

Consortia Progress Report – Part 1

National Research Data Infrastructure (NFDI)



NFDI 4
BIODIVERSITY
BIODIVERSITY, ECOLOGY & ENVIRONMENTAL DATA

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B-1 Part 1, for publication

1 General Information

- Name of the consortium

NFDI4Biodiversity: Biodiversity, Ecology and Environmental Data

- Research domains or research methods addressed by the consortium

NFDI4Biodiversity covers methods and data types from organismal biological and ecosystem research (DFG review boards 202 Plant Sciences, 203 Zoology; plus subject areas from: 201 Basic Research in Biology and Medicine, 204 Microbiology, Virology and Immunology, 207 Agriculture, Forestry and Veterinary Medicine, 304 Geology and Palaeontology). Data include (I) species observations recorded in the form of tables, photos, videos, specimens and audio files, (II) preserved specimens (collection management/digitisation of historic material), (III) molecular –omics data (genomics, metabolomics, glycomics, and transcriptomics), (IV) data from earth system sciences (e.g. environmental conditions, land use) and (V) data from continuous monitoring of environmental parameters by sensors/satellites. Laboratory analyses, in vivo/in vitro experiments and computational methods (bioinformatics, modelling). Interdisciplinary (socio-ecological research) also use social sciences methodology.

- URL of the consortium website and repositories used for publishing output

<https://www.nfdi4biodiversity.org>

<https://zenodo.org/communities/nfdi4biodiv>

<https://www.youtube.com/@NFDI4Biodiv>

<https://twitter.com/NFDI4BioDiv>

2 Summary

Status & Scope: NFDI4Biodiversity has become 'the' relevant hub for biodiversity research data and tools, fostering collaborations between several data- and method-oriented communities in Germany. The consortium picks up the needs of a diverse stakeholder community in **biodiversity research and conservation**, spanning various sub-communities such as **ecosystem research, taxonomy, bioinformatics, and biodiversity monitoring**.

Structure & organisation: Rooted in the German Federation for Biological Data (GFBio) the partner group has been **expanded strategically**, now comprising over 50 research organisations, collections, IT centres, expert groups, government agencies, and citizen science initiatives. With **15 co-applicants** and **35+ participants**, NFDI4Biodiversity tackles the challenge of integrating diverse data and technical designs. Over 25 **structured use case projects** showcase how tools and standards serve to mobilise and integrate data, as well as improve data management practices and data science across stakeholder groups. The **central Helpdesk** and a comprehensive **training program** play pivotal roles in addressing user needs. The consortium ensures professional advice through a **Strategic Advisory Board (SAB)**, reaching out to **science, policy, and society**.

Operating Model: The consortium operates as a **distributed resource provider and expert network**, facilitating collaborations between institutional data providers, scientific IT centres, developers, and the user community. This operational model is based on a network of **domain-oriented data centres** which curate, archive, and publish data from the community. It is supported by a **team of NFDI-funded software engineers and professional domain expert data curators**, enhancing data management capabilities in the community.

Collaboration: NFDI4Biodiversity actively seeks **collaborations within the NFDI ecosystem** to align activities of common interest and foster early consolidation. The consortium is **involved in all NFDI sections** and contributes to 40 of the 47 groups and committees of the NFDI association. Consortium members were key drivers in uniting the NFDI Consortia Assembly behind the idea of a joint Basic Service Initiative - now implemented as Base4NFDI. Collaboration with other consortia resulted in joint RDM support schemes, training events, and use case projects. Cross-consortia hackathons have successfully fostered collaboration in data science and software development. In addition, and beyond NFDI, NFDI4Biodiversity operates within an **extensive national and international network**, with several long-standing data and standards initiatives and global research infrastructures. For example, the consortium actively cooperates and liaises with GBIF, TDWG, Bioschemas, and ELIXIR, leading to uptake of tools and technology as well as cross-initiative events and workshops. Around 60 relevant initiatives have been assessed to identify top candidates for engagement, matching the scope and needs of the consortium's community of interest.

Key results and benefits: Advancements in community services derive strongly from our five task area's activities and measures. In particular, we achieved progress in the following areas: **(I) Access to state-of-the-art technologies and a comprehensive stock of biodiversity and environmental data:** Stakeholders benefit from accessible academic cloud environments provided by IT centres in our network, where services and specific analyses pipelines can be hosted. Data providers benefit from the federated archiving services provided by data centres, who take on individual researchers' data as well as data from use case partners. Measures in our work programme mobilise notable data resources, needed by stakeholders to contribute to the conservation of biodiversity: More than 1.2 million data units and 1500 data sets have been thoroughly curated, archived and published in collaboration with collections and individual data submitters. **(II) Methods and tools for archiving, publishing, searching and analysing data that are suitable for everyday use:** Previously unconnected infrastructure projects from a number of national and international initiatives are brought together, and several tried-and-tested institutional databases and software components have been consolidated and made available to external users. **(III) Providing an expert forum with training and consultation opportunities for data management, software, and analysis:** With professionals from over 50 partner organisations and several national and international established initiatives, we provide advice for data producers and consumers, handling more than 400 helpdesk requests during the runtime of the project. Notable resources have been made available to the community in the form of dozens instructive videos, educational events, items of shared code and software applications.

Service Portfolio: We collected an initial Service Portfolio with currently **80 services in different stages of development**, offered by 23 partners. The portfolio approach makes the services accessible for structuring and subsequently consolidating the tools and technologies used in the community, as well as organising shared responsibilities for valuable resources. A selected set of services is made available as a **public Service Catalogue**, following a structured onboarding process.

Our **Research Data Commons (RDC)** are conceptualised as a comprehensive, cloud-based **platform** exceeding the scope of the present GFBio portal by **additional end-user services for data transformation, discovery, and analysis** as well as **storage and computing solutions**. Functional components developed so far encompass cloud-based storage, an ontology service, and a search index. Cloud infrastructure is being provided by partner organisations, and operation and sustainability of a productive RDC data platform are under negotiation across the NFDI consortia following the spirit of **One NFDI**. In this way NFDI4Biodiversity serves, integrates, and advances the biodiversity community across academia, collections centres, public agencies, citizen science, and natural history societies in Germany.

3 Composition of the consortium

- Applicant institution

Applicant institution	Location	Duration
A-01 UniBremen/MARUM – Center for Marine Environmental Sciences, University of Bremen	Bremen, Germany	10/20 - today

- Spokesperson

Spokesperson	Institution, location	Duration
Prof. Dr. Frank Oliver Glöckner [0000-0001-8528-9023]	MARUM, University Bremen	10/20 - today

- Co-applicant institutions (in order of the proposal)

Co-applicant institutions	Location	Duration
BGBM - Freie Universität Berlin, Botanic Garden and Botanical Museum Berlin	Berlin	10/20 - today
BIBI - Bielefeld University, Bielefeld Institute for Bioinformatics Infrastructure	Bielefeld	10/20 - today
DSMZ - Leibniz Institute DSMZ - German Collection of Microorganisms and Cell Cultures GmbH	Braunschweig	10/20 - today
FBN - Research Institute for Farm Animal Biology	Dummerstorf	10/20 - today
GFBio - German Federation for Biological Data e.V.	Bremen	10/20 - today
GWDG - Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen	Göttingen	10/20 - today
HITS - Heidelberg Institute for Theoretical Studies gGmbH	Heidelberg	10/20 - today
IPK - Leibniz Institute of Plant Genetics and Crop Plant Research	Gatersleben	10/20 - today
SNSB - Bavarian Natural History Collections	München	10/20 - today
UFZ - Helmholtz Centre for Environmental Research	Leipzig	10/20 - today
UniGießen - Justus Liebig University Gießen	Gießen	10/20 - today
UniJena/iDiv - Friedrich Schiller University Jena, German Centre for Integrative Biodiversity Research Halle-Jena-Leipzig	Jena	10/20 - today
UniMarburg - Philipps University Marburg	Marburg	10/20 - today
UniKassel - University of Kassel	Kassel	10/20 - today

- Co-spokespersons

Co-spokespersons	Institution, location	Task area(s)	Duration
Anton Güntsch [0000-0002-4325-4030]	BGBM, Berlin	TA2	10/20 - today
Prof. Dr. Jens Stoye [0000-0002-4656-7155]	BIBI, Bielefeld	TA2	10/20 - today
Prof. Dr. Jörg Overmann [0000-0003-3909-7201]	DSMZ, Braunschweig	TA5	10/20 - today
Prof. Dr. Klaus Wimmers [0000-0002-9523-6790]	FBN, Dummerstorf	TA1	10/20 - today
Dr. Barbara Ebert [0000-0003-3328-6693]	GFBio e.V., Bremen	TA5	01/21 - today
Dr. Michael Diepenbroek [0000-0003-3096-6829]	GFBio e.V., Bremen	TA4	10/20 - today
Dr. Ivaylo Kostadinov [0000-0003-4476-6764]	GFBio e.V., Bremen	TA5	10/20 - today
Prof. Dr. Ramin Yahyapour [0000-0002-9057-4395]	GWDG, Göttingen	TA2	10/20 - today
Dr. Wolfgang Müller [0000-0002-4980-3512]	HITS, Heidelberg	TA4	10/20 - today
Dr. Uwe Scholz [0000-0001-6113-3518]	IPK, Gatersleben	TA4	10/20 - today
Dr. Dagmar Triebel [0000-0003-1980-3148]	SNSB, München	TA3	10/20 - today
Dr. Mark Frenzel [0000-0003-1068-2394]	UFZ, Leipzig	TA1	10/20 - today
Prof. Dr. Alexander Goesmann [0000-0002-7086-2568]	UniGießen	TA4	10/20 - today
Prof. Dr. Birgitta König-Ries [0000-0002-2382-9722]	UniJena/iDiv	TA3	10/20 - today
Prof. Dr. Aletta Bonn [0000-0002-8345-4600]	UniJena/iDiv/UFZ	TA1	10/20 - today
Prof. Dr. Bernhard Seeger [0000-0002-9362-153X]	UniMarburg	TA4	10/20 - today
Prof. Dr. Birgit Gemeinholzer [0000-0002-9145-9284]	UniKassel	TA1	10/20 - today

- Participants (in order of the proposal)

Participating institutions	Location	Duration
AraGes - Arachnological Society, represented by State Museum of Natural History Karlsruhe (SMNK)	Putbus	10/20 - today
AWI - Alfred Wegener Institute – Helmholtz Centre for Polar and Marine Research	Bremerhaven	10/20 - today
BGBM-DI - Freie Universität Berlin, Botanic Garden and Botanical Museum Berlin, Research Group Diatoms	Berlin	10/20 - today
BIOfid - Specialised Information Service Biodiversity Research, University Library Johann Christian Senckenberg, Goethe University Frankfurt	Frankfurt am Main	10/20 - today
BSH - Federal Maritime and Hydrographic Agency	Hamburg	10/20 - today
BUND - German Federation for the Environment and Nature Conservation	Berlin	10/20 - today
de.NBI - German Network for Bioinformatics Infrastructure e.V.	Heidelberg	07/22 - today
DNAquaNet - University of Duisburg-Essen, Aquatic Ecosystem Research	Essen	10/20 - today
DDA - Federation of German Avifaunists	Münster	10/20 - today
GdO - Association of German-speaking odonatologists	Essen	10/20 - today
Gfl - German Ichthyological Society	Düsseldorf	10/20 - today
GfÖ - Ecological Society of Germany, Austria and Switzerland	Berlin	10/20 - today
HIFMB - Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg	Oldenburg	10/20 - today
HLNUG - Hessian Agency for Nature Conservation, Environment and Geology	Wiesbaden	10/20 - today
IfL - Leibniz Institute for Regional Geography	Leipzig	10/20 - today
IGB - Leibniz Institute of Freshwater Ecology and Inland Fisheries	Berlin	10/20 - today
InfAI - Institute for Applied Informatics association e.V.	Leipzig	10/20 - today
IÖR - Leibniz Institute of Ecological Urban and Regional Development	Dresden	10/20 - today
JKI - Julius Kühn Institute, Federal Research Centre for Cultivated Plants	Quedlinburg	10/20 - today
LAU - State Office for Environmental Protection Saxony-Anhalt	Halle (Saale)	10/20 - today
LfULG - Saxon State Office for Environment, Agriculture and Geology	Dresden	10/20 - today
MfN - Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science	Berlin	10/20 - today

MPI-BCG – Max-Planck-Institute for Biogeochemistry	Jena	07/23 (pending)
naturgucker.de - non-profit registered cooperative	Northeim	10/20 - today
NetPhyD - Network Phytodiversity Germany	Rostock	10/20 - today
Nationalpark Bayerischer Wald - Bavarian Forest National Park	Grafenau	10/20 - today
Nationalpark Hunsrück-Hochwald - National Park Office	Birkenfeld	10/20 - today
GDA/SAB – General Directorate of the Archives of the Bavarian State	München	10/20 - today
SGN - Senckenberg – Leibniz Institution for Biodiversity and Earth System Research	Frankfurt am Main	10/20 - today
SMNS - Stuttgart State Museum of Natural History	Stuttgart	10/20 - today
SUB - Göttingen State and University Library	Göttingen	10/20 - today
Thünen - Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries	Braunschweig	10/20 - today
UniGöttingen/CIDAS - Georg-August-University Göttingen, Campus Institute Data Science	Göttingen	10/20 - today
UniLeipzig - Leipzig University	Leipzig	10/20 - today
ZFMK - Zoological Research Museum Alexander Koenig	Bonn	10/20 - today
ZMT - Leibniz Centre for Tropical Research	Bremen	10/20 - today



Participants of the NFDI4Biodiversity consortium

Participating individuals as of 09/2023

Participating individuals	Institution, location	Duration
Dr. Hubert Höfer [0000-0003-3962-151X]	State Museum of Natural History Karlsruhe (SMNK), Arachnological Society (AraGes), Putbus	10/20 - today
Prof. Dr. Stephan Frickenhaus [0000-0002-0356-9791]	Alfred Wegener Institute – Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven	10/20 - today
Dr. Janine Felden [0000-0002-4177-6644]	Alfred Wegener Institute – Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven	10/20 - today
Dr. Jonas Zimmermann [0000-0002-0522-0569]	Freie Universität Berlin, Botanic Garden and Botanical Museum Berlin, Research Group Diatoms (BGBM-DI), Berlin	10/20 - today
Dr. Gerwin Kasperek [0000-0001-6528-9720]	Specialised Information Service Biodiversity Research (BIOfid), University Library Johann Christian Senckenberg, Goethe University Frankfurt, Frankfurt am Main	10/20 - today
Gregor von Halem	Federal Maritime and Hydrographic Agency (BSH), Hamburg	10/20 - today
Silvia Bender	German Federation for the Environment and Nature Conservation (BUND), Berlin	10/20 - 05/20
Magnus Wessel	German Federation for the Environment and Nature Conservation (BUND), Berlin	05/20 - today
Sina-Victoria Barysch	Deutsches Netzwerk für Bioinformatik-Infrastruktur e.V. (de.NBI), Bremen	07/22 - today
Prof. Dr. Florian Leese [0000-0002-5465-913X]	University of Duisburg-Essen, Aquatic Ecosystem Research (DNAquaNet), Essen	10/20 - today
Johannes Schwarz	Federation of German Avifaunists (DDA), Münster	10/20 - today
Dr. Christoph Sudfeldt	Federation of German Avifaunists (DDA), Münster	10/20 - today
Klaus-Jürgen Conze	Association of German-speaking odonatologists (GdO), Essen	10/20 - today
Prof. Dr. Heiko Brunken [0000-0002-3745-5629]	German Ichthyological Society (GfI), Düsseldorf	10/20 - today
Prof. Dr. Christian Ammer	Ecological Society of Germany, Austria and Switzerland (GfÖ), Berlin	10/20 - today

Prof. Dr. Helmut Hillebrand [0000-0001-7449-1613]	Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg (HIFMB), Oldenburg	10/20 - today
Prof. Dr. Thomas Brey [0000-0002-6345-2851]	Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg (HIFMB), Oldenburg	10/20 - today
Stephan Karger	Hessian Agency for Nature Conservation, Environment and Geology (HLNUG), Wiesbaden	10/20 - today
Dr. Jana Moser	Leibniz Institute for Regional Geography (IfL), Leipzig	10/20 - today
Prof. Dr. Hans-Peter Grossart [0000-0002-9141-0325]	Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin	10/20 - today
Prof. Dr. Adrian Paschke	Institute for Applied Informatics association (InfAI), Leipzig	10/20 - today
Dr. Gotthard Meinel [0000-0002-9201-7664]	Leibniz Institute of Ecological Urban and Regional Development (IÖR), Dresden	10/20 - today
Dr. Holger Beer	Julius Kühn Institute (JKI) Federal Research Centre for Cultivated Plants, Quedlinburg	10/20 - today
Dr. Kai Gedeon	State Office for Environmental Protection Saxony-Anhalt (LAU), Halle (Saale)	10/20 - today
Holger Lueg	Saxon State Office for Environment, Agriculture and Geology (LfULG), Dresden	10/20 - today
Dr. Christian Bölling	Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science (MfN), Berlin	10/20 - today
Dr. Jana Hoffmann [0000-0001-6214-661X]	Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science (MfN), Berlin	10/20 - today
Stefan Munzinger	naturgucker.de non-profit registered cooperative, Northeim	10/20 - today
Prof. Dr. Florian Jansen [0000-0002-0331-5185]	Network Phytodiversity Germany (NetPhyD), Rostock	10/20 - today
Prof. Dr. Jörg Müller	Bavarian Forest National Park, Grafenau	10/20 - today
Jan Rommelfanger	Hunsrück-Hochwald National Park Office, Birkenfeld	10/20 - today
Dr. Margit Ksoll-Marcon	General Directorate of the Archives of the Bavarian State (GDA), München	10/20 - 08/22
Dr. Markus Schmalzl	General Directorate of the Archives of the Bavarian State (GDA), München	09/22 - today
Prof. Dr. Thomas Hickler [0000-0002-4668-7552]	Senckenberg – Leibniz Institution for Biodiversity and Earth System Research (SGN), Frankfurt am Main	10/20 - today
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Prof. Dr. Wolfram Horstmann [0000-0001-8673-6104]	Göttingen State and University Library (SUB), Göttingen	10/20 - today
Florian Hoedt [0000-0002-6068-1659]	Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, Braunschweig	10/20 - today
Prof. Dr. Thomas Kneib [0000-0003-3390-0972]	Georg-August-University Göttingen, Campus Institute Data Science (CIDAS), Göttingen	10/20 - today
Prof. Dr. Christian Wirth [0000-0003-2604-8056]	Leipzig University, Leipzig	10/20 - today
Prof. Dr. Miguel D. Mahecha [0000-0003-3031-613X]	Leipzig University, Leipzig	10/20 - today
Dr. Peter Grobe [0000-0003-4991-5781]	Zoological Research Museum Alexander Koenig (ZFMK), Bonn	10/20 - today
Dr. Nicolas Dittert [0000-0002-1143-3405]	Leibniz Centre for Tropical Research (ZMT), Bremen	10/20 - today