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Towards Enhanced Global Biodiversity Observations: GEO BON

Mike Gill

Vice-Chair, Group on Earth Observations
Biodiversity Observation Network

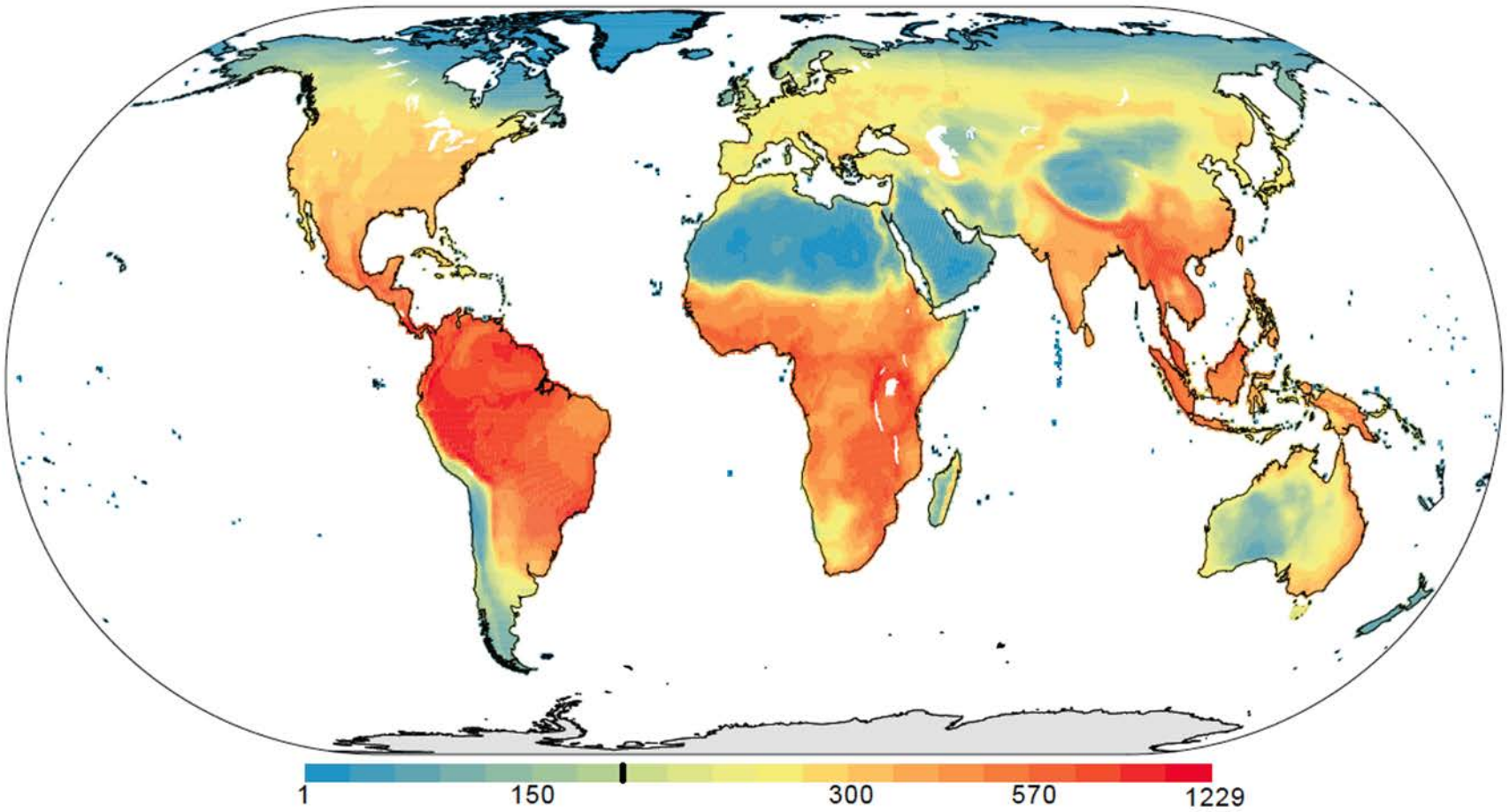
Future Earth Symposium on Global Biodiversity Monitoring

Yale University, May 4, 2015

Gaps in biodiversity monitoring

Living Planet Index Populations

Vertebrate Species Richness

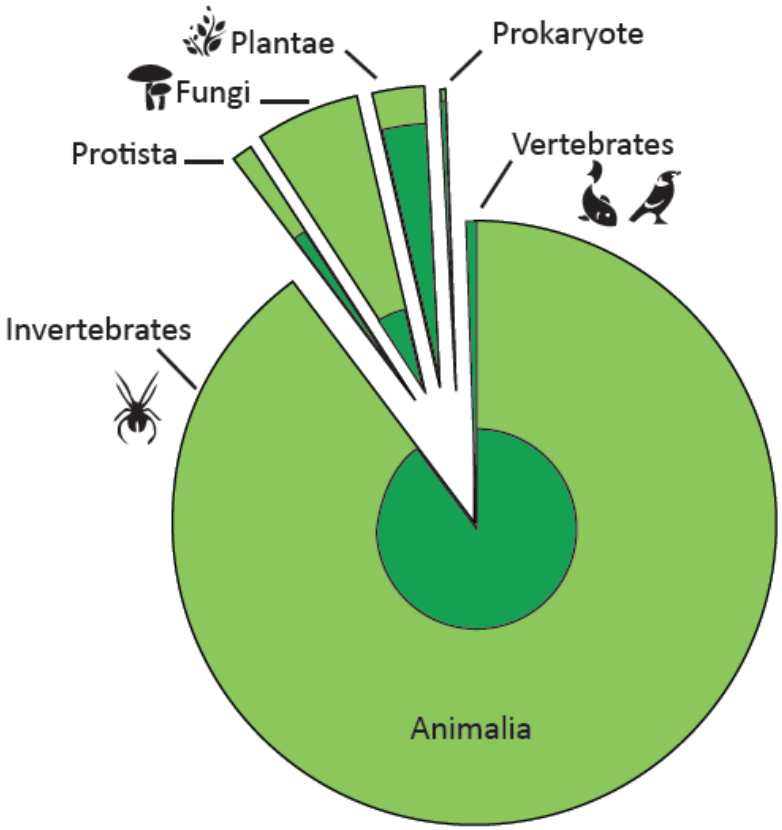


Conversion to agriculture

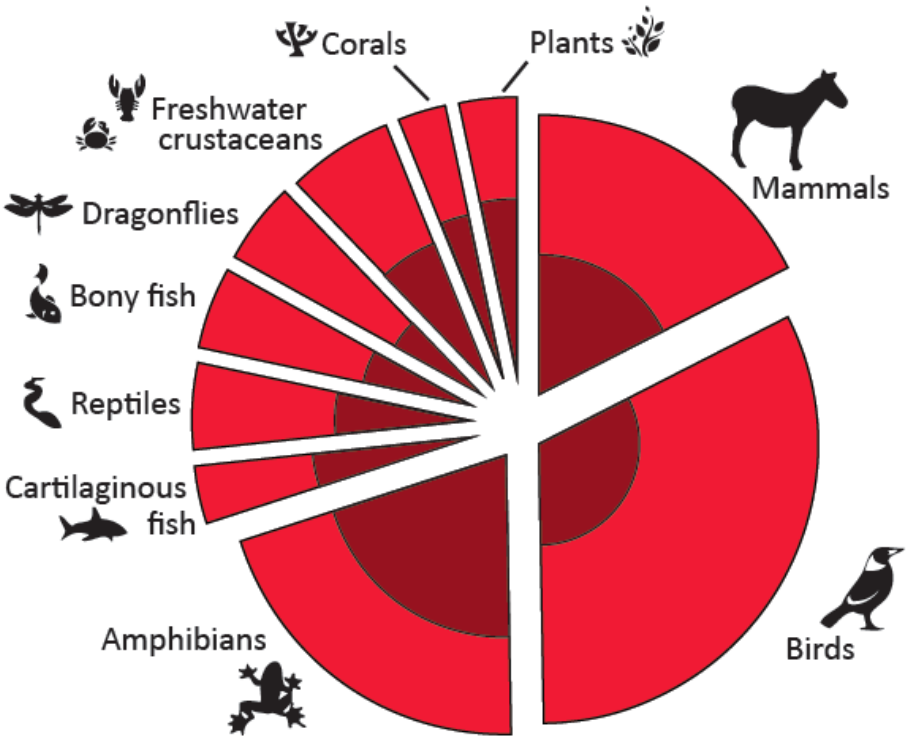
Pereira, H.M. et al (2012) *Annual Review of the Environment and Resources*. Original Source: WWF/ZSL 2010.

Taxonomic gaps

Estimated species richness



Species assessed in the Red List



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Pereira, H.M. et al (2012) *Annual Review of the Environment and Resources*.

Resulting in…

- Limited and often, ill-informed conservation and development decisions
- Untapped potential for using earth observation data to support effective decision-making

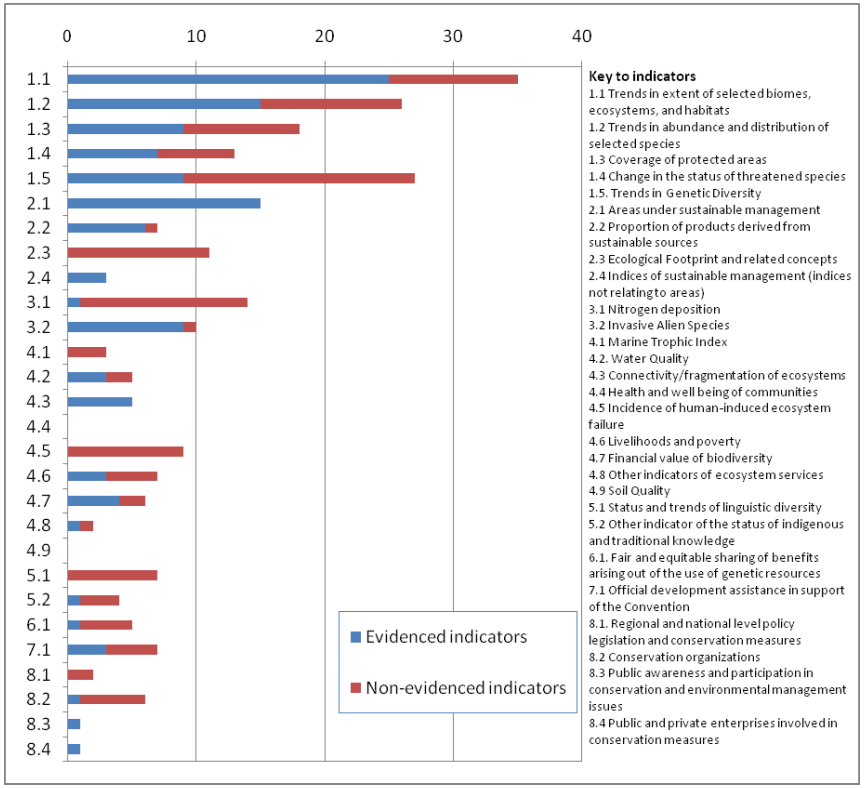

Figure 10: Number of CBD Parties reporting 'additional' indicators to CBD global indicators in 4th national reports, within CBD headline indicator categories

Bubb, P., et al. (2011) National Indicators, Monitoring and Reporting for the Strategic Plan for Biodiversity 2011-2020. UNEP-WCMC, Cambridge.

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What is GEO BON?

Group on Earth Observations Biodiversity Observation Network

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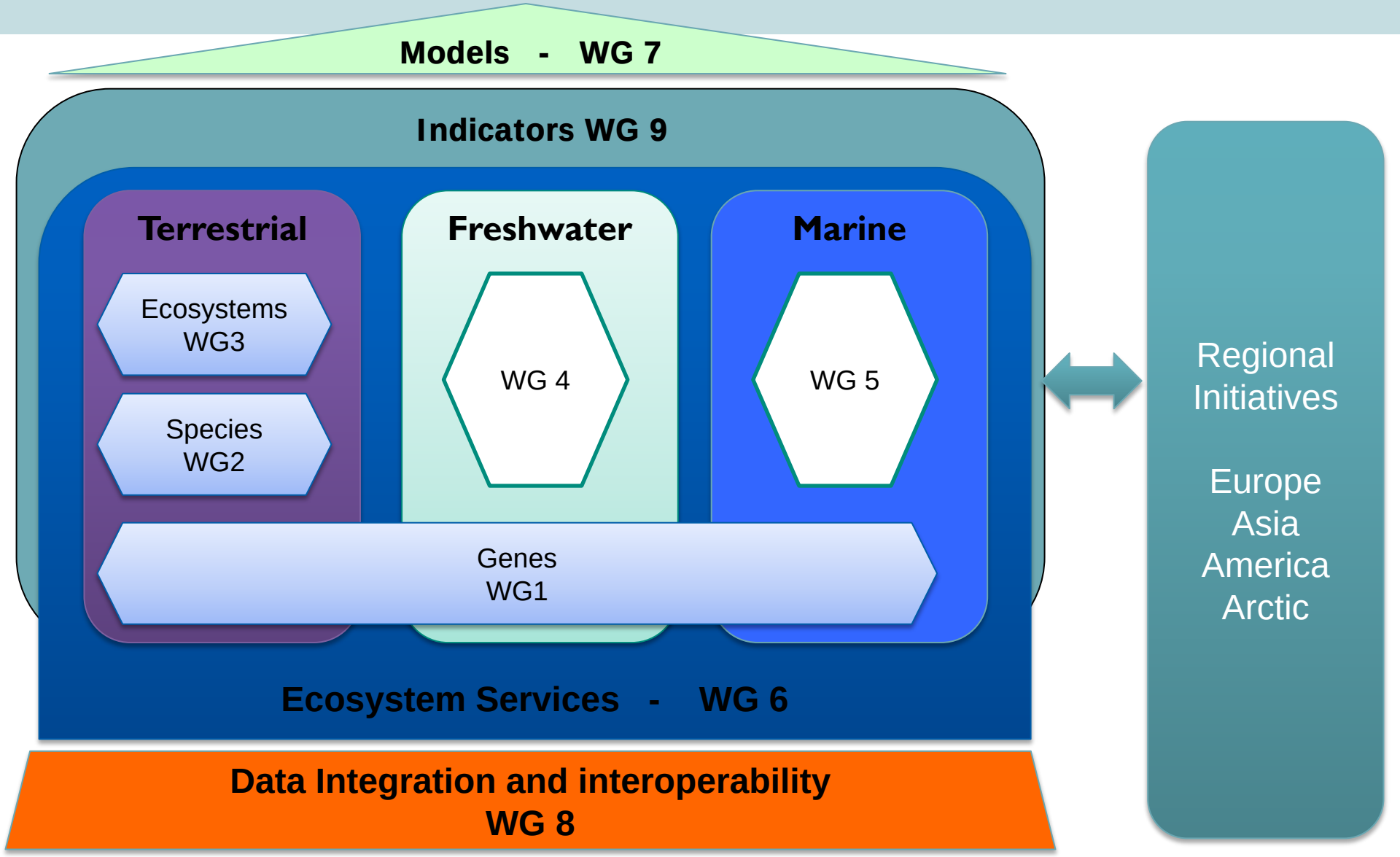
GEO BON Structure

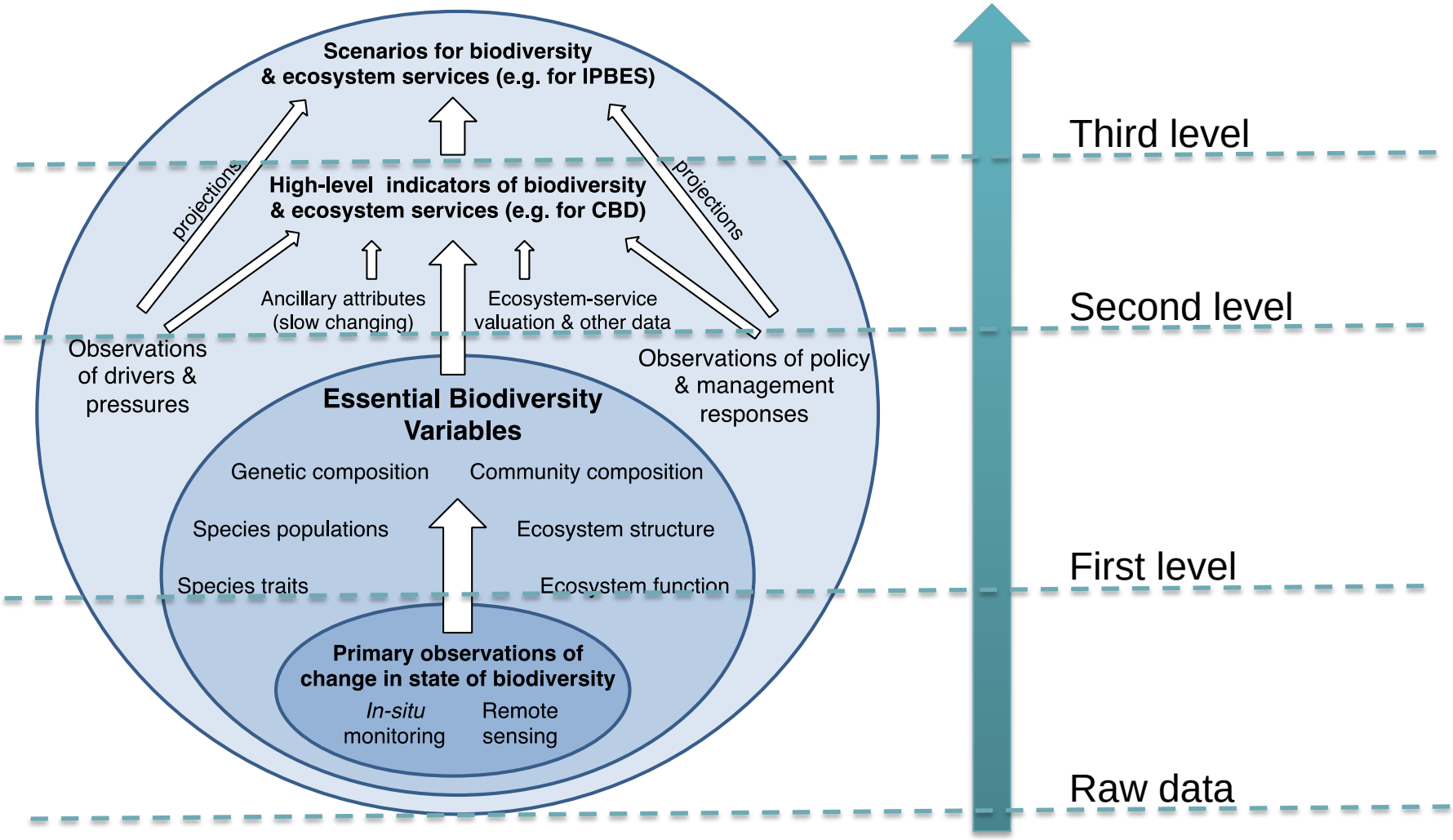


GEO BON Approach

- Provide a robust, extensive and harmonized framework for biodiversity observations and systems that meet user needs
  - Top-Down approach:
    - Focus on a targeted set of variables (e.g. Essential Biodiversity Variables)
  - Bottom-Up (e.g. national and regional capacity building – BON in a Box)




What is an Essential Biodiversity Variable?



Examples of candidate Essential Biodiversity Variables

EBV class	EBV examples	Measurement and scalability	Temporal sensitivity	Feasibility	Relevance for CBD targets and indicators (*1*,*9*)
Genetic composition	Allelic diversity	Genotypes of selected species (e.g., endangered, domesticated) at representative locations.	Generation time	Data available for many species and for several locations, but little global systematic sampling.	Targets: 12, 13. Indicators: Trends in genetic diversity of selected species and of domesticated animals and cultivated plants; RLI.
Species populations	Abundances and distributions	Counts or presence surveys for groups of species easy to monitor or important for ES, over an extensive network of sites, complemented with incidental data.	1 to >10 years	Standardized counts under way for some taxa but geographically restricted. Presence data collected for more taxa. Ongoing data integration efforts (Global Biodiversity Information Facility, Map of Life).	Targets: 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15. Indicators: LPI; WBI; RLI; population and extinction risk trends of target species, forest specialists in forests under restoration, and species that provide ES; trends in invasive alien species; trends in climatic impacts on populations.
Species traits	Phenology	Timing of leaf coloration by RS, with in situ validation.	1 year	Several ongoing initiatives (Phenological Eyes Network, PhenoCam, etc.)	Targets: 10, 15. Indicators: Trends in extent and rate of shifts of boundaries of vulnerable ecosystems.
Community composition	Taxonomic diversity	Consistent multitaxa surveys and metagenomics at select locations.	5 to >10 years	Ongoing at intensive monitoring sites (opportunities for expansion). Metagenomics and hyperspectral RS emerging.	Targets: 8, 10, 14. Indicators: Trends in condition and vulnerability of ecosystems; trends in climatic impacts on community composition.
Ecosystem structure	Habitat structure	RS of cover (or biomass) by height (or depth) globally or regionally.	1 to 5 years	Global terrestrial maps available with RS (e.g., Light Detection and Ranging). Marine and freshwater habitats mapped by combining RS and in situ data.	Targets: 5, 11, 14, 15. Indicators: Extent of forest and forest types; mangrove extent; seagrass extent; extent of habitats that provide carbon storage.
Ecosystem function	Nutrient retention	Nutrient output/input ratios measured at select locations. Combine with RS to model regionally.	1 year	Intensive monitoring sites exist for N saturation in acid-deposition areas and P retention in affected rivers.	Targets: 5, 8, 14. Indicators: Trends in delivery of multiple ES; trends in condition and vulnerability of ecosystems.

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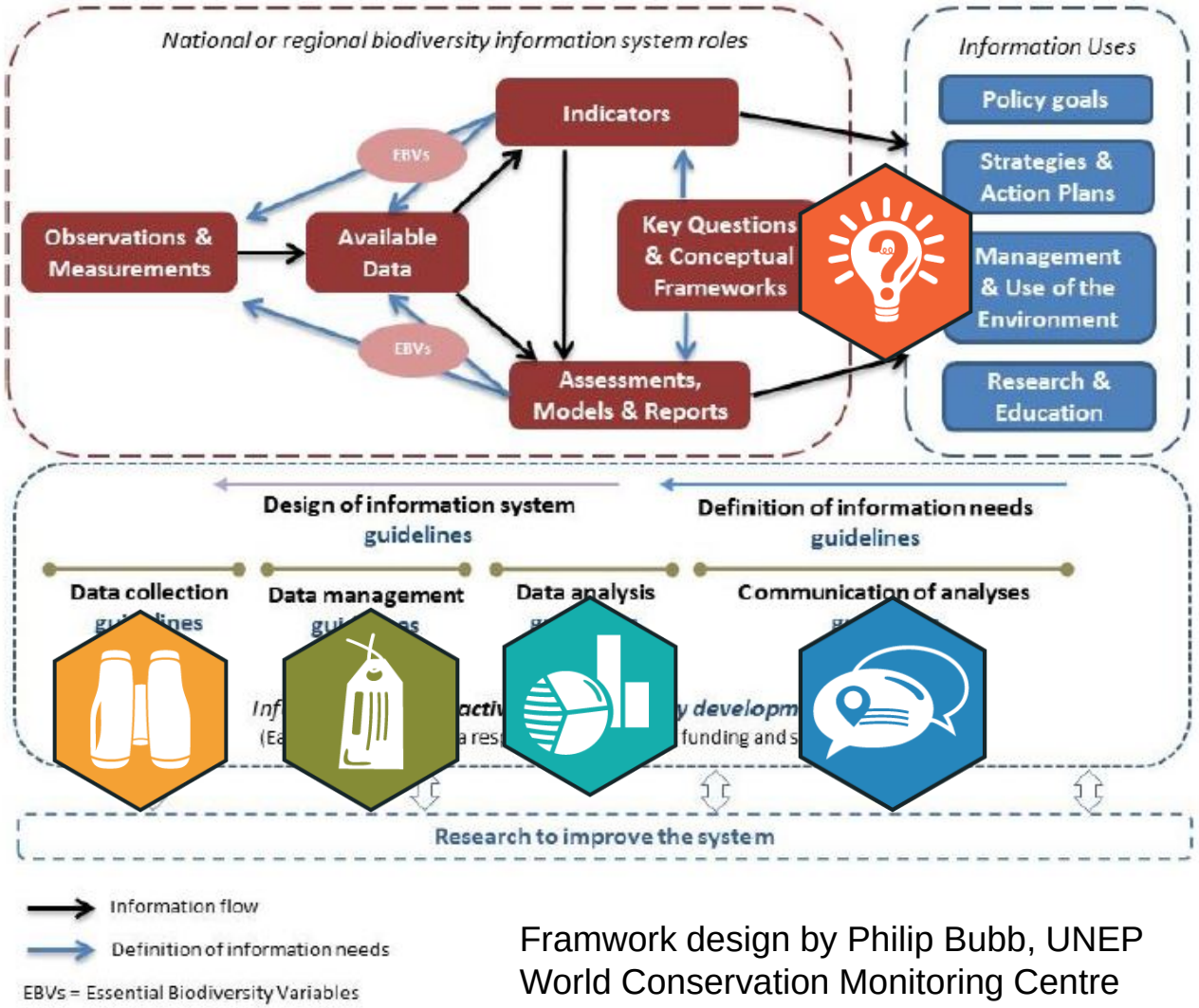
Pereira, H.M. et al (2013) *Science*

Bottom-Up: National Capacity Building & BON-in-a-Box

- GEO BON is building a **digital, customizable, 'smart' toolkit for biodiversity observations ('BON-in-a-Box')**
- Purpose:
  - **Lower the threshold** for a nation or region to develop or enhance an existing Biodiversity Observation Network;
  - **Improve and target biodiversity observations** to better meet user (e.g. policy) needs;
  - **Improve the power** to detect & attribute biodiversity trends.
  - Foster **regional sharing** of best practices and technology
  - Advance i**nteroperability** – promote uptake of harmonized observations, data management, analysis & reporting
- **Working directly with nations** to design national biodiversity observation systems




Framework for a National Biodiversity Information System



Framwork design by Philip Bubb, UNEP World Conservation Monitoring Centre


Convention on
Biological Diversity
2011-2020
United Nations Decade on Biodiversity
POLÍTICA NACIONAL PARA
LA GESTIÓN INTEGRAL DE LA
BIODIVERSIDAD Y SUS
SERVICIOS ECOSISTÉMICOS
(PNGIBSE)
Estrategia
Nacional de Bio
diversidad
de Bolivia
RESUMEN EJECUTIVO
Plan de Acción Regional
en
Biodiversidad del sur
de la
Amazonia Colombiana
"Toda la vida"
PARBSAC
GBIF
SiB
SISTEMA DE INFORMACIÓN
SOBRE BIODIVERSIDAD
DE COLOMBIA
BIO
DIVERSIDAD
2014
CAPITAL
NATURAL
DE MÉXICO
Informe Anual sobre el Estado
del Medio Ambiente
y los Recursos Naturales
Renovables en Colombia
Biodiversidad:
La riqueza de Bolivia


BON IN A BOX REGIÓN LATINOAMÉRICA
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Bon in a Box
Monitoreo
Herramientas
Contacto
BON IN A BOX
Herramientas de monitoreo para necesidades especificas
BON IN A BOX
Bon in a Box es un set de herramientas en linea para monitoreo, customizable y en constante actualización. Todo esto con el motivo de facilitar el inicio o la mejora de los sistemas de observación de la Biodiversidad.
Bon in a Box proporciona un conjunto de variables de biodiversidad cientificamente validadas, herramientas de diseño, métodos y directrices de monitoreo, lo que reduce el umbral para la puesta en marcha o mejora de un sistema de observación de la biodiversidad.
LA CAJA
PÚBLICO
MOTIVO
MANEJO
GEO BON

COMPONENTES DEL MONITOREO

DATA ANALYSIS

Primeras preguntas claves en monitoreo

Bon in a Box es un set de herramientas en línea para monitoreo, customizable y en constante actualización. Todo esto con el motivo de facilitar el inicio o la mejora de los sistemas de observación de la Biodiversidad.


HERRAMIENTAS
Filtros
EBV
CATÁLOGO DE LA BIODIVERSIDAD
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SiB CATÁLOGO DE ESPECIES
BIOMODELOS
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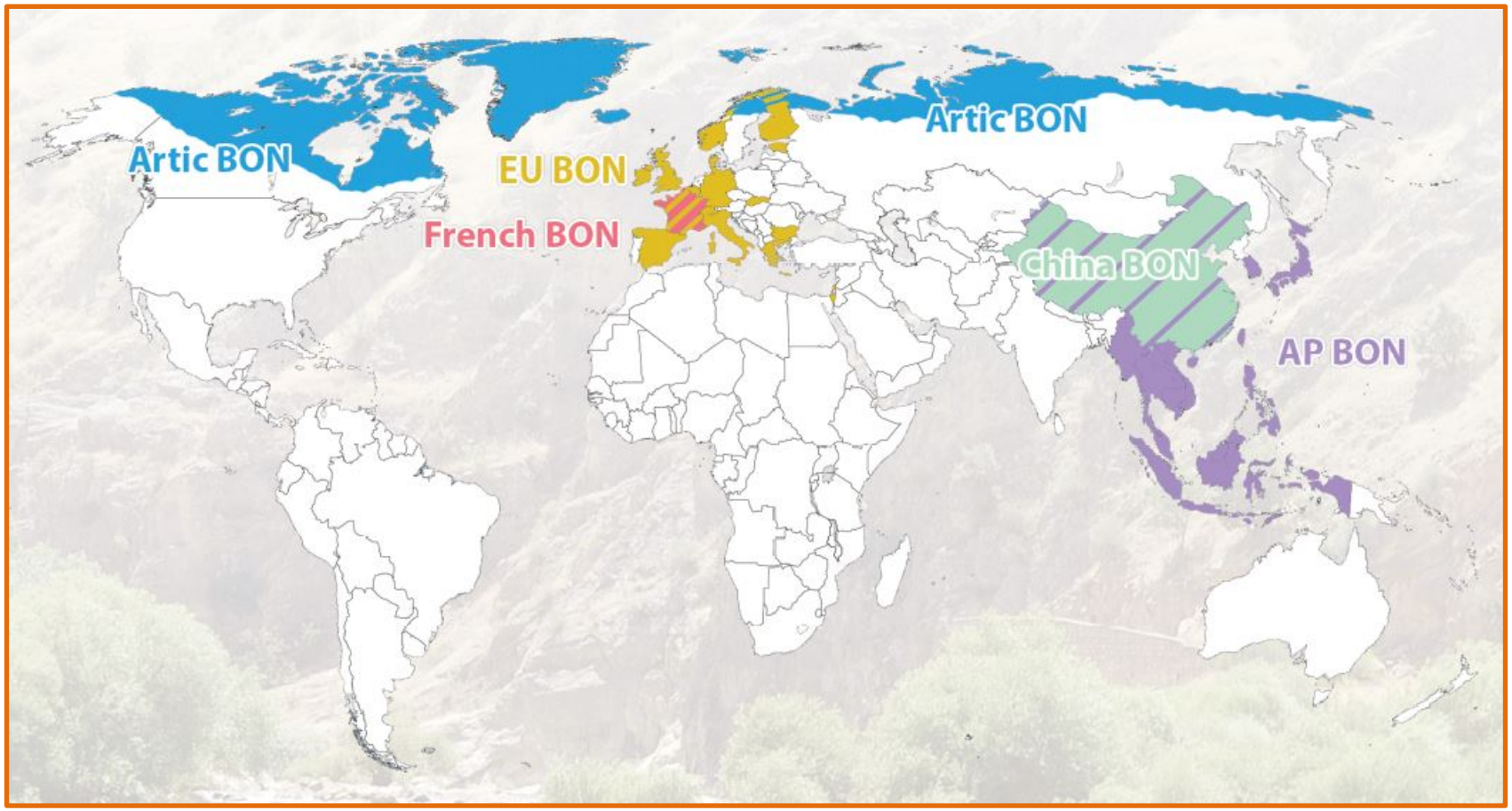
Bottom-Up: National & Regional BONs



How can we best strengthen/complement ongoing efforts?

- **Connect them to user needs** – Who are the users? What information do they need? How do we produce that information?
- **Provide common frameworks and tools** to connect biodiversity observations - scalable from local to national to global scale
- **Focus on value-added**: for scientists, decision-makers & public

Ideas for Symposium Discussion/Cluster Activities

- How do we **connect global** initiatives and data **to local or national** scales and vice-versa?
  - **Downscaling** models/**disaggregating** global datasets/**regionalization** of tools
  - How do we **scale up** to the global scale? **Aggregating local /national** datasets? **Tools** to facilitate interoperable data?

Thanks!

Photos by: Kathy Crane, US NOAA; Maria Cecilia Londoño, Instituto Humboldt, Carsten Egevang, ARC-PIC.COM