



## **Glossary for Ecosystem Service mapping and assessment terminology**

### **Deliverable D1.4**

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#### **ESMERALDA**

**Enhancing ecosystem services mapping  
for policy and decision making**



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## Introduction

The aim of ESERALDA (<http://www.esmeralda-project.eu/>) is to “to deliver a flexible methodology to provide the building blocks for pan-European and regional assessments”. Deliverable 1.4 “Glossary for ES mapping and assessment terminology” is split into an “internal agreement to be delivered in month 4 and a final version to be fed into the online stakeholder infrastructure in months 40. This version 1.0 represents the working definitions to be tested by the ESERALDA consortium over the next couple of months.

It has been agreed in the ESERALDA Executive Board to use the glossary, which has been developed in the OpenNESS project as a working document. The following description is to inform the reader how the OpenNESS Glossary Version 2.0 has been developed.

In using and reviewing the terms it is important to note the scope and purpose of the work. The following is the background on which the original OpenNESS Glossary was built:

- The starting point was the set of Ecosystem Services/Natural Capital S related terms developed through other initiatives such as the MA<sup>1</sup>, TEEB<sup>2</sup>, the UK NEA<sup>3</sup>, and Rubicode<sup>4</sup>. Glossary Editorial Team consolidated the terms they defined into one list in early 2014, so that the similarities and differences could be reviewed and the applicability to OpenNESS discussed.
- Through a three-month consultation process within the OpenNESS consortium Glossary Editorial Team asked for comments on the range of terms included in the glossary, the definitions themselves and suggestions for any additional terms.
- As a result of the consultation the glossary now contains about 200 terms. It should be noted, however, that the terms included do not just reflect the ES literature but also the particular subjects that OpenNESS is focusing on covering; there are no clear boundaries. The original list was constructed through a dialogue in the consortium – and in the future Glossary Editorial Team can add or drop terms as required.
- The major changes made were to improve consistency and clarity, especially with the work done through the development of the OpenNESS Synthesis Papers<sup>5</sup>.

## Structure of the Glossary

The entries in the glossary are arranged in a tabular format so that users can see the background to the terms covered. The columns deal with the:

- *‘Term’*: some terms are ‘starred’ [\*]: the term has been accepted as a working definition but internal discussions are already ongoing and “patrons” (patron teams) have been formed to discuss those further and changes on the definition are likely to be expected in V3.0.
- *‘Definition’* reflects agreed working definition for the OpenNESS consortium.
- *‘Source’*, that is where we took the direct quote from. Note, this does not mean origin, that is where it was first used or suggested.

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<sup>1</sup> The Millennium Ecosystem Assessment (MA): <http://millenniumassessment.org/>

<sup>2</sup> The Economics of Ecosystems and Biodiversity (TEEB): <http://www.teebweb.org/>

<sup>3</sup> UK National Ecosystem Assessment: <http://uknea.unep-wcmc.org/>

<sup>4</sup> Rationalising Biodiversity Conservation in Dynamic Ecosystems (RUBICODE): <http://www.rubicode.net/rubicode/index.html>

<sup>5</sup> <http://www.openness-project.eu/library/reference-book>, see also Appendix A for overview and status of Synthesis Papers

- In the source column, where there is an attribution to TEEB, MA or UK NEA the term appears in their glossary. When the OpenNESS Glossary editorial team took terms from other sources, we mainly acknowledge the first one to define it. So if, for example, TEEB or UK NEA has kept the same definition as MA, we have put MA in as source. If UK NEA has changed it, or Rubicode added to the MA or other definitions, we added those as the source.
- Where the word 'New' is used in the source column, we mean that the wording has been changed or different definitions merged to better reflect what has been discussed in OpenNESS. Sometimes the definition is new but sometimes it is a modification of another source. The term has been newly defined for OpenNESS.
- '*Comment*': 'see also SP ...' refers to synthesis papers developed with in OpenNESS. They are available via the reference book on the OpenNESS website, see footnote 5.

## Developing the glossary

In preparing the glossary, we do not imply that all the terms listed were developed from the ES community, but that they are often used in the ES literature, and potentially within ESMERALDA. Although some terms may have been used by other people in other disciplines, our main concern is not to trace their origins but to identify their relevance and applicability for ESMERALDA. The purpose of the exercise was not to reinvent anything, but to provide a set of working definitions for the consortium.

## The current consultation process

The draft glossary was initially circulated to the OpenNESS consortium between the beginning of October and mid-November 2014. The aim was to ask for instant reactions to the working definitions. Comments were received via email and via an on-line survey tool. Altogether 18 people participated in the consultation and comments were considered on 74 terms.

The comments received were discussed within the 'Glossary Working Group' and suggestions, responses on decisions noted. In order to make the consultation process as transparent as possible, Version 1.1 has now been posed on the OpenNESS Intranet with the notes on the editing process. The same terms without the editorial comments have now also been uploaded onto the OpenNESS public website in December 2014 as Version 2.0.

## Acknowledgements

The original glossary was prepared by the "OpenNESS Glossary editorial team" Marion Potschin (UNOTT, coordinating), Roy Haines-Young (UNOTT), Ulrich Heink (UFZ), Kurt Jax (UFZ) with contributions from P.Berry (UOXF), P. Bezak (ILESAS), M. García Llorente (UAM), E. Gomez Baggethun (UAB/NINA), C. Görg (UFZ), J. Hauck (UFZ), P. Harrison (UOXF), Z. Izakovicova (ILESAS), C. Kretsch (UNOTT), A.L Madsen (HUGIN), J. Maes (JRC), B. Martín-López (UAM), G. Martinez Pastur (CONICET), P. Mederly (ILESAS), J. Niemelä (UH), J. Priess (UFZ), E. Primmer (SYKE), G. Rusch (NINA), E. Stange (NINA), M. Termansen (AU); F. Turkelboom (INBO), V. Yli-Pelkonen (UH).

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Potschin, M.; Haines-Young, R.; Heink, U. and K. Jax (2014): OpenNESS Glossary (V2.0). Grant Agreement No 308428. Available from: <http://www.openness-project.eu/library/reference-book>

Term	Definition	Source	Comment
Abatement Cost	See 'Marginal Abatement costs'	MA (2005)	
Abiotic	Referring to the physical (non-living) environment, for example, temperature, moisture and light, or natural mineral substances.	Modified from Lincoln et al. (1998: 1)	
Abundance	The total number of individuals of a taxon or taxa in an area, population, or community. Relative abundance refers to the total number of individuals of one taxon compared with the total number of individuals of all other taxa in an area, volume, or community.	MA (2005)	
Adaptation	Adjustment in natural or human systems to a new or changing environment.	MA (2005)	
Adaptive Capacity	The ability of ecosystems and social systems, to adjust and renew as a response to contextual changes. The term can be distinguished from coping capacity, which is defined as the ability to deal with changes, especially those relating to climate, as they actually happen.	New, draws on Gunderson and Holling (2002); Primmer (2011), Dunford et al. (2014)	
Adaptive Management	A systematic process for continually improving management policies and practices by learning from the outcomes of previously employed policies and practices. In active adaptive management, management is treated as a deliberate experiment for purposes of learning and achieving a desired goal.	Adapted from the MA (2005)	
Additional (system) Inputs	Non-ecosystem-based anthropogenic contributions to ecosystem services, referring for example to fertiliser, energy, pesticide, technique, labour or knowledge use in human-influenced land use systems.	Burkhard et al. (2014)	As used in MAES (2014)
Afforestation	Planting of forests on land that has historically not contained forests (as opposed to Reforestation).	MA (2005)	
Agro-biodiversity (or agricultural biodiversity)	The biodiversity in agricultural ecosystems (including domestic animals and cultivated plants, e.g. crop plants).	MA (2005)	
Agro-ecosystem	An ecosystem, in which usually domesticated plants and animals and other life forms are managed for the production of food, fibre and other materials that support human life.	Common usage	
Alien Species	A plant or animal whose distribution is outside its natural range; alien species are frequently introduced by human activity.	Common usage and consistent with MA (2005)	
Alien Invasive Species	See 'invasive alien species'		
Aquaculture	Breeding and rearing of aquatic organisms (fish, molluscs, crustaceans and aquatic plants) in ponds, enclosures, or other forms of confinement in either fresh or marine waters for direct harvest of the product.	Adapted from MA (2005)	extended by FAO yearbook Fishery and Aquaculture Statistics (2011)

Term	Definition	Source	Comment
Assemblage	A group of organisms from either one taxon (e.g. birds) or from different taxa.	Common usage	
Assessment	The analysis and review of information derived from research for the purpose of helping someone in a position of responsibility to evaluate possible actions or think about a problem. Assessment means assembling, summarising, organising, interpreting, and possibly reconciling pieces of existing knowledge and communicating them so that they are relevant and helpful to an intelligent but inexperienced decision-maker.	(Parson, 1995).	As used in MAES (2014)
Asset, ecological	Ecological assets are the stocks of potential services which the ecosystem, conditioned by structure and processes, might provide. In economic terms these represent the 'wealth' of the ecosystem.	UK NEA (2011); Bateman et al. (2011: 182)	
Bayesian Belief Network [a.k.a. Bayesian Network]	A probabilistic graphical model for reasoning under uncertainty, consisting of an acyclic, directed graph describing a set of dependence and independence properties between the variables of the model represented as nodes, and a set of (conditional) probability distributions that quantify the dependence relationship.	Adapted from Kjærulff & Madsen (2013)	
Beneficiary	A person or group whose well-being is changed in a positive way by an ES.	New	
Beneficiary Approach	The classification of ES according to beneficiary (sub-)categories.	New	
Benefits*	Positive change in wellbeing from the fulfilment of needs and wants.	(TEEB, 2010)	As used in MAES (2014)
Biodiversity	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.	(cf. Article 2 of the Convention on Biological Diversity, 1992).	As used in MAES (2014)
Biodiversity offsets	Conservation activities that are de-signed to give biodiversity benefits to compensate for losses - ensuring that when a development damages nature (and this damage cannot be avoided via prevention or mitigation) new, bigger or better nature sites will be created. They are different from other types of ecological compensation as they need to show measurable out-comes that are sustained over time.	modified from Gov. UK	
Bioenergy	Renewable energy made available from materials derived from biological sources.	Common usage	
Biofuel	A fuel that contains energy from geologically recent carbon fixation, produced from living organisms, usually plants.	Common usage	
Biogeographic Realm	A large spatial region, within which ecosystems share a broadly similar biota. Eight terrestrial biogeographic realms are typically recognised, corresponding roughly to continents (e.g. Afrotropical realm).	UK NEA (2011)	
Biological Diversity	See Biodiversity.		

Term	Definition	Source	Comment
Biomass	The mass of tissues in living organisms in a population, ecosystem, or spatial unit derived by the fixation of energy through organic processes.	Common usage and MA (2005)	
Biome	The largest unit of ecological classification that is convenient to recognize below the entire globe. Terrestrial biomes are typically based on dominant vegetation structure (e.g. forest, grassland). Ecosystems within a biome function in a broadly similar way, although they may have very different species composition. For example, all forests share certain properties regarding nutrient cycling, disturbance, and biomass that are different from the properties of grasslands. Marine biomes are typically based on biogeochemical properties. The WWF biome classification is used in the MA.	MA (2005)	
Biophysical Structure	The architecture of an ecosystem as a result of the interaction between the abiotic, physical environment and the biotic communities, in particular vegetation.		As used in MAES (2014)
Biophysical Valuation	A method that derives values from measurements of the physical costs (e.g., in terms of labour, surface requirements, energy and material inputs) of producing a given good or service.	TEEB	As used in MAES (2014)
Capacity Building	A process of strengthening or developing human resources, institutions, organisations, or networks. Also referred to as capacity development or capacity enhancement.	UK NEA (2011)	
Carbon Sequestration	The process of increasing the carbon content of a reservoir other than the atmosphere.	MA (2005)	
Choice experiment	A method of valuing goods and services based on their attributes. It is a stated preference technique whereby respondents trade-off different levels of the attributes with payments to reveal the value of changes in the attributes.	Modified according to Hanley et al. (1998)	
Classification System [for ES]	An organised structure for identifying and organising ES into a coherent scheme.	Common usage	
Coastal System	Systems containing terrestrial areas dominated by ocean influences such as tides and marine aerosols, plus near shore marine areas. The inland extent of coastal ecosystems is the line where land based influences dominate, up to a maximum of 100 kilometres from the coastline or 100-meter elevation (whichever is closer to the sea), and the outward extent is the 50-meter-depth contour.	Adapted from UK NEA (2011)	
Community (Ecological)	An assemblage of species occurring in the same space or time, often linked by biotic interactions such as competition or predation.	UK NEA (2011), and common usage	
Community (Human, Local)	A group of people who have something in common. A local community is a fairly small group of people who share a common place of residence and a set of institutions based on this fact, but the word 'community' is also used to refer to larger collections of people who have something else in common (e.g., national community, donor community).	Adapted from MA (2005) and UK NEA (2011)	

Term	Definition	Source	Comment
Conceptual Framework [for ecosystem services and biodiversity]*	See Term "Framework"		
Conservation Status	The sum of the influence acting on a habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species.	EEC	As used in MAES (2014)
Contingent Valuation	Stated preference-based economic valuation technique based on a survey of how much respondents would be willing to pay for specified benefits.	Adapted from MA (2005) and MA (2005)ES	
Cost-Benefit Analysis	A technique designed to determine the economic feasibility of a project or plan by quantifying its economic costs and benefits.	MA (2005)	
Cost-Effectiveness analysis/Approach	Analysis to identify the least cost option that meets a particular goal.	MA (2005)	
Critical Natural Capital	That set of environmental resources which performs important environmental functions essential to human well-being, and for which no substitutes in terms of human, manufactured or other natural capital currently exist.	New, modified version of Ekins (2003)	
Critically Endangered Species	A species which has been categorised by the International Union for Conservation of Nature as facing a very high risk of extinction in the wild. It is the highest risk category assigned by the IUCN Red List for wild species.	IUCN	
Cultural Landscape	See term 'Landscape'.		
Cultural Ecosystem Service (CES)	All the non-material, and normally non-consumptive, outputs of ecosystems that affect physical and mental states of people. CES are primarily regarded as the physical settings, locations or situations that give rise to changes in the physical or mental states of people, and whose character are fundamentally dependent on living processes; they can involve individual species, habitats and whole ecosystems. The settings can be semi-natural as well as natural settings (i.e. can include cultural landscapes) providing they are dependent on <i>in situ</i> living processes. In CICES, a distinction between settings that support interactions that are used for physical activities such as hiking and angling, and intellectual or mental interactions involving analytical, symbolic and representational activities is made. Spiritual and religious settings are also recognised. The classification also covers the 'existence' and 'bequest' constructs that may arise from people's beliefs or understandings.	As defined in CICES	
Decision-maker	A person, group or an organisation that has the authority or ability to decide about actions of interest. (NEW, EP).	MA (2005)	



Term	Definition	Source	Comment
Degradation of an Ecosystem Service	Reduction in the contribution that an ecosystem service, or bundles of services, makes to human well-being as a result of loss of a stock of natural capital or its condition (capacity) to generate service output.	New	
Demand	See "ecosystem service demand".		
Direct Use Value (of Ecosystems)	The economic or social value of the goods or benefits derived from the services provided by an ecosystem that are used directly by an agent. These include consumptive uses (e.g., harvesting goods) and non-consumptive uses (e.g., enjoyment of scenic beauty). Agents are often physically present in an ecosystem to receive direct use value	New, adapted from MA (2005) and Rubicode (2010)	
Disservice*	Negative contributions of ecosystems to human well-being; undesired negative effects resulting from the generation of other ecosystem services.	New, modified TEEB	
Diversity	See 'Biodiversity'.		
Drivers of Change [Direct & Indirect]	Any natural or human-induced factor that directly or indirectly causes a change in an ecosystem. A direct driver of change unequivocally influences ecosystem processes and can therefore be identified and measured to differing degrees of accuracy, an indirect driver of change operates by altering the level or rate of change of 1 or more direct drivers.	MA (2005)	As used in MAES (2014)
Ecological Character	See term 'Ecosystem properties'.		
Ecological Damage	See term 'Degradation of ecosystems'.		
Ecological Degradation	See 'Degradation of ecosystems'.		
Ecological Process	An interaction among organisms, and/or their abiotic environment.	shortened from Mace et al. (2012)	
Ecological Status	A classification of ecosystem state among several, well-defined value categories.	Maes et al. (2013)	
Ecological Value*	Non-monetary assessment of ecosystem integrity, health, or resilience, all of which are important indicators to determine critical thresholds and minimum requirements for ecosystem service provision.	TEEB (2010)	As used in MAES (2014)  we suggest for ESMERALDA not to use the term
Economic Valuation	The process of expressing a value for a particular good or service in a certain context (e.g., of decision-making) in monetary terms.	TEEB (2010)	As used in MAES (2014) [See terms 'monetary valuation' and 'non-monetary valuation'.]
Ecosystem	Dynamic complex of plant, animal, and microorganisms communities and their non-living environment interacting as a functional unit. Humans may be an integral part of an ecosystem, although 'socio-ecological system' is sometimes used to denote situations in which people play a significant role, or where the character of the ecosystem is heavily influenced by human action.	Modified MA (2005)	As used in MAES (2014): For practical purposes it is important to define spatial dimensions of concern.

Term	Definition	Source	Comment
Ecosystem Accounting	The process of organising information about natural capital stocks and ecosystem service flows, so that the contributions that ecosystems make to human well-being can be understood by decision makers and any changes tracked over time. Accounts can be organised in either physical or monetary terms.	New	
Ecosystem Approach*	A strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use. An ecosystem approach is based on the application of appropriate scientific methods focused on levels of biological organisation, which encompass the essential structure, processes, functions, and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of many ecosystems.	MA (2005)	
Ecosystem Assessment	A social process through which the findings of science concerning the causes of ecosystem change, their consequences for human well-being, and management and policy options are brought to bear on the needs of decision-makers.	UK NEA (2011)	As used in MAES (2014)
Ecosystem Attribute	A biological, physical, or chemical characteristic or feature of an ecosystem.	Modified, after Nahlik et al. (2012)	
Ecosystem Change	Any variation in the state, process rates, outputs, or structure of an ecosystem.	MA (2005)	
Ecosystem Condition	The capacity of an ecosystem to yield services, relative to its potential capacity.  Comments from MAES (2014) For the purpose of MAES, ecosystem condition is, however, usually used as a synonym for 'ecosystem status'.  Check also term "Ecosystem Service Potential" for further definitions of potential.	MA (2005)	As used in MAES (2014)
Ecosystem Degradation	A persistent reduction in the capacity to provide ecosystem services.	MA (2005)	As used in MAES (2014)
Ecosystem Function*	Subset of the interactions between biophysical structures, biodiversity and ecosystem processes that underpin the capacity of an ecosystem to provide ecosystem services.  The subset of the interactions between biophysical structures, and ecosystem processes that underpin the capacity of an ecosystem to provide ecosystem services. See ecosystem capacity and ecosystem condition.	TEEB (2010)  defined for OpenNESS	As used in MAES (2014)
Ecosystem Functioning	The operating of an ecosystem. Very often, there is a normative component involved, insofar as ecosystem functioning not only refers to (any) functioning/performance of the system but to 'proper functioning' and thus implies a normative choice on what is considered as a properly functioning ecosystem (operating within certain limits).	Based on Jax (2010)	

Term	Definition	Source	Comment
Ecosystem Health*	A state of nature (whether managed or pristine) that is characterized by systems integrity: that is, a healthy nature is a largely self-organized system.	Rapport (1992: 145)	
Ecosystem Integrity	Integrity is often defined as an environmental condition that exhibits little or no human influence, maintaining the structure, function, and species composition present, prior to, and independent of human intervention [i.e., integrity is closely associated with ideas of naturalness, particularly the notion of pristine wilderness (Angermeier and Karr 1994, Callicott and others 1999)]	Hull et al. (2003: 2)	
Ecosystem Management	A direct and conscious intervention (or agreement to refrain from interventions) in an ecosystem by people that is intended to change its structure or functioning for some benefit.	Adapted from MA (2005)	
Ecosystem Process	Any change or reaction, which occurs within ecosystems, physical, chemical or biological. Ecosystem processes include decomposition, production, nutrient cycling, and fluxes of nutrients and energy.  A dynamic ecosystem characteristic measured as a rate, that is essential for the ecosystem to operate and develop, such as decomposition, production, nutrient cycling, and fluxes of nutrients and energy. (See also ecosystem structure and biophysical characteristic).	MA (2005)  New	As used in MAES (2014)
Ecosystem Properties	Attributes which characterize an ecosystem, such as its size, biodiversity, stability, degree of organization, as well as its functions and processes (i.e., the internal exchanges of materials, energy and information among different pools).	MA (2005) and UK NEA (2011)	
Ecosystem Services*	The benefits that people obtain from ecosystems (MA, 2005). The direct and indirect contributions of ecosystems to human well-being (TEEB, 2010). The concept 'ecosystem goods and services' is synonymous with ecosystem services. The service flow in our conceptual framework refers to the actually used service.  The direct and indirect contributions of ecosystems to human well-being.	TEEB	As used in MAES (2014)  For ESMEAL-DA we suggest the following: "Contributions of ecosystem structure and function – in combination with other inputs – to human well-being" (Burkhard et al. 2012a)
Ecosystem Service Antagoniser	An organism, species, population, functional group, or community which by virtue of their traits can disrupt the provision of ecosystem services.	New, adapted from Harrington et al. (2010)	
Ecosystem Service Bundle	A set of associated ecosystem services that are supplied by or demanded from a given ecosystem or are associated with a particular place and appear together repeatedly in time and space.	New	

Term	Definition	Source	Comment
Ecosystem Service Demand	Ecosystem goods and services currently consumed or used in a particular area over a given time period, not considering where ecosystem services actually are provided,	Burkhard et al. (2012b)	
Ecosystem Service Flow	The rate at which ecosystem services are supplied to some beneficiary.  <i>De facto</i> used set (bundles) of ecosystem services and other outputs from natural systems in a particular area within a given time period.	New  Burkhard et al. (2014)	
Ecosystem Service Potential	The hypothetical maximum yield of selected ecosystem services.  The opportunity to use structures and processes of ecosystems and landscapes.	Burkhard et al. (2012b) Bastian et al. (2012)	
Ecosystem Service Provider	The ecosystems, component populations, communities, functional groups, etc. as well as abiotic components such as habitat type, that are the main contributors to ES output.	Modified from Harrington et al. (2010) after Kremen (2005)	
Ecosystem Service Typology	A classification of ecosystem services that defines the various types and subtypes of service (e.g. MA, TEEB, CICES).	New	
Ecosystem State*	The physical, chemical and biological condition of an ecosystem at a particular point of time.		As used in MAES (2014)
Ecosystem Status*	Classification of ecosystem state among several well-defined categories. It is usually measured against time and compared to an agreed target in EU environmental directives (e.g. HD, WFD, MSFD), e.g. "conservation status".  A description of the structure or functioning of an ecosystem according to some predefined criteria.	As defined in OpenNESS	As used in MAES (2014)
Ecosystem Structure	A static characteristic of an ecosystem that is measured as a stock or volume of material or energy, or the composition and distribution of biophysical elements. Examples include standing crop, leaf area, % ground cover, species composition (cf. ecosystem process).	New	
Enabling Condition	Critical preconditions for success of responses, including political, institutional, social, economic, and ecological factors.	MA (2005)	
Endangered Species	See term "threatened species".		
Energy Inputs	See term "Additional Inputs".		
Environmental Accounting*	See term "Natural Capital Accounting".		
Environmental Liability	Obligation based on the principle that a polluting party should pay for any and all damage caused to the environment by its activities (also known as polluter pays principle).	New	

Term	Definition	Source	Comment
Environmental Policy Integration	The incorporation of environmental objectives into all stages of policy making in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy, accompanied by an attempt to aggregate presumed environmental consequences into an overall evaluation of policy, and a commitment to minimize contradictions between environmental and sectoral policies by giving principled priority to the former over the latter.	Lafferty and Hovden (2003)	
Environmental Settings	Locations or places where humans interact with each other and nature that give rise to the cultural goods and benefits that people obtain from ecosystems.	UK NEA (2011)	
Equity	Fairness of rights, distribution, and access. Depending on context, this can refer to resources, services or power.	MA (2005)	
Evolutionary Process	A series of events that produce changes in gene frequencies within a population. Such changes can result in the appearance of new species (speciation) or new intraspecific taxa.	Modified from Mace et al. (2012)	
Excludability	Occurs if institutions or technologies exist that prevent other individuals or groups from using a good or service.	Costanza (2008)	
Existence Value	The value that individuals place on knowing that a resource exists, even if they never use that resource (also sometimes known as conservation value or passive use value).	MA (2005)	
Explorative Scenario	The projection of the state and condition of an ecosystem into the future, based on the anticipated impacts of the direct and indirect drivers of change, designed to help people understand the consequences of different sets of assumptions. See 'normative scenarios'.	New	
Externality	A consequence of an action that affects someone other than the agent undertaking that action and for which the agent is neither compensated nor penalized through the markets. Externalities can be positive or negative.	MA (2005) definition	
Extrapolation	A projection, extension, or expansion of information from what is known into an area not known or experienced, providing conjectural knowledge of the unknown area.	New	
Final Ecosystem Service*	The outcomes from ecosystems that directly lead to goods or benefits that are valued by people.		See also Term 'Goods'
Flow	See 'Ecosystem Service Flow'.		
Framework	A structure that includes the relationship amongst a set of assumptions, concepts, and practices that establish an approach for accomplishing a stated objective or objectives.	Nahlik et al. (2012)	
Functional Diversity	The value, range, and relative abundance of traits present in the organisms in an ecological community.	UK NEA (2011)	

Term	Definition	Source	Comment
Functional Group	A collection of organisms with similar functional trait attributes. Some authors use 'Functional Type' in the same way. Groups can be associated with similar responses to pressures and/or effects on ecosystem processes. A functional group is often referred to as a guild, especially when referring to animals, e.g. the feeding types of aquatic organisms having the same function within the trophic chain, e.g. the group (guild) of shredders or grazers.	Harrington et al. (2010)	
Functional Richness	This includes two components, which authors have used selectively or jointly to denote: a) the range of trait attributes represented in the community, i.e. the amount of niche space filled by species in the community (Mason et al. 2005); or, b) the number of functional groups or trait attributes in the community (Petchey et al., 2004).	Harrington et al. (2010)	
Functional Traits	A feature of an organism that has demonstrable links to the organism's function.  Those characteristics (e.g. morphological, physiological etc.) of organisms that either are related to the effect of organisms on community and ecosystem processes or their response to these processes and the physical environment.	New	As used in MAES (2014)
Futures Thinking	Thinking about how our understandings of the past and present can be used to understand the future, using a range of approaches such as forecasts, projections, predictions and scenarios. See exploratory and normative scenarios.	New	
Geographic Information System	A computer-based system for the storage, analysis and display of spatially referenced data.	New	
Goods*	The objects from ecosystems that people value through experience, use or consumption, whether that value is expressed in economic, social or personal terms. Note that the use of this term here goes well beyond a narrow definition of goods simply as physical items bought and sold in markets, and includes objects that have no market price (e.g. outdoor recreation).	UK NEA (2011)	The term is synonymous with benefit (as proposed by the UK NEA), and not with service (as proposed by the MA).
Governance	The process of formulating decisions and guiding the behaviour of humans, groups and organisations in formally, often hierarchically organised decision-making systems or in networks that cross decision-making levels and sector boundaries.	Adapted from Rhodes (1991) and Saarikoski et al. (2013)	
Green Infrastructure (GI)	A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services (ES). It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.	EC (2013: 3)	

Term	Definition	Source	Comment
Habitat	<p>The physical location or type of environment in which an organism or biological population lives or occurs. Terrestrial or aquatic areas distinguished by geographical, abiotic and biotic feature, whether entirely natural or semi-natural.</p> <p>[Note the Council of Europe definition is more specific: the habitat of a species, or population of a species, is the sum of the abiotic and biotic factors of the environment, whether natural or modified, which are essential to the life and reproduction of the species within its natural geographic range.]</p>	MA (2005)	As used in MAES (2014)
Health (Human)	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. The health of a whole community or population is reflected in measurements of disease incidence and prevalence, age-specific death rates, and life expectancy.	UK NEA (2011)	
Heritage [Cultural and Natural]*	Our legacy from the past, what we live with today, and what we pass on to future generations. Physical objects produced and used by past generations, ranging from small-scale domestic utensils to large-scale buildings, monuments, places and landscapes, may become valued as cultural heritage by their descendants. Equally, symbolic products of human creativity and imagination such as music, visual arts, poetry and prose, knowledge and know-how contribute to a society or group's understanding of its cultural heritage.	UK NEA (2011)	
Hotspots	Areas that provide large components of particular services in a comparably small area/spot (opposite to ES coldspots).	García-Nieto et al. (2013); Egoh et al. (2008); Gimona & van der Horst (2007)	
Human Well-Being	<p>A context- and situation-dependent state, comprising basic material for a good life, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience.</p> <p>A state that is “intrinsically and not just instrumentally valuable” (or good) for a person or a societal group In the MA components (or drivers) of human well-being have been classified into: basic material for a good life, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience, not precluding other classifications.</p>	<p>MA (2005)</p> <p>Adapted from Alexandrova (2012) and MA (2005)</p>	As used in MAES (2014)
Impact	Negative or positive effect on individuals, society and/or environmental resources resulting from environmental change.	Modified after Harrington et al. (2010)	

Term	Definition	Source	Comment
Indicator	<p>Observed value representative of a phenomenon to study. In general, indicators quantify information by aggregating different and multiple data. The resulting information is therefore synthesised.</p> <p>An indicator in policy is a metric of a policy-relevant phenomenon used to set environmental goals and evaluate their fulfilment” (cf. Heink &amp; Kowarik, 2010). An indicator in science is a quantifiable metric which reflects a phenomenon of interest (the indicandum).</p>	New for OpenNESS, modified from Heink & Kowarik (2010)	As used in MAES (2014)
Indirect Use Value	The benefits derived from the goods and services provided by an ecosystem that are used indirectly by an agent. For example, an agent at some distance from an ecosystem may derive benefits from drinking water that has been purified as it passed through the ecosystem. (Compare Direct use value)	MA (2005)	
Intensification / disintensification	Intensification of land use aims at raising ecosystem service outputs (e.g. in agriculture raising crop yields per unit area and per unit time), in other words to increase productivity. To achieve this goal, usually the inputs (see term “additional inputs”) are increased. To raise crop yields, a broad range of methods is being applied, often in combinations, including breeding, irrigation, organic and inorganic fertilization, green manure and cover crops, pest and weed management, multi-cropping, crop rotation and the reduction of fallow periods.	Modified after Geist (2006)	
Intermediate Ecosystem Service	An ecological function or process not used directly by a beneficiary, but which underpins those final ecosystem services which are used directly. See also “supporting services” and “ecological functions”.	New	Suggest not to use term - see 'Final Ecosystem Service'
Interdisciplinarity	The act of combining of two or more academic disciplines into one integrated activity to create new insights by crossing knowledge boundaries and linking ideas.	New	
Institution (Informal)	The conventions, norms and rules that formally or informally regulate the interactions between people and between people and their environment.	Vatn (2005)	
Institutional analysis	An analysis of the rules regulating the behaviour of people, groups or organizations, paying attention to formal regulations and laws and/or informal rules about customs and practices. The interest lies in what rules have produced current behaviour, or what rules might produce targeted behaviour. Institutional analysis merges approaches from law, economics and organizational studies.	New	draws on Ostrom, (1990), Scott, (2001); Vatn, (2005); Paavola, (2007); Primmer, (2011).
Instrumental Value*	Value that something has as a means to an end (e.g. game animals used for food).	Modified after Harrington et al. (2010)	
Integrated Coastal Zone Management	Approaches that integrate economic, social, and ecological perspectives for the management of coastal resources and areas.	UK NEA (2011)	[ICZM]



Term	Definition	Source	Comment
Integrated Responses	Responses that address degradation of ecosystem services across a number of systems simultaneously or that also explicitly include objectives to enhance human well-being.	UK NEA (2011)	
Interventions	See 'Response'.		
Intrinsic Value*	Intrinsic value is the value something has independent of any interests attached to it by an observer or potential user. This does not necessarily mean that such values are independent of a valuer (i.e. values which exist 'as such'), they may also require a (human) valuer (but this is a matter of disagreement among philosophers).	New, adapted from various sources.	
Land Cover	The physical coverage of land, usually expressed in terms of vegetation cover or lack of it. Related to, but not synonymous with, land use.	UK NEA (2011)	
Landscape*	A heterogeneous mosaic of land cover, habitat patches, physical conditions or other spatially variable elements viewed at scales relevant to ecological, cultural-historical, social or economic considerations.	Adapted from Wiens (1995)	
Land Use	The human use of a piece of land for a certain purpose such as irrigated agriculture or recreation. Influenced by, but not synonymous with, land cover.	UK NEA (2011)	
Limit (regulatory)	<i>Regulatory limits</i> refer to points in some variable or state which should not be exceeded or underrun (like in regulations of nitrate or pesticides levels in drinking water). While ecological thresholds (see threshold, ecological) are largely descriptive, regulatory limits involve societal choices and negotiation of values and aims.	New, following Johnson (2013)	
Marginal Abatement Costs	The cost of reducing an incremental unit of an undesirable substance, such as a pollutant or carbon.	Modified UK NEA (2011)	
Market-Based Instruments	Mechanisms that create a market for ecosystem services in order to improve the efficiency in the way the service is used. The term is used for mechanisms that create new markets, but also for instruments such as taxes, subsidies, or regulations that affect existing markets.	Adapted from MA (2005) and UK NEA (2011)	
Market Failure*	The inability of a market to capture the full value of ecosystem services and/or the costs of their loss/degradation.	New	
Marine System	Marine waters from the low-water mark to the high seas that support marine capture fisheries, as well as Deepwater (>50 meters) habitats. Four sub-divisions (marine biomes) are recognized: the coastal boundary zone; trade-winds; westerlies; and, polar.	MA (2005) and UK NEA (2011)	
Mitigation	The action of making the consequence of an impact less severe.	New	
Monetary Valuation*	The process whereby people express the importance or preference they have for the service or benefits that ecosystems provides in monetary terms. See 'Economic valuation'.	Defined for OpenNESS from TEEB	

Term	Definition	Source	Comment
Multi-Criteria Decision Analysis (MCDA)	Multi-Criteria Decision Analysis (MCDA) is a non-monetary valuation method for simultaneously embracing, combining, and structuring often incommensurable diversity: diversity of information (e.g. qualitative and quantitative data, as well as uncertainty), diversity of opinion (also among experts), diversity in actor perspectives (stakes), and diversity in assessment/decision-making criteria. MCDA supports deliberation and helps to pave the way to decision making and communication about the decisions taken.	Keune and Dendoncker (2014)	
Multi-Disciplinarity	Linking several academic disciplines or professional specializations in an approach to a topic or problem; however, the disciplines retain their identity and perspective, unlike the situation with interdisciplinary approaches.	New	
Natural Asset	A component of Natural Capital.	New	
Natural Capital	The elements of nature that directly or indirectly produce value for people, including ecosystems, species, freshwater, land, minerals, air and oceans, as well as natural processes and functions. The term is often used synonymously with natural asset, but in general implies a specific component.	Modified after MA (2005)	Note: ecosystem capital and ecosystem assets are sometimes used to refer to the parts of nature that produce benefits for people.
Natural Capital Accounting	A way of organising information about natural capital so that the state and trends in natural assets can be documented and assessed in a systematic way by decision makers.	New	
Natural Capital Stock	The tangible biotic and abiotic structures that make up the natural world and which support processes and functions that can contribute to human well-being. Stocks can be represented in various ways, but are more often measured in terms of the areas, volumes or numbers.	Modified after MA (2005)	
Net Primary Production	See 'production, biological'		
Non-Monetary Valuation*	The process whereby people express the importance or preference they have for the service or benefits that ecosystems provide in terms other than money. See monetary or economic valuation.	New	
Normative	Relating to values or prescriptions.	New	
Operationalization	The process by which concepts are made usable by decision makers.	new	
Opportunity Costs	The benefits forgone by undertaking one activity instead of another.	MA (2005)	
Participatory Approach	Family of approaches and methods to enable (rural) people to share, enhance, and analyse their knowledge of life and conditions, to plan and to act, to monitor and evaluate.	Chambers (1997)	

Term	Definition	Source	Comment
Payments for Ecosystem Services (PES)	Conditional payments offered to providers (e.g., farmers or landowners) in exchange for employing management practices that enhance ES provision	Modified from Tacconi (2012)	
Policy Coherence	An attribute of policy that systematically reduces conflicts and promotes synergies between and within different policy areas to achieve the outcomes associated with jointly agreed policy objectives.	Nilsson et al. 2012: 396	
Policy Consensus	Agreement on an overall plan that embraces goals and procedures.	New	
Policy Maker	A person with the authority to influence or determine policies and practices at an international, national, regional or local level.	Modified UK NEA (2011)	
Population (Biological)	A group of organisms, all of the same species, which occupies a particular area (geographic population), is genetically distinct (genetic population) or fluctuates synchronously (demographic population).	Harrington et al. (2010)	
Potential	See term "ecosystem service potential"		
Precautionary principle	The management concept stating that in cases 'where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.	Modified from UK NEA (2011)	
Prediction* [in the context of scenarios]	A description or estimate of the state of a variable or system in the future with a high degree of certainty (in contrast to ->projection).	New	See terms Projection, Forecast, Scenario
Pressure*	The endogenous variables that quantify the effect of drivers within an ecosystem. They are equivalent to the 'direct drivers' and 'endogenous drivers' of the MA (2005)	Harrington, et al. (2010)	
Production (biological)	Rate of biomass produced by an ecosystem, generally expressed as biomass produced per unit of time per unit of surface or volume. Net primary productivity is defined as the energy fixed by plants minus their respiration.	UK NEA (2011)	
Production (economic)	Output of a system	New	
Program Theory	Program theory is a systematic configuration of stakeholders' prescriptive assumptions (what actions are required to solve a problem) and descriptive assumptions (why the problem will respond to the action) underlying a program – whether explicit or implicit assumptions are made by stakeholders. As the success of a program in reaching its goals depends on the validity of its program theory, an evaluation based on the conceptual framework of program theory provides information not only on whether a program is effective or ineffective but the reasons for either.	Chen (2005: 340)	

Term	Definition	Source	Comment
Projection*	A potential future evolution of a quantity or set of quantities, often computed with the aid of a model. Projections are distinguished from 'predictions' in order to emphasise that projections involve assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realised; they are therefore subject to substantial uncertainty.	UK NEA (2011)	
Provisioning Services	Those material and energetic outputs from ecosystems that contribute to human well-being.	Shortened from CICES	
Public Good	A good where access to the good cannot be restricted.	Modified from UK NEA (2011)	
Reforestation	Action to restocking the forest cover, either through artificial planting, natural seeds or agamic propagation, in an area that previously had a natural forest cover.	New for OpenNESS	
Regime Shift	A large, persistent change in the structure and function of (social-) ecological systems, with substantive impacts on the suite of ecosystem services provided by these systems. The transition is characterised by a lack of re-tractability or hysteresis.		
Regulating Services	All the ways in which ecosystems and living organisms can mediate or moderate the ambient environment so that human well-being is enhanced. It therefore covers the degradation of wastes and toxic substances by exploiting living processes.	Modified after CICES	
Resilience	A measure of an (eco)system's ability to recover and retain its structure and processes following an exogenous change or disturbance event. If a stress or disturbance does alter the ecosystem, then it should be able to bounce back quickly to resume its former ability to yield a service or utility rather than transform into a qualitatively different state that is controlled by a different set of processes. In order for ecosystem resilience to be defined, the ecosystem must have a degree of stability prior to the perturbation. Resilience relates to return to stability following a specified perturbation.	Modified from Holling (1973); Dawson et al. (2010) and Harrington et al. (2010)	See Brand & Jax (2007) for the variety of definitions of this concept.
Resistance	The capacity of an ecosystem to withstand the impacts of drivers without displacement from its present state.	UK NEA (2011)	
Responses (in the context of scenarios)	Human actions, including policies, strategies, and interventions, to address specific issues, needs, opportunities, or problems. In the context of ecosystem management, responses may be of legal, technical, institutional, economic, and behavioural nature and may operate at various spatial and time scales. Such responses aim to minimise negative impacts or maximise positive impacts by acting on some pressure or driver of change.	New, based on UK NEA (2011) and Harrington, et al. (2010)	

Term	Definition	Source	Comment
Rich Picture Modelling	A qualitative method designed to explore, acknowledge and define a situation and express it through diagrams to create a preliminary mental model. A rich picture helps to open discussion and come to a broad, shared understanding of a situation.	Following Checkland (2000)	
Risk	The product of the probability of an occurrence and the magnitude of the damage.	Klöpffer (1994: 49)	
Rivalry	The degree to which the use of one ecosystem service prevents other beneficiaries from using it. Non-rival ecosystem services in return provide benefits to one person that do not reduce the amount of benefits available for others.	Schröter et al. (2014); Kemkes et al. (2010); Costanza (2008); Burkhard et al. (2012b).	
Robustness*	An ecosystem's ability to adapt to or maintain its function under chronic exogenous drivers and pressures. An ecosystem is robust when it is capable of resisting changes caused by long-term drivers or pressures that are external to the ecosystem, such as global warming, nutrient loading or hunting pressure. Robust ecosystems demonstrate adaptability to external forces, for example if a keystone species goes extinct, surviving species can compensate for the loss of function over physiological, demographic, or evolutionary time scales.	Harrington et al. (2010), after Lenski et al. (2006); Dawson et al. (2010)	
Scale	Scale (spatial and temporal): the physical dimensions, in either space or time, of phenomena or observations.	Reid et al. (2006)	
Scenario	Plausible, but simplified descriptions of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces and relationships. Scenarios are no predictions of what will happen, but ore projections on what might happen or could happen given certain assumptions about which there might be great uncertainty.	New, modified from UK NEA (2011)	
Security	Access to resources, safety, and the ability to live in a predictable and controllable environment.	UK NEA (2011)	
Service	See 'Ecosystem service'		
Service-Benefitting Area (SBA)	The complement to ecosystem service providing units (see below). SBAs may be far distant from relevant SPUs. The structural characteristics of a benefiting area must be such that the area can take advantage of an ecosystem service (Syrbe and Walz 2012). Commensurate with ecosystem service demand (Crossman et al. 2013) but several intermediate steps related to complex production and trade schemes may be included (Burkhard et al. 2012b).	Burkhard et al. (2014)	
Service-Connecting Area (SCA)	Describe the spatial relationships and areas between the place of service production (SPU) and where the benefits are realized (SBA).	Burkhard et al. (2014)	

Term	Definition	Source	Comment
Service-Providing Unit* (SPU)	The collection of individuals from a given species and the metrics of trait attributes (e.g., abundance, phenology, distribution) that are necessary for delivery of an ecosystem service at a desired level. The SPU can be quantified in terms of metrics such as abundance, phenology and distribution.	After Luck et al. (2003) and Harrington et al. (2010).	
Shared Social Value	The fulfilment, meaning or significance of the collective needs of society in relation to social, health and cultural services.	UK NEA (2011)	
Societal Choice	Collective decisions based on a decision-making process that identifies preferences or processes arguments.	New	
Socio-Economic System	Our society (which includes institutions that manage ecosystems, users that use their services and stakeholders that influence ecosystems)  A system consisting of individuals, groups and organizations and their economic and social interactions.	  New	As used in MAES (2014)
Social–Ecological System	Interwoven and interdependent ecological and social structures and their associated relationships.	New	Sometimes referred to as ‘Socio-Ecological System’
Species [taxonomic rank only]	A taxon of the rank of species; in the hierarchy of biological classification the category below genus; the basic unit of biological classification.	Lincoln et al. (1998: 280)	
Species Diversity	Biodiversity at the species level, often combining aspects of species richness, their relative abundance, and their dissimilarity.	UK NEA (2011)	
Species Richness	The number of species within a given sample, community, or area.	MA (2005), UK NEA (2011)	
Stability	“[A] kind of overarching meta-concept, comprising very different and more specific concepts such as persistence, resilience, constancy, elasticity [also robustness], etc., each of which also has several different meanings.” (Jax 2010: 168). Precise meaning should be specified for each use.	Jax (2010: 168) and Grimm and Wissel (1997)	
Stakeholder	Any group, organisation or individual who can affect or is affected by the ecosystem’s services”.	New: definition developed by OpenNESS	
Stakeholder Analysis	Stakeholder analysis can be defined as a process that: i) defines aspects of a social and natural phenomenon affected by a decision or action; ii) identifies individuals, groups and organisations who are affected by or can affect those parts of the phenomenon (this may include nonhuman and non-living entities and future generations); and iii) prioritises these individuals and groups for involvement in the decision-making process.	Reed et al. (2009)	
Stakeholder Typology	Classification of stakeholders according to the attributes: power, legitimacy, and urgency.	Mitchell et al. (1997).	

Term	Definition	Source	Comment
State [of a social-ecological system]	Collection of variables that describe the overall physical condition of a social ecological system, including attributes of both ecosystem service providers and ecosystem service beneficiaries.	Modified from Harrington et al. (2010)	
Story Boarding	A verbal description of a problem or situation or system usually developed through qualitative, deliberative methods.	New	See also term 'Rich Picture Modelling'.
Storyline	A narrative description of a scenario, which highlights its main features and the relationships between the scenario's driving forces and its main features.	UK NEA (2011)	
Structure [of an Ecosystem, Habitat, Community]	The aggregate of elements of an entity in their relationships to each other. The component parts of an ecosystem; see 'natural capital asset' or 'natural capital stock'.	Common usage, adapted.	
Supporting Services	Ecological processes and functions that are necessary for the production of final ecosystem services. See also 'intermediate services' and 'ecosystem functions'.		In ESMERALDA we suggest not to use the term
Sustainable Use of ES	Human use of an ecosystem so that it may yield a continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.	UK NEA (2011)	
Sustainability	A characteristic or state whereby the needs of the present and local population can be met without compromising the ability of future generations or populations in other locations to meet their needs. Weak sustainability assumes that needs can be met by the substitution of different forms of capital (i.e. through trade-offs); strong sustainability posits that substitution of different forms of capital is seriously limited.	UK NEA (2011)	
Synergies	Synergistic interactions allow for simultaneous enhancement of more than one ES, i.e. increasing the supply of one ES can enhance the supply of other ES (for example, forest restoration may lead to improvements in several cultural, provisioning, and regulating ES).	Haase et al. (2012)	
System	A construct for a reporting unit at a level of aggregation generally above that which is applied to an ecosystem. Systems may include many ecosystems with varying degrees of inter-action and spatial connectivity, in addition to their associated social and economic components. Systems are not mutually exclusive and can over-lap both spatially and conceptually.	Modified from MA (2005)	
Taxon (Pl. Taxa)	The named classification unit to which individuals or sets of species are assigned. Higher taxa are those above the species level. For example, the common mouse, <i>Mus musculus</i> , belongs to the Genus <i>Mus</i> , the Family <i>Muridae</i> , and the Class <i>Mammalia</i> .	UK NEA (2011)	
Threatened Species	Species that face a high (vulnerable species), very high (endangered species), or extremely high (critically endangered species) risk of extinction in the wild.	UK NEA (2011)	

Term	Definition	Source	Comment
Threshold, ecological	A point at which an ecological system experiences a qualitative change, mostly in an abrupt and discontinuous way. In the context of OpenNESS we use ecological threshold and tipping points as synonyms. See also 'regime shift' and the distinction with 'limit'.	New	
Tipping Point	Used here as being synonymous with 'ecological threshold'.	New	
Total Economic Value (TEV)	A widely used framework to disaggregate the components of utilitarian value in monetary terms, including direct use value, indirect use value, option value, quasi-option value, and existence value.	New	
Trade-off	ES trade-offs arise from management choices made by humans. Such choices can change the type, magnitude, and relative mix of ES provided by an ecosystem. Trade-offs occur when the provision of one ES is reduced as a consequence of increased use of another ES.  In some cases, a trade-off may be an explicit choice, in others, trade-offs arise without awareness that they are taking place.	Rodriguez et al. (2006)	
Transdisciplinarity	A reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge.	Lang et al. (2012)	
Travel Costs Analysis	Economic valuation techniques that use observed costs to travel to a destination to derive demand functions for that destination.	MA (2005)	
Uncertainty	An expression of the degree to which a condition or trend (e.g. of an ecosystem) is unknown. Uncertainty can result from lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from quantifiable errors in the data to ambiguously defined terminology or uncertain projections of human behaviour. Uncertainty can therefore be represented by quantitative measures (e.g. a range of values calculated by various models) or by qualitative statements (e.g. reflecting the judgment of a team of experts).	Modified from UK NEA (2011)	
Urban	Environmental condition linked to high population density, extent of land transformation, or a large energy flow from surrounding area.	New, (after McIntyre 2000)	
Urbanisation	An increase in the proportion of the population living in urban areas or systems. See 'Urban systems'.	UK NEA (2011)	
Urban Systems	The total of functional interlinkages within an area designated as "urban" (see definition of "urban").	New	



Term	Definition	Source	Comment
Valuation	The process whereby people express the importance or preference they have for the service or benefits that ecosystems provide. Importance Value can be expressed in monetary or non-monetary terms. See 'monetary valuation' and 'non-monetary valuation'.		
Value	<p>The contribution of an action or object to user-specified goals, objectives, or conditions.</p> <p>The worth, usefulness, importance of something. Thus, value can be measured by the size of the well-being improvement delivered to humans through the provision of good(s). In economics, value is always associated with trade-offs, i.e. something only has (economic) value if we are willing to give up something to get or enjoy it.</p>	<p>MA (2005)</p> <p>After UK NEA (2011), Mace et al. (2012) and De Groot, (2010)</p>	As used in MAES (2014)
Value System	Norms and precepts that guide human judgments about value and action.	Shortens from Farber et al. (2002)	
Well-Being (Human)	See 'Human well-being'		

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