RESPONSE FROM GBIF TO
QUESTIONS FOR FURTHER CONSIDERATION

A. Policy support tools and methodologies developed or used under the Convention and their adequacy, impact and obstacles to their uptake, as well as gaps and needs for further development of such tools and methodologies

- How adequate are the policy support tools or methodologies developed or used by the Convention?

The Strategic Plan for Biodiversity 2011-2020 offers a remarkable overarching policy framework that covers not only the needs of the Convention on Biological Diversity but also the other Conventions, as well for the entire United Nations system. This plan also serves for many organisations like the Global Biodiversity Information Facility and its participant countries and organisations as a mean to translate the identified goals into institutional priorities. While the Strategic Plan for Biodiversity offers a set of targets to be achieved by 2020, many organisations may feel that these are inadequately articulated and do not cover all targets they would expect to see listed. For example, the Strategic Plan does not address sufficiently the negative impacts of climate change on biotic and abiotic stresses.

The Global Strategy for Plant Conservation 2011-2020 (GSPC) offers through its five goals a much narrower and precise set of targets to reduce the extinction of plants around the world. The GSPC offers for GBIF a more adequate framework for contributing to effective plant conservation, in particular through the use of biodiversity evidence information. Taking into consideration the type of information GBIF is mobilising today for the scientific community, the linkage with the taxonomic, temporal and geospatial dimensions offers to GBIF a better means to contribute to the individual targets.

The other policy support tools and instruments (e.g. CBD Work Programmes) do also offer an adequate policy framework environment, in particular for GBIF Participant countries that are parties to the Convention. From a Secretariat point of view, we have decided not to address these since we believe that individual parties through this consultation process will provide more accurate and detailed information regarding their adequacy.

Overall, the GBIF Secretariat is of the opinion that the Strategic Plan for Biodiversity 2011-2020 and the Global Strategy for Plant Conservation 2011-2020 are both offering an adequate overarching framework and support mechanism. We are also of the opinion that the real challenges are to develop meaningful baselines and indicators at national, regional as well as global levels to monitor progress during the period 2011-2020. In this context, the associated Biodiversity Indicator Partnership (BIP) is a critical instrument to mobilize the scientific community in assisting countries to develop key indicators to monitor progress towards 2020 Targets. We are however concerned that funding support for the development of global, regional and national indicators is currently lacking. This situation may affect the collaboration between key international contributors such as GBIF, IUCN, UNEP-WCMC and many others in providing the most appropriate biodiversity data, methodology and scientific results required for this process.

- What has been their applicability and impact at the national level?

The applicability of such policy support tools depends largely on the availability of essential biodiversity information, in particular biodiversity evidence at the species, temporal and geospatial levels. Unfortunately in many circumstances we have observed that the absence or scarcity of such essential data has prevented some of our Participant countries from fully take advantage of these policy instruments. On the other hand, we

have recently observed that some of our Participant countries have made successful use of GBIF mediated data in the development of national biodiversity and ecosystem assessments (e.g. South Africa) as well as NBSAPs. The recent development of coherent national biodiversity information systems or national Biodiversity Information Facilities (BIF) in support of the mission of the GBIF can greatly support the development of baselines and indicators for the relevant policy instruments. We therefore expect to see in the future an increased level of application and consolidation of national information systems making use of essential global information resources such as GBIF, in particular for developing countries.

- What have been the challenges or obstacles to their use or uptake at the national level?

In recent years, we have observed that the main obstacle for parties to make optimum use of these policy support tools and methodologies is the scarcity of biodiversity-related information. In many circumstances parties have been unable to build comprehensive national species checklists, which is a critical initial step before assessing the state, threats, trends and benefits of biodiversity and ecosystems. The development of baselines and indicators has been limited and in many cases based on subjective assessments. Therefore, we consider that the main obstacle today for parties to make best use of these policy support tools is the lack of knowledge of the state, threats to, trends and benefits of biodiversity and therefore the lack of adequate data and information.

- Bearing in mind that not all policy support tools and methodologies necessarily need to be developed by the Convention, what other tools developed nationally or by other organizations are relevant?

Over recent years, we have observed that many parties have successfully developed national biodiversity and ecosystem assessment reports based on reliable information. We believe that the most critical step for parties is the development of coherent national biodiversity and ecosystem information systems. Such systems should be the main national discovery access point to all national biodiversity and ecosystems information resources, coupled with mechanisms to deliver comprehensive summary reports for scientists and policy-makers on the state of biodiversity and ecosystems. We believe that the Global Biodiversity information Facility and its Participants offer an ideal intergovernmental platform for the development of best practices and guidelines for the establishment of such national information systems. Collaboration is on-going with other initiatives and in particular IPBES and the Group on Earth Observation Network (GEO-BON) with similar objectives.

The Global Biodiversity Outlook: With the adoption of the Aichi targets, governments have recognized the importance of this undertaking. Target 19 explicitly sets the goal of improving our knowledge about biodiversity. Meeting the other targets will require, among many other things, a better understanding of how ecosystems work, to underpin effective policy in support of the wider vision of living in harmony with nature. In July 2012, the first Global Biodiversity Informatics Conference was held in Copenhagen – Denmark. The participants in GBIC looked at some of the key informatics capabilities, tackling questions raised by the global targets to end biodiversity loss (the Aichi Targets), and prioritizing actions for 'game-changing' strategies to provide better information about biodiversity.

The Global Biodiversity Informatics Outlook (GBIO), a key outcome of the GBIF, offers a blueprint for a coordinated effort towards this end. Developed in consultation with a diverse range of specialists in biodiversity science, policy and information technology, it has four main focus areas: putting the right foundations in place; increasing the mobilization of data by orders of magnitude; improving and aggregating those data to ensure that they are open to discovery both by people and through automated tools; and working across disciplines to generate new knowledge. Broken

down into more detailed components, the outlook provides a realistic roadmap towards a much more complete understanding of life on Earth.

The GBIO provides a mechanism through which progress in these focus areas and components can be tracked, helping to guide effort and funding in support of improved knowledge of biodiversity.

Similar developments are happening at national levels such as for India where a 'National Biodiversity Information Outlook' (NBIO) was developed and is becoming the foundation for leading future support to host biodiversity informatics activities. The NBIO is intended to form an essential component of the national effort to support the development of the National Biodiversity Strategy and Action Plan (NBSAP) for India as well as contributing to the GBIO objectives.

B. Adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in the Aichi Biodiversity Targets

- How adequate are the observations and data systems in your country for reporting on the issues addressed in each of the Aichi Biodiversity Targets?

The Global Biodiversity Information Facility (GBIF) was established by governments in 2001 to encourage free and open access to biodiversity data, via the Internet. Through a global network of countries and organizations, GBIF promotes and facilitates the mobilization, access, discovery and use of information about the occurrence of organisms over time and across the planet. Today GBIF provides access to approximately 400 million biodiversity occurrence records from more than 450 publishers worldwide, representing a total of 10,000 datasets. As such GBIF is a discovery window to biodiversity data published by countries around the world and therefore an ideal mechanism to assess the availability and adequacy of observations and data systems. For many developed countries, GBIF provides access to very comprehensive species distribution information with a relatively high temporal span. However, recent analysis of the biodiversity data mobilized through GBIF also showed that gaps in the content are observed for key species such as endangered species (e.g. from the IUCN Red List), invasive alien species, plants, etc. Therefore the underlying occurrence or biodiversity evidence data to support for example Aichi Target 9 on Invasive Alien Species (IAS) are insufficient for all identified species (using the IUCN ISSF Global Invasive Species Database as a reference). In most cases large portions of the species distribution area lack sufficient information to estimate properly the potential range expansion of the species as well as its native area. In terms of taxonomy coverage, GBIF provides information on more than 1 million species in total. Compared to an authoritative reference like Catalogue of Life (CoL) offering more than 1.5 million species referenced on earth, the total number of species catalogued in GBIF is therefore quite impressive. On the other hand, only 58% of the species have at least one single geo-referenced occurrence, and fewer than 22% have more than 10 georeferenced occurrence (i.e. presence in more than 10 grid squares of 1/10 degree each). Finally, fewer than 6% of the species catalogued in GBIF have a presence greater than 100 occurrence records. These simple indicators of fitness-for-use for assessing species distribution (e.g. using ecological niche modelling techniques) demonstrate that greater efforts are urgently needed at national level to collect, document, digitize and publish occurrence data. The key take-home message for parties to the CBD is that 1) a large volume of occurrence data is available through the GBIF network of country participants, but 2) this volume does not yet enable proper assessment of the key indicators of biodiversity threats, status and changes at a large scale and for a vast number of species. In conclusion, the actual state of occurrence data availability is still

suboptimal and will enable only the proper monitoring of biodiversity over time and space only for a limited number of species. The role of GBIF is therefore fundamental in 1) facilitating data publishing, 2) providing coordinated data discovery and access as well as 3) providing an evaluation mechanism for assessing completeness and coverage. The role of parties in this endeavour would be to commit to a data sharing culture as well as engage in the development of coherent national biodiversity information system providing key services such as the provision of up-to-date national checklists.

- What would be needed to improve their adequacy?

At the Global Biodiversity information Facility Secretariat, it is felt that urgent attention should be given to the establishment of proper long-term observation of biodiversity with particular attention to areas where gaps are observed. This could take the form of large-scale data observatories requiring proper long-term investments from the international community. Particular attention is required for key areas such as biodiversity hotspots, protected areas, RedList species (e.g. threatened & endangered species), invasive alien species, etc. Such investments in monitoring key priority species, priority areas and ensuring long-term monitoring are urgently required to enable proper assessments for example of Aichi Targets 9, 10, 11, 12, 13 and 14.

- What are the opportunities to make enhancements in the following areas: (i) *in situ* observations, (ii) remote sensing information, (iii) data management, (iv) data analysis and (v) preparation of decision support tools (e.g. indicators)?

(i) *in situ* observations: After more than 10 years of existence GBIF has made more than 400 million occurrence data discoverable. In recent years, we have observed an exponential increase of data from citizen scientist groups (especially bird watchers), which demonstrates the potential of some leading communities in collecting, managing and publishing biodiversity evidence data. These recent developments also show how much *in situ* observation can be rapidly generated as well as curated online (e.g. taxonomy verification, tagging etc.) by a disparate but committed community. These recent developments have focused very much on animal data but similar growth is being observed for plant records through networks such as iNaturalist and iSpot. We also believe that substantial and cost effective progress could be achieved through the establishment of long-term observatories across the globe, which will support the collation of temporal data within delimited geospatial boundaries. Such efforts will enable the generation of a vast volume of high-quality and high-value information that can easily support the assessment of indicators for many of the Aichi Targets as well as GSPC Targets.

(ii) remote sensing information: While this is not the field of expertise of GBIF, this essential source of data combined with biodiversity observation could provide essential information regarding potential future changes in species diversity patterns (e.g. related to land use changes). We consider that this area needs appropriate attention in conjunction with sustained efforts to mobilize *in situ* observations.

(iii) Data management: While this is not strictly within the mandate of our organization, the data management component is one of the key fundamental requirements for the collection and provision of quality observation information. A key role for Parties is therefore to ensure the establishment of sustainable data repositories and the GBIF community could provide a pool of expertise and knowledge for their establishment. The key requirement today is the adoption of agreed international data standards to best describes biodiversity evidence information, as well as new standards (e.g. for abundance data, genomics). Therefore we believe that the best opportunity to enhance data management of biodiversity information is the adoption of international recommendations at the

SBSTTA level on agreed data standards to document biodiversity, as well as the commitment of parties to provide free and open access to such information to the international community. The development of free and open source management software is a priority, in particular for developing countries. In the last few decades, many high-quality data management software tools have emerged and are being used widely by the collection managers such as in natural history museums. The promotion of existing high-quality, open source and free solutions should be a priority, as well as the provision of multi-lingual training courses. GBIF for example is promoting the adoption of its open-source data-publishing tool – The Integrated Publishing Toolkit (IPT) – that is now adopted and used by a wide community of data publishers worldwide.

(iv) Data analysis: In terms of data mobilization and aggregation of large volumes of data, GBIF provides a global information exchange platform already in use by most of the parties of the convention. However, we foresee that a future challenge faced by the community involved in contributing to the Strategic Plan on Biodiversity will be the use of large data volumes accessible through interoperable research infrastructures. The volume of data we are managing today is growing at an exponential rate and this increasingly limits the ability of many parties to make optimum use/application of key indicators at regional and global levels (e.g. for invasive alien species). Access to affordable computing capacities as well as open source and/or free tools is becoming an impediment for many developing countries (e.g. in Africa and Latin America). GBIF is a key player in this field through the establishment of its global infrastructure providing not only discovery of biodiversity evidence data but also by providing essential web services that can be integrated in other applications, portals or more complex research infrastructures.

(v) Preparation of decision support tools: As mentioned before, many institutions and researchers have developed a series of decision support tools using GBIF mediated data. Examples include: the Local Ecological Footprinting Tool (LEFT[1]), developed by the Oxford Biodiversity Institute, which makes intensive use of data served through GBIF to help plan sensitive siting of development projects with minimum negative impacts; and the Wallace Initiative[2], involving a number of partners, which uses GBIF-mediated data to project the impact of climate change on the future distribution of nearly 50,000 plant and animal species. At the national level, some Parties have integrated GBIF mediated data to support the development of national assessments of biodiversity and ecosystems. Over the last decade, the use of biodiversity evidence data is gaining greater visibility in the development of decision support tools. The CBD Parties should consider promoting the use of global biodiversity information resources such as GBIF in addressing the Goals of the Strategic Plan on Biodiversity.

[1] http://www.biodiversity.ox.ac.uk/announcements/left-local-ecological-footprinting-tool/

[2] http://wallaceinitiative.org/