Policy needs for mapping and assessment of ecosystems and their services in the context of the EU Biodiversity Strategy to 2020

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European Commission
Mapping and assessment of ecosystems and their services is a framework to inform policy:

- helps in **understanding the causal chain**, from human actions to impacts on ecosystems and their services, to human well-being
- helps to **tell a story** and communicate the importance of ecosystems to different stakeholders
- provides tools for policy-makers to reduce **pressures**, manage **synergies** and **trade-offs**, protect and **restore** ecosystems and **monitor progress** towards the 2020 biodiversity targets
The EU Biodiversity Strategy to 2020

2050 VISION

2020 headline target
halt biodiversity loss – restore ecosystem services – global contribution

SIX TARGETS

1. Enhance implementation of nature legislation
2. Restore ecosystems and establish Green Infrastructure
3. Sustainable agriculture and forestry
4. Sustainable fisheries
5. Combat Alien Invasive Species
6. Contribute to averting global biodiversity loss

ACTIONS
Mid-term review, October 2015

➢ Mid-term, not mid-way
Target 1

**Nature Directives’ Fitness Check**, December 2016

- Directives still relevant, implementation needs strengthening
- Follow-up Action Plan to enhance implementation: Spring 2017

**MAES work can inform efforts** in many areas, e.g.:

- Filling knowledge gaps and valuing ecosystem services
- Support for N2000 designation, management
- Communication / engagement of stakeholders
- Coherence with other policies: agriculture, forestry, energy
- N2000 connectivity
- What is happening within and beyond the network, i.e. show what is working.
Target 2

- **Biodiversity mid-term review:** progress on policy, knowledge (MAES) and restoration activities but pressures on ecosystems and their services continue

**MAES underpins work on:**

- Valuing natural capital
- Restoration prioritisation
- Green infrastructure: mapping
- Halting the loss of biodiversity and ecosystem services outside N2000
- Links to MSFD, WFD and sector policies
Target 3

Biodiversity mid-term review:
- Success examples, but overall continuing decline
- Much better integration and understanding of causal links needed

MAES can contribute e.g. to:
- **Better** integrated data to deliver a coherent story
- **Understanding policy responses** – measures that work
- **Increasing** stakeholder acceptance
- **Bringing the discussion on the CAP review to sustainable food policy**
Biodiversity mid-term review:
• Progress in policy frameworks for sustainable fisheries and but uneven implementation
• Multiple pressures and continuing decline of marine ecosystems

MAES can fill major knowledge gaps for:
• the designation and management of MPAs,
• the achievement and monitoring of Good Environmental Status
• Tell the whole story
Target 5

Combat invasive alien species

IAS are a fast-growing threat
• IAS Regulation and first list of IAS of Union concern adopted
• Next steps: implementation, updating, monitoring and reporting

MAES can contribute e.g. to understanding IAS impacts on vulnerable ecosystems in the context of multiple pressures, in order to inform risk assessments and decisions.
Help avert global biodiversity loss

**MAES relevant e.g. to support:**

- IPBES assessments
- A basis for consideration of indirect drivers of global biodiversity loss – consumption, trade. How to account for the EU’s global footprint?
- 2030 Agenda for Sustainable Development

Ecological footprint per region of the world

Source: EEA (SEBI)
The global 2030 Agenda for Sustainable Development
**IPBES and MAES**

- High scope for synergies and cost-effective use of people and resources
- MAES as core EU input to the IPBES regional assessment for Europe
- IPBES regional assessment for Europe and Central Asia due by **March 2018** and global assessment by 2019 (tbc)

- **EU:** To support SOER 2020, Final Assessment and update of the EU Biodiversity Strategy beyond 2020
- **Beyond EU:** To support the 5th Global Biodiversity Outlook and the update of the Strategic Plan beyond 2020, Agenda 2030
EU Natural Capital Assessment timeline until 2020

2018
- IPBES Regional assessments
- 5NR

2019
- IPBES global assessment GBO5
- EU Final Evaluation 7EAP

2020
- MAES
- SDG report
- EU Final Evaluation BDS 2020
- State of Nature in Europe
- EEA SOER

Post-2020 framework...
MAES – leading to a coherent story:

- **Inform of where we are and where we are going, and why**
- **Demonstrate cause and effects**
- **Capture the social and economic angle**
- **Make the case for protecting and restoring ecosystems, messages to different stakeholders**
- **Enable working on strengths – drivers of success**

-> towards a robust post-2020 biodiversity policy
Environmental Implementation Review

- Published on 6 February 2017
- 28 country reports, including Natural Capital chapters
- A communication summarising the political conclusions and examining common trends.
- Recommendations for improvements, summarising suggestions communicated to Member States.
- A framework for sharing solutions, dialogue and a peer-to-peer tool for Member States.
Thank you for your attention!

More information on Europa

BISE
http://biodiversity.europa.eu/maes
Second phase of MAES:

- Biophysical mapping and assessment will continue and valuation and Natural Capital Accounting will gain prominence up to 2020
- Activities started in MS, KIP on NCA for EU layer

**EU:** To support 7EAP, Circular Economy, Greening of Semester, Sustainable Development

**Beyond EU:** CBD (Aichi Target 2), SDG process – need for statistics that go beyond GDP, better transparency and accountability
Project KIP INCA

- **Knowledge Innovation Project on Integrated System for Natural Capital and Ecosystem Services Accounting in the EU**
- Project developed by a partnership of European Commission services (DG ENV, DG CLIMA, DG JRC, DG ESTAT, DG RTD and EEA)
- Objective to **strengthen the knowledge base for the implementation of the 7th EAP**
- Knowledge Innovation Projects (KIPs) have the ambition to **address gaps in environmental knowledge**, using an **innovate approach**
- Feasibility and design phase till mid-2016, then if "go ahead" implementation phase till 2020
Eurostat (leader in phase 1):
- Experience with geospatial-statistical data integration
- Operates LUCAS
- Lead service for geospatial information in the EU
- Statistics on land use/land cover, forest, agriculture
- Environmental-Economic Accounts (SEEA)

DG Environment:
- Provides policy context and is the principal user of KIP INCA outputs
- Responsible for MAES
- Follows Natural Capital Accounting initiatives (private and global)
- "owns" administrative reporting obligations

KIP INCA partners

DG RTD:
- Runs research programs on ecosystem services and biodiversity, e.g. ESMERALDA
- Coordination between INCA and research activities

EEA:
- Principal information provider on the state of the environment in Europe
- Long-term experience in ecosystem accounting, involved in MAES
- Operates data centres on water and biodiversity
- Responsible for CORINE land cover and Copernicus data
- The main data processing partner

EC Joint Research Centre:
- Operates data centres on forest and soil and information systems on agriculture, ecosystems and water
- Vast modelling experience on ecosystem services
Components of ecosystem accounting (SEEA EEA)

Physical

**Thematic:** Land, Water, Carbon, Biodiversity
- **Extent**
- **Condition**

**Tools:**
- Classifications, Spatial units, scaling & aggregation, Biophysical modelling

**Services Supply**
**Services Use**

**Tools:** Valuation techniques

Monetary

**Asset**

**Supporting:**
- SNA, I-O tables, economic production functions

**Augmented I-O Table**

**Integrated Sector Accounts and Balance Sheets**
Existing potential input: MAES (ecosystem extent)

### Ecosystem type

<table>
<thead>
<tr>
<th>Ecosystem type</th>
<th>EUNIS Level 1</th>
<th>EUNIS Level 2</th>
<th>Total ecosystem coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>J Constructed, industrial and other artificial habitats</td>
<td>J1 Buildings of cities, towns and villages</td>
<td>102151 km², 46.08%</td>
</tr>
<tr>
<td></td>
<td>J2 Low density buildings</td>
<td>J2 Buildings of cities, towns and villages</td>
<td>94150 km², 42.47%</td>
</tr>
<tr>
<td></td>
<td>J3 Extractive industrial sites</td>
<td>J3 Extractive industrial sites</td>
<td>6453 km², 2.91%</td>
</tr>
<tr>
<td></td>
<td>J4 Transport networks and other constructed hard-surface areas</td>
<td>J4 Transport networks and other constructed hard-surface areas</td>
<td>16100 km², 7.26%</td>
</tr>
<tr>
<td></td>
<td>J5 Highly artificial man-made waters and associated structures</td>
<td>J5 Highly artificial man-made waters and associated structures</td>
<td>1828 km², 0.82%</td>
</tr>
<tr>
<td></td>
<td>J6 Waste deposits</td>
<td>J6 Waste deposits</td>
<td>998 km², 0.45%</td>
</tr>
<tr>
<td>Cropland</td>
<td>I Regularly or recently cultivated agricultural, horticultural and domestic habitats</td>
<td>I1 Arable land and market gardens</td>
<td>1243168 km², 99.18%</td>
</tr>
<tr>
<td></td>
<td>I2 Cultivated areas of gardens and parks</td>
<td>I2 Cultivated areas of gardens and parks</td>
<td>10292 km², 0.82%</td>
</tr>
<tr>
<td>Grassland</td>
<td>E Grasslands and land dominated by forbs, mosses or lichens</td>
<td>E1 Dry grasslands</td>
<td>9330 km², 1.35%</td>
</tr>
<tr>
<td></td>
<td>E2 Mecis grasslands</td>
<td>E2 Mecis grasslands</td>
<td>57151 km², 82.48%</td>
</tr>
<tr>
<td></td>
<td>E3 Seasonally wet and wet grasslands</td>
<td>E3 Seasonally wet and wet grasslands</td>
<td>55771 km², 8.04%</td>
</tr>
<tr>
<td></td>
<td>E4 Alpine and subalpine grasslands</td>
<td>E4 Alpine and subalpine grasslands</td>
<td>21328 km², 3.05%</td>
</tr>
<tr>
<td></td>
<td>E5 Woodland fringes, clearings and tall forbs stands</td>
<td>E5 Woodland fringes, clearings and tall forbs stands</td>
<td>0 km², 0.00%</td>
</tr>
<tr>
<td></td>
<td>E6 Inland salt steppes</td>
<td>E6 Inland salt steppes</td>
<td>3043 km², 0.44%</td>
</tr>
<tr>
<td></td>
<td>E7 Sparsely wooded grasslands</td>
<td>E7 Sparsely wooded grasslands</td>
<td>32195 km², 4.64%</td>
</tr>
<tr>
<td>Woodland and forest</td>
<td>G Woodland, forest and other wooded land</td>
<td>G1 Broadleaved deciduous woodland</td>
<td>497790 km², 28.29%</td>
</tr>
<tr>
<td></td>
<td>G2 Broadleaved evergreen woodland</td>
<td>G2 Broadleaved evergreen woodland</td>
<td>49248 km², 2.86%</td>
</tr>
<tr>
<td></td>
<td>G3 Coniferous woodland</td>
<td>G3 Coniferous woodland</td>
<td>695907 km², 40.35%</td>
</tr>
<tr>
<td></td>
<td>G4 Mixed woodland</td>
<td>G4 Mixed woodland</td>
<td>291687 km², 16.91%</td>
</tr>
<tr>
<td></td>
<td>G5 Lines of trees, small woodlands, recently felled woodlands, early stage woodland, coppice</td>
<td>G5 Lines of trees, small woodlands, recently felled woodlands, early stage woodland, coppice</td>
<td>199784 km², 11.58%</td>
</tr>
<tr>
<td>Heathland and shrub</td>
<td>F Heathland, scrub and tundra</td>
<td>F1 Tundra</td>
<td>0 km², 0.00%</td>
</tr>
<tr>
<td></td>
<td>F2 Arctic, alpine and subalpine scrub</td>
<td>F2 Arctic, alpine and subalpine scrub</td>
<td>34524 km², 14.88%</td>
</tr>
<tr>
<td></td>
<td>F3 Temperate and mediteraneo-montane scrub</td>
<td>F3 Temperate and mediteraneo-montane scrub</td>
<td>52824 km², 22.76%</td>
</tr>
<tr>
<td></td>
<td>F4 Temperate shrub heathland</td>
<td>F4 Temperate shrub heathland</td>
<td>691 km², 0.30%</td>
</tr>
</tbody>
</table>

(Source: EEA)
Existing potential input layers - MAES activities (ecosystem services)

(Source: JRC)
From maps to accounting tables...
(...from accounting tables to better policies)

Table 4.2 Ecosystem extent account

<table>
<thead>
<tr>
<th>Ecosystem type</th>
<th>Cover</th>
<th>Urban and associated</th>
<th>Rainfed herbaceous cropland</th>
<th>Forest tree cover</th>
<th>Inland water bodies</th>
<th>Open wetlands</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td></td>
<td></td>
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<tr>
<td>Residential</td>
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<td></td>
</tr>
<tr>
<td>Ownership</td>
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<tr>
<td>Government</td>
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</tr>
<tr>
<td>Private</td>
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<tr>
<td>Protected</td>
<td></td>
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<tr>
<td>Maintenance</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
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<td>Government</td>
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</tr>
<tr>
<td>Maintenance</td>
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</tr>
</tbody>
</table>

Ecosystem condition account (similar to SEEA EEA Table 4.3: see also SEEA EEA Table 4.3 with changes in condition account)

Table 4.4 Ecosystem services supply account (LCEU by CICES)

<table>
<thead>
<tr>
<th>Ecosystem service</th>
<th>Units</th>
<th>Land cover type</th>
<th>Urban</th>
<th>Pasture</th>
<th>Cropland</th>
<th>Forest</th>
<th>Heath</th>
<th>Peat</th>
<th>Water</th>
<th>Other nature</th>
<th>Provincial total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunting</td>
<td>kg meat</td>
<td>-</td>
<td>9,100</td>
<td>14,732</td>
<td>8,100</td>
<td>678</td>
<td>70</td>
<td>1,513</td>
<td>34,193</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provisioning</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking water extraction</td>
<td>10^3 m^3 water</td>
<td>4,071</td>
<td>7,026</td>
<td>11,227</td>
<td>3,117</td>
<td>214</td>
<td>147</td>
<td>862</td>
<td>26,995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop production</td>
<td>10^3 kg produce</td>
<td>-</td>
<td>-</td>
<td>1,868</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,868</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fodder production</td>
<td>10^3 kg dry matter</td>
<td>533</td>
<td>251</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>784</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulation</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air quality regulation</td>
<td>10^3 kg PM_{10}</td>
<td>272</td>
<td>404</td>
<td>717</td>
<td>700</td>
<td>45</td>
<td>7</td>
<td>69</td>
<td>2,254</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon sequestration</td>
<td>10^3 kg carbon</td>
<td>875</td>
<td>8,019</td>
<td>273</td>
<td>306</td>
<td>149</td>
<td>-</td>
<td>1,056</td>
<td>61,429</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational cycling</td>
<td>10^3 trips</td>
<td>2,690</td>
<td>1,863</td>
<td>2,611</td>
<td>1,565</td>
<td>30</td>
<td>3</td>
<td>139</td>
<td>220</td>
<td>9,121</td>
<td></td>
</tr>
</tbody>
</table>
KIP INCA

- Data integration allows making use of existing sources
- Expertise and data available through collaboration of key partners, incl. accounting, monitoring, analysis and modelling
- Gradual adjustment of existing data collections towards better contributing to ecosystem accounting
- EU level data sets are integrated by EU-level bodies – no extra work for EU member states but an opportunity to "plug in"
Potential policy uses of NCA

- Develop macro-indicators, both physical and monetary
- Show how sectors benefit from and impact on natural capital
- Account for range of ecosystem benefits and values
- Determine synergies/trade-offs amongst ecosystem services
- Corporate accounting: consistency with national accounts
- EU input to UN-SEEA EEA
- WAVES: World Bank - developing countries
Some Research Issues

- Underlying science of relationship between biodiversity, ecosystem condition and services
- Data issues – integrating and making use of various data sources (including Copernicus, etc)
- Issues of scale and aggregation
- Valuation methodologies for accounting
- Using accounts in decision making processes
- Requires approaches across disciplines and specific expertise
- Capacity building
Integrating 3 basic layers of data to measure ecosystems and their services

- Satellite images (incl. aerial photos, maps);
- Statistics (ideally regional) depicting economic activity and uses of nature;
- Point information (e.g. LUCAS, forestry inventories, observation of species, scientific assessments regularly required under EU legislation);
- Needs common frame to upscale and downscale the data layers to a common frame using models;
- Key ecosystem services:
  - **Provisioning** (crops, fodder, wood, drinking water, ....)
  - **Regulating** (carbon sequestration, flood and erosion prevention, air purification, ....)
  - **Cultural** (recreation, scientific, spiritual, ....)
- Key accounts: ecosystem extent, condition, services supply and services use – first physical then potentially monetary estimates.
Summary on KIP INCA

- **Data integration** allows making use of existing sources
- Expertise and data available through **collaboration of key partners**, incl. accounting, monitoring, analysis and modelling
- **Gradual adjustment** of existing data collections (such as LUCAS 2018) towards better contributing to ecosystem accounting
- **EU level** data sets are integrated by **EU-level bodies** – no extra work for EU member states but an opportunity to "plug in"
- KIP INCA is the EU response to clear **EU policy targets of the 7th EAP** and current international developments
- **Experimental valuation** is possible once the physical accounts are set up – division of labour between statistics and research