



**United Nations Environment Programme
World Conservation Monitoring Centre**

**Biodiversity and Ecosystem Accounting
13th Conference of the Parties, Convention on Biological Diversity,
Cancun, Mexico, 4th – 17th December, 2016
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OUTLINE



- 1. Biodiversity in the System of Environmental Economic Accounting – Experimental Ecosystem Accounting (SEEA-EA)**
- 2. Developing thematic species accounts**
- 3. Opportunities for Sustainable Development**



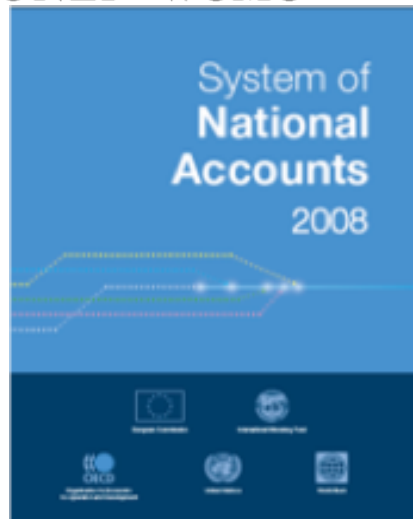


BIODIVERSITY IN THE SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING – EXPERIMENTAL ECOSYSTEM ACCOUNTING

OR SEEA-EEA FOR SHORT

December, 2016

DEVELOPMENT OF THE SEEA-EEA



System of National Accounts

- Monetary measures
- Asset and production boundaries set by economics
- Production defined as being capable of being sold in markets
- Assets defined as being owned and capable of being used for economic gain



SEEA Central Framework

- Physical quantity measures added to monetary measures
- Asset boundary expanded
- Assets no longer have to be owned or capable of being used for economic gain



SEEA Experimental Ecosystem Accounting

- Physical quality (or condition) measures added
- Production boundary extended
- Production from ecosystems recognized and does not need to be sold in markets

BIODIVERSITY – A FAMILIAR DEFINITION



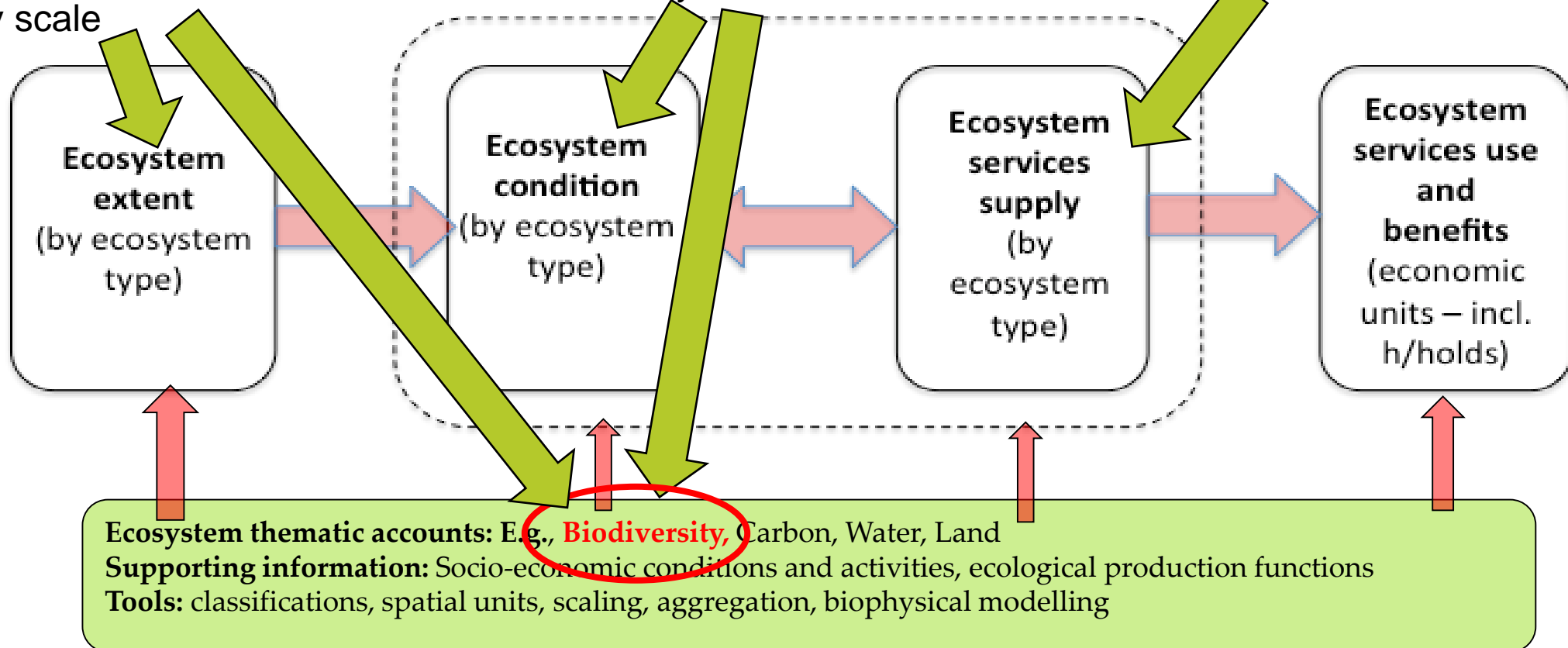
“Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this **includes diversity within species, between species and of ecosystems**” (CBD, 1992)

BIODIVERSITY IN THE SEEA-EEA

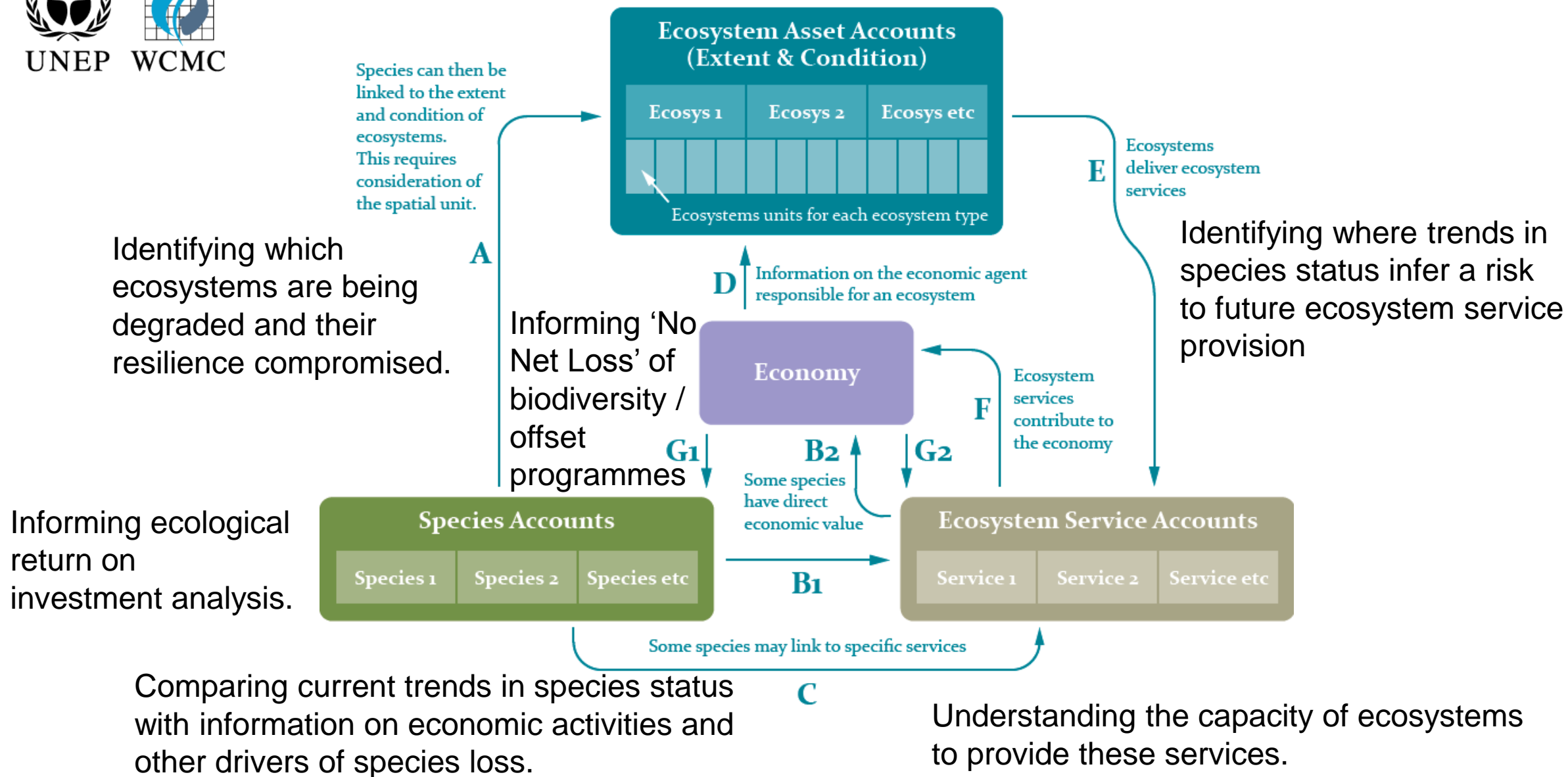
Areas of ecosystems – reveals **ecosystem diversity** at landscape / country scale

Species diversity
characteristic of
ecosystem condition

Ability to deliver
ecosystem services



A HOLISTIC PICTURE



CHALLENGES AND BARRIERS



Experimental Biodiversity Accounting as a component of the System of Environmental- Economic Accounting Experimental Ecosystem Accounting (SEEA-EEA)

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- 1. Where can I find the information and data I need for accounting?**
- 2. Which aspects of biodiversity should I focus on?**
- 3. Which measurements of biodiversity do I capture in the accounts (e.g. species richness vs. species abundance)?**
- 4. At which scale should I organise my information on biodiversity?**
- 5. How do I integrate this in the wider SEEA-EEA accounts?**

http://wcmc.io/SEEA_EEA_Bio_Accounting

DEVELOPING THEMATIC SPECIES ACCOUNTS

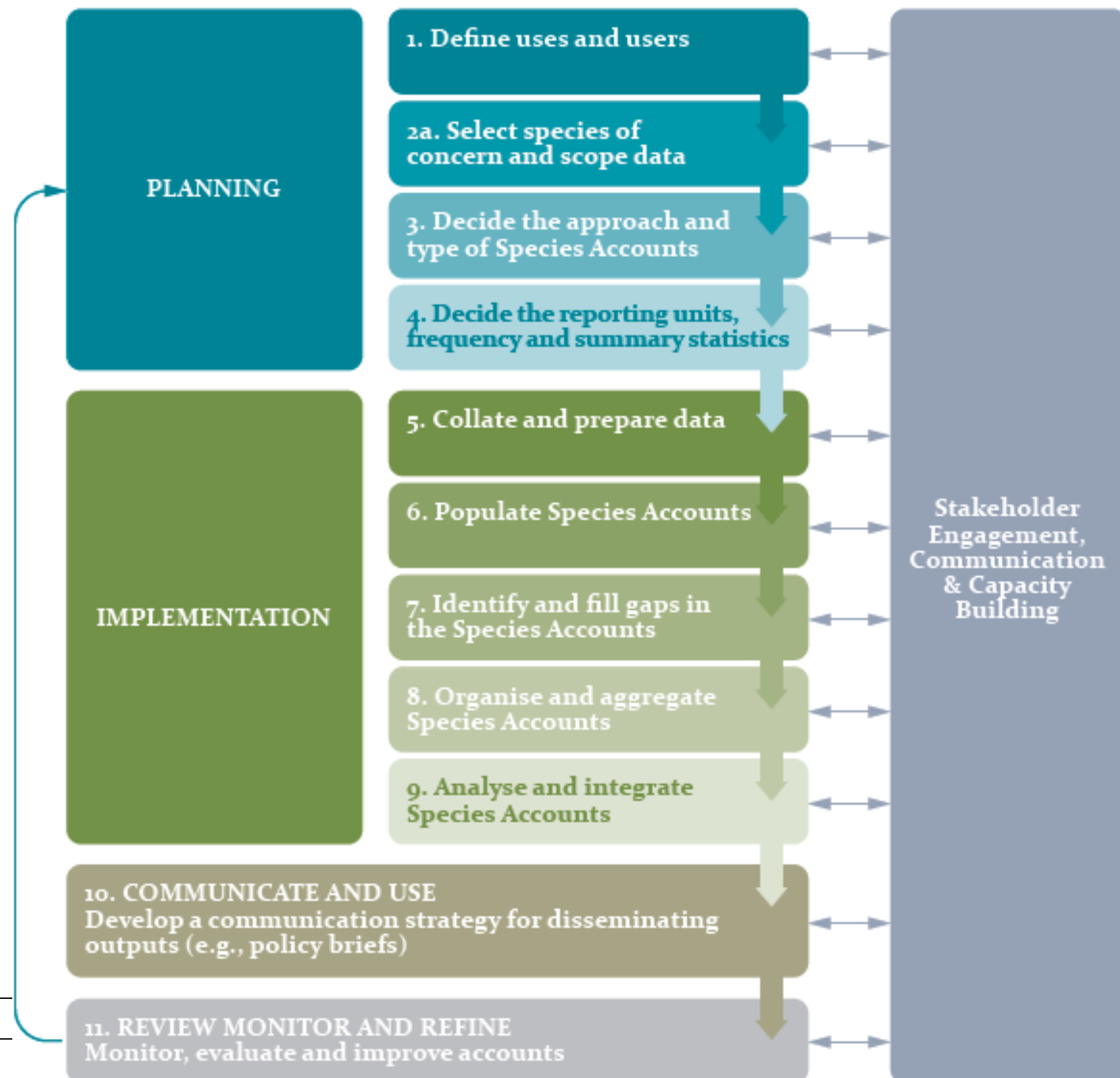
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EXPLORING APPROACHES FOR CONSTRUCTING SPECIES ACCOUNTS IN THE CONTEXT OF THE SEEA-EEA



http://wcmc.io/Species_Accounting

CBD COP PRESENTATION



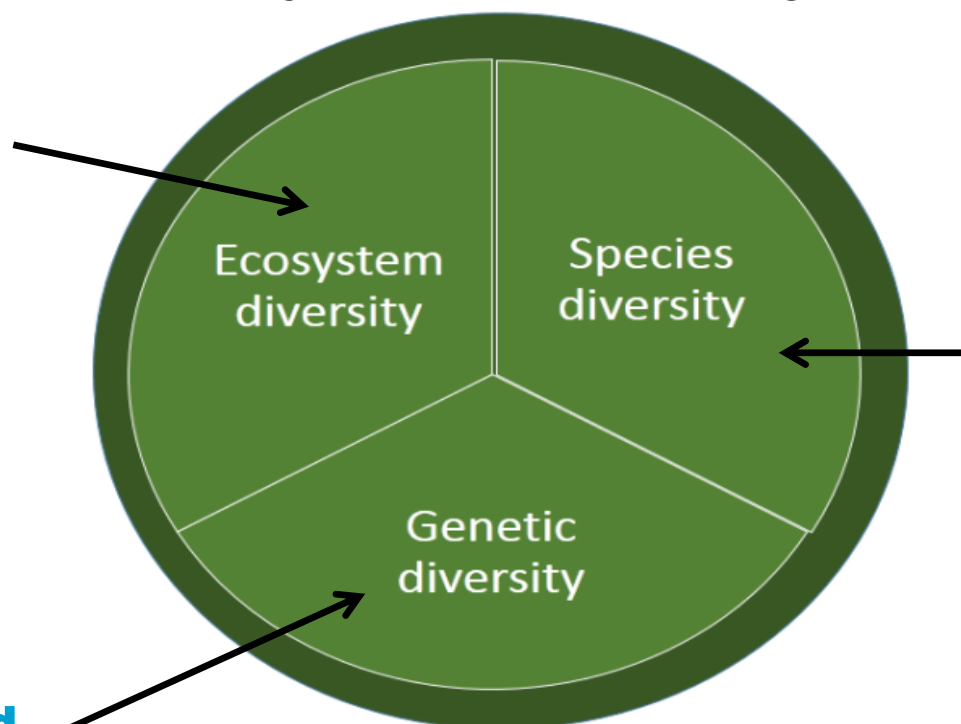
WHY FOCUS ON SPECIES ACCOUNTS?

Information in Ecosystem Extent Accounts

Testing still required on how to communicate ecosystem-level biodiversity from these accounts and linking to ecosystem services and policy

An important gap for which accounts should be developed in future work

Components of biodiversity



**Important for ecosystem function
- Species provide an indicator of ecosystem condition**

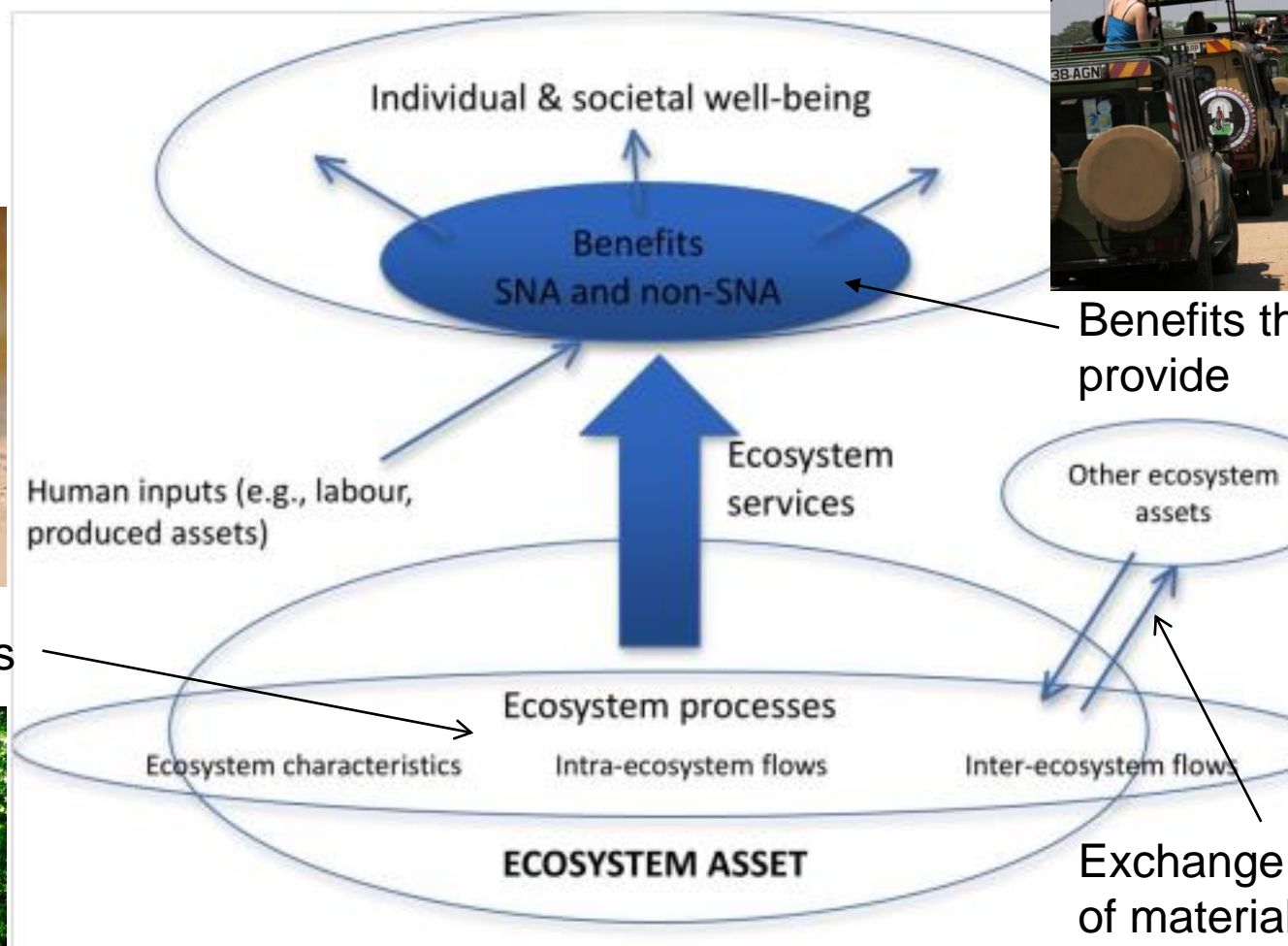
Perform functional roles

Methodological gap

SPECIES AND THE SEEA-EEA



Functional traits



Benefits that species provide



Exchange of material

PRIORITISING SPECIES FOR ACCOUNTING

Reflects species are an important element of ecosystem condition and service supply and a consideration for ecosystem management in itself *

Conservation Concern:

- Threatened species
- Endemic species
- Migratory species
- Evolutionary distinct species

Thematic concerns

Direct Ecosystem Service Concern:

- Charismatic species
- Wild food species

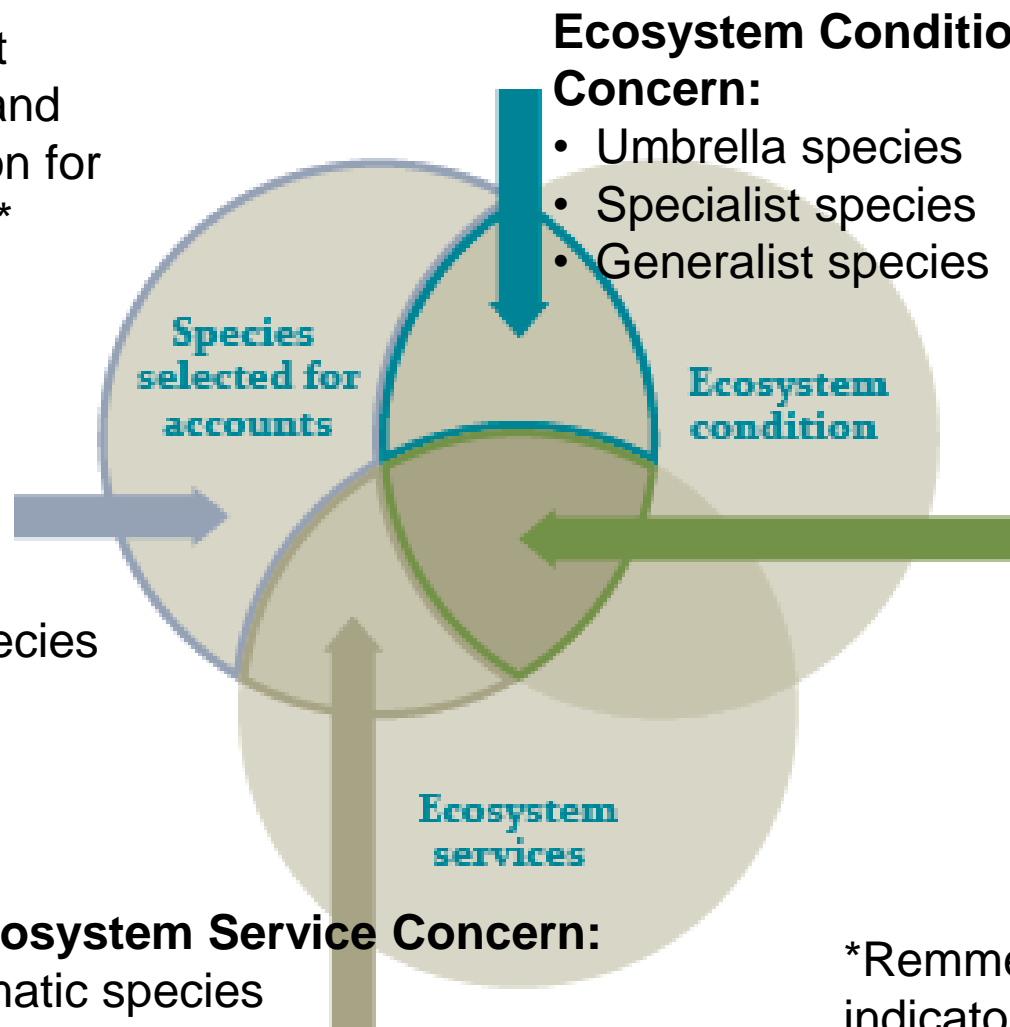
Ecosystem Condition Concern:

- Umbrella species
- Specialist species
- Generalist species

Condition concerns

Ecosystem Condition & Functioning Concern:

- Keystone species
- Trophic groups
- Taxonomic groups
- Functional groups
- Structural classes



*Remme et al., (2016) Exploring spatial indicators for biodiversity accounting

DATA ACQUISITION APPROACHES

1) Direct observations of species status

- i. Census counts, nest counts, population estimates from surveys
- ii. Requires significant investment

2) Habitat based modelling of species status

- i. Satellite-borne remote sensing data to model habitat condition for species and species groups
- ii. Based on the assumption that habitat suitability = species presence

3) Threat status categories

- i. IUCN Red List Data soon available at National Scale
- ii. Difficult to disaggregate spatially

4) Extent of important places for species

- i. Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, National Parks, Wilderness Areas



UNEP WCMC

HYPOTHETICAL EXAMPLE USING DIRECT OBSERVATION AND HABITAT BASED APPROACHES

Reference measure for a common year

Abundance measure at start of accounting period

Additions and reductions
Should be stated if known

Abundance measure at End of accounting period

Net change in abundance over accounting period

Relative Abundance measure at start of accounting period

Relative Abundance measure at end of accounting period

Net change in relative abundance over accounting period

Change as % of the opening relative abundance

	Species or Species Group 1	Species or Species Group 2	Species or Species Group 3	Species or Species Group 4	Species or Species Group 5
Example Species	Panda	Cuckoo	Tree sparrow	Orangutan	Vertebrates
Unit of measurement	No. of individuals	No. of individuals	Relative abundance based on population density	Hectares of suitable habitat	Proportion of original species complement
Reference (1995)	2,000	100,000	Set to 1.0	1,000,000	85%
Opening (2005)	1,500	60,000	0.70	100,000	80%
Additions	100	N/A	N/A	10,000	N/A
Reductions	200	N/A	N/A	30,000	N/A
Closing (2010)	1,400	65,000	0.50	80,000	70%
Net Change	-100	+5,000	-0.20	-20,000	-10%
Opening (% of reference, 2005)	75%	60%	70%	10%	94%
Closing (% of reference, 2010)	70%	65%	50%	8%	82%
Net change (% of reference)	-5%	+5%	-20%	-2%	-12%
Change (% of opening)	-6.7%	+8.3%	-29%	-20%	-13%

SPECIES-LEVEL BIODIVERSITY ACCOUNTS



Experimental Ecosystem Accounts for the
Central Highlands of Victoria

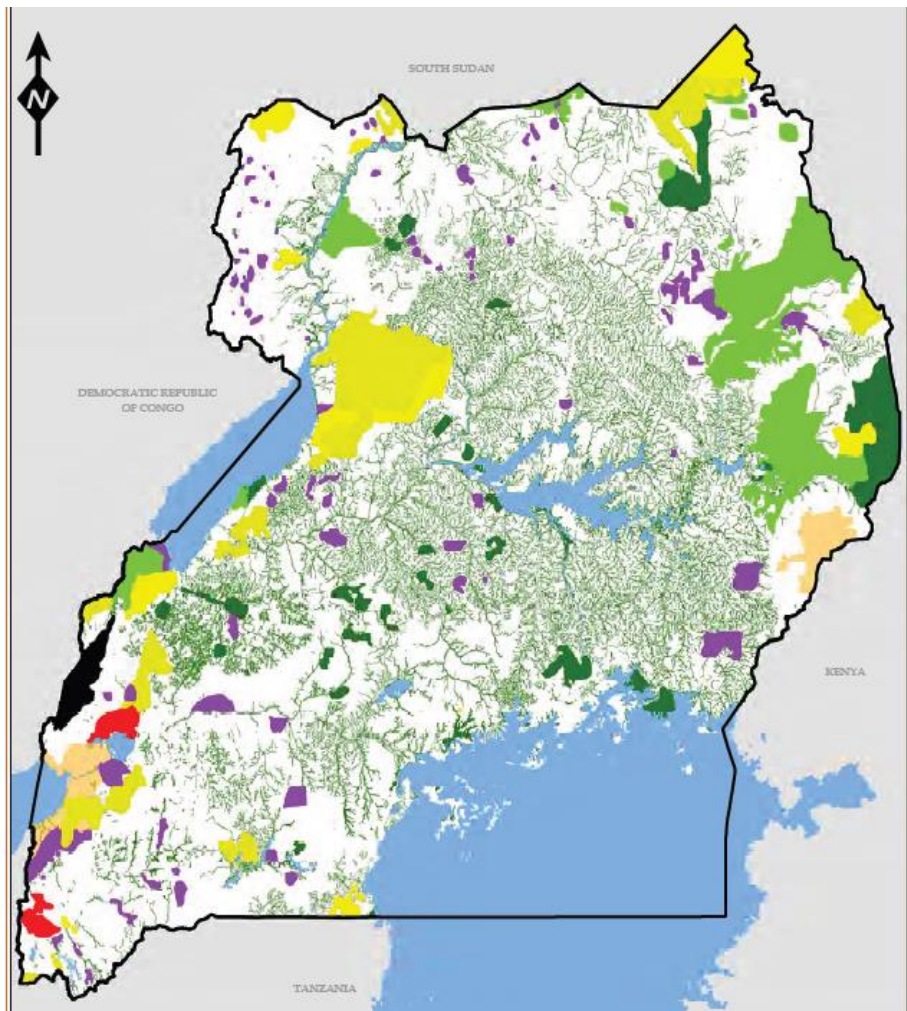


Ecosystem type	Invertebrates (% biodiversity retained)			Vascular plants (% biodiversity retained)			Vertebrates (% biodiversity retained)		
	2009	2011	2013	2009	2011	2013	2009	2011	2013
Palm swamps	90.3%	90.1%	90.0%	87.0%	86.9%	86.8%			
Humid forest with high hills	88.3%	87.8%	87.4%	89.2%	88.8%	88.4%			
Humid forest with low hills	87.7%	87.3%	86.9%	88.6%	88.2%	87.8%			
Humid montane forest	91.1%	90.8%	90.5%	91.1%	90.7%	90.5%			
Lowland terra firme forest	86.5%	86.0%	85.6%	86.1%	85.5%	85.1%			
Floodplain forest	86.7%	86.2%	85.8%	86.6%	86.1%	85.7%			

Table 9.3a. Change over time in the numbers of species listed under the IUCN Red List of threatened species categories in the Central Highlands study area

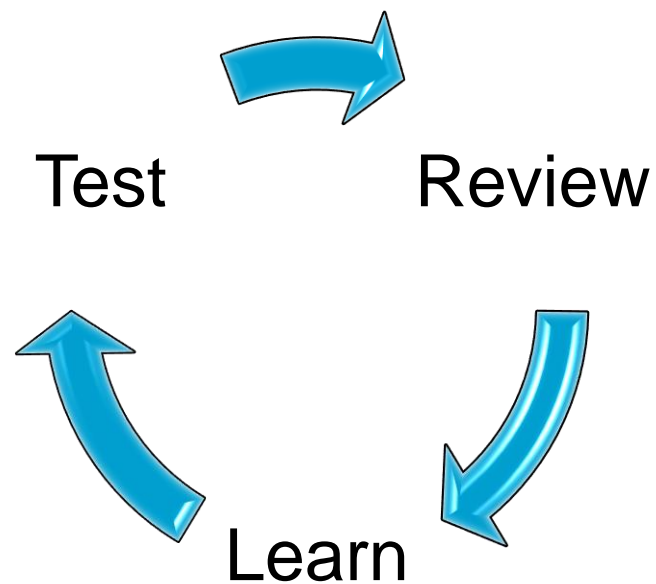
	Extinct	Critically Endangered	Endangered	Vulnerable	Near Threatened	Least Concern	Lower Risk	Total
1990	0	0	0	2	2	0	12	16
1995	1	0	6	10		0	10	27
2000	1	1	7	15	1	1	14	40
2005	1	3	8	13	5	8	2	40
2010	1	4	7	10	11	8	0	42
2015	0	8	6	9	9	12	0	44
Net change 1990 to 2015	0	8	6	7	7	12	-12	28

NEXT STEPS



Uganda Demonstration Accounts

- a. Species accounts**
- b. Ecosystem extent accounts**
- c. Foundation for set of ecosystem accounts**





CBD COP PRESENTATION

OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT

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INTEGRATED DECISION MAKING

The drivers of biodiversity / species loss arise throughout the economy

Agriculture

Pollution

Climate
Change

Forestry

Biofuel

Infrastructure

Biodiversity Protection / Enhancement Targets / NBSAPs

Natural
Hazard
Protection

Food
Security

Climate
Adaptation

Water Quality
& Supply

Sustainable
Development

Human
Health

Rural
Livelihoods

Maintaining and investing in biodiversity will have benefits far beyond biodiversity and contribute to goals across our economies and societies

HEALTHY AND
PRODUCTIVE ECOSYSTEMS

Targets: 1.b, 2.1, 2.4, 3.3, 6.3, 6.5, 6.6, 7.2, 11.4, 11.6, 11.a, 12.6, 12.7, 12.8, 13.3, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.c, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.a, 17.5, 17.14, 17.19



THANK YOU!

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