

Supporting Biodiversity Science for the 21st Century

A vision for GBIC 2012

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In the next few weeks a hundred experts from around the world with backgrounds in biodiversity science, informatics, conservation and policy will meet in Copenhagen for the Global Biodiversity Informatics Conference (GBIC, 2-4 July 2012), hosted by GBIF and the University of Copenhagen and organised in conjunction with [CReATIVE-B \(Lifewatch\)](#), the [Encyclopedia of Life](#), the [Consortium for the Barcode of Life](#) and the [Natural History Museum](#), London. GBIC has been planned to help GBIF and the broader biodiversity informatics community to develop a Global Biodiversity Informatics Outlook (GBIO) document to serve as a strategy and roadmap for our activities in the coming decade. GBIC and the GBIO are a response to the world's urgent need for improved understanding of the complexity and patterns of global biodiversity and to continuing enhancements in the tools, systems and policies which enable us to observe biodiversity and handle the resulting data.

In effect, GBIF and its partners are seeking to develop a vision for a 21st-century informatics-based biodiversity science.

Our knowledge of the natural world and its complexity continues to grow at a staggering rate. We are learning more and more of the intricate complexity of DNA-based life and how the various products of evolution interact to create even more levels of complex system. In many ways we are still engaged in the same endeavour as individuals such as Gilbert White, Jean-Henri Fabre, Linnaeus and Darwin. We are still trying to develop an understanding of the natural world and how it operates – but now we can see more levels to this complexity than those earlier naturalists could have imagined. Biodiversity research activities around the globe rely on access to high-quality data on all aspects of these systems.

At the same time, the Third Global Biodiversity Outlook (GBO3) has concluded that there is a high risk of dramatic biodiversity loss and accompanying degradation of a broad range of ecosystem services if ecosystems were pushed beyond certain thresholds or tipping points. The conclusions of GBO3 have prompted the adoption of a new set of targets under the Strategic Plan for Biodiversity 2011-2020. These are known as the Aichi Biodiversity Targets and cover a wide range of direct and indirect threats to biodiversity and impacts on the functioning and prosperity of human society. The Executive Secretary of the CBD, Braulio Dias, has acknowledged that the lack of consistent baseline data and ongoing monitoring of biodiversity has been a “major obstacle towards improving the scientific evidence of the consequences of biodiversity loss” and that the Aichi Targets will only be achieved with great improvements in this evidence base .

Meanwhile we are fortunate to have in our hands an increasing number of tools to assist us with measuring, recording and observing this complex system. We have rapid sequencing technologies, a wealth of imaging systems, remote-sensing systems, physical and chemical sensors of all kinds, global-positioning tools, the information backbone and processing power of the web and modern high-

performance computing, a global workforce of biologists with greater understanding of evolutionary processes than ever before, an army of amateur observers and potential contributors to our understanding. We also have increasing political recognition of the importance of our understanding this system and applying that understanding to support a sustainable future for mankind, the planet and all the other species around us.

The first task for GBIC is therefore to consider the virtual tool-box of instruments that are already at our disposal or just around the corner for observing, measuring and characterising biodiversity. What is realistically measurable? What kinds of data sets could be gathered if sufficient funding and support were made available? Such data sets could include very traditional forms of data (specimen databases, taxonomic hierarchies, character matrices) all the way through to classes of data that most biologists have not begun to consider. Even for the more traditional data types, there may be informatics-based ways to capture and manage these data at scales or rates of capture magnitudes higher than have traditionally been possible. What tools could we use to build a comprehensive observing/recording network for biodiversity in the next decade?

The next task for GBIC will be to understand what we may be able to achieve with these tools at our disposal. Combining different classes of data – provided these data are sufficiently comprehensive and reliable – may allow us to attach the problems that interest us in completely novel ways. Recognising what may be possible will help to identify the most important areas for investment and for closer collaboration between national, regional and global initiatives. The attendees at GBIC are being brought together to stimulate thinking on these possibilities and to develop a vision for ways in which informatics can support and transform research over the coming decade.

The GBIC organisers and workshop leaders will use the discussions from these three days of workshops to develop the GBIO and to present an integrated strategy for biodiversity informatics during the Decade of Biodiversity. The GBIO will focus on how this strategy will provide opportunities to support and accelerate fundamental biodiversity research and, through such support for science, contribute to the response to internationally recognised priorities such as the Aichi Targets.

Our aim is to develop broad consensus and collaboration around implementing the resulting strategy. We therefore plan to circulate drafts of the GBIO as soon as possible after GBIC and encourage all those with an interest in the use of biodiversity data to review and respond to the document. An early version will also be presented and discussed at the GBIF Governing Board meeting in September and subsequently at the Convention on Biological Diversity (CBD) COP 11 meeting in Hyderabad in October. Follow up meetings will be scheduled during 2013 to promote take-up of GBIO's recommendations among key stakeholders.