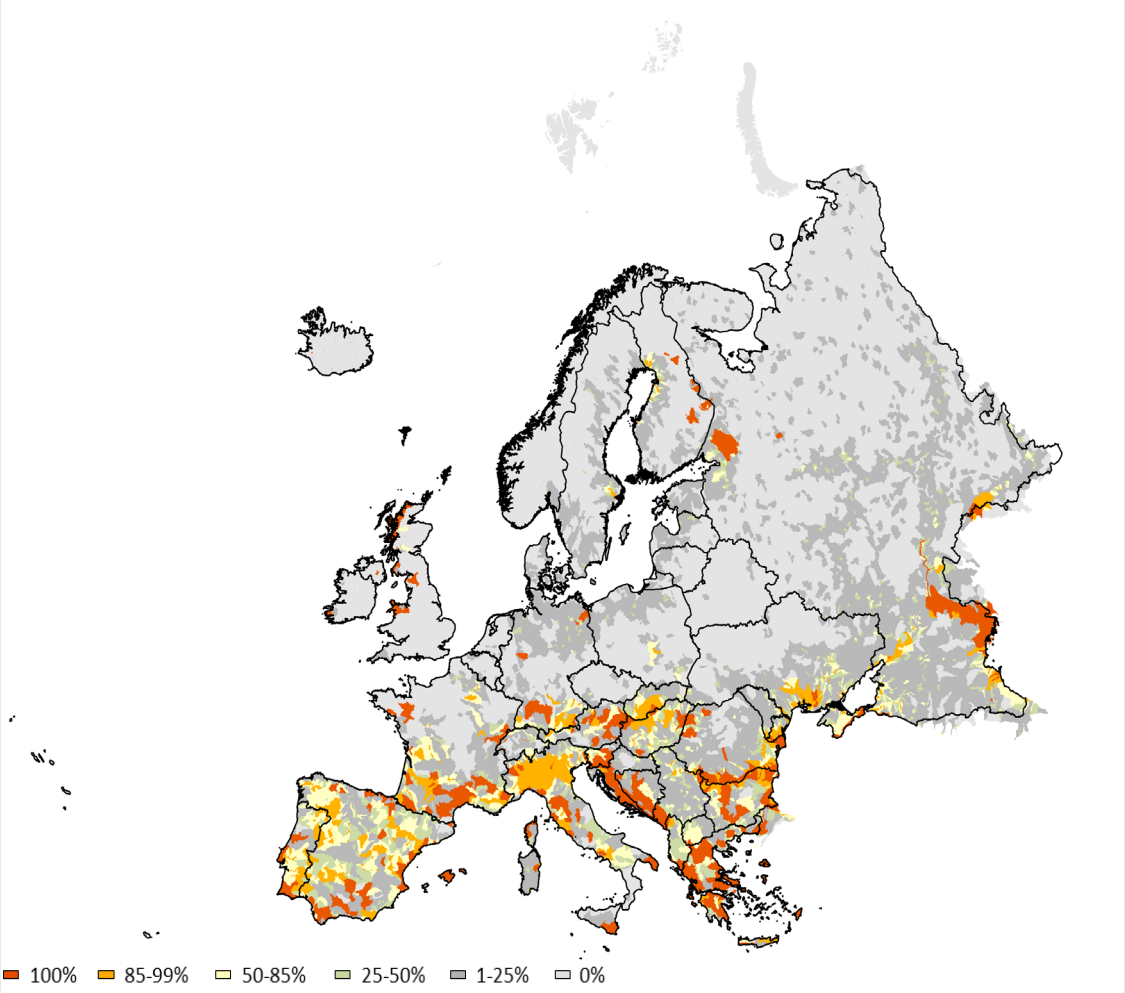

Figure 1: The irreplaceability of catchments as estimated by the frequency of their selection in 1000 runs of MARXAN. Red indicates indispensable catchments selected in each (100%) of the 1000 runs, orange indicates catchments selected in at least 85% of the runs and so on. Catchments in light grey were never part of the best network.

However, recent research in Africa has clearly demonstrated that existing protected areas are not necessarily located in the right places to benefit freshwater species. An important question for Europe is therefore: Does the protected area network in Europe provide effective protection for freshwater species? A key goal of the BioFresh project has been to answer this question.

Following 4 years of data collation and analyses through BioFresh we are now able, for the first time, **to identify and map the locations of priority sites for conservation of freshwater biodiversity across Europe and to see how well they are covered by the existing network of protected areas**. These priority sites fall under the umbrella term of "Key Biodiversity Areas" (KBAs), representing sites that contribute significantly to the global persistence of biodiversity as identified through a set of agreed scientific criteria. With the assistance of BioFresh we first of all developed and published the methodology for application to freshwater ecosystems (Holland et al. 2012) and then applied the criteria to identify a network of proposed freshwater KBAs for Europe. We selected river/lake sub-catchments as the planning unit, being the generally accepted spatial unit for managing freshwater ecosystems. The freshwater KBAs we identified cover approximately 45% of the area of Europe, highlighting southern Europe as a conservation priority. As this represents a rather large land area we ran some scenarios, using Systematic Conservation Planning approaches (MARXAN in this case), to further optimise the network for specified targets, such as to ensure inclusion of the most highly threatened species within a maximum land area of 17% - selected to meet additional EU targets for protected area cover. Those "irreplaceable sites" that are required in all possible networks to meet these targets are identified as immediate priorities for inclusion in any protected area network (Figure 1).

Figure 2: Presentation of the findings at the BioFresh/REFRESH Science-Policy meeting "Water Lives" in Brussels. Photo: Ria Mishaal

This study demonstrates the ways in which this new data set can be used to run any number of scenarios aimed at helping EC policy makers to best meet EC targets for the conservation of freshwater biodiversity. The next logical step will be to analyse these species data in conjunction with maps of Ecosystem Service (ES) provision and to examine the impacts of the current EC policy for maximising ES provision on the conservation of biodiversity. The results were presented at the "Water Lives" Science Policy Symposium in Brussels (29/30 January 2014) and elicited interested discussion on "The next steps to ensure freshwater KBAs are better accounted for within the Natura 2000 network."

Now that we know where the most important catchments are for the conservation of freshwater biodiversity we could examine the extent of their inclusion within the current protected areas network. In summary, we found a substantial lack of protection for the freshwater KBA network with only around 8% of KBAs having more than 60% surface area coverage by protected areas. Many KBAs were not included at all within protected areas, especially in the Balkans and eastern Europe.

Clearly, although Natura 2000 represents a tremendous step foward in transnational protection of biodiversity, in its current form it does not provide sufficient protection to ensure EU targets for halting the loss of biodiversity regarding freshwater species. The Natura 2000 system needs to show sufficient flexibility to develop in ways which address this current failure to represent freshwater species. As many countries are yet to complete the required designation of Natura 2000 sites the opportunity is there to ensure that the priority freshwater sites identified here could be included in the future network. Beyond the Natura 2000 network we also recommend that freshwater KBAs be the focus of another EC target to restore at least 15% of degraded ecosystems.

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Will Darwall
IUCN

Vulnerability of European Freshwater Ecosystems to Climate Change

Freshwater ecosystems are the most threatened on the planet, yet multi-faceted studies on the potential impacts of climate change on freshwater biodiversity at scales that inform integrated management planning are lacking.

BioFresh members Jonathan David (UOXF.AC), Danijela Markovic (IGB), Savrina Carrizo (IUCN) and Paul Jepson (UOXF.AC) developed a study in which they derived a Climate Vulnerability Index (CVI) for 18,783 freshwater catchments across Europe based on climate-induced exposure to hydrological and temperature regime changes, sensitivity to altered environmental conditions of 1,685 freshwater species of plants, fishes, molluscs, amphibians, crayfish and turtles, and the resilience potential conferred by features within and between catchments, such as topology and connectivity. Using multiple general circulation models, emission scenarios and hydrological models, the methods examine the potential variability in climate vulnerability within and among catchments and highlight consensus across methods.

We showed consensus that climate vulnerability increases from the 2030s to the 2080s and that the biodiverse Lakes Ohrid, Prespa and Skadar, along with the islands of Rhodes, Lesbos (Greece), Mallorca (Spain), Sicily and Sardinia (Italy) represent just some of the 576 catchments that show high to very high climate vulnerability by the 2030s (Fig. 1 - next page).

We suggest these could be a practical starting point as targets for climate change mitigation. Furthermore, the presence of dams significantly reduces resilience and elevates climate vulnerability, indicating that management actions and development decisions can be taken to mitigate against climate change in freshwater ecosystems.

Finally, with protected areas currently covering less than 25% of the most climate vulnerable catchments, our results also highlight the need to improve and 'future-proof' Europe's protected area network for freshwater ecosystems (Fig. 2 - next page)

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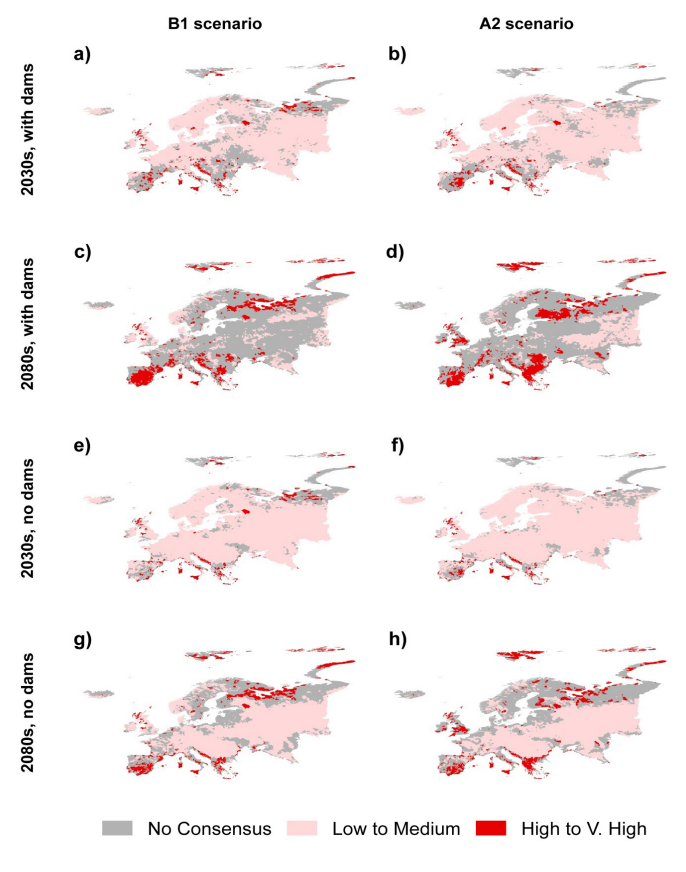

Figure 1: Consensus pattern of the climate change vulnerability (CV) for:

a) 2030s exposure, B1 scenario, with barriers; b) 2030s exposure, A2 scenario, with barriers; c) 2080s exposure, B1 scenario, with barriers; d) 2080s exposure, A2 scenario, with barriers; e) 2030s exposure, B1 scenario, without barriers; f) 2030s exposure, A2 scenario, without barriers; g) 2080s exposure, B1 scenario, without barriers; h) 2080s exposure, A2 scenario, without barriers.

Within the consensus approach, a catchment was assigned the category 'low to medium' or 'high to very high' only if the same category was assigned for all vulnerability methodologies.

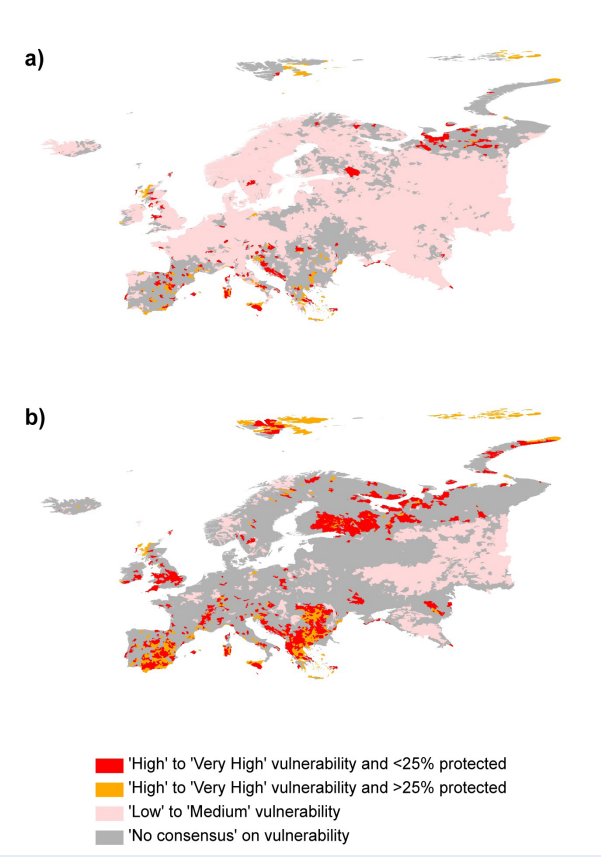

Figure 2: Gap analysis of Protected Areas and Climate Vulnerability. The most pessimistic consensus scenarios were chosen for the 2030s and 2080s to highlight catchments most in need of management actions (< 25 % of their area protected by the current European protected area network and 'high' to 'very high' climate change vulnerability) a) 2030s exposure, B1 scenario, with barriers; b) 2080s exposure, A2 scenario, with barriers.

BioFresh - Science Policy Interface dialogue

BioFresh dissemination meeting: the role of Natura 2000 in protecting freshwater biodiversity

The BioFresh team had a meeting with Stefan Leiner of the Directorate General Environment (DG ENV - Nature Unit) as a follow-up on the last consultative dialogue about BioFresh´s main scientific findings, (see page 9 of this Newsletter) in particular those related to the role of Natura 2000 in protecting freshwater biodiversity.

In February 2014, the Commission announced that a "fitness check" of the EU Nature legislation will be undertaken in order to help improving the implementation of the Birds and Habitats Directives. This exercise will also consider commitments under the EU Biodiversity Strategy and international Biodiversity Conventions, and will also benefit from information gathered from the mid-term review of the Biodiversity Strategy to be carried out in 2015. The fitness check does not yet predict a change in the legislation but will rather identify where are the gaps and why improve implementation. Taken this fitness check mandate into consideration, BioFresh attendees discussed opportunities of collaboration and expressed interest and willingness to be engaged into this exercise by offering important information concerning conservation planning of freshwater biodiversity and explain in detail the gaps presented in freshwater protection .

Participants:

BioFresh: William Darwall (IUCN), Núria Cid and Ana Cristina Cardoso (JRC) and Jörg Freyhof (former BioFresh member)

DG ENV: Stefan Leiner.

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The BioFresh blog

What does it do?

During the second week of April the number of views of the BioFresh blog passed the 100,000 mark. Blog statistics are important and fun to follow but it's hard to know what they really mean. This milestone certainly says something about consistency of our postings and that there are people out there interested in reading our content. However, this particular statistic sheds little light on a question we set out to answer through delivery of the BioFresh blog: are specialist science blogs worth the effort? What is their purpose and what do they do?

We conducted an in depth analysis of the blog, including analysis of statistics, a review of relevant literature and a survey of the BioFresh consortium. The science communication literature foregrounds the role of science blogs in providing a more informal and thus accessible space to communicate specialist science - one where new ideas can be developed and where lay publics can discuss and dispute science. An insight from our study was that science blogs, such as the BioFresh, may serve a valuable function in terms of strengthening science-policy interfaces. The concept of epistemic community (introduced by PM Hass) is nicely defined on Wikipedia as "a transnational network of knowledge-based experts who help decision-makers to define the problems they face, identify various policy solutions and assess the policy outcomes". This concept draws attention to the fact that it is not so much the quality of individual scientific outputs that underpin effective policy, rather it is the profile and vibrancy of the epistemic communities that interact with policy makers over time. The BioFresh project was conceived as an initiative to raise the profile of freshwater biodiversity in policy through strengthening the science base. The practice of delivering the BioFresh blog has reminded us that delivering on this goal also involves communication activities aimed at building an active and cohesive epistemic community. The BioFresh blog is emerging as a virtual space serving to strengthen science community: one that builds profile and identity, that gives visibility and voice to members and the science, issues and interests that motivate and bond people.

Lastly, science that informs policy is increasingly conducted by networks of scientists organised under time-limited projects. The BioFresh blog is transferring to the newly launched MARS project. This is an exciting and significant development. It demonstrates the portability of blogs and thereby the potential of successive projects to develop and deploy this type of digital media asset to strengthen science community and science policy interfaces.

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BioFresh-REFRESH Water Lives Symposium

Symposium report

In partnership with the EU FP7 project BioFresh, REFRESH organised a Science Policy Symposium for Freshwater Life with the aim of bringing together policy makers and stakeholders from the water, energy and conservation sector, NGOs, the scientific community and selected experts to discuss challenges in implementation of the 2020 Biodiversity strategy and the EU Water Framework Directive and to agree on recommendations for policy making and future research.

The scientific advances of BioFresh and REFRESH were presented (along with those of a number of other FP7 projects), and the implications of these for the freshwater management in the EU were discussed with the aim of highlighting clear recommendations for policy making. The Symposium sought to support the implementation of the Biodiversity Strategy 2020 and the EU Water Framework Directive (and its potential revision) and to create synergies across them building on the best recent knowledge on the current and future status of freshwater ecosystems and their inherent biodiversity.

REFRESH has increased the understanding of freshwater ecosystem response to climate and land use change and develops tools to support adaptive management. BioFresh delivered policy relevant data and results on the current status, trends, pressures and conservation priorities of freshwater biodiversity.

The symposium aligned key research findings with the needs of policy making and generated policy-relevant messages relating to:

- Conservation planning and management of freshwater biodiversity in the context of Green Infrastructure and Natura 2000.
- Future protected area networks considering environmental scenarios and policy targets.
- The use of freshwater biodiversity data and information to contribute to recent activities in ecosystem assessments.
- Achieving WFD good ecological status under future climate and land use change scenarios.
- Interlinkages between biodiversity, water related policies and other policy sectors (e.g. energy and agriculture) and the provision of recommendations on synergies for their implementation.

The outcomes of the symposium will be a **policy brief presenting the key messages and recommendations from the discussions, the publication of a policy paper in a peer reviewed journal, and a strengthening of networks in the interface of freshwater science and policy.**

It was generally agreed, in panel discussions, that the meeting had provided:

- very useful inputs on WFD implementation that can be collated for the revision which has a 6-year cycle. The focus now should be centered on the delivery of Ecosystem services which is a useful concept to establish synergies between the two policies. The consequences for ecosytem services of climate change needs further consideration.
- very good interactions between scientists and policy makers, but for better synergies between WFD and Biodiversity Strategy, representatives from other policy sectors (agriculture and industry) could have been involved.
- a great opportunity at many different levels (scientists to policy makers) to discuss in a relaxed mode and understand their needs. Many issues raised at this meeting will be followed up since many scientific activities have been considered by policy makers.

Copies of the presentations are available on the Symposium web site at

- www.waterlives.eu

Video footage of the first day of the Symposium is available at

- http://www.ufz.de/waterlives/index.php?en=32365

A podcast and a summary video of the Symposium outcomes are to be found at

- http://research.freshwaterbiodiversity.eu/index.php/policy/science-policy-symposium

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Water Lives - Impressions by Ria Mishaal

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