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United Nations Environment Programme
World Conservation Monitoring Centre

BIODIVERSITY ACCOUNTING, 22ND MEETING OF THE LONDON GROUP, 28TH – 30TH SEPTEMBER, 2016

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03/10/2016

OUTLINE

1. Biodiversity in the SEEA-EEA
2. Developing Thematic Species Accounts
3. Opportunities for Sustainable Development

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BIODIVERSITY IN THE SEEA-EEA

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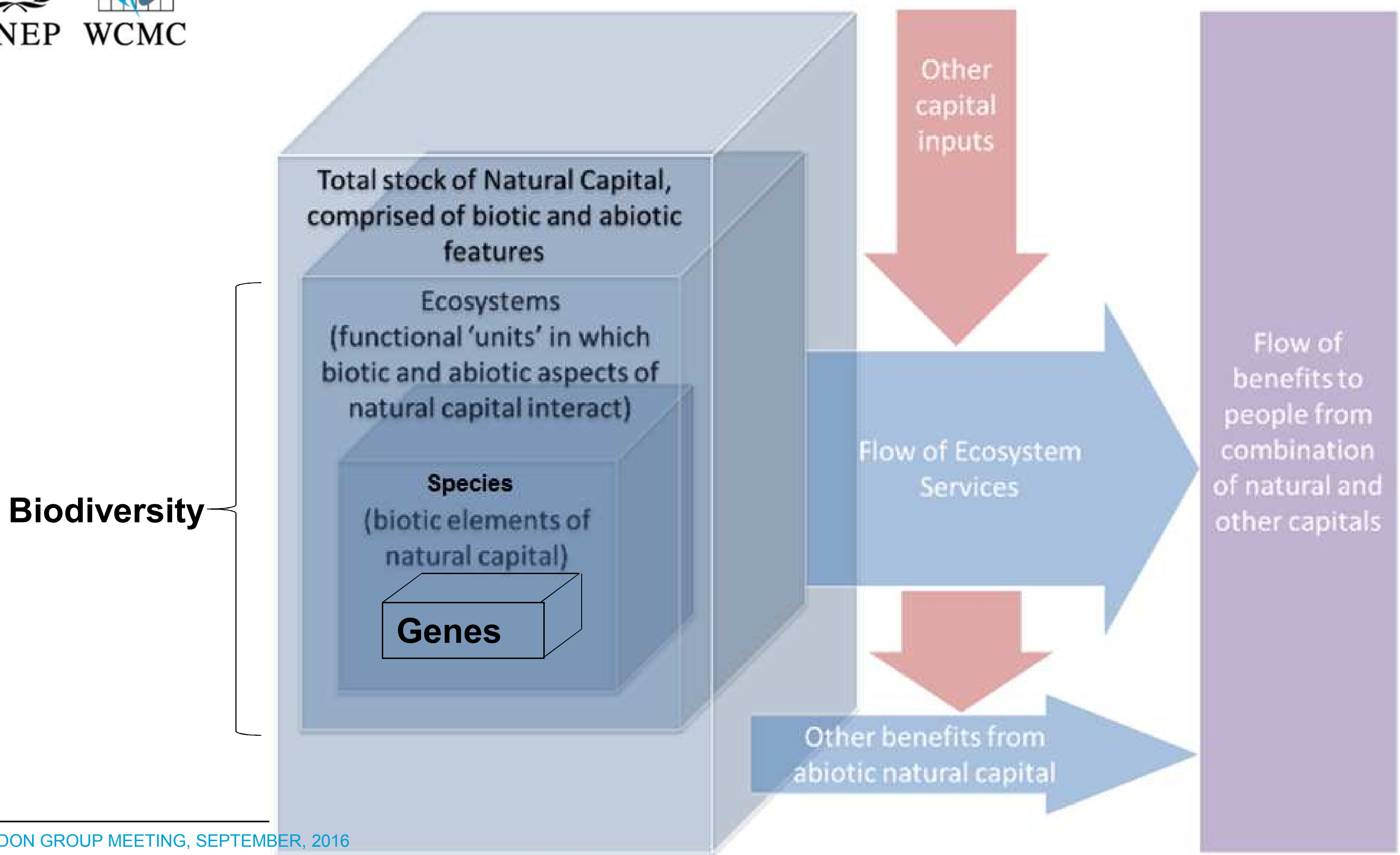
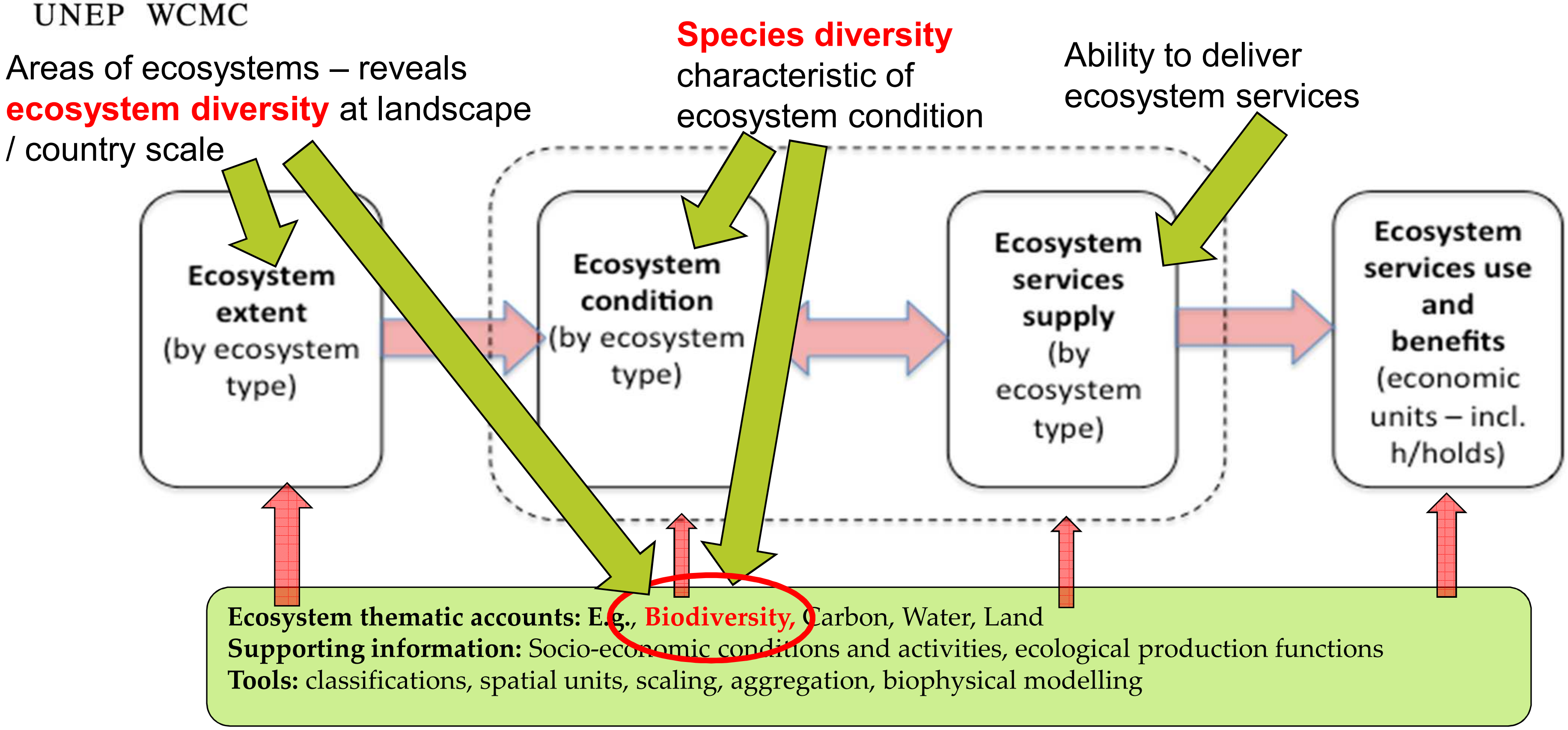
BIOLOGICAL DIVERSITY – DEFINITION

"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 AND ECOSYSTEM SERVICES



BIODIVERSITY IN THE SEEA-EEA

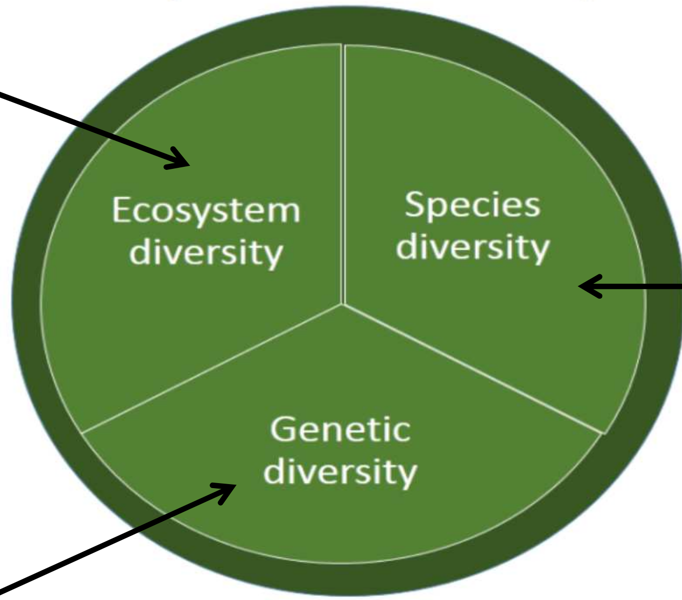


THEMATIC SPECIES ACCOUNTS?

Information in Ecosystem Extent Accounts

Testing on how to communicate ecosystem-level biodiversity and linking to ecosystem services

Components of biodiversity



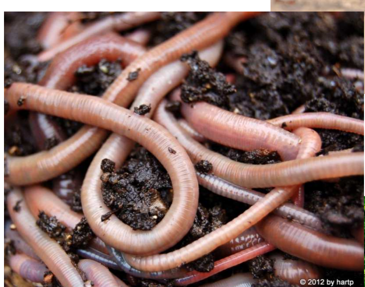
Important for ecosystem function - Species provide an indicator of ecosystem condition

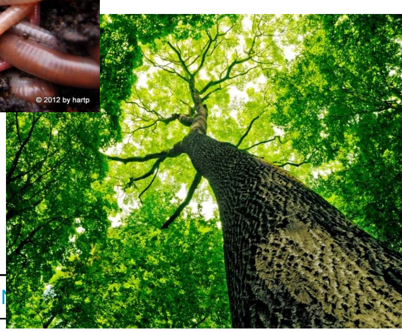
Perform functional roles

Methodological gap - planning for species may differ from planning for ecosystems

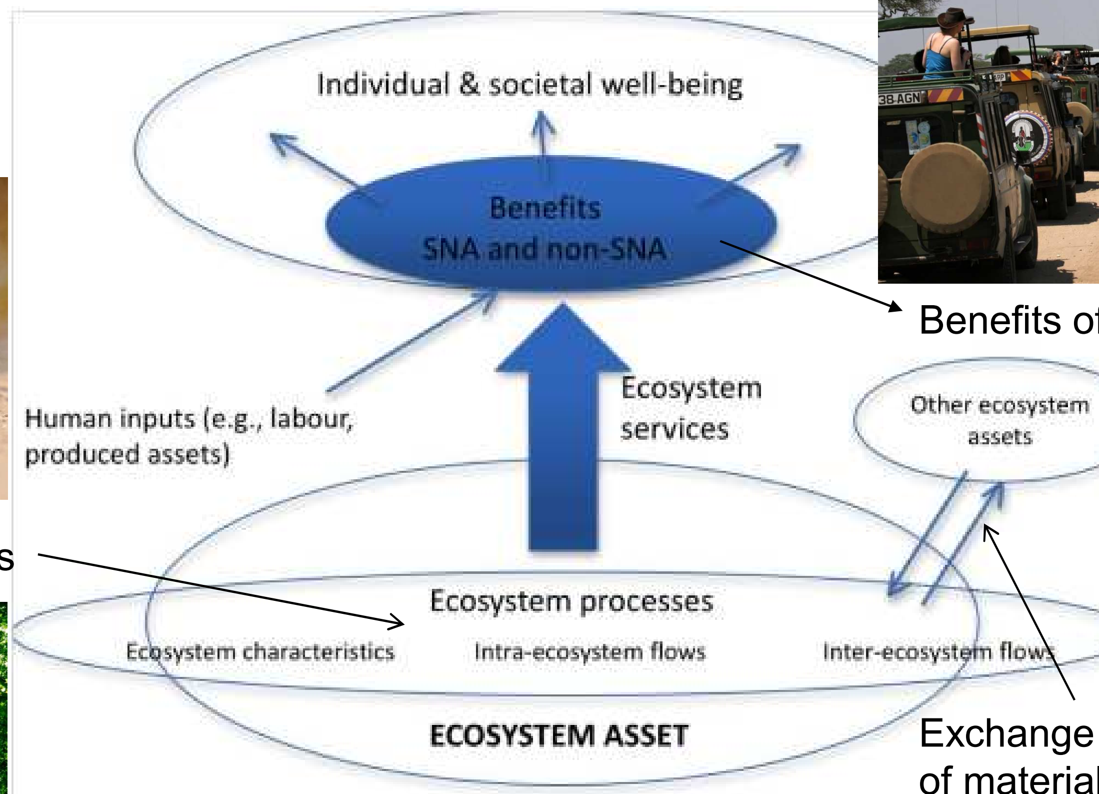
Important but for the future!

SPECIES AND THE SEEA-EEA





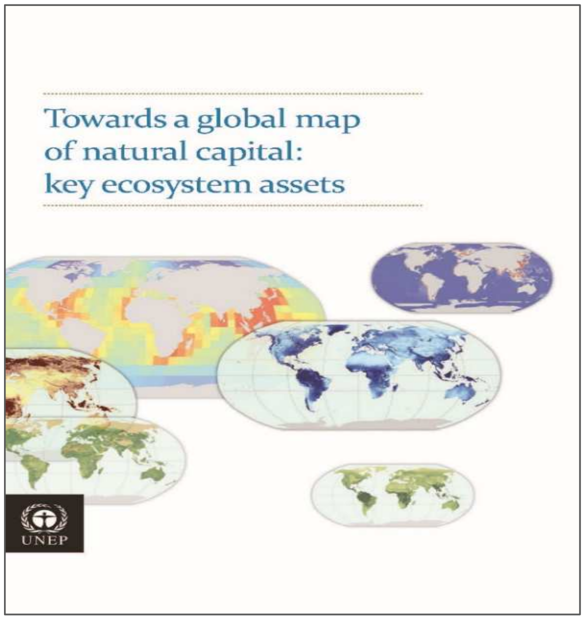
Functional traits



Benefits of Species

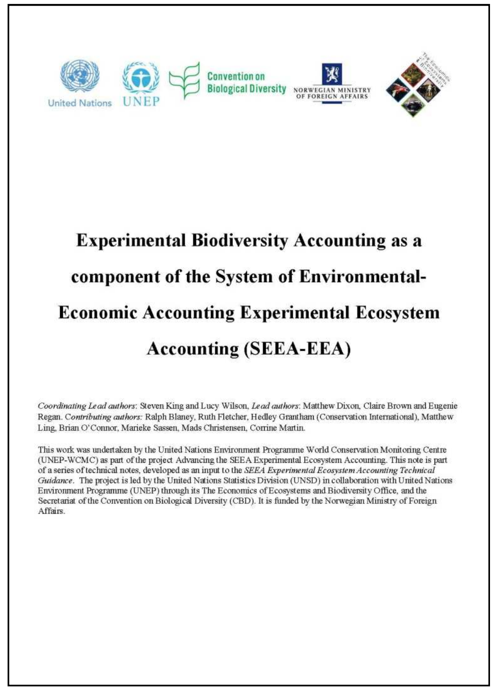
Exchange of material

UNEP-WCMC PUBLICATIONS TO DATE



2014

http://wcmc.io/Global_Nat_Cap



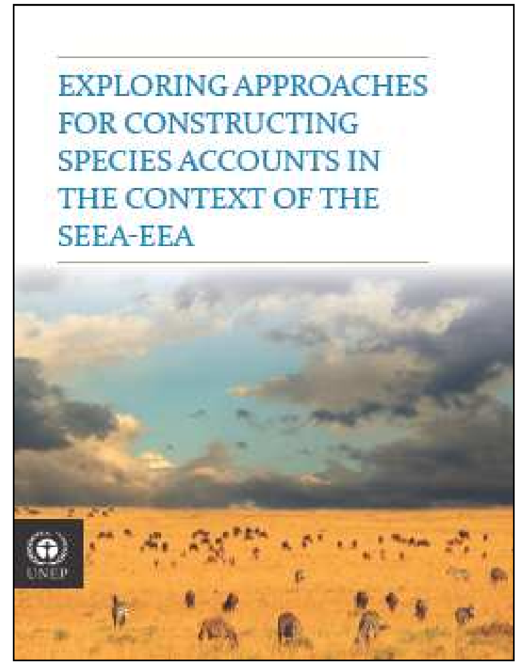
Experimental Biodiversity Accounting as a component of the System of Environmental-Economic Accounting Experimental Ecosystem Accounting (SEEA-EEA)

Coordinating Lead authors: Steven King and Lucy Wilson, *Lead authors*: Matthew Dixon, Claire Brown and Eugenie Regan. *Contributing authors:* Ralph Blaney, Ruth Fletcher, Hedley Grantham (Conservation International), Matthew Ling, Brian O'Connor, Marieke Sassen, Mads Christensen, Corrine Martin.

This work was undertaken by the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) as part of the project Advancing the SEEA Experimental Ecosystem Accounting. This note is part of a series of technical notes, developed as an input to the *SEEA Experimental Ecosystem Accounting Technical Guidance*. The project is led by the United Nations Statistics Division (UNSD) in collaboration with United Nations Environment Programme (UNEP) through its The Economics of Ecosystems and Biodiversity Office, and the Secretariat of the Convention on Biological Diversity (CBD). It is funded by the Norwegian Ministry of Foreign Affairs.

2015

http://wcmc.io/SEEA_EEA_Bio_Accounting



2016

http://wcmc.io/Species_Accounting

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DEVELOPING THEMATIC SPECIES ACCOUNTS

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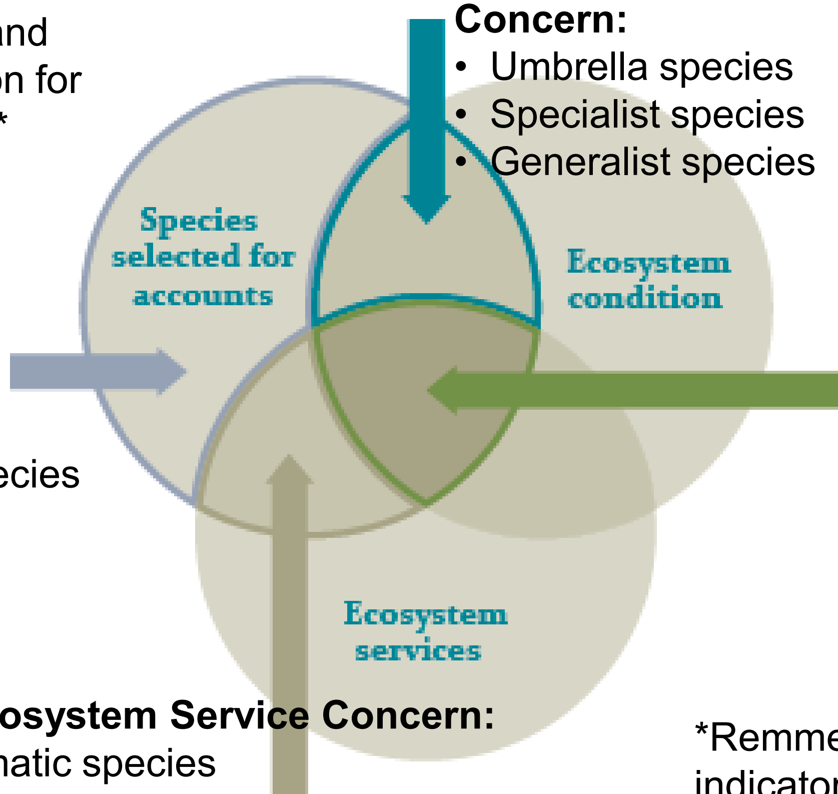
PRIORITISING SPECIES FOR ACCOUNTING

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

Condition concerns

Ecosystem Condition Concern:
- Umbrella species
- Specialist species
- Generalist species



Conservation Concern:
- Threatened species
- Endemic species
- Migratory species
- Evolutionary distinct species

Ecosystem Condition & Functioning Concern:
- Keystone species
- Trophic groups
- Taxonomic groups
- Functional groups
- Structural classes

Thematic concerns

Direct Ecosystem Service Concern:
- Charismatic species
- Wild food species

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

BIODIVERSITY ACCOUNTS IN 2016

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			

Experimental Ecosystem Accounts for the Central Highlands of Victoria

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

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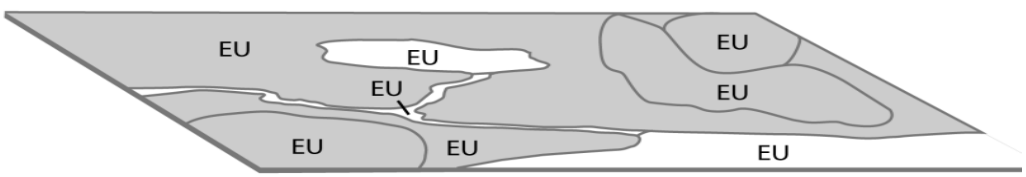
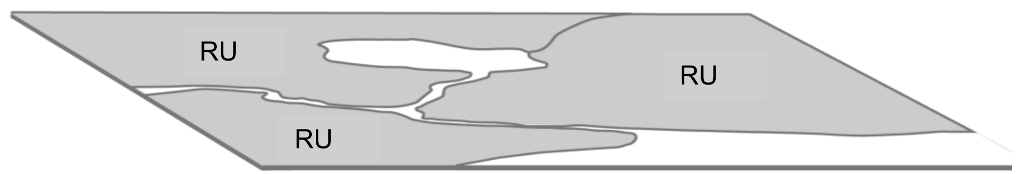
SCALE AND AGGREGATION CHALLENGES

‘Bottom-up’



1) Fits the accounting unit of an ‘Ecosystem Asset’
2) Only captures diversity within a location / ecosystem unit
3) Species-level biodiversity is not additive
4) Resource intensive – generally requires significant direct observation data

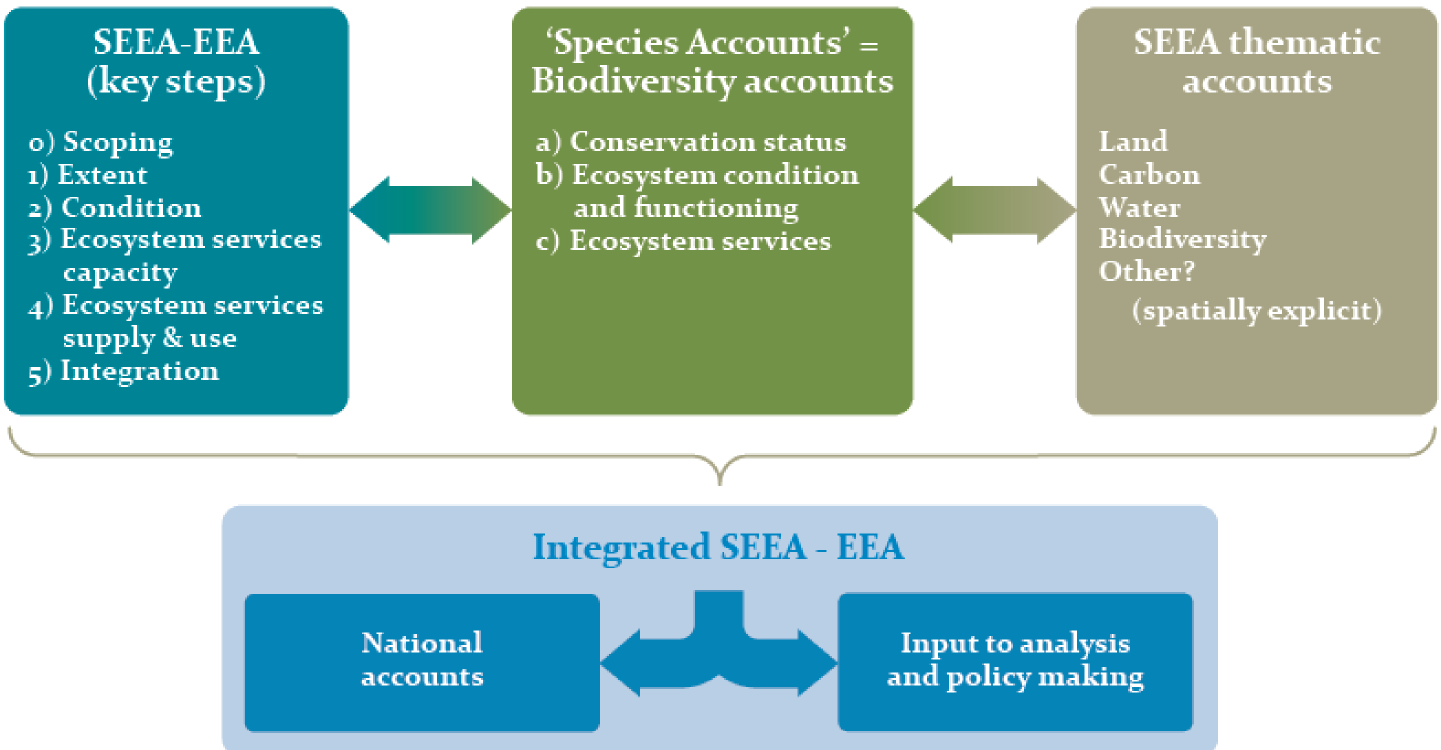
‘Top-Down’



1) Capture diversity between locations (ecosystems interact)
2) Simplify accounting where species use multiple ecosystems
3) Less resources intensive – can employ modelling approaches to make use of sparse direct observation data

Interaction between the biodiversity and accounting community required to develop pragmatic solutions for scale and aggregation issues!

INTEGRATION CHALLENGES



Interaction between the biodiversity and accounting community required to develop pragmatic solutions for integration issues!

GENERAL CHALLENGES

1) Consideration of thresholds – need to establish safe operating spaces for species and ecosystems
2) Reference condition – need to establish appropriate common reference point / year to aggregate and compare across species data and (potentially) other ecosystem condition characteristics
3) Applying big data – can we effectively use satellite remote sensing data, in-situ monitoring and citizen science

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OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT

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A HOLISTIC PICTURE

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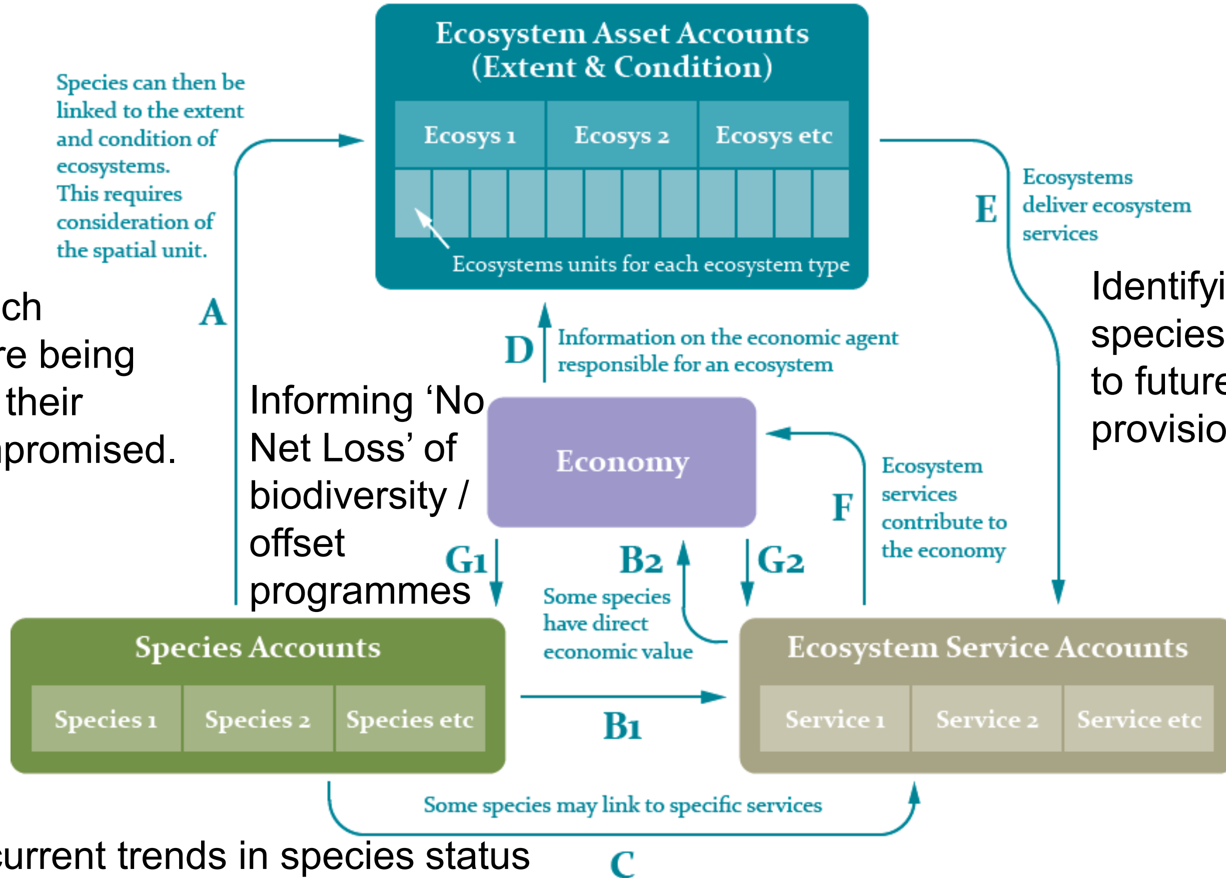
Identifying which ecosystems are being degraded and their resilience compromised.

Informing ‘No Net Loss’ of biodiversity / offset programmes

Identifying where trends in species status infer a risk to future ecosystem service provision

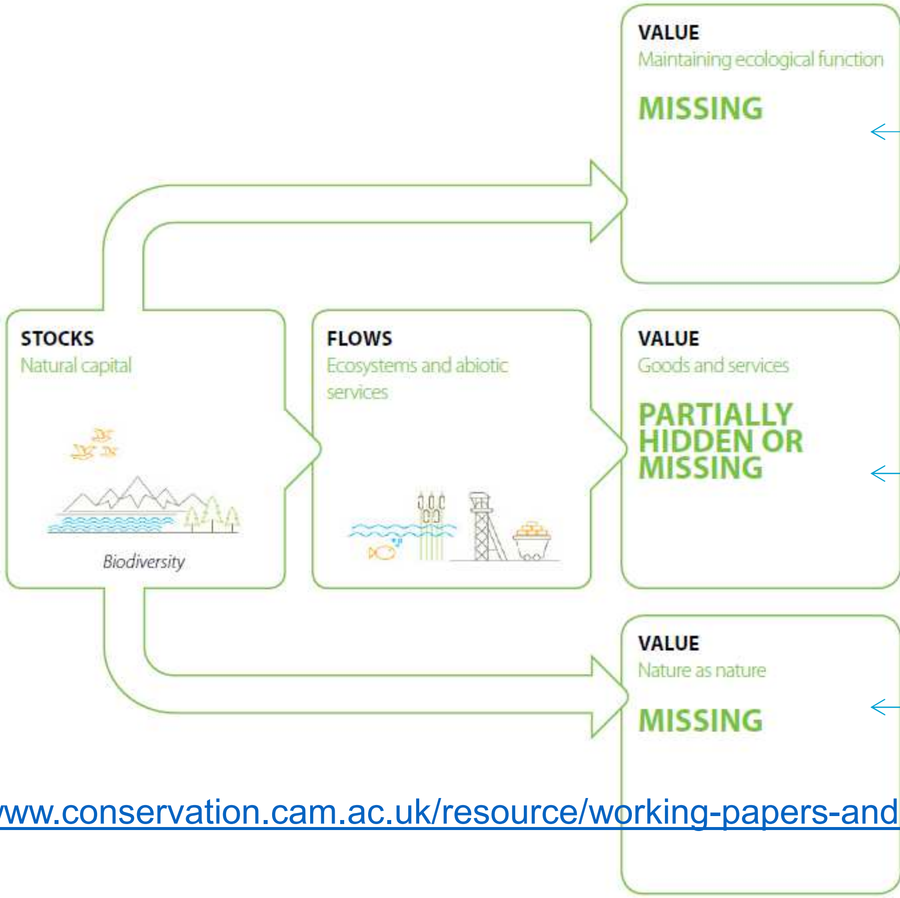


Informing ecological return on investment analysis.

Comparing current trends in species status with information on economic activities and other drivers of species loss.

Understanding the capacity of ecosystems to provide these services.

A THEMATIC PICTURE



The role of species in transferring matter and energy within and between ecosystems.

Maintaining biodiversity is an important part of 'future-proofing' ecosystems against climate change and other shocks.

In the wider SEEA-EEA this will be a subset of priority services – it will not be possible to robustly value all ecosystem services (e.g., climate regulation, water purification, pollination)

Conservation concerns of people (e.g., cultural benefits)

http://www.conservation.cam.ac.uk/resource/working-papers-and-reports/report-biodiversity-heart-accounting-natural-capital

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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

- 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

15 LIFE ON LAND

13 CLIMATE ACTION

2 ZERO HUNGER

1 NO POVERTY

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THANK YOU!

Images: Down to earth, Peter Hartl,; The production of Shea Butter, Carsten ten Brink, CC courtesy of Flickr ; Prunus Africana (Hook.f.) Kalkman (ROSACEAE), Scamperdale; Cabrero (Spindalis zena, Thraupidae), Rodrigo Medel, all CC courtesy of Flickr. Remainder reproduced under license from Shuttershock

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HETEROGENEITY OF EXISTING DATA

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

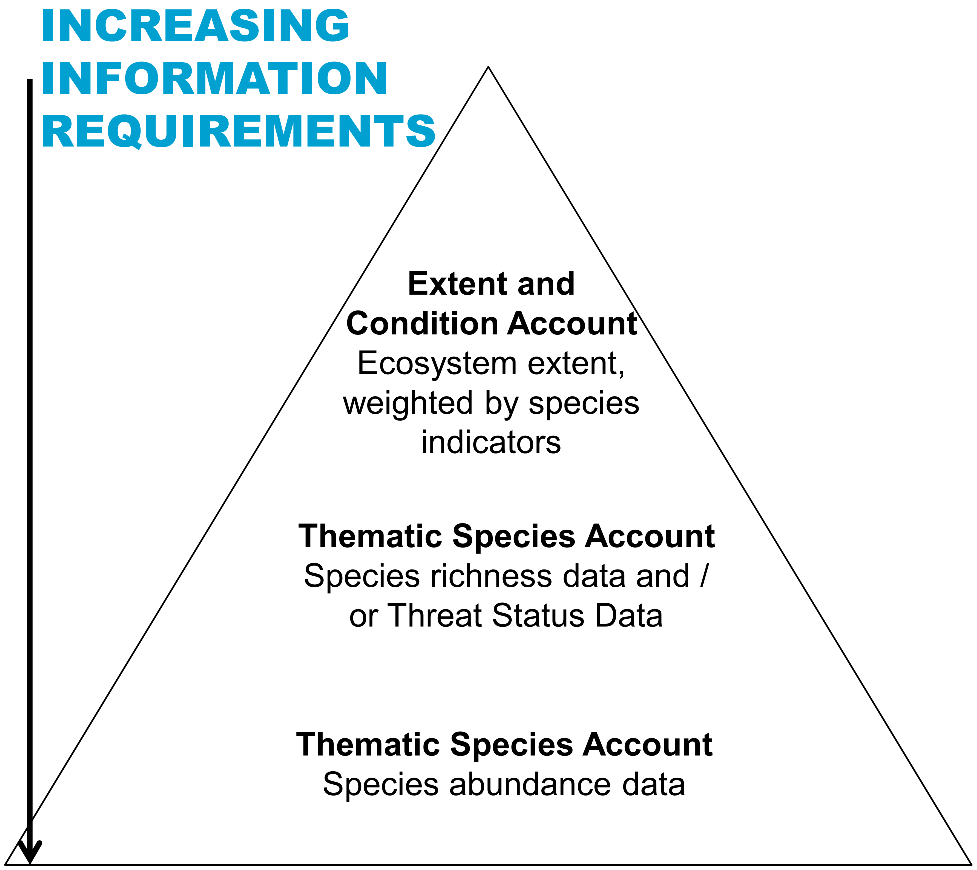
Change as % of the opening relative abundance

	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	Composite indicator
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	N/A
Reference (1995)	2,000	100,000	Set to 1.0	1,000,000	85%	100%
Opening (2005)	1,500	60,000	0.70	100,000	80%	N/A
Additions	100	N/A	N/A	10,000	N/A	N/A
Reductions	200	N/A	N/A	30,000	N/A	N/A
Closing (2010)	1,400	65,000	0.50	80,000	70%	N/A
Net Change	-100	+5,000	-0.20	-20,000	-10%	N/A
Opening (% of reference, 2005)	75%	60%	70%	10%	94%	49%
Closing (% of reference, 2010)	70%	65%	50%	8%	82%	43%
Net change (% of reference)	-5%	+5%	-20%	-2%	-12%	-6%
Change (% of opening)	-6.7%	+8.3%	-29%	-20%	-13%	-13%

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. Maybe difficult to align with the ecosystem unit
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

A PROPOSED TIERED APPROACH OF DATA NEEDS FOR BIODIVERSITY ACCOUNTS



Examples of information recorded for a Montane Coniferous Forest Ecosystem Unit (EU)

Extent and Condition Account

Montane Coniferous Forest EU extent, weighted by an input species condition indicator (e.g., Simpsons Index).

Thematic Species Account

Species richness of different taxonomic groups in Montane Coniferous Forest. Supplemented with information on species Red List stats.

Thematic Species Account

Species abundance monitoring data for Montane Coniferous Forest.