

# GBIF, DiSSCo and NorBIF Vision document



Photo: University of Oslo Natural History Museum Lepidoptera collection by Kasten Sund

Resulting from discussions held at and after the DiSSCo and GBIF node governance seminar,  
at the University of Oslo Natural History Museum, Tøyen, Oslo, 6-7 February 2020

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# Contents

<b>Executive summary</b>	<b>2</b>
<b>Background</b>	<b>3</b>
<b>DiSSCo Norway - Considerations and Recommendations</b>	<b>5</b>
<b>GBIF Norway - Considerations and Recommendations</b>	<b>7</b>
<b>Norwegian Biodiversity Infrastructure Forum - Considerations</b>	<b>10</b>
<b>From vision to strategy - Next steps</b>	<b>12</b>
<b>Abbreviations and acronyms</b>	<b>13</b>

## Executive summary

This document lays out a vision for Norwegian participation in the European Research Infrastructure project DiSSCo, application of a new Norwegian GBIF node from the RCN, and a national forum for biodiversity data tentatively coined NorBIF. DiSSCo and GBIF are part of a larger landscape of initiatives on open biodiversity data that are relevant from a Norwegian perspective. Close coordination of these and other initiatives is essential in communicating the needs and services of our biodiversity research community to funders and policymakers but also to create an integrated community that benefits from our shared expertise and investments in synergy. This vision document is intended as an inspiration and basis for discussion on how this can be done in Norway. The document summarizes the main considerations and lays out a number of recommendations for DiSSCo Norway, GBIF Norway, and NorBIF.

## Background

**DiSSCo** — Distributed System for Systematic Collections — is a European Research Infrastructure Consortium currently in its Prepare phase, with a focus on establishing a distributed infrastructure for scientific collections. **GBIF** — the Global Biodiversity Information Facility — is an international network and research infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth. The two projects have shared objectives, as well as important differences, e.g., GBIF is a global network aimed at providing access to collection and observation data of all biodiversity, whereas DiSSCo is a European consortium focused on digital access to natural history museum collections encompassing biodiversity, geology, and mineralogy.

Norway participates in GBIF through the GBIF Norway node and in DiSSCo through the Norwegian Consortium for Participation in DiSSCo. Participation in both projects is coordinated through the Natural History Museum at the University of Oslo with different partners in each project. There is considerable overlap in the key stakeholders in each project, but also differences, e.g. collections versus observations, biodiversity versus natural history, data access versus data sharing services.

In the greater landscape of biodiversity data infrastructures and initiatives, a few are especially worth mentioning in the context of Norwegian participation in DiSSCo and GBIF. On a national level relevant is **Living Norway Ecological Data Network**, which aims to build tools, work-flows, ideas and networks from a wide international community of biodiversity informatics infrastructures and organizations. **BIOSCAN Norway**, a NorBOL project, will be a research infrastructure proposal for the 2020 RCN Infrastructure call that builds on the successful NorBOL RCN-funded infrastructure project, and will be the Norwegian participation in the iBOL - International Barcode of Life - project BIOSCAN, 2019-2025. BIOSCAN aims to illuminate biodiversity by developing globally accessible, DNA-based systems for the discovery and identification of all multicellular life. **NORBINA**, a research infrastructure proposal for the 2020 RCN Infrastructure call that builds on the 2018 NIBIGEN RCN infrastructure proposal. Norwegian participation in the **Earth BioGenome** project. The EBG aims to sequence, catalog and characterize the genomes of all of Earth's eukaryotic biodiversity over a period of ten years. The EBG project is not currently aiming to submit a proposal to the 2020 RCN Infrastructure call. **ELIXIR3** is a research infrastructure proposal for the 2020 RCN infrastructure call for the continuation of the ELIXIR-Norway node of the pan-European ESFRI research infrastructure for biological information with focus on

DNA sequence data. **Nasjonal referansesamling for marint arts mangfold** (abbreviated here **NRMA** for practical purposes), a research infrastructure proposal for the 2020 RCN Infrastructure call that builds on the 2018 RCN infrastructure proposal. The project aims to build a national reference collection for marine biodiversity, which includes collections and derived meta and sequence data. **Norwegian Marine Data Center (NMDC)** at the Institute of Marine Research (IMR) as a national data center for marine environmental and fisheries data. **Norwegian Scientific Data Network (NorDataNet)** provides a research data infrastructure to make Norwegian research data available to the wider community. NorDataNet includes marine datasets from the Meteorological Institute, Institute for Marine Research (including NMDC datasets), Norwegian Institute for Air Research (NILU), Nansen Environmental and Remote Sensing Center (NERSC), and the Norwegian Polar Institute. Many datasets from NMDC and NorDataNet could be published in GBIF. NMDC and NorDataNet are funded through the RCN research infrastructure program. **MUSIT** establishes shared IT services for the Norwegian university museums including a common strategy, operation routines, annual work plans, and a shared collection management database. MUSIT is a collaboration between the university museums with the same partners as the members of the DiSSCo Norway consortium. MUSIT implements some of the same functions on a national stage in Norway as DiSSCo aims to establish on the pan-European stage, but covers both natural history as well as cultural history. On a European level, the following are worth to list as all have some form of Norwegian participation: LifeWatch-ERIC, eLTER (Long-Term Ecosystem Research in Europe), EOSC (European Open Science Cloud), ENVRI (a community of Environmental Research Infrastructures, projects, networks and other diverse stakeholders interested in environmental Research Infrastructure matters), as well as the DiSSCo-related projects: MOBILISE (Mobilising Data, Experts and Policies in Scientific Collections), SYNTHESYS+ (Synthesis of Systematic Resources), and ICEDIG (Innovation and consolidation for large scale digitization of natural heritage). On the wider international level, we must also include TDWG (Biodiversity Information Standards), GGBN (Global Genome Biodiversity Network), Research Data Alliance (RDA), Ocean Biogeographic Information System (OBIS), and others.

## DiSSCo Norway - Considerations and Recommendations

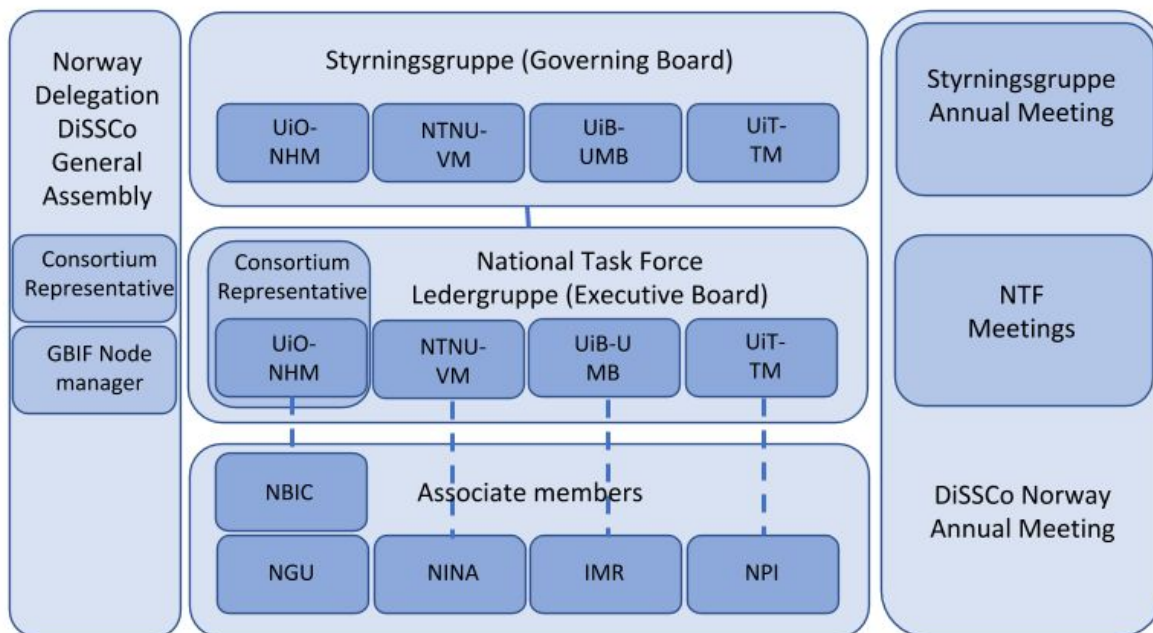
Participation in DiSSCo is currently organized through the Memorandum of Understanding on the Formation of the Norwegian Consortium for Participation in DiSSCo ("[DiSSCo Norway MoU March 2017](#)") that is signed by the directors of the four university museums holding natural history collections, University of Oslo Natural History Museum (UiO-NHM), NTNU University Museum in Trondheim (NTNU-VM), University of Bergen University Museum (UiB-UMB), University of Tromsø - The Arctic University of Norway University Museum (UiT-TM). The Consortium Representative (CR) is the UiO Natural History Museum and is responsible for organizing the Norwegian National Task Force (NTF). At this time the role of Consortium Representative has been delegated by the UiO-NHM research director Jan Lifjeld to Hugo de Boer. The NTF is informally composed of Hugo de Boer (lead), Dag Endresen and Jan Lifjeld. Through the NTF, UiO-NHM is a co-applicant and beneficiary of DiSSCo Prepare (H2020-INFRADEV-2019-2 871043). DiSSCo is currently in its preparatory phase with the launch of DiSSCo Prepare on 2020-02-27, in which Norway participates in WP2.1 and WP8.1. The DiSSCo CR and NTF lead also lead the DiSSCo Synchronisation Group SG5 on Training & capacity enhancement. The DiSSCo General Assembly has also been established and launched on 2020-02-28. Norway is currently an associate member of the General Assembly (GA) and a decision should be taken on commitment of the annual membership fee of 20 000 EUR for full voting membership. Fifteen out of 21 countries participating in the project have become full members. Membership in DiSSCo is limited to natural history collection institutes. At a meeting between the NTF and Research Council of Norway (RCN) on 2019-10-29, the RCN clarified that it can provide 500 000 NOK plus 250 000 NOK funding to beneficiaries of ESFRI Prepare projects for mobilization of national participation, and this funding is available for DiSSCo Norway. The RCN also stressed that no infrastructure funding would be granted from the RCN for Norwegian participation in ESFRI participatory phase projects. The current DiSSCo Norway MoU suffices for participation in the preparatory phases of DiSSCo from 2020-2025 that include DiSSCo Prepare, DiSSCo Construction, DiSSCo Transition, before the DiSSCo ERIC operational launch.

Based on these considerations, initiatives, and developments, it would be strategic to work towards the following:

1. The DiSSCo Norway MoU is maintained for the preparatory phases of DiSSCo.
2. A National Task Force for DiSSCo Norway is established that functions as the DiSSCo Norway Ledergruppe (Executive Board) with one representative from

each MoU partner, plus the Consortium Representative as leader of the Ledergruppe.

- a. The DiSSCo Norway LG meets twice a year, in person or virtually.
3. A DiSSCo-Norway Styringsgruppe (Governing Board) is established consisting of the DiSSCo Norway MoU signatories (i.e. the current directors of the partner institutions).
  - a. The DiSSCo Norway SG meets once a year, in person or virtually.
4. DiSSCo Norway commits to becoming a full member of the DiSSCo General Assembly.
  - a. For the period 2020-2021 DiSSCo Norway agrees to raise the annual membership fee of 20 000 EUR with a shared contribution from the MoU partners.
5. DiSSCo Norway establishes a category of Associate Members for other public and private sector actors in Norway that collect, hold or use natural history collections. These include, but are not limited to, NGU, IMR, and NINA.
  - a. Engagement of the Associate Members will be done by twinning, i.e. natural history museums will work bilaterally with relevant institutes e.g. UiB-UMB with IMR, NTNU-VM with NINA, UiT-TM with NPI, UiO-NHM with NGU, etc.



**Figure 1.** Proposed organization of the DiSSCo Norway Consortium with Styringsgruppe, Ledergruppe/National Task Force and Associate Members. A DiSSCo Norway Annual Meeting will be the main meeting point for DiSSCo Norway, but the NTF will have more regular meetings. The Consortium Representative will represent DiSSCo Norway in the DiSSCo General Assembly.

## GBIF Norway - Considerations and Recommendations

The Global Biodiversity Information Facility (GBIF) is an existing and operational international organization that focuses on making scientific data on biodiversity open and freely available using web services. GBIF's information architecture makes these data accessible and searchable through a single portal. Data available through the GBIF portal currently are primarily distribution data on plants, animals, fungi, and microbes for the world, and scientific names data. The mission of GBIF is to facilitate free and open access to biodiversity data worldwide to underpin sustainable development. Priorities, with an emphasis on promoting participation and working through partners, include mobilizing biodiversity data, developing protocols and standards to ensure scientific integrity and interoperability, building an informatics architecture to allow the interlinking of diverse data types from disparate sources, promoting capacity building and catalyzing the development of analytical tools for improved decision-making.

The Norwegian participant node, GBIF Norway, was established at the UiO Natural History Museum in 2005 with the mission to make information from Norwegian natural history collections and other sources available to the international GBIF network and to coordinate GBIF related activities in Norway. GBIF Norway operates in close cooperation with Artsdatabanken (Norwegian Biodiversity Information Centre, NBIC). In November 2007, NBIC and GBIF Norway set up a joint map-based portal that delivers Norwegian species data: Artskart (Species Map). Museum IT (MUSIT), the Norwegian Institute for Nature Research (NINA) and the Norwegian Institute of Marine Research (IMR) are among the growing number of GBIF data publishers in Norway.

The GBIF Norway node is organized with the following node staff: Dag Endresen, Node Manager; Rukaya Johaadien, Data Manager and IT-developer; and Vidar Bakken, Data Mobilization Officer, part-time. The Head of Delegation of the node is Hugo de Boer (from 2020, before that Fridtjof Mehlum). The node has an advisory group with representatives from the major contributing institutions, UiO-NHM, NTNU-VM, and NBIC. Up to the end of 2019, the advisory group members included Fridtjof Mehlum, UiO-NHM; Nils Valland, NBIC; and Solveig Bakken, NTNU-VM. The Science ambassadors of GBIF Norway are Anders Finstad, NTNU-VM, vice-chair GBIF Science Committee (2016-2019); Erlend B. Nilsen, Norwegian Institute for Nature Research (NINA); and Vigdis Vandvik, University of Bergen (UiB).

The operation of GBIF Norway has been primarily funded by the Research Council of Norway. This current funding period was set to end at 2019-12-31, and GBIF Norway was encouraged to transfer to the RCN Infrastructure program for continued funding. In the 2018 RCN Infrastructure call, GBIF Norway was included in two proposals,

LivingNorway and NIBIGEN, both of which were not funded. After a meeting between the GBIF Norway stakeholders and the RCN on 2019-10-29, the RCN committed additional funding to maintain the activity of GBIF Norway at the current level for 2020 and stressed that a new application for 2020 RCN Infrastructure call is expected. A new proposal was expected to be limited to GBIF Norway only (and a proposal was submitted for the RCN INFRA phase one call in May 2020). Operating GBIF Norway as a RCN Infrastructure creates the possibility of establishing a GBIF participant node using the recommendations provided by the GBIF Secretariat, and presented at the seminar by Mélianie Raymond. The first step in this process is to establish a GBIF Norway consortium in order to apply for the 2020 RCN Infrastructure call.

RCN is also currently working on a long-term mechanism for securing the funding for the national commitments of Norway as a member of GBIF. The new funding mechanism for the membership fee and operation of a minimum node based on the current cost level might be in place to ensure continued operation (from 2021).

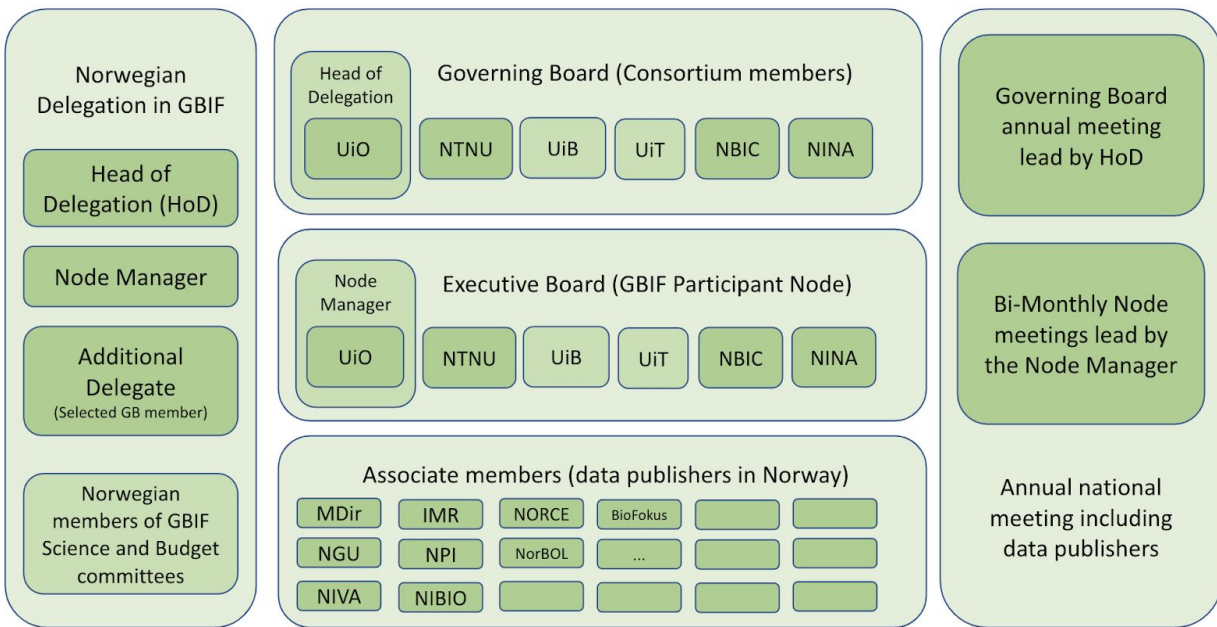
Based on these considerations, initiatives, and developments, it would be strategic to work towards the following:

1. Establish a GBIF Norway consortium for the operation of GBIF Norway from 2020 and onwards. The consortium should consist of the main stakeholders of biodiversity data in Norway: the four universities with university museums, NBIC, and NINA. A desired expansion of the node consortium will be decided and approved by the Governing Board. The GBIF Norway consortium will have a Governing Board and an operative Executive Board.
2. The GBIF Norway participant node functions as the GBIF Norway Executive Board with one representative from each GBIF Norway consortium partner and led by the Node Manager.
  - a. The GBIF Norway Executive Board meets twice a year, in person or virtually.
3. A GBIF Norway Governing Board is established consisting of representatives from each consortium member and led by the Head of Delegation. The intention here is to put together a GB of partners with a direct interest and relevant expertise for national participation in GBIF.
  - a. The GBIF Norway GB meets once a year, in person or virtually.
4. The GBIF Norway Delegation to the international GBIF GB consists of the Head of Delegation, the Node Manager, plus a person proposed by the GB.
5. The GBIF Norway Infrastructure proposal includes the establishment of a category of Associate Members of biodiversity information facility stakeholders

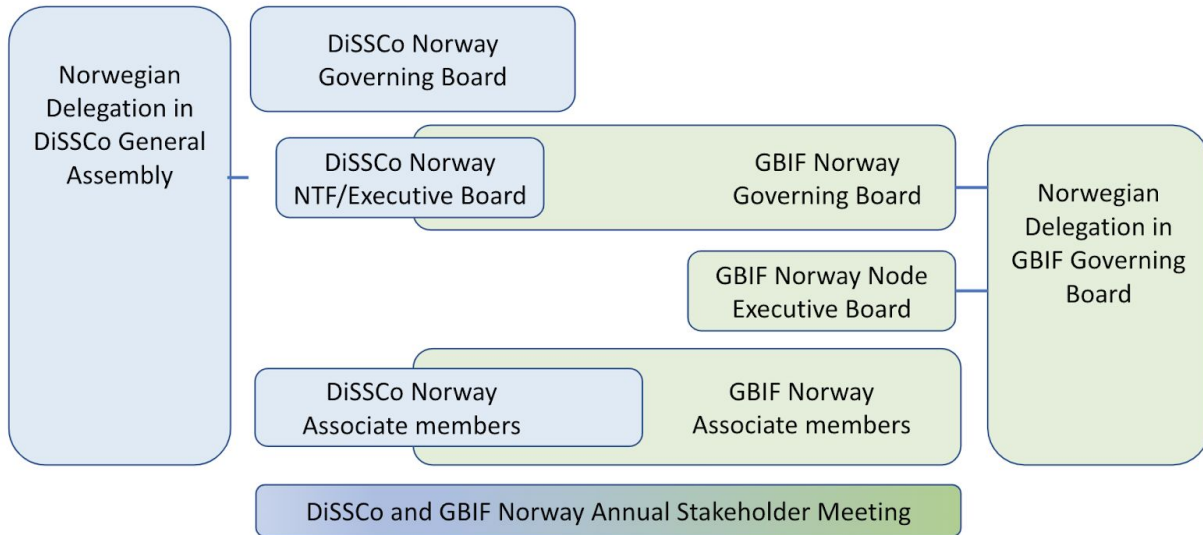


for other public and private sector actors in Norway that collects, holds or uses natural history collections or observation data.

- a. Associate Members are encouraged to participate in annual Associated member forum meetings as well as GBIF Norway symposia.
  - b. Engagement of the Associate Members will be done by encouraging collaboration between institutions working with similar interests and data types.
6. The GBIF Norway Infrastructure proposal aims to establish a participant node with node staff at each consortium partner.



**Figure 2.** Proposed organization of the GBIF Norway Consortium with Governing Board, Executive Board/Node and Associate Members. A GBIF Norway Annual Meeting will be the main meeting point for GBIF Norway, but the Node will have more regular meetings. The Norwegian Delegation will represent GBIF Norway in the GBIF Governing Board.



**Figure 3.** Simplified overview of the DiSSCo and GBIF Norway consortia. The Annual Meetings of DiSSCo Norway and GBIF Norway could be a single daylong event followed by a stakeholder symposium.

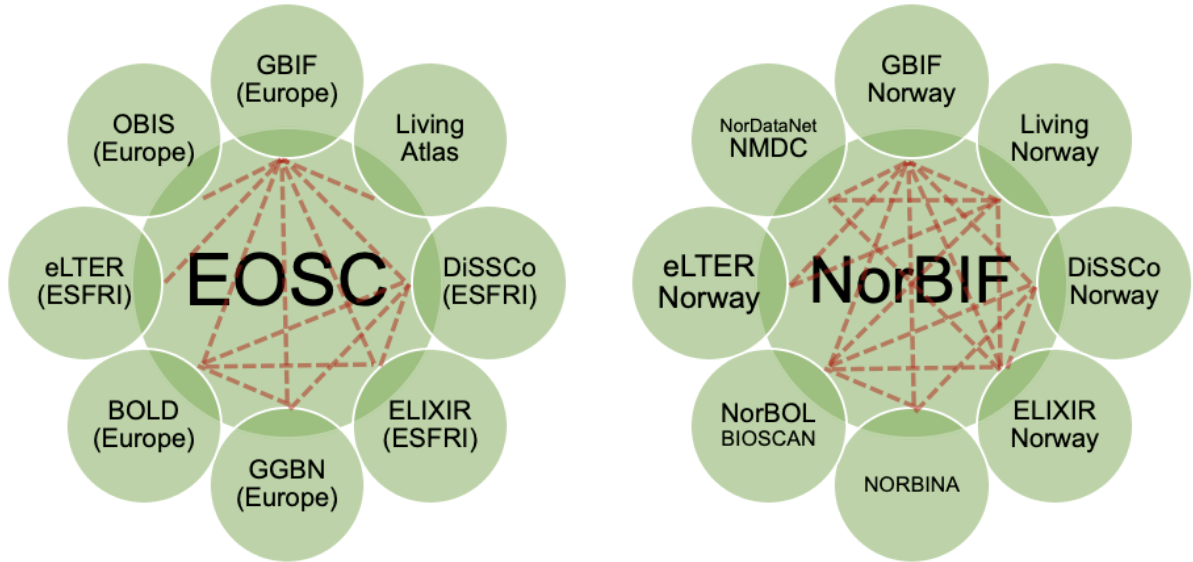
## Norwegian Biodiversity Infrastructure Forum - Considerations

Open data is revolutionizing biodiversity research, and this revolution is happening on many different fronts. Initiatives such as GBIF and DiSSCo build on digitization efforts that have been made over a long period. Our natural history collections are slowly coming out of their cabinets and being made available to the research community as well as the public. The availability of collection metadata as well as digital images of physical objects enables research that used to be time-consuming and only available to vetted taxonomic experts. New types of data such as those collected from long-term monitoring programs, broad mapping efforts, targeted surveys and experiments, including observations of ecosystems, communities, individuals and organismal and environmental DNA, are posing new opportunities but also challenges for the traditional model of centralized natural history collections. Observational data from the institute sector, citizen scientists and other sources have laid a foundation for new biodiversity research, monitoring, and discovery.

These developments all have different infrastructure requirements, and although these requirements, as well as their overlaps and differences, might be clear to specialists, they are not as easily understood by policymakers or funders. Initiatives such as GBIF, DiSSCo, MUSIT, Living Norway, NORBINA, NorBOL, BIOSCAN, NRMA, NMDC, NorDataNet, and EBG are very different to us, but if we want to avoid confusing reviewers and expert panels, it would be good to create a single umbrella for all these initiatives. The umbrella would show that these initiatives are coordinated, non-redundant, and important to the objective of open biodiversity data access.

An umbrella does not necessarily need to be an organization or affiliated with a single institution, but it should include representatives from all projects and stakeholder institutions. The intention would not be to exclude any initiative but rather to ensure that we avoid competing or redundant activities. The umbrella could also serve as a meeting point for Norwegian biodiversity data initiatives and research.

It would be good if we can take the initiative to establish such an umbrella as a Norwegian Biodiversity Infrastructure Forum (NorBIF). The umbrella would need a small secretariat and have relevant representatives that have a direct interest in these initiatives as well as a relevant role and strong mandate from organizations. The Norwegian Biodiversity Infrastructure Forum (NorBIF) could then also take the initiative for annual biodiversity data meetings, and these would replace any GBIF or DiSSCo annual meetings. This could potentially be organized back-to-back with relevant biodiversity events, such as ForBio Research School in Biosystematics Annual Meeting, NBICs Artsprosjektdagene, or the Norwegian Oikos meetings.



**Figure 4.** Biodiversity data infrastructure relationships on a European and Norwegian level. Bringing these national initiatives together under the shared umbrella of Norwegian Biodiversity Infrastructure Forum (NorBIF) would streamline initiatives, avoid duplication and send a clear message to funders and policymakers for common infrastructure needs for open biodiversity data. NorBIF could be marketed through annual open biodiversity meetings rotating through Norway.

## From vision to strategy - Next steps

The seminar on 6-7 February 2020 has collected information and use-cases of how DiSSCo- and GBIF nodes are organized in other countries. The consortium for DiSSCo Norway established in 2017 between the university museums at NTNU, UiB, UiO, and UiT will continue. A consortium agreement for GBIF Norway will be developed.

For **DiSSCo Norway** the following steps should be taken:

- Nominate NTF representatives for NTNU-VM, UiB-UMB, and UiT-TM by the DiSSCo Consortium, ideally, these should be the research directors.
- Agree to join DiSSCo as a voting member and pay the annual membership fee (20 000 €). Agree on a model to share these costs.
- Apply for ESFRI Prepare support from RCN (500 000 NOK) by NTF.

For **GBIF Norway** the following steps should be taken:

- A follow-up meeting at NBIC in Trondheim (*or online*) should be organized to develop a consortium agreement for GBIF Norway.
- Preparations of a research infrastructure application for GBIF Norway must deliver a sketch to the Research Council before the deadline 27th May 2020, and a complete application before the deadline on 18th November 2020.

For **NorBIF** the following steps should be taken:

- Ask each partner to give feedback to this proposal, and express interest to join. This should lead to further discussions on the premises, mode, and profile of a Norwegian Biodiversity Infrastructure Forum.

# Abbreviations and acronyms

BIOSCAN - iBOL research program 2019-2026  
BOLD - Barcode of Life Data systems  
CETAF - Consortium of European Taxonomic Facilities  
CR - DiSSCo Consortium Representative  
DiSSCo - Distributed System of Scientific Collections  
DiSSCo Norway - Norwegian participant node in DiSSCo  
EBG - Earth BioGenome project  
eLTER - Long-Term Ecosystem Research in Europe  
ENVRI - a community of Environmental Research Infrastructures  
EOSC - European Open Science Cloud  
ERIC - European Research Infrastructure Consortium  
ESFRI - European Strategy Forum on Research Infrastructures  
FINBIF - Finnish Biodiversity Information Facility  
ForBio - Research School in Biosystematics  
GA - DiSSCo General Assembly  
GB - (GBIF) Governing Board  
GBIF - Global Biodiversity Information Facility  
GBIF Norway - Norwegian participant node in GBIF  
GGBN - Global Genome Biodiversity Network  
iBOL - International Barcode of Life consortium  
ICEDIG - Innovation and consolidation for large scale digitization of natural heritage  
IMR - Norwegian Institute of Marine Research  
Living Norway - Living Norway Ecological Data Network  
LUOMUS - Finnish Museum of Natural History  
MOBILISE - Mobilising Data, Experts and Policies in Scientific Collections  
MoU - Memorandum of Understanding  
MUSIT - the Norwegian museum database initiative  
NBIC - Norwegian Biodiversity Information Centre  
NERSC - Nansen Environmental and Remote Sensing Center  
NGU - Geological Survey of Norway  
NILU - Norwegian Institute for Air Research  
NINA - Norwegian Institute of Nature Research  
NLBIF - Netherlands Biodiversity Information Facility  
NMDC - Norwegian Marine Data Center  
NODES - GBIF Nodes Committee  
NorBIF - Norwegian Biodiversity Infrastructure Forum

NORBINA - Norwegian Biobank for Nature  
NorBOL - Norwegian Barcode of Life  
NorDataNet - Norwegian Scientific Data Network  
NORCE - Norwegian Research Centre  
NPI - Norwegian Polar Institute  
NRMA - “Nasjonal referansesamling for marint arts mangfold”  
NTF - DiSSCo national task force  
NTNU - Norwegian University of Science and Technology  
NTNU-VM (NTNU-UM) - NTNU University Museum  
OBIS - Ocean Biogeographic Information System  
RCN - Research Council of Norway  
RDA - Research Data Alliance  
SBDI - Swedish Biodiversity Data Infrastructure  
SYNTHEsys+ - Synthesis of Systematic Resources  
TDWG - Biodiversity Information Standards  
UiB - University of Bergen  
UiB-UMB - University of Bergen University Museum in Bergen  
UiO - University of Oslo  
UiO-NHM - UiO Natural History Museum in Oslo  
UiT - University of Tromsø, the Arctic University of Norway  
UiT-TM - University of Tromsø University Museum (Tromsø Museum)  
USIT - University of Oslo University Center for Information Technology