GLOBAL BIODIVERSITY INFORMATION FACILITY

Annual Report 2007

GBIF

www.gbif.org

Summary Timeline 2007

Numbers in color *to the right of event listings are page(s) of this Report on which more information can be found about the milestone indicated.*

Acronyms*: See page 56.*

10 Jan	Announcement that the Royal Danish Ministry of Foreign Affairs provided 1.63M Danish kroner (approximately €200,000) to the GBIF Supplementary Fund; of this, 1.13M kroner were in support of the CEPDEC Pilot Project in Tanzania	32
11 Jan	Call for preproposals for GBIF Campaigns issued	34
30 Jan	GBIF *Strategic and Operational Plans 2007 - 2011: From Prototype towards Full Operation* released as a public document	6
12 - 14 Feb	GBIF - TDWG workshop on TAPIR development, Copenhagen, Denmark	
20 Feb	GBIF and International Commission on Zoological Nomenclature (ICZN) sign Memorandum of Cooperation	
6 - 8 Mar	GBIF workshop on best practices in handling sensitive data, Washington, DC	18
13 Mar	First CEPDEC pilot project officially launched in Daar-es-Salaam, Tanzania, when GBIF and Tanzania Commission for Science and Technology sign Memorandum of Cooperation	32
19-23 Mar	Second GBIF Georeferencing Training workshop in Buenos Aires, Argentina	32
23 Mar	First Report of the GBIF *pro bono* Legal Advisory Group regarding GBIF and IPR issues released	28
10 - 24 Apr	DIGIT and ECAT hold e-conferences to gain input concerning GBIF priorities	
16 - 18 Apr	GBIF workshop on Species Profile Model, Copenhagen, Denmark	13
23 - 26 Apr	GBIF Governing Board Executive, Science and Budget Committee meetings, Copenhagen, Denmark	
12 Jun	Ebbe Nielsen Prize winner announced: Paul Flemons of Australian Museum, Sydney	37
2 Jul	GBIF Data Portal officially launched at the meeting of the SBSTTA, Paris, France	8
	The GBIF Data Portal: A practical "hands-on" tutorial published (print, CD, online)	10
9 Aug	GBIF and the Integrated Project ALARM (Assessing LArge scale environmental Risks for biodiversity with tested Methods) sign Memorandum of Cooperation on a Pollinator Information System	
13 Aug	GBIF and FAO sign Memorandum of Cooperation in support of the International Pollinator Initiative	

Summary Timeline 2007

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Acronyms*: See page 56.*

Dr. Nicholas King takes up office as Executive Secretary of GBIF 31	**16 Aug**
GBIF Call for 2007 – 2008 Seed Money Proposals related to major global issues 20 - 26	**31 Aug**
CODATA – Creative Commons/Science Commons – GBIF working meeting on Licensing Agreements and Biodiversity Data Products, Paris 27	**24 - 25 Sep**
First issue of G*Bits*, the bimonthly GBIF electronic newsletter 55	**1 Oct**
Call for proposals for Node-to-Node Mentoring released	**13 Oct**
Ninth NODES Committee meeting, Amsterdam, The Netherlands	**14 - 15 Oct**

GBIF Governing Board 14th meeting, Amsterdam, The Netherlands 29
• Adoption of decentralised network model and 1 Billion Record goal (16 Oct) 29
• Adoption of recommendation regarding Exchange of Information (16 Oct) 29
• Four GBIF Campaigns endorsed (17 Oct) 29, 34
  • 2010 Biodiversity Indicators 35
  • ABBIF 35
  • Pollinators 36
  • WORMS 36
• Ebbe Nielsen Prize awarded (17 Oct) 37
• GBIF Science Symposium 5: *Biodiversity on the Web* (18 Oct) 33
	15 - 19 Oct

GBIF manuals on *Uses of Primary Data*, *Data Quality* and *Data Cleaning* made available in Korean	**9 Nov**
Fourth GBIF workshop on Ecological Niche Modelling, Warsaw, Poland 32	**26 - 30 Nov**
GBIF formally accepted as a Participant in the Group on Earth Observations (GEO) 14 - 15	**28 Nov**
GBIF, Biodiversity Information Standards (TDWG) and Royal Botanic Garden, Edinburgh sign Memorandum of Cooperation to foster development of a Biodiversity Collections Index	**5 Dec**
GBIF and CYTED (The Iberoamerican Project in Science and Technology for Development) sign Memorandum of Cooperation	**7 Dec**
Databases of publications about GBIF in the scientific and popular media made available by the Secretariat (http://www.editgrid.com/user/gbif_secretariat/) 19, 50 - 53	**10 Dec**

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2007 Annual Report

Letter from the Director

The GBIF Secretariat is pleased to present the Annual Report for 2007.

GBIF entered our second phase of development – "from prototype towards full operation" - in earnest in 2007. We began operating under the new MOU and the 2007 – 2008 Work Programme, and, with the appointment of a new Executive Secretary/Director in the second half of the year, new goals were set at GB14 in October, in particular regarding the growing need to distribute the technical functions throughout the GBIF network.

A significant achievement in 2007 was the launch of the new Data Portal in July at the CBD SBSTTA meeting in Paris. It was the product of many months of work during both 2006 and 2007, and ongoing improvements continue to occupy a central role in the Informatics area of the Work Programme for 2008. The launch itself was accompanied by production of an in-depth Tutorial (in print, online, and CD versions) on using the Data Portal.

The launch of the Portal made it possible to turn a greater amount of attention toward the Content thematic area of the Work Programme. GBIF needs to make large and rapid strides in mobilising sufficient volumes of high quality data in order to become truly useful to its many stakeholders. In October, at GB14, the Governing Board endorsed this view and enthusiastically accepted the challenge of making 1 billion (10^9) high quality data records accessible via the GBIF Data Portal by the end of 2008. The "1 billion record" goal, whilst ambitious, is certainly achievable if GBIF's Members quickly meet the commitments they made in the 2007-2011 Strategic Plan to greatly increase the resourcing of their Nodes and thus the Nodes' ability to mobilise and share data. Fully capacitating Nodes is critical if GBIF is to move to a more decentralised network model, as it must if it is to grow, another key challenge adopted at GB14 (see following page).

To further assist Nodes, the Secretariat proposed in 2007 to employ a Training Officer, whose duties would include developing curricula for training for Nodes themselves, for data providers and for data users. The Training Officer will work with all the thematic areas and all Participants. Increasing and improving participation is critical because GBIF is a participatory network – and Participants provide the content which makes GBIF useful, from the provider of the smallest dataset to the most active of the Nodes.

In another new development in 2007, the Governing Board also endorsed four GBIF Campaigns. The Campaign concept is designed to leverage additional resources amongst Participants in order to bring both data into the network and to address issues that GBIF's Participants deem significant. The Campaigns are described in this Report, and it is envisaged that the products of their work will begin to appear in 2008.

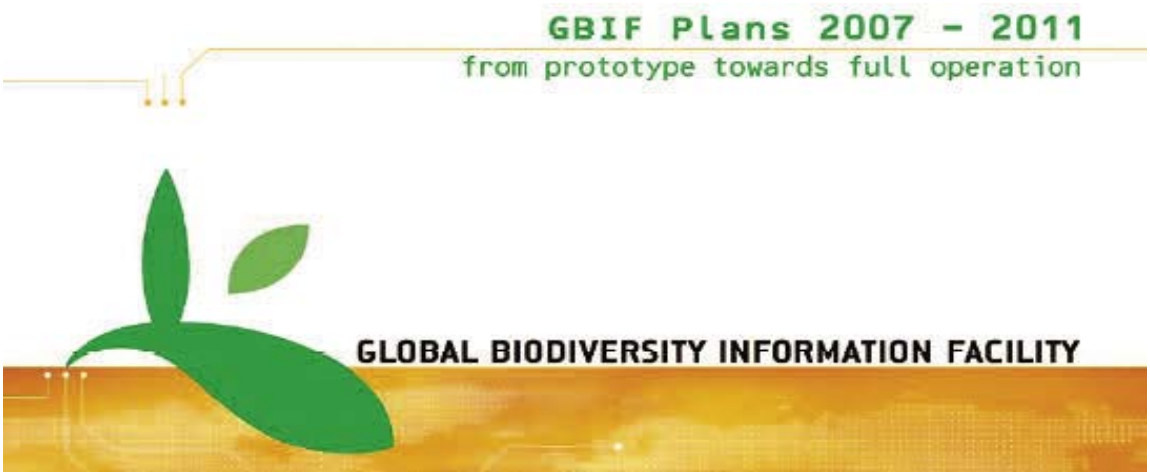
In all, 2007 has been an exciting and active year of change for GBIF. It is our hope that every Participant also feels this excitement and is actively engaged in 2008 in mobilising resources and data to reach not only GBIF's immediate goal of 1 billion records but also its foundational goal, set by the Participants, of making the world's biodiversity data available to all in service to a sustainable future.

Sincerely,

Photo by C.-M. Vizitiu

Dr Nicholas King
Executive Secretary/Director
(from 16 Aug 2007)

From Prototype towards Full Operation -- Growing GBIF Network Capacity



The Strategic Plan for GBIF's second phase (2007 to 2011) is subtitled "from prototype towards full operation". In moving "towards full operation" a clear need is to grow capacity within the Participants. As GBIF is intended to be a network facilitated by the Secretariat in service to Participants, it makes sense to follow a decentralised model whereby Participants find it easier to mobilise the additional necessary resources in-country rather than towards the operations of a centralised Secretariat.

In a distributed model the capacity is essentially infinite amongst Participants, whereas the centralised model constrains activities to the limited capacity of the Secretariat. Decentralisation allows the Secretariat to focus more on its role as a facilitating mechanism in service to participants, for example in brokering agreement on standards and protocols, and developing tools for capacity building, portal development and various data mobilisation and analysis techniques.

One of the greatest benefits of GBIF's existence is that Participants gain access to many millions of biodiversity records originating from their countries, in compatible formats from many different sources. Many developing countries in particular now have significant amounts of primary biodiversity data available via GBIF, providing significant progress towards the CBD goal for countries to 'facilitate the exchange of information relevant to the conservation and sustainable use of biodiversity'.

These primary (GBIF-served) data are key to meeting international obligations such as producing "trends in the abundance and distribution of selected species" (CBD VIII/15.12). Biodiversity indices based on primary data can be calculated at global, regional, national and local levels for all scenarios such as habitat loss and climate change.

Data sharing, including this 'exchange' between countries of origin and data holders, and access to analytical tools, allows all countries to participate more fully in global environmental treaty negotiations. Thus by participating in GBIF and working through GBIF structures, architecture, and standards member countries

- acquire improved access to information and prevent duplication and wasted efforts, and
- access 'fast-tracking' of analyses which improve policy responses by presenting information in ways that can be used by decision-makers in biodiversity and broader sustainability debates.

However, in order for such a distributed network model to reach "full operation", an urgent need exists for countries *rapidly* to mobilise further resources to:

- invest in the necessary human resources and infrastructure capacity in-country (through the principles of GBIF Nodes);
- ramp up the rate of mobilisation (digitisation based on GBIF-mediated, globally-agreed standards) of biodiversity data held and collected in future, in order to make these readily available for enriched analysis;
- develop and apply the analytical tools;
- apply metadata and registry protocols and standards to better allow all countries to discover, inventory, access, analyse and use these data.

This increased capacity will greatly improve local, national, regional (e.g. EU, SADC, ASEAN) and global analysis for policy-making by agencies at all these scales.

Thus, GBIF's moving "from prototype towards full operation" to benefit the global community as well as individual Participants can only be achieved through full buy-in, and a significant mobilisation of relevant resources in-country -- and therein lies the challenge to GBIF network Participants.

Without significantly increased commitment of resources to mobilise information, it will prove increasingly difficult to address the rapidly growing socio-economic problems arising from environmental destruction that governments must address.

The GBIF Secretariat pledges its full support to assisting you to meet this challenge, but ultimately it is up to you, as both the proponents of and participants in the GBIF network, to make it work for you, as we strive to meet growing sustainability challenges.

This Annual Report is organised around the major thematic areas of GBIF work as outlined in the Strategic Plan for 2007 – 2011 and the Work Programme for 2007 – 2008. These are Informatics, Content, Participation and Campaigns. Important individual activities are highlighted in sidebars and boxes. A timeline for the accomplishments and events of the year is provided on the inside front cover of this Report.

Informatics

GBIF Data Portal Launch

The newly implemented and much improved GBIF Data Portal was officially launched on 2 July at the CBD SBSTTA12 meeting in Paris.

The new GBIF Data Portal provides an Internet gateway capable of handling millions of data records provided by hundreds of institutions scattered across the world. The GBIF Data Portal is a single point-of-entry to these many databases and their millions of records (as of this writing, 150 million records are being shared throgh the GBIF network).

Using GBIF's new Portal search engine, a user can find where on the globe a species can be found, or get a list of species in his country or her back yard. The data retrieved can be instantly plotted on Google Earth. The Data Portal is also a sophisticated tool for users to incorporate biodiversity data into their own websites, or download datasets for ecological studies. When combined with environmental datasets (soil type, climate, elevation, etc.), GBIF data can be used in predicting species' response to climate change,

choosing the best places to put protected areas, etc.
"This new Portal is one of the key tools GBIF has been working toward since its inception in 2001," said Dr **Nicholas King**, then CEO of the Endangered Wildlife Trust, and soon to become Executive Secretary of GBIF. "It will be extremely useful in improving decisions in support of sustainable development."

Ahmed Djoghlaf, Executive Secretary of the Convention on Biological Diversity, welcomed the launch of the new Portal. "The creation of this new Portal comes at a time when the Parties are enhancing their efforts to achieve the 2010 biodiversity target. This new Portal will make a significant contribution in building the capacity of countries -- including repatriation of data to countries of origin, and in promoting free exchange of biodiversity information among countries."

The Side Event was chaired by **David Penman**, Chair of the GBIF Governing Board. He introduced a PowerPoint presentation on a few of the capabilities of the GBIF Data Portal, and then welcomed the remarks of a number of notable speakers.

Pictured from left to right are: Ashgar Fazel, Jan Plesnik, Keping Ma, Alfred Oteng-Yeboah, Christoph Häuser, David Penman (standing).

Christoph Häuser, former Chair of the GBIF Governing Board and currently associated with the Global Taxonomic Initiative, reminded the attendees of the long and strong association of GBIF with the CBD via a memorandum of cooperation with the Secretariat and close working ties with the CHM, GTI, GSPC and the 2010 Target.

Alfred Oteng-Yeboah commented on the potential of GBIF for assistance in reporting on biodiversity for the millenium assessment, and regarding millenium development goals. He noted that data made available through the Global Biodiversity Information Facility are inherently data that are repatriated, and so countries and institutions that share their data with GBIF are accomplishing goals of the CBD.

Keping Ma discussed the relationship of GBIF data to conservation and sustainable use – in order to accomplish these, a country must first know what biodiversity it has. GBIF data help to answer this question. He also noted the global and cooperative nature of GBIF that allows a country to ask and answer its own questions while using a global resource.

Jan Plesnik emphasised that countries can use GBIF data in meeting their national obligations to the CBD, in preparing and implementing the National Biodiversity Strategies and Action Plans. He showed that GBIF data also helps in the management of natural resources, citing some examples from within the Czech Republic.

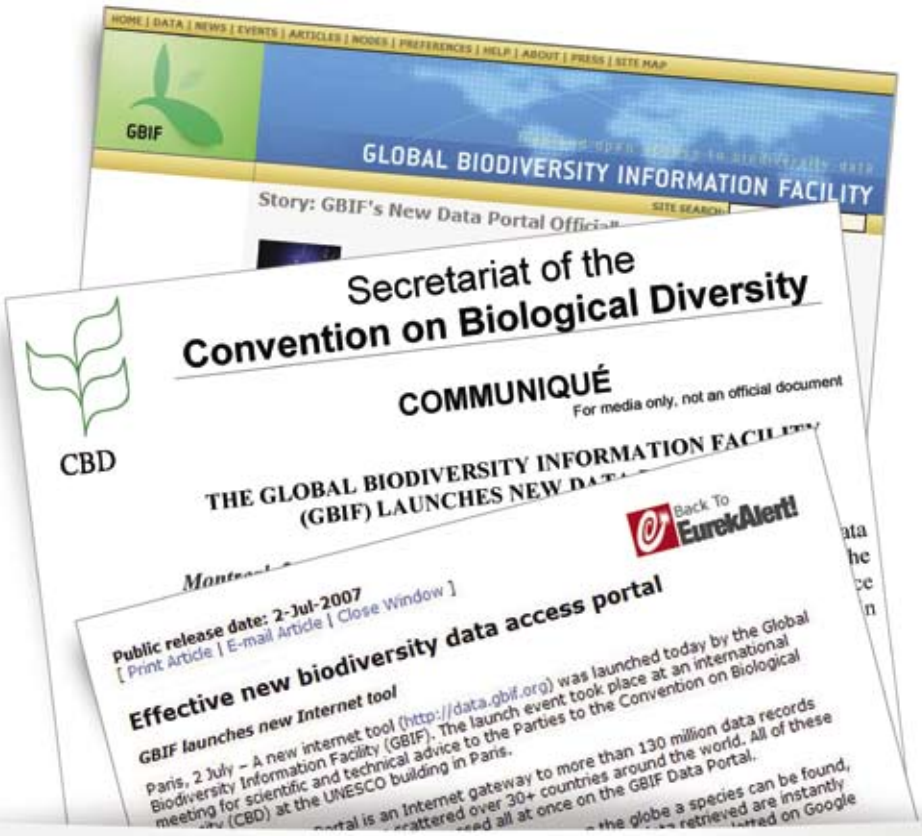
Hesiquio Benitez (not pictured) of Mexico discussed the effort and expense that Mexico had to go to in order to form the databases on biodiversity now used to great effect by CONABIO in helping the government make biodiversity management decisions of all types. CONABIO data are used in predicting movements of invasive species, the spread of diseases, etc.; regulation of GM crops; as criteria and information for establishing protected areas and biological corridors; and in making predictions concerning the effects of climate change on biodiversity. He also noted that CONABIO gathered more than 6 million Mexican biodiversity records over 15 years of effort, and yet, there are 400,000 additional records of Mexican biodiversity available through GBIF that are not directly in the CONABIO databases.

GBIF makes it easier and less expensive to replicate Mexico's experience in other countries because of the information infrastructure it has put in place, and because of the data that are available via that infrastructure. GBIF provides a framework for making partnerships for digitisation projects and tools for analyses to provide advice to decision-makers.

Ashgar Fazel complimented GBIF on the work it has done to date, and made it clear that he thought that GBIF is an excellent partner for any country that wishes to have a biodiversity information system that serves it as well as CONABIO does Mexico.

Jaime Webbe of the CBD Secretariat strongly supported the idea that countries should avail themselves of GBIF's information infrastructure, and support its efforts to build content, in order to address issues that arise from climate change.

The side event concluded with a champagne toast to GBIF's success and future efforts, and an invitation to visit the GBIF "booth" during the meeting for a "hands-on" experience with the GBIF Data Portal.



Press information on the launch was released to worldwide channels both by GBIF and by the CBD Secretariat.

A tutorial on the use of the new Data Portal was prepared in print, online and CD versions for distribution at the Launch and other meetings.

The GBIF Secretariat maintained a booth at the SBSTTA meeting that was visited by representatives of over 50 countries and organisations.

Characteristics of the New Data Portal

The prototype data portal that was in place from February 2004 through June 2007 allowed a user to search on one scientific name at a time and get back lists of data records and a map of those localities that were georeferenced. It relied on a single taxonomy and could export KML files (which could be imported into Google Earth in a separate step).

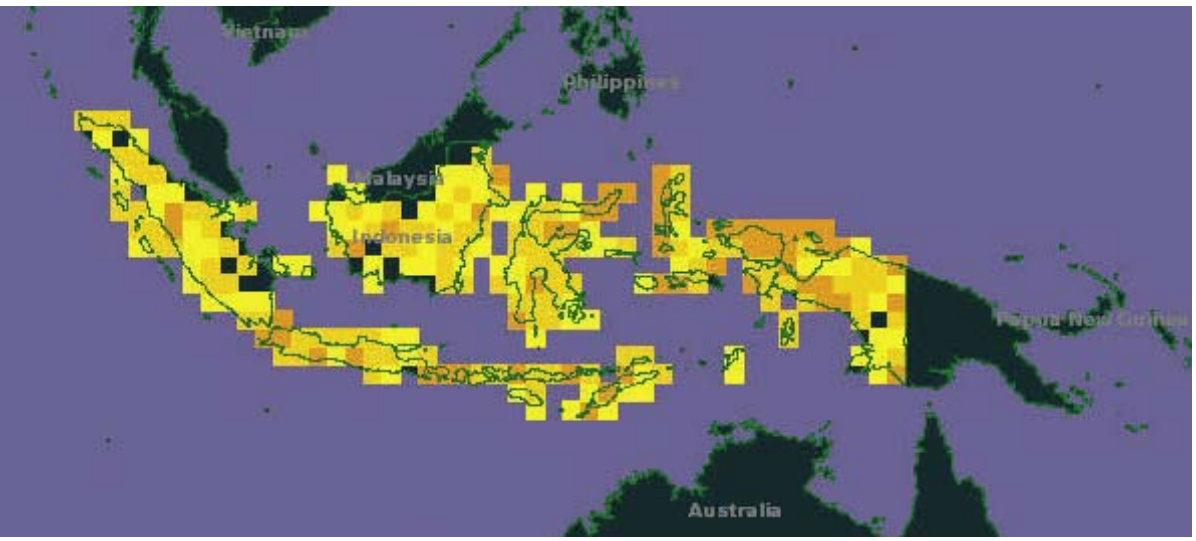
With all its limitations, the prototype portal was proof of the concept that a worldwide distributed network of biodiversity data providers could be linked together and made searchable from a single point of access. It served GBIF well as a testbed for a number of ideas and trial implementations.

The new GBIF Data Portal has two essential and complementary parts. The first of these is a sophisticated information infrastructure that includes search engine, index, reference file of scientific names and web services.

The information infrastructure of the GBIF Data Portal

- Allows a user to search on any taxon, country or dataset, or on combinations of these parameters.
- Provides taxon searches at the species, generic, family, or higher levels all the way up to a whole kingdom at once if the user wishes.
- Makes several taxonomies available and preserves the structure of each independently of the others; users can choose which one(s) to use or ignore. In addition, there is improved taxonomic placement for species not included in the Catalogue of Life.
- Maps returned are relatively fast to load because they are initially plotted as record density in a 1 x 1 degree cell. It is possible to "drill down" within such a cell as far as 0.1 x 0.1 degree. At that point, clicking on a cell will bring up the original data record(s).
- Data can be plotted directly to Google Earth, either as record densities or as actual placemarks. The original record data remain attached to the placemarks, so that navigation back to GBIF directly from Google Earth is possible.
- Has a very advanced search function (called an Occurrence Search). The user can specify geographic region, country or bounding box, level of classification, and/or a number of other parameters by setting search filters, including time series (by month or by range of years).
- Links to images of the organism(s) in question where such links exist; this service will grow substantially over the coming months.
- Provides detection and reporting of data quality issues (e.g. mismatched countries and coordinates; scientific name format problems; missing required fields) to enable data providers to improve the quality of the data they share.
- Supports data providers that use the TAPIR protocol and either current versions of Darwin Core or the ABCD data standards.
- Has web service interfaces for external tools and web sites to access and import GBIF data into their own portals.

The new portal is ready to index additional sources of name and classification data as well as resources offering images and further species-related links.



Maps returned by the new portal are relatively fast to load because they are initially plotted as record density in a 1 x 1 degree cell.

Development of Data and Metadata Standards, and Tools

The new portal logs a number of issues which may be detected during the indexing process and annotates the associated records with this information. Data providers can view these results through the user interface, but the process will also be enhanced to send reports directly upon completion of indexing. To assist data providers with resolving issues of access, parsing and indexing their data, a full time Portal Data Manager has been added to the Secretariat staff.

During 2007, the Secretariat put into place contracts for the development of various tools to further assist those who share occurrence or taxonomic data through the GBIF network:

- Data provider for nomenclatural and taxonomic data, incorporating a database structured according to the TDWG Taxon Concept Schema and accessible using the TAPIR protocol.
- Tool for managing collection metadata, incorporating a database based on the TDWG Natural Collections Description schema and accessible using the TAPIR protocol.
- Data provider tool for use with the Invasive Alien Species Profile Schema developed by the Global Invasive Species Information Network.

Species Profile Model Workshop

GBIF and TDWG have identified a pressing need to develop a standardised species data model to complement those already available for specimens and observations (Darwin Core and ABCD Schema). Several initiatives have already begun to model species level data and there is a need to bring them together to reach consensus and avoid fragmentation. To start this process, a species model workshop took place at the GBIF Secretariat in Copenhagen from 16 to 18 April 2007 and was attended by representatives from several species modelling initiatives (Plinian Core, GISIN, Nature Serve, FishBase/SeaLifePortal, ETI Informatics, the EDIT and CATE eTaxonomy projects, TDWG, and GBIF). The meeting led to the development of the Species Profile Model, a draft standard for exchanging information about species in a form that can be incorporated by a wide range of portals.

GBIF and GEOSS

A number of GBIF Participants, recognising the importance of the Group on Earth Observations System of Systems (GEOSS), encouraged GBIF to interact with other initiatives involved in this high-level consortium of nations and networks.

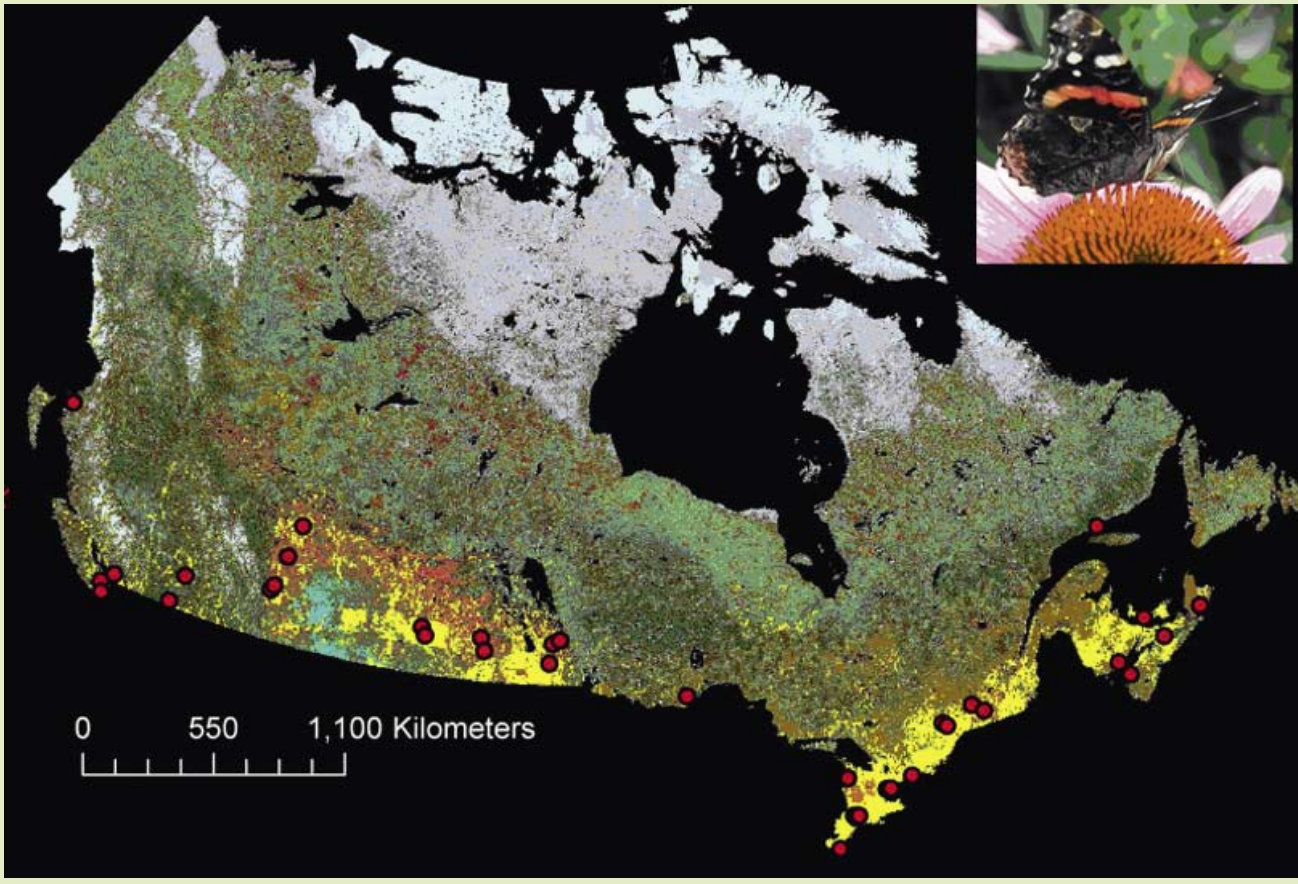
On 28 November 2007, during the Fourth GEO Plenary at Cape Town, South Africa, GBIF was formally accepted as a Participating Organisation in GEO.

In addition, GBIF has been an important player in the proposal and preparation for a GEO Biodiversity Observing Network, and in fact the GBIF information architecture, and the organisation, are serving as a model for building a network of data providers and networks.

Walther, B., A. Laurigauderie, N. Ash, G. N. Geller, N. Jürgens and M. A. Lane. 2007. Toward a global biodiversity observation network. Pp. 79 – 81 *in* GEO Secretariat. The Full Picture. Tudor Rose, Geneva. ISBN 978-92-990047-0-8.

Distribution of *Vanessa atalanta* in Canada

Left: Distribution derived from historical observations (climate, land use, species location) from 1900-1930



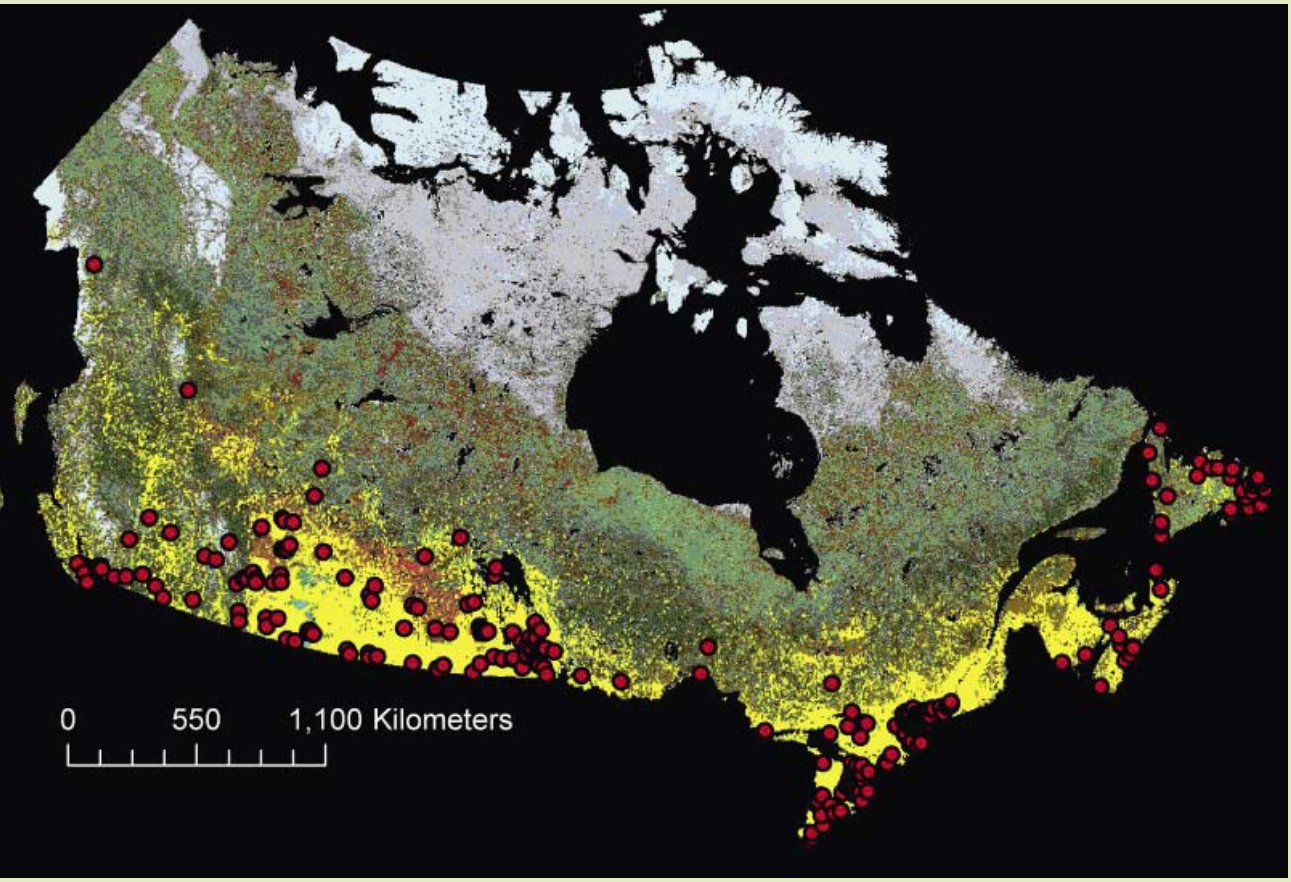
GEO Interoperability Process Pilot Project (IP3)

The GBIF REST style web services have been registered in the GEO Registry, making them discoverable and accessible for other applications.

During 2007, GBIF participated in GEOSS demonstration projects. Working with Italian, Finnish, Canadian and American colleagues, and using GBIF mediated biodiversity data and climate data from the US National Center for Atmospheric Research (NCAR), ecological niche models were developed to demonstrate the effects of climate change on the distribution of Canadian butterfly species.

Nativi, S., P. Mazzetti, H. Saarenmaa, J. Kerr, H. Kharouba, È. Ò Tuama, and S. J. S. Khalsa. 2007. Predicting the impact of climate change on biodiversity – a GEOSS scenario. Pp. 262 – 264 *in* GEO Secretariat. The Full Picture. Tudor Rose, Geneva. ISBN 978-92-990047-0-8.

Right: Distribution derived from models run on the same data sets from 1960-1990 showing high predictability



Content

The Portal Data Manager is able to provide many more statistics about the data served by the new Portal than was previously possible.

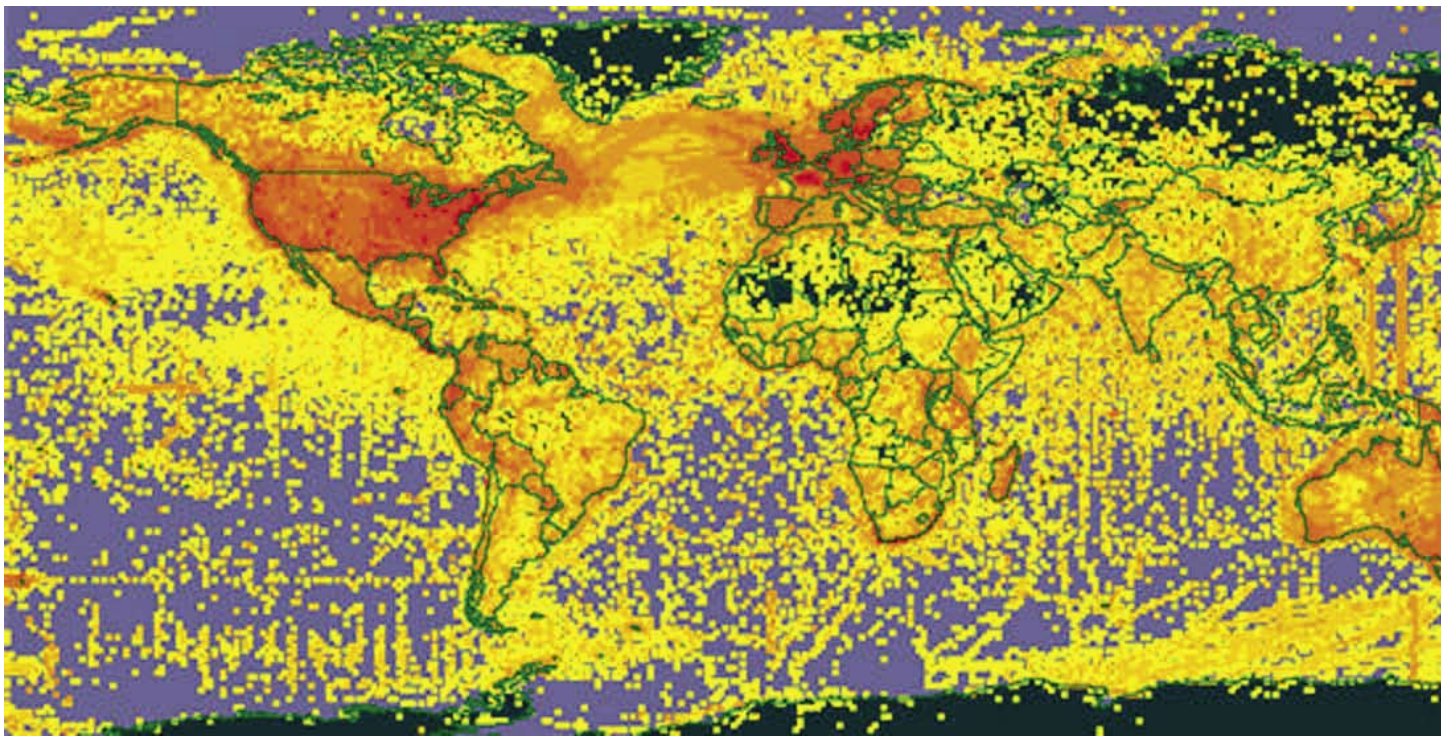
	July 2007	December 2007
Occurrence data providers	220	234
Occurrence data resources	1313	1480
Occurrence records indexed	84,376,020	119,560,510
Georeferenced records (including erroneous)	65,040,755	93,404,818
Georeferenced records (without errors)	63,176,519	89,718,121
Taxonomic data providers	3	3
Taxonomic data resources	51	51
Taxon concepts from taxonomic resources	3,326,948	3,326,948
Taxon names from occurrence data	2,212,035	2,087,051

One Billion Records Goal

Recognising that GBIF needs to make large and rapid strides in mobilising sufficient volumes of high quality data in order to become truly useful to its many stakeholders, the Governing Board at its meeting in October enthusiastically accepted the ambitious (see Box 3) challenge of making 1 billion (10^9) high quality data records accessible via the GBIF Data Portal by the end of 2008.

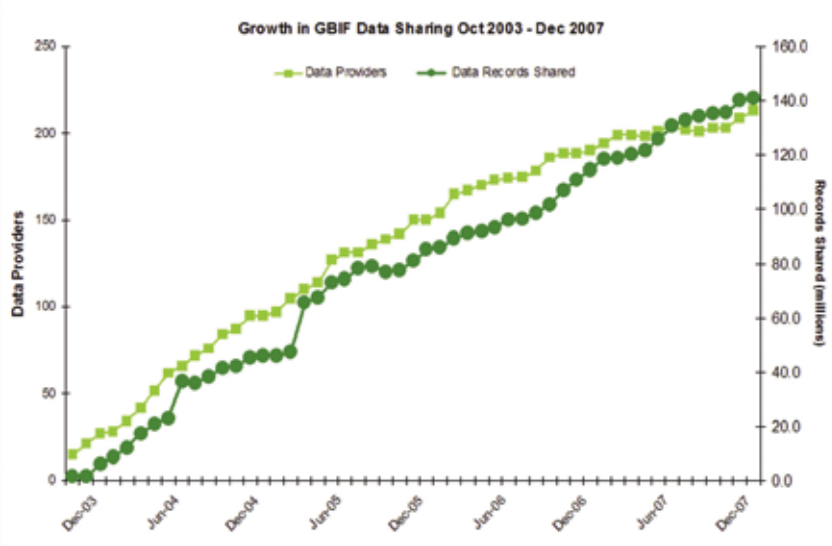
Large parts of the globe, including hotspots of biodiversity in Africa and Asia, are GBIF-data deficient. These gaps could most readily be filled by existing databases being made available via GBIF by their owners, and by digitisation and sharing of the major museum collections via GBIF.

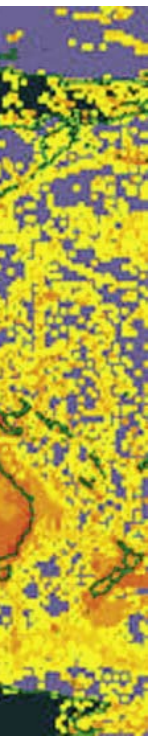
At the end of 2007, the number of georeferenced records without obvious error was nearly 90 million.



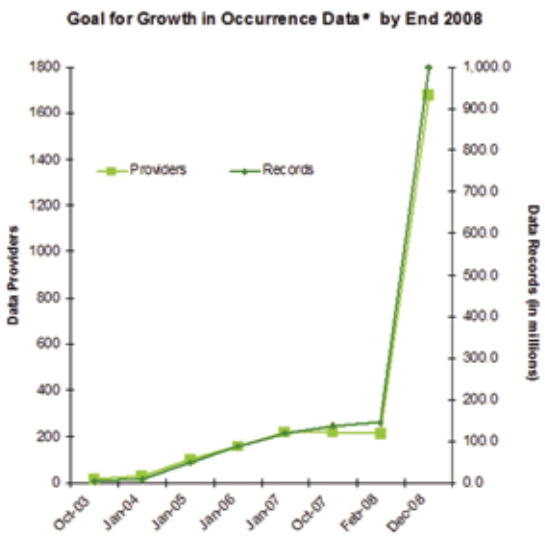
Achieving the goal will require much greater interest and investment in GBIF-related activities at the national level. The Governing Board called on all its members, as well as other countries and organisations, to make such investments in the interest of addressing global problems.

Governments of the world's developed nations should invest more money to support institutions and scientists around the world in their quest to digitise, publish and upload more of the data presently hidden in museums (Yesson, et al. 2007; see Box, overleaf). GBIF calls for these and other data holders (for instance of monitoring and observational data) to help address the world's need to understand its biodiversity in order to promote sustainable development.





The rate of increase of numbers of high-quality data records available through the GBIF portal has been steady (above). However, to achieve the critical mass of data needed to address the biodiversity issues that are part of sustainable development, that rate of increase needs itself to increase by orders of magnitude during 2008 (right). The GBIF Governing Board recognised the need for this increase, and pledged to encourage additional data digitisation and sharing in order to achieve the needed levels of data availability.



Sensitive Data Workshop

This workshop, which was held in the offices of NatureServe in Washington, DC, from 6 – 7 March 2007, was attended by key experts and staff from GBIF, NatureServe and various global initiatives. Its aims were to advance discussion on the issues associated with handling sensitive primary species occurrence data and to formulate recommendations to GBIF about its role relative to sensitive data that are shared through the network. Recommendations emerging from the workshop included:

- GBIF should promote transparent decision-making relating to the identification and control of access to sensitive features within biodiversity information resources shared through the portal. The rationale behind any restrictions should be made available alongside the data. GBIF has a leading facilitation role – i.e. communicating to users and public what data are available and the reasons for any constraints.
- GBIF has a key leadership and facilitation role and should develop best practice advice and tools to help data holders through a set of high level principles for data sharing. These high level principles should continue to include that
    - Data be freely available wherever possible;
    - Where data are restricted – reasons should be given.
- GBIF should promote the use of metadata to appropriately describe data resources and in particular any restrictions being placed upon their availability.
- GBIF should promote a consistent method of generalisation of data. In addition GBIF should promote the principle of data providers mobilising the full detail of all data they hold and applying dynamic generalisation to restrict public access to sensitive data, whilst continuing to share the details with authorized and authenticated users.

Biodiversity Collections Index

The Global Biodiversity Information Facility, Biodiversity Information Standards (TDWG) and the Royal Botanic Garden Edinburgh are paving the way for more effective discovery of important research specimens by the international research community. An internet-based index of data repositories is the goal of this collaborative initiative.

A Memorandum of Co-operation was signed among these three organisations on December 5, 2007, stating their intention to create the "Biodiversity Collections Index" (BCI), which will be a compilation of an internet-accessible listing of all the reference collections of biodiversity materials anywhere in the world. The Index will keep track of the museums, herbaria, and research institutes that hold collections of cultured, frozen, dried or pickled specimens of plants, animals, fungi or microorganisms.

Currently, it is not known exactly how many such collections, nor how many specimens, actually exist. Building the BCI will help inventory these world treasures. Implementation of the Biodiversity Collections Index will begin early in 2008, and will help to achieve GBIF's 1 Billion Record goal.

2007 Publications that Utilised GBIF-mediated Data

(also see Annex)

Faith, D. P., S. Ferrier, K. J. Williams. 2007. Getting biodiversity intactness indices right: ensuring that "biodiversity" reflects "diversity". Global Change Biology (online accepted articles). doi:10.1111/j.1365-2486.2007.01500.x

Flemons, P., R. Guralnick, J. Krieger, A. Ranipeta, and D. Neufeld. 2007. A web-based GIS tool for exploring the world's biodiversity: The Global Biodiversity Information Facility Mapping and Analysis Portal Application (GBIF-MAPA). Ecological Informatics 2 (1): 49 - 60. doi:10.1016/j.ecoinf.2007.03.004

Gontier, M. 2007. Scale issues in the assessment of ecological impacts using a GIS-based habitat model -- A case study for the Stockholm region. Environmental Impact Assessment Review 27: 440-459.

Graham, M., and J. Kennedy. 2007. Visual exploration of alternative taxonomies through concepts. Ecological Informatics 2(3): 248 - 261.

Grenz, J. H., J. Sauerborn. 2007. Mechanisms limiting geographical range of the parasitic weed Orobanche crenata. Agriculture, Ecosystems & Environment 122: 275 - 281.

Guralnick, R. P. 2007. Differential effects of past climate warming on mountain and flatland species distributions: a multispecies North American mammal assessment. Global Ecology and Biogeography 16 (1), 14-23. doi:10.1111/j.1466-8238.2006.00260.x

Guralnick, R.P., A. W. Hill and M. A. Lane. 2007. Towards a collaborative, global infrastructure for biodiversity assessment. Ecology Letters 10:663-672. doi: 10.1111/j.1461-0248.2007.01063.x

Kerr, J., H. Kharouba, and D. Currie. 2007. The macroecological contribution to global change solutions. Science 316: 1581-1584.

Khuroo, A. A., G. H. Dar, Z. S. Khan and A. H. Malik. 2007. Exploring an inherent interface between taxonomy and biodiversity: Current problems and future challenges. Journal for Nature Conservation 15(4): 256 - 261. 11 Dec 2007. doi:10.1016/j.jnc.2007.07.003

Morris, R., R. D. Stevenson and W. Haber. 2007. An architecture for electronic field guides. J. Intelligent Information Systems 29: 97 - 110. DOI 10.1007/ s10844-006-0033-9

Nativi, S., P. Mazzetti, H. Saarenmaa, J. Kerr, H. Kharouba, È. Ò Tuama, and S. J. S. Khalsa. 2007. Predicting the impact of climate change on biodiversity – a GEOSS scenario. Pp. 262 – 264 in GEO Secretariat. The Full Picture. Tudor Rose, Geneva. ISBN 978-92-990047-0-8.

Papeş, M. and Gaubert, P. 2007. Modelling ecological niches from low numbers of occurrences: Assessment of the conservation status of poorly known viverrids (Mammalia, Carnivora) across two continents. Diversity & Distributions 13 (6): 890-902. DOI: 10.1111/j.1472-4642.2007.00392.x

Sterling, J.A., O. Seberg, C.J. Humphries, F. Borschenius and J. Dransfield. 2007. Priority areas for rattan conservation on Borneo. Chapter 10 in Curry, G. and C. Humphries, eds. Biodiversity Databases: Techniques, Politics, and Applications (Biodiversity Databases: From Cottage Industry to Industrial Networks - Systematics Association Special Volume 73). Taylor & Francis, Boca Raton, Florida, USA.

Thau, D. and B. Ludäscher. 2007. Reasoning about taxonomies in first-order logic. Ecological Informatics 2 (3): 195 - 209.

Vila, M., J. Pino and X. Font. 2007. Regional assessment of plant invasions across different habitat types. J. Vegetation Science 18: 35 - 42.

Yesson, C., P. W. Brewer, T. Sutton, N. Caithness, J. S. Pahwa, M. Burgess, W. A. Gray, R. J. White, A. C. Jones, F. A. Bisby and A. Culham. 2007. How global is the Global Biodiversity Information Facility? PLoS ONE 2(11): e1124. doi:10.1371/journal.pone.0001124

Yingzhong, Y. Y. Droma, J. Guoen, B. Zhenzhong, M. Lan, Y. Haixia, C. Yue, K. Kubo and G. Rili. 2007. Molecular cloning of hemoglobin alpha-chain gene from Pantholops hodgsonii, a hypoxic tolerance species. J. Biochmeistry & Molecular Biology 40: 426-431.

GBIF Data Distribution by Kingdom

Kingdom	Number as of Dec 2007	% Total	% Total (less unknowns)
Animalia	72,840,272	60.87	62.44
Plantae	40,526,996	33.87	34.74
Fungi	2,076,842	1.74	1.78
Protozoa	446,843	0.60	0.61
Chromista	226,328	0.34	0.35
Bacteria	98,380	0.08	0.08
Viruses	569	0.00	0.00
Archaea	492	0.00	0.00
Unknown	2,997,999	2.51	
Total	119,662,684	100.00	116,664,685

2007-2008 GBIF Seed Fund Awards

Project Description

Tsetse flies and Sandflies of medical and economic importance in East Africa

The project will collect and database the distribution data of Tsetse flies which are both important vectors of diseases in the eastern African region. In addition, Tsetse flies transmit trypanosomes, which cause huge losses in production and productivity in a wide range of key livestock species. GBIF has virtually no data on these taxa from the region This project will provide accessible distribution data that will be an important baseline for medical and veterinary research in the region, as well as for studying the effect of climate change on the spatial distribution of insect decease vectors. The existing dataset will be continuously supplemented by data from relevant research activities being undertaken by partner institutions.

Countries: Kenya

Institutions: African Insect Science for Food and Health, Kholodny Institute of Botany, Kenya Agricultural Research Institute, Kenya Medical Research Institute

Digitalisation and release of data and images from the collections of the Instituto de Ciencias Naturales, and elaboration of data cards for the catalogue of organisms' names

Colombia is one of the most diverse countries in the world and it is estimated to have the 10% of the planet diversity, despite having only 0.1% of its surface. The Instituto de Ciencias Naturales will systematize information from 128,000 specimens of cryptogams species, some pollinator species, exotic invasive species and endangered species. This project will support the country's development and have national-international relevance by providing access to multiple projects and the basis for the generation and validation of knowledge, through the projects' development. Colombia urgently needs information about its diversity. Evidence of this is the frequent use of non-native species for environmental recovery strategies or even as diversity symbols by the public. At an academic level, it is easy to find continental distribution maps that inexplicably show a discontinuity in the distribution of species that is consistent with the country's political boundaries. The social and economic impacts begin with providing an invaluable data set which could help in a decisions' making process. This information will be the basis to propose conservation strategies, environmental management plans, programs of sustainable use of species, production and marketing and, in this way to help the community and the productive sector to improve the knowledge and appropriate the resources of the country.

Countries: Colombia

Institutions: Instituto de Ciencas Naturales

Inventory of all Caterpillars and their Food Plants and Parasitoids of Area de Conservacion Guanacaste, Costa Rica

These data are being used by Costa Rican conservation planning, climate change mitigation, biodiversity prospecting, primary school education, adult ecotourism, biological control, biodegredation of agricultural wastes, water quality control, systematics, taxonomy, conservation awareness, and now, even part of a nation-wide effort to "*environmentalize*" the entire country.

Countries: Costa Rica, USA

Institutions: Univ. of Pennsylvania

Relevance	Award €	Product(s)	Taxa	Species	Region
Climate Change Disease Vectors	25410	5000 digitized, geo-referenced specimens	Tsetse flies and sand flies	20	Kenya
Conservation strategies and capacity building	40000	128,000 cryptogam specimens, 88,000 images 2,000 taxon records	Cryptogams	4000	Colombia
2010 Indicators Climate Change Invasive Alien Species Conservation	8792	144,348 images 120,000+specimens, 380,000 occurrences.	Lepidoptera	3000+	Costa Rica

2007-2008 GBIF Seed Fund Awards

Project Description

Digitisation and Analysis of Information Relevant for the Implementation of the Global Strategy for Plant Conservation in Central America

The main objective of the proposal is to increase the quantity and quality of digital records of plants from Central America and to demonstrate its usefulness by developing an analysis and report on two critical targets of the Global Strategy for Plant Conservation (GSPC). An increase in the quantity of plant records will be achieved by digitizing 112,000 new specimen records from Guatemala, Honduras, and Costa Rica. The improvement in data quality will be achieved by applying data curation techniques on the newly generated digital data and on 160,000 digital records from two herbaria from the Mesoamerican Herbaria Network. By integrating this curated data with data from GBIF's portal and the Portal of Plants of Central America managed by INBio (a regional analysis addressing two of the targets of the Global Strategy for Plant Conservation will be prepared and distributed to regional authorities. The analysis will include target 1 ("A widely accessible working list of known plant species, as a step towards a complete world flora") and target 7 ("60 per cent of the world's threatened species conserved in situ") that are directly related to the information integrated and shared by GBIF's Portal.

Countries: Costa Rica

Institutions: Universidad de Costa Rica, Herbario USJ, Costa Rica; Universidad Nacional Autónoma de Honduras, Herbario TEFH, Honduras; Universidad de San Carlos de Guatemala, Herbario USCG (CECON), Guatemala; Escuela Agrícola Panamericana, Zamorano, Herbario EAP, Honduras; Proyecto Flora Mesoamericana (MOBOT, MEXU, British Museum); Regional Institute of Biodiversity (IRBIO), Honduras; Centro Zamorano de Biodiversidad, Honduras; Biodiversity Office, Ministries of the Environment of Central America

Project to Digitize Fungal Occurrence Data from Cyrillic Alphabet Sources

Much information about occurrence of fungi exists in the Cyrillic alphabet. Most relates to the former Soviet Union and old Warsaw Pact countries, nearly 20% of the world's land surface. Very little is digitized, less is accessible in the Latin alphabet, and the GBIF dataset currently contains little or no fungal occurrence data from those regions. This project aims to digitize at least 40,000 records of fungi (plus about 20,000 records of associated animals and plants) from Cyrillic alphabet sources (mycological publications and reference collection packet data), and to make this hitherto unavailable information accessible in the Latin alphabet freely through the GBIF portal. This project will contribute to work which the proposed participants are already carrying out on fungi and climate change, conservation of microfungi and the evaluation of 1500 ascomycetes as 2010 indicators. Significant matched funding for closely related work is already approved.

Countries: UK, Bulgaria, Ukraine

Institutions: CABI Bioscience, Bugarian Acad. Sci, Kholodny Institute of Botany

Relevance	Award €	Product(s)	Taxa	Species	Region
GSPC Targets 1 and 7	40600	292,000 new and updated specimen records; Reports and workshops	Higher plants	22,000+	Central America
Climate Change 2010 Indicators Conservation of Fungi	34000	40,000 fungi 20,000 associated sp.	Fungi	thousands	Former USSR

2007-2008 GBIF Seed Fund Awards

Project Description

Digitisation of Bee Specimen Records from University of California Riverside

The UCR Entomology Research Museum has one of the most significant collections of North American bees . Mobilising this material will represent a major contribution to global knowledge of bee diversity, biogeography, phenology, and pollination ecology. Many of the species represented are specialist pollinators, whose floral associations are narrowly restricted and of potentially vast significance for ecology and conservation of the associated plant species.

Countries: USA

Institutions: Univ. of CA - Riverside

Early Land Plants Today: Uniting Liverwort Taxonomy, Nomenclature and Geography

Liverworts (Marchantiophyta) are pivotal in our understanding of early land plant evolution. They form a conspicuous and important component in many terrestrial ecosystems throughout the world. The objective is to unify the vastly scattered biological literature on liverwort taxonomy, nomenclature, and geography.

Countries: USA, Australia, China

Institutions: Field Museum, Univ. Sydney, Univ. Göttingen, East China Normal Univ.

Evaluation and cleaning of data on ground beetles (Insecta Coleoptera Carabidae s.l.) accessible through the GBIF Data Portal (2007)

Ground beetles are ideal indicator organisms in climate change studies. Many species are invasive in nearctic and tropical regions. Over 300,000 records in the GBIF network will be reviewed for taxonomic accuracy to ensure all records are of very high quality for subsequent scientific use.

Countries: Germany

A system for increasing the georeferencing quantity and quality of all GBIF-mediated occurrence records

Although a majority of the 135 million occurrence records that are cached by the GBIF portal are georeferenced, the quality and methodology of georeferencing varies widely, and a much smaller fractions have georeference data produced according to best practices . This proposal will help rectify this problem by providing a system to georeference the occurrences with high quality locality data and then provide these georereferenced data back to GBIF or the original data providers. This will improve the utility of these data, making them more accessible to, for example, niche-modelling and distribution algorithms that seek geo-referenced occurrence data.

Countries: USA, Australia

Institutions: Univ. Florida, Australian Museum, Univ. Kansas, Univ Colorado

Relevance	Award €	Product(s)	Taxa	Species	Region
Pollinator Associations Pollinator Species	33268	230,000 specimens 150,000 floral associations	Bees	500	SW USA
GSPC Target 1	41265	Global catalog of liverworts and 60,000 occurrence records	Liverworts	6000-9000	Global
Global Climate Change Invasive Alien Species	3000	Verification/ remediation of over 300,000 Carabid records	Ground beetles	35000	Global
Climate Change Range Changes Invasive Alien Species	46081	A geo-referencing service for the entire GBIF network that allows data providers to geo-reference localities, and error-check existing geo-referencing based on locality information.	All major groups	-	Global

2007-2008 GBIF Seed Fund Awards

Project Description

GBIF data content development from the Consortium of California Herbaria: Advancing the international effort to monitor and control non-native taxa

When a newly introduced, non-native plant is first noticed in the United States, it usually finds its way to an herbarium for identification. Therefore, herbarium botanists, trained to identify plants from anywhere in the world, are on the front lines of the battle to prevent the establishment and spread of non-native plants. Herbarium specimens provide irrefutable, vouchered, documentation of the earliest reports of the introduction of non-native plants. Because of their verifiability, herbarium specimen data are an essential tool used to monitor the introduction, establishment, and spread of invasive, non-native taxa. The products of the proposed project will be used in the ongoing effort to document non-native California plants and the introduction and spread of alien taxa around the world.

Countries: USA

Institutions: University of California – Berkeley, Rancho Santa Ana Botanic Garden, California Dept. of Food & Agriculture

Extracting Nomenclatural Data, Species Descriptions and Collecting Events from Legacy Publications: The Zootaxa-TaxonX-ZooBank Project

This proposals seeks to develop a workflow that enables taxonomic literature, both retrospective, and currently, to be marked up in a taxonomic data schema and stored in a collective data repository for multifaceted access. The proposal will target the retrospective tagging of publications from ZooTaxa, a new online journal specializing in the publication of new species descriptions. Zootaxa has published many species of importance in biodiversity and conservation. This proposal will ensure that the data contained with the source publications is available both in the context of the original but also within other geographic, temporal, and thematic contexts.

Countries: Switzerland, New Zealand, UK, USA

Institutions: Landcare Research, Universität Karlsruh, Ohio State Univ. Columbia Univ., Bishop Museum, NHM London

Enhancement of GBIF as a resource for mosquito biodiversity and vector-borne disease studies

This proposal will make available to GBIF 130,000 geo-referenced mosquito collection records, the majority with associated voucher specimens. Mosquitoes have been overlooked as indicators of biodiversity. However, groups of mosquitoes have highly specialized ecological requirements, and many of these are only found in forest habitats where immatures exploit natural water receptacles such as palm spathes, bamboo, tree holes and bromeliads (the Neotropical Anopheles subgenus Kerteszia is only found in bromeliads). Recently, mosquitoes were included in a project to measure the impact of climate change on biodiversity by the Smithsonian Institution Global Earth Observatories. Mosquitoes have overwhelming public health importance and by becoming a major data resource for mosquitoes (and someday ticks, fleas and other groups) GBIF can extend its mission in novel directions.

Countries: USA

Institutions: Smithsonian Institution

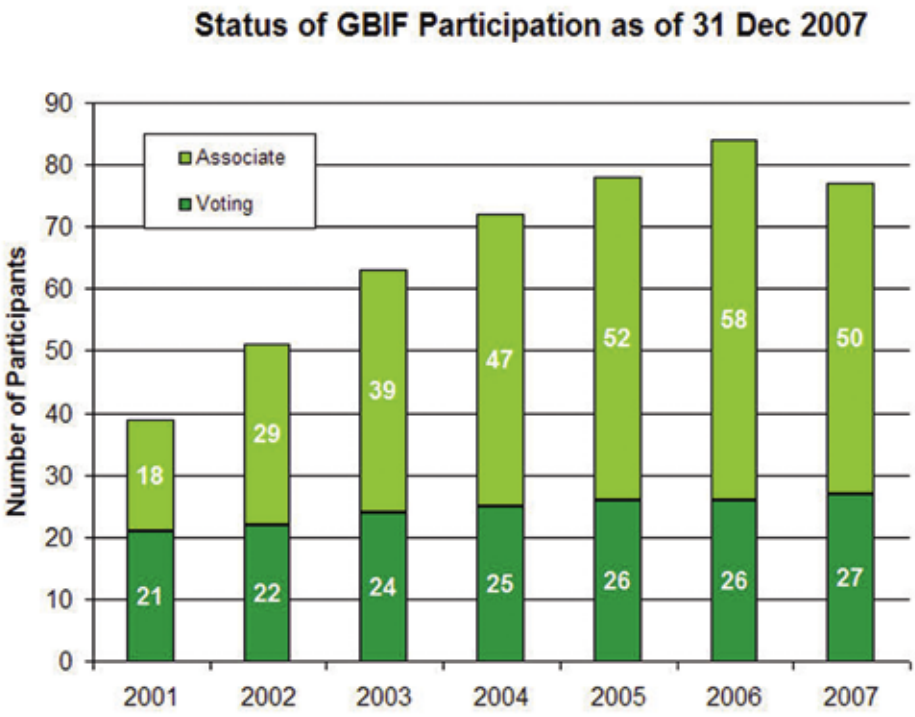
Relevance	Award €	Product(s)	Taxa	Species	Region
Invasive Alien Species	42510	57,800 non-native plant specimens	Flowering plants	unspecified	California, USA
Conservation Invasive Alien Species Pollinators	50000	A workflow for processing current and historic taxonomic publications into a searchable, atomized database and web service.	Animalia	-	Global
Invasive Alien Species Climate Change 2010 LIndicators Disease Vectors	40681	130,000 specimen records	Mosquitoes	3500	Global

Participation

In 2007, three countries moved from Associate to Voting status: Argentina, Slovakia and Tanzania.

Burkina Faso, CETAF, DIVERSITAS and BioNET - ANDINONET joined as new Associate Participants.

The apparent drop in number of Associate Participants is attributable to delays in signing the new GBIF MOU, not actual loss of membership.



Intellectual Property Rights

PROLeg (*pro bono* Legal Expert Group) Report

As a service to its Participants, GBIF investigates and reports on Intellectual Property Rights (IPR) relative to biodiversity data online. One of the mechanisms for doing this is through the constitution of a group of 10 legal advisors from around the world.

GBIF is benefitting from the first report of this group, which was made available in March, 2007. These experts recommended:

- Considering that the mandate and purpose of GBIF is to promote the sharing of primary biodiversity data freely and openly, GBIF should seek to rely upon and use, as much as possible, the practices norms, and policies of public science to guide its activities and avoid using legalistic solutions and enforcement mechanisms
- Consistent with Recommendation 1 and the relevant statutory law, GBIF should impose the least possible restrictions and obligations on users.
- GBIF should continue to include attribution as a condition of the use of the data through its portal in order to encourage such normative behavior by the data users.
- GBIF should consider normative enforcement methods that rely on the promotion of ethical scientific practice, good will, and peer pressure as a soft and low-cost alternative, and in conformity with the values and objectives promoted by the organisation. Publicising of inappropriate behavior related to persistent noncompliance with important terms and conditions of data use may be considered, but only in consultation with legal counsel.
- GBIF should continue to develop a strategy for dealing with the barriers perceived by potential participants, consistent with its fundamental data access and use principles.

Licensing Agreements and Biodiversity Data Products

CODATA, the Creative Commons/Science Commons, and the Global Biodiversity Information Facility (GBIF) jointly organized a working meeting on "Licensing Agreements and biodiversity data products". The event took place 24-25 September 2007 in Paris and was attended by 26 experts from around the world. GBIF contributed 2 papers to the discussions. In addition, GBIF provided support for the preparation of a paper on "The advantages and disadvantages of using Creative Commons licenses for biodiversity data products". That document, and the main findings of this working meeting will be published in legal journals.

GB14

At its annual meeting in October of 2007, the GBIF Governing Board endorsed the 1 Billion Record Goal and distibuted network model proposed by Dr. Nicholas King (see Box, overleaf), who was attending his first Governing Board meeting as Executive Secretary of GBIF.

The Governing Board also adopted an official statement on GBIF's Contribution to the Exchange of Information with Countries of Origin, in support of Article 17 of the Convention on Biological Diversity, and then discussed four issue-oriented Campaigns that would be undertaken as group endeavours led by GBIF Participants (see section on Campaigns).

After thanking outgoing officers (see photo), the Governing Board elected new individuals to serve for the next two years, including:

Governing Board Chair:	David Penman (second term)
Governing Board 1st Vice Chair:	Keiichi Matsuura (first term)
Governing Board 2nd Vice Chair:	Christoph Häuser (second term)
Budget Cmte Chair:	Lars Nilsson (second term)
Budget Cmte Vice Chair:	Helmut Kühr (second term)
Budget Cmte Vice Chair:	Peter Schalk (second term)
Rules Cmte Vice Chair:	Mark Fornwall (first term)
Science Cmte Chair:	Erick Mata (first term)
Science Cmte Vice Chair:	Daphne Fautin (second term)
DADI SSC Chair:	William Ulate (first term)
DIGIT SSC Chair:	Walter Berendsohn (second term)
ECAT SSC Chair:	Yde de Jong (first term)
OCB SSC Chair:	Carmen Quesada (first term)

Thirty-six countries and 18 international organisations, represented by 119 delegates, met in Amsterdam to discuss GBIF's future directions.

The Governing Board thanked outgoing officers: Stan Blum (Chair, DADI Subcommittee), Wouter Los (Chair, Science Committee), Hideaki Sugawara (First Vice Chair), Vishwas Chavan (OCB Subcommittee Chair), Chris Lyal (Chair, ECAT Subcommittee).

Sendoff for GBIF's First Executive Secretary

The Governing Board held a reception for Dr. James L. Edwards, former Executive Secretary of GBIF, following the 5th Annual GBIF Science Symposium, in which he gave the final presentation.

Dr. Edwards concluded his term with GBIF in May, 2007, when he took on the duties of Executive Director of Encyclopedia of Life, one of GBIF's partner organisations.

Former GBIF Executive Secretary James L. Edwards (left) is congratulated on his new position by Korea's Head of Delegation, Hyung-Seon (Howard) Park (right)

New GBIF Executive Secretary

In August 2007, Dr. Nicholas King, previously CEO of the Endangered Wildlife Trust in South Africa, arrived in Copenhagen to take up the Executive Secretary post vacated by Dr. James Edwards in May.

Dr. King comes to GBIF from a distinguished background. He was born in Kenya and grew up in South Africa, and has received tertiary qualifications from institutions in South Africa, the United States, and the United Kingdom. Prior to the GBIF appointment, he has been CEO both at the Endangered Wildlife Trust from 2003 to 2007, and at BioNET-International in the UK from 1999 to 2003. Before this he was Technology Manager in the Environmental Division of the CSIR in South Africa.

Of his decision to join GBIF, Dr. King says, "I am passionate about reaching a time when the world is sustainably managing its biodiversity. One of the things that will help the global community achieve that goal is the data and information about biodiversity that GBIF makes available. I'm excited about working to help GBIF achieve its potential."

Dr. King's background includes degrees in biology, ecology, geography, the management of information technology and environmental law. He also has expertise in technology innovation, environmental impact assessment and in the resolution of problems stemming from resource constraints.

"Nick will bring fresh insights into the opportunities for GBIF to play a major role in delivering biodiversity information to the many user communities we serve globally, from research to sustainable development" said Board Chair David Penman. "His recent experiences, and continuing links, in southern Africa and the less developed world generally will be enormously valuable to widening GBIF's potential influence and partnership role".

Photo by C.-M. Vizitiu

Dr. Nicholas D. King

Training and Capacity Building in Biodiversity Informatics

Georeferencing Training Workshop

The main objective of this training workshop, held in Buenos Aires, Argentina from 19 – 23 March 2007, was to build and consolidate regional and national capacities to improve quality of geospatial descriptions in specimen/observation data. Participation was opened to researchers and staff directly involved in georeferencing activities within major digitisation initiatives.

A total of 30 participants from 14 different nations (Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica Republic, Mexico, Nicaragua, Panama, Peru, Spain, Uruguay, Venezuela) attended this training workshop (GBIF provided support to 9 individuals from GBIF Participant countries). The workshop was cosponsored by GBIF and Museo Argentino de Ciencias Naturales (MACN), Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (CYTED), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).

Ecological Niche Modeling workshop

The fourth GBIF Ecological Niche Modeling workshop took place 26-30 November 2007 in Warsaw, Poland. This training event was co-organized with the University of Warsaw, The Polish GBIF Node, the Biodiversity Research Center (Kansas University) and UNAM (Mexico).

The 4th ENM training was attended by 24 participants from 20 countries. The host country benefitted with 6 Polish scientists getting trained. The participants were nominated by GBIF Heads of Delegations, as this was a capacity building event to benefit GBIF Participants. Based on the evaluations made at the end of the course, the participants were extremely satisfied with this training, as they gave very high marks to the faculty, the contents of the course, the hands-on exercises and running of projects.

CEPDEC Pilot Project Tanzania

The CEPDEC Pilot in Tanzania is a 3-year project funded by the Royal Danish Ministry of Foreign Affairs (RDMFA), established with the overall aim to support sustainable development in Tanzania by making the country's biodiversity information easily accessible, as well as by improving the country's capacity to mobilize and use this information. The project's activities started on 30 January 2007, and the implementation process began on 1 March. The key achievements of the pilot project during 2007 were:

- Establishment of the Tanzanian Biodiversity Information Facility (TanBIF), including the TanBIF National Committee and the TanBIF Secretariat;
- Successful launch of the project at a meeting in Dar Es Salam in March 2007;
- Active engagement of a broad range of partner institutions at the national level in the establishment of TanBIF, and explicit interest to participate in data sharing activities;
- Data providers and data holdings on Tanzanian biodiversity preliminary identified, and a framework for further assessment developed;

- Users and needs of biodiversity information in Tanzania evaluated, with emphasis on those areas where biodiversity information can help addressing issues of social, environmental, or economic relevance for the country;
- External partners contacted for providing technical support and guidance in the implementation of the national facility; training plans for 2008 drafted;
- Requirements for the development of the TanBIF Internet Portal developed; an external partner (ETI Netherlands) contacted for assisting with the implementation of this portal; and
- Good documentation of the project development, including the production of project materials that can be re-used by other developing countries wishing to pursue similar activities (these materials include action plans, terms of reference, brochures, presentations, and methodologies, among others).

Fifth Annual GBIF Science Symposium

GBIF Information Architecture: Data sharing and interoperability
Donald Hobern
Global Biodiversity Information Facility

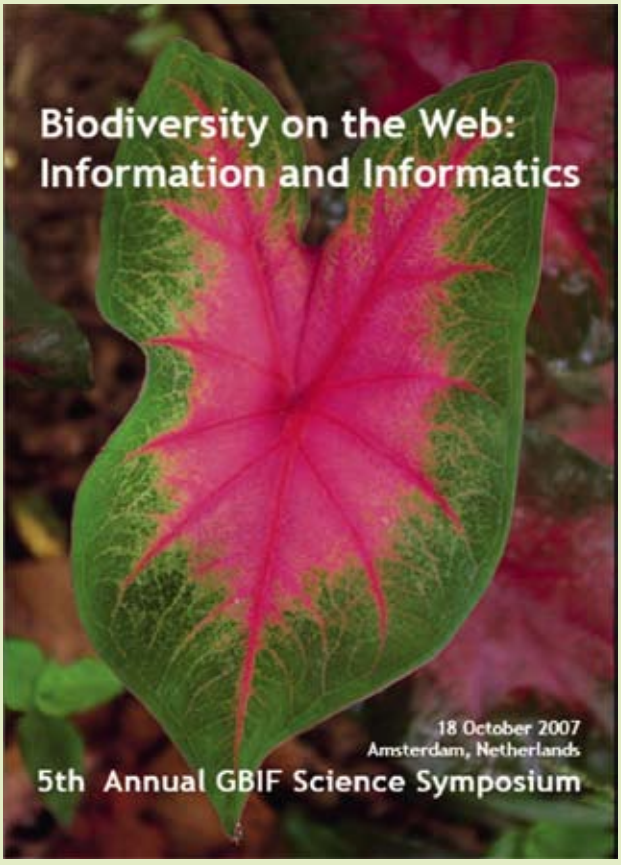
The role of GBIF data in biodiversity studies: Examples from the sea
Magda Vincx, B. Merckx and T. Deprez
University of Ghent, Belgium

GBIF's role in creating a platform for biodiversity prediction
Robert Penn Guralnick and Andrew Hill
University of Colorado, USA

Using GBIF data and the GEOSS framework to strengthen predictions of global change impacts on biodiversity
Jeremy Kerr
McGill University, Canada

DNA barcodes: Linking GBIF biodiversity data to gene sequences
David Schindel
Consortium for the Barcode of Life

The future of biodiversity informatics: GBIF, EOL and beyond
James L. Edwards
Encyclopedia of Life



GBIF Campaigns

Four user-focused initiatives, led by Participant countries or organisations (not by the GBIF Secretariat), are carrying out projects that address issues of global concern, and also contribute to GBIF priorities.

What is a GBIF Campaign?

Different users of the GBIF network have different interests that require significant volumes of biodiversity data of various types. Given the small size and coordination mandate of the Secretariat, it is not possible for GBIF's central activities to meet all of these needs. However, the interests of various countries and organisations that participate in the GBIF network do coincide with the needs of these user groups.

GBIF has therefore encouraged all parties that are interested in particular areas of concern to come together to design and implement activities that will meet the data needs associated with addressing those concerns. The GBIF information architecture and existing data are the foundation upon which these projects can be built. The data and other capabilities developed during these activities will be openly shared via the GBIF network.

The activities of such a group of users, data providers, and funders are known as a "GBIF Campaign". The intention of the Campaign model is to broaden the capacity and resources availbale for qctivities assocvaited with the overlll GBIF objectives, without being contrained by the limited Secretariat reosurces. Thus Campaigns have a liaison within the GBIF Secretariat, but are led by a GBIF participant and it is intended that Campaign activities after the initial planning stages will be supported by non-GBIF sources of funding.

Four GBIF Campaigns endorsed in 2007

At its 2007 meeting, the GBIF Governing Board endorsed four Campaigns, and awarded €30,000 to each for the planning stage. Of primary importance during that planning stage is of course identifying the fundraising activities that will be undertaken to sustain the Campaign.

The four GBIF Campaigns that are currently underway focus on the following areas of concern:

- developing evidence-based indicators to measure progress toward the 2010 Target of the Convention on Biological Diversity;
- building a biodiversity information facility for the Amazon basin;
- increasing the available data and building networks to address the global pollinator crisis; and
- developing a register of marine species for the world.

GBIF for 2010 Biodiversity Targets

The GBIF2010 Campaign, led by Australia and UNEP-WCMC, will mobilise and apply GBIF data in order to address the globally recognised biodiversity target for 2010 of a significant reduction in the current rate of biodiversity loss at the global, regional and national levels. At the core of the campaign is better measurement of biodiversity patterns (by integrating GBIF and other data) and better support for the decision-making and planning needed to reduce biodiversity loss (by using systematic conservation planning).

While many have regarded the 2010 target as difficult to achieve, a reduced rate of biodiversity loss by 2010 is possible, based on the core idea of systematic conservation planning (SCP). Simply put, land-use planning and other decision making that more efficiently balances conservation with other needs of society implies reduced biodiversity losses, compared to business-as-usual. Through that important core idea of finding a balance, the GBIF2010 Campaign provides links to the Millennium Development Goal (MDG) of sustainability at global and regional scales.

The SCP approach proposed depends on GBIF primary data as the basis for good measures of overall (wholesale) biodiversity. These data are integrated with environmental data to extend the predictive power of the biodiversity models. These models then must be integrated with socio-economic, threats, and land use data for SCP decisions and indicators of achievement against the 2010 target. In this way, the Campaign hopes to promote, demonstrate, and enable application of GBIF primary biodiversity data to not only measure progress towards, but actually achieve the 2010 biodiversity target.

Amazon Basin Biodiversity Information Facility (ABBIF)

ABBIF is a multilateral effort led by Peru and Colombia, and involves partners from Bolivia, Brazil, Colombia, Ecuador, French Guyana, Peru, Surinam and Venezuela. The Campaign will unlock biodiversity data on the Amazon basin, with the development of strong collaborative links in the region. The campaign will ensure that all biodiversity databases and information systems that are developed will comply with GBIF standards and protocols. ABBIF also has the support of organisations including INBIO - Costa Rica, Argentinean Natural History Museum, CONABIO - Mexico, GBIF.es - SPAIN, BIOTA / UTU - Finland, ETI Bioinformatics - Netherlands, AndinoNet, and the New York Botanical Garden.

Once operational, ABBIF will help promote a collaborative environment to study, discover, and describe species diversity in the region, to analyse, synthesise, and share information and knowledge to promote sustainable development and human well-being.

The campaign will address important thematic and taxonomic gaps already identified for the region, aiming at improving the primary data (species and specimens) infrastructure currently available on vascular plants and Amazonian fish. But the campaign will be opportunistic in order to accommodate emerging partnerships with interested communities in contributing data from key indicators or taxa, including ants and amphibians.

Global Pollinator Species Campaign

One of the most important of the free ecosystem services provided by nature is pollination, the transfer of pollen between flowers by animals. Without this vital ecosystem service, 3/4 of the world's leading fruit, vegetable, and seed crops would be in peril. The global value of pollination to agriculture has been estimated at $200 billion per year. While bees are by far the dominant pollinator group (about 20,000 described species), other insects, birds, mammals, and reptiles are also important.

Increasing concern about the loss of pollinator species and the consequent effects on food supply and natural biodiversity has given rise to regional pollinator initiatives in the Americas, Europe, Africa, and Oceania. Additionally, the Food and Agriculture Organisation of the United Nations (FAO) has taken the lead for the Convention of Biological Diversity to coordinate these regional efforts through the International Pollinator Initiative.

This GBIF Campaign is led by the United States, and will support pollinator conservation through the use of integrated taxonomic knowledge. Five major information products are proposed:

- A World Checklist of Bees and other Pollinating Species,
- Searchable Digitized Records from Major Bee Collections and Observation Programs,
- Information on Plant and Pollinator Associations,
- Pollinator Identification Capability, and
- Status and Trends of Pollinators.

World Register of Marine Species (WoRMS)

Ocean biological data exchange and management, and the integration of biological with other ocean data urgently require an authoritative register of all known marine species. Such a register also facilitates the efforts of taxonomists to discover and describe new species, fosters global-scale collaboration among experts, enables ecologists and other scientists to insure that they are using correct taxonomic names in their work, and stimulates biogeographic and evolutionary research.

The "World Register of Marine Species" (WoRMS) campaign is led by GBIF Associate Participant OBIS. WoRMS is the next step in the long-term effort to make ocean biodiversity informatics an everyday part of the marine and biodiversity sciences and associated environmental management. WoRMS will be a standards based, quality controlled, expert validated, open-access infrastructure for research, education, and data and resource management.

WoRMS builds on the European Register of Marine Species and the Ocean Biogeographic Information System (OBIS), and collaborates with GBIF's ECAT and Global Names Architecture, as well as the Catalogue of Life partnership, OBIS, SpeciesBase, Encyclopedia of Life, SeaLifeBase, the International Oceanographic Data and Information Exchange of IOC, and multiple data centres and other related initiatives.

For additional detail, see www.marinespecies.org.

2007 Ebbe Nielsen Prize

The 2007 Ebbe Nielsen Prize was awarded on Wednesday, 17 October 2007, in Amsterdam, Netherlands, where the winner, Paul Flemons of the Australian Museum made a presentation about the work that earned him the award.

GBIF established the Prize in honour of Dr. Ebbe Schmidt Nielsen, who was an inspirational leader in the fields of biosystematics and biodiversity informatics.

This is the only award in the world that is given in the area of biodiversity informatics. The yearly award of €30,000 recognises a researcher who is combining biosystematics and biodiversity informatics research in an exciting and novel way.

Speaking about the Prize when he was notified, Flemons said "I am honoured by the award. GBIF is making a significant contribution to biodiversity informatics."

Paul Flemons applies computer-based ecological modeling to help identify places where lots of species occur together, or species that occur only in very restricted geographical areas. This helps biodiversity scientists be more efficient in their efforts to discover and conserve species.

The GBIF Science Committee noted when it announced the 2007 Prizewinner, "Paul Flemons has been a key figure in developing a robust and accessible biodiversity data infrastructure that supports visualisation and analysis for use in conservation planning and natural resource decision-making."

Further, the Committee said, "As a software developer, Flemons is particularly attuned to user needs. His work includes innovations that similar developments lack, and he has a rare mix of skill sets."

The 2007 Ebbe Nielsen Prize Winner, Paul Flemons (right) is congratulated by GBIF Governing Board Chair David Penman (left) and His Excellency Stephen Brady, Australian Ambassador to the Netherlands.

Flemons also works on making desktop software tools into web-based tools that can be shared across the Internet. Sharing analytical software in this way promotes collaboration and cooperation among scientists and between scientists and policy-making agencies. He was the team leader in developing GBIF-MAPA and other informatics tools, which are discussed online at the Australian Museum website.

Flemons understands the importance of the interplay between natural history collections data, visualisation and analysis tools, and conservation decision-making. He has published in top-tier scientific journals, but at the same time he builds software applications that are intuitive and maximize the user experience for both scientists and non-scientists.

GBIF Network Nodes

Argentina

In 2007 the **Argentinean Node** organised a georeferencing workshop (19-23 March; http://www.macn.secyt.gov.ar/cont_Eventos/2007/03/evento-03-03.php), cofinanced by GBIF, CYTED, CONICET, and ORNIS. Thirty persons from more than 10 countries participated in the workshop, which was given in Spanish. The node also sponsored the attendance of one participant to the GBIF Ecological Niche Modeling Workshop in Warsaw (26-30 November), and prepared a successful application for a GBIF mentoring project that is being executed in 2008.

Australia (ABIF)

In 2007, **ABIF** (Australian Biodiversity Information Facility) began a 12-month process of redevelopment as part of the Atlas of Living Australia (ALA). The ALA is exploring the use of the GBIF Data Portal software as a tool to manage Australian biodiversity data and expects to enhance the software to exploit national-level GIS information. The ALA will also include work to manage metadata for Australian biodiversity information resources and to integrate a wide range of species information. Participating Australian herbarium and museum communities are currently redeveloping their on-line access portals to achieve compliance with TDWG standards and compatibility with the GBIF data portal.

Belgium (BeBIF)

BeBIF organised a conference on Climate Change (http://www.biodiversity.be/change) in Brussels 21 – 22 May that had two goals: offering an overview of scientific knowledge (with a focus on Belgian research) of present and predicted impacts of climate change on biodiversity, and formulating priorities for research and mitigatory conservation actions. On 28 September, BeBIF held a Digitisation Products Event to debrief the projects funded in 2006 and 2007. This was an excellent opportunity to promote digitisation among the major institutes of Belgium.
BeBIF and **NLBIF** jointly organised hands-on data validation workshops for Dutch and Belgian data providers. The first training event took place in Brussels (19-20 April 2007), and was repeated in Amsterdam (26-27 April 2007).

BioNET International

During 2007, BioNET and its regional networks (LOOPs) supported GBIF outreach, mobilising data and ECAT in many ways, for example

- In May, BioNET-SACNET (BioNET's South-Asian network) together with Species 2000 Asia-Oceania held a planning meeting in Bangladesh co-funded by the Swiss Agency for Development and Cooperation and hosted by the University of Chittagong and the BioNET-SACNET-Bangladesh Coordinating Institution, the Biodiversity Research Group of Bangladesh. Participants from the region committed to developing SABIS (South Asian Biodiversity Information System), including a regional Catalogue of Life, as an open information platform by 2012.
- In July, BioNET-NAFRINET (BioNET's North African network) held its first coordinating committee meeting in Morocco; BioNET's Secretariat introduced GBIF, led a discussion on the advantages of making databases interoperable and encouraged committee members to consider making NAFRINET a Participant Node of GBIF.
- In September, BioNET-ANDINONET (BioNET's Andean country network) became an Associate Participant of GBIF. With local and IABIN financial support, ANDINONET and the Museo del Instituto de Zoologia Agricola, Universidad Central de Venezuela committed to digitise and share data on 20.000 specimens of their Chrysomelidae collection freely on the web via IABIN and GBIF within one year.

CABI Bioscience

In 2007, **CABI Bioscience** in collaboration with Landcare Research (New Zealand)

- implemented Life Science IDentifiers (LSIDs) and associated web services for the ca. 300K specimens of the CABI fungal reference collection
- augmented Index Fungorum web services to support continuous synchronisation
- configured the web services of the reference collection and Index Fungorum for TAPIR services, including enabling response to OAI-PMH requests

GBIF Network Nodes

Cameroon

Promotion of the idea of setting up a GBIF Node within Cameroon took the form of including a plenary presentation on GBIF at the XVII AETFAT Congress in Yaoundé, and arranging for delegates from francophone African countries to attend GBIF's GB14, under the auspices of France's SEP project.

CETAF (BioCASE)

BioCASE (the CETAF node) worked intensely during 2007 on a data portal for European biodiversity data to be released in March 2008: **http://search.biocase.org**. The BioCASE portal software can be configured to link occurrence data to regional taxonomic thesauri. BioCASE also offers two helpdesks to data providers: The technical helpdesk supports those with installation and configuration problems with the BioCASe provider software, whereas the content helpdesk is aimed at enhancing data quality in the GBIF/BioCASE network by communicating content errors to the responsible parties (with a focus on ABCD). BioCASE is supported by the SYNTHESYS project of the European Commission.

Costa Rica

In June, 2007 the **Costa Rican Node** of GBIF sponsored, in close coordination with the Costa Rican UNESCO Chair of Biodiversity Informatics, two seminars entitled "From Data to Uncertainty - Improving quality through the management and cleaning of biodiversity data" and "Developing Guidelines for Dealing with Sensitive Species Occurrence Data".

As the Coordinating Institution of **IABIN**'s Species and Specimen Thematic Network, the Costa Rican Node extended the GBIF Customisable Portal functionality to include species-level information. The resulting portal will be used as the second version of the Costa Rican National Portal. This initiative was supported in-kind by GBIF via two members of its portal development team, who worked jointly with Node staff to train personnel, implement functionality to query species information, configure GIS functionality and develop strong lines of communication between Node programmers and GBIF development staff.

Together with the GBIF-ES and IABIN, Costa Rica helped develop a new version of the Plinian Core, later adopted by IABIN as its standard for species-level information. As coordinating institution of IABIN's Specimen and Species Thematic network, the Costa Rican Node implemented a software tool, endorsed by IABIN, that complies with GBIF's and the Plinian Core standards to capture and manage specimen and species level information.

Denmark (DanBIF)

During 2007, **DanBIF** (Danish Biodiversity Information Facility)

- hosted the fourth in a series of international conferences on the application of biodiversity informatics, entitled ***Biodiversity Informatics and the Barcode of Life***. The conference was highly successful.
- greatly increased the number of information-rich (e.g. including images) and scientifically important primary specimen and observation databases served through DanBIF to GBIF
- launched web-based tools on both the DanBIF portal and on separate specialised portals to aid Danish data providers in georeferencing their primary data and in plotting their occurrence data using a dynamic web-based mapping service.
- engaged in a process of getting three very large Danish data providers online, thereby planning to mobilise at least ~7,000,000 records some time during 2008
- launched a Danish portal called Natural History Guide that informs the public about natural history organisations, museums, institutions, botanical and zoological gardens, journals and magazines, education, natural history websites, and so on.

GBIF Network Nodes

ETI

During 2007, **ETI Bioinformatics**

- formed a collaboration with the emerging Tanzanian Node, TanBIF, to build a national biodiversity information portal for Tanzania, expected to launch in mid-2008.
- began building a Marine Species Identification portal (MISP), which will provide access to detailed information on 10,000 species dynamically drawn from sources such as GBIF and contributing to GBIF, EOL, WoRMS, et al.
- initiated the EU-funded Key to Nature (K2N) project, which will be a pan-European approach to teaching biodiversity, focused on the identification of organisms. It will connect and collaborate with GBIF, TDWG, EDIT, EOL and LIFEWATCH.

Finland

The **Finnish Node** doubled the number of its data providers to four, and conducted an inventory of Finnish collections and datasets. The inventory identified a total of 22 million specimens in about 80 collections, as well as 27 million digital records in about 30 databases. The inventory metadatabase is based on the BioCASE NODIT data model and is available on the web.

A new national strategy and action plan for biodiversity was accepted by the Finnish government, and the Ministry of Education began implementing it by targeting funding for data sharing. A new open access data policy has consequently been accepted by the Finnish Museum of Natural History, see http://www.fmnh.helsinki.fi/english/about/data-policy.htm.

The Hatikka field journal service for citizen observers has gained wide acceptance and now has about 5000 users.

France

The **French node of GBIF** organised a training workshop from 4-6 April 2007, at the Muséum National d'Histoire Naturelle, Paris. The session covered the tools and techniques for connecting a database to the GBIF network and instruction on georeferencing, as well as an introduction to the use of GBIF data in analytical methods, including ecological niche modelling. A presentation on GBIF and a training session was provided to participants in Dakar, Senegal, as part of the French SEP programme. A priority for GBIF France during 2007 was to collect national metadata in coordination with the SINP project (GBIF France focused on metadata about collections, and SINP focused on observational networks), and to develop an interface for entering, consulting and modifying these metadata. In 2007, GBIF France provided access to approximately 4 million data records.

Germany (GBIF-D)

Throughout 2007, the German GBIF Nodes **(GBIF-D)** continued their efforts to mobilise primary biodiversity information. The IT Group organised two workshops involving researchers from the ecological community. Preparations were made for the GEO-Species Diversity Day 2008, an international biodiversity field day jointly organised by the magazine *GEO* and GBIF-D.

A major step forward is the start of the German DNA-Bank network project by GBIF-D nodes. It will use GBIF and BioCASE techniques to provide access to high-quality DNA samples and the respective vouchers (http://www.dnabank-network.org/).

The German Nodes' coordinators group is continuing to lobby funding bodies to provide for a stable national GBIF infrastructure.

GBIF Network Nodes

IABIN

The Inter American Biodiversity Information Network (**IABIN**), through its Species and Specimens Thematic Network (SSTN), translated the new GBIF Portal into Spanish and expanded it to manage and access information on species. IABIN also provided partial funding for the development of the species standard – Plinian Core – which was developed jointly by **GBIF-ES** and **GBIF-Costa Rica**.

Through its Pollinators Thematic Network (PTN) IABIN is collaborating in GBIF's Pollinators Campaign.

IABIN endorsed the Centro de Referência em Informação Ambiental (CRIA) of Brazil, as part of the IABIN Node.

Korea, Republic of (KBIF)

KBIF (Korean Biodiversity Information Facility) upgraded its mirror of the GBIF portal from the prototype to the new GBIF Data Portal, and implemented a Korean language user interface. In addition, it created bilingual (English/Korean) search capabilities for both the KBIF Data Repository (KDR) and the KBIF Data Portal (NABIPOS).

The Korean National Biodiversity Commission was organised by KBIF. A memorandum of understanding was signed by representatives of 27 biodiversity research institutions, including university and national natural history museums and government institutes.

During 2007, KBIF prepared a Korean translation of three documents written by Arthur Chapman for GBIF, in order to share his ideas with both data providers and data users in the Korean biodiversity community and public. KBIF did this in the hope that it would inspire other Nodes to translate the documents into their languages, as well as help to increase understanding of biodiversity data sharing issues in Korea.

Madagascar

The **Malagasy Node** held, jointly with REBIOMA (Malagasy Network for Biodiversity) and SIST (Science and Technology Information System), an awareness session on Environmental and Biodiversity Information (19 Dec 2007). This session brought together 38 institutions working in environment who are potential data providers.

Netherlands (NLBIF)

In March 2007 **NLBIF** (Netherlands Biodiversity Information Facility) launched the NLBIF Biodiversity Data Portal. This portal provides access to Dutch GBIF data in a user friendly, bilingual (English/Dutch) interface. It is built upon the GBIF web-services. The portal also provides access to specific Dutch data and databases with primary (collections, observations, species lists) and secondary (literature, images, ecology, conservation status) biodiversity information.

In May, NLBIF co-organised a national biodiversity symposium to celebrate the completion of a Dutch Science Foundation project that resulted in the digitisation of 1.5 million Dutch collection records.

NLBIF and **BeBIF** jointly organised hands-on data validation workshops for Dutch and Belgian data providers. The first training event took place in Brussels (19-20 April 2007), and was repeated in Amsterdam (26-27 April 2007).

On behalf of the Netherlands, **ETI Bioinformatics** and NLBIF organised the GBIF GB14 meeting from 14-19 October in Amsterdam. The program encompassed two days of NODES meeting, with reports and demonstrations by the national GBIF Nodes and practical training on operability tools, two days of Governing Board meeting with formal decision on policy and work program, and a one day Science Symposium focused on biodiversity data on the web.

GBIF Network Nodes

NORDGEN

In November 2007, the GBIF NODE of the Nordic Genetic Resources Centre (previously Nordic Gene Bank), **NORDGEN** (previously NGB) hosted a meeting of **NordBIN**, a regional forum for the planning of cooperation activities for the North European GBIF NODES (http://circa.gbif.net/Members/irc/projects/nordbin/home). NordBIN's current cooperative project is establishing a common e-infrastructure including LSID keys for taxon names.

NORDGEN, together with the GBIF Node of **Bioversity International** (http://cwrint.grinfo.net), also contributed to the development of the Crop Wild Relative (CWR) Global Portal, which provides an index of CWR resources with direct links and automatically updated taxon and country level metadata from relevant international and national datasets. The summary metadata on the number of CWR species occurrences as reported through the GBIF data portal is automatically updated from GBIF's REST web service interface.

OBIS

The **Ocean Biogeographic Information System** continues to grow as a network of data providers. During 2007, more than 30 were added, bringing in well over a million data points. There are now 13 Regional OBIS nodes (RONs); in October 2007, RON managers had a meeting jointly with the GBIF Nodes Committee.

In 2007, OBIS' long-discussed 'discovery' metadata system became operational. OBIS metadata can be consulted through the OBIS web site, but also through a specialised portal on the GCMD web site: http://gcmd.gsfc.nasa.gov/KeywordSearch/Home.do?Portal=OBIS&MetadataType=0

The Ocean Biodiversity Informatics '07 conference (OBI'07) was held 2 to 4 October 2007, and covered many issues related to biodiversity informatics. Of the 35 posters, 12 were from the OBIS community; of the 42 oral presentations, 18 where directly related to OBIS.

OBIS adopted the World Register of Marine Species (WoRMS, http://www.marinespecies.org) as its taxonomic reference, and is working to complete a first draft list of all marine species by the end of 2008. WoRMS will also serve as a tool to organise the contribution of the marine community to the Catalogue of Life as part of Species 2000, and investigating how to contribute also to Encyclopedia of Life. GBIF adopted WoRMS as one of its Campaigns.

Aquamaps, a system for mapping species ranges using OBIS/GBIF data points and environmental data (http://www.aquamaps.org/) has been developed. The environmental limits may be edited by experts to provide more accurate range maps. Over 5,000 species have been mapped to date.

PBIF

PBIF, the Pacific Node of GBIF, became operational in October of 2007. The Node includes five regional biodiversity databases in addition linkages to the GBIF portal. The primary focus of this developing node has been providing access to data collected from the region but not readily accessible in the region.

Slovakia

The **Slovakian Node** was active in persuading the Ministry of Environment to sign the GBIF MOU as a Voting Participant.

Spain (GBIF-ES)

GBIF-ES carried out a training program during 2007 that included 12 courses covering aspects such as data provision, collection data management, flora and fauna data management and publishing, DiGIR/TAPIR, georeferencing, ecological niche modeling, etc. The training was intended mostly for a Spanish audience; persons from other GBIF participants were also invited to take advantage of these opportunities.

GBIF-ES developed a strategy to improve quality in the GBIF Network. This included a software application (http://www.gbif.es/darwin_test/Darwin_Test_in.php) that performs a number of validations and checks records before uploading them to the web.

With the **Costa Rican** GBIF Node, GBIF-ES are developing a data profile for species-level data (http://www.pliniancore.org). Plinian Core is already implemented by **IABIN**, and other GBIF member Nodes are planning to implement it as well.

Sweden

In June 2007 **GBIF-Sweden** published a new service that is accessed through the Swedish-language based website (www.gbif.se). This Internet service enables map-based visualisation of occurrence data delivered by Swedish providers. Late in the year, GBIF-Sweden started developing a new data portal, which includes the map service. Other important activities have been to connect more datasets to the GBIF network, deliver steadily increasing numbers of data records, and establish connections with new potential data providers.

Switzerland

GBIF Switzerland reached a consensus for sharing Swiss observation data: Within the nationally agreed ethical framework, all observation data banks are disposed to make their data accessible through GBIF. In 2007, three of the seven digitisation projects launched in 2006 have been finalised, providing more than 70,000 high quality entries of important Swiss botanical and zoological collections records. GBIF Switzerland reported on its activities at the annual Swiss curators meeting.

UK (NBN Gateway)

The UK node of GBIF (**NBN Gateway**) designed and set up a new server infrastructure to meet the growing information demands placed on it by requests coming from, for instance, the GBIF network. While the results of this will not be visible to most users, the changes will ensure that the amount of information that the NBN Gateway can share with GBIF and other users can continue to grow for the foreseeable future. 2007 also saw the successful uptake of Gateway web services by the GBIF information infrastructure and other portals and individual users, allowing them to incorporate maps and data directly from the NBN Gateway into their own pages.

USA (NBII)

The US National Biological Information Infrastructure **(NBII)** established the North American GBIF mirror site in late 2007. Additionally, NBII provided several workshops and briefings during the year and participated, both through leadership and technical support, in several committees and organisations to further collections digitisation efforts. It also continued to support the establishment of US data providers by funding collections- and networks-related grants at the universities of Kansas, Tennessee, and New Mexico.

Summary Financial Statement[1] 2007

GBIF Core Funds	DKK	EUR [2]
Income	17,217,556	2,311,081
Expenditures		
Work Programme 2007/2008 - Informatics	-5,684,028	-762,957
Work Programme 2007/2008 - Content	-1,187,394	-159,382
Work Programme 2007/2008 - Participation	-3,297,492	-442,616
Work Programme 2007/2008 - Campaigns	0	0
Work Programme 2007/2008 - Provisions	-741,599	-99,543
Work Programme Carry Over 2006/2007 spending	-1,787,545	-239,939
Governance - Committee costs	-732,697	-98,349
Management - Staff expenditure	-4,530,213	-608,082
Management - Running expenditure	-2,048,191	-274,925
Management - Secretariat facilities	-760,328	-102,057
Total expenditures	-20,769,487	-2,787,851
Changes in foreign exchanges rates	-253,522	-34,030
Interest	368,733	49,494
Result	(3,436,720)	(510,799)
Assets		
Other receivables, and VAT return	257,897	34,617
Cash at bank	8,122,003	1,090,202
Total assets	8,379,900	1,124,819
Retained funds and liabilities		
Retained funds	-1,488,155	-199,747
Provisions	807,604	108,403
Supplementary funds	4,375,830	587,360
Auditor	41,000	5,503
Prepayments re 2008-2011	3,947,157	529,820
Other payables	696,424	93,480
Total equity and liabilities	8,379,900	1,124,819

GBIF Supplementary Fund	DKK	EUR [2]
Balance at 1 January	5,878,204	789,021
Income	3,655,827	490,715
Expenditure	-5,234,196	-702,577
Change in foreign exchange rates	-110,442	-14,824
Correction to 2006 accounts	186,437	25,025
Result	4,375,830	587,360

Note 1: Preliminary Financial Report 2007, not yet approved by the Governing Board.
Note 2: Average exchange rate 7.45

Financial Contributions 2007

Basic Contributions 2007

Voting Participants	Financial Contributors
Argentina	CONCIET - Museo Argentino de Ciencias Naturales
Australia	CSIRO Entomology
Belgium	Belgian Federal Science Policy Office
Canada	Canadian Museum of Nature
Costa Rica	Asociación Instituto Nacional de Biodiversidad (InBio)
Denmark	Danish Natural Research Council
Estonia	Ministry of Environment
Equatorial Guinea	CICTE - Council of Cientific and Technological Investigations
Finland	Academy of Finland
France	INRA PARIS 59
Germany	German Aerospace Center/DFG
Iceland	Ministry for the Environment
Japan	Japan Science and Technology Agency
Mexico	CONACYT
Netherlands	Ministry of Education, Culture and Science
New Zealand	Ministry of Research, Science and Technology
Norway	The Research Council of Norway
Portugal	Foundation for Science and Technology
Republic of Korea	Ministry of Science and Technology
Slovak Republic	Ministry of the Environment
Slovenia	Ministry of Science, Technology and Higher Education
Sweden	Swedish Research Council
Tanzania	Tanzania Commission for Science and Technology (COSTECH)
United Kingdom	DEFRA
	BBSRC, Polaris House, Swindon
	NERC, Polaris House, Swindon
	Royal Botanic Gardens, Kew
	NRRA, Department of Environment, Food and Rural Affairs
	Natural History Museum
	Joint Nature Conservation Committee

Grants Received 2007

Royal Danish Ministry of Foreign Affairs
- DKK 1,630,000 / EUR 218,500

Copenhagen University
- DKK 170,000 / EUR 22,800

Moore Foundation
- USD 288,000

Ishøj Kommune
- DKK 43,500 / EUR 5,800

GBIF Participants as of 31st December 2007

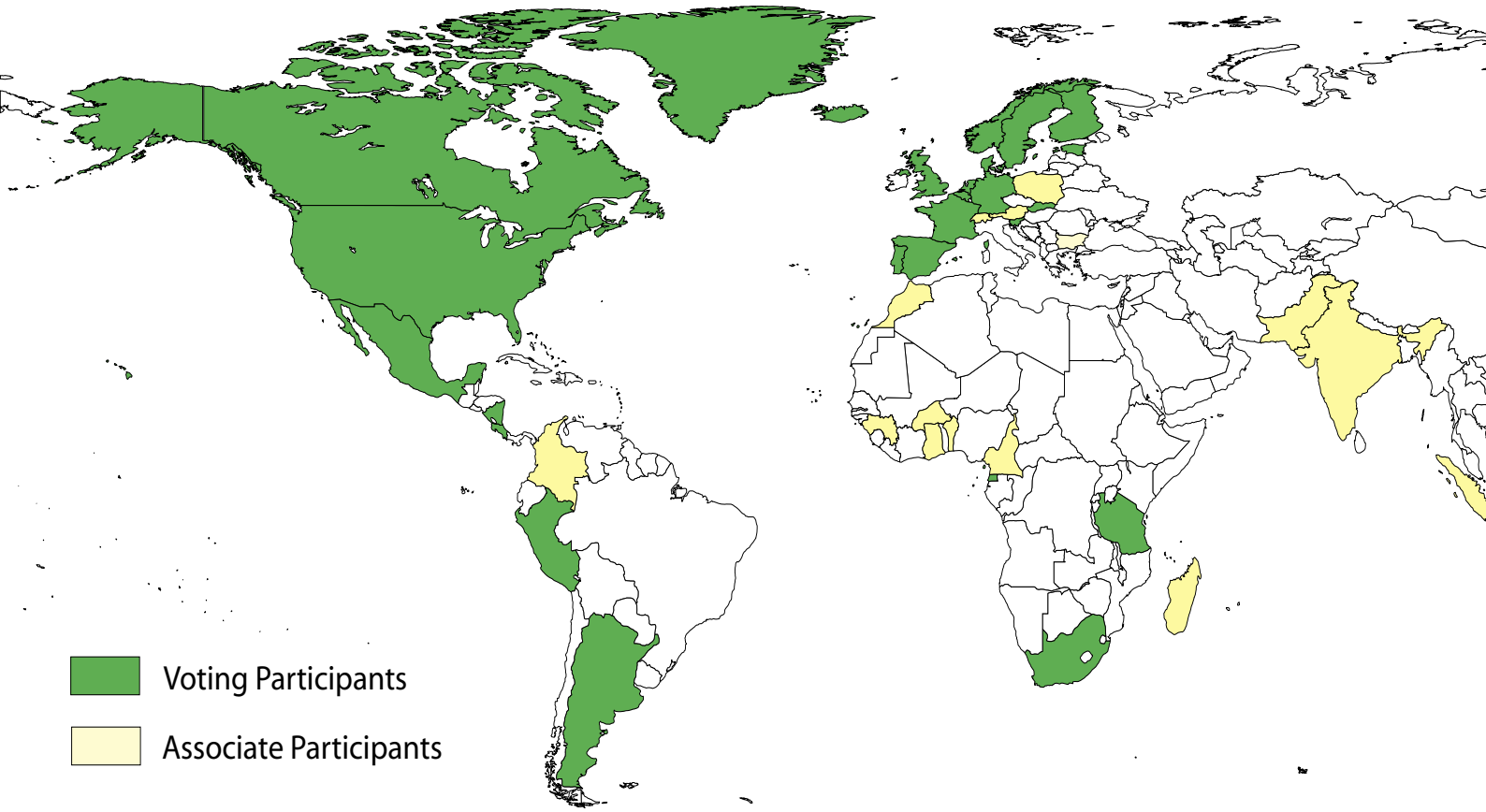
Voting Participants

Argentina	Mar 2002 *
Australia	Feb 2001
Belgium	Feb 2001
Canada	Mar 2001
Costa Rica	May 2001
Denmark	Jan 2001
Equatorial Guinea	Mar 2005
Estonia	Sep 2003
Finland	Apr 2001
France	Mar 2001
Germany	Feb 2001
Iceland	Jun 2001
Japan	Feb 2001
Korea, Republic of	May 2001
Mexico	Mar 2001
Netherlands	Feb 2001
New Zealand	Feb 2001
Nicaragua	Jun 2001
Norway	Mar 2004
Peru	Sep 2002
Portugal	Jun 2001
Slovakia	Aug 2001 **
Slovenia	Feb 2001
South Africa	May 2003
Spain	Feb 2001
Sweden	Feb 2001
Tanzania	Sep 2002 ***
United Kingdom	Aug 2001
United States of America	Jan 2001

* *Argentina became a Voting Participant in September 2007, moving up from Associate Participant, which it had been since March 2002*

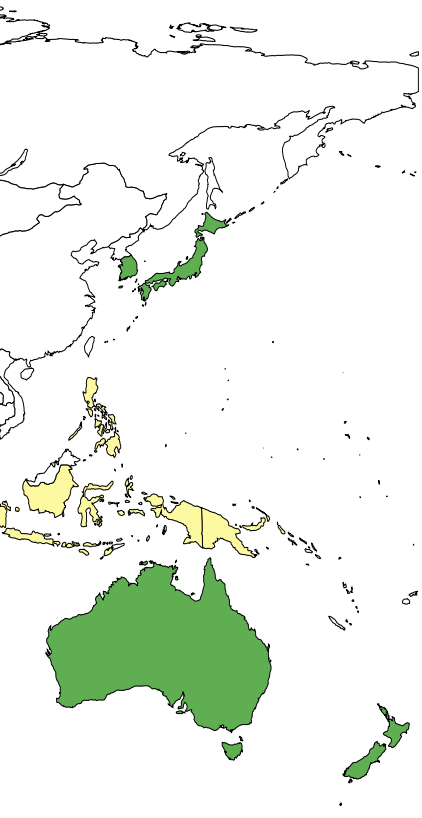
** *Slovakia became a Voting Participant in April 2007, moving up from Associate Participant, which it had been since August 2001*

*** *Tanzania became a Voting Participant in January 2007, moving up from Associate Participant, which it had been since September 2002*



Country Associate Participants

Austria	Sep 2001	Indonesia	Nov 2004
Benin	Dec 2004	Madagascar	Jan 2003
Bulgaria	Aug 2001	Morocco	Jun 2003
Burkina Faso	Jan 2007	Pakistan	Aug 2001
Cameroon	Mar 2005	Papua New Guinea	Mar 2004
Colombia	Sep 2003	Philippines	Mar 2005
Ghana	Mar 2001	Poland	Mar 2001
Guinea	Mar 2005	Switzerland	Feb 2001
India	Aug 2003		



Other Associate Participants

BioNET-ANDINONET	Oct 2007
BioNET-ASEANET	Oct 2002
BioNET-EASIANET	Oct 2002
BioNET-INTERNATIONAL	May 2001
BioNET-SAFRINET	Aug 2003
Bioversity International	Jul 2006
Botanic Gardens Conservation International	Aug 2004
CABI Bioscience	Sep 2001
Chinese Taipei	Mar 2001
Ciencia y Tecnología para el Desarrollo (CYTED)	May 2006
Consortium for the Barcode of Life (CBOL)	Mar 2005
Consortium of European Taxonomic Facilities (CETAF)	Jun 2007
DIVERSITAS	May 2007
ETI Bioinformatics	Mar 2001
Finding Species	Dec 2003
Freshwater Biological Association - FreshwaterLife	Oct 2003
Integrated Taxonomic Information System (ITIS)	Mar 2001
Inter-American Biodiversity Information Network (IABIN)	May 2001
International Centre for Insect Physiology and Ecology (ICIPE)	Mar 2004
International Commission on Zoological Nomenclature (ICZN)	Jun 2005
International Species Information System (ISIS)	Jun 2006
Major Systematic Entomology Facilities (MSEF)	Mar 2006
Natural Science Collections Alliance (NSCA)	Dec 2004
NatureServe	May 2001
Nordic Gene Bank	Mar 2004
Ocean Biogeographic Information System (OBIS)	Jun 2001
Pacific Biodiversity Information Forum (PBIF)	Sep 2004
Species 2000	Mar 2001
Taxonomic Databases Working Group (TDWG)	Mar 2002
United Nations Environment Programme (UNEP)	May 2001
Wildscreen	Jan 2003
World Data Center for Biodiversity and Ecology (WDCBE)	Apr 2005
World Federation for Culture Collections (WFCC)	Oct 2002

GBIF Secretariat Staff 2007

Director:	**James L. Edwards** (Jan - May) **Hugo von Linstow** (Acting, Jun - Jul) **Nicholas King** (Aug - Dec)
Deputy Director for Informatics:	**Donald Hobern**
Webmaster and Network Administrator:	**Ciprian Vizitiu**
Software Engineer:	**Giorgos Ksouris** (Jan - Nov)
Data Portal Administrator:	**Andrea Hahn**
Java Developer:	**Tim Robertson**
Java Developer:	**Dave Martin**
Deputy Director for Management & International Relations:	**Hugo von Linstow**
ICT Support Manager:	**Anne Mette Nielsen**
Office Manager & PA to the Director:	**Susanne Lønstrup Sheldo**n (Jan - Nov) **Jane Sutton** (Nov - Dec)
Financial Officer:	**Belinda Skeel**
Senior Programme Officer, Data Access & Database Interoperability:	**Éamonn Ó Tuama**
Senior Programme Officer, Digitisation of Natural History Collections:	**Larry Speers (Jan - May)** **Vishwas Chavan (Oct - Dec)**
Senior Programme Officer, Electronic Catalogue of Names:	**David Remsen**
Senior Programme Officer, Outreach and Capacity Building:	**Beatriz Torres**
Senior Programme Officer, NODES:	**Juan Carlos Bello**
Public & Scientific Liaison Officer:	**Meredith A. Lane**
Technical Assistant:	**Nikolas Ioannou**

GBIF Governing Board Standing Committees 2007

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Committee Chairs	Wouter Los (Science)
	Lars Nilsson (Budget)
	Lawrence Way (Nodes)
	Joanne Daly (Rules)
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	Dag Terje Endresen
Members	Every Node Manager
Programme Officer	Juan Carlos Bello

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Subcommittee Chairs	Stan Blum (DADI)
	Walter Berendsohn (DIGIT)
	Chris Lyal (ECAT)
	Vishwas Chavan (OCB)
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	1st Vice-Chair, Governing Board
	Chair, NODES
	Executive Secretary

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	Renato De Giovanni
	Markus Döring
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	Conrad Matthee
	Roderic Page
	Hideaki Sugawara
	Sylvia Spengler
	Javier de la Torre
	John Wieczorek

Subcommittee for Electonic Catalogue of Names of Known Organisms (ECAT)

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	Paul M. Kirk
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	Roderigo Bernal
	Arthur Chapman
	Leslie Christidis
	Christopher Frazier
	Gerald Guala
	Anton Guntsch
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	Ryan Hill
	Dirk Houtgraaf
	Alain Leplaideur
	Renee Le Roux
	Erick Mata
	Junko Shimura
	Stella Simiyu
	Kevin Thiele
	Toral Patel Waynand
	Iván Valdespino

GBIF Citations in the Professional Literature

Publications in which GBIF is Discussed

Dedeurwaerdere, T. 2007. The Institutional Dynamics of Sharing Biological Information : Towards Reflexive Governance of the Information Society. In IFIP International Federation for Information Processing, Volume 233, The Information Society: Innovations, Legitimacy, Ethics and Democracy, eds. P. Goujon, Lavelle, S., Duquenoy, P., Kimppa, K., Laurent, V., (Boston: Springer), pp. 121-146.

Gemmill-Herren, B., C. Eardley, J. Mburu, W. Kinuthia and D. Martins. 2007. Pollinators. Chapter 9 in Scherr, S. and J. McNeeley, eds. Farming with Nature: The science and practice of ecoagriculture. Island Press, 472 pp.

Greene, S., T. Minoura, J. J. Steiner and G. Pentacost. 2007. WebGRMS: Prototype software for web-based mapping of biological collections. Biodiversity and Conservation 16(9). DOI 10.1007/s10531-006-9067-0

Heidorn, P. B., C. L. Palmer and D. Wright. 2007. Biological information specialists for biological informatics. Journal of Biomedical Discovery and Collaboration 2: 1 doi doi:10.1186/1747-5333-2-1

Körner C., Donoghue M., Fabbro T., Häuser C., Nogués-Bravo D., Arroyo M. T. K. , Soberon J., Speers L., Spehn E. M., Sun H., Tribsch A., Tykarski P., Zbinden N. 2007. Creative use of mountain biodiversity databases: the Kazbegi Research Agenda of GMBA-DIVERSITAS. Mountain Research and Development, 27 (3), 276-281

Lane, M. A. and J. L. Edwards. 2007. The Global Biodiversity Information Facility. Chapter 1 in Curry, G. and C. Humphries, eds. Biodiversity Databases: Techniques, Politics, and Applications. Taylor & Francis, Boca Raton, Florida, USA.

Richards, C.L., B.C. Carstens and L. Lacey Knowles. 2007. Distribution modelling and statistical phylogeography: An integrative framework for generating and testiing alternative biogeographical hypotheses. Journal of Biogeography 34 (11): 1833 - 1845. DOI: 10.1111/j.1365-2699.2007.01814.x

Schaaff, A. 2007. Data in astronomy: From the pipeline to the virtual observatory. Pp. 52-62 in M. Weske, M.-S. Hacid, C. Godart (Eds.): WISE 2007 Workshops, LNCS 4832. Springer-Verlag Berlin.

Sóberon, J., R. Jiménez, J. Golubov and P. Koleff. 2007. Assessing completeness of biodiversity databases at different spatial scales. Ecography 30: 152-160. DOI 10.1111/j.2006.0906-7590.04267

Uhlir, P. and P. Schroeder. 2007. Open data for global science. Data Science Journal 6: OD36 - OD53.

Walther, B., A. Laurigauderie, N. Ash, G. N. Geller, N. Jürgens and M. A. Lane. 2007. Toward a global biodiversity observation network. Pp. 79 – 81 in GEO Secretariat. The Full Picture. Tudor Rose, Geneva. ISBN 978-92-990047-0-8.

Also see Box (page 19) : *2007 Publicati*

These bibliographies are regularly updated and are

http://www.editgrid.co

Anonymous. 2007. Le projet gbif : La biodiversité à l'échelle mondiale. Fondation du point nodal gbif france. Bulletin de la société française de systématique janvier 2007. 37: 17.

Anonymous. 2007. The future of systematics in Switzerland: Systematics as a key discipline in biology. J. Zoological Systematics & Evolutionary Research 45 (4): 285 - 288. DOI: 10.1111/j.1439-0469.2007.00431.x

Baker, K. S. and G. C. Bowker. 2007. Information Ecology: Open system environment for data, memories, and knowing. Journal of Intelligent Information Systems (Special Issue: BDEI) 29 (1): 127-44

Berenbaum, M. et al. (National Research Council). 2007. Nature Revealed: Selected Writings, 1949-2006. JHU Press, 736 pp. ISBN 801883296

Best, B.D., P.N. Halpin, E. Fujioka, A. J. Read, S. S. Qian, L. J. Hazen and R. S. Schick. 2007. Geospatial web services within a scientific workflow: Predicting marine mammal habitats in a dynamic environment. Ecological Informatics 2(3): 210 - 223.

Botkin, D. B., H. Saxe, M. B. Araújo, R. Betts, et al. 2007. Forecasting the effects of global warming on biodiversity. BioScience 57 (3): 227-236.

Chavan, V., c. T. Achuthankutty, and A. K. A. 2007. Port Blair Declaration pledged to establish and develop Andaman and Nicobar Ocean Biogeographic Information System. Current Science 92: 879-880.

Consalvey, M. 2007. GBIF Data Portal. CenSeam Newsletter VIII, pp. 14 - 15.

Curry, G.B., C.J. Humphries, C. Humphries. 2007. Biodiversity Databases: Techniques, Politics, and Applications. Taylor & Francis, Boca Raton, Florida, USA.

David Weinberger. 2007. Status of Pollinators in North America. National Academies Press, 307 pp. ISBN 309102898

Davies, K. 2007. Bioinformatics.Org Announces 2008 Franklin Award Finalists. Bio-IT World.com Dec. 2007.

Dawyndt, P., T. Dedeurwaerdere, and J. Swings. 2007. Exploring and exploiting microbiological commons: contributions of bioinformatics and intellectual property rights in sharing biological information. Introduction to the special issue on the microbiological commons. International Social Science Journal.

Dube, J., S. Carrier and J. Greenberg. 2007. DRIADE: A data repository for evolutionary biology (abstract). Proceedings of the 2007 International Conference on Digital Libraries.

Edwards, E., C. Still and M. Donoghue. 2007. The relevance of phylogeny to studies of global change. Trends in Ecology & Evolution 22: 243-249.

Faith, D. P., S. Ferrier, K. J. Williams. 2007. Getting biodiversity intactness indices right: ensuring that "biodiversity" reflects "diversity". Global Change Biology (online accepted articles). doi:10.1111/j.1365-2486.2007.01500.x

Fukasaku, Y. 2007. International Initiatives in Data Sharing: OECD, CODATA and GICSI. Delivered at Berlin 5 Open Access : From practice to impact : Consequences of Knowledge dissemination, Padova (Italy).

Guisan, A., E. Spehn and C. Korner. 2007. Georeferenced Biological Databases -- A tool for understanding mountain biodiversity. MRI Newsletter 8.

ons that Utilised GBIF-mediated Data.

maintained in downloadable spreadsheet format at

m/user/gbif_secretariat

Papers in which GBIF is Mentioned *(continued)*

Hák, T., Bedřich Moldan, Arthur L. Dahl. 2007. Everything Is Miscellaneous: The Power of the New Digital Disorder. Times Books, 288 pp. ISBN 805080430

Heywood, V. H., R.K. Brummitt, A. Culham, O. Seberg. 2007. Flowering Plant Families of the World. Firefly Books, ISBN 1554072069. 454 pp. (see p. 9).

Hibbett, D. S. et al. 2007. A higher level phylogenetic classification of the fungi. Mycological Research 111: 509 - 547.

Hodkinson, T. R., S. Waldren, J. A. N. Parnell, Colin T. Kelleher, K. Salamin and N. Salamin. 2007. DNA banking for plant breeding, biotechnology and biodiversity evaluation. Journal of Plant Research 120(1): 17-29.

Iverson, L. R. 2007. Adequate data of known accuracy are critical to advancing the field of landscape ecology. Chapter 2 (pp 11 - 38) in Wu, J. and R. Hobbs, eds. Key Topics in Landscape Ecology: Key Issues in Theory, Methodology and Applications. Cambridge University Press. ISBN: 0-521-61644-1

Jeltsch, F., K. A. Moloney, F. M. Schurr, M. Köchy and M. Schwager. 2007. The state of plant population modelling in light of environmental change. Perspectives in Plant Ecology, Evolution and Systematics 9(3-4): 171-189.

Kemp, Z., L. Tan annd J. Whalley. 2007. Interoperability for geospatial analysis: A semantics and ontology-based approach. ACM International Conference Proceedings Series Vol 242: Proceedings of the 18th conference on Australasian databases.

Khalsa, S., S. Nativi, R. Shibasaki. 2007. The GEOSS Interoperability Process Pilot Project. Geophysical Research Abstracts.

Khuroo, A. A., G. H. Dar, Z. S. Khan and A. H. Malik. 2007. Exploring an inherent interface between taxonomy and biodiversity: Current problems and future challenges. Journal for Nature Conservation 15(4): 256 - 261. 11 Dec 2007. doi:10.1016/j.jnc.2007.07.003

Klingenberg, C. & M. Verhaagh. 2007. Anttypes.org: Uma nova base de dados para taxonomistas de formigas. Resumo Expandido (Biológico) 69 (supl. 2): 435-437.

Knapp, S., A. Polaszek and M. Watson. 2007. Spreading the word. Nature 446: 261-262. doi:10.1038/446261a

Langhammer, Penny F. , Mohamed I. Bakarr, Leon Bennun, Thomas M. Brooks. 2007. Sustainability Indicators: A Scientific Assessment. Island Press. 448 pp. ISBN 1597261319

Leary, P. R., D. P. Remsen, C. N. Norton, D. J. Patterson and I. N. Sarkar. 2007. uBioRSS: Tracking new taxonomic literature using RSS. Bioinformatics; doi: 10.1093/bioinformatics/btm109

Los, W. and C.H.J. Hof. 2007. The European Network for Biodiversity Information. Chapter 2 in Curry, G. and C. Humphries, eds. Biodiversity Databases: Techniques, Politics, and Applications. Taylor & Francis, Boca Raton, Florida, USA.

Michener, W. K., J. H. Beach, M. B. Jones, B. Ludäscher, D. Pennington, R.Pereira, A. Rajasekar and M. Schildauer. 2007. A knowledge environment for the biodiversity and ecological sciences. Intelligent Information Systems 29(1): 111-126. DOI 10.1007/s10844-006-0034-8

Miller, S. E. 2007. DNA barcoding and the renaissance of taxonomy. Proc. National Acad. Sci. 104(12): 4775-4776.

Numes, M. L. and N. M. Bandarra, eds. 2007. Micologia, avanços no conhecimento : actas do Congresso Brasileiro de Micologia, 5, Recife, 2007." Recife : Universitária da UFPE, 2007. ISBN: 978-85-7315-444-3. pp. 173-180.

O' Tuama, E'. and T. Hamre. 2007. Design and implementation of a distributed GIS Portal for oil spill and harmful algal bloom monitoring in the marine environment. Marine Geodesy 30: 145 - 168.

Raven, P. H. and D. Yeates. 2007. Australian biodiversity: threats for the present, opportunities for the future. Australian J. Entomology 46: 177-187.

Ruhsam, M. and A. P. Davis. 2007. A taxonomic revision of the genus Flagenium Baill. (Rubiaceae-Octotropideae). Botanical Journal of the Linnaean Society 155: 557-570. doi:10.1111/j.1095-8339.2007.00714.x

Sarkar, I. N. 2007. Biodiversity informatics: organizing and linking information across the spectrum of life. Briefings in Bioinformatics. 15 Aug 2007. Briefings in Bioinformatics, doi:10.1093/bib/bbm037

Sarkar, I. N. 2007. Grand challenges in biodiversity informatics.

Saunier, Richard E. and Richard Albert Meganck. 2007. Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems. IUCN, 116 pp. ISBN 283170992X

Scherr, Sara J. and Jeffrey A. McNeely. 2007. Dictionary and Introduction to Global Environmental Governance ISBN 1844074250

Scoble, M. J. and W. G. Berendsohn. 2007. Networking biological collections databases: Building a European infrastructure. Chapter 4 in Curry, G. and C. Humphries, eds. Biodiversity Databases: Techniques, Politics, and Applications. Taylor & Francis, Boca Raton, Florida, USA.

Shao, K-T., C-I. Peng, E. Yen, K-C. Lai, M-C. Wang, J. Lin, H. Lee, Y. Alan and S-Y. Chen. 2007. Integration of biodiversity databases in Taiwan and linkage to global databases. Data Science Journal 6: S2-S10.

Shyamal, L. 2007. Taking Indian ornithology into the Information Age. Indian Birds 3 (4): 122 - 137.

Tansey, Geoff & Tasmin Rajotte. 2007. Farming with Nature: The Science and Practice of Ecoagriculture. Island Press, 472 pp. ISBN 1597261289

Teder, T., M. Moora, E. Roosaluste, K. Zobel, M. Partel, Urmas Kolialg, M. Zobel. 2007. Monitoring of biodiversity: A common-ground approach. Conservation Biology 21: 313 - 317.

Triebel, D., D. Persoh, T. H. Nash III, L. Zedda and G. Rambold. 2007. Q LIAS -- An interactive database system for structured descriptive data of Ascomycetes. Chapter 8 in Curry, G. and C. Humphries, eds. Biodiversity Databases: Techniques, Politics, and Applications. Taylor & Francis, Boca Raton, Florida, USA.

Villa, F. 2007. A semantic framework and software design to enable the transparent integration, reorganisation and discovery of natural systems knowledge. J. Intelligent Information Systems 29 (1): 79 - 96.

Wilson, E.O. 2007. Editors Choice: E.O. Wilson. A global Biodiversity Map. Reprinted from Science. American Society of Parasitologists Newsletter 28(3). 28 September, 2000.

Wootten, Rajbhandari, Rana. 2007. Automatic assertion of actor state in service oriented architectures. ICWS, pp 655-662, IEEE International Conference on Web Services (ICWS 2007)

Wu, J. and R.J. Hobbs. 2007. Key Topics in Landscape Ecology. Cambridge University Press. 314 pp.

Wu, J. and Richard J. Hobbs. 2007. The Future Control of Food: An Essential Guide to International Negotiations and Rules on Intellectual Property, Biodiversity and Food Security. Earthscan, 224 pp. ISBN 1844074307

Xia, Y., R. Maarey, K. Suiter and R. Stinner. 2007. Applications of Information Technology in IPM. Pp. 209 - 226 in General Concepts in Integrated Pest Management. Springer, Netherlands. DOI 10.1007/978-1-4020-6061-8_8

GBIF Publications in 2007

During 2007, the GBIF Secretariat produced a number of promotional pamphlets (below), including these two that address needs of countries relative to the biodiversity conventions. All GBIF publications are available on request to the Secretariat, or at ***http://www.gbif.org/GBIF_org/GBIF_Documents***

GBIF Publications in 2007

A bimonthly electronic newsletter, called GBits, was inaugurated in October 2007, when it was sent to over 1600 recipients. Issue 2 was released in December 2007.

Acronyms Used in this Report

ABBIF	Amazon Basin Biodiversity Information Facility
ABIF	Australian Biodiversity Information Facility (Australian GBIF Node)
AETFAT	Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale
ALA	Atlas of of Living Australia
ALARM	Assessing LArge scale environment Risks for biodiversity with tested Methods
ANDINONET	BioNET's Andean Country Network
ASEAN	Association of Southeast Asian Nations
ASEANET	BioNET's South East Asian Network
BBSRC	Biotechnology and Biological Sciences Research Council (UK)
BCI	Biodiversity Collections Index
BeBIF	Belgian Biodiversity Information Facility (Belgium's GBIF Node)
BioNET	BioNET INTERNATIONAL
BIOTA / UTU	Biota BD / University of Turku (Finland)
CATE	Creating a Taxonomic e-Science (UK)
CBD	Convention on Biological Diversity
CBOL	Consortium for the Barcode of Life
CEPDEC	Capacity Enhancement Programme for Developing Countries (GBIF)
CETAF	Consortium of European Taxonomic Facilities
CHM	Clearing House Mechanism
CICTE	Council of Cientific and Technological Investigations (Equatorial Guinea)
CODATA	Committee on Data for Science and Technology (ICSU)
CONABIO	Comisión nacional para el conocimiento y uso de la biodiversidad (Mexico)
CONACYT	Consejo Nacional de Ciencia y Tecnología (Mexico)
CONICET	Consejo Nacional de Investigaciones Científicas Y Técnicas (Argentina)
COSTECH	Commission for Science and Technology (Tanzania)
CRIA	Centro de Referência em Informação Ambiental (Brazil)
CSIR	Council for Scientific and Industrial Research (India)
CSIRO	Commonwealth Scientific and Research Organization (Australia)
CWR	Crop Wild Relative
CYTED	Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (Spain)
DADI	Data Access and Database Interoperability (GBIF)
DanBIF	Danish Biodiversity Information Facility (Denmark's GBIF Node)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)
DIGIT	Digitisation of Natural History Collection Data (GBIF)
EASIANET	BioNET's East Asian Network
ECAT	Electronic Catalogue of Names of Known Organisms (GBIF)
EDIT	European Distributed Institute of Taxonomy
EOL	Encyclopedia of Life
EU	European Union
FAO	United Nations Food and Agriculture Organization
GBIF	Global Biodiversity Information Facility
GBIF-D	German GBIF Node
GBIF-ES	Spanish GBIF Node
GCMD	Global Change Master Directory

Acronyms Used in this Report

Group on Earth Observations	**GEO**
Group on Earth Observations System of Systems	**GEOSS**
Geographic Information System	**GIS**
Global Invasive Species Information Network	**GISIN**
Global Strategy for Plant Conservation	**GSPC**
Global Taxonomic Initiative	**GTI**
Inter-American Biodiversity Information Network	**IABIN**
International Centre for Insect Physiology and Ecology	**ICIPE**
International Commission on Zoological Nomenclature	**ICZN**
International Commission on Zoological Nomenclature	**INBio**
Asociación Instituto Nacional de Biodiversidad	**INRA PARIS**
l'Institut National de la Recherche Agronomique (France)	**IOC**
Intergovernmental Oceanic Commission	**IP3**
GEO Interoperability Process Pilot Project	**IRBIO**
Instituto Regional de Biodiversidad (Honduras)	**ISIS**
International Species Information System	**ITIS**
Integrated Taxonomic Information System (USA, Canada, Mexico)	**ABBIF**
Key to Nature	**K2N**
Korean Biodiversity Information Facility	**KBIF**
KBIF Data Repository	**KDR**
Keyhole Markup Language (used by Google Earth)	**KML**
BioNET's Local Partnerships	**LOOPS**
Life Science IDentifiers	**LSIDs**
Museo Argentino de Ciencias Naturales	**MACN**
Millennium Development Goal	**MDG**
Herbarium of the Universidad Nacional Autónoma de México	**MEXU**
Marine Species Identification Portal	**MISP**
Missouri Botanical Garden	**MOBOT**
Memorandum of Understanding	**MOU**
Major Systematic Entomology Facilities	**MSEF**
KBIF's Data Portal	**NABIPOS**
BioNET's North African Network	**NAFRINET**
National Biological Information Infrastructure (USA)	**NBII**
National Biodiversity Network (UK Node of GBIF)	**NBN**
National Center for Atmospheric Research (USA)	**NCAR**
Natural Environment Research Council (Canada)	**NERC**
Netherlands Biodiversity Information Facility (GBIF Node)	**NLBIF**
National Node Data Input Tool	**NODIT**
Natural Resource and Rural Affairs, DEFRA (UK)	**NRRA**
Natural Science Collections Alliance	**NSCA**
Open Archives Initiative – Protocol for Metadata Harvesting	**OAI-PMH**
Ocean Biogeographic Information System	**OBIS**
Outreach and Capacity Building (GBIF)	**OCB**
Pacific Biodiversity Information Forum (Pacific Node of GBIF)	**PBIF**
pro bono Legal Expert Group (GBIF)	**ProLEG**
Pollinators Thematic Network (of IABIN)	**PTN**

Acronyms Used in this Report

RDMFA	Royal Danish Ministry of Foreign Affairs
REBIOMA	Malagasy Network for Biodiversity (Madagascar)
REST	Representational State Transfer
RONs	Regional OBIS Nodes
SABIS	South Asian Biodiversity Information System
SACNET	BioNET's South-Asian Network
SADC	Southern African Development Community
SAFRINET	BioNET's Southern African Network
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice(CBD)
SCP	Systematic Conservation Planning
SEP	Sud Expert Plantes (France)
SINP	Système d'Information sur la Nature et les Paysages (France)
SIST	Science and Technology Information System (Madagascar)
SSTN	Species and Specimens Thematic Network (of IABIN)
TAPIR	TDWG Access Protocol for Information Retrieval
TanBIF	Tanzanian Biodiversity Information Facility (GBIF Node of Tanzania)
TDWG	Taxonomic Databases Working Group /Biodiversity Information Standards
TEFH	Herbarium of the Universidad Nacional Autónoma de Honduras
UCR	Entomology Research Museum of the University of California, Riverside (USA)
UN	United Nations
UNAM	Universidad Nacional Autónoma de México
UNEP-WCMC	United Nations Environment Programme – World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
USCG CECON	Universidad de San Carlos de Guatemala Centro de Estudios Conservacionistas
WDCBE	World Data Center for Biodiversity and Ecology
WFCC	World Federation of Culture Collections
WoRMS	World Register of Marine Species

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