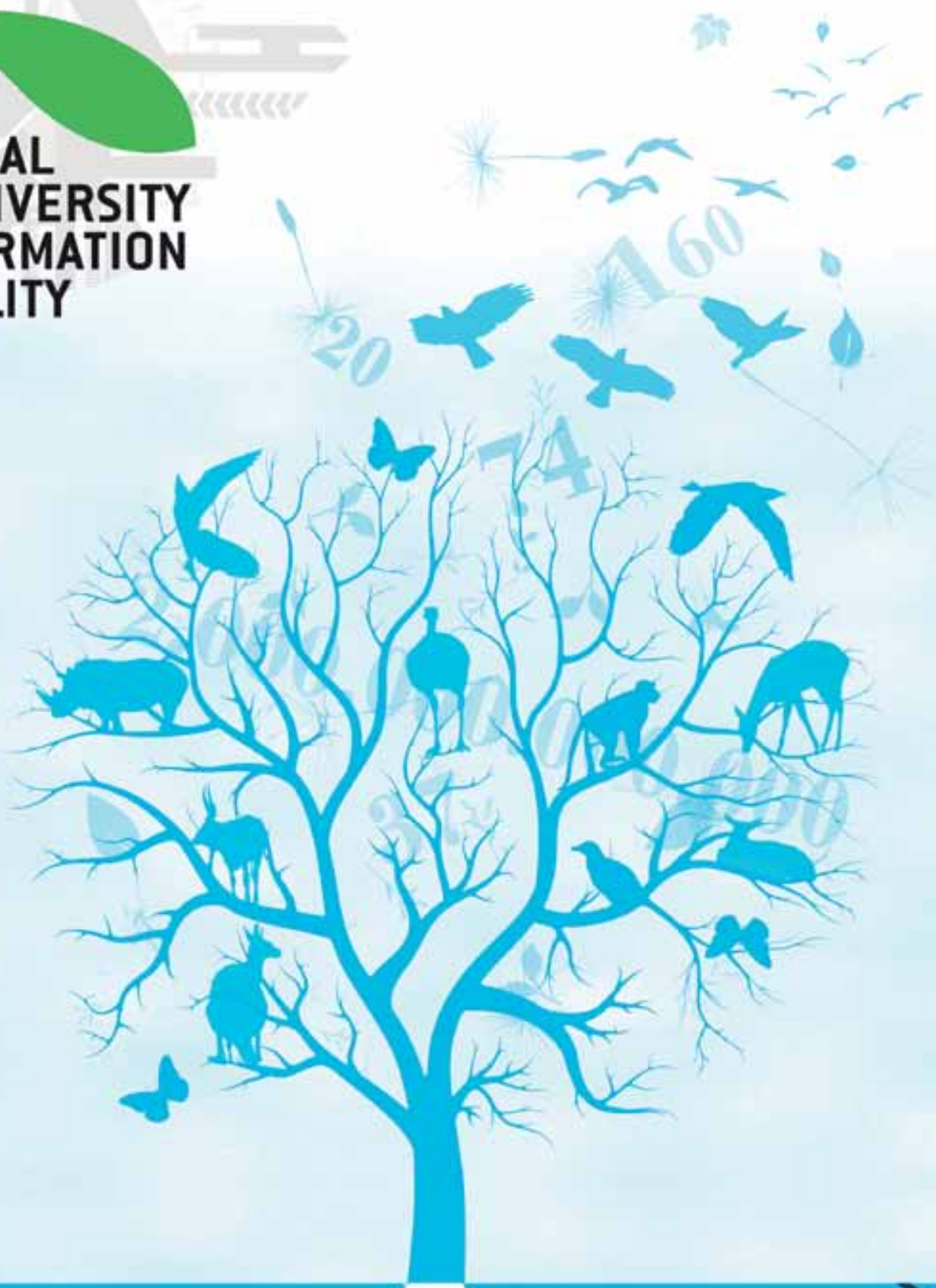




GLOBAL
BIODIVERSITY
INFORMATION
FACILITY



ANNUAL REPORT

www.gbif.org

2008

Table of Contents

| | |
|--|----|
| Letter from the Director | 3 |
| Summary of Key Activities 2008 | 4 |
| Governance | 6 |
| GB15 | 6 |
| Box: GBIF's Participation in GEO BON..... | 7 |
| The Ebbe Nielsen Prize | 7 |
| GBIF 6th Science Symposium - Biodiversity, Humans and Global Change in Africa | 8 |
| 'From Prototype towards Full Operation': Growing Capacity, Distributing Infrastructure, Decentralising Activities and Responsibilities | 9 |
| Work Programme 2009-2010 Summary: Key Outputs | 11 |
| Informatics | 14 |
| Informatics Infrastructure & Portal (IIP)..... | 14 |
| Data Portal and Statistics | 15 |
| Box: GBIF Data Portal Version 1.2.2..... | 15 |
| Data Portal and Web Services Usage Statistics | 17 |
| Integrated Publishing Toolkit | 21 |
| Harvesting and Indexing Toolkit | 23 |
| Web Services and Statistics..... | 23 |
| Rich Internet Application - World Database on Protected Areas..... | 24 |
| Box: Collaborative Projects | 25 |
| Inventory, Discovery, Access (IDA) | 26 |
| Box: Successful Completion of Moore Foundation Project | 27 |
| Content | 28 |
| Digitisation and Mobilisation of Primary Biodiversity Data (DIGIT)..... | 28 |
| Electronic Catalogue of Names of Known Organisms (ECAT) | 32 |
| Box: Pink Millipede on Top Ten New Species List..... | 33 |
| Participation | 34 |
| Nodes - Participant Node Managers Committee | 34 |
| Training | 40 |
| Outreach | 42 |
| Campaigns..... | 43 |
| Box: GEO BON Plan Approved at GEO V Plenary | 47 |
| 2008 Financial Statement Summary | 48 |
| Basic Contributions 2008..... | 49 |
| Grants Received 2008..... | 49 |
| Annex 1 - GBIF Participants as of 31st December 2008 | 50 |
| Annex 2 - GBIF Secretariat Staff 2008..... | 52 |
| Box: GBIF Secretariat Staff 2008 | 53 |
| Annex 3 - GBIF Governing Board, Standing Committees and Task Groups..... | 56 |
| Annex 4 - GBIF Citations..... | 58 |
| Annex 5 - GBIF Publications, Posters, DVDs and CDs | 61 |
| Annex 6 - Acronyms Used in this Report | 65 |

Letter from the Director

The GBIF Secretariat is pleased to present the Annual Report for 2008. The Annual Report briefly summarises the major activities and achievements of 2008, as listed for easy reference in the 'Key Activities' table on the next pages, each item of which is covered in more detail in the body of the report.

2008 was once again a year which saw significant change at both the Secretariat and within the GBIF community as a whole. The Secretariat broadened our ability to service Participants and address capacity needs throughout the network by appointment of a full-time Training Officer in March. A new Head of Informatics and three new technical programming staff joined the Secretariat later in the year to allow us to expedite information technology (IT) infrastructural developments, the key service delivery area for GBIF. In addition to successfully completing the 2007-2008 Work Programme, we spent an extraordinary amount of time in 2008 developing the 2009-2010 Work Programme as we sought to define clearly a framework for moving GBIF 'from prototype towards full operation' as envisaged in the 2007-2011 Strategic Plan. This resulted in the Work Programme defining a 'network-wide' schedule of activities and measures *for Participants* as well as the Secretariat, based upon an increasingly distributed and customisable infrastructure and identifying decentralised responsibilities for mobilisation of resources and uptake and implementation of the Work Programme *by Participants*.

The four Campaigns approved in 2007 made varying degrees of progress through 2008 in mobilising additional data, financial resources and participation; the Governing Board review concluded that it is still early days in the life of the Campaigns, that good progress has been made and that an increase in rate of success could be reasonably expected during 2008 as the Campaigns develop further; *however, much depends on greater Participant involvement*.

The major disappointment of 2008 was the lack of any change in the rate of data mobilisation across the GBIF network, despite the adoption by the Governing Board of the 1 billion record target, to be achieved by end 2008. The rate of mobilisation remained effectively linear rather than gathering any momentum to enter the required exponential curve. As the self-assessments by Participant Nodes reflect, it is not a lack of data which hinders mobilisation, *but a lack of commitment of resources by Participants*. In keeping with the agreements made at GB15 in Arusha on respective obligations in the 2009-2010 Work Programme, for GBIF to deliver on its mandate *will require a far greater commitment by GBIF's Participants*; it is thus expected that 2009 will see a *significant change in delivery from Participants*, from increasing data mobilisation, though infrastructure uptake and development, to greater participation in governance structures and technical task groups. Only then will we be able to demonstrate any significant progress 'towards full operation'.

Sincerely



Dr Nicholas King, PhD, LLM
Executive Secretary/Director



Dr Nicholas King
Executive Secretary/Director
Photo by Ciprian-Marius Vizitiu

Summary of Key Activities 2008

Numbers in colour to the right of event listings show page(s) of this Report where more information can be found.

Acronyms: See pages [65-67](#)

| | |
|-----------|---|
| 25 Jan | GBIF Secretariat constitutes the Observational Data Task Group (pg. 29) |
| 28-29 Jan | Biodiversity Collections Index (BCI) Kick-Off meeting, Washington D.C., USA (pg. 31) |
| 18-22 Feb | GBIF Secretariat attends CBD SBSTTA 13, Rome, Italy (pg. 41) |
| 11 Mar | GBIF Secretariat constitutes the Multimedia Resources Task Group (pg. 30) |
| 26-29 Mar | GBIF participates in the East African Regional Meeting and Workshop on Biodiversity Informatics, Nairobi, Kenya (pg. 40) |
| 31 Mar | GBIF and ZipCode Zoo sign Memorandum of Cooperation |
| 31 Mar | <i>Guide to Best Practices for Generalising Sensitive Species Occurrence Data</i> published |
| 1 Apr | Ad Hoc Advisory Group for Nodes established |
| 21-23 Apr | GBIF and EoL host Nomina II Workshop, Woods Hole, MA, USA (pg. 32) |
| 28-30 Apr | GBIF Governing Board mid-term Science and Executive Committee meetings, Copenhagen, Denmark |
| 5-8 May | GBIF Secretariat participates in IAIA Annual meeting, Perth, Australia; proposal for Memorandum of Cooperation agreed |
| 5-8 May | Third GBIF training workshop on Georeferencing Biodiversity Databases, Madrid, Spain (pg. 40) |
| 18-24 May | GBIF attends the CBD COP9 meeting in Bonn, Germany (pg. 41) |
| 26-30 May | Training course on data provider implementation and Node strategic planning workshop, Bogota, Colombia |
| 29-30 May | Visit to the Irish GBIF Node (pg. 26) |
| 9-12 Jun | GBIF participates in the South African Biodiversity Information Management Forum and Workshop, Pretoria, South Africa (pg. 40) |
| 9 Jul | Beta release of Biodiversity Collections Index (BCI) (pg. 31) |
| 17 Jul | Visit of GBIF France to the GBIF Secretariat |
| 21-26 Jul | Visit to Pakistan and India |
| 24-28 Jul | GBIF Secretariat participates in the Indian National Biodiversity Stakeholders meetings, New Delhi, India |

| | |
|--------------|--|
| 1 Aug | GBIF constitutes a Data Citation Task Group (DCTG) (pg. 57) |
| 25 Aug | Ebbe Nielsen Prize winner 2008 announced: Vincent Stuart Smith (pg. 7) |
| 1 Sep | GBIF and UNEP-WCMC sign a Memorandum of Cooperation to integrate databases and other collaborative efforts (pg. 25) |
| 12-13 Sep | GBIF Multimedia Resources Task Group meeting in Woods Hole, MA, USA to draft the Multimedia Metadata Schema for Biodiversity (pg. 30) |
| 16-18 Sep | Nodes European Regional meeting, Copenhagen, Denmark (pg. 34) |
| 22 Sep | GBIF Secretariat constitutes a Task Group on a Global Strategy and Action Plan for Mobilisation of Natural History Collections (pg. 29) |
| 24-26 Sep | Nodes Latin American Regional meeting, San José, Costa Rica (pg. 34) |
| 5-14 Oct | GBIF Secretariat participates in the 4th IUCN World Conservation Congress in Barcelona, Spain (pg. 25) |
| 6-7 Oct | GBIF Global Strategy and Action Plan for Mobilisation of Natural History Collections Data (GSAP-NHC) Task Group meets in Copenhagen, Denmark (pg. 29) |
| 15-18 Oct | GBIF hosts Nomina III meeting, Margaret River, Western Australia (pg. 33) |
| 19-25 Oct | GBIF participates in Biodiversity Information Standards (TDWG) Annual Conference in Freemantle, Perth, Australia (pg. 26) |
| 31 Oct-7 Nov | 15th GBIF Governing Board meeting, Arusha, Tanzania (pg. 6) |
| 10-12 Nov | GBIF participates in IPBES founding workshop, Kuala Lumpur, Malaysia |
| 17 Nov | GBIF and the Secretariat of the Convention on Migratory Species (CMS) sign a Memorandum of Cooperation to work on GROMS (pg. 42) |
| 19-21 Nov | GBIF participates at GEO V Plenary, Bucharest, Romania (pg. 47) |
| 24-26 Nov | GBIF participates in OBIS/IOC meeting, Oostende, Belgium |
| 1-4 Dec | GBIFS participates in Stockholm Biodiversity Informatics Symposium, Stockholm, Sweden |
| 1-12 Dec | GBIF attends UNFCCC CoP 14, Poznan, Poland, as official observer organisation |
| 3 Dec | GBIF provides online support for CBD Parties in the preparation of their 4th National Biodiversity Reports |
| 5 Dec | Call for nominations for the Ebbe Nielsen Prize 2009 |
| 5 Dec | GBIF co-authors paper on nomenclature published in Zootaxa |

Governance

GB15

The annual meeting of the GBIF Governing Board (GB15) took place at the Arusha International Conference Centre in Tanzania in November. Thirty-two countries and 14 international organisations, represented by 110 delegates, took part in the Governing Board meeting. The Board was welcomed by the host, Professor Dr Hassan Mshinda, Director General of the Tanzanian Commission for Science and Technology (COSTECH).

Amongst its major decisions, the Board approved the GBIF Work Programme for 2009-2010 (see p. 11), the 2009 Budget and the Financial Report for 2007. The Board considered options for a further phase of GBIF when the current Memorandum of Understanding (MoU) expires at the end of 2011. A *limited, focused review* of current activities was agreed, as well as a *forward look beyond 2011* that delegations can use in their national decision-making processes on the next phase of GBIF, during 2010.



A traditional Tanzanian painting; a gift from the local host to GBIF
Photo by Harry Msenga



The Governing Board was honored by the presence of His Excellency, Dr Mohammed Ali Shein, Vice President of the United Republic of Tanzania, who officially closed the Board meeting. The Honourable Vice President expressly thanked GBIF for addressing key issues facing developing nations, and, following the formal closure, the Vice President inaugurated the Tanzania Biodiversity Information Facility (TanBIF: www.tanbif.or.tz) as part of the Capacity for Enhancement Programme for Developing Countries (CEPDEC) -Tanzania Pilot Project (see p. 37).

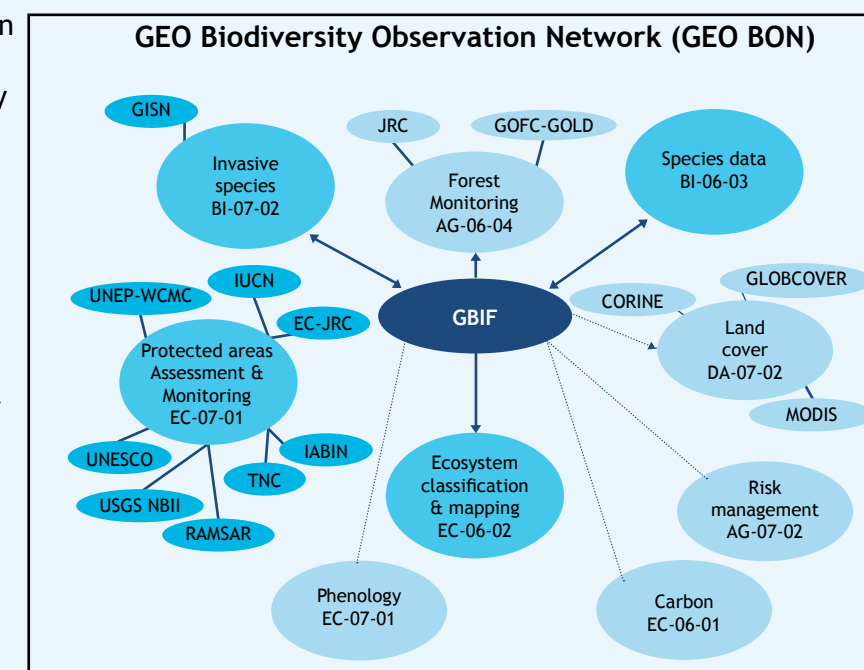
His Excellency, Dr Mohammed Ali Shein
Photo by Harry Msenga



Thirty-two countries and 14 international organisations, represented by 110 delegates, met in Arusha, Tanzania.
Photo by Harry Msenga

Box: GBIF's Participation in GEO BON

Until 2008, GBIF participated in the formation of the Group on Earth Observations Biodiversity Observation Network (GEO BON) under a 'middle road' support strategy approved by the Governing Board. As GEO BON is gaining momentum, and given the considerable overlaps and synergies with GBIF's achievements to date and future plans in the area of biodiversity informatics (see diagram), the GBIF Governing Board decided during GB15 to adopt a strategy of direct involvement in GEO BON.



Final version of GEO BON concept

This approach will allow GEO BON to capitalise on GBIF's achievements and investments by countries in the development of biodiversity informatics standards, infrastructure, and data mobilisation, as well as the growing GBIF network of participants and publishers of biodiversity data. Countries participating in GBIF and GEO BON can thus avoid funding unnecessary duplication of work in biodiversity informatics, while GEO BON will be able to use the seven years of investment already made in GBIF as a springboard for rapid progress.

The Ebbe Nielsen Prize

The Ebbe Nielsen Prize was awarded for the seventh time on 5th November 2008, in Arusha, Tanzania at GBIF's fifteenth Governing Board meeting (GB15). The award honours the memory of Ebbe Schmidt Nielsen, who was an inspirational leader in the fields of biosystematics and biodiversity informatics, and 'founder-in-chief' of GBIF.

The 2008 prize was awarded to Dr Vince Stuart Smith, a British cyber-taxonomist from the British Natural History Museum in London for his innovative 'Scratchpads' development (<http://scratchpads.eu/>).



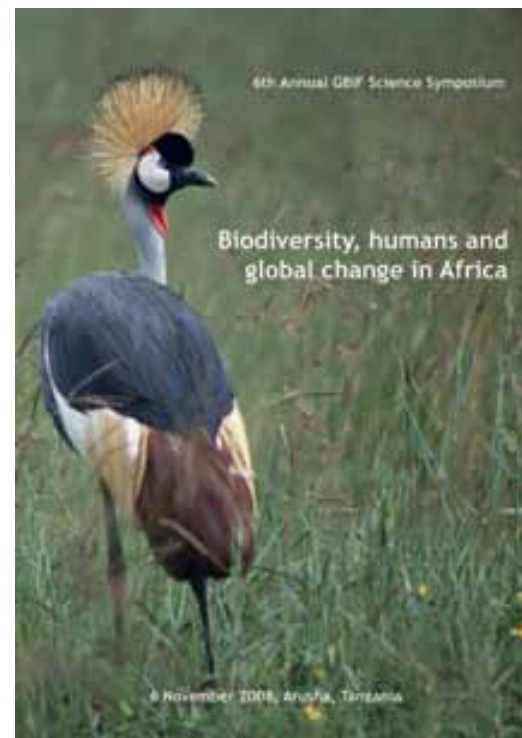
The 2008 Ebbe Nielsen Prize winner Vincent Stuart Smith
Photo by Harry Msenga

GBIF 6th Science Symposium - Biodiversity, Humans and Global Change in Africa

This year's Symposium addressed the thought provoking theme of Biodiversity, Humans and Global Change in Africa. The Symposium was co-organised with the Tanzanian Commission for Science and Technology (COSTECH) and took place on 6th November, 2008, back-to-back with the 15th GBIF Governing Board meeting (GB15) in Arusha, Tanzania.

The symposium was attended by 145 members of the Governing Board and the Tanzanian scientific community. The event was highly appreciated by many of the delegates as the scientific presentations touched upon key challenges facing African countries.

Six speakers covered a wide range of topics under the theme 'using GBIF-mediated data'. From predictive modeling of species' distributions and use of informatics tools, to invasive species management, predicting infectious disease spread, and adaptation of agricultural biodiversity through policy making and capacity building, the speakers showed the broad range of important topics that can be addressed using GBIF-mobilised data.



Speakers at the Symposium were:

Dr Enrique Martínez-Meyer, Universidad Nacional Autónoma de México (UNAM), Mexico
Keynote: Biodiversity informatics tools and predictive distribution modeling for research on climate change: Case studies in biodiversity-rich countries

Dr Phoebe Barnard, South African National Biodiversity Institute (SANBI), South Africa
Building an early warning system for biodiversity under climate change in southern Africa - modeling and policy translation lessons from plant and bird data

Dr Arne Witt, CABI, Kenya
A warmer planet - Implications for invasive species management

Dr Jeremy Kerr, University of Ottawa, Canada
Predicting conservation needs and infectious disease distributions in an era of global change: Critical roles for GBIF and remote sensing

Dr Andrew Jarvis, International Center for Tropical Agriculture (CIAT), Colombia
Use of GBIF data for conserving and adapting agricultural biodiversity in the face of climate change

Dr Flora Ismail on behalf of Dr Pius Z. Yanda, University of Dar Es Salam, Tanzania
Potential use of GBIF-like data for assessing impact of climate on biodiversity in Africa: Need for capacity building

The programme of the Symposium also included the presentation of the 2008 Ebbe Nielsen Prize to the winner, Dr Vincent Stuart Smith.

'From Prototype towards Full Operation': Growing Capacity, Distributing Infrastructure, Decentralising Activities and Responsibilities

The 2007-2011 Strategic Plan for GBIF's second phase is subtitled 'from prototype towards full operation'. In moving 'towards full operation' there is a clear need to grow capacity within the wider GBIF community of Participants, as well as to distribute the infrastructural IT components required for 'full operation' at the Participant level. GBIF is both a physical network of people, institutions and infrastructure, as well as a virtual 'ether-network' developed and facilitated by the Secretariat as a service to Participants. To function, GBIF needs to shift towards a decentralised model whereby Participants increasingly mobilise the additional resources necessary in-country, rather than towards the operations of a centralised Secretariat.

In a decentralised model, capacity is enormous 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 serving Participants, for example in brokering agreement on standards and protocols, in developing tools for capacity building, portal development, and data mobilisation and analysis techniques, and in ensuring all components are accessible to, and customisable by all Participants.

One of the greatest benefits of GBIF's existence is that Participants gain access to many millions of biodiversity records that originated in their countries, in compatible formats, from many different sources (see p. 16). Many developing countries have made significant amounts of their primary biodiversity data available via GBIF, constituting significant progress towards the Convention on Biological Diversity's (CBD) goal for countries to "facilitate the exchange of information relevant to the conservation and sustainable use of biodiversity".

These data (now accessible through the GBIF portal) are key to meeting international obligations such as identifying "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 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 allow all countries to participate more fully in global environmental treaty negotiations. Thus, by participating in GBIF and working through GBIF structures and standards, member countries can:

- gain improved access to information and prevent duplication and wasted efforts; and
- access 'fast-track' analyses, which improve policy responses by presenting information in appropriate formats for decision-makers to use in biodiversity and broader sustainability debates.

However, for such a decentralised model to reach 'full operation', countries must rapidly mobilise further resources to:

- invest in the necessary human resources and infrastructure in-country (according to the 'best practice' establishment principles for Participant Nodes);
- ramp up the rate of mobilisation (digitisation based on GBIF-mediated, globally agreed standards) of biodiversity records held and those collected in future, in order to make them readily available for enriched analysis;
- refine and apply the analytical tools developed by the GBIF community;
- 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 analysis for policy making at local, national, regional (e.g. European Union (EU), Southern African Development Community (SADC), and Association of Southeast Asia Nations (ASEAN)) and global levels.

Moving GBIF 'from prototype towards full operation' will benefit both the global community and individual Participants, but it can only be achieved through full buy-in and a significant mobilisation of relevant resources in-country - and therein lies the challenge to GBIF Participants. GBIF is a community of thousands of individuals, hundreds of organisations and institutions and dozens of countries; GBIF is not just the Secretariat based in Copenhagen.

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

The GBIF Secretariat pledges its full support to assist Participants to meet this challenge, but ultimately it is up to the Participants to make it work 'in full operation' for the benefit of all, as we strive to meet growing sustainability challenges.

Work Programme 2009-2010 Summary: Key Outputs

Participation

Nodes

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Establish online Resource Centre at the GBIF communication portal for Nodes providing documents, best practices and customisable toolkits • Develop comprehensive Training Portfolio for Nodes • Develop regional partnership programme to support capacity building for Nodes • Establish fully functional distributed Helpdesk for Nodes |
| Participants | <ul style="list-style-type: none"> • Mobilise the technical capacity and funds to establish functional Nodes, fully engage data publishers and address end-users' needs within their domain • Participate fully in the Nodes Committee and through this contribute to implementation of the WP • Contribute content to the Online Resource Centre • As regional partners, provide technical support and guidance to other Nodes • Actively collaborate with other Nodes, especially via formal mentoring plans |

Training

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Establish online Resource Centre at the GBIF communication portal for Training with annual training plans/curricula and roll-out of associated training activities • Set up e-learning classrooms for Participants • Provide customisable e-training tools |
| Participants | <ul style="list-style-type: none"> • Develop and share customised training modules for inclusion in the e-learning classrooms • Submit training activities information to the Online Resource Centre for Training • Participants and regional partners mobilise additional resources for meeting national or regional training needs |

Outreach

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Achieve significant growth and geographic balance in GBIF participation • Identify and mobilise key Participants as Outreach Task Group to expand outreach activities • Sign agreements with relevant conventions to mobilise data and tools to assist countries to meet their obligations • Encourage major conservation NGOs to use and share data via GBIF • Establish a database with access to relevant information on IPR and citation issues |
| Participants | <ul style="list-style-type: none"> • Participate actively in the Outreach Task Group to mobilise new Participants (countries, organisations, etc.) |

- Move Associate Participants to Voting Participation
- Provide relevant information on IPR and citation issues for the online database

Communications, Media & Fund-raising

- | | |
|--------------|--|
| Secretariat | <ul style="list-style-type: none"> • Develop and roll-out a comprehensive communication strategy • Develop digital media products for various audiences, online videos, etc. |
| Participants | <ul style="list-style-type: none"> • Develop and roll out a comprehensive fund-raising strategy • Contribute to and use promotional materials on GBIF to raise funds for national needs and interact with national stakeholders • Use materials to promote GBIF to the widest possible audience |

Strategic Applications & Campaigns

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Use seed funds for strategic application projects using GBIF-mediated data and addressing priority user needs |
| Participants | <ul style="list-style-type: none"> • Initiate projects in strategically relevant areas using GBIF-mediated data • Participate in and successfully roll out existing campaigns • If a call is made in 2010, propose new campaigns with Participant leadership and funding |

Informatics

IDA (Inventory, Discovery, Access)

- | | |
|-------------|---|
| Secretariat | <ul style="list-style-type: none"> • Develop a metadata catalogue system as part of the Global Biodiversity Resources Discovery System (GBRDS) for discovery of all kinds of biodiversity resources both digitised and undigitised • Promote development and uptake of standards for exchange of data and metadata • Promote development and uptake of standards for web services that enable data sharing |
|-------------|---|

IDA

- | | |
|--------------|--|
| Participants | <ul style="list-style-type: none"> • Install, populate and maintain a metadata management system • Promote the use of and provide high quality/complete metadata for all datasets under their ownership and/or custodianship |
|--------------|--|

DIGIT (Digitisation of Natural History Collection Data)

- | | |
|-------------|---|
| Secretariat | <ul style="list-style-type: none"> • Coordinate development of strategies and action plans for rapidly mobilising all types of primary biodiversity data • Provide best practices on data standards, quality assessment, data cleaning and rescue and archive of unhosted datasets • Assist the uptake of the GBRDS and Integrated Publishing Toolkit (IPT) to significantly increase the amount of mobilised data • Develop a strategy for scientific publishers and funding agencies to register metadata of datasets |
|-------------|---|

- | | |
|--------------|---|
| Participants | <ul style="list-style-type: none"> • Rapidly increase investments in, and rate of, data discovery and mobilisation • Mobilise metadata covering up to 5 billion records for the GBRDS and up to 2 billion primary records through the IPT • Contribute to a content needs assessment study and development of consequent strategies and action plans • Actively work on improving 'fitness for use' of primary biodiversity data for multiple users |
|--------------|---|

ECAT (Electronic Catalogue of Names of Known Organisms)

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Develop tools and infrastructure that enable taxon name and concept data to be served to the GBIF network • Establish names portal comprising a complete online catalogue of organism names • Set up network architecture that supports the visibility and promotion of providers of names and name-services • Develop tools, applications and services that utilise the electronic catalogue of names to assist those who serve or access primary biodiversity data |
| Participants | <ul style="list-style-type: none"> • Refine and adopt standards for format and exchange of names data • Inventory, register and provide taxon name and concept data to the GBIF network • Implement and utilise globally unique identifiers (GUIDs) for names and concepts • Support the development of impact factors and other metrics of support for name providers |

Informatics Infrastructure & GBIF Portal

- | | |
|--------------|---|
| Secretariat | <ul style="list-style-type: none"> • Provide an informatics suite of tools to meet Participants' needs • Develop and roll-out a strategy for a distributed GBIF network infrastructure, including the required standards and customisable tools for data sharing • Improve the GBIF Portal with the inclusion of discovery services (e.g. GBRDS) and portals (e.g. Metadata, Names and Data Portal) to provide quicker and simpler access to content |
| Participants | <ul style="list-style-type: none"> • Make use of the GBIF informatics suite to optimise benefits • Adopt the decentralisation strategy and mobilise investment • Index nomenclatures, metadata, and primary biodiversity data within the new distributed model • Customise tools and services to meet own needs and also provide these freely to the network |

Informatics

Informatics Infrastructure & Portal (IIP)

In moving 'from prototype towards full operation', the GBIF Informatics Infrastructure and Portal (IIP) work area focuses on developing the suite of IT infrastructure, architecture, services and tools necessary to enable a fully-functional, scalable, distributed IT network to serve the needs of all Participants.

The primary challenge is to meet the requirements of all GBIF Participants in terms of:

- growth through richer content that complements specific records (for example, specimen/ observations, names/nomenclatures, metadata, etc.);
- scalability through a customised GBIF informatics distributed architecture and decentralised services;
- improved capacity through the provision of appropriate tools, products and services;
- accessibility and visibility through a Global Biodiversity Resources Discovery System (GBRDS) embedded into a powerful and user-friendly GBIF Portal.

The design of a distributed architecture will empower Participants through their Nodes to fully contribute to the data mobilisation, sharing and use of larger amounts of primary biodiversity data. Such architecture will facilitate improved registration and identification mechanisms for data publishers, institutions and collections as well as individual biodiversity records shared through the GBIF network.

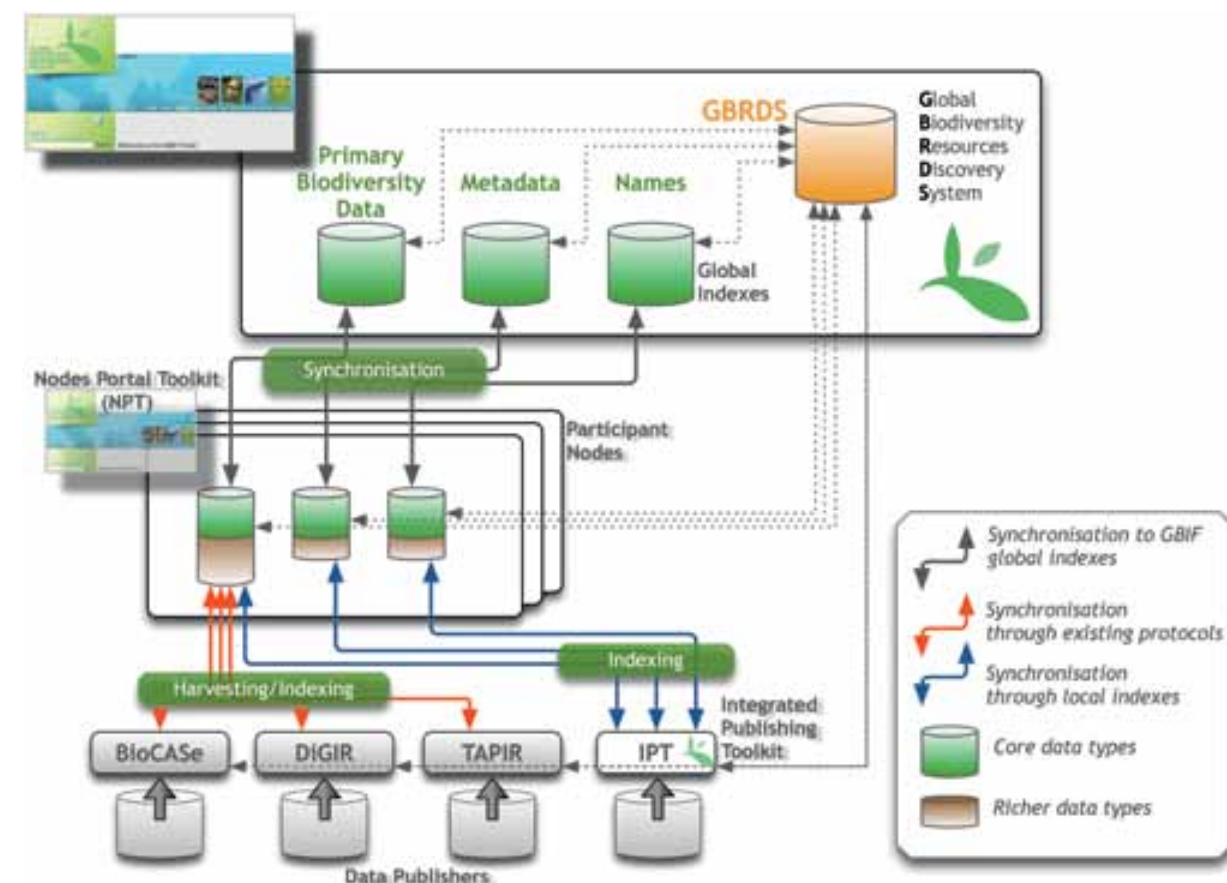
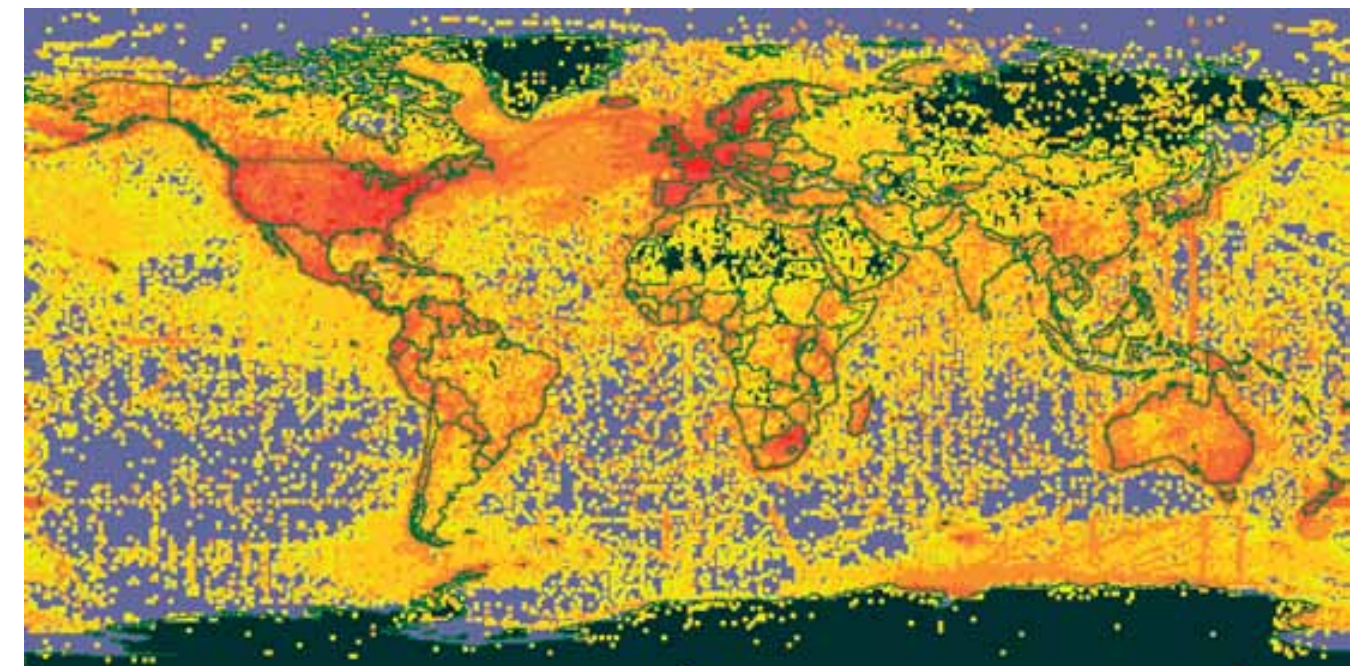


Diagram showing how the various GBIF tools, registry, services and portal are linked together to form the comprehensive GBIF Global Informatics Network



Distributed data mobilisation is only possible when adequate tools are available for use by the community. The forthcoming key components from GBIF will include:

- Integrated Publishing Toolkit (IPT) to enable easy sharing of primary biodiversity data, descriptive dataset metadata, and name and taxonomic information;
- Harvesting Indexing Toolkit (HIT): to simplify harvesting, collation and indexing of data for portal and web site development;
- Nodes Portal Toolkit (NPT): a customisable basic portal allowing developers to concentrate on incorporating functionality that is specific to their domain, or simply to use with the basic functionality.

Data Portal and Statistics

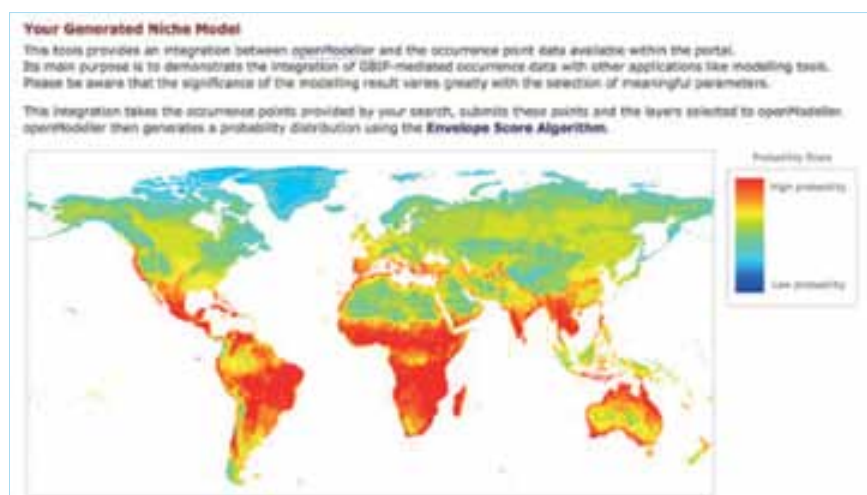
The GBIF Data Portal, launched in 2007, was a proof of the concept that a worldwide-distributed network of biodiversity data providers could be linked together and made searchable from a single

Box: GBIF Data Portal Version 1.2.2

The GBIF Data Portal was further upgraded to version 1.2.2 in 2008. Data are now searchable by altitude and depth, and a demonstration of niche modeling integration with the CRIA OpenModeller software now allows users to run modeling on the results of occurrence searches.

An Open Geospatial Consortium (OGC) mapping service for public testing (<http://geoserver.gbif.org>) provides access to data using a web mapping service (WMS) and web feature service (WFS), with filters for taxon, country, host country, resource, provider, and resource network.





Example of niche modelling for cultivated chickpea (*Cicer arietinum*) using the five most important data sources in GBIF-mediated data

point of access. The GBIF Data Portal allows complex searches on any taxon, country or dataset, or on a combination of these parameters. During 2008, a series of improvements to the existing Portal were made in response to user needs. For example, searches by altitude and depth are now integrated within the existing search filter.

Other improvements such as the availability of Open Geospatial Consortium (OGC) Mapping Services (web mapping service (WMS) and web feature service (WFS) have been incorporated into the GBIF Portal in a beta version. These allow OGC compliant clients to include, as layers in the generation of maps, GBIF-mediated density coverage for taxa, providers, resources, networks, countries, and host countries, all with two resolutions (1.0 degree and 0.1 degree), as well as point data, depending on the resolution. It is expected that in 2009, with the upgrade of the GBIF infrastructure, a fully dedicated server will be assigned to this service.

In 2008, a demonstration of niche modelling of GBIF-mediated occurrence data was made possible via the GBIF Portal, using the OpenModeller server hosted by the Centro de Referência em Informação Ambiental (CRIA) in Brazil. The demonstration could be configured to produce models using either terrestrial or marine environmental parameters.

Finally, a new set of tables facilitate quick access to GBIF Participants' Data Sharing with Countries of Origin. Users can link to data-providing institutions and map the data points directly from the tables.

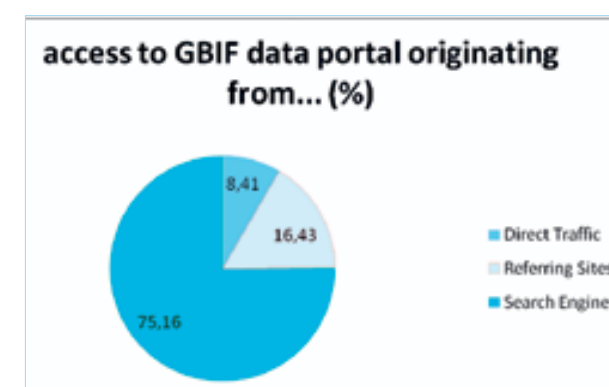
Table which shows data sharing with countries of origin.

Data Portal and Web Services Usage Statistics

The total number of usage events (web services and portal user interface access) totalled 6,141,578 in 2008, a significant increase compared to the previous year.

Summary usage statistics of the GBIF Portal

| | | |
|--------------------|-----------|-------|
| Web access | 3,162,235 | 51.5% |
| Web Service access | 2,979,343 | 48.5% |
| Total | 6,141,578 | |



An in-depth analysis of the usage statistics shows that more than 75% of users discovered the GBIF Data Portal through web search engines such as Google. This is the result the Informatics Team's efforts to enable fast and easy indexing of the full GBIF Data Portal content by external resources such as Google robots. The results show that a large majority of the users of the GBIF Data Portal are able to discover the mediated content indexed by GBIF.

Interestingly, a growing number of visitors are reaching the GBIF Data Portal through links from third party web sites. The recent analysis of the Top 31 referring sites are shown in the table on the next page.

Web sites, such as the International Union for the Conservation of Nature (IUCN) Red List, Encyclopedia of Life (EoL), DiscoverLife, United Nations Environment Programme - World Conservation Monitoring Centre (UNEP-WCMC), Wikipedia and FishBase, are increasingly directing users to the GBIF Data Portal. This is a very encouraging trend that needs to continue in 2009 to ensure that the GBIF Data Portal information is rapidly mobilised and used by other major players in the field of Biodiversity Informatics.

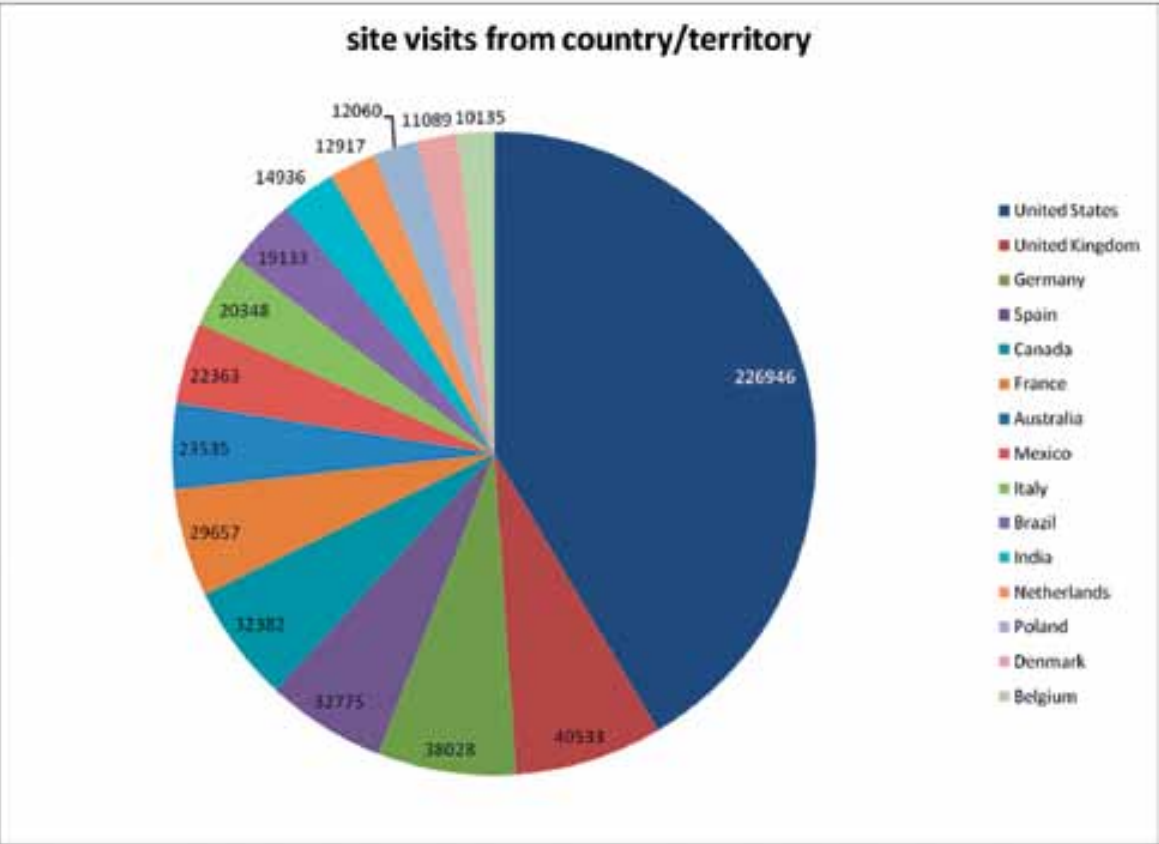
Unsurprisingly, visitors are mainly located in the most active contributor countries of the GBIF Network. However, within the Top 30 listing, users from non-member countries (shown in blue in the table) such as Brazil, Italy, China and Russia are also actively using the GBIF Data Portal.

Top 31 referring sites for GBIF Data Portal

| Source/ Medium | number of visits from referring sites | Pages/ Visit | Source/ Medium | number of visits from referring sites | Pages/ Visit |
|-----------------------|---|-----------------|--------------------------|---|-----------------|
| gbif.org | 43574 | 14.77 | unep-wcmc.org | 896 | 7.73 |
| zipcodezoo.com | 13154 | 5.10 | ispecies.org | 799 | 4.66 |
| iucnredlist.org | 9414 | 4.53 | translate.google.com | 729 | 1.40 |
| hondurassilvestre.com | 5745 | 3.57 | darwin.zoology.gla.ac.uk | 721 | 5.51 |
| itis.gov | 4735 | 5.86 | 194.203.77.76 | 664 | 3.53 |
| eol.org | 4184 | 4.44 | ucjeps.berkeley.edu | 635 | 5.01 |
| cbif.gc.ca | 2855 | 4.47 | en.wikipedia.org | 491 | 3.52 |
| ubio.org | 2496 | 4.07 | gbif.fr | 490 | 11.53 |
| portal.ubio.org | 1725 | 2.90 | 209.85.135.104 | 484 | 5.07 |
| marinebio.org | 1499 | 2.59 | floraweb.de | 478 | 5.63 |
| google.com | 1449 | 3.33 | siit.conabio.gob.mx | 454 | 7.39 |
| herpnet.org | 1292 | 13.93 | utexas.edu | 391 | 13.84 |
| gbif.es | 1169 | 13.21 | gbif.ddbj.nig.ac.jp | 388 | 5.80 |
| species.wikimedia.org | 1028 | 6.34 | fishbase.org | 378 | 5.80 |
| discoverlife.org | 925 | 4.40 | virboga.de | 378 | 4.28 |
| nlbif.nl | 903 | 5.21 | | | |

Top 30 locations of visitors to GBIF Data Portal

| Country/Territory | Visits | Pages/Visit | Country/Territory | Visits | Pages/Visit |
|------------------------|--------|-------------|--------------------------------|--------|-------------|
| United States | 226946 | 3.22 | Philippines | 8939 | 2.18 |
| United Kingdom | 40533 | 4.48 | Japan | 8826 | 3.25 |
| Germany | 38028 | 5.42 | South Korea | 8552 | 4.53 |
| Spain | 32775 | 4.86 | Indonesia | 8482 | 2.26 |
| Canada | 32382 | 4.62 | Colombia | 8066 | 5.43 |
| France | 29657 | 4.00 | Sweden | 7822 | 4.96 |
| Australia | 23535 | 4.20 | Portugal | 7304 | 5.37 |
| Mexico | 22363 | 5.77 | Czech Republic | 7269 | 2.80 |
| Italy | 20348 | 3.05 | China | 6911 | 3.64 |
| Brazil | 19133 | 4.07 | Turkey | 6798 | 2.72 |
| India | 14936 | 2.95 | Switzerland | 5998 | 4.31 |
| Netherlands | 12917 | 3.86 | Argentina | 5912 | 3.59 |
| Poland | 12060 | 3.13 | Peru | 5680 | 4.77 |
| Denmark | 11089 | 4.35 | Russia | 5616 | 3.24 |
| Belgium | 10135 | 6.10 | Romania | 5008 | 2.74 |



The recent usage statistics show that an important percentage of visitors are using the GBIF Data Portal on a more regular basis (e.g. 10-50 visits/year). This is a very encouraging signal indicating that the level of user loyalty is increasing for a large portion of the GBIF Data Portal.



Integrated Publishing Toolkit



Screen shot of the Integrated Publishing Toolkit (IPT)



Screen shots of the IPT user interface, showing the various visualisation features of occurrence summaries and metadata information.

The Integrated Publishing Toolkit (IPT) allows for efficient and easy sharing and hosting of organism occurrence data, taxonomic and nomenclatural information, and general dataset metadata. By focusing on specific biodiversity data types, the software can provide a richer environment than current generic wrapper solutions like the Distributed Generic Information Retrieval (DiGIR).

The IPT allows data custodians to publish information about specimen and observational occurrence, nomenclature and taxonomic checklists, and collection descriptive data.

The IPT provides a multilingual web-user interface, allowing easy customisation to meet the publisher's needs. The IPT also offers a variety of user interfaces to enable discovery of content being published. This is a major improvement compared to previous versions, which were originally conceived as a simple stand-alone web service with limited user interface for the general public wishing to discover data publishers' IPT installations. The IPT offers the possibility of publishing not only existing databases, but also data uploaded through delimited field formats, such as tab-delimited files.

The ability to browse and search these data through an embedded web application makes the IPT a great discovery tool sitting at the level of the data publisher. More importantly, the IPT offers additional features such as the charting of published data to allow for easy viewing, quality analysis and insight.

The IPT also permits the publishing of descriptive data (collection metadata) including geospatial, temporal and taxonomic coverage, as well as research methods, rights and citation information. The IPT has the ability to include controlled vocabularies and extend the types of data exchanged by including extensions.

Support for geospatial searching through Open Geospatial Consortium services is provided as well as for searching through the Taxonomic Databases Working Group Biodiversity Information Standards (TDWG) protocols; and role-based user management to allow for multiuser installations.



Screen shots of the IPT user interface, enabling rapid visualisation of summary information.

Available Extension

Extensions allow for serving additional data types, such as multiple identifiers or descriptive data about species. It is possible to define custom extensions, but this is not automated process with this version of the IPT. Please contact pona@gbif.org if you wish to define and register custom extensions.

Check for all available extensions

| Extension Name | Properties | Installed | Documentation |
|----------------------|------------|-----------|---------------|
| ResourceRelationship | 0 | NO | unavailable |
| SampleAttribute | 0 | NO | unavailable |
| EventAttribute | 0 | NO | unavailable |
| Identification | 0 | NO | unavailable |
| Description | 0 | NO | unavailable |
| Multimedia | 0 | NO | unavailable |
| CommonName | 0 | NO | unavailable |
| Distribution | 0 | NO | unavailable |
| MaterialExamined | 0 | NO | unavailable |
| DarwinCore | 124 | YES | unavailable |
| Taxon | 10 | YES | unavailable |

Screen shots of the IPT user interface for the thesaurus and extensions modules

Thesaurus vocabularies

| Vocabulary | URI |
|-----------------------------|---|
| ISO 639-1 Languages | http://iso.org/639-1 |
| ISO 3166 Country Codes | http://iso.org/3166 |
| Darwin Core Type Vocabulary | http://rs.tdwg.org/ontology/vst/TaxonName.rdf#terminologyCodeTerms |
| TDWG Nomenclatural Codes | http://rs.tdwg.org/ontology/vst/TaxonRank |
| Taxonomic Ranks | |

Basic Metadata

Please describe the dataset you want to publish as a whole

Title: Type:

Contact Name: Contact Email: Upload logo (8x8kpx): no file selected

Description:

Resource last modified Feb 28, 2008 3:29:34 PM

Screen shot of the IPT user interface for the metadata authoring module.

Harvesting and Indexing Toolkit

The Harvesting and Indexing Toolkit (HIT) is a software platform under construction to facilitate rapid development of systems that collate data published using the TDWG. Combined with a registry of data sources, HIT allows those wishing to build thematic data portals, or develop analytical tools, to concentrate on real product development, by relieving them of the need to write low-level scheduling, logging and communication clients.

The screenshot shows a table of data sources with columns: Database, Provider, URL, Target, Max, Min, Drop, and Harvesting Status. The table lists several data sources, including 'Australian Antarctic Data Centre', 'Australian National Insect Collection', and 'Australian National Insect Collection EntomID'. The 'Harvesting Status' column shows various icons and text indicating the status of each source.

Screen shot of the Harvesting and Indexing Toolkit, showing how data sources are discoverable, harvested and indexed.

The multilingual, web-based application will have the following features:

- support for the TDWG Access Protocol for Information Retrieval (TAPIR), DiGIR, BioCASE and text-based DarwinCore Archive formats;
- synchronisation with registries such as the GBIF universal description discovery and integration (UDDI) registry;
- scheduling of harvesting resources;
- open source platform allowing easy extension to support custom data stores, such as databases or Apache Lucene based indexes;
- log event viewing to help diagnose network connection and transport issues.

Web Services and Statistics

The GBIF portal offers a range of services to support the use of biodiversity data in other applications and analyses. The portal includes a range of web services that can be used by other portals and applications to directly access XML formatted, GBIF-mediated data. The services currently available include:

- Taxon data service;
- Occurrence record data service;
- Occurrence density data service;
- Dataset metadata service;
- Data provider metadata service;
- Data network metadata service.

Since their public release, the GBIF community has used these services intensively for various purposes. Many researchers are using such services in the context of their research studies (for example, on species' distributions). The services are also being used in the development of biodiversity web portals that make GBIF's data and other good quality biodiversity information applicable at local, national, regional, as well as global scales. Such services are also in demand for the development of species information systems that integrate high quality, reliable information with other knowledge sources (such as taxonomic surveys, bio-monitoring and educational materials).

In 2008, due to strong demand from an exponentially growing number of data consumers, the GBIF portal web services suffered some downtime. Special technical support was required to ensure that the GBIF Secretariat could respond to such demand. By the end of 2008, the core web services had been completely reprogrammed and streamlined to increase their responsiveness as well as their reliability. The new web services were released in December 2008 with an astonishing gain in performance. The following graph shows a comparison of response times between the previous and new web services. The occurrence record data service is now some 25 to 30 times faster than previously. As a consequence of this great improvement, some data consumers have already stopped requesting access to the full GBIF index database dump and are now relying entirely on these web services.

Rich Internet Application - World Database on Protected Areas



Screen shot of the WDPA widget

The conservation community is both an important source and user of primary biodiversity data, tools and products. A focused effort is needed to understand the needs of, and services required by, key organisations such as the IUCN, UNEP-WCMC, Conservation International and BirdLife International.

In collaboration with the IUCN and the UNEP-WCMC, a flash-based widget was developed to provide access to GBIF mediated data, specific to the protected areas detailed in the World Database of Protected Areas (WDPA).

The multilingual widget has the following features:

- browsing of the taxonomy derived from the GBIF specimen and observational occurrence data for the protected area. Selecting a taxon will take you to the GBIF data portal for that taxon.
- details of the data providers responsible for publishing the data for each area, with links via the GBIF portal to the provider or resource detail page.
- simple and intuitive map browsing with variable resolution of data-gridding based on the zoom level. Selection of a cell allows the user to browse the taxonomic content of the cell.
- the ability to download the raw data for the area in a variety of formats.



Screen shot of the taxonomical view in the widget



Screen shot of the data publisher view in the widget



Screen shot of the data download view



Screen shot of the map viewer in the widget

Box: Collaborative Projects

UNEP-WCMC: The World Database on Protected Areas

The IUCN World Database on Protected Areas (WDPA) is compiled from multiple sources and is the most comprehensive global dataset on marine and terrestrial protected areas available. In a formal collaboration with the WDPA development team at UNEP-WCMC in Cambridge, United Kingdom, work started in 2008 to integrate cross-domain searching between the GBIF-mediated species occurrence data and the protected areas of the WDPA (see RIA WDPA, p 24).

The first prototype was demonstrated at the 4th IUCN World Conservation Congress in Barcelona, October 2008. This prototype allowed for the selection, visualisation and download of GBIF-mobilised species occurrence data for two countries, namely Spain and Madagascar, recorded within the protected areas of those countries, and the functionality was integrated on the new WDPA website launched at the Congress. Following this demonstration the work was expanded to cover the full spectrum of protected areas for all countries within the WDPA.



Dr Nick King, Director of the GBIF Secretariat, and Dr Jon Hutton, Director of UNEP-WCMC, signing the interorganisational MoC on developing collaborative products, such as the interoperability 'widget' between the GBIF network datasets and the IUCN's WDPA, at the IUCN World Conservation Congress, Barcelona, October 2008
Photo by Roberto Cavalcanti

Convention on Migratory Species: Global Registry on Migratory Species

GBIF and the Convention on Migratory Species (CMS) Secretariat agreed to work together to develop and share biodiversity data on migratory species. The CMS Global Registry on Migratory Species (GROMS) database contains scientific information on migratory species, their ranges, maps of migration routes, seasonal distributions and populations. The purpose of the Memorandum of Cooperation is to facilitate interoperability of the CMS GROMS database (<http://www.groms.de/>) with GBIF primary data, enhancing the accessibility of relevant data by both the GBIF network community and the CMS constituency.

Through this collaboration, interoperability and exchange will be developed between GROMS data and polygons, and the GBIF data portal functionalities, including GBIF-mediated primary biodiversity data and associated web services, such as tools for mapping geo-referenced point data. The first version of the prototype will be released in June 2009

Inventory, Discovery, Access (IDA)

The Inventory, Discovery, Access (IDA) work area maintained the focus of the former Data Access and Database Interoperability (DADI) area on biodiversity standards, but with a renewed emphasis on metadata and interoperability with other networks, in particular, the Group on Earth Observations System of Systems (GEOSS). A Metadata Task Group, convened by IDA, delivered a Metadata Strategy Document for GBIF in March, which, with additional comments from Participants, is being used to inform GBIF's metadata plans.

IDA participated in the International Long Term Ecological Research (ILTER) Information Management Workshop on metadata at Lake Taihu, Nanjing, China, in April. The meeting covered standards, ontologies and multilingual issues. Agreement was reached on the minimal metadata elements (based on Ecological Metadata Language, EML) to enable cross-searching of ILTER and GBIF networks. As an output, GBIF co-authored a paper entitled "Building an Information Management System for Global Data Sharing: A Strategy for the International Long Term Ecological Research (ILTER) Network", which was presented at the Environmental Information Management 2008 Conference, in September, in New Mexico, USA.

IDA coordinated GBIF's participation in the TDWG 2008 Conference in Fremantle, Australia, in October, where GBIF had a very strong presence, convening sessions, giving talks, presenting posters and demonstrating software, all based around key aspects of the GBIF Work Programme 2009-2010.

In May, the IDA and Nodes Programme Officers visited the National Biodiversity Data Centre (NBDC) of Ireland, which has been designated as the national Node. Over the course of the two days, the NBDC staff heard presentations on the GBIF informatics infrastructure and biodiversity standards, data citation issues, and exemplar biodiversity data centres. In turn, NBDC staff provided a preview of the web-based mapping system that NBDC is developing for integrating biodiversity with other data. The face-to-face meeting proved invaluable for getting to know each other and for informal discussions on ways in which the wider GBIF community can help new Nodes, especially during their start-up phase.

As a Group on Earth Observations (GEO) Participant, GBIF has been collaborating with GEO for some time on the GEOSS work programme's Societal Benefit Area 9: Biodiversity, and in particular, on the establishment of the GEO Biodiversity Observation Network (GEO BON). IDA has acted as one of the main links between GBIF and GEO, and has participated in numerous activities. These include membership of the Data Work Group for the GEO BON implementation plan; scoping of a biodiversity scenario for the monitoring and management of protected areas in a meeting organised by the GEO User Interface Committee, and the Architecture and Data Committee, at the Joint Research Centre (JRC), in Ispra, Italy, in February; partnership in the EuroGEOSS project; making a presentation on "Using GEOSS to protect Biodiversity" at the GEOSS Asia-Pacific Symposium in Tokyo, Japan, in April; and participating in the Biostrat meeting on the "European contribution to GEO BON" in September in Cegléd, Hungary. GBIF will continue to make a strong contribution to the establishment of GEO BON, as endorsed by the Governing Board at GB15.

Box: Successful Completion of Moore Foundation Project

In 2005, GBIF received a grant of US\$ 1,494,000 from the Gordon and Betty Moore Foundation to fund a project in support of standards development. The project objective was to develop an agreed standards ratification process through the recognised standards-setting body for the biodiversity informatics community, namely TDWG.

The project was completed in 2008 and the Moore Foundation wrote in its project sign-off message of 9th October 2008: *"Most importantly TDWG, as a key standards body in the field of biodiversity informatics, is now well positioned to sustain its mission in the foreseeable future. This project has achieved the intended result of hardening the TDWG-based standards and protocols for storing and sharing biodiversity data, thereby increasing the ease at which these data can be aggregated and transformed into useful knowledge."*

On behalf of the Gordon and Betty Moore Foundation I would like to congratulate GBIF on a project well done, and wish you the best in your future endeavors."

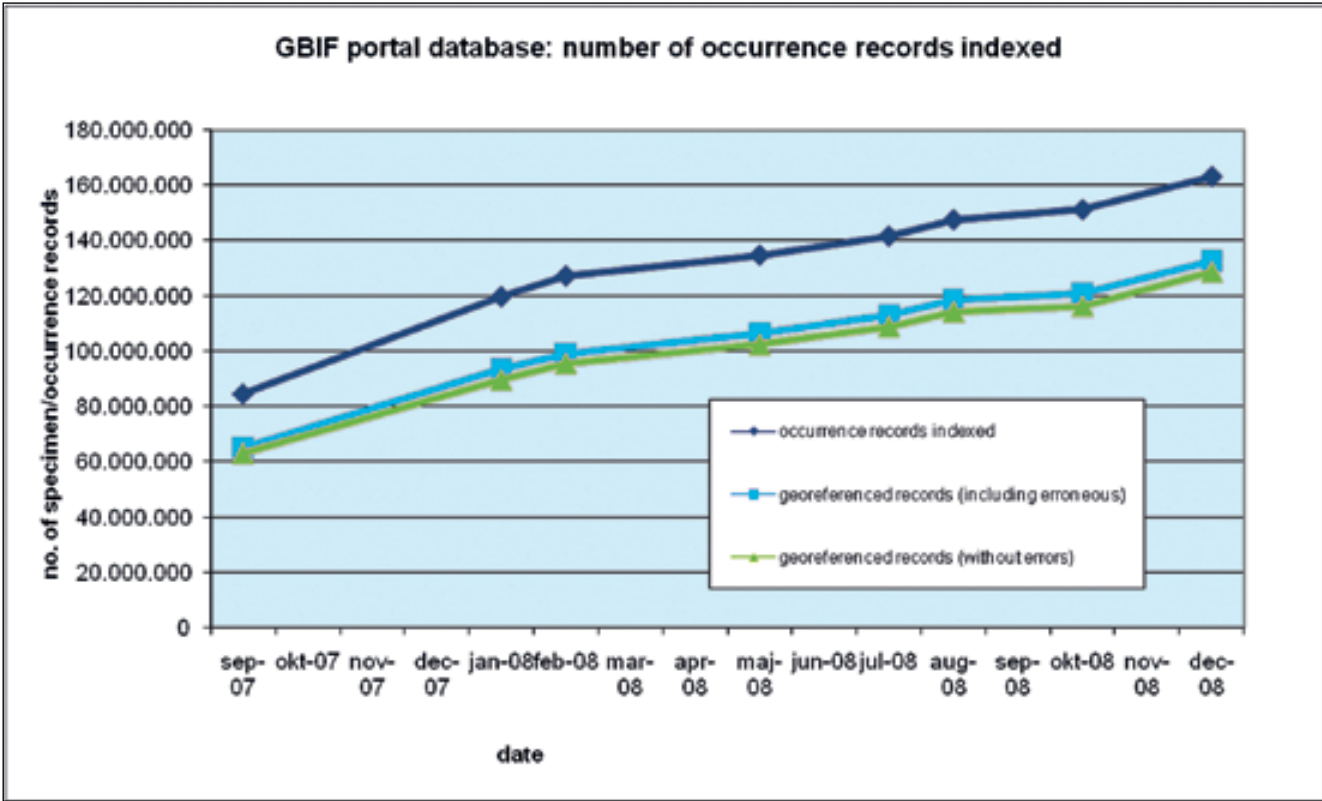
Chris Mentzel
Senior Project Manager
Science Program
Gordon and Betty Moore Foundation

Content

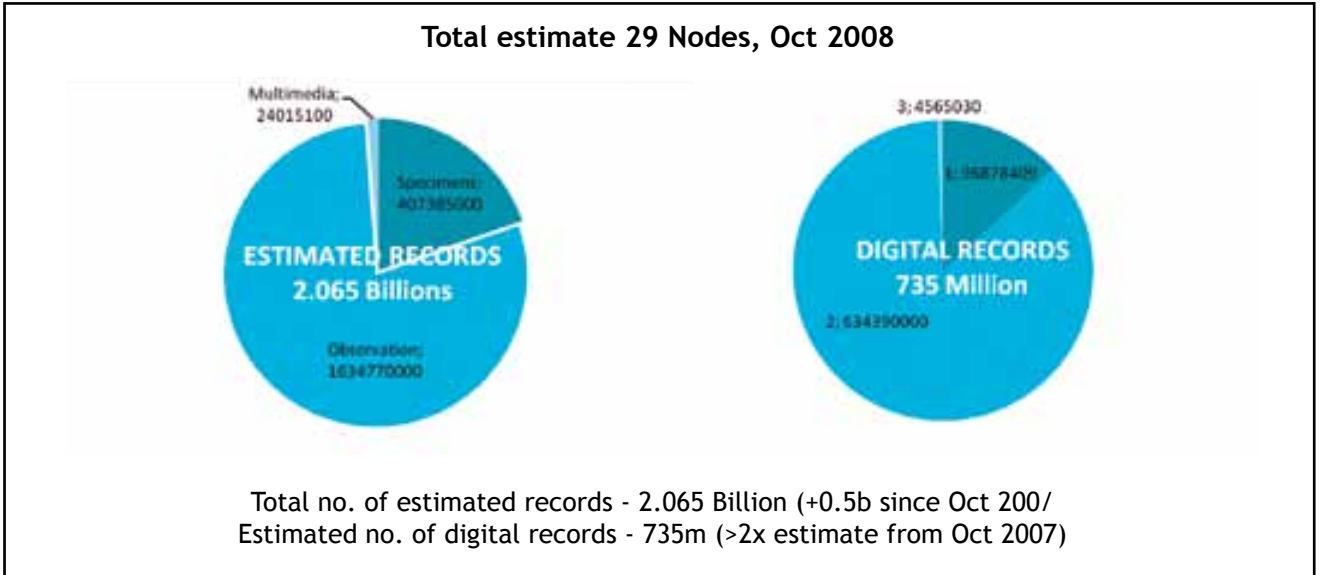
Digitisation and Mobilisation of Primary Biodiversity Data (DIGIT)

Data Mobilisation and Discovery

As of 19th December 2008, the GBIF Data Portal provided access to over 163 million occurrence records, from 274 providers and 7,586 registered datasets. Of these, over 132 million records are geo-referenced. However, the increase in occurrence records has been more or less linear since the GB14 endorsed the target of 1 billion records by December 2008.



A survey of GBIF Nodes was carried out in October 2008 to estimate the number of records that Nodes could make accessible in the near future. Twenty-nine Nodes responded to the survey and identified inventories of over 2 billion records, which is an increase of half a billion records since October 2007. Of these 2 billion records, 735 million are already in digital form.



Global Strategy and Action Plan for Mobilisation of Natural History Collections Data

As part of a broader Global Strategy for mobilising Primary Biodiversity Data, GBIF has convened a Task Group to catalyse the development of a Global Strategy and Action Plan for further mobilisation of natural history collections data worldwide (GSAP-NHC). The GSAP-NHC Task Group is chaired by Dr Walter Berendsohn, Director and Professor at the Department of Biodiversity Informatics and Laboratories, Botanical Garden and Botanical Museum, Berlin.

The GSAP-NHC Task Group met in Copenhagen in August 2008 to develop the initial strategy document, which was presented at GB15 in Arusha, in November. The document was then opened for further comments by the GBIF Participants, who were invited to comment on the initial strategy, and provide suggestions on the roles they are willing to play in:

1. Actively supporting participation in the ensuing consultation process;
2. Supporting the research activities outlined, either by means of supplementary funds or by in-kind staff support; and
3. Supporting the coordination of natural history collection institutions at national and regional levels.

The response from the GBIF Participants to the initial strategy document was very encouraging. The Harvard Museum of Comparative Zoology (MCZ) was the first to pledge its support of US\$ 5,000 towards the research component of the GSAP-NHC exercise. Draft recommendations of the GSAP-NHC will be presented to the GBIF Governing Board in October 2009, with the final report being made available by February 2010. The final report on the GSAP-NHC will provide a framework, identifying overarching issues, including specific recommendations for the execution of the plan.

Observational Data Task Group

The Observational Data Task Group (ODTG) was constituted to address several technical questions regarding mobilisation of observational data, as this form of data increasingly dominate GBIF-mediated data. The ODTG was chaired by Dr Steve Kelling, Director for Information Science at the Cornell Ornithology Laboratory, USA.

The ODTG recommended that, in order to cater for observational data GBIF must provide a 'resource discovery' mechanism, extend the Darwin Core terms to facilitate access to deeply-structured data, and encourage the participation of increasing numbers of data publishers by improving data usability. It further recommended that GBIF Participants encourage the establishment of national, regional and thematic data repositories. The GBIF Science Committee endorsed the recommendations of the Task Group, and appealed to the Participants rapidly to adopt and implement these recommendations in order to mobilise increased volumes of observational biodiversity data.



ODTG Group photo: Sitting (L to R): Bruce Stein, Steve Kelling. Standing (L to R): Tapani Lahti, Vishwas Chavan, Matthew Jones, Denis Lepage, Brenda Daly, Baban Ingole, Éamonn Ó Tuama

Photo by Vishwas Chavan

Multimedia Resources Task Group

The Multimedia Resources Task Group (MRTG) was commissioned to address the mobilisation of multimedia data through the GBIF network. The MRTG is chaired by Dr Robert A Morris of the Massachusetts University at Boston, USA.

In addition to several conference calls and deliberations through wiki and mailing lists, a face-to-face meeting of the MRTG was held in Copenhagen in June 2008. The MRTG recommended addressing social and technical issues, and developing long-term strategies for mobilising multimedia resources that have the potential to be used as 'primary biodiversity records'. The MRTG also recommended that GBIF Participants encourage the establishment of national, regional and thematic data repositories.



MRTG Group photo: L to R: Vishwas Chavan, Robert Morris, Greg Riccardi, Ivan Teage, Patrick Leary, Annette Olson, Gregor Hagedorn, Eamonn O' Tuama, Vijay Barve and Greg Whitbread
Photo by Vishwas Chavan

A MRTG sub-group met at Woods Hole on 12-13 September 2008, to draft the Multimedia Metadata Schema, which was further discussed at the TDWG Annual Conference in Perth, Australia. In November, the GBIF Science Committee noted with appreciation the work done by the MRTG, and suggested that it continue to refine the Multimedia Metadata Schema, and work on details of technical implementation for mobilising such data, as well as its roles and implications for GBIF Participants, etc. The Task Group is expected to submit its final report by April 2009.

GBIF Training Manual 1: Digitisation of Natural History Collections Data

The GBIF Training Manual 1: Digitisation of Natural History Collections Data brings together in one volume a number of GBIF publications that have been well received by the community. The result is a complete package of background information and guidance for the curators and managers of natural history collections and herbaria. Topics covered by the Training Manual include: a) uses of digitised collections data, b) initiating a collection digitisation project, c) data quality, d) data cleaning, e) geo-referencing, and f) generalising sensitive data, a GBIF Glossary and Acronym Expansion, and a number of important GBIF documents such as the Data Use and Data Sharing agreements. The Training Manual can be accessed at http://www.gbif.org/GBIF_org/GBIF_Publications/trainingmanual1/.

White Paper on Observational Data

Observations of nature are the foundation of ecological studies, which use observations to search for patterns in nature, and biodiversity conservation. Organism observations (observational) data are a major constituent of 'primary biodiversity data'. GBIF commissioned a White Paper entitled "Significance of Organism Observations" authored by Steve Kelling. This paper serves two purposes: a) it formally identifies the subset of observational data focused on species occurrences; and b) it describes the particular opportunities offered to further ecological understanding and biodiversity conservation by the special characteristics of these observational datasets on organisms. While many biodiversity information initiatives have focused on data from specimen



collections (a special subset of observational data), this paper focuses on broadening the scope to include all observational data. It further provides an overview of current efforts to organise and provide access to these data, and makes recommendations for better community-wide resource integration. This paper is freely available for download and use at http://www2.gbif.org/Observational_Data.pdf.

Biodiversity Collections Index

A tri-partite project commissioned by GBIF, TDWG and the Royal Botanic Garden Edinburgh (RBGE) to develop the Biodiversity Collections Index (BCI) was completed in 2008. Accessible at <http://www.biodiversitycollectionsindex.org/>, BCI allows users to search and browse collection records. There is a series of web services available for retrieving information about collections that includes: Life Science Identifier (LSID) authority, LSID proxy, Uniform Resource Identifier (URI), RESTful (Representational State Transfer) Services, comma separated value (CSV) download, and the Open Archives Initiative - Protocol for Metadata Harvesting (OAI-PMH).

The BCI database includes approximately 20,000 collections. Five thousand of these represent 'real' collections that have existed in a single location at some stage. The other 15,000 represent 'collectors' collections' or 'virtual collections' that are housed in a single or multiple locations. This allows BCI to act as a source of information about the locations of specimens collected by historically significant biologists. BCI will be integrated with GBIF's Global Biodiversity Resources Discovery System (GBRDS) during 2009.

Recommendation on Discovery and Publishing of Biodiversity Data

The GBIF Science Committee endorsed the draft of the "Recommendation on Publishing and Discovery of Biodiversity Data Resources" at its meeting during GB15 in Arusha, Tanzania. The recommendation appeals to scientific publishers, editors and reviewers dealing with papers on biodiversity to: 1) recognise and promote the value of publishing datasets with standardised metadata; 2) publicise the proposed Global Biodiversity Resources Discovery System (GBRDS) as a mechanism for registering and publishing metadata of datasets; and (3) promote the registration of metadata for datasets used to produce research publications, and use globally unique identifiers (GUIDs) for them, through the GBRDS or similar data discovery mechanism.

The recommendation further appeals to research councils, other funding agencies and private foundations, as well as scientists and biodiversity data generators, aggregators, curators, custodians and publishers to contribute towards this goal. The draft of the recommendation is now open for comment by the Participants, to be followed by its inter-sessional adoption.

Electronic Catalogue of Names of Known Organisms (ECAT)

Global Names Architecture

Scientific names are a component of each data record that moves through the GBIF network, and both common and scientific names are important keywords for accessing these records. Exploitation of this ubiquitous feature to quickly locate and access data records related to a species or group of species is hampered by a number of factors. First, scientific names are often difficult to spell, even by experts, so that misspellings may be introduced during a search, or may exist in the data themselves. Second, a single name may be insufficient for retrieving all information about a species, because the taxon may be known by multiple names, or synonyms. Third, the same name may refer to more than one species. Finally, taxonomic experts may disagree on how a species is defined, resulting in different sets of relevant synonyms, or they may organise species into different classification arrangements.

The solution to this problem is simple in concept but complex in practice. The GBIF community needs a comprehensive thesaurus of all scientific names that ties misspelled names to an authoritative list of correctly spelled names. It also requires a complete catalogue of taxonomy, with both historic and contemporary views represented in a common way, so that changes among them can be accurately evaluated and any particular view held by a user can form the basis for accessing related data. The use of common names as keywords in any language should also be accommodated.

Initiatives such as GBIF, the Biodiversity Heritage Library, the BarCode of Life, and the Encyclopedia of Life (EoL), to name just a few, require a common solution to the shared names problem they all face. In 2008, GBIF and EoL started to develop a solution to this problem called the Global Names Architecture (GNA). The central aims of the GNA are to develop a common framework for the inventory and discovery of, and access to, taxonomic and nomenclatural resources, to make them universally available for use, integration, and synthesis. This will provide the means to evaluate progress in the creation of comprehensive taxonomic and nomenclatural catalogues, relative to the full scope of names identified within all the biodiversity information resources mobilised within participating initiatives. Our goal is to increase the utility, relevance, visibility and coordination of taxonomy through its application within search, retrieval and synthesis of biodiversity information on the web.

To this end, in 2008, GBIF developed the GNA concept and held a series of workshops to develop a consortium of participants and refine the technical and logical framework.

Nomina partners meeting: In April 2008, a series of workshops was held in Woods Hole, Massachusetts, USA. These established the initial set of participants, representing major taxonomic, nomenclatural and biodiversity data initiatives including GBIF, the Catalogue of Life Partnership, the International Plant Names Index, ZooBank, Index Fungorum, MycoBank, World Register of Marine Species (WoRMS), AlgaeBase, the Universal Virus Database of the International Committee on Taxonomy of Viruses (ICTVdb), Missouri Botanical Garden, Ocean Biogeographic Information System (OBIS), California Academy of Sciences and EoL. The partners agreed on a strategy for developing a common index of the names utilised within their individual domains, called the Global Names Index (GNI).

Nomina II workshop: Following the Nomina Partners meeting in Woods Hole, a second workshop focused on designing a prototype of a generalised names index. This technical workshop provided the blueprint for the GBIF/EoL-supported GNI, scheduled for release in early 2009.

Global nomenclators workshop: The GNA calls for the development of an agreed, authoritative index of nomenclature that provides the basis for a collective dictionary of scientific names. GBIF co-hosted a workshop in Paris in August 2008, attended by representatives of the major nomenclatural databases to explore the means by which a common virtual interface could be

developed and accessed by users such as GBIF, EoL, the Catalogue of Life, and others. Participants agreed that a unified framework was desirable and defined the services that would arise from it.

ZooBank data providers workshop: GBIF co-hosted a second workshop in Paris to discuss the development of ZooBank, the authoritative nomenclator for zoological names. Representatives of a number of large zoological taxonomic and nomenclatural databases attended, as well as representatives from the other nomenclatural domains (e.g. plants, fungi and prokaryotes). Participants discussed strategies for the registration of new species names, and how the ZooBank database would be populated. Participants agreed to serve data to ZooBank.

Nomina III: A follow-up technical workshop was held in Western Australia in conjunction with the 2008 TDWG meeting to develop an implementation plan for a coordinated framework for the major animal, fungal, and plant nomenclatural databases. Technical representatives developed a plan to create a single virtual nomenclator (provisionally called the Global Names Usage Bank, GNUB) that would mask the differences between the different nomenclatural code groups and expand the means to create name registries and other input mechanisms, in order to speed up the cataloguing and validation of names. Representatives of major biodiversity data mobilisation initiatives from GBIF, EoL, the European Distributed Institute of Taxonomy (EDIT), and others defined a strategy for tying scientific names to this authoritative nomenclatural framework.

Integrated Publishing Toolkit: In 2008, GBIF began developing the long overdue capacity to serve taxonomic and nomenclatural data, through the Integrated Publishing Toolkit (IPT), due for release in April 2009. The IPT will allow data providers to supply taxonomic, regional, and thematic checklists, nomenclatural data and multi-lingual lists of vernacular names using agreed standards and protocols, to serve multiple uses within the GNA.

Access to taxonomic data via publications: In 2008, GBIF developed the capacity to access taxonomic data directly from taxonomic publications. GBIF funded the development of this capacity in collaboration with Plazi.org, an open source repository of taxonomic publications.

Box: Pink Millipede on Top Ten New Species List

Professor Henrik Enghoff of the Natural History Museum of Denmark and DanBIF Chair, and scientists from Chulalongkorn University, Bangkok, have discovered a new species of millipede, the shocking pink dragon millipede, *Desmoxytes purpuresea*. The species won a spot in the 2008 International Institute for Species Exploration (IISE) Top Ten New Species list (<http://species.asu.edu/Top10>).



H. Enghoff, C. Sutcharit & S. Panha. 2007. The shocking pink dragon millipede, Desmoxytes purpuresea
Photo by Somsak Panha

Participation

Nodes - Participant Node Managers Committee

Overview

Several activities were carried out during 2008 to consolidate the Node Managers Committee as the main technical body advising on, and leading the implementation of, the GBIF Work Programme at the Participant level. In 2008, it was critical to give more prominence to the role that Participant Nodes play in the overall functioning of the GBIF network, especially in the context of the GBIF decentralisation strategy.

Contributions of Nodes to Work Programme Preparation

Participant Nodes were actively involved in the preparation of the GBIF Work Programme for 2009-2010. This process, led by the Chair and Vice Chairs of the Node Managers Committee, started early in the year with a broad consultation about Participant needs and priorities, importantly including identification of key constraints that prevent further development and expansion of Participant Nodes. Representatives from some of the most active Nodes were then involved in providing feedback to the GBIF Secretariat on key strategies, actions and activities for the Work Programme. Contributions from Nodes were certainly a driving force in helping to ensure the relevance and inclusivity of the Work Programme approved at the GB15 in Arusha, Tanzania.

Regional Meetings

The growth of the Nodes Committee, combined with its inherent heterogeneity, prompted the need to look for new means of interaction, discussion, collaboration and decision-making among Nodes. As a result, Participant Nodes put forward the proposal of holding regional meetings to complement the general Committee Meeting traditionally held with the annual Governing Board meeting. The proposal identified six regions for these meetings: Asia, Africa, Europe, Latin America, North America, and Oceania. In 2008 meetings were held in three of these regions (Europe, Latin America and Africa), with the remaining three expected to take place during the first half of 2009.

The main objective of the regional meetings held in 2008 was to discuss the draft GBIF Work Programme for 2009-2010, and identify additional needs, gaps, and opportunities for its implementation. As shown in the table, these meetings involved the participation of around 75 representatives from a total of 42 Participant Nodes. Results from these meetings were used as an integral part of the report and recommendations presented by the Nodes Chair to the Governing Board, Executive Committee, and Science Committee.



Caption: Attendees at the Regional Meeting of GBIF Participant Nodes in Latin America, held in San José, Costa Rica, September 2008.
Photo by Juan Carlos Bello

Overview of regional meetings of the Participant Nodes Committee held during 2008

| Regional Meeting | Participants |
|--|---|
| Europe (hosted by the GBIF Secretariat and DanBIF, Copenhagen, September 2008) | Belgium (Andre Heughebaert), Bioversity (Sonia Dias), CABI (Paul Kirk), Denmark (Isabel Calabuig, Mihail Carausu), ETI Bioinformatics (Wouter Addink), Finland (Hannu Saarenmaa), France (Anne-Sophie Archambeau, Eric Chenin, Justine Cheval), Germany (Walter Berendsohn, Dagmar Triebel, Peggy Seltmann), Iceland (Starri Heidmarsson), Ireland (Liam Lysaght), Netherlands (Cees Hof), NordGen (Johan Bäckman, Dag Terje Filip Endresen, Magdalena Svärdh), Poland (Piotr Tykarski, Robert Meronka), SCAR-MarBIN/OBIS (Sylvain Renaudier), Spain (Francisco Pando), Sweden (Mickaël Graf, Charlotte Johnzon, Sven Kullander, Helena Eklund Snäll), Switzerland (Yves Gonseth, Pascal E. Tschudin-von Laer), United Kingdom (Lawrence Way, Steve Wilkinson), GBIF Secretariat (Andrea Hahn, Hugo von Linstow, Juan Bello, David Remsen, Alberto González Talaván, Beatriz Torres, Samy Gaiji, Vishwas Chavan, Éamonn Ó Tuama, Simone Niedermüller). |
| Latin America (hosted by INBio, San José, Costa Rica, September 2008) | AndinoNET (José Clavijo, Thaís Sanchez), Argentina (Alejandro Tablado), Colombia (Angela Suarez, Monica Vera), Costa Rica (Erick Mata, Hazel Ramirez, Maria Auxiliadora Mora), Cuba (Francisco Cejas), Germany (Walter Berendsohn), IABIN (Boris Ramírez, Ben Wheeler), Mexico (Sonia Careaga), Peru (Victor Miyakawa), Nicaragua (Martha Lucia Sanchez), GBIF Secretariat (Juan Carlos Bello). |
| Africa (hosted by TanBIF, Arusha, November 2008) | Belgium (Andre Heughebart), Benin (Cossi Jean Ganglo), Burkina Faso (Louis Rayaïssom Ouedraogo, Louis Blanc Traore), Cameroon (Gaston Achoundong, Louis Zapfack), Madagascar (Jaona Ranaivo, Hery Lisi Tiana Ranarijaona, Pierre Hervé Ravelonandro), Ghana (George Owusu-Afriye), Kenya (Francis Oguya), ICIPE (Fabian Haas), Tanzania (Hulda Gideon, Theophilus Mlaki, Hezron Makundi, Pantaleo Munishi, Flora Ismail, Edna Nyika, Mwita Machoke, William Kindeketa, Neduvoto Mollel, Jacob Mtui, Erica Nkonoki), Equatorial Guinea (Jose Nguema Oyana, Coleta Omogo Obiang), South Africa (Fatima Parker-Allie), EWT (Brenda Daly), France (Eric Chenin, Anne-Sophie Archambeau, Régine Vignes-Lebbe), Denmark (Isabel Calbuig), Mexico (Patricia Koleff), Netherlands (Cees Hof), Norway (Einar Timdal), United States of America (Thomas Hermann), United Kingdom (Lawrence Way), Korea (Howard Hyung Seon Park, Dong Hee Kim), BioNet Int (Kornelia Rassmann, Richard D. Smith), OBIS (Edward Van den Berghe), IABIN (Bonnie C. Carrol), Peru (Viktor Miyakawa), Germany (Walter Berendsohn), GBIF Secretariat (Juan Carlos Bello, Alberto González Talaván, Éamonn Ó Tuama, Vishwas Chavan, Samy Gaiji, Tim Robertson, David Remsen, Sandy Andelman, Simone Niedermüller). |

Nodes Reports

In 2008, Participant Nodes provided information about their status, activities, and plans for the next period using a reporting system based on SurveyMonkey (www.surveymonkey.com). Compared to the reports in previous years, the 2008 report gathered new information to better understand the status of Nodes in their implementation process, particularly in their coordinating role as Biodiversity Information Facilities (BIFs) established at the GBIF Participant level. A total of 37 Participants submitted their reports (out of 88).

Some of the key findings from the reports include:

- most Participant Nodes are science-driven, although the number which are policy-driven is expected to increase;
- 43% of the Nodes place themselves in a consolidation and expansion phase; 15% report inactivity over the last 12 months;
- 26% of the Nodes are fully funded, 23% have a budget only for basic operation, while 17% have no dedicated funding;
- in 2009, Nodes expect budget limitations. 25% will be able to cover only basic operations, while the proportion of fully-funded Nodes will drop to 20%, and the proportion of Nodes with no funds will increase to 27%;
- in terms of teams, most Nodes report that they have only the basic staff to operate, with most of the key positions still vacant. Nodes report a lack of staff to work on data analysis and modeling, development of information products and services, capacity building and training, and fundraising;
- this complements the finding that, although the majority of Nodes are currently focused on data mobilisation, most have identified addressing end-user needs as a key priority;
- 42 out of 88 Participants (at the time of the survey) were mobilising data via GBIF; of these, just 12 were publishing 90% of all the primary records available on GBIF (around 130 million);
- 26 out of the 46 that are not making data available are Associate international organisations; similarly, 15 of these 46 are Associate country participants;
- only five Voting Participants are not yet publishing data via GBIF (one joined GBIF during 2008).

Nodes elections

In 2008, Lawrence Way (United Kingdom) completed his second term as the Chair of the Participant Node Managers Committee. During the four years in this position Lawrence was an inspirational figure who helped to significantly increase the visibility and importance of Participant Nodes in the overall implementation and success of GBIF. Francisco (Paco) Pando de la Hoz, Node Manager of GBIF Spain, was elected at GB15 in Arusha, as the new Nodes Committee Chair. A mycologist and biodiversity informatics expert, Paco has led the consolidation of GBIF Spain as one of the most advanced Nodes in the GBIF network; in addition, he also brings to the committee his experience as a GBIF Secretariat staff member (from his role as Nodes Programme Officer from 2005-2006). Jim Croft (Australia) also completed his first term as first Nodes Vice Chair, being replaced by Steve Wilkinson (United Kingdom). Dag Terje Filip Endresen (representing NordGen) was elected for a second term.

Mentoring activities

Two mentoring projects selected from the 2007 Call were carried out during 2008. In the first, Argentina requested mentoring from Colombia and the USA, with the objective of increasing the overall capacity of Argentine and Latin American research and conservation institutions to document, administer and exchange metadata and geo-reference specimen and species-related data. This mentoring involved 18 representatives from research and conservation institutions in

Argentina, plus another six participants from other Latin American countries (in the context of the Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (CYTED) Ibero-American Network for the Conservation and Digitisation of Biological Collections).

The second mentoring project was a request by Colombia to GBIF Spain and GBIF Netherlands. The main objective was to help Colombia in the consolidation of its national network of biodiversity information, based on the experience and expertise of the Spanish and Dutch Nodes. The mentoring included online support, country visits and training events in areas such as data management, information technologies, and scientific outreach. This mentoring was also used to initiate cooperation between Colombian and Dutch research institutions, specifically towards the effective mobilisation and publication of biodiversity data from Colombia held in the Netherlands.



After GB15, a small group of GBIF members climbed Mount Kilimanjaro and took the GBIF Flag to the Uhuru Peak (5,895 m), the highest point in the African continent. In the picture: Paco Pando (Spain), Eric Chenin (France), and Mariette and Yde de Jong (Netherlands).

Photo by Juan Carlos Bello

Capacity Enhancement Programme for Developing Countries (CEPDEC)

CEPDEC Pilot Project in 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 of supporting sustainable development in Tanzania by making the country's biodiversity information easily accessible, as well as by improving the country's capacity to mobilise and use this information. Project activities started on 30th January 2007, and the implementation process began on 1st March 2007.

The main outcome of this project has been the establishment of the Tanzania Biodiversity Information Facility (TanBIF). During 2008, TanBIF began its consolidation as a national-level initiative, linked to the GBIF global network, and with strong support, participation, and buy-in within the country. Most of the activities carried out in 2008 were aimed at creating capacity among Tanzanian institutions and partners to efficiently mobilise and use biodiversity data and information, particularly in areas relevant to the conservation of biodiversity and sustainable development of the country.

Among the key achievements of the CEPDEC Pilot Project in Tanzania during 2008, it is worth highlighting:



- the design, development and installation of a TanBIF Web Portal to foster sharing of biodiversity data and information held in various sources inside and outside Tanzania;
- the successful launch of the TanBIF Portal on 5th November 2008 with participation from high ranking officials in the government (including the Vice President) as well as national and international representatives;
- establishment of the Tanzania Species Catalogue Experts Group to advise on the integration, updating, and maintenance of the list of Tanzanian Species;
- identification and endorsement of priorities and criteria for digitalisation of biodiversity data and information in the country by the TanBIF National Committee;
- proposals received for Seed Money Grants for digitalisation projects;
- expansion and consolidation of TanBIF through memberships and networks;
- country biodiversity information needs, data providers and data identified;
- external partners engaged in providing technical support and guidance in the implementation of the national facility and training;
- a series of training events organised and carried out, expanding the in-country capacity to efficiently manage and use biodiversity data at various levels. Node managers from other African countries attended some of the training workshops held in Tanzania, promoting and facilitating regional interactions and collaboration.
- a mid-term review of the project was successfully carried out. Observations and recommendations from this review have been taken into account for the planning of the third and final year of the project.
- 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, brochures, presentations and methodologies, among others.
- one funding proposal successfully submitted in collaboration with international partners to the JRS Biodiversity Foundation (www.jrsbdf.org).

SEP-CEPDEC Project

In 2007, a letter of cooperation between the GBIF Secretariat and France's Institut de Recherche pour le Développement (IRD) was signed to bring together GBIF's CEPDEC and IRD's Sud Expert Plantes (SEP) project. SEP has been established to help 22 Francophone countries discover, conserve and sustainably use their plant and associated genetic resources. The SEP-CEPDEC is a 3-year collaboration funded by France's Ministry of Foreign Affairs, aiming at assisting SEP countries to build the necessary capacity to efficiently use biodiversity to support policy, science and education, particularly in the context of the UN Millennium Development Goals, the Convention on Biological Diversity, and other relevant international agreements and national programmes.

In 2008, SEP-CEPDEC started its activities with a) the engagement of GBIF France as a mentor to the SEP Participant countries, b) the formulation and agreement of a SEP-CEPDEC work plan, c) the development of various communication materials, and d) a kick-off meeting involving representatives from the five SEP countries that are also GBIF members (namely Benin, Burkina Faso, Cameroon, Guinea and Madagascar), GBIF France, GBIF Belgium and the GBIF Secretariat. During the kick-off meeting participating countries expressed their keen interest in and commitment to the project; they also expressed interest in using the Tanzania CEPDEC project as a model to expedite the development of their own national biodiversity information facilities (NBIFs). Specific action points for the implementation of the SEP-CEPDEC collaboration during 2009 were also agreed upon during this meeting.

In terms of outreach, the SEP-CEPDEC collaboration will be used to promote participation among 17 countries in Africa (Burundi, Chad, Central African Republic, Comoros, Côte d'Ivoire, Congo, D.R. Congo, Gabon, Mali, Mauritania, Niger, Rwanda, Senegal, Togo) and Asia (Cambodia, Laos and Vietnam).

Other important results from the 2008 SEP-CEPDEC activities include:

- in June 2008, the GBIF Secretariat hired a very well qualified intern to support the project coordination and management;
- two coordination meetings between GBIF France and the GBIF Secretariat were held. The objective of these meetings was to discuss and prepare the project work plan and implementation activities;
- the project was officially launched at a project kick-off meeting held in Arusha, Tanzania, in November 2008. Representatives from the five SEP-GBIF member countries also attended training on how to establish and manage a Participant Node, and benefited from the interactions with other GBIF members present at the GB15.
- After the kick-off meeting the five SEP-GBIF member countries prepared their own national plans for the implementation of the project;
- the GBIF Secretariat and GBIF France also prepared, adapted, or translated key documents and materials to guide the countries in their individual planning.



*Participants at the kick-off meeting of the SEP-CEPDEC project, held in Arusha on 7th November 2008.
Photo by Juan Carlos Bello*

Training

Training and Capacity Building in Biodiversity Informatics

3rd GBIF Training Workshop on Geo-referencing Biodiversity Databases

Increasing the quality and fitness-for-use of biodiversity databases is one of the strategic objectives of GBIF's second phase. In this regard, GBIF's training on geo-referencing biodiversity databases reflects a firm commitment to improving the geospatial information available in the network.

This workshop was jointly organised by the GBIF Secretariat and GBIF Spain. The main lecturer was John Wiecek from the University of Berkeley (California), GBIF Ebbe Nielsen Prize winner in 2006. The event was held in the Royal Botanical Garden of Madrid (Consejo Superior de Investigaciones Científicas (CSIC), Spain) from 5th to 8th May 2008.

Twenty-four participants from Brazil, Colombia, Denmark, France, Kenya, Netherlands, Tanzania, Tunisia, the United Kingdom, the United States and Venezuela took part in the event. In line with GBIF's train-the-trainers policy, six knowledge dissemination events have been held by the participants in Brazil, Colombia, France, Nicaragua, Kenya and the United Kingdom (and three more events are scheduled for early 2009, in Denmark, Panama and Tanzania) with more than 100 people being introduced to the topic of geo-referencing.

1st & 2nd Training Courses on GBIF Participant Node Management

As part of the strategy to strengthen the capacity of the Participant Nodes in the GBIF network, two training courses on GBIF Participant Node Management were organised in 2008. These courses tackled a wide range of topics such as engaging data publishers, technical aspects of the GBIF network, and fund raising.

The first course was organised within the framework of the CEPDEC Tanzania project. It was held in Dar es Salaam (Tanzania), from 25th to 29th February 2008. Francisco Pando, Node Manager of GBIF Spain, participated as the main speaker. Nine participants from Ghana, South Africa and Tanzania took part in the event. As a tangible result of this workshop, three funding proposals were submitted to the JRS Biodiversity Foundation, of which two have been approved.

The second course was organised as part of the Regional Meeting of GBIF Participant Nodes in Africa. It was held in Arusha (Tanzania), from 31st October to 1st November and included two of the participants from the first course as speakers: Hulda Gideon (Tanzania) and Fatima Parker-Allie (South Africa). Other GBIF Participant Node Managers also participated as speakers: Isabel Calabuig (Denmark), Eric Chenin and Anne-Sophie Archambeau (France), Patricia Koleff (Mexico), and Hulda Gideon (Tanzania). A total of 45 participants from Benin, Burkina Faso, Cameroon, Equatorial Guinea, Ghana, Kenya, Madagascar, South Africa, Tanzania and the United States benefited from this training.

Other training events held in 2008

Training is becoming an increasingly important area for GBIF Participant Nodes, which are becoming very active in organising national, regional and thematic events (see <http://www.gbif.org/nodes>). Some of the training events carried out with the collaboration of the GBIF Secretariat include:

- Information Management and Biodiversity Informatics, Nairobi (Kenya), 26-30 March; 70 participants.
- Biodiversity Standards and Protocols and Data Digitisation and Cleaning, Pretoria (South Africa), 9-12 June; 30 participants.
- How to build content for biodiversity portals, Dar es Salaam (Tanzania), 4-7 August; 10 participants.

- Biodiversity Data Standards, Digitisation of Natural History Collections and Data Cleaning, Lucknow (India), 22 August; 42 participants.

GBIF Tools: Training and Promotional CDs and DVDs

During 2008, the GBIF Secretariat has produced several off-line digital materials with outreach and training purposes. These CDs and DVDs are freely available and all of them include extensive information about GBIF, its mission, membership, data availability in the network and much more:

- GBIF Training Manual I: Digitisation of Natural History Collections Data. This CD is an easy-to-browse compilation of all the chapters of this GBIF manual, covering uses of data, data cleaning, sensitive data, etc.
- GBIF Country DVDs. These DVDs include a customised report on the data available in the GBIF network about individual countries, how to use the GBIF Data Portal to access these data and specific information on how to become a GBIF Member (English and Spanish versions available). Customised DVDs have been produced for 26 countries: Bolivia, Brunei Darussalam, Brazil, Cambodia, China, Cuba, Ecuador, Greece, India, Indonesia, Italy, Kenya, Laos PDR, Latvia, Malaysia, Myanmar, Pakistan, Philippines, Romania, the Russian Federation, Singapore, South Africa, Thailand, Uganda, Venezuela and Vietnam.
- GBIF Training CDs on Node Management. As an additional product of the GBIF training courses on 'GBIF Participant Node Management', CDs have been compiled with all the contents shown during the course, such as information about GBIF, how to build a GBIF Participant Node, and how to engage data providers. The latest information about the resources that GBIF is making available is also included: information about the GBIF Data Portal, the GBIF Integrated Publishing Toolkit, GBIF Training Materials, etc.

All these materials are available from the GBIF Secretariat upon request.

GBIF Promotion: GBIF Booths

GBIF has been present in the most relevant biodiversity-related events held in 2008, namely the SBSTTA (Rome, Italy in February), and the Conference of the Parties of the CBD (Bonn, Germany in May); the World Conservation Congress of the IUCN (Barcelona, Spain, 5-14 October), and the V Plenary Meeting of GEO (Bucharest, Romania, 18-21 November).

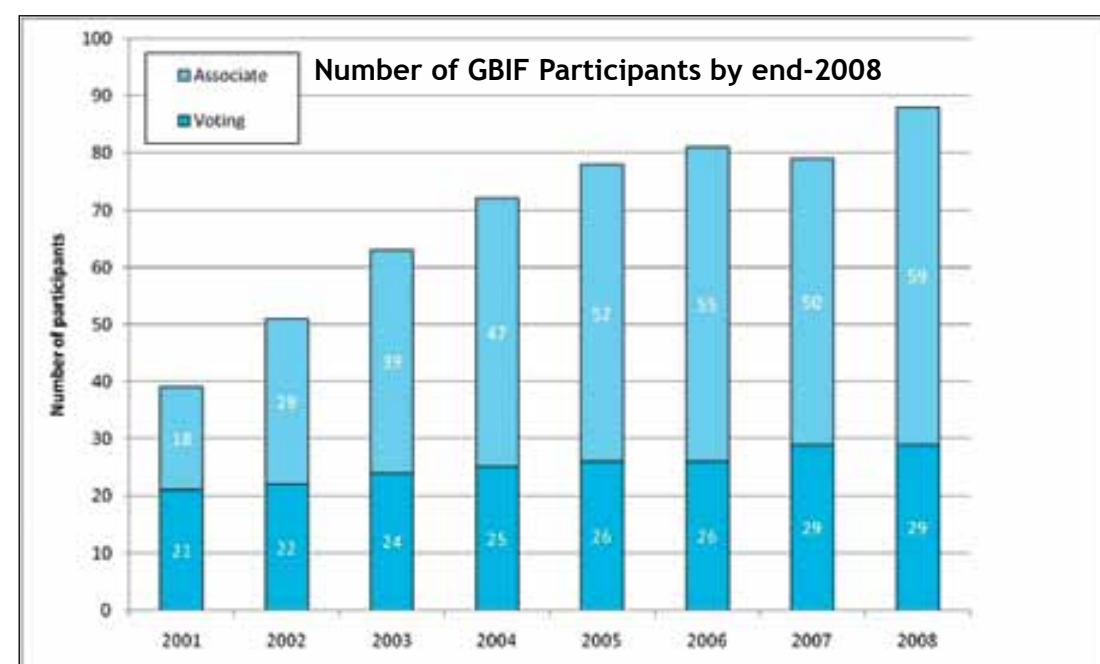
At these events, GBIF set up booths to provide first-hand information on the initiative, its implementation, and how to contribute to, and use the data available in the network. Live demonstrations of the latest GBIF tools, promotional videos and DVDs complemented GBIF's efforts to attain greater visibility in these fora.

Outreach

Growth in Participation

Four new countries and five international organisations became GBIF Participants during the course of 2008:

- Voting Participant - Ireland
- Associate Participants - Cuba, Kenya, Luxembourg
- Organisations - Discover Life, Encyclopedia of Life (EoL), Endangered Wildlife Trust (EWT), International Long Term Ecological Research (ILTER), Scientific Committee on Antarctic Research (SCAR)



In addition, a Letter of Intent was received from Uruguay to join as a Voting Participant and from Romania to join as an Associate Participant; we look forward to welcoming them on board in 2009. Nicaragua decided to continue as a member for the second phase of GBIF (2007-2011) but chose to change their status from Voting to Associate Participant in 2008.

Collaborative Agreement with the Convention on Migratory Species (CMS)

GBIF signed a Memorandum of Cooperation to assist in the mobilisation of migratory species data contained in the Global Registry on Migratory Species (GROMS, <http://www.gbif.org/News/cms>).

Promotion of Open Access Policies

In keeping with recommendations made by the GBIF Governing Board on promoting open access policies, GBIF worked as part of the Conservation Commons to obtain approval at the IUCN World Conservation Congress (October 2008) of a Resolution and a Recommendation on open access to biodiversity data, both of which are relevant to biodiversity conservation (Resolution 4012 and Recommendation 4108).

Campaigns

At GB14 in Amsterdam, October 2007, the Board, for the first time, approved four GBIF Campaigns (as outlined in the GBIF Strategic Plan 2007-2011):

- Global Pollinator Species Campaign (GPSC)
- World Register of Marine Species Campaign (WoRMS)
- Amazon Basin Biodiversity Information Facility Campaign (ABBIF)
- GBIF and the 2010 Biodiversity Target Campaign (2010).

Each Campaign received €30,000 in financial support at the beginning of 2008 for the start-up costs. At GB15 in Arusha, Tanzania in November 2008, the four Campaigns provided a report to the Board on achievements and lessons learned in 2008. The Board noted from the presentations and discussions that the campaigns are long-term initiatives and that it is too early to assess their usefulness as a new mechanism to raise additional external funding and mobilise data of relevance to the GBIF mission. The Board therefore decided not to call for any new Campaigns in 2009 before further assessment of the existing Campaigns has been made by the Science Committee.

The Campaign reports are summarised below:

The Global Pollinator Species Campaign

Lead Participant Country: United States of America

Project Leader: Dr. Michael Ruggiero, Integrated Taxonomic Information System, Smithsonian Institution, USA

The overall purpose of the GPSC is to increase the amount of taxonomic information available on pollinators, provide easier access to this information, and make it relevant to a wide variety of users globally.

Key events and products achieved in 2008 by the GPSC and its partners are:

Global pollinator summit: 1-4 July, South Africa. The GBIF start-up funds (€30,000) used to support the workshop were more than doubled by funding from the US National Science Foundation and the Consortium for the Barcode of Life (CBOL). The Summit helped to focus the Campaign goals on serving users' needs.

World checklist of bees: The checklist was completed in 2008 and contains more than 21,000 accepted/valid names, synonyms, and common names for nearly 19,500 species of bees.

Increased access to digitised pollinator records: The number of bee specimen and observation records available through the GBIF portal has increased nearly tenfold, from 90,000 to more than 840,000 in 2008.

New data digitisation tool: Developed by GBIF's partner, IABIN, the tool enables custodians of small databases to easily digitise and make available pollinator or pollinator/plant data through the DiGIR or TDWG Access Protocol for Information Retrieval (TAPIR) exchange protocols.

Digital publications: Two seminal publications were released in digital format: Catalogue of Hymenoptera in America North of Mexico (Krombein et al., 1979, digitised by BHL) and Catalogue of Bees of the Neotropical Region (Moure et al., 2008).

A strategy to barcode the world's bee species: GPSC partners, CBOL and the Canadian Barcode of Life Network, produced a strategy and plan to develop Bee-BOL, a reference set of DNA barcodes for the world's bee species.

Preparing a global assessment of pollinators: Plans are underway to begin development of regional and global assessments of pollinator status and trends using, in part, data developed through the GPSC.

Additional funding in 2008: The Campaign partners raised approximately €700,000 for Campaign operations, projects, workshops and data content development.

Outreach to users: The GPSC Project Leader gave nine presentations and posters about the Campaign to a number of potential user groups.

World Register of Marine Species Campaign

Proposed by the Ocean Biogeographic Information System (OBIS) and now part of the Society for the Management of Electronic Biodiversity Data (SMEBD)

Campaign Leader: Dr. Mark J. Costello, Leigh Marine Laboratory, University of Auckland, New Zealand.

The overall purpose of WoRMS is to complete the development of a validated World Register of Marine Species for a number of scientific and practical purposes. This requires taxonomic experts, data managers, and species data users to work closely together. By providing a quality control system for all marine species' names, WoRMS will: a) provide a checklist of species for which data are published online, and b) facilitate the publication of species data through GBIF and its marine thematic node, OBIS.

Key events and products achieved in 2008 by WoRMS and its partners are:

Growing content: During 2008, WoRMS has concentrated on growing content through the work of individual taxonomic editors, and inviting more editors to address taxonomic gaps. Over 140 taxonomic editors from 92 institutions and 26 countries were collaboratively engaged in building the Register in 2008.

International workshop of taxonomic editors: This resulted in a major press release about WoRMS, reported in at least 275 media outlets in 27 countries. Further announcements about WoRMS are underway, via email lists and newsletters that target key scientific audiences and at conferences.

A call for competition for mini-grants: The call was advertised and GBIF start-up funds were used to sponsor seven taxonomic experts to fill key content gaps in WoRMS.

Additional funding in 2008: The WoRMS infrastructure has a permanent host institution at the Flanders Marine Institute (VLIZ) in Belgium and governance within SMEBD. It received significant new funding (€400,000) as part of the EU Pan-European Species-directories Infrastructure (PESI) project.

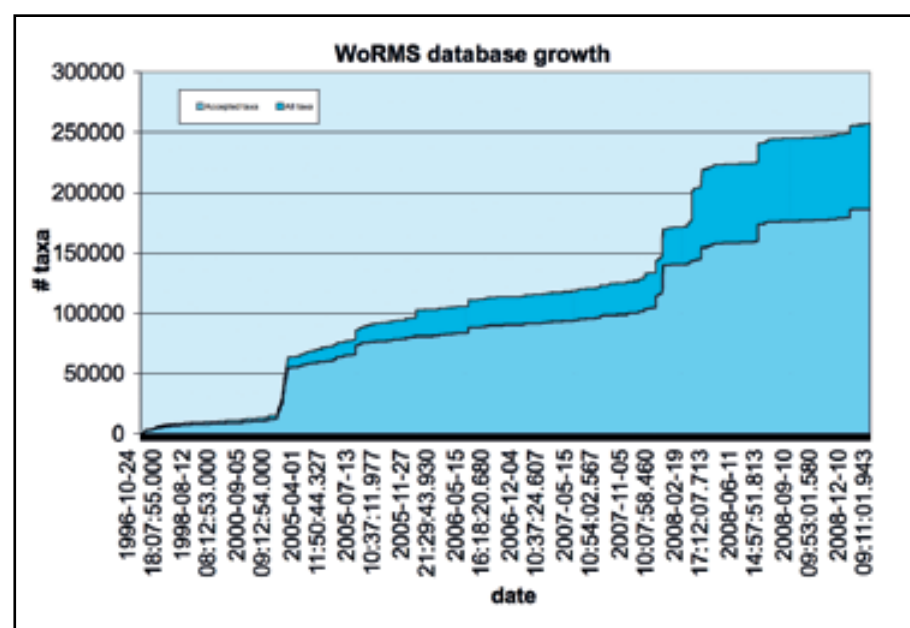


Figure 1. Growth in the number of species names in WoRMS

Use of marine species data: Copies of WoRMS have been licensed to 18 organisations, to support quality control in their data management. WoRMS also regularly contributes content to Species 2000 and the Catalogue of Life, EoL, GenBank, and CBOL.

Amount of data available and access: Of the estimated 230,000 marine species described at www.marinespecies.org, over 128,000 have been validated. The data can be viewed through 18 global and six regional species databases.

Outreach to experts: A special effort is being made to involve taxonomic experts spread geographically around the world.

Amazon Basin Biodiversity Information Facility Campaign

Lead Participant Countries: Peru, Colombia

Campaign Leaders: Dr. Victor Miyakawa, Instituto de Investigaciones de la Amazonía Peruana, Peru; and Dr Fernando Gast, DG Instituto Humboldt, Colombia

The overall purpose of the ABBIF Campaign is to develop and coordinate multi-institutional and cross-border initiatives from Brazil, Bolivia, Colombia, Ecuador, French Guyana, Peru, Surinam, Venezuela and European countries to unlock biodiversity data on the Amazon basin. This initiative aims at improving the capacity to study, discover and describe species diversity in the region, and to analyse, synthesise, and share information and knowledge for the sake of science and global issues such as climate change.

Key events and achievements in 2008 by ABBIF and its partners are:

Definition of main components of the Campaign: The three regional ABBIF coordinators from Peru, Colombia and Brazil carried out the following strategic activities for the Campaign implementation:

- formulation of a detailed Work Plan;
- development of the ABBIF website (www.abbif.net);
- discussion of the ABBIF Work Plan with national and international stakeholders.

The Work Plan was built around three core activities on which all participating countries have agreed to work: a) to increase biodiversity data content, b) to improve data quality, and c) to increase data usage and user groups.

The ABBIF website will provide access to ongoing and planned initiatives on digitisation, mobilisation and use of data about the Amazon basin biota.

Biodiversity data: The website aims to show existing data from the region, and will also provide information on metadata and data that are not yet available. Both Peru and Ecuador plan to publish 100,000 records on the ABBIF website in 2009.

Outreach and presentations: The ABBIF Campaign was presented in a side-event at the CBD Conference of Parties (COP-9) in Bonn, Germany, for key policy makers from Amazonian countries and 19 other GBIF country members. Part of the GBIF start-up grant was used for this purpose.

A presentation to FAO in Rome, Italy, led to the signing of a Memorandum of Understanding with the Knowledge and Information Centre in FAO. Presentations were also made to the Environmental Ministries in Ecuador, Colombia and Bolivia.

Funding: €368,000 has been pledged by the Community of Andean Nations (CAN, www.comunidadandina.org) to support the implementation of ABBIF within the context of the BioCAN programme (<http://www.comunidadandina.org/INGLES/press/press/np19-6-07.htm>). The basic objective of the BioCAN programme is to raise the standard of living of the inhabitants of tropical

regions of the CAN Member Countries, through the equitable conservation and sustainable use of their biodiversity, while respecting their cultural diversity.

In addition to this, and after a stakeholders meeting in Bogota, Colombia, the Amazon Cooperation Treaty Organization (ACTO) provided a seed fund grant of US\$ 37,000 for the development and implementation of an information exchange platform based on ABBIF.

GBIF and the 2010 Biodiversity Target Campaign

Lead Participant Country: Australia

Lead Associate Participant organisation: UNEP-WCMC

Campaign Leaders: Dr Daniel Faith, Australian Museum, Australia; and Dr Claire Brown, UNEP-WCMC, UK

The overall purpose of the Campaign is to promote, demonstrate, and enable the application of GBIF primary biodiversity data to measure progress towards, and achievement of, the 2010 Target using a case study approach.

Key events and achievements in 2008 by the 2010 Campaign and its partners are:

Start-up: A start-up workshop was held at UNEP-WCMC, Cambridge, UK, which identified ten case studies in different parts of the world. The GBIF start-up grant was used to support participation in the workshop.

Funding: A key focus in 2008 has been on raising funds for the case studies. A grant from the Terrestrial Ecosystem Research Network may provide a portion of the funding for the Australian case study. GBIF data for Australia have already been utilised in the case study.

Case study progress: Analysis and modeling on Papua New Guinea are in progress using data from 12 different GBIF data publishers, covering a total of approximately 19,000 records on plants and animals. A case study on Patagonia received a grant for a meeting in 2008 of 30 scientists at Duke University, USA, to explore how historical biodiversity data can fit into the Patagonia case study and conservation plan.

A case study of the Coral Triangle waters (between the Philippines, Sumatra (Indonesia) and Papua New Guinea) was started using distribution information on approximately 1,000 different species. The original Milne Bay 2010 case study is under revision.

Outreach: Several presentations were made about the 2010 Campaign during 2008. Growing interest in the work has been expressed by organisations such as WWF and EDIT, and representatives from the Campaign have been invited to make presentations at relevant fora.

Box: GEO BON Plan Approved at GEO V Plenary

GBIF participated in the GEO V Plenary in Bucharest on 19th and 20th November, where the establishment of the Group on Earth Observations Biodiversity Observation Network (GEO BON) was approved by GEO members. This is a culmination of efforts by many organisations, including GBIF, who have devoted time to developing a concept document and implementation plan for GEO BON. As a worldwide initiative and component of the Global Earth Observation System of Systems (GEOSS), GEO BON seeks to link and build on the work of countries, organisations and individuals to collect, manage, share and analyse data on an ongoing basis, on the status of the world's biodiversity. GEO BON will build on existing global efforts, such as GBIF's capacity building programme and informatics network, allowing GEO BON to capitalise on successes and investments in these areas to date.



Dr Nick King (GBIF) and Dr Anne Larigauderie (DIVERSITAS) jointly presenting the 'GEO BON - Implementation Overview' document for acceptance at the GEO V Plenary in Bucharest, 19th November 2008. Photo by Éamonn Ó Tuama

At the GEO V Plenary, the GBIF booth highlighted the organisation's contribution to developing a global biodiversity informatics infrastructure, including contributions to GEOSS and GEO BON.



*The GBIF Booth at the GEO V Plenary in Bucharest, 19-20 November 2008
Photo by Éamonn Ó Tuama*

2008 Financial Statement Summary

| GBIF Core Funds | EUR |
|--|-------------|
| Income | 4,237,047 |
| Expenditures | |
| Work Programme 2008/2009 - Informatics | (701,662) |
| Work Programme 2008/2009 - Content | (606,625) |
| Work Programme 2008/2009 - Participation | (452,317) |
| Work Programme 2008/2009 - Campaigns | - |
| Work Programme Carry Over 2007/2008 - Spending | (441,619) |
| Governance Committee Costs | (123,133) |
| Management - Staff Expenditure | (662,647) |
| Management - Running Expenditure | (282,139) |
| Management - Secretariat Facilities | (71,344) |
| Total Expenditures | (3,341,486) |
| Changes in foreign exchange rates | 39,380 |
| Interest | 60,888 |
| Result | 995,829 |
| Assets | |
| Other Receivables and VAT refund | 58,461 |
| Cash at Bank | 2,019,405 |
| Total Assets | 2,077,866 |
| Retained funds and liabilities | 796,082 |
| Provisions | 202,283 |
| Supplementary funds | 551,714 |
| Auditor | 5,503 |
| Prepayments | 473,822 |
| Other payables | 48,462 |
| Total equity and liabilities | 2,077,866 |
| GBIF Supplementary Funds | |
| Balance at 1 January | 587,360 |
| Income | 287,339 |
| Expenditure | (337,809) |
| Change in foreign exchange rates | 14,824 |
| Balance at 31 December | 551,714 |
| Average exchange rate DKK-EUR 7.45 | |

Basic Contributions 2008

| Voting Participants Financial Contributors | | | |
|--|--|-------------------|--|
| Argentina | CONICET - Museo Argentino de Ciencias Naturales | Portugal | Foundation for Science and Technology |
| Australia | CSIRO Entomology | Republic of Korea | Ministry of Education, Science and Technology |
| Canada | Agriculture and Agri-Food of Canada | Slovak Republic | Ministry of the Environment |
| Costa Rica | Asociación Instituto Nacional de Biodiversidad (InBio) | Slovenia | Ministry of Higher Education, Science and Technology |
| Denmark | Danish Natural Research Council | Spain | Ministry of Education and Science |
| Equatorial Guinea | CICTE - Council of Scientific and Technological Investigations | Sweden | Swedish Research Council |
| | | Tanzania | COSTECH - Tanzanian Commission for Science and Technology |
| Estonia | Ministry of Environment | | |
| Finland | Academy of Finland | United Kingdom | BBSRC - Biotechnology and Biological Sciences Research Council |
| France | INRA PARIS 59 | | NERC - Natural Environment Research Council |
| Germany | German Aerospace Center / DFG | | Royal Botanic Gardens, Kew |
| Iceland | Ministry for the Environment | | Natural History Museum |
| Ireland | National Parks & Wildlife Service | | Joint Nature Conservation Committee |
| Japan | Japan Science and Technology Agency | | DEFRA - Department for Environment, Food and Rural Affairs |
| Mexico | CONACYT - Consejo Nacional de Ciencia y Tecnología | | National Science Foundation |
| Netherlands | Ministry of Education, Culture and Science | USA | |
| New Zealand | Ministry of Research, Science and Technology | | Delayed payment, received in 2009 |
| Norway | The Research Council of Norway | Belgium | Belgian Federal Science Policy Office |
| Peru | IIAP - Instituto de Investigación de la Amazonía Peruana | South Africa | National Research Foundation |

Grants Received 2008

| | |
|--|--|
| Royal Danish Ministry of Foreign Affairs (General Outreach and Tanzania Pilot Project) | Institut de Recherche pour le Développement (SEP-CEPDEC) |
| DKK 1,370,000 / EUR 183,900 | DKK 521,700 / EUR 70,000 |
| Copenhagen University (IT support) | Ishøj Kommune (Tanzania Pilot Project) |
| DKK 170,000 / EUR 22,800 | DKK 71,670 / EUR 9,620 |
| Copenhagen University (Tanzania Pilot Project) | |
| DKK 30,000 / EUR 4,030 | |

Annex 1 - GBIF Participants as of 31st December 2008

Voting Participants

| | | | |
|--------------------|------------|--------------------------|--------------|
| Argentina | Mar 2002 * | Mexico | Mar 2001 |
| Australia | Feb 2001 | Netherlands | Feb 2001 |
| Belgium | Feb 2001 | New Zealand | Feb 2001 |
| Canada | Mar 2001 | Norway | Mar 2004 |
| Costa Rica | May 2001 | Peru | Sep 2002 |
| Denmark | Jan 2001 | Portugal | Jun 2001 |
| Equatorial Guinea | Mar 2005 | Slovakia | Aug 2001 ** |
| Estonia | Sep 2003 | Slovenia | Feb 2001 |
| Finland | Apr 2001 | South Africa | May 2003 |
| France | Mar 2001 | Spain | Feb 2001 |
| Germany | Feb 2001 | Sweden | Feb 2001 |
| Iceland | Jun 2001 | Tanzania | Sep 2002 *** |
| Ireland | Jan 2008 | United Kingdom | Aug 2001 |
| Japan | Feb 2001 | United States of America | Jan 2001 |
| Korea, Republic of | May 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 | Kenya | Jul 2008 |
| Bulgaria | Aug 2001 | Luxembourg | May 2008 |
| Burkina Faso | Jan 2007 | Madagascar | Jan 2003 |
| Cameroon | Mar 2005 | Morocco | Jun 2003 |
| Colombia | Sep 2003 | Nicaragua | Jun 2001* |
| Cuba | Aug 2008 | Pakistan | Aug 2001 |
| Ghana | Mar 2001 | Philippines | Mar 2005 |
| Guinea | Mar 2005 | Poland | Mar 2001 |
| India | Aug 2003 | Switzerland | Feb 2001 |

- * Nicaragua changed from Voting to Associate Participant in July 2008.



Other Associate Participants

| | | | |
|---------------------------------|----------|---|----------|
| BioNET-ANDINONET | Oct 2007 | International Centre for Insect | |
| BioNET-ASEANET | Oct 2002 | Physiology and Ecology (ICIPE) | Mar 2004 |
| BioNET-EASIANET | Oct 2002 | International Commission on | |
| BioNET-INTERNATIONAL | May 2001 | Zoological Nomenclature (ICZN) | Jun 2005 |
| BioNET-SAFRINET | Aug 2003 | International Species | |
| Biodiversity International | Jul 2006 | Information System (ISIS) | Jun 2006 |
| Botanic Gardens Conservation | | Major Systematic | |
| International (BGCI) | Aug 2004 | Entomology Facilities (MSEF) | Mar 2006 |
| CABI Bioscience | Sep 2001 | Natural Science Collections | |
| Chinese Taipei | Mar 2001 | Alliance (NSCA) | Dec 2004 |
| Ciencia y Tecnología para | | NatureServe | May 2001 |
| el Desarrollo (CYTED) | May 2006 | Nordic Genetic Resource | |
| Consortium for the | | Center (NordGen) | Mar 2004 |
| Barcode of Life (CBOL) | Mar 2005 | Ocean Biogeographic Information | |
| Consortium of European | | System (OBIS) | Jun 2001 |
| Taxonomic Facilities (CETAF) | Jun 2007 | Pacific Biodiversity Information | |
| Discover Life | Feb 2008 | Forum (PBIF) | Sep 2004 |
| DIVERSITAS | May 2007 | Scientific Committee for | |
| Encyclopedia of Life (EoL) | Jan 2008 | Antarctic Research (SCAR) | Feb 2008 |
| Endangered Wildlife Trust (EWT) | Aug 2008 | Society for the Preservation of Natural | |
| ETI Bioinformatics | Mar 2001 | History Collections (SPNHC) | Jan 2007 |
| Finding Species | Dec 2003 | Species 2000 | Mar 2001 |
| Freshwater Biological | | Taxonomic Databases Working | |
| Association - FreshwaterLife | Oct 2003 | Group (TDWG) | Mar 2002 |
| Integrated Taxonomic | | United Nations Environment | |
| Information System (ITIS) | Mar 2001 | Programme (UNEP) | May 2001 |
| Inter-American Biodiversity | | Wildscreen | Jan 2003 |
| Information Network (IABIN) | May 2001 | World Data Center for Biodiversity | |
| International Long Term | | and Ecology (WDCBE) | Apr 2005 |
| Ecological Research (ILTER) | Aug 2008 | World Federation for Culture | |
| | | Collections (WFCC) | Oct 2002 |

Annex 2 - GBIF Secretariat Staff 2008

| | |
|---|--|
| Executive Secretary/Director: | Nicholas King |
| Deputy Director for Management & International Relations: | Hugo von Linstow |
| Office Manager & PA to the Director: | Jane Sutton (Maternity replacement January to September) Susanne Lønstrup Sheldon (On maternity leave January to September) |
| ICT Support Manager: | Anne Mette Nielsen |
| Financial Officer: | Belinda Skeel (Until December) |
| Programme Assistant | Louise Scharff (From October) |
| Head of Informatics: | Samy Gaiji (From April) |
| Webmaster and Network Administrator: | Ciprian Vizitiu |
| System Administrator | Andrei Cenja |
| Data Portal Manager: | Andrea Hahn |
| Systems Architect: | Tim Robertson |
| Programmer: | Jose Miguel Cuadra Morales (From November) |
| Programmer Assistant: | Kyle Braak (From October) |
| Senior Programme Officer, Inventory, Discovery, Access: | Éamonn Ó Túama |
| Senior Programme Officer, Digitisation and Mobilisation of Primary Biodiversity Data: | Vishwas Chavan |
| Senior Programme Officer, Electronic Catalogue of Names of Known Organisms: | David Remsen |
| Senior Programme Officer, Outreach: | Beatriz Torres |
| Senior Programme Officer, NODES: | Juan Carlos Bello |
| CEPDEC Intern: | Simone Niedermüller (From June) |
| Training Officer: | Alberto González-Talaván (From March) |
| Public & Scientific Liaison Officer: | Meredith A. Lane (Until July) |
| Technical Assistant: | Nikolas Ioannou (January to August and December) |

Box: GBIF Secretariat Staff 2008

Head of Informatics: Samy Gaiji is a French and Tunisian national who, from 1998 until his move to GBIF, was Senior Scientist and Project Coordinator of the Biodiversity Informatics Project, as well as Project Leader of the Consultative Group on International Agricultural Research (CGIAR) System-wide Information Network on Genetic Resources (SINGER) at Bioversity International (formerly the International Plant Genetic Resources Institute, IPGRI).

Samy Gaiji comes to GBIF with experience in information management for several international organisations, including the Clearinghouse Mechanism for the Convention on Biological Diversity, the UN Food and Agriculture Organization (FAO), and Bioversity International. He brings to GBIF expertise in project planning and management with a particular focus on the use of biodiversity informatics tools for scientists and decision makers.



The Head of Informatics will play a key integrating role in liaising continuously with each of the GBIF work areas to identify and ensure delivery of appropriate cross-cutting products and services. He will also be the main liaison between the Secretariat Informatics team and the rest of the Secretariat, the GBIF Participants and the network.

Programmer: Jose Miguel Cuadra Morales is a Costa Rican national who, from 2007 was Lead Developer for the Specimen and Species Thematic Network (SSTN) Portal at the Inter-American Biodiversity Network (IABIN). Jose comes to GBIF with experience in the maintenance and improvement of portal interfaces, as well as in managing distributed information retrieval and indexing systems. His primary focus will be on supporting the management of the GBIF Data Portal and Web Services with a particular focus on responding to a variety of scientific needs in close collaboration with expert communities (e.g. 2010 Biodiversity Targets, Climate Change, Invasive Species). Jose joined the Secretariat in November 2008.



Programmer Assistant: Kyle Braak is a Canadian national who, from 2007 worked as a software developer specialising in web services. Previously he spent two years working as a consultant in Java software at the International Maize and Wheat Improvement Center (CIMMYT), specialising in the development of a suite of bioinformatics tools. Kyle will be supporting the maintenance and improvement of the existing distributed information retrieval and indexing system, as well as integration within the GBIF global discovery services (e.g. metadata, names, nomenclatures). He will also contribute to the further decentralisation of the GBIF Network by supporting data publishers and Nodes. Kyle joined the Secretariat in October 2008.



Training Officer: Alberto González-Talaván. In recognition of the needs throughout the GBIF network for training for Nodes, data providers and users, GBIF has added a Training Officer to the staff of the Secretariat. Alberto González-Talaván comes from GBIF-ES, where he has served as Projects Coordinator since 2004. There, he was involved in a number of training sessions on GBIF-related topics, including georeferencing and ecological niche modelling. With a degrees in biology specialising in botany, and experience in translation and web page design as well as four years' service as Informatics Coordinator for several relevant projects led by the University of Salamanca's Department of Botany, Alberto has a background well suited to the production and presentation of training materials.



Intern: Simone Niedermüller comes from Austria, where she has worked as Project Manager after finishing her studies at the University of Vienna in 2007. With a multi-lingual education, a Master degree in Zoology specialising in Marine Biology, and experience in project management, Simone has a background well suited to her responsibilities as a GBIF Intern. In her role as Intern Simone will support the Programme Officer for Nodes in the implementation of CEPDEC-related activities, in particular regarding the two CEPDEC projects (the pilot in Tanzania, and SEP-CEPDEC).



Programme Assistant: Louise Scharff started at the Secretariat on 1 October 2008. In recognition of the high administrative work loads of the GBIF Secretariat Programme Officers, it was decided to hire a Programme Assistant in order to allow the Programme Officers to focus more on the substantive areas of their portfolios. Louise comes with a wealth of inter-governmental organisation experience from having worked at ICES (International Council for the Exploration of the Sea) based in Copenhagen, Denmark.



Farewell to:

GBIF Public and Scientific Liason Officer: Meredith Lane left GBIF in the beginning of July 2008 to go back to the US. Meredith had been with the GBIF Secretariat since July 2002 and during her employment by GBIF, Meredith had editorial responsibility for the GBIF web-site, including most of the GBIF news stories. She was also responsible for drafting annual reports, press releases, pamphlets, tutorials, powerpoint presentations and logo design and use questions. As Scientific Liaison officer, she was a major driver in the development of the GBIF Strategic Plan 2007-2011, the GBIF Science Symposia, and the Ebbe Nielsen Prize presentations. Over the years Meredith has also been very much involved with various scientific biodiversity informatics communities as well as GBIF external relationships. Some of GBIF's founders may also recall that Meredith was active throughout the original OECD Working Group process that led to the establishment of GBIF.



Temporary Office Manager and PA to the Director: Jane Sutton was the maternity replacement for the Office Manager for January to September 2008.



Financial Officer: Belinda Skeel left the GBIF Secretariat by the end of December 2008 to spend more time with her young family.



Annex 3 - GBIF Governing Board, Standing Committees and Task Groups

Executive Committee

| | |
|------------------|---|
| Chair | David Penman |
| Vice Chairs | 1st Vice Chair: Keiichi Matsuura 2nd Vice Chair: Christoph Häuser 3rd Vice Chair: Gladys Cotter |
| Committee Chairs | Erick Mata (Science) Lars Nilsson (Budget) Lawrence Way (Nodes) Joanne Daly (Rules) |
| Ex-officio | Executive Secretary |

Budget Committee

| | |
|-------------------|---|
| Chair | Lars Nilsson |
| Vice Chairs | Helmut Kühr Peter Schalk |
| Members | Bonnie C. Carroll Shunichi Kikuchi |
| <i>Ex-officio</i> | Chair of Governing Board Executive Secretary |

Node Managers Committee (NODES)

| | |
|-------------|--------------------|
| Chair | Lawrence Way |
| Vice Chairs | Jim Croft |
| | Dag Terje Endresen |
| Members | All Node Managers |
| Programme | |
| Officer | Juan Carlos Bello |

Science Committee

| | |
|-------------------|--|
| Chair | Erick Mata |
| Vice Chairs | Daphne Fautin |
| | Mark Graham |
| Work Area | Walter Berendsohn (DIGIT) |
| Chairs | Yde de Jong (ECAT) |
| | William Ulate (IDA) |
| | Carmen Quesada (Outreach) |
| <i>Ex-officio</i> | David Penman, Chair, Governing Board |
| | Keiichi Matsuura, 1st Vice Chair, Governing Board |
| | Christoph Häuser, 2nd Vice Chair, Governing Board |
| | Gladys Cotter 3rd Vice Chair; Governing Board |
| | Lawrence Way, Chair, NODES Executive Secretary |

Rules Committee

| | |
|-------------|-----------------------|
| Chair | Joanne Daly |
| Vice Chairs | Mark Fornwall |
| | Robert Van Akker |
| Members | Esteban Manrique Reol |
| | William Alex Gray |
| | Fabian Haas |

Observational Data Task Group

Chair: Steve Kelling

Members: Jerry Cooper
Baban Ingle
Matthew Jones
Tapani Lahti
Denis Lepage
Bruce Stein

Programme

Officer: Vishwas Chavan

Multimedia Resources Task Group

Chair: Robert A. Morris

Members: Vijay Barve
Chris Freeland
Gregor Hagedorn
Mikko Heikkinen
Annette Olson
Greg Riccardi
Greg Whitbread

Programme

Officer: Vishwas Chavan

Global Strategy and Action Plan for Mobilisation of Natural History Collections Data Task Group (GSAP-NHC)

Chair: Walter Berendsohn

Members: Arturo Ariño

Roger Baird

Penny Bernets

Thierry Bourgoïn

Michelle Hamer

Tsuyoshi Hosoya

Sven Kullander

James Macklin

M. Sanjappa

Malcolm Scoble

Ángela Suárez-Mayorga

Programme

Officer: Vishwas Chavan

Data Citation Task Group

Chair: Mark Costello

Members: Donat Agosti
Arthur Chapman
Werner Greuter
Francisco Pando
Dave Roberts
Piotr Tykarski

Programme

Officer: Beatriz Torres

Annex 4 - GBIF Citations

- Anonymous. 2008. A place for everything (editorial). *Nature* 453 (2). doi:10.1038/453002a. 1 May 2008; published online 30 April 2008.
- Automated extraction of data from text using an XML parser: An earth science example using fossil descriptions. *Geosphere* 4 (1): 159-169. February 2008.
- Balian, E.V., H. Segers, C. Lévêque and K. Martens. 2008. The Freshwater Animal Diversity Assessment: an overview of the results. *Hydrobiologia* 595 (1): 627-637. doi:10.1007/s10750-007-9246-3.
- Barreto. 2008. A Web-based Relational Database for Monitoring and Analyzing Mosquito Population Dynamics. *Journal of Medical Entomology* 45 (4): 775-784. July 2008.
- Bertzky, M., and S. Stoll-Kleemann. 2008. Multi-level discrepancies with sharing data on protected areas: What we have and what we need for the global village. *Journal of Environmental Management* 90 (1): 8-24. January 2009.
- Bode, M., K.A. Wilson, T.M. Brooks, W.R. Turner, R.A. Mittermeier, M.F. McBride*, E.C. Underwood and H.P. Possingham. 2008. Cost-effective global conservation spending is robust to taxonomic group. *PNAS* 105 (17): 6498-6501. 29 April 2008.
- Buckley, L. B. 2008. Linking Traits to Energetics and Population Dynamics to Predict Lizard Ranges in Changing Environments. *American Naturalist* 171: E1-E19. doi:10.1086/523949.
- Chapman, A.D. and O. Grafton. 2008. Guide to Best Practices for Generalising Sensitive Primary Species Occurrence Data. Copenhagen: Global Biodiversity Information Facility.
- Christidis, L. and W. Boles. 2008. Systematics and Taxonomy of Australian Birds.
- Cui, H. 2008. Converting Taxonomic Descriptions to New Digital Formats. *Biodiversity Informatics* 5: 20-40.
- Daltio, J. and C. Bauzer Medeiros. 2008. Aonde: Um Serviço Web de Ontologias para Interoperabilidade em Sistemas de Biodiversidade.
- Diniz-Filho, J.A.F., L.M. Bini, C.M. Vieira, D. Blamires. 2008. Spatial Patterns of Terrestrial Vertebrate Species Richness in the Brazilian Cerrado. *Zoological Studies* 47(2): 146-157
- Fior, C. and G. Notarangelo. 2008. Utilizzo di XML per semplificare lo scambio delle conoscenze nella pianificazione forestale. *Foresta è la rivista della Società Italiana di Selvicoltura ed Ecologia Forestale*. ISSN 1824-0119 Reg. Trib. PR no. 16/2004.
- Foley, D.H., A.L. Weitzman, S.E. Miller, M. Faran, L.O.M. Rueda, and R.C. Miller. 2008. The value of georeferenced collection records for predicting patterns of mosquito species richness and endemism in the Neotropics. *Ecological Entomology* 33: 12-23.
- Gallagher, R.V., L.J. Beaumont, P.O. Downey, L. Hughes, M.R. Leishman. 2008. Projecting the Impact of Climate Change on Bitou Bush and Boneseed Distributions in Australia. *Plant Protection Quarterly* 23(1).
- Gotelli, N.J. 2008. Hypothesis testing, curve fitting, and data mining in macroecology.
- Graham, J., A. Simpson, A. Crall, C. Jarnevich, G. Newman, and T.J. Stohlgren. 2008. Vision of a Cyberinfrastructure for Nonnative, Invasive Species Management. *BioScience Article*: 263-268.
- Hartemink, A.E., A. McBratney and M. de L. Mendonça-Santos. 2008. Towards a Data Quality Management Framework for Digital Soil Mapping with Limited Data. 10.1007/978-1-4020-8592-5_11.

- Hof, C.H.J. 2008. The virtues of digitised biodiversity data in a global information infrastructure. *EAZA News* 68: 28.
- Jeltscha, F., K.A. Moloneyb, F.M. Schurra, M. Köchya, and M. Schwage. 2008. The state of plant population modelling in light of environmental change.
- Jones, O.R., T. Clutton-Brock, T. Coulson, and H.C.J. Godfray. 2008. A web resource for the UK's long-term individual-based time-series (LITS) data. *Journal of Animal Ecology* 77: 612-615.
- Kalliola, R., T. Toivonen, V. Miyakawa and M. Mavila. 2008. Open access to information bridges science and development in Amazonia: lessons of the SIAMAZONIA service. *Environ. Res. Lett.* 3.
- Knapp, S. 2008. Taxonomy as a team sport. Chapter 3 (pp. 33-50) in Wheeler, Q. (ed.). *The New Taxonomy* (Systematics Association Special Volume series 76). CRC Press. 237 pp. ISBN 978-0-8493-9088-3.
- Koch, F. H., and W. D. Smith. 2008. Spatio-Temporal Analysis of *Xyleborus glabratus* (Coleoptera: Circulionidae: Scolytinae) Invasion in Eastern U.S. Forests. *Environmental Entomology Article*: pp. 442-452.
- Lang, D., A.D. Zimmer, S.A. Rensing, and R. Reski. 2008. Exploring plant biodiversity: the *Physcomitrella* genome and beyond. *Trends in Plant Science* 13 (10): 542-549.
- Levi C.T., R. Pereira Bastos, G. de Oliveira and B. de Souza. 2008. Schema driven assignment and implementation of life science identifiers (LSIDs). *Journal of Biomedical Informatics* 41 (5): 730-738.
- Lobo, J.M. 2008. Database records as a surrogate for sampling effort provide higher species richness estimations. *Biodiversity and Conservation* 17 (4).
- Malamud, R. 2008. Life as we know it. *Chronicle of Higher Education* 54 (46). 25 July 2008 ISSN: 00095982
- Mayo, S. J., R. Allkin, W. Baker, V. Blagoderov, I. Brake, B. Clark, R. Govaerts, C. Godfray, A. Haigh, R. Hand, K. Harman, M. Jackson, N. Kilian, D.W. Kirkup, I. Kitching, S. Knapp, G.P. Lewis, P. Malcolm, E. von Raab-Straube, D.M. Roberts, M. Scoble, D.A. Simpson, C. Smith, V. Smith, S. Villalba, L. Walley and P. Wilkin. 2008. Alpha e-taxonomy: responses from the systematics community to the biodiversity crisis. *Kew Bulletin* 63 (1). March, 2008.
- Milius, S. 2008. Biological Moon Shot: Realizing the dream of a Web page for every living thing. *Science News Online* 173 (5): 72. Week of 2 Feb 2008.
- Moore, J.D., S.P. Kell, J.M. Iriondo, B.V. Ford-Lloyd and N. Maxted. 2008. CWRML: representing crop wild relative conservation and use data in XML. *BMC Bioinformatics* 9: 116.
- Mora, C., D.P. Tittensor and R.A. Myers. 2008. The completeness of taxonomic inventories for describing the global diversity and distribution of marine fishes. *Proceedings of the Royal Society B (Biological Sciences)* 275: 149-155. doi 10.1098/rspb.2007.1315.
- Moreira, D. de O., B.R. Couthino and S.L. Mendes. 2008. Interoperabilidade em Sistemas de Biodiversidade
- Nehm, R.H. and A.F. Budd. 2008. The Neogene Marine Biota of Tropical America ("NMITA") Database: Integrating Data from the Dominican Republic Project. *Topics in Geobiology Volume* 30.
- Nesshöver, C., R. Müssner, K. Henle, and I. Sousa Pinto. 2008. Linking Biodiversity Research and Policy in Europe. *AMBIO: A Journal of the Human Environment Article*: pp. 138-141.

- Nijman, V., M. Aliabadian, A.O. Debrot, J.A. de Freitas, L.G.L. Gomes, T.G. Prins and R. Vonk. 2008. Conservation status of Caribbean coot *Fulica caribaea* in the Netherlands Antilles and other parts of the Caribbean. *Endangered Species Research* 4: 241-246.
- Page, R.M. 2008. LSID Tester, a tool for testing Life Science Identifier resolution services. *Source Code for Biology and Medicine* 3:2. doi:10.1186/1751-0473-3-2.
- Page, R.D.M. 2008. Biodiversity informatics: the challenge of linking data and the role of shared identifiers. *Briefings in Bioinformatics*. Advance Access published online on April 29, 2008. doi:10.1093/bib/bbn022.
- Page, R.D.M. 2008. LSID Tester, a tool for testing Life Science Identifier resolution services. *Source Code Biol Med.* 3: 2.
- Remsen, D. and M. Lane. 2008. Taxonomically informed biodiversity informatics supports taxonomy. *EDIT Newsletter* 9: 10-12. ISSN 1958-5152.
- Roberts, D. and V. Chavan. 2008. Standard identifier could mobilize data and free time. *Nature* 453: 449-450.
- Rönkä, M., H. Tolvanen, E. Lehtikainen, M. von Numers and M. Rautkari. 2008. Breeding habitat preferences of 15 bird species on south-western Finnish archipelago coast: The applicability of digital spatial data archives to habitat assessment. *Biological Conservation* (article in press, available online 19 Dec 2007). doi:10.1016/j.biocon.2007.10.010.
- Scholes, R. J., G. M. Mace, W. Turner, G.N. Geller, N. Jürgens, A. Larigauderie, D. Muchoney, B.A. Walther, H.A. Mooney. 2008. Toward a Global Biodiversity Observing System. *Science* 321(5892): 1044-1045. doi: 10.1126/science.1162055.
- Scoble, M. J. 2008. Networks and their role in e-taxonomy. Chapter 2 (pp. 19-31) in Wheeler, Q. (ed.). *The New Taxonomy* (Systematics Association Special Volume series 76). CRC Press. 237 pp. ISBN 978-0-8493-9088-3.
- Soria-Auza, R. W. and M. Kessler. 2008. The influence of sampling intensity on the perception of the spatial distribution of tropical diversity and endemism: a case study of ferns from Bolivia. *Diversity & Distributions* 14(1): 123-130. doi: 10.1111/j.1472-4642.2007.00433.x.
- Speers, L. and J.L. Edwards. 2008. International infrastructure for enabling the New Taxonomy: The role of the Global Biodiversity Information Facility (GBIF). Chapter 6 (pp. 88 - 94) in Wheeler, Q. (ed.). *The New Taxonomy* (Systematics Association Special Volume series 76). CRC Press. 237 pp. ISBN 978-0-8493-9088-3.
- Stephenson, S. L., M. Schnittler and Y. K. Novozhilov. 2008. Myxomycete diversity and distribution from the fossil record to the present. *Biodiversity and Conservation* 17(2): 285-301. doi 10.1007/s10531-007-9252-9.
- Tamilselvi, J. Jebamalar and V. Saravanan. 2008. A Unified Framework and Sequential Data Cleaning Approach for a Data Warehouse. *International Journal of Computer Science and Network Security* 8 (5). May 2008.
- Vieira, C.M. 2008. Modelagem por auto-regressão da riqueza de espécies no Cerrado Brasileiro. *Brazilian Journal of Biology* [online] 68 (2): 233-240. ISSN 1519-6984.
- Vieira, C.M., D.I. Blamires, J.A.F. Diniz-Filho, L.M. Bini, T.F.L.V.B. Rangel. 2008. Autoregressive modelling of species richness in the Brazilian Cerrado. *Brazilian Journal of Biology* [print] 68 (2) ISSN 1519-6984
- Youatt, R. 2008. Counting Species: Biopower and the Global Biodiversity Census. *Environmental Values* 17 (3): 393-417.

Annex 5 - GBIF Publications, Posters, DVDs and CDs

Publications:



Kelling, S. 2008. Significance of organism observations: Data discovery and access in biodiversity research. Report for the Global Biodiversity Information Facility, Copenhagen (ISBN: 87-92020-08-9), accessible at http://www2.gbif.org/Observational_Data.pdf



The SEP-CEPDEC Cooperation, GBIF Secretariat, Copenhagen, October 2008, Pamphlet (Language: English)

La coopération SEP-CEPDEC, GBIF Secretariat, Copenhagen, October 2008, Pamphlet (Language: French)



Recommendations of the GBIF Observational Data Task Group (contributors: Steve Kelling, Baban Ingole, Brenda Daly, Bruce Stein, Denis Lepage, Éamonn Ó Tuama, Jerry Cooper, Matthew Jones, Tapani Lahti, Vishwas Chavan). GBIF Technical Report No. 1/2008, September 2008. pp. 21



Recommendations of the GBIF Multimedia Resources Task Group (contributors: Robert Morris, Annette Olson, Éamonn Ó Tuama, Greg Riccardi, Greg Whitbread, Gregor Hagedorn, Ivan Teage, Mikko Heikkinen, Patrick Leary, Vijay Barve, Vishwas Chavan). GBIF Technical Report No. 2/2008, September 2008. pp. 28

GBIF newsletter: GBits no. 3-8

The bi-monthly newsletter from the GBIF Secretariat. Available at http://www.gbif.org/GBIF_org/newsletter

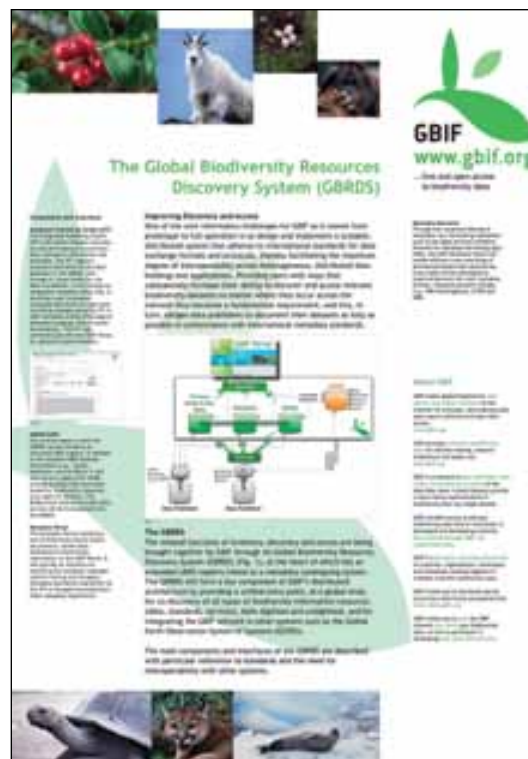


Posters

Posters presented at the Biodiversity Information Standards (TDWG) Annual Conference 2008, Western Australian Maritime Museum, Victoria Quay, Fremantle (Perth), Australia, 19-25 October 2008



Abstract:
<http://www.tdwg.org/proceedings/article/view/397>

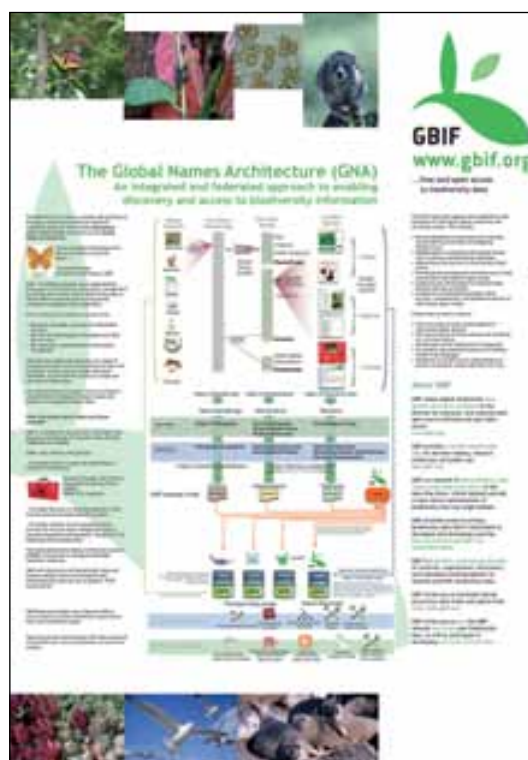


Abstract:
<http://www.tdwg.org/proceedings/article/view/395>



Abstract:
<http://www.tdwg.org/proceedings/article/view/394>

Poster presented at the IUCN World Conservation Congress, Centre de Convencions Internacional de Barcelona (CCIB), Barcelona, Spain, 5-14 October 2008



Abstract:
<http://www.tdwg.org/proceedings/article/view/399>



Abstract:
<http://www.tdwg.org/proceedings/article/view/403>



All GBIF posters can be downloaded
 freely from http://www.gbif.org/GBIF_org/posters

CDs and DVDs

GBIF Training CDs on Node Management (CD)



GBIF Training Manual I: Digitisation of Natural History Collections Data (CD)
Available from http://www.gbif.org/GBIF_org/GBIF_Publications/trainingmanual1/index_html



GBIF Promotional Country DVDs:

- | | |
|----------------------|------------------------|
| 1. Bolivia | 14. Latvia |
| 2. Brunei Darussalam | 15. Malaysia |
| 3. Brazil | 16. Myanmar |
| 4. Cambodia | 17. Pakistan |
| 5. China | 18. Philippines |
| 6. Cuba | 19. Romania |
| 7. Ecuador | 20. Russian Federation |
| 8. Greece | 21. Singapore |
| 9. India | 22. South Africa |
| 10. Indonesia | 23. Thailand |
| 11. Italy | 24. Uganda |
| 12. Kenya | 25. Venezuela |
| 13. Laos PDR | 26. Vietnam |



Annex 6 - Acronyms Used in this Report

| | |
|-----------|---|
| ABBIF | Amazon Basin Biodiversity Information Facility |
| ACTO | Amazon Cooperation Treaty Organization |
| ANDINONET | BioNET’s Andean Country Network |
| ASEAN | Association of Southeast Asian Nations |
| ASEANET | BioNET’s South East Asian Network |
| BCI | Biodiversity Collections Index |
| BGCI | Botanic Gardens Conservation International |
| BioCAN | Biodiversity Program of the Andean Community |
| BioCASE | Biological Collection Access Services for Europe |
| BioNET | BioNET-INTERNATIONAL |
| CAN | Community of Andean Nations |
| CBD | Convention on Biological Diversity |
| CBOL | Consortium for the Barcode of Life |
| CEPDEC | Capacity Enhancement Programme for Developing Countries |
| CETAF | Consortium of European Taxonomic Facilities |
| CGIAR | Consultative Group on International Agricultural Research |
| CIAT | International Center for Tropical Agriculture |
| CIMMYT | International Maize and Wheat Improvement Center |
| CMS | Convention on Migratory Species |
| CoP | Conference of Parties of United Nations Conventions |
| COSTECH | Commission for Science and Technology (Tanzania) |
| CRIA | Centro de Referência em Informação Ambiental |
| CSIC | Consejo Superior de Investigaciones Científicas, National Research Council, Spain |
| CSV | Comma separated values |
| CYTED | Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (Spain) |
| DADI | Data Access and Database Interoperability (GBIF) |
| DanBIF | Danish Biodiversity Information Facility |
| DCTG | Data Citation Task Group |
| DiGIR | Distributed Generic Information Retrieval |
| 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 |
| EML | Ecological Metadata Language |
| EoL | Encyclopedia of Life |
| EU | European Union |
| EWT | Endangered Wildlife Trust |
| FAO | UN Food and Agriculture Organization |
| GB15 | 15th Governing Board meeting |

| | |
|----------|--|
| GBIF | Global Biodiversity Information Facility |
| GBRDS | Global Biodiversity Resources Discovery System |
| GEO | Group on Earth Observations |
| GEO BON | Group on Earth Observations Biodiversity Observation Network |
| GEOSS | Group on Earth Observations System of Systems |
| GNA | Global Names Architecture |
| GNI | Global Names Index |
| GNUB | Global Names Usage Bank |
| GPSC | Global Pollinator Species Campaign |
| GROMS | Global Registry on Migratory Species |
| GSAP-NHC | Global Strategy and Action Plan for Mobilisation of Natural History Collections Data |
| GUID | Globally Unique Identifier |
| HIT | Harvesting Indexing Toolkit (GBIF) |
| IABIN | Inter-American Biodiversity Information Network |
| ICIPE | African Insect Science for Food and Health (formerly the International Centre for Insect Physiology and Ecology) |
| ICTVdb | Universal Virus Database of the International Committee on Taxonomy of Viruses |
| ICZN | International Commission on Zoological Nomenclature |
| IDA | Inventory, Discovery, Access (GBIF) |
| IISE | International Institute for Species Exploration |
| ILTER | International Long Term Ecological Research |
| INBio | Asociación Instituto Nacional de Biodiversidad (Costa Rica) |
| IOC | Intergovernmental Oceanic Commission |
| IPBES | Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services |
| IPGRI | International Plant Genetic Resources Institute (now part of Bioversity International) |
| IRD | Institut de Recherche pour le Développement |
| IPR | Intellectual Property Rights |
| IPT | Integrated Publishing Toolkit |
| IUCN | International Union for the Conservation of Nature |
| ISIS | International Species Information System |
| IT | Information technology |
| ITIS | Integrated Taxonomic Information System |
| JRC | Joint Research Centre |
| LSID | Life Science Identifiers |
| MCZ | The Harvard Museum of Comparative Zoology |
| MoC | Memorandum of Cooperation |
| MoU | Memorandum of Understanding |
| MRTG | Multimedia Resources Task Group |
| MSEF | Major Systematic Entomology Facilities |
| NBDC | National Biodiversity Data Centre |
| NBIF | National Biodiversity Information Facility |

| | |
|-----------|---|
| NIBIF | Netherlands Biodiversity Information Facility |
| NordGen | Nordic Genetic Resource Centre |
| NPT | Nodes Portal Toolkit |
| NSCA | Natural Science Collections Alliance |
| OAI-PMH | Open Archives Initiative - Protocol for Metadata Harvesting |
| OBIS | Ocean Biogeographic Information System |
| ODTG | Observational Data Task Group |
| OGC | Open Geospatial Consortium |
| PBIF | Pacific Biodiversity Information Forum (Pacific Node of GBIF) |
| PESI | Pan-European Species-directories Infrastructure |
| RBGE | Royal Botanic Garden Edinburgh |
| RDMFA | Royal Danish Ministry of Foreign Affairs |
| REST | Representational State Transfer |
| RIA WDPa | Rich Internet Application - World Database on Protected Areas |
| SADC | Southern African Development Community |
| SANBI | South African National Biodiversity Institute |
| SAFRINET | Southern African Network of BioNET-INTERNATIONAL |
| SBSTTA | Subsidiary Body on Scientific, Technical and Technological Advice (CBD) |
| SCAR | Scientific Committee on Antarctic Research |
| SEP | Sud Expert Plantes |
| SINGER | CGIAR System-wide Information Network on Genetic Resources |
| SMEBD | Society for the Management of Electronic Biodiversity Data |
| SPNHC | Society for the Preservation of Natural History Collections |
| SSTN | Specimen and Species Thematic Network |
| TanBIF | Tanzanian Biodiversity Information Facility (GBIF Node of Tanzania) |
| TAPIR | TDWG Access Protocol for Information Retrieval |
| TDWG | Taxonomic Databases Working Group / Biodiversity Information Standards |
| UDDI | Universal description discovery and integration (registry) |
| UNEP-WCMC | United Nations Environment Programme - World Conservation Monitoring Centre |
| UNFCCC | United Nations Framework Convention on Climate Change |
| URI | Uniform Resource Identifier |
| VLIZ | Flanders Marine Institute |
| WDCBE | World Data Center for Biodiversity and Ecology |
| WDPA | World Database of Protected Areas |
| WFCC | World Federation of Culture Collections |
| WFS | Web feature service |
| WMS | Web mapping service |
| WoRMS | World Register of Marine Species |
| WP | Work Programme |



**GLOBAL
BIODIVERSITY
INFORMATION
FACILITY**

www.gbif.org

GBIF
Universitetsparken 15
DK-2100 Copenhagen Ø
Denmark
Tel.: +45 35 32 14 70
Fax.: +45 35 32 14 80
Email: info@gbif.org