

Recognising the need to improve our understanding of the Earth system and enhance our ability for informed decision making for the benefit of our planet and the sustainability of our societies, over 130 governments and leading international organisations are participating in the Group on Earth Observations, or GEO, to coordinate the construction of a Global Earth Observation System of Systems (GEOSS) by the year 2015.

This series of brochures provides a snapshot of the process developed by the GEO to build the GEOSS taking advantage of the international framework of cooperation and of the common vision to share and integrate information with a view to serving nine Societal Benefit Areas.

Examples of contributions from European and the European Commission-funded projects benefiting to the specific societal area or to the GEOSS building blocks are presented in each thematic brochure

GEOSS for Disasters
GEOSS for Health
GEOSS for Energy
GEOSS for Climate
GEOSS for Water
GEOSS for Weather
GEOSS for Ecosystems
GEOSS for Agriculture
GEOSS for Biodiversity

Architecture and Data Management within GEO
Capacity Building within GEO
Science and Technology within GEO
User Engagement within GEO

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GEOSS for Biodiversity

The GEO Biodiversity Societal Benefit Area

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EUROPEAN COMMISSION

GEOSS for Biodiversity

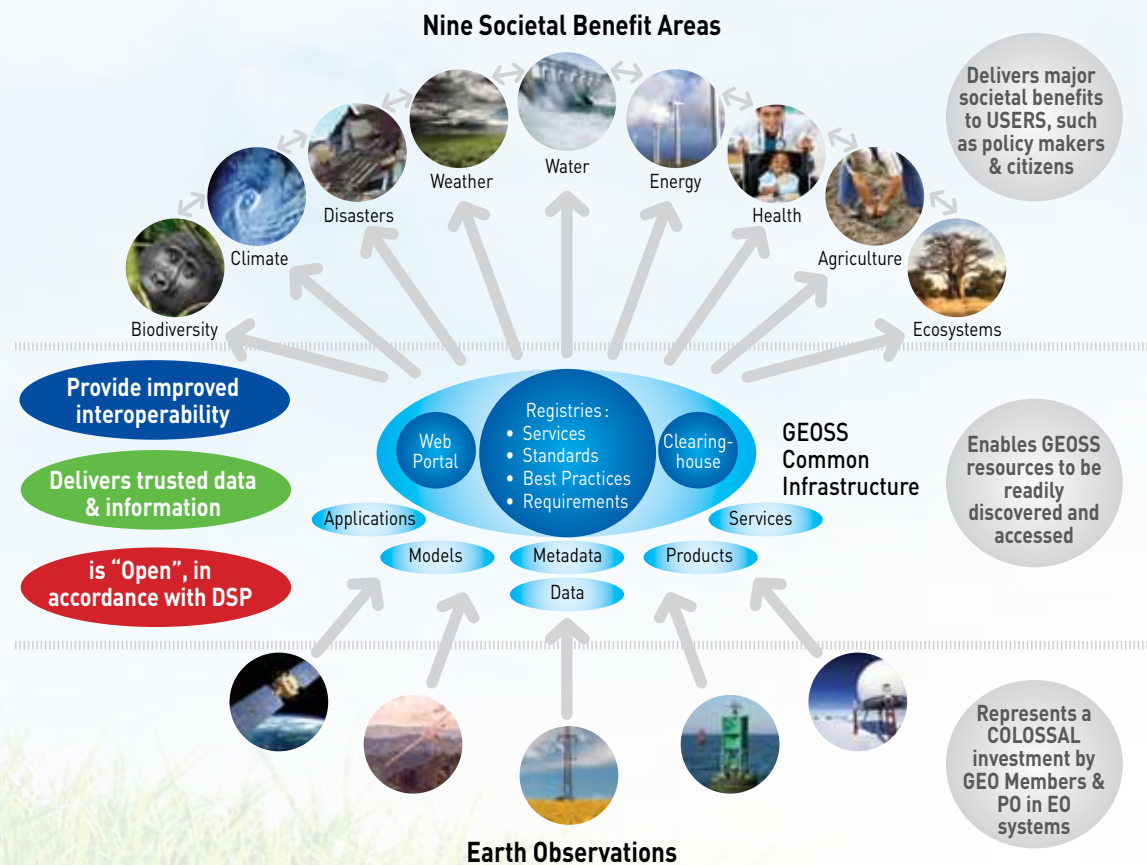
The GEO Biodiversity
Societal Benefit Area



GEOSS - A GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS

The Group on Earth Observations (GEO) is coordinating efforts to build a Global Earth Observation System of Systems (GEOSS). GEO was established in February 2005 by the Third Earth Observation Summit in Brussels in response to calls for action by the 2002 World Summit on Sustainable Development and the Group of Eight (G8) leading industrialised countries. **GEO is a voluntary partnership of governments and international organisations. It provides a framework within which these partners can develop new projects and coordinate their strategies and investments.**

www.earthobservations.org.



The vision for GEOSS is to realise a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information. GEOSS will work with and build upon existing national, regional, and global systems to provide comprehensive, coordinated Earth observations from thousands of instruments worldwide and to transform the data they collect into vital information for society.



GEOSS will simultaneously address nine Societal Benefit Areas (SBA) of critical importance to people and society. It aims to empower the international community to protect itself against natural and human-induced **disasters**, understand the environmental sources of **health** hazards, manage **energy** resources, respond to **climate** change and its impacts, safeguard **water** resources, improve **weather** forecasts, manage ecosystems, promote sustainable **agriculture** and conserve **biodiversity**. GEOSS coordinates a multitude of complex and interrelated issues simultaneously.

This **cross-cutting approach** avoids unnecessary duplication, encourages synergies between systems and ensures substantial economic, societal and environmental benefits.

Many efforts are oriented towards **solving the standardisation of data and interoperability issues** within GEO.

GEO is also **building on its Data Sharing Principles (DSP)** agreed by its members to develop a consistent data sharing implementation plan at international level.

THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



Target 2015

The GEOSS Strategic Target for Biodiversity is the following :

Before 2015, GEO aims to :

Establish, in conjunction with a comprehensive ecosystem monitoring capability, a worldwide biodiversity observation network to collect, manage, share and analyze observations of the status and trends of the world's biodiversity, and enable decision-making in support of the conservation and improved management of natural resources.

This will be demonstrated by :

- Increased routine collection of long term in-situ and remotely sensed biodiversity observations.
- Access through GEOSS to a large panel of biodiversity observations, including satellite, aerial and in-situ.
- Increased information sharing on biodiversity conservation and sustainable use of biodiversity resources.
- Implementation of a mechanism that enables users to interact with the development of biodiversity observations systems and request services.
- Increased availability of biodiversity information necessary to respond to and support related topics (ecosystems, health, climate, etc.).
- Increased information to reduce the cost and support the management of biodiversity issues.



GEOSS FOR BIODIVERSITY

GEO Work Programme relating to BIODIVERSITY

Under the current GEO Work-Plan 2009-2011, the Biodiversity issue is addressed in task BI-07-01: Developing a Global Biodiversity Observation Network.

This task aims to coordinate and improve biodiversity (animals, plants, genes, etc), observation, assessment and conservation – especially in terms of acquisition and use of satellite, aerial and in-situ observation. Develop a global observation network to facilitate coordination among information users and providers. Improve the quality and quantity of observation and advocate for a better understanding of trends and conservation.

a) Biodiversity Observation Network (GEO BON).

GEO BON will provide a global, scientifically- robust framework for observations designed to detect biodiversity change by coordinating the data gathering and delivery of biodiversity change information.

b) Invasive Species Monitoring System

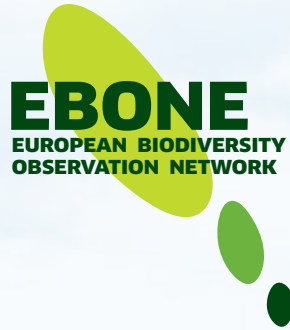
Characterise, monitor and predict changes in the distribution of invasive species. Characterise the current requirements and capacity for invasive species monitoring, identify gaps, and develop strategies for implementing cross-search functionality among existing online invasive species information systems from around the globe.

c) Capturing Historical and New Biodiversity Data

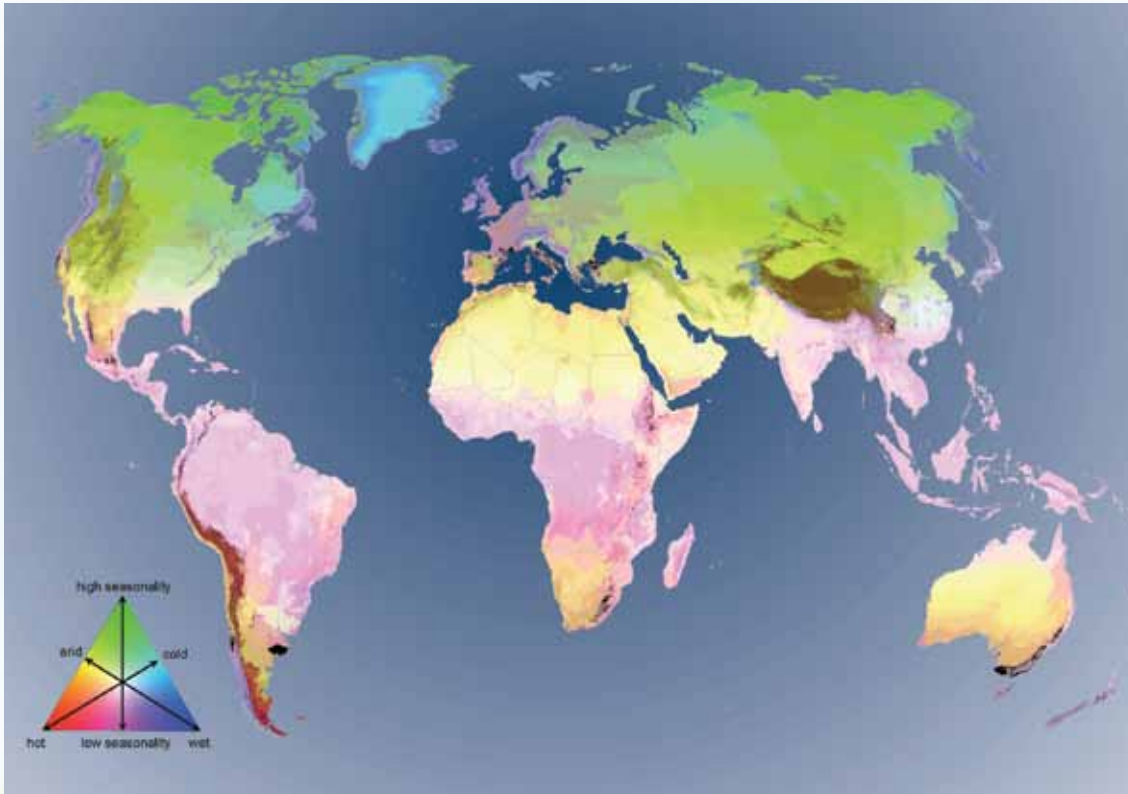
Develop a strategic plan for the capture and mobilisation of various types of “fit-for-use” historical and new biodiversity data through multi-cultural, heterogenous and distributed data custodians. Develop criteria for Data Rescue Centres. Develop strategies for industrialisation of capture, digitisation and mobilisation of primary biodiversity data. Develop strategies for mobilisation of biodiversity data generated through “ad-hoc” and “non-primary” projects. Promote uptake of Global Biodiversity Resources Discovery System (GBRDS). Review and develop primary biodiversity data capture standards. Implement the strategic plan for capturing historical biodiversity data from natural history collections and the research community.



Examples of the European Projects contributing to the Biodiversity SBA



The **European Biodiversity Observation Network (EBONE)** addresses the challenge of developing a coherent system for data collection which can be used for international comparative assessments. The project focuses on unifying many of the disparate biodiversity observing systems and **creating a platform to integrate biodiversity data with other types of information**. The project is developing a system of biodiversity observation at a regional, national and European level and is contributing to European reporting on biodiversity. It is a **vital pilot contribution for biodiversity monitoring in the GEOSS task and international initiative GEO-BON**. (www.ebone.wur.nl) .



The Global Environmental Stratification depicting 125 strata at 1km² resolution.



The **LifeWatch project** is working towards providing **e-Science and Technology Infrastructure for Biodiversity Data and Ecosystem Research**.

LifeWatch is supported by the Research Infrastructures funding scheme of the Capacities Programme of FP7. It aims to be a world-class e-infrastructure supporting all

aspects of research on the protection, management and sustainable use of biodiversity. Its innovative design supports access to and integration of large-scale data resources, advanced algorithms and computational capability. Data mining, data analysis and modelling support the study of patterns and mechanisms across different levels of biodiversity. The facility is a component of the European contribution to the Global Earth Observation System of Systems (GEOSS). (www.lifewatch.eu).



Geophysical research on the river Scheldt (photograph: Flemish Marine Institute VLIZ).



The objective of **GEOBENE**, is to develop methodologies and analytical tools to assess the societal benefits of GEOSS including biodiversity.

GEOBENE has focused on the creation of a comprehensive observation system for biodiversity that can be used by natural resource planners, governments, scientists and researchers. Extensive data on biodiversity factors is not widely available in many developing countries, yet these nations are home to most of the world's unprotected biodiversity.

GEOBENE research in South Africa revealed that poor quality data often led decision makers to over-estimate the amount of land needed for conservation areas. Investing in the gathering of high quality data will help to make the establishment and management of conservation areas more cost effective and free up more land for other uses. (www.geo-bene.eu).

Results Biodiversity

By using higher resolution data opportunity costs for species protection can be reduced significantly.

Data-poor scenario



79 mammals

Data-rich scenario



79 mammals
12,000 plants
94 birds
111 butterflies
21 frogs
125 scarabs
42 scorpions

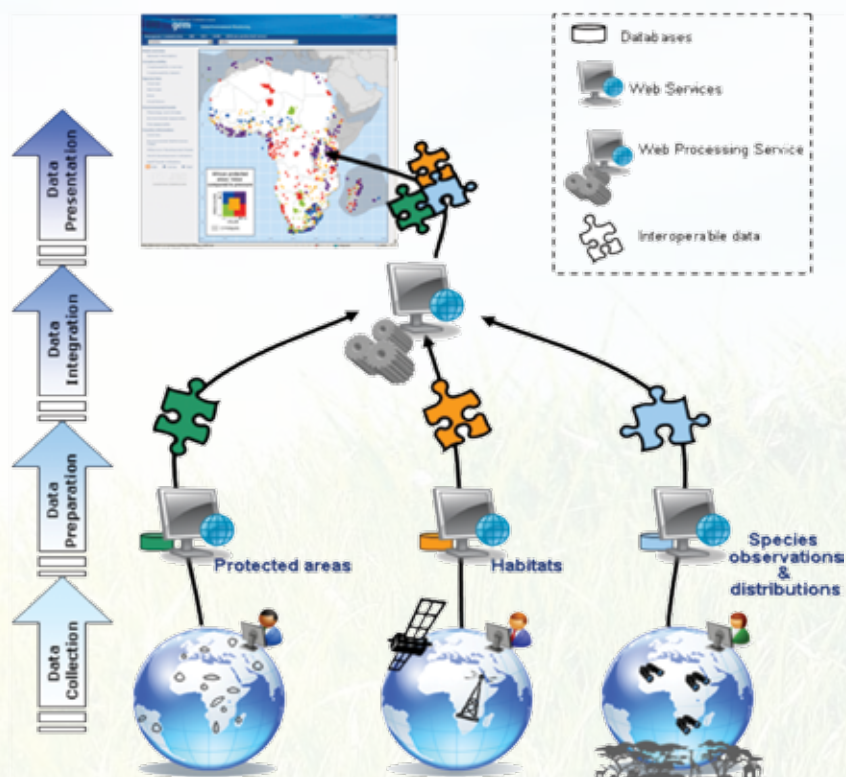
Species Protection (Jonas et al., 2005)



The EuroGEOSS project, a European approach to GEOSS, is building a **multidisciplinary operating capability** for a European Environmental Earth Observation System in the three strategic areas of **biodiversity, forestry and drought**. A key result will be an increased capacity for scientists from different disciplines to work together, sharing data, models and processes to develop better understanding and predictions of environmental phenomena and social impacts.

In particular EuroGEOSS extends the capabilities of an existing operational biodiversity information system in Africa to a global distributed database of biodiversity information: the **Digital**

Observatory for protected Areas will provide methods and tools to assess and forecast terrestrial biodiversity and habitats of areas of ecological interest as well as the threats to these areas. (www.eurogeoss.eu).



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