GROUP ON EARTH OBSERVATIONS

GEO BON working groups: Getting started

To start the GEO BON implementation process a variety of topical working groups were proposed at the January 2009 GEO BON Steering Committee meeting in Washington DC. These groups must now be formed and begin their work. To facilitate this process this note provides a draft description of each working group, suggests some WG members for each group, frames an overall approach to help each WG get started, and describes the essential output products that must be created.

Topical working groups are needed to begin the implementation of GEO BON. The immediate task of each working group is to develop an Implementation Plan for their topical area (later, the groups will focus on implementation itself). Developing the Implementation Plan consists of two basic tasks:

Task 1: Mapping the **concepts** in the Concept Document to the **activities** needed to implement them

Task 2: Creating a **plan**—the Implementation Plan—that describes the approach that will be used for implementation.

Each of these tasks should result in an output product created by the WG:

Task 1 product: A description of each of the major activities needed to implement the concepts in the Concept Document that are pertinent to the WG.

Task 2 product: An implementation plan specific for the WG's topical area. This would describe, for example, the major steps and milestones for each activity as well as who will (or could) perform them. It should also discuss how the implementing organizations will be identified and funded.

A few comments: First, creating these products is a very significant amount of work, and the WGs must recognize that considerable effort will be required. Second, within a WG there will be considerable variation in the maturity of different parts of the plan. In fact, many parts of the plan will change over time. This does not mean that new documents are continuously produced, just that the dynamic nature of implementation and its planning must be recognized and effectively dealt with.

One good approach for mapping Concepts to Activities would be to consult the Concept Document, identify those parts that are pertinent to the WG focus area, and then to discuss what must happen to implement the concepts in the Real World. It may be necessary to consider tradeoffs between, for example, accuracy, coverage, convenience, maturity of science, availability of expertise, resources, etc. Although difficult, some tradeoffs are inevitable because an implementation plan must be **realistic** or it will never be executed.

Regional BONs. It is very likely that GEO BON will work through a variety of regional BONs. EBONE is perhaps the most concrete example, but other regional BONs are forming such as Japan-BON, Afri-BON and Southeast Asia BON. These regional BONs will likely play a major role in implementation and the topical WGs will need to work with the regional BONs as these develop.

Strawperson Milestones (and some suggested dates):

Mostly completed	Identification of confirmed WG leads
Tuesday, 21 April	Mail out WG Getting Started doc to WG leds, with cover letter
5-May	First telecon with WG leaders: Official start (with GEO BON co-leads, WG leads; GEO sec). Afterwards, GEO Sec sends out email to full distribution list with request to consider participation in WGs
By week of 15th June	WG leads have established most of their WG membership
By week of 15th June	WG leads convene their WG via telecon; agree on approach, schedule, key milestones, outputs
Week of 15th June	2nd telecon with WG leads: status and plans
By 19th June	WG leads send several ppt slides on WG status to prep for SC meeting
22-23 June	Steering Committee meets
Various	Monthly telecons with all WG leaders on 3rd Thursday of each month
17-18 nov	GEO Plenary

Initial WG summaries follow. These descriptions are currently only drafts and must be updated by the appropriate WG leads. The first member listed (bold letters) is the WG leader. The other listed members are candidates only and must be confirmed; many of these names are extracted from similar WGs in EBONE, which was used as a model.

1 WORKING GROUP ON GENETICS

Group lead: Dan Faith (The Australian Museum, dpfaithma@yahoo.com.au)

Group members:

Global monitoring of genetic diversity aims to observe genetic diversity within species, populations and subspecies diversity. Genetic monitoring does not yet take place consistently; it is a rather new and open field. Several methods are being applied at present. Genetic diversity can be monitored using a combination of remote sensing and in situ approaches and combined with work at the ecosystem and species levels. The most obvious is direct observation of specific genetic components in selected target species. Another approach is observation of other biodiversity components, such as range extents for a representative set of species that are then integrated with models to infer genetic diversity with potential applications of Remote Sensed data. Applications are, among others, in agrobiodiversity, population diversity and population dynamics.

2 TERRESTRIAL SPECIES MONITORING PROGRAMMES

Group lead: Henrique Pereira (Universidade de Lisboa, hpereira@fc.ul.pt)

Group members:

Monitoring of species aims to observe long term developments in individual species, such as birds, butterflies, mammals, insects and plants. The Species component will focus on several critical aspects of species monitoring. The first is monitoring how species distribution and abundance are changing. Sampling schemes are mostly local to national, but for birds and butterflies some continental agreements exist. However, comparisons can only be made globally through harmonised sampling schemes or at least with the existence of metadata and protocols that allow analysis of the observation technique and density. For global assessments data should be prioritised, statistically reliable and cost efficient, utilizing representative species. Important issues are, among others, the standards between organisations, methods of monitoring, metadata agreements and international harmonisation. The second aspect is to facilitate access to, and creation of distribution maps for species. The third aspect is to link species monitoring to ecosystem services in articulation with the Ecosystem Services Working Group. A final important issue is how species-level and community-level modelling can be integrated with remotely sensed data to help assess the links between drivers of ecosystem change and species diversity change.

3 TERRESTRIAL ECOSYSTEM MONITORING

Group lead: Rob Jongman (Alterra, EBONE WP4, rob.jongman@wur.nl)

Group members:

Monitoring of ecosystem change aims to observe the long term changes in ecosystems under natural succession as well as under influence of human impact, land use change and climate change. The Terrestrial Ecosystems component of GEO BON will provide global information on terrestrial ecosystems, focusing on their distribution, extent, and condition, and how these parameters are changing over time. The observation of ecosystems is scale dependent and can be monitored at local to continental level. That means that upscaling and downscaling are important aspects. The drivers of these changes and their consequences are of particular interest, as are linkages between different ecosystems. The GEOSS Global Ecosystem Mapping Task, from the Ecosystems Societal Benefit Area, will be an important input to this work. Important issues are the development of comparable approaches for different continents to be able to report at a global level. Ecosystems allow comparisons between continents (Latin American and African savannah, wetlands over the world, tropical rain forests). This requires globally exchangeable definitions, methods, standards and metadata.

4 FRESHWATER ECOSYSTEM MONITORING

Group lead:

Group members:

Monitoring of freshwater ecosystems aims to observe species and population dynamics in different freshwater ecosystems and make global comparisons on systems and system changes under the influence of management, regulation and use. The Freshwater Ecosystems component of GEO BON will provide global information on freshwater ecosystems, focusing on their distribution, extent, and condition, and how these parameters are changing over time. The drivers of these changes and their consequences are of particular interest, as are linkages between different ecosystems. The global monitoring requires common approaches for standards in measuring chemical, physical and biological data, harmonization of approaches and agreement on exchangeable formats for metadata.

5 MARINE ECOSYSTEM MONITORING

Group lead: Jan W. de Leeuw (Royal NIOZ and Utrecht University, deleeuw@nioz.nl) & Carlo Heip (Royal NIOZ and NIOO-CEME, c.heip@nioo-knaw.nl)

Group members:

Monitoring of the marine environment aims to measure biodiversity changes in open oceans, coastal oceans, seas and their sediments at the species/population level and at the ecosystem level (water column, coral reefs, sea mounts, abyssal plains, subseafloor, etc). The Marine Ecosystems component of GEO BON will provide global information on marine species, populations and ecosystems, focusing on their distribution, extent, and condition, and how these are changing over time. The natural and human drivers of these changes and their consequences are of particular interest, as are linkages between different populations and ecosystems. This means standardisation or at least harmonisation of observing methods and agreement on the methods for observation and exchangeable formats for meta- and other data.

6 ECOSYSTEM SERVICES MONITORING

Group lead: Hal Mooney (DIVERSITAS International, hmooney@stanford.edu)

Group members:

Ecosystem services monitoring is an open field that has not yet been explored. GEO BON will conduct limited analyses, such as change detection, trend recognition, forward projections, range interpolations and model-based estimations of the supply of ecosystem services. Models will play a key role for changes that are hard to measure directly, as well as for predicting change, using readily available data such as that from remote sensing. GEO BON will support more detailed assessments undertaken by biodiversity and ecosystem assessment bodies. The working group will focus on global comparison studies in ecosystem services, its exchangeability and the use of common metadata standards. This information will form the basis for future assessments by the envisaged IPBES (Intergovernmental Platform for science-policy on Biodiversity and Ecosystem Services).

7 IN-SITU / REMOTE SENSING INTEGRATION: INTEGRATION AND MODELLING ACROSS SCALES

Group lead: Simon Ferrier (Simon.Ferrier@csiro.au)

Group members:

To enable effective detection and monitoring of biodiversity change GEO BON will give particular emphasis to the integration of in-situ (direct) and remote-sensing observations. This working group will focus on the analytical and modelling approaches needed to achieve such integration across a range of spatial scales (local to global). The work of the group will cut across that of a number of other groups, as it will consider techniques of relevance to multiple levels of biodiversity (genetic, species, ecosystem) across multiple environments (terrestrial, freshwater, marine). The broad types of analysis and modelling likely to be addressed by the group are outlined in section 2.5 of the GEO BON Concept Document, and include: 1) derivation of spatial surrogates for the baseline distribution of biodiversity through species-level and community-level modelling and extrapolation; 2) interpretation of remotely-sensed changes in the extent and condition of ecosystems through the "lens" of these modelled patterns in biodiversity distribution; 3) use of in-situ monitoring of biodiversity change at local scale to parameterise and calibrate assessments of change at regional and global scales derived through remote sensing; and 4) linking of this integrated assessment of observed change in biodiversity to broader efforts to model (forecast) future biodiversity change under alternative ecological and socio-economic scenarios.

8 DATA INTEGRATION AND INTER-OPERABILITY; INFORMATICS AND PORTALS

Group lead: Hannu Saarenmaa (hannu.saarenmaa@helsinki.fi)

Group members:

It is a significant challenge to coordinate, standardize, and manage in situ data that are collected by disparate institutions and individuals for differing purposes. The Census of Marine Life, and OBIS, its data integration component, can serve of an example how sharing data can make the sum more than the sum of its parts. GEO BON will create a distributed data and informatics system for research on the protection, management and sustainable use of biodiversity. It will consist of: a network of facilities, sites and collections for data generation; facilities for data integration and interoperability and will complement programmes linking in situ and remote earth observations such as the European GMES and global GEOSS observation systems. The challenge being faced today is the definition of a widely accepted standardized ontology, which means basic concepts with high and widespread commitment as core ontologies and extensions for specialized needs as domain ontologies. For terrestrial habitat data such ontology can be developed by the consistent use of life forms as biodiversity indicator (Bunce et al 2005). These life forms reflect the structure of vegetation and enable the main series of European habitats to be defined consistently.