**TABLE 1 – DEFINITIONS BY SOURCE, WITH COMPARISON** (not Accounts and Accounting, see TABLE 2)

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| Term | Source | Definition |
| Abiotic | SEEA-EEA 2012 | Flows from the environment to economic and other human activity that do not arise from biophysical processes and other interactions within and between ecosystems. The main examples are flows of mineral and energy resources from underground deposits, harnessing of energy from the sun for the growing of crops and for use as a source of renewable energy, the movement of wind and tides which can be captured to serve as sources of energy, and the provision of space in areas of land and water for the undertaking of economic and other human activity. (3.20-3.22) |
| SEEA-EEA TG Apr 2015 | 5.14 As noted in the SEEA EEA Table 2.3, not all flows from the bio-physical environment to the economy and society can be considered ecosystem services. There are a range of so-called “abiotic” services reflecting the flows we receive in the form of mineral and energy resources, flows of renewable energy such as solar, wind, wave and geo-thermal energy, solar energy for photosynthesis, oxygen for combustion, air for respiration and more generally, the space for people to live, work and play.  5.15. Since the focus of the SEEA EEA is on ecosystems accounting for these various flows is not considered in the ecosystem accounting model. Many of these flows are considered in specific accounts described in the SEEA Central Framework (e.g. mineral and energy accounts, energy supply and use tables and land use accounts). At the same time, the spatially explicit approach outlined in the SEEA EEA may mean that it is highly relevant to consider incorporating measures of abiotic services to consider the full range of issues within a defined area. |
| Rhodes | *[to SEEA TG Apr 2015] (pre-harvest) wind, weather, and water are particularly thorny here, when they would be final ES by a definition that would include them as final ES; policy analysis will want the ones in FEGS-CS and NESCS. This creates (partial?) overlap for Central Framework rows/columns. Can one system handle these structurally opposed needs?* |
| OpenNESS Gloss 2016 | Referring to the physical (non-living) environment, for example, temperature, moisture and light, or natural mineral substances. [Modified from Lincoln et al. (1998: 1)] |
| “Accounts/Accounting & Assets” Definitions in TABLE 2 (separate) | | |
| Agro-ecosystem | OpenNESS Gloss 2016 | 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 while often also providing non-material benefits. [Common usage] |
| FEGS-CS | (p. 26) agroecosystems…are highly managed to produce crops, but the agroecosystem may incidentally provide viewscapes…, fauna…, among other FEGS to beneficiaries other than farmers. |
| Beneficiary | SEEA-EEA 2012 | Individual and economic units (enterprises, households, governments and units in the rest of the world) that receive the benefits to which ecosystem services contribute. (2.76, 3.8, 3.9, 3.33) |
| OpenNESS Gloss 2016 | A person or group whose well-being is changed in a positive way by an ecosystem service. See also SP “Concepts and Frameworks” |
| FEGS-CS | the interests of an individual (i.e., person, group, and/or firm) that drive active or passive consumption and/or appreciation of ecosystem services resulting in an impact (positive or negative) on their welfare. |
| Rhodes | *[to FEGS-CS] NESCS does not use this term within its CS, but rather: User* |
| Beneficiary Approach | OpenNESS July 2016  FEGS-CS | The classification of ES according to beneficiary (sub-)categories |
| Benefits | SEEA-EEA 2012 | Goods and services that are ultimately used and enjoyed by people and which contribute to individual and societal well-being. (2.19-2.21) In SEEA …[EEA], benefits are distinguished from ecosystem services (which contribute to the generation of benefits) and from well-being (to which benefits contribute). … |
| SEEA-EEA TG Apr 2015 | [numbers in parentheses refer to objects in Figure 2, p 9; see also “Ecosystem Assets” in TABLE 2]  2.5 Each ecosystem asset generates a set or basket of **ecosystem services (3)** which, in turn, contribute to the production of **benefits (4)**. Benefits may be goods or services (products) currently included in the economic production boundary of the SNA, referred to as SNA benefits; or they may be benefits received by individuals that are not produced by economic units (e.g. clean air). These are referred to as non-SNA benefits. Both SNA and non-SNA benefits contribute to **individual and societal well-being (5)**.  2.6 The chain of relationships from ecosystem assets to well-being is at the core of the SEEA EEA. While there remain some important issues of definition in terms of the boundaries between different components, and there are measurement challenges; the core model reflecting the relationships between ecosystem assets, ecosystem services, benefits and individual and societal well-being remains strong. [p.9] |
| CICES Consultation v4 Jan 2013 | Ecosystem goods and benefits are things that people create or derive from final ecosystem services. These final outputs from ecosystems have been turned into products or experiences that are not functionally connected to the systems from which they were derived. Goods and benefits can be referred to collectively as ‘products’. |
| NESCS | (p. 26) “…human welfare impacts”  (p. 45, reviewing other literature) [Boyd and Banzhaf (2007)] argue that cultural services, including spiritual and religious values, aesthetic values, and recreation and ecotourism, should be characterized as benefits rather than as services. …Haines-Young and Potschin (2010a, 2010b, 2013) also note that there is a distinction between benefits and services for two reasons. First, most services have multiple benefits. For example, food provides health, pleasure, and sometimes even cultural identity. Second, similar to criticism by Boyd and Banzhaf (2007), they note that benefits have a human component to them.  (p. 46) One important implication of [Boyd and Banzhaf’s defn of final ES] is that ecosystem services are not benefits, nor are they always the final product consumed. For example, it is more appropriate to consider recreation as a benefit rather than an ecosystem service, since it is produced using both ecological services and conventional goods and services. |
| OpenNESS Gloss 2016 | The direct and indirect outputs from ecosystems that have been turned into goods or experiences that are no longer functionally connected to the systems from which they were derived. Benefits are things that can be valued either in monetary or social terms. [OpenNESS] See also SP "Classification”, See also term ‘goods’ |
| Rhodes | *[ to NESCS] 3-Systems consultants need to harp on the break between ES and benefits, if we are going to use or release this set, to highlight where we differ from the “first-gen MA” advocates who equate ES and benefits* |
| Hein, Obst, Edens, Remme 2015 | (in Ecosystem Accounting:) *Benefits = goods and services that are ultimately used and enjoyed by people and which contribute to individual and societal well-being* [Box 1, p87] |
| CICES | CICESv4.3 | (p. i, 12) … regarded primarily as a way of describing ecosystem outputs as they directly contribute to human well-being, so that discussions about appropriate assessment frameworks (economic, social, aesthetic and moral) can take place.  (p.12) CICES is intended as a classification of final services. In line with the SEEA, they are regarded as final in the sense that, these ecosystem outputs can be used by households, enterprises or government to produce benefits, often by combining these ecosystem goods and services with other forms of capital. Thus CICES aims to describe one step in this ‘production chain’, and focuses on the things that can be turned into products that are valued in some way.  (p. A-1) CICES V4.3 has a five level hierarchical structure (section – division – group – class – class type) (see Appendix 1). The more detailed class types makes the classification more user-friendly and provides greater clarification on what ecosystem services are included within each class. Using a five-level hierarchical structure is in line with United Nations Statistical Division (UNSD) best practice guidance as it allows the five level structure to be used for ecosystem mapping and assessment…. |
| Rhodes | *of course you can change this, I took snippets grasping at the gist, as I could find no “CICES is” statement by its authors within v4.3. I went very long in trying to be fair.* |
| Composite End-Product | NESCS | (p. 86-87, Table 4-3) A sub-class of Ecological End-Products(/Points) designed to accommodate for the fact that people may value combinations of end-products (or characteristics unique to the combination) differently than the individual end-products themselves (thus avoiding double-counting of FFES, with a careful valuation process). There are three sub-types: (-)Scapes, which are land-, sea-, sky-, or subterranean-scapes; regulation of extreme events (always as FFES); and presence of the environmental class or sub-class |
| Rhodes | *end-point, not end-products for UNSD* |
| Cultural Ecosystem Service (CES) | SEEA-EEA 2012 | The intellectual and symbolic benefits that people obtain from ecosystems through recreation, knowledge development, relaxation and spiritual reflection. (3.4(c)) |
| OpenNESS Gloss 2016 | All the non-material, and normally non-consumptive, outputs of eco-systems 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. [As defined in CICES] See SP “Classifications and Cascade” |
| Rhodes | *[to OpenNESS] CR: defn Benefits above clashes, opposing term under many uses; CES=benefits by this defn?* |
| Direct Use Value (of Ecosystems) | OpenNESS Gloss 2016 | The economic or social value of the goods or benefits derived from the services provided by an ecosystem that are used directly by an economic 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. [OpenNESS, adapted from MA (2005) and Rubicode (2010)] |
| NESCS | *Direct use/non-use* (*not* value, of Ecological Endpoints): Different ways in which end-products are directly used or appreciated by humans. Direct uses may be either extractive or in-situ. End-products may be used as inputs into market production processes or they may be used or appreciated by households. Note that households may derive well-being from actually using end-products as well as from non-use (i.e., households may appreciate end-products even if they do not see or use them). |
| Rhodes | *[to OpenNESS] I follow the NESCS distinctions between economically- and ecosystem-derived values, which I believe this definition confuses in a way that would imperil a “common system”*  *[to NESCS] end-point, not end-products for UNSD* |
| Disservice | SEEA-EEA TG Apr 2015 | 5.18. *The treatment of ecosystem disservices*: Ecosystem disservices pertain to cases where the interaction between the ecosystem and humans is considered to be bad. Usually this refers to things such as pests and diseases that emerge from ecosystems to negatively affect economic production and human life. The SEEA EEA recognises the frequent discussion on the measurement of ecosystem disservices but does not propose a treatment in accounting terms.  5.19. This is because, unfortunately, accounting principles do not work well when trying to make a distinction between products that may be considered as either “goods” and “bads”. Accounting makes no assumptions as to the welfare effects of use and focuses instead on the activity associated with the generation of products and the associated patterns of use by economic actors. As a consequence all flows between producers and consumers have positive values in the accounts irrespective of their possible welfare effects. The positive values arise since it is difficult to envisage either component of value, prices or quantities, being negative. |
| OpenNESS Gloss 2016 | Negative contributions of ecosystems to human well-being; undesired negative effects resulting for the generation of ecosystem services. [OpenNESS, modified TEEB] |
| NESCS | (p A-2) If a change in an ecological end-product does not increase market output and/or human well-being (holding the flow of all other goods and services constant), then it does not provide an ecosystem service. 🡪 Negative effects would imply ecosystem “disservices,” which are also possible (e.g., nuisance effects of mosquitos from wetlands). |
| Ecological End-Products (/Endpoints) | NESCS | Biophysical components of nature that are either directly used by humans to produce goods and services or directly enjoyed or used to yield human well-being. They are usually (but not always) represented as stocks of end-products. Note that conceptually, they are different from FFES (defined below) but in some situations may be used as indicators of FFES. |
| Rhodes | *“endpoints” for UNSD* |
| Ecological Process | OpenNESS Gloss 2016 | An interaction among organisms, and/or their abiotic environment.  [shortened from Mace et al. (2012) ] |
| Ecological Production Function (EPF) | NESCS | (p. 71) QE(N), which represents the myriad of natural processes through which ecosystems (N) transform, adapt, and evolve to produce ecological end-products (E, represented as E = QE(N)) [i.e., so that each “E” has its own EPF, which is QE(N), where the “N” is specific to the Environments in which E manifests. Formal QE(N) iterations will be produced by ecosystem modelers, and will be comprised of multiple elements and their relationships to each other given known conditions.] |
| Economic Valuation | OpenNESS | See terms 'monetary valuation' and 'non-monetary valuation' |
| Ecosystem capacity | SEEA-EEA 2012 | In general terms, ecosystem capacity refers to the ability of a given ecosystem asset to sustainably generate a set of ecosystem services into the future. While this general concept is highly relevant to ecosystem assessment, definitive measurement of ecosystem capacity requires the selection of a particular basket of ecosystem services and in this regard measures of ecosystem capacity are more likely to relate to consideration of a range of alternative ecosystem use scenarios than to a single basket of ecosystem services. |
| OpenNESS Gloss 2016 | Ecosystem capacity refers to the ability of a given ecosystem (or ecosystem asset) to generate a specific (set of) ecosystem service(s) in a sustainable way into the future. [Based on SEEA-EEA] |
| Ecosystem Condition | SEEA-EEA 2012 | The overall quality of an ecosystem asset in terms of its characteristics. (2.35) Measures of ecosystem condition are generally combined with measures of ecosystem extent to provide an overall measure of the state of an ecosystem asset. |
| OpenNESS Gloss 2016 | Ecosystem condition reflects the overall quality of an ecosystem (or ecosystem asset), in terms of its main characteristics underpinning its capacity to generate ecosystem services. Ecosystem condition should be measured by indicators representing the quality of its key components (such as water, soil, biodiversity, nutrient flow, or landscape configuration) with respect to a reference condition. [based For the purpose of MAES, ecosystem condition is, used as a synonym for 'Ecosystem Status'.] |
| Ecosystem Function | OpenNESS Gloss 2016 | 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.  [OpenNESS] see SP “Conceptual Frameworks and Cascade” see SP “Classification” |
| Haines-Young | *CICES would stress that ecosystem functions are the properties or characteristics of the ecosystem that determine the supply of the service* |
| Ecosystem Process | OpenNESS Gloss 2016 | A dynamic ecosystem characteristic that is essential for the ecosystem to operate and develop. Examples of ecosystem processes are fluxes of nutrients and energy (production and decomposition) and characteristics determining population dynamics such as seed dispersal and migration. (See also ecosystem structure and biophysical characteristic). [OpenNESS] |
| Ecosystem Services  (ES) | SEEA-EEA 2012 | The contributions of ecosystems to benefits used in economic and other human activity. (2.23) The definition of ecosystem services used in SEEA Experimental Ecosystem Accounting involves distinctions among (a) the ecosystem services, (b) the benefits to which they contribute and (c) the well-being that is ultimately affected. Ecosystem services should also be distinguished from the ecosystem characteristics and functions and processes of ecosystem assets. Ecosystem services are considered to exist only when a contribution to a benefit is established. Consequently, the definition of ecosystem services excludes the set of flows commonly referred to as supporting or intermediate services. |
| Rhodes | *Note, ES by UNSD are necessary Final.* |
| SEEA-EEA TG Apr 2015 | 5.5.An important part of the rationale for measuring ecosystem services is the understanding that much economic production (for example in agriculture, forestry and fisheries) utilizes inputs from ecosystems but these inputs are not recorded in the standard accounting framework. In these situations, the logic of the SEEA EEA is that ecosystem services should be differentiated from the goods and services that are produced and rather the ecosystem services represent the contribution of the ecosystem to the production of those goods and services. In effect this sets up an extended input-output or supply chain that includes ecosystems as a supplier whose contribution was previously not explicitly recognised.  … 5.8.Distinguishing ecosystem services and benefits  … 5.9.Distinguishing final and intermediate ecosystem services |
| OpenNESS Gloss 2016  CICESv4.3 | are the contributions of ecosystem structure and function – in combination with other inputs – to human well-being. [Burkhard et al. (2012)]  CICES (v4.3 p.A-1 ): the contributions that ecosystems make to human well-being |
| FEGS-CS | a general term used to refer to "the benefits people obtain from ecosystems" (MA 2005). A common variation of this general term is "ecosystem goods and services" (EGS). Ecosystem services, used in this general way, is all-inclusive and may include ecological processes and functions (sometimes referred to as intermediate services), goods, services, among anything from or within the environment. |
| NESCS | The ways in which ecosystems contribute to human well-being |
| Hein, Obst, Edens, Remme 2015 | (in Ecosystem Accounting:) *Ecosystem service = the contributions of ecosystems to benefits used in economic and other human activity (UN et al. [8], 2.23), e.g. providing standing timber for harvesting or air filtration.* [Box 1, p87] |
| Rhodes | *Agree verbatim with Hein et al.,* until *examples, then I disagree that either example (timber, air filtering) is ES in all cases* |
| IPBES Framework | The benefits (and occasionally losses or detriments) that people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; and cultural services such as recreation, ethical and spiritual, educational and sense of place. In the original definition of the Millennium Ecosystem Assessment the concept of ‘ecosystem goods and services’ is synonymous with ecosystem services. Other approaches distinguish ‘final ecosystem services’ that directly deliver welfare gains and/or losses to people through goods from this general term that includes the whole pathway from ecological processes through to final ecosystem services, goods and anthropocentric values to people. |
| Rhodes | *this definition must be disputed in the 3-Systems’ effort, based on UNSD distinction as well as that followed by all 3 ES-CS* |
| Ecosystem Service Flow | OpenNESS Gloss 2016 | A measure for the amount of ES that are actually mobilized in a specific area and time. It includes a dynamic temporal dimension and conceptually links ES supply with demand. [ESMERALDA] |
| NESCS | See “Flows” |
| ES Supply | OpenNESS Gloss 2016 | the provision of a service by a particular ecosystem, irrespective of its actual use. It can be determined for a specified period of time (such as a year) in the present, past, or future. [ESMERALDA] |
| ES Valuation | OpenNESS Gloss 2016 | The process whereby people express the importance, preference or principles and core beliefs they have for the service or benefits that ecosystems provide. Values can be expressed in monetary or non-monetary terms. See 'monetary valuation' and 'non-monetary valuation'. [IPBES (2016)] See also SP “Non-monetary valuation” |
| Environment | NESCS | Spatial units, with similar biophysical characteristics, that are located on or near the Earth’s surface and that contain or produce “end-products” |
| Rhodes | *This is a specialized use of the term within NESCS (and similarly within the FEGS-CS). endpoints vs end-products for UNSD* |
| Exchange Value | SEEA-EEA 2012 | This reflects the actual outlays and revenue for all quantities of a product that are transacted. It is equal to the market price multiplied by the quantity transacted. It is based on the assumption that all purchasers pay (and producers receive) the same price on average, and hence excludes consumer surplus. Exchange values are those that underpin national and business accounting frameworks, as they can be estimated based on observed transactions. (5.21) |
| SEEA-EEA TG Apr 2015 | 8.7. In terms of the valuation of ecosystem services the relevant valuation concept for ecosystem accounting purposes is that of exchange value. If there were observable markets in individual ecosystem services this value would reflect the actual prices paid by consumers of ecosystem services to the relevant producers (i.e. the ecosystems). Since transactions with ecosystems are not observable, these exchange values must be estimated using one of a variety of non-market valuation techniques.  8.8.Some non-market valuation techniques do not reflect only the value of the exchange but also incorporate the welfare effects that can arise to the consumer of the ecosystem service. … |
| Existence Value | OpenNESS Gloss 2016 | 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)] |
| FEGS | FEGS-CS | See “FEGS-CS” in “Final Ecosystem Service(s)” in row two definitions below. |
| FEGS-CS | FEGS-CS  (defn here uses “FEGS,” defined under Final ES, below) | (p. 6) FEGS-CS provides a solid foundation for defining specific FEGS relating to two independent components that are derived from the definition of Final Ecosystem Goods and Services: 1) Environmental Class (addressing the question, “Where does the FEGS occur on the earth?”) and 2) Beneficiary Category (addressing the question, “Who is the beneficiary and what are the FEGS?”). In other words, FEGS are explicitly defined by the landscape in which they occur and the interests of people that interact (i.e., enjoy, consume, or use) with the FEGS. |
| Final Ecosystem Service(s) | SEEA-EEA 2012 | Final ecosystem services (see Ecosystem services) |
| SEEA-EEA TG Apr 2015 | 5.10. Further, while at an aggregate level a focus on only final ecosystem services is appropriate, this may not be the case when considering the contribution of individual ecosystems whose primary function might be to support neighbouring ecosystems.  … 5.29. Without clearly defining the beneficiaries there is likely to be an overestimation of the quantity of ecosystem services by adding together the intra- and inter-ecosystem flows that reflect the operation of an ecosystem, and the “final” ecosystem services that are direct contributions to economic and social beneficiaries. |
| OpenNESS Gloss 2016 | The outcomes from ecosystems that directly lead to goods or benefits that are valued by people. [Potschin and Haines-Young, 2011] See also Term ‘Goods’, See also SP “Conceptual Frameworks and Cascade” |
| Rhodes | *This seems to dangerously overlook economic activity as a network of activated choices, there is nothing “directly lead”ing to goods or benefits; but rather the requirement of mixing human-created inputs or values to get benefits* |
| FEGS-CS | [Final Ecosystem Goods and Services, FEGS] "components of nature, directly enjoyed, consumed, or used to yield human well-being" (Boyd and Banzhaf, 2007). The final ecosystem service is a biophysical quality or feature and needs minimal translation for relevance to human well-being. Furthermore, a final ecosystem service is the last step in an ecological production function before the user interacts with the ecosystem, either by enjoying, consuming, or using the good or service, or using it as an input in the human economy. |
| NESCS | *Flows of Final Ecosystem Services (***FFES**; Flows defined below*)*: The contributions that the end-products of nature provide (1) directly to human production processes or (2) directly to households and human well-being. They are represented by service flows between ecological end-products and direct human uses. Note that conceptually, they are different from end-products (defined above). |
| Rhodes | *endpoints vs end-products for UNSD; note “FEGS” is mostly equivalent to “ecological end-products” in NESCS, but also FEGS are formal 6-digit objects from FEGS-CS Matrix application, and is informally used as the elements of nature that “ES” are meant to conceptually encompass* |
| Flows | NESCS | A flow variable is measured over an interval of time. Therefore, flow measures are typically expressed as a rate per unit of time—e.g., annual income (dollars/year) and daily nutrient load (pounds per day). Compare to *Stocks* |
| La Notte | La Notte & Dalmazzone 2016 draft:…flows generated by ecosystem assets and directed to people [are] ecosystem services. |
| Framework | OpenNESS Gloss 2016 FEGS-CS | 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)] See also term ‘Conceptual Framework’, SP “Conceptual Frameworks and Cascade” |
| Goods | OpenNESS Gloss 2016 | 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). The term is synonymous with benefit (as proposed by the UK NEA), and not with service (as proposed by the MA). [UK NEA (2011)] See SP “Conceptual Frameworks and Cascade” |
| Rhodes | *I believe following NESCS that there is a danger in defining and using this term unmodified. If there are ecosystem goods, they are also certainly not synonymous with benefits; neither are economic goods.* |
| NESCS | (throughout, but largely explained in Section 4.1, 4.2, incl. Box 4-1) NESCS differentiates *intermediate* and *final economic/market goods* (products) and *non-market goods*, from *intermediate* and *final economic services*, from *public goods*, and from *ecosystem services*. Following NIPA, there is no overlap in these definitions, while some goods or services may be intermediate in some contexts and final in others. NESCS does **not** use the term “ecosystem goods.” |
| Indicator | OpenNESS Gloss 2016 | An indicator in policy is a metric of a policy-relevant phenomenon used to set environmental goals and evaluate their fulfilment.” (cf. Heink & Kowarik, 2010). An indicator in science is a quantifiable metric which reflects a phenomenon of interest (the indicandum). [OpenNESS, modified from Heink & Kowarik (2010)] |
| FEGS-CS | *Metrics and Indicators*: a direct or indirect measurement of a FEGS that can be consistently and reliably related to a FEGS. There can be multiple metrics and indicators for a single FEGS, possibly necessitating the aggregation and weighting of metrics and indicators into an index. |
| Rhodes | *NESCS does not define the term. I now take metric to be a single measure, and indicator first to be any proxy measure, and second to be any proxy comprised of multiple metrics that may or may not be mathematically or statistically manipulated* |
| Indirect Use Value | OpenNESS Gloss 2016 | The benefits derived from the goods and services provided by an ecosystem that are used indirectly by an economic 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)] |
| Rhodes | *Maybe we can exclude this term from this list. It is a minefield of errors, mostly due to its age.* |
| Intermediate Ecosystem Service | SEEA-EEA 2012 | *Intermediate ecosystem services (see Ecosystem services, Inter-ecosystem flows, Intra-ecosystem flows)*  *Inter-ecosystem flows:* Flows between ecosystem assets that reflect ongoing ecosystem processes. (2.13) The flows of water between ecosystem assets by way of rivers are one example. These flows may relate directly or indirectly to flows of ecosystem services. Most commonly, inter-ecosystem flows are flows considered to be supporting or intermediate services.  *Intra-ecosystem flows*: Flows within ecosystem assets that reflect ongoing ecosystem processes. (2.13) One example is nutrient cycling. These flows may relate directly or indirectly to flows of ecosystem services. Most commonly, intra-ecosystem flows are flows considered to be supporting or intermediate services. |
| SEEA-EEA TG Apr 2015 | In the SEEA EEA, the flows between ecosystem assets, if recorded, were considered inter-ecosystem flows and in turn these flows were equated with intermediate services. However, recording only the physical flows does not serve to highlight the dependencies between ecosystems and indeed there are many ecosystem services both final and intermediate for which there is no direct physical flow. … (5.11🡪5.12) there is a general sense that it is not advisable to attempt to measure all flows and dependencies between ecosystems and, indeed, current ecological knowledge would seem to suggest this was not practical in any event. Consequently, it is an open question as to which intermediate ecosystem services should be considered within scope of ecosystem accounting. |
| OpenNESS Gloss 2016 | 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. [OpenNESS] In OpenNESS *we suggest not used the term* - see 'Final Ecosystem Service' and SP “Conceptual Frameworks and Cascade” |
| FEGS-CS | ecological processes, functions, structures, characteristics, and interactions that are essential to the existence of Final Ecosystem Goods and Services but are not directly enjoyed, used, or consumed by beneficiaries. |
| Rhodes | *NESCS would agree with this defn, stressing intra- or inter-ecosystem flows that are not final as ES-CS distinguish final* |
| NESCS | inputs to the natural processes that ultimately produce FFES. Example: Wetlands’ removal of contaminants from water flowing into aquifers. |
| Rhodes | *these may be considered inputs to EPFs. We acknowledge that intermediate ES are not true “services” in the economic sense of the word (must end to a person), but chose to cleave to the B&B’07 vocabulary for consistency with their terms.* |
| Marginal Analysis | NESCS | Analysis of policies that involves evaluations of *changes* to the system rather than evaluating the status of the *total* system. Policies that are relevant in this context are typically those that cause *changes* to ecosystems that are small *relative* to the *total* value of ecosystems. |
| National Ecosystem Services Classification System (NESCS) | NESCS | A classification system for flows of final ecosystem services. It provides a conceptual framework, a four-group classification structure, and a coding system for identifying distinct FFES. It is designed primarily to support the analysis of welfare impacts of policy-induced changes to ecosystems. Note that the NESCS terminology does not include flows of final ecosystem goods. NESCS defines (1) ecological end-products (most of which are stocks of ecosystem goods), (2) flows of final ecosystem services, and (3) flows of economic goods. |
| Natural Capital | SEEA-EEA 2012 | The term “natural capital” is not defined in SEEA Experimental Ecosystem Accounting. Commonly, the term refers to all types of environmental assets, as defined in the SEEA Central Framework. Used in this way, natural capital has a broader scope than that of ecosystem assets, as defined in SEEA Experimental Ecosystem Accounting, since it includes mineral and energy resources. Generally, the concept of natural capital incorporates a broad perspective on the set of services from ecosystems … natural capital may be considered a broader measure than the measures of environmental assets described in the SEEA Central Framework, which are limited to consideration of material/SNA benefits. It is to be noted that, while natural capital would usually incorporate all ecosystem assets, there is ample evidence to indicate that very few, if any, ecosystems are not influenced by humans and therefore there are few ecosystem assets that may be considered purely “natural”.  *Natural resources*: All natural biological resources (including timber and aquatic resources), mineral and energy resources, soil resources, and water resources. (SEEA Central Framework, 5.18) In the SEEA, unlike the SNA, natural resources exclude land, which is considered a distinct type of environmental asset. |
| OpenNESS Gloss 2016 | 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. |
| NESCS | Natural capital is the stock of natural ecosystems that yields a flow of valuable ecosystem goods or services into the future (Costanza, 2008b). In the context of NESCS, it is important to consider both quantity as well as quality attributes of natural capital. This is because changes in policy can lead to changes in one or both of these attributes and consequently lead to changes in the FFES provided. |
| Natural Capital Stock | OpenNESS Gloss 2016 | 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)] |
| NESCS | See “Stock,” consulting meaning between economic and ecosystem stocks |
| Rhodes | *NESCS argues this distinction is important* |
| Non-Use Value (incl. measure) | SEEA-EEA TG Apr 2015 | An important part of the value of ecosystems from a societal perspective can lie in the non-use values that a reflected in various cultural services provided by ecosystem assets. These values include existence values (…); altruistic value (…) and bequest value (…). *At this point there are relatively few studies in this area of valuation and the methods by which exchange values for these types of use may be defined.* (emphasis added) |
| Rhodes | *note need to be exchange values for Envtl Acctg purposes* |
| NESCS | Human preferences for goods or services that are not associated with or derived from direct use or contact with them. For instance, individuals may care about or appreciate ecological end-products, even if they never directly use or see them – i.e., they may have non-use values for the existence of things like tropical forests or pristine lakes, even if they never visit them. They are distinct from “use” values. |
| Rhodes | *endpoints vs end-products for UNSD* |
| Production Function | FEGS-CS | models of the relationship between inputs and factors of production to production outputs. In the case of ecosystem services, there can be both ecological production functions, relating to natural structure and function (Daily and Matson 2008), and economic production functions, relating to human capital and economic products. |
| Rhodes | *FEGS-CS defines this without separately defining EPF, but assumes that “ecological” as an adjective covers the distinction* |
| NESCS | (p. 67) represents the various processes and technologies by which labor and capital inputs are transformed into output products (Y, represented [in standard economics] by Y = Q(K, L)) |
| Rhodes | *EPF is separate above* |
| Provisioning Services | SEEA-EEA 2012 | Contributions to the benefits produced by or in the ecosystem, for  example, a fish, or a plant with pharmaceutical properties. The associated benefits may be provided in agricultural systems, as well as within semi-natural and natural ecosystems. (3.4 (a)) |
| OpenNESS Gloss 2016 | Those material and energetic outputs from ecosystems that contribute to human well-being. [Shortened from CICES] see also SP “Classification and CICES” |
| Regulating Services | SEEA-EEA 2012 | These result from the capacity of ecosystems to regulate climate, hydrologic and biochemical cycles, Earth surface processes and a variety of biological processes. (3.4 (b)) |
| OpenNESS Gloss 2016 | All the ways in which ecosystems and living organisms can mediate or moderate the ambient environment so that human well-being is enhanced. This therefore includes the degradation of wastes and toxic substances by exploiting living processes (*bioremediation*). [Modified after CICES V4.3] see also SP “Classification and CICES” |
| Resilience | OpenNESS Gloss 2016 | The capacity of a (eco) system to cope with variability—including hazardous events, trends or disturbances—in ways that maintain the system’s essential structure, identity, internal processes and corresponding ability to deliver services. Also relates to the system’s rate of return to stability following a specified perturbation, and presupposes a degree of stability prior to the perturbation. [Modified from Holling (1973); Dawson et al. (2010), Harrington et al. (2010), and IPCC (2014)] See Brand & Jax (2007) for the variety of definitions of this concept. See SP “Resilience” |
| Service Benefiting Area (SBA) | OpenNESS Gloss 2016 | spatial unit to which an ecosystem service flow is delivered to beneficiaries. SBAs spatially delineate groups of people who knowingly or unknowingly benefit from the ecosystem service of interest. [ESMERALDA] |
| FEGS-CS | *Servicescape*: the area or areas (as they can be non-contiguous) that contain beneficiaries that directly enjoy, consume, or use the FEGS provided by a defined region. |
| Services | NESCS | Services are distinct from goods. Services are typically intangible, non-storable, and inseparable from provider and consumer. Also, typically in economics, in contrast to goods, which can be treated as “stocks” and measured at a specific point in time, services are viewed as “flows” from the provider to the consumer and are measured over a period of time. |
| Stakeholder | OpenNESS Gloss 2016 | Any group, organisation or individual who can affect or is affected by the ecosystem’s services. [OpenNESS] See also SP “Stakeholder” |
| Stock(s) | NESCS | A stock variable represents a quantity existing at a point in time (which may have accumulated in the past). Units of measurement are typically expressed in levels – e.g., wealth (dollars), physical assets (number of machines), and nutrient concentration (milligrams per liter) at the beginning of the year. |
| Structure (Ecological) | Landers & Nahlik | Spatial and other arrangements of species in an ecosystem. [*Dictionary of Ecology*, 1985] |
| Supporting Services | OpenNESS Gloss 2016 | Ecological processes and functions that are necessary for the production of final ecosystem services. See also 'intermediate services'. [OpenNESS] Term not used in OpenNESS, see term “Function” See SP “Conceptual Framework and Cascade” |
| Sustainability | OpenNESS Gloss 2016 | 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)] |

Sources: (1) CICES and RHY-sent sets including OpenNESS Glossary *under the presumption that OpenNESS and CICES definitions are congruent*; (2) FEGS-CS; (3) NESCS; (4) UNSD documents including drafts; IPBES conceptual framework terms list.

**Notes:**

In 09/09/16 version, Structure-process-function vs intermediate processes not directly addressed.

**TABLE 2 – ACCOUNTS, ACCOUNTING, and ASSETS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | Definition | | | |
| Source | | | **Formal**  **[Source]** | |
| Ecosystem Accounting | SEEA CF 2014 | | For a given ecosystem or group of ecosystems, ecosystem accounting considers the capacity of living components within their non-living environment to work together to generate flows known as ecosystem services. ***Ecosystem services are the contributions of ecosystems to benefits used in economic and other human activity.*** [p14] | |
| SEEA-EEA 2012 | | Ecosystem accounting is a relatively new and emerging field dealing with the integration of complex biophysical data, use of those data to track changes in ecosystems and linkage of the changes to economic and other human activity. | |
| SEEA-EEA, Tech Recs Dec 2015 | | Ecosystem accounting is a coherent and integrated approach to the measurement of ecosystems and the flows of services from them into economic and other human activity. Ecosystem accounting complements, and builds on, the accounting for environmental assets as described in the System of Environmental-Economic Accounting (SEEA) Central Framework.[p1]  **Ecosystem Accounts:**  There are *three main types* of ecosystem accounts: accounts for *ecosystem assets*, accounts for *ecosystem services* and *integrated accounts* which presented ecosystem accounting information with standard economic and national accounts data. [p29, CR: *emphasis added*] | |
| Hein, Obst, Edens, Remme 2015: *Ecosystem accounting is…defined as an integrated approach to measure and monitor ecosystems, and the flows of services from ecosystems into economic and other human activity.* [p87] | | | |
| OpenNESS | | 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. | |
| Ecological Assets | | OpenNESS | 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)] |
| Rhodes: *This differs materially from Ecosystem Asset and Environmental Asset as defined by SEEA-EEA. I think we want to avoid confusion. The definition here (from UK NEA [Rocky Harris?] reads to me first to be stocks (wealth, accumulated and yielding “interest,” where the interest that can be spent without depleting the stock of wealth would be a flow measurable in an accounting period).* | |
| Ecosystem Assets | SEEA-EEA 2012  (term *not* directly in SEEA CF, but 2.21-2.22 closest match; beware environmental assets is discussion there) | | Spatial areas comprising a combination of biotic and abiotic components and other elements which function together. (2.31, 4.1)  Depending on the analysis being conducted, an ecosystem asset may be defined as containing either a specific combination of ecosystem characteristics (e.g., a tropical rainforest represented by an LCEU) or areas that comprise a variety of combinations of ecosystem characteristics (e.g., a river basin encompassing wetlands, agriculture and settlements represented by an EAU).  Ecosystem assets should be distinguished from (a) the various individual components (e.g., plants, animals, soil, water bodies) that are contained within a spatial area; and (b) other ecosystem characteristics (e.g., biodiversity, resilience). In different contexts and discussions, each of these components and other characteristics may be considered assets in their own right (e.g., in the SEEA Central Framework, many individual components are considered to be individual environmental assets). However, for ecosystem accounting purposes, the focus is on the functioning system as the asset. The term “ecosystem assets” has been adopted rather than “ecosystem capital”, since the word “assets” is more aligned with the terminology employed by the SNA and also better conveys the intention in ecosystem accounting of encompassing measurement in both monetary and physical terms. In general, however, the terms “ecosystem assets” and “ecosystem capital” may be considered synonymous. | |
| SEEA-EEA, Tech Recs Dec 2015 | | 2.2.1 The ecosystem accounting model 2.2 The SEEA EEA ecosystem accounting model has five main components…, the model is based around accounting for an **ecosystem asset** that is represented by a spatial area. The delineation of the area that defines an ecosystem asset is required for accounting purposes and should be considered a statistical representation of ecosystems, which by their nature are not discrete systems. …Conceptually, ecosystem assets are represented by ecosystem units (EU). … Each ecosystem asset generates a set or basket of **ecosystem services (3)** which, in turn, contribute to the production of **benefits** [p.8-9]  2.7 At the centre of the ecosystem accounting model is the *distinction between ecosystem assets and ecosystem services. The former are the stocks within the accounting system and the latter are flows*. The distinction is an application of the separation in standard accounting between capital and income. [p.10; CR: *emphasis added*] | |
|  | La Notte & Dalmazzone 2016 draft [p7]: *According to SEEA-EEA definitions, the stocks in ecosystem accounting are represented which constitutes an ecosystem asset. Each ecosystem asset has a range of ecosystem characteristics that can be fixed, such as slope and altitude, and variables, such as rainfall, land cover, and biodiversity.* | | | |
| Ecosystem Services Accounting | SEEA-EEA, Tech Recs Dec 2015 | | There are three main types of ecosystem accounts: accounts for ecosystem assets, *accounts for ecosystem services* and integrated accounts which presented ecosystem accounting information with standard economic and national accounts data. … In compilation, there is a progression in compilation from extent accounts, to condition and *ecosystem services accounts* in physical terms, to ecosystem services supply and use tables in monetary terms, to full integrated accounts. (only use of term, p29; *emphasis added*) | |
| Landers: *Recommend “Final Ecosystem Services” Accounting, or “Final Ecosystem Goods and Services” Accounting* | | | |
| Rhodes*: ES accounting seems to me (according to accountants) to be ES broken into Supply and Use tables, physical, and monetary. If intra- and inter-ecosystem flows are included that are not final ES, these must be portioned, to avoid totaling across all “ES” rows or columns.* | | | |
| SEEA-EEA, Tech Recs Dec 2015 | | …[M]ost *environmental accounting*, and …most measurement …, tend to focus on specific characteristics in individual or multiple ecosystem assets. …[T]here may be monitoring on, for example, carbon, water, timber, soil, species diversity, landscape characteristics…, ecosystem resilience and integrity. [only use of term, p64, *emphasis*] | |
| Environmental Assets | SEEA-EEA, Tech Recs Dec 2015 | | In the SEEA Central Framework, environmental assets are accounted for as individual resources such as timber resources, soil resources and water resources. [p1] | |
| La Notte & Dalmazzone 2016 draft:  *Environmental assets are addressed and accounted as individual components environment, resources that can be harvested, extracted or otherwise moved for direct use in economic production, consumption or accumulation. [p6]* | | | |
| Hein, Obst, Edens, Remme 2015: ***Ecosystem capital*** *= ecosystem assets* [p86] | | | |
| Environmental-Economic Accounting | SEEA-EEA 2014 CF | | (SEEA Central Framework) is a multipurpose conceptual framework that describes the interactions between the economy and the environment, and the stocks and changes in stocks of environmental assets. … In practice, environmental-economic  accounting includes the compilation of physical supply and use tables, functional accounts (such as environmental protection expenditure accounts) and asset accounts for natural resources. [p1] | |
| SEEA-EEA, Tech Recs Dec 2015 | | While there has long been recognition of ecosystems in the context of environmental-economic accounting, and recognition of the need to account for the degradation of ecosystems, the approach described in the SEEA EEA has only emerged in recent years. Its design is attributable to the relatively recent development of concepts of ecosystem services. With these concepts, it has been possible to develop accounting for ecosystems using, *as a starting point*, the accounting approaches developed for recording economic activity and individual environmental stocks and flows (e.g. water, energy, timber resources, greenhouse gas (GHG) emissions) [p2, CR: *emphasis added*] | |
| Natural Capital | La Notte & Dalmazzone 2016 draft | | Within the definition of natural capital there are several elements that can be combined with each other but that cannot be confused with each other. In some recent definition (European Commission 2013,…) natural capital includes on one hand subsoil assets and abiotic flows, and on the other hand ecosystem capital, that in turn includes ecosystem as asset and ecosystem services. [p12] | |
| SEEA-EEA 2014 CF | | natural capital perspective not yet addressed in SEEA docs [p188] | |
| Hein, Obst, Edens, Remme 2015 | | (in Ecosystem Accounting:) *Natural Capital = The set of renewable (e.g. ecosystems) and non-renewable (e.g. mineral deposits) environmental assets that directly or indirectly produce value or benefits to people.* [p87] | |
| Natural Capital Accounting | OpenNESS | | 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. | |
| SEEA-EEA, Tech Recs Dec 2015 | | For natural capital, it is clear that the use of exchange values for ecosystem services would not correspond directly to the conceptual requirements of wealth accounting, although there will be strong connections between the two approaches. [“Natural Capital” and “Natural Capital Accounting” are *undefined* in this document. This quote from “9.63 Alternative approaches to integration,” p 113. However the terms are discussed as existing in other documents: “A draft reference document on natural capital accounting has also been released for consultation (January 2015). Largely it is a description of the various approaches to natural capital accounting, including the SEEA and includes discussion of natural capital itself, and the role of natural capital accounting in policy,” p 121. From this wording it is not clear if this is a MAES or UN document.] | |
| Natural Asset | OpenNESS Gloss 2016 | | A component of Natural Capital. [OpenNESS] | |
| La Notte & Dalmazzone 2016 draft | | Natural assets such as water and biotic resources (e.g., timber, fisheries) are not ecosystem and are not ecosystem services but undoubtedly they are part of ecosystem capital and (together with abiotic assets and flows) of natural capital. [p12] | |