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Workshop Report

1ˢᵗ EU BON Stakeholder Roundtable (Brussels, Belgium): Biodiversity and Requirements for Policy

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Abstract

The first EU BON Stakeholder Roundtable was held on 18 June 2013 at the Leibniz Association in Brussels, under the motto "Biodiversity and Requirements for Policy". Important topics regarding biodiversity information were discussed with political stakeholders and a variety of valuable recommendations were given for the future process of EU BON in order to improve biodiversity knowledge availability and usability. Among the participants were members of the European policy, representatives of recent European biodiversity projects and EU BON members. At the roundtable, intensive discussions took place regarding what biodiversity policy needs, for example which indicators and measurements are needed to answer policy questions that are related to biodiversity and ecosystems. Suggestions were made to formalize Essential Biodiversity Variables (EBV's) and Aichi targets. A future approach was set towards producing a guideline and timeline for the work on EBVs that should be established within EU BON.

The challenges of future research policy were also discussed and the collaboration of EU BON with the Group on Earth Observations (GEO) will be a substantial part of the continuous contributions to the global process. EU BON should also serve as a showcase for the European Commission in this respect. EU BON also aims to answer crucial questions regarding data policy, e.g. how to establish a general repository for a long-lasting

storage of data and how to handle 'big data'. Another future task will be to integrate EU relevant projects and initiatives and their data portals, datasets and metadata.

At the roundtable it was also discussed how public stakeholders can be involved in the future, particularly citizen scientists, so that they could be integrated in EU BON and provide useful information for scientists and researchers. The general outcomes were collected and compiled in this report and provide useful recommendations for science-policy interfaces in Europe in general.

Keywords

European environmental policy, biodiversity, GEO, GEOSS, EU BON, science-policy interface, biodiversity data, research

Rationale

In this compilation of the EU BON Stakeholder Roundtable (RT) reports we want to provide a summarized overview, providing shared experiences gained in three different workshops that were organized by the EU BON project from 2013-2015, with altogether more than 100 participants from over 20 countries (ranging from Norway to Israel, and from the United States to Estonia).

Here we summarize the results of the first Stakeholder Roundtable - in addition to this report, also the summaries of the second and third EU BON Stakeholder Roundtable are available and published in RIO with open access.

EU BON - Building the European Biodiversity Observation Network (www.eubon.eu) is a project funded under the EU FP7 framework. It presents an innovative approach towards the integration of biodiversity data and information systems, both from in-situ and remote sensing data sources (Hoffmann et al. 2014). The aim is to address policy and information needs in a timely manner, customized for various stakeholders on different levels - from local test sites to European and international policy EU BON aims to provide integrated data and linkages of social science and policy networks as well as technological infrastructures (Wetzel et al. 2015). One of the key features will be the development of a new open-access platform for biodiversity data and tools.

The RT aimed to exchange ideas and discuss highly relevant issues with relevant stakeholders, from policy, citizen science and local/regional stakeholders in order to inform EU BON and adapt the working programme. Topics of the discussions were related to biodiversity information and its open-access and availability, data workflows and integration of citizen science as well as science-policy interfaces. We will start with a brief general overview of the project, particularly describing the overall framework and role of the stakeholder engagement in the policy and dialogue work package. Secondly, we provide detailed reports of each of the roundtables, outlining its aims, intentions, discussions as well as results and recommendations that were drafted based on the roundtable

discussions, world café sessions and working groups which are now published for the first time in the new series of EU BON Project Outcomes.

The Stakeholder Roundtables are a specific task and part of a Work Package (WP6, see Fig. 1) that focuses on the stakeholder engagement and the science-policy dialogue within EU BON. The main aim of the stakeholder roundtables is to carry out regular engagement with relevant political authorities and other stakeholders at European and national level in support of the delivery of the EU BON project. Furthermore, the roundtables seek to build up a stakeholder dialogue with exemplar sector-specific user communities to incorporate feedback loops for the products of EU BON (data, tools and models) as well as to develop improvements of existing biodiversity data workflows (e.g. from the monitoring species occurrences in the field to processing and analysing the data).
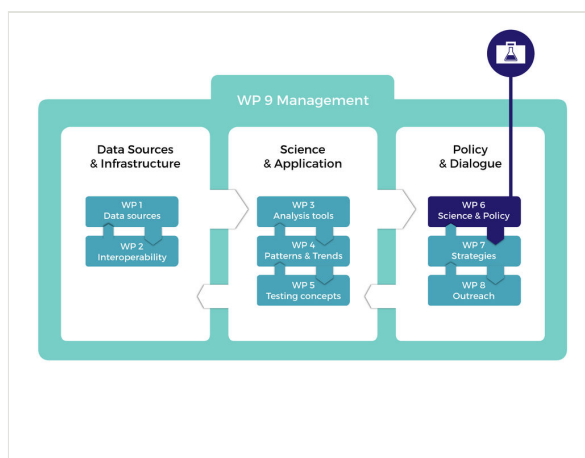

Figure 1.

EU BON Work Packages (WP) with the three sections (a) Data Sources and Infrastructure, (b) Science and Application and (c) Policy and Dialogue. The Stakeholder Roundtables are a specific task in the WP 6 that targets the stakeholder engagement and science-policy dialogue (credits: Pensoft).

More specifically, the aims of the RT are defined in the description of work as follows: "*This task will help to build and ensure regular and efficient linkages to relevant political authorities and other stakeholders at national and European level to support the development and delivery of the EU BON project. While stakeholder interactions will occur throughout EU BON, this task has two elements: the first is a support service for EU BON - mapping stakeholder engagement and providing contacts and support for stakeholder engagement to all relevant EU BON tasks. This will include establishing an overarching policy stakeholder group with contact points to relevant national and European level agencies and authorities involved in biodiversity and environmental policy, and GEO related activities. The second element will be a more focused series of three strategic stakeholder engagement processes that will occur at the beginning, middle and end of EU BON. Each interaction will take the form of an interactive workshop – at which high level*

stakeholders and scientists will work collaboratively to address three sets of questions: a) What major changes need to occur in order that current and future policy needs for biodiversity data are met? b) How effective are the current approaches for improving the availability and policy relevance of biodiversity data? c) What data strategies should be put in place to realise the lessons generated during EU BON?"

To address different stakeholders groups, the aims, guiding questions and invited groups were specifically adjusted in each of the workshops, resulting in three roundtables:

1. **"Biodiversity and Requirements for Policy" - 1st EU BON Stakeholder Roundtable (Brussels, Belgium).** *Addressed stakeholders: European policy (Commission, agencies, researchers), International Networks (Group on Earth Observations), EU funded projects with linkage to biodiversity data.*
2. **"How can EU BON support citizen science?" - 2nd EU BON Stakeholder Roundtable (Berlin, Germany).** *Addressed stakeholders: Citizen Science projects, citizen science networks, researchers and biodiversity networks.*
3. **"Workflow from data mobilization to practice" - 3rd EU BON Stakeholder Roundtable (Granada, Spain).** *Addressed stakeholders: European, national and regional networks (biodiversity data, Group on Earth Observations, ecological research), researchers from the field / sites, EU BON test site partners, political administration.*

Introduction

The first EU BON Stakeholder Roundtable took place in Brussels on 18 June 2013 and was hosted by the Leibniz Association. A main obstacle to reach the 2010 biodiversity goals and to implement the European Biodiversity Strategy is the lacking integration of biodiversity aspects into political, economic and management decisions in different sectors mainly due to knowledge gaps. The aim of the 1-day workshop was to identify existing gaps, determine current needs regarding biodiversity information and develop solutions to overcome the existing knowledge gaps within the EU BON project .

Based on that introduction, existing approaches that compile biodiversity or biodiversity-relevant data and the possible synergies and possible contributions to EU BON had been discussed. Another important aspect of the meeting was to highlight the link to policy and governments of the European Union and their specific needs regarding biodiversity information. Participants were representatives of major biodiversity stakeholders including Gilles Ollier, Jane Shiel and Sofie Vandewoestijne - European Commission, DG Research and Innovation; Anne Teller - European Commission, DG Environment; Georgios Sarantakos - GEO Secretariat; Cigdem Adem - European Environment Agency; representatives of recent European biodiversity projects (FunDiv, BioFresh, STEP and INSPIRE) and EU BON members (see Suppl. material 1 for an acronym list).

Aims of the roundtable

In order to meet the demands of the main political stakeholders in the EU, the workshop aimed to give an overview of the project and its first results, summarized in the first show case, which is dealing with datasets in relation to political targets and indicators. Furthermore, an intensive exchange with other EU-funded projects was foreseen and discussions how to link their data and information to the project and learn from their experiences. In addition, an important topic was to focus on the idea of how the science–policy/management interface can function on a European scale. One of the planned planned interfaces is the EU BON European Biodiversity Portal - the current plans were presented and the requirements for policy (political administration) discussed with the participants from European policy and research.

Key outcomes and discussions

The view of the European Commission

Jane Shiel (European Commission) pointed out that the workshop should pave the way for the discussions with relevant stakeholders (Fig. 2). GEO will be the cornerstone of EU BON, the European contribution for an assessment of freshwater, marine and terrestrial biodiversity data. Furthermore, EU BON should support the Group on Earth Observations - Biodiversity Observation Network (GEO BON) and EU BON outputs should be in line with current policy. *Sofie Vandewoestijne* (EC, DG Research and Innovation) stated that biodiversity data is of vital importance as well as the biological resources and thus they should be prioritized. Biodiversity data exists, but there are knowledge gaps and the data is diverse in spatial and topical coverage. Also, biodiversity data is often not well distributed and not globally harmonized. For example, marine and freshwater observation systems are often not well connected. EU BON is a necessary tool to make data accessible, interoperable and valid and will enable syntheses and assessments. Due to EU BON, data should be integrated across many assessments. There are important tasks and obstacles to overcome, a challenging technical issue will be the integration of various datasets. The European Community ratified data standards to ensure the quality of the data. It will be also important to improve the culture of data dissemination, open access of data is needed and the EC is pushing open access to data that was gathered with EU funded projects.

Figure 2.

Discussing policy relevance of biodiversity data at a European scale (credits: MfN).

General overview of EU BON and its targets

Christoph Häuser (MfN), presentation: "General overview of EU BON and its targets". Christoph Häuser pointed out that there will be a series of stakeholder roundtables, the first stakeholder roundtable should be a kick off for a number of activities. There is still a high fragmentation in biodiversity data and huge gaps Fig. 3. The aims of the workshop will be to determine the current political needs regarding biodiversity information, to develop solutions to overcome existing data gaps and improve accessibility of data. There are many global challenges and biodiversity is one of the major issues. Humanity has become a knowledge society and challenges are the ongoing biodiversity loss, the missing biodiversity baseline data and the fragmentation of available information. The loss of species is not stopped and for the biggest part of biodiversity there is even no knowledge available. The challenge will be to bring together the remote sensing community and 'on ground'-communities (for terrestrial, marine and freshwater species), as the different communities are not well integrated. Aims of EU BON will be to create a better monitoring and assessment of biodiversity data and the provision of practical indicators. The purpose of EU BON will be to serve as the European contribution to GEO BON and the GEOSS common infrastructure and for the linkage to IPBES.
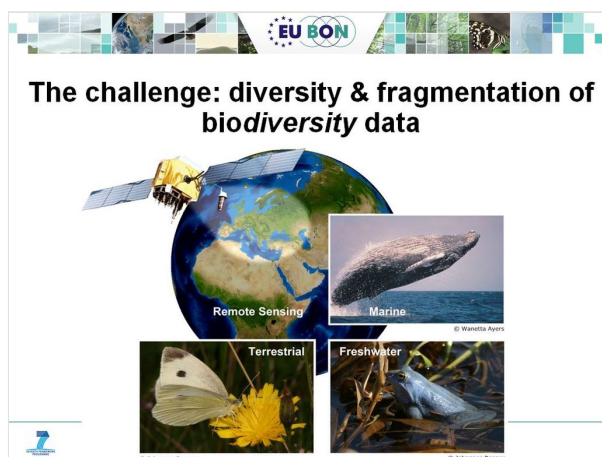
Figure 3.

The challenge of integrating biodiversity data from remote sensing and in-situ (freshwater, marine, terrestrial).

Synergies and contributions from other EU projects

Kris Verheyen (University of Gent): Presentation on FunDiv Europe. FunDiv Europe is a project (funded till October 2014) to quantify the functional significance of tree diversity for element cycling (carbon, nutrients, water) and multitrophic interactions in forests in different bioclimatic regions of Europe. It will contribute to the development of the European Long Term Ecological Research Network (LTER) and information will be obtained to support climate change mitigation policies. Furthermore, the project aims to support the EU and international policies related to forest ecosystems. FunDiv Europe combines different experimental, observational and modelling approaches, and integrates a specifically designed European network of > 200 plots in natural forests.

Jörg Freyhof (IGB): Presentation on BioFresh. BioFresh is a EU funded project; the mission of the project is to improve the capacity to protect and manage freshwater biodiversity in the face of global change. The mission is to build a freshwater biodiversity information platform, to predict responses to multiple stressors and to improve awareness on freshwater biodiversity conservation – this is also highly relevant in the European context. The project period is scheduled from 2009–2014. A data portal is part of the project and there are many freshwater datasets freely available. There are also interactions with GEOSS and Global Biodiversity Information Facility (GBIF), and International Union for Conservation of Nature (IUCN) data was already improved with help of BioFresh distribution maps. The biggest challenge is the low data density for some occurrence data of species, like Trichoptera with many gaps in Western Spain and in the East.

Lyubomir Penev (Pensoft): Presentation on STEP. The STEP project; the aims of the STEP project are to identify drivers for the global decline of pollinators, to document recent trends in pollinators and insect-pollinated plants and to disseminate findings to a wide range of

stakeholders. 22 European partners from 17 countries and 4 BRIC (Brazil, Russia, India and China) partners plus 2 advisors are involved in the project, the project phase is scheduled from 2010-2015. There are synergies with EU BON emerging, for example the exchange of data (due to the Darwin Core Standard). Furthermore, several products could be integrated in the EU BON biodiversity portal: the Pan-European database on pollinator and plants traits and environmental pressures, the European Red Data Book for endangered bees, the Climatic Risk Atlas of the Bees of Europe and the Pan-European distributional atlas of bombus bees (digital maps).

Rudolf May (BfN): Presentation of INSPIRE. INSPIRE is a directive from the European Parliament and the Council. The aim of INSPIRE is to create a European spatial infrastructure and to enable the sharing of environmental spatial information. INSPIRE creates no obligations for member states to collect new data, unlike the habitat directive, but member states are asked to hand in their spatial data. Some of the data that should be included in the INSPIRE data portal consist of biodiversity information, like on protected sites, biogeographical regions, habitats and species distributions. For example for species this will be a major task as there are potentially 150 000 – 200 000 species in Europe to be included.

Peter Galbusera (Royal Zoological Society of Antwerp): Presentation on ConGRESS. ConGRESS is a project for the conservation of genetic resources, supported by the EU (2010-2013). One aim was to provide a user-friendly information portal to promote effective communication on biodiversity policy and management. Also simulation and decision tools for integrating the aspect of genetic diversity in projects and studies are part of the project. For EU BON it will be important that policy makers and managers are involved, as experienced during the ConGRESS project. Furthermore, lessons learnt from ConGRESS are that a project stands or falls by how end users can be engaged. Also enabling a multi-level engagement is important, i.e. an engagement from experts to novices.

In the discussion, *Gilles Ollier* (EC, DG Research and Innovation) pointed out that it will be important that EU BON will become a main biodiversity data portal, as small approaches will probably not survive in the long run, so EU BON is expected to be the starting point for a large information system. The existing problem is the high number of databases and data duplications as well as data fragmentation – from the political point of view there is the need to compile the data. Dirk Schmeller (UFZ) agreed and reiterated the need to develop a business plan on how a European biodiversity network can be established. Anne Teller (EC, DG Environment), stated that – with regards to Biodiversity Information for Europe - the EU wants to have access to the most reliable indicators that give information on major relevant processes for policy makers. Indicators have to be created that will be used by policy makers; this is not efficiently reflected in current biodiversity information. Crucial for EU BON will also be the science policy interface. Additionally, *Claus Mayr* (Birdlife) stated the need to improve and speed up the knowledge transfer as policy often needs information within a short time. *Georgios Sarantakos* (GEO Secretariat) also added that it will also be important to think of how new stakeholders can be involved in the process. *Katrin Vohland* (MfN) additionally emphasized that a sustainability strategy for the data has to be considered, i.e. how data remains accessible after the project ended.

Gap-analysis of existing biodiversity information with regard to the European Biodiversity Strategy and its indicators

Urmas Köljalg (UTARTU) gave a presentation on biodiversity data sources and the gap analysis. Urmas Köljalg stated that a gap analysis of biodiversity data will be needed and that there is no actual biodiversity data available except few examples. There are simple questions that have to be answered for biodiversity data and the biodiversity portal, like how the data is collected, who collects it, where is it stored, how is it accessible. The GBIF data consist of data from different institutions from different countries. However, the most important and needed data is still left in institutional databases. The best working example is the INSDC (NCBI "GenBank") as research papers are only published when the underlying data is published. Overall, there is the need for a major biodiversity data portal.

Christina Secades (UNEP-WCMC): Presentation "Delivering a comprehensive suite of biodiversity indicators in Europe: a science-policy perspective". Christina Secades stated that more science policy has to be integrated when developing a European Biodiversity data portal and there should be taken care about how to communicate such approaches. Also the different "two speed trains" of European Policy have to be considered, between the wealthy west Europe on the one hand and east Europe/Balkans with different capacities at a national level. There are also various legal binding requirements like the Convention on Biological Diversity (CBD), the European Biodiversity Strategy and national laws relevant regarding biodiversity data. EU BON will have to fill the existing gaps of European biodiversity information. Also initiatives like the BIP (Biodiversity Indicators Partnerships) are important where 40 organizations at global, regional and national scales are involved. The first common start point before compiling data should be to determine the policy questions the data should answer, as the indicators need a political purpose ("think from the stakeholders perspective").

In the discussion, *Anne Teller* (EC, DG Environment) stated that the Commission supported the development of EU indicators and global indicators, that the Aichi targets and also national targets are relevant (in the EU there were six indicators developed). Constraints are still the European coverage of biodiversity data, and to obtain long-term data series for evaluating data trends. There should be a start with the data we have and a discussion should be launched how to improve data. *Dirk Schmeller* (UFZ) mentioned that there should be first, due to data limitations, a focus on a certain set of indicators. *Georgios Sarantakos* (GEO Secretariat) added that it should be evaluated how crowd sourcing data could be incorporated in the assessment. *Rudolf May* (BfN) noted that governments and scientists have to be linked much better as they are two different communities. *Jörg Freyhof* (IGB) noted that it is often hard to get the information and data from a legal framework. For example, raw data of the Natura 2000 data process is hardly available

EU BON and global governance - Perspectives for biodiversity policy

Georgios Sarantakos (GEO Secretariat) pointed out (in his talk called "EU BON and global governance - Perspectives for biodiversity policy") how a regional program can have a global impact, such as regional approaches like Arctic BON, Asian Pacific BON and additionally national BON's like in France or Japan. All these systems are connected; there is also an interconnection with the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and CBD and sustainable development goals. EU BON is expected to be a leader in the EU and that it will contribute significantly to global efforts.

Anne Teller (EC, DG Environment), presentation "EU 2020 Biodiversity Strategy: information requirement". The EU 2020 Biodiversity Target is a central policy tool of the European Union to follow up on conservation targets. One EU 2020 headline target is to halt the degradation of ecosystem services and to restore them as far as possible. There are several actions linked to this headline target, for example target 2, Action 5 deals with monitoring ecosystem services and for that purpose, researchers and member states have to be linked. The project "Mapping and Assessment of Ecosystems and their Services" (MAES) is the overarching roof assessment. The aim here is to map and assess ecosystem services. Challenges are arising, as often the access to the data is not in the hand of the European Commission, like in the case of ecosystems data or for agricultural data. Six pilot EU projects (freshwater, marine, forests...) started and it is expected that the pilots will provide some guidelines until the end of the year. Indicators based upon data should be clearly visible and accessible; however, this should be only a part of the general data. The provision of data and metadata will be also part of the project.

In the discussion, also the genetic data was mentioned as a valuable part of biodiversity data. However, in the case of genetic data it is particularly important that this data could be used as an indicator in order to give policy recommendations. Here, the approach to determine Essential Biodiversity Variables (EBVs) could be valuable.

Perspectives for citizen science

Veljo Runnel (UTARTU), presentation: "EU BON Citizen Science perspectives". Veljo Runnel explained how EU BON will integrate the citizen science initiatives. There are different levels of expertise among EU countries – in smaller countries only a couple of people participate in those initiatives, in others, like the UK, thousands of participants can be mobilized. So there is a huge variety – and EU BON should improve approaches to generate more data on biodiversity. The EU BON biodiversity portal will include a citizen science gateway – which should be designed in a sustainable way. Volunteers are needed, at the same time the data needs to meet high quality standards. Crucial will be also the motivation of data collectors, so it has to be determined what motivates the data collectors mostly and probably interaction with other data collectors is a key motivation source. The portal could integrate high quality tools and a way to extract high quality data.

In the discussion *Patricia Mergen* (RMCA) pointed out that there is an underlying fear of many scientists that they are not needed any more. *Jörg Freyhof* (IGB) indicated that if there are toolkits for standardized citizen science (like for dragonflies in Wallonie) developed, it could be beneficial to implement such toolkits under EU BON. *Veljo Runnel* (UTARTU) agreed; EU BON will develop such toolkits.

Cigdem Adem (EEA) reported in her presentation "EEA and LLTK and Citizen Science" about EEA Citizen Science activities in the past and recent approaches. There are different levels of citizen science, it incorporates the gathering and analyzing of data and also proposing and designing of research. Cigdem Adem pointed out that there is a need for a more long term monitoring of biological and ecological systems which can be supported in part by citizen scientists. There is a strong link between scientists and citizen scientists but the link to policy has to be strengthened. An example for making data publicly available is Eye on Earth, a global public information network for collecting and sharing data from diverse sources that can be visualized on a map.

EU BON Biodiversity Portal - content creation and integrating key datasets for policy, science and citizens

Patricia Mergen (RMCA) reported in her presentation "EU BON Biodiversity Portal" about the design of the EU BON Biodiversity Portal – specifically regarding the content creation and how key datasets for policy, science and citizens can be integrated. The work on the portal will start soon (August 2013) and there is also the link to the task of sharing tools. The task is not to increase the already high number of data points but to develop a central data access portal. One of the challenges will be how to mobilize new content, how to curate and update the existing content. Also another critical point is the challenge of how to find funding in order to update existing data (like updating museum data), to get such funds collaborations with the private sector could be a good option. However, big companies want exclusivity and often scientific needs are too specific and could not be commercialized. One of the priorities will be the gap analysis. But there should be first a detailed definition of what a gap in data means, as there are several definitions possible. There are some partners that could be additionally involved in a gap analysis, like Smithsonian, the JRC in Ispra, New York Botanical Garden, and others. Trainings on communication between scientists and policy makers will be organized in collaboration with Christina Secades from UNEP-WCMC.

In the discussion, *Rudolf May* (BfN) noted that the existing technology should be used and more effort should be spent for initiatives to share data, also some rewarding system for data sharers could enhance the sharing of data in general. *Andrew McConville* (IEEP) pointed out that it will be important to add additional data sources e.g. from hunters and other users of biodiversity as they collect lots of data. *Urmas Kõljalg* (UTARTU) mentioned in the respect of a rewarding system the approach of Thomson Reuters publisher: they developed an initiative so that data that was used for papers will be cited. Another critical point will be how to secure that data remains accessible after a project ended. Furthermore it will be crucial to integrate other communities. *Georgios Sarantakos* (GEO Secretariat)

indicated that private companies could be interested in applications concerning access to real time data versus legacy data.

Conclusions

Christoph Häuser gave a resume of the first EU BON stakeholder roundtable (Fig. 4). In the focus of EU BON there are many political stakeholders and in this meeting a whole variety of valuable recommendations were given for the future process of EU BON and many important aspects were discussed:

Figure 4.

Participants from science, policy and international networks at the 1st EU BON stakeholder roundtable in Brussels (credit: EU office of the Leibniz Association).

1. Biodiversity policy: What biodiversity policy needs are indicators and measurements to answers burning policy questions. During the meeting good suggestions were made to formalize EBVs and Aichi targets. It would be a good approach to set up a guideline and timeline for EBVs that should be established within EU BON.

2. Research policy: EU BON should also serve GEO and make continuously contributions to the global process; it should also serve as a showcase for the European Commission. EU BON will also be relevant for crucial questions regarding data policy, e.g. to establish a general repository for a long-lasting storage of data and how to handle 'big data'. Another relevant challenge will be to integrate EU relevant projects and initiatives and their data portals, datasets and metadata.

3. The third important aspect was the discussion about how public stakeholders can be involved in the future, particularly citizen scientists, so that they could be integrated in EU BON and provide useful information for scientists and researchers. A list will be prepared to formalize the relationships with other key biodiversity

projects – for that purpose a MoU will be drafted to establish a network of EU BON associates and for a follow up with other biodiversity projects and political stakeholders.

General synthesis and lessons learnt from the three EU BON stakeholder roundtables

In addition to the conclusions of the roundtables stated above, there are some general lessons learnt from the three stakeholder roundtables:

- The project EU BON started slightly overambitious – the discussions showed that the project will not serve all demands of all stakeholders. However, the roundtables gave good hints for strategic partners that are key for the further work of the project, e.g. the Global Earth Observation System of Systems (GEOSS), the Long Term Ecological Research Network (LTER) and the Group on Earth Observations - Biodiversity Observation Network (GEO BON).
- The stakeholder roundtables require a careful preparation: Feedback on topics and the planned sessions from the project partners are a precondition in order to get useful results out of the meetings and discussions. A profound expertise with regards to the main institutions and actors in the field of biodiversity data, biodiversity data analysis and policy is needed, as well as time to find key-people in the field.
- It is not always possible to get the desired stakeholders to the roundtable, due to manifold reasons: There are (still) language barriers existing, resources are often limited (e.g. travel money and time), and there is no joint understanding of added value of EU BON existing.
- Mediators are needed for a proper stakeholder engagement process – they have to get in touch with the stakeholder and brief the people beforehand, they should also show relevance of biodiversity networks and direct benefits that emerge from such processes.
- Mediators could be partners on a regional level, for example institutions that are bot involved in science and policy (regional environmental agencies), well-established networks covering many European countries (e.g. European Citizen Science Association) or main actors in the field or specific contact persons that work across different levels (i.e. on local as well as on more general/European level).
- It is important to have physical meetings organized in an open way, i.e. that the agenda, topics and discussions points could still be adjusted during the meeting. In the course of the roundtables it turned out that some discussions during the meeting where more fruitful than others, and more time should be spent on agenda items where dynamic interactions occurred which, in the end, resulted in valuable workshop results (i.e. nice best-practice examples, input for guidelines or recommendations. It is also important to have some dedicated time for social interactions included, where people can share their thoughts, develop ideas and a further work plan to solve the given tasks and generally learn from each other.

- Limit the number and time for presentations and talks at the meetings; they are needed in order to present the main activities and work of participating institutions and projects. However, the experience gained in the roundtables showed that discussions and interactive sessions mostly produced the main results and key findings as well as possible solutions.
- It is important to reflect oneself when organizing roundtables and to adjust the presentations, language and examples used – they should be adjusted to the audience and stakeholders that participate. It is crucial to adjust presentations according to stakeholder knowledge/skills/interests, and not to give presentations in a usual "scientific" manner. It is also helpful to include a demo or training sessions: Show (visually) the products (portal, maps) and tools.
- Focus on some main products – e.g. what is essential for a BON and what do the key stakeholders really need in terms of EU BON products : 1. portal, 2. tools, 3. EBVs, 4. data mobilization, 5. visualisation of products.
- Think ahead: Sustainability is important – which products are needed in the future and need to be provided sustainably? The long-term goals and vision with regards to the projects products need to be integrated in the process in an early stage. In order to incorporate a demand and stakeholder-driven perspective it needs to be discussed with partners and the dialogue with stakeholders should already start in the project preparation phase.
- Time is needed for (individual) discussions, it is important not invite too many actors and schedule too many topics in a stakeholder roundtable. Hence it is more productive to focus on some aspects than to cover the whole thematic field in the sessions/discussions.

Some lessons learnt for BONs in general:

- The policy needs long-term biodiversity data for reporting on the progress, state and trends of biodiversity and the effects of biodiversity-related policy (conservation, nature-based solutions, ecosystem services, use of natural resources). One of the core services of EU BON, in the view of policy actors, is the long-term provision of biodiversity data (e.g. species occurrences, traits) and a proper and scientifically sound data analysis and storage.
- As raw data are very heterogeneous and need huge data storages ('big data', for example for satellite-derived data), a profound thematic and technical expertise in various fields is needed, to integrate and standardize data from several research areas, to make this data openly available and derive information and ultimately knowledge that satisfy the needs of policy actors. Participants from European authorities stated in the roundtables (e.g. EC, EEA etc.), that politicians do need maps and visualized products that are easily understandable.
- There are many interactions of citizens with scientists, and many citizen-science initiatives. However, the interactions of citizen science and European policy and its actors need to be strengthened. BONs can facilitate in this process but also supply tools and infrastructure for data handling, data standardization and curation and upload - in order to provide free access of data.

- The role of BONs for local stakeholders (protected areas, research sites in the field, conservation manager) is firstly to provide an overarching framework and, together with European policy, act as an acknowledged authority for reliable biodiversity data that provides policy-relevant information or downscaled data for the local level/ sites.
- The discussions at the roundtables showed that the main users of EU BON will be scientists, trained professionals at governments and authorities on regional, national and European level.
- BONs are both social and technological networks – and strengthening interactions with key stakeholders is essential, both with end-users from European policy, national and international authorities, researchers and data providers from the local level.

Acknowledgements

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Supplementary material

Suppl. material 1: Acronyms - 1st EU BON Stakeholder Roundtable

Authors: Florian T. Wetzel, Anke Hoffmann, Christoph L. Häuser, Katrin Vohland
Data type: Acronym list
Filename: Supplement - Acronyms 1 st EU BON RT.pdf - Download file (183.87 kb)