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Notes on the current revision (V5.1, 18/03/2018)

CICES should be used in association with the accompanying document: Haines-Young, R. and M.B. Potschin (2018): Common International Classification of Ecosystem Services (CICES) V5.1 and Guidance on the Application of the Revised Structure.

CICES V5.1 retains four level hierarchical structure of V4.3, and the facility for users to add class-types below the class level is retained. The nomenclature has been modified in order to ensure that it is more clearly seen as a 'functional' classification. The Group level descriptors are now framed in a way the ecosystem that are ultimately useful to people (e.g. nutrition), while the Divisional level captures functional attributes, or the ecosystem properties under consideration, that facilitate human use (directly or indirectly). Both these dimensions are now reflected in the class definition

The class definitions seeks to combine an 'ecological' and a 'use' clause, and in the spreadsheet these are kept separate to check syntax. When quoting these classes should be combined; note, however, in understanding what the classes cover the inheritance properties of the hierarchal

To help users apply definitions simple/non-technical class descriptors are provided. Application specific labels can be used with appropriate cross referencing to classes.

Example services and example benefits associated with them are provided, along with reference to underpinning literature; these form part of the guidelines for V5.1. The spreadsheet does not retain the examples from V4.3, which were not satisfactory because they sometimes conflated services and benefits. Note the examples are not intended to be comprehensive - but indicative.

In order that classes can, where appropriate, be aggregated, equivalent classes for cultivated crops and reared animals have been added under 'Nutrition', 'Materials', and 'Energy'. This also made it easier to include abiotic ecosystem outputs (see below) in the same classification logic if required. The modification of the Division and Group level descriptors in V5.1 compared to earlier versions for Provisioning Services (Biotic) enables aggregation for accounting purposes when end-use is not

'Cultivated crops' has been renamed 'cultivated plants'. The definition reflects the discussion in the wider community about their status as a final service; the definition shows the service to be the 'contribution that ecosystems make' to the growth of cultivated crops - but the guidance will recognise that in practice this is measured not by some apportionment of 'natures contribution' to the joint production but usually some overall measure of crop output. Similar logic carries over into the services involving reared animals and cultivation of plants for materials and energy.

The class 'Materials from plants, algae and animals for agricultural use' has been dropped from V5.1 to avoid the overlap with other materials classes.

The Division 'Genetic material from all biota (including seed, spore or gamete production)' has been added, with subdivisions to cover the collection of materials for the establishment of maintenance of new stands or population of plants or animals, the use of plants and animals at the whole organism level for breeding purposes, and gene extraction. The collection of materials for reproduction is therefore excluded from the other classes dealing with 'materials'. Note, the maintenance of nursery populations (a regulating service) is distinct from the collection of materials for establishing or maintaining a population because the former deals with outputs at the habitat level and the latter covers the collection of specific types of material for use elsewhere.

The Division level in 'Regulating and maintenance' has been modified; flows are now part of 'Regulation of physical, chemical, biological conditions', since they are referring to 'physical

Flood protection' has been merged with 'Hydrological cycle and water flow maintenance' to avoid double counting.

Fire protection has been added under the Group 'Mediation of nuisances'. However, some people feel this should not be added since vegetation generally contributes to fire risk. It has been included to allow the classification to be as comprehensive and as widely applicable as possible.

Gas/Air flows distinguished in V4.3 have been dropped as a Group in V5.1 because of the overlap with the ways ecosystems regulate local climate; 'wind protection' is included in the set of classes covering flows and the definition of classes under 'Atmospheric composition and conditions' have been modified to clarify what they cover, and remove any overlap with wind/flood protection (Hydrological cycle and water flow maintenance)

The classification of cultural services have been redesigned complied with V4.3, and Division level now separates in-situ and remote opportunities. There is a simple read across between the V4.3 classes and the new ones in V5.1.

Under 'Physical and experiential interactions with natural environment' there is now a separation between opportunities for active engagement (walking, sailing) and passive engagement (observation, smells, sounds)

Abiotic services have been included in the current version since they broadly follow the same classification logic. The user can chose to include or exclude these by using the filter in Column A. Choose 'CICES' to show how V5.1 relates to V4.3; select 'CICES extended' for the abiotic classification. See Note 15 for status of 'water' as a provisioning service.

While it could be argued that water as a source of nutrition, materials or energy should be placed within the abiotic table, it has been retained within CICES to ensure that V5.1 is as consistent with V4.3 as possible. However, the qualifier (Abiotic) has been added to the labels at Section level. Users can display 'water' either with or without the biotic/abiotic categories by using the text filters for column A & B:

>>In Column A selecting 'CICES' includes water with ecosystem services that depend on biotic ecosystem components. Water can be excluded from this list by using the filter for column B - deselect 'Provisioning (abiotic)'.

>>In Colum A selecting 'CICES_extended' displays all abiotic ecosystem outputs excluding water. To display all abiotic categories including water, use the filter for column B and select all elements with Column Q, ('Marine CICES') indicates those CICES Classes that are considered relevant in the marine context as an example of how the classification might be 'customised' in a particular context. It allows a filter to be applied to hide those classes that are not considered important. This is based on the work synthesised by Royo Gelabert, (2016) (see Guidance Document for details). Only biotic outputs were considered in the study.

Columns R-U given equivalences between the CICES V5.1 classes and the categories used by IPBES, the MA and TEEB. Further information and discussion of these cross-comparisons are to be found in the accompanying guidance and in other documentation on the CICES website (www.cices.eu).

The reference error in the IPBES lookup colum has been corrected in this version.

CICES	Provisioning (Biotic)	Biomass
CICES	Provisioning (Biotic)	Biomass
CICES	Provisioning (Biotic)	Biomass
CICES	Provisioning (Biotic)	Biomass
CICES	Provisioning (Biotic)	Biomass
CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)

CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)
CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)
CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)
CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)
CICES	Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)

CICES	Provisioning (Biotic)	Other types of provisioning service from biotic sources
CICES	Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems
CICES	Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems
CICES	Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems

CICES	Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems
CICES	Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems
CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions
CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions

CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions
CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions
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CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions
CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions

CICES	Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions
CICES	Regulation & Maintenance (Biotic)	Other types of regulation and maintenance service by living processes
CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting

CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
CICES	Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting
CICES	Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting
CICES	Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting
CICES	Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting
CICES	Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting

CICES Extended	Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs
CICES Extended	Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems
CICES Extended	Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems
CICES Extended	Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems
CICES Extended	Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems
CICES Extended	Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions
CICES Extended	Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions
CICES Extended	Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions
CICES Extended	Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions

CICES Extended	Regulation & Maintenance (Abiotic)	Other type of regulation and maintenance service by abiotic processes
CICES Extended	Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting
CICES Extended	Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting
CICES Extended	Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting
CICES Extended	Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting
CICES Extended	Cultural (Abiotic)	Other abiotic characteristics of nature that have cultural significance

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ave changed - equivalents

Group
Cultivated terrestrial plants for nutrition, materials or energy
Cultivated terrestrial plants for nutrition, materials or energy
Cultivated terrestrial plants for nutrition, materials or energy
Cultivated aquatic plants for nutrition, materials or energy
Cultivated aquatic plants for nutrition, materials or energy
Cultivated aquatic plants for nutrition, materials or energy

Reared animals for nutrition,
materials or energy

Reared animals for nutrition,
materials or energy

Reared animals for nutrition,
materials or energy

Reared aquatic animals for
nutrition, materials or energy

Reared aquatic animals for
nutrition, materials or energy

Reared aquatic animals for
nutrition, materials or energy

Wild plants (terrestrial and aquatic)
for nutrition, materials or energy

Wild plants (terrestrial and aquatic)
for nutrition, materials or energy

Wild plants (terrestrial and aquatic)
for nutrition, materials or energy

Wild animals (terrestrial and
aquatic) for nutrition, materials or
energy

Wild animals (terrestrial and
aquatic) for nutrition, materials or
energy

Wild animals (terrestrial and
aquatic) for nutrition, materials or
energy

Genetic material from plants, algae
or fungi

Genetic material from plants, algae or fungi

Genetic material from plants, algae or fungi

Genetic material from animals

Genetic material from animals

Genetic material from organisms

Other

Mediation of wastes or toxic substances of anthropogenic origin by living processes

Mediation of wastes or toxic substances of anthropogenic origin by living processes

Mediation of nuisances of anthropogenic origin

Mediation of nuisances of anthropogenic origin

Mediation of nuisances of anthropogenic origin

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Lifecycle maintenance, habitat and gene pool protection

Lifecycle maintenance, habitat and gene pool protection

Lifecycle maintenance, habitat and gene pool protection

Pest and disease control

Pest and disease control

Regulation of soil quality

Regulation of soil quality

Water conditions

Water conditions

Atmospheric composition and conditions

Atmospheric composition and conditions

Other

Physical and experiential interactions with natural environment

Physical and experiential interactions with natural environment

Intellectual and representative interactions with natural environment

Intellectual and representative interactions with natural environment
Intellectual and representative interactions with natural environment
Intellectual and representative interactions with natural environment
Spiritual, symbolic and other interactions with natural environment
Spiritual, symbolic and other interactions with natural environment
Spiritual, symbolic and other interactions with natural environment
Other biotic characteristics that have a non-use value

Other biotic characteristics that have a non-use value

Other

Surface water used for nutrition, materials or energy

Surface water used for nutrition, materials or energy

Surface water used for nutrition, materials or energy

Surface water used for nutrition, materials or energy

Ground water for used for nutrition, materials or energy

Ground water for used for nutrition, materials or energy

Ground water for used for nutrition, materials or energy

Other mineral or non-mineral substances or ecosystem properties used for nutrition, materials or energy

Mediation of waste, toxics and other nuisances by non-living processes

Mediation of waste, toxics and other nuisances by non-living processes

Mediation of waste, toxics and other nuisances by non-living processes

Mediation of nuisances of anthropogenic origin

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Regulation of baseline flows and extreme events

Maintenance of physical, chemical, abiotic conditions

Other

Physical and experiential interactions with natural abiotic components of the environment

Intellectual and representative interactions with abiotic components of the natural environment

Spiritual, symbolic and other interactions with the abiotic components of the natural environment

Other abiotic characteristics that have a non-use value

Other

A to select CICES V5.0, (Select 'CICES) or by inclu
 fro V4.3 are given.

Class	Code
Cultivated terrestrial plants (including fungi, algae) grown for nutritional purposes	1.1.1.1
Fibres and other materials from cultivated plants, fungi, algae and bacteria for direct use or processing (excluding genetic materials)	1.1.1.2
Cultivated plants (including fungi, algae) grown as a source of energy	1.1.1.3
Plants cultivated by in- situ aquaculture grown for nutritional purposes	1.1.2.1
Fibres and other materials from in-situ aquaculture for direct use or processing (excluding genetic materials)	1.1.2.2
Plants cultivated by in- situ aquaculture grown as an energy source	1.1.2.3

Animals reared for nutritional purposes	1.1.3.1
Fibres and other materials from reared animals for direct use or processing (excluding genetic materials)	1.1.3.2
Animals reared to provide energy (including mechanical)	1.1.3.3
Animals reared by in-situ aquaculture for nutritional purposes	1.1.4.1
Fibres and other materials from animals grown by in-situ aquaculture for direct use or processing (excluding genetic materials)	1.1.4.2
Animals reared by in-situ aquaculture as an energy source	1.1.4.3
Wild plants (terrestrial and aquatic, including fungi, algae) used for nutrition	1.1.5.1

Fibres and other materials from wild plants for direct use or processing (excluding genetic materials)	1.1.5.2
Wild plants (terrestrial and aquatic, including fungi, algae) used as a source of energy	1.1.5.3
Wild animals (terrestrial and aquatic) used for nutritional purposes	1.1.6.1
Fibres and other materials from wild animals for direct use or processing (excluding genetic materials)	1.1.6.2
Wild animals (terrestrial and aquatic) used as a source of energy	1.1.6.3
Seeds, spores and other plant materials collected for maintaining or establishing a population	1.2.1.1

Higher and lower plants (whole organisms) used to breed new strains or varieties	1.2.1.2
Individual genes extracted from higher and lower plants for the design and construction of new biological entities	1.2.1.3
Animal material collected for the purposes of maintaining or establishing a population	1.2.2.1
Wild animals (whole organisms) used to breed new strains or varieties	1.2.2.2
Individual genes extracted from organisms for the design and construction of new biological entities	1.2.2.3

Other	1.3.X.X
Bio-remediation by micro-organisms, algae, plants, and animals	2.1.1.1
Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	2.1.1.2
Smell reduction	2.1.2.1

Noise attenuation	2.1.2.2
Visual screening	2.1.2.3
Control of erosion rates	2.2.1.1
Buffering and attenuation of mass movement	2.2.1.2

Hydrological cycle and water flow regulation (Including flood control, and coastal protection)	2.2.1.3
Wind protection	2.2.1.4
Fire protection	2.2.1.5
Pollination (or 'gamete' dispersal in a marine context)	2.2.2.1

Seed dispersal	2.2.2.2
Maintaining nursery populations and habitats (Including gene pool protection)	2.2.2.3
Pest control (including invasive species)	2.2.3.1
Disease control	2.2.3.2

Weathering processes and their effect on soil quality	2.2.4.1
Decomposition and fixing processes and their effect on soil quality	2.2.4.2
Regulation of the chemical condition of freshwaters by living processes	2.2.5.1
Regulation of the chemical condition of salt waters by living processes	2.2.5.2
Regulation of chemical composition of atmosphere and oceans	2.2.6.1

<p>Regulation of temperature and humidity, including ventilation and transpiration</p>	<p>2.2.6.2</p>
<p>Other</p>	<p>2.3.X.X</p>
<p>Characteristics of living systems that that enable activities promoting health, recuperation or enjoyment through active or immersive interactions</p>	<p>3.1.1.1</p>
<p>Characteristics of living systems that enable activities promoting health, recuperation or enjoyment through passive or observational interactions</p>	<p>3.1.1.2</p>
<p>Characteristics of living systems that enable scientific investigation or the creation of traditional ecological knowledge</p>	<p>3.1.2.1</p>

Characteristics of living systems that enable education and training	3.1.2.2
Characteristics of living systems that are resonant in terms of culture or heritage	3.1.2.3
Characteristics of living systems that enable aesthetic experiences	3.1.2.4
Elements of living systems that have symbolic meaning	3.2.1.1
Elements of living systems that have sacred or religious meaning	3.2.1.2
Elements of living systems used for entertainment or representation	3.2.1.3
Characteristics or features of living systems that have an existence value	3.2.2.1

Characteristics or features of living systems that have an option or bequest value	3.2.2.2
Other	3.3.X.X
Surface water for drinking	4.2.1.1
Surface water used as a material (non-drinking purposes)	4.2.1.2
Freshwater surface water used as an energy source	4.2.1.3
Coastal and marine water used as energy source	4.2.1.4
Ground (and subsurface) water for drinking	4.2.2.1
Ground water (and subsurface) used as a material (non-drinking purposes)	4.2.2.2
Ground water (and subsurface) used as an energy source	4.2.2.3

Other	4.2.X.X
Mineral substances used for nutritional purposes	4.3.1.1
Mineral substances used for material purposes	4.3.1.2
Mineral substances used for as an energy source	4.3.1.3
Non-mineral substances or ecosystem properties used for nutritional purposes	4.3.2.1
Non-mineral substances used for materials	4.3.2.2
Wind energy	4.3.2.3
Solar energy	4.3.2.4
Geothermal	4.3.2.5

Other	4.3.2.6
Dilution by freshwater and marine ecosystems	5.1.1.1
Dilution by atmosphere	5.1.1.2
Mediation by other chemical or physical means (e.g. via Filtration, sequestration, storage or accumulation)	5.1.1.3
Mediation of nuisances by abiotic structures or processes	5.1.2.1
Mass flows	5.2.1.1
Liquid flows	5.2.1.2
Gaseous flows	5.2.1.3
Maintenance and regulation by inorganic natural chemical and physical processes	5.2.2.1

Other	5.3.X.X
Natural, abiotic characteristics of nature that enable active or passive physical and experiential interactions	6.1.1.1
Natural, abiotic characteristics of nature that enable intellectual interactions	6.1.2.1
Natural, abiotic characteristics of nature that enable spiritual, symbolic and other interactions	6.2.1.1
Natural, abiotic characteristics or features of nature that have either an existence, option or bequest value	6.2.2.1
Other	6.3.X.X

uding categories for 'CICES_extended' abiotic ecosystem

Class type	V4.3 Equivalent	Code(4.3)
<i>Crops by amount, type (e.g. cereals, root crops, soft fruit, etc.)</i>	<i>Cultivated crops</i>	<i>1.1.1.1</i>
<i>Material by amount, type, use, media (land, soil, freshwater, marine)</i>	<i>Fibres and other materials from plants, algae and animals for direct use or processing</i>	<i>1.2.1.1</i>
<i>By amount, type, source</i>	<i>Plant-based resources</i>	<i>1.3.1.1</i>
<i>Plants, algae by amount, type</i>	<i>Plants and algae from in-situ aquaculture</i>	<i>1.1.1.5</i>
<i>Plants, algae by amount, type</i>	<i>Plants and algae from in-situ aquaculture</i>	<i>1.1.1.5</i>
<i>Plants, algae by amount, type</i>	<i>Plants and algae from in-situ aquaculture</i>	<i>1.1.1.5</i>

<i>Animals, products by amount, type (e.g. beef, dairy)</i>	<i>Reared animals and their outputs</i>	<i>1.1.1.2</i>
<i>Material by amount, type, use, media (land, soil, freshwater, marine)</i>	<i>Materials from plants, algae and animals for agricultural use</i>	<i>1.2.1.2</i>
<i>By amount, type, source</i>	<i>Animal-based resources & Animal-based mechanical energy</i>	<i>1.3.1.2 & 1.3.2.1</i>
<i>Animals by amount, type</i>	<i>Animals from in-situ aquaculture</i>	<i>1.1.1.6</i>
<i>Animals by amount, type</i>	<i>Animals from in-situ aquaculture</i>	<i>1.1.1.6</i>
<i>Animals by amount, type</i>	<i>Animals from in-situ aquaculture</i>	<i>1.1.1.6</i>
<i>Plants, algae by amount, type</i>	<i>Wild plants, algae and their outputs</i>	<i>1.1.1.3</i>

<i>Plants, algae by amount, type</i>	<i>Wild plants, algae and their outputs</i>	<i>1.1.1.3</i>
<i>Material by type/source</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Animals by amount, type</i>	<i>Wild animals and their outputs</i>	<i>1.1.1.4</i>
<i>Material by type/source</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By amount, type, source</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By species or varieties</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>

<i>By species or varieties</i>	<i>Genetic materials from all biota</i>	<i>1.2.1.3</i>
<i>Material by type</i>	<i>Genetic materials from all biota</i>	<i>1.2.1.3</i>
<i>By species or varieties</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By species or varieties</i>	<i>Genetic materials from all biota</i>	<i>1.2.1.3</i>
<i>Material by type</i>	<i>Genetic materials from all biota</i>	<i>1.2.1.3</i>

<p><i>Use nested codes to allocate other provisioning services from living systems to appropriate Groups and Classes</i></p>	<p><i>Not recognised in V4.3</i></p>	<p><i>N/A</i></p>
<p><i>By type of living system or by waste or subsistence type</i></p>	<p><i>Bio-remediation by micro-organisms, algae, plants, and animals</i></p>	<p><i>2.1.1.1</i></p>
<p><i>By type of living system, or by water or substance type</i></p>	<p><i>Filtration/sequestration /storage/accumulation by micro-organisms, algae, plants, and animals And Filtration/sequestration /storage/accumulation by ecosystems</i></p>	<p><i>2.1.1.2 & 2.1.2.1</i></p>
<p><i>By type of living system</i></p>	<p><i>Mediation of smell/noise/visual impacts</i></p>	<p><i>2.1.2.3</i></p>

By type of living system	<i>Mediation of smell/noise/visual impacts</i>	2.1.2.3
By type of living system	<i>Mediation of smell/noise/visual impacts</i>	2.1.2.3
<i>By reduction in risk, area protected</i>	<i>Stabilisation and control of erosion rates</i>	2.2.1.1
<i>By reduction in risk, area protected</i>	<i>Buffering and attenuation of mass flows</i>	2.2.1.2

<p><i>By depth/volumes</i></p>	<p><i>Hydrological cycle and water flow maintenance And Flood protection</i></p>	<p><i>2.2.2.1 & 2.2.2.2</i></p>
<p><i>By reduction in risk, area protected</i></p>	<p><i>Storm protection</i></p>	<p><i>2.2.3.1</i></p>
<p><i>By reduction in risk, area protected</i></p>	<p><i>Not recognised in V4.3</i></p>	<p><i>N/A</i></p>
<p><i>By amount and pollinator</i></p>	<p><i>Pollination and seed dispersal</i></p>	<p><i>2.3.1.1</i></p>

<i>By amount and dispersal agent</i>	<i>Pollination and seed dispersal</i>	<i>2.3.1.1</i>
<i>By amount and source</i>	<i>Maintaining nursery populations and habitats</i>	<i>2.3.1.2</i>
<i>By reduction in incidence, risk, area protected by type of living system</i>	<i>Pest control</i>	<i>2.3.2.1</i>
<i>By reduction in incidence, risk, area protected by type of living system</i>	<i>Disease control</i>	<i>2.3.2.2</i>

<i>By amount/concentration and source</i>	<i>Weathering processes</i>	<i>2.3.3.1</i>
<i>By amount/concentration and source</i>	<i>Decomposition and fixing processes</i>	<i>2.3.3.2</i>
<i>By type of living system</i>	<i>Chemical condition of freshwaters</i>	<i>2.3.4.1</i>
<i>By type of living system</i>	<i>Chemical condition of salt waters</i>	<i>2.3.4.2</i>
<i>By contribution of type of living system to amount, concentration or climatic parameter</i>	<i>Global climate regulation by reduction of greenhouse gas concentrations</i>	<i>2.3.5.1</i>

<p><i>By contribution of type of living system to amount, concentration or climatic parameter</i></p>	<p><i>Micro and regional climate regulation & Ventilation and transpiration</i></p>	<p><i>2.3.5.2 & 2.2.3.2</i></p>
<p><i>Use nested codes to allocate other regulating and maintenance services from living systems to appropriate Groups and Classes</i></p>	<p><i>Not recognised in V4.3</i></p>	<p><i>N/A</i></p>
<p><i>By type of living system or environmental setting</i></p>	<p><i>Experiential use of plants, animals and land-/seascapes in different environmental settings</i></p>	<p><i>3.1.1.1</i></p>
<p><i>By type of living system or environmental setting</i></p>	<p><i>Physical use of land-/seascapes in different environmental settings</i></p>	<p><i>3.1.1.2</i></p>
<p><i>By type of living system or environmental setting</i></p>	<p><i>Scientific</i></p>	<p><i>3.1.2.1</i></p>

<i>By type of living system or environmental setting</i>	<i>Educational</i>	<i>3.1.2.2</i>
<i>By type of living system or environmental setting</i>	<i>Heritage, cultural</i>	<i>3.1.2.3</i>
<i>By type of living system or environmental setting</i>	<i>Aesthetic</i>	<i>3.1.2.5</i>
<i>By type of living system or environmental setting</i>	<i>Symbolic</i>	<i>3.2.1.1</i>
<i>By type of living system or environmental setting</i>	<i>Sacred and/or religious</i>	<i>3.2.1.2</i>
<i>By type of living system or environmental setting</i>	<i>Entertainment</i>	<i>3.1.2.4</i>
<i>By type of living system or environmental setting</i>	<i>Existence</i>	<i>3.2.2.1</i>

<i>By type of living system or environmental setting</i>	<i>Bequest</i>	<i>3.2.2.2</i>
<i>Use nested codes to allocate other cultural services from living systems to appropriate Groups and Classes</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By amount, type, source</i>	<i>Surface water for drinking</i>	<i>1.1.2.1</i>
<i>By amount & source</i>	<i>Surface water for non-drinking purposes</i>	<i>1.2.2.1</i>
<i>By amount, type, source</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By amount, type, source</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>By amount, type, source</i>	<i>Ground water for drinking</i>	<i>1.1.2.2</i>
<i>By amount & source</i>	<i>Ground water as source of energy</i>	<i>1.2.2.2</i>
<i>By amount & source</i>	<i>Ground water for non-drinking purposes</i>	<i>N/A</i>

<i>Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Minerals</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Solid</i>	<i>N/A</i>
<i>Amount by type</i>	<i>N/A</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Non-mineral</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Gas</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Wind</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Solar</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Geo-thermal</i>	<i>N/A</i>

<i>Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Dilution by atmosphere, freshwater and marine ecosystems</i>	<i>2.1.2.2</i>
<i>Amount by type</i>	<i>Dilution by atmosphere, freshwater and marine ecosystems</i>	<i>2.1.2.2</i>
<i>Amount by type</i>	<i>Mediation of waste, toxics and other nuisances, by natural chemical and physical processes</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Mediation of flows by natural abiotic structures</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Maintenance of physical, chemical, abiotic conditions</i>	<i>N/A</i>

Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Amount by type</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>
<i>Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes</i>	<i>Not recognised in V4.3</i>	<i>N/A</i>

em outputs classified using the same structure

Simple descriptor	Ecological clause
<i>Any crops and fruits grown by humans for food; food crops</i>	<i>The ecological contribution to the growth of cultivated, land-based crops.....</i>
<i>Material from plants, fungi, algae or bacterial that we can use</i>	<i>The ecological contribution to the production of plants, fungi, algae or bacterial...</i>
<i>Plant materials used as a source of energy</i>	<i>The ecological contribution to the growth of cultivated crops.....</i>
<i>Plants that are cultivated in fresh or salt water that we eat</i>	<i>The ecological contribution to the growth of plants and algae under aquaculture....</i>
<i>Plants that are cultivated in fresh or salt water that we can use as a material</i>	<i>The ecological contribution to the growth of plants and algae under aquaculture....</i>
<i>Plants that are cultivated in fresh or salt water that we can use as an energy source</i>	<i>The ecological contribution to the growth of plants and algae under aquaculture....</i>

<i>Livestock raised in housing and/or grazed outdoors</i>	<i>The ecological contribution to the rearing of domesticated land-based animals and their outputs...</i>
<i>Material from animals that we can use</i>	<i>The ecological contribution to the production of animal matter...</i>
<i>Animal materials used as a source of energy or for traction</i>	<i>The ecological contribution to domesticated or wild animal species whose outputs...</i>
<i>Animals that are cultivated in fresh or salt water that we eat.</i>	<i>The ecological contribution to the growth of cultivated aquatic animals</i>
<i>Animals that are cultivated in fresh or salt water that we can use as a material.</i>	<i>The ecological contribution to the growth of cultivated aquatic animals</i>
<i>Animals that are cultivated in fresh or salt water that we can use as a source of energy.</i>	<i>The ecological contribution to the growth of cultivated aquatic animals</i>
<i>Food from wild plants</i>	<i>Parts of the standing biomass of a non-cultivated plant species...</i>

<i>Materials from wild plants</i>	<i>Parts of the standing biomass of a non-cultivated plant species...</i>
<i>Materials from wild plants, fungi and algae used for energy</i>	<i>Parts of the standing biomass of a non-cultivated plant, fungi, algae or bacteria species...</i>
<i>Food from wild animals</i>	<i>Non-domesticated, wild animal species and their outputs...</i>
<i>Materials from wild animals</i>	<i>Materials from wild animals....</i>
<i>Material from wild animals that can be used as a source of energy</i>	<i>Biomass from wild animals....</i>
<i>Seed collection</i>	<i>Seeds and spores and other plant materials...</i>

<i>Plants, fungi or algae that we can use for breeding</i>	<i>Wild plants, fungi algae and bacteria ...</i>
<i>Genetic material from wild plants, fungi or algae that we can use</i>	<i>Generic information or material from plants, fungi algae and bacteria ...</i>
<i>Animals used for replenishing stock</i>	
<i>Wild animals that we can use for breeding</i>	<i>Wild animals ...</i>
<i>The genetic information that is stored in wild animals that we can use</i>	<i>Generic material from animals ...</i>

<i>Decomposing wastes</i>	<i>Transformation of an organic or inorganic substance by a species of plant, animal, bacteria, fungi or algae...</i>
<i>Filtering wastes</i>	<i>The fixing and storage of an organic or inorganic substance by a species of plant, animal, bacteria, fungi or algae</i>
Reducing smells	The reduction in the impact of odours on people...

<i>Reducing noise</i>	<i>The reduction in the impact of noise on people...</i>
<i>Screening unsightly things</i>	<i>The reduction in the visual impact of human structures on people...</i>
<i>Controlling or preventing soil loss</i>	<i>The reduction in the loss of material by virtue of the stabilising effects of the presence of plants and animals...</i>
<i>Stopping landslides and avalanches harming people</i>	<i>The reduction in the speed of movement of solid material by virtue of the stabilising effects of the presence of plants and animals...</i>

<i>Regulating the flows of water in our environment</i>	<i>The regulation of water flows by virtue of the chemical and physical properties or characteristics of ecosystems....</i>
<i>Protecting people from winds</i>	<i>The reduction in the speed of movement of air by virtue of the presence of plants and animals...</i>
<i>Protecting people from fire</i>	<i>The reduction in the incidence, intensity or speed of spread of fire by virtue of the presence of plants and animals...</i>
<i>Pollinating our fruit trees and other plants</i>	<i>The fertilisation of crops by plants or animals...</i>

<i>Spreading the seeds of wild plants</i>	<i>The dispersal of seeds and spores....</i>
<i>Providing habitats for wild plants and animals that can be useful to us</i>	<i>The presence of ecological conditions (usually habitats) necessary for sustaining populations of species....</i>
<i>Controlling pests and invasive species</i>	<i>The reduction by biological interactions of the incidence of species...</i>
<i>Controlling disease</i>	<i>The reduction by biological interactions of the incidence of species...</i>

<i>Ensuring soils form and develop</i>	<i>Biological decomposition of minerals...</i>
<i>Ensuring the organic matter in our soils is maintained</i>	<i>Decomposition of biological materials and their incorporation in soils</i>
<i>Controlling the chemical quality of freshwater</i>	<i>Maintenance of the chemical condition of fresh waters by plant or animal species....</i>
<i>Controlling the chemical quality of salt water</i>	<i>Maintenance of the chemical condition of salt waters by plant or animal species....</i>
<i>Regulating our global climate</i>	<i>Regulation of the concentrations of gases in the atmosphere</i>

<p><i>Regulating the physical quality of air for people</i></p>	<p><i>Mediation of ambient atmospheric conditions (including micro- and mesoscale climates) by virtue of presence of plants....</i></p>
<p><i>Using the environment for sport and recreation; using nature to help stay fit</i></p>	<p><i>The biophysical characteristics or qualities of species or ecosystems (settings/ cultural spaces)....</i></p>
<p><i>Watching plants and animals where they live; using nature to distress</i></p>	<p><i>The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....</i></p>
<p><i>Researching nature</i></p>	<p><i>The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....</i></p>

<i>Studying nature</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....</i>
<i>The things in nature that help people identify with the history or culture of where they live or come from</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....</i>
<i>The beauty of nature</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/cultural spaces).....</i>
<i>Using nature to as a national or local emblem</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....</i>
<i>The things in nature that have spiritual importance for people</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....</i>
<i>The things in nature used to make films or to write books</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....</i>
<i>The things in nature that we think should be conserved</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....</i>

<i>The things in nature that we want future generations to enjoy or use</i>	<i>The biophysical characteristics or qualities of species or ecosystems (settings/landscapes/cultural spaces).....</i>
<i>Drinking water from sources at the ground surface</i>	<i>Natural, surface water bodies...</i>
<i>Surface water that we can use for things other than drinking</i>	<i>Natural, surface water bodies...</i>
<i>Hydropower</i>	<i>The flow of water on land....</i>
<i>Wave or tidal power</i>	<i>The movement of waves or current...</i>
<i>Drinking water from the below ground</i>	<i>Natural, below ground water bodies or aquifers...</i>
<i>Sub-surface water that we can use for things other than drinking</i>	<i>Natural below ground water bodies or aquifers...</i>
<i>Sub-surface water that we can use as a source of energy</i>	<i>Natural below ground water bodies or aquifers...</i>

<i>Minerals in our food</i>	<i>Reference biophysical or inorganic chemical mechanism/characteristic/property...</i>
<i>Natural inorganic materials from nature that we can use</i>	<i>Reference biophysical or inorganic chemical mechanism/characteristic/property...</i>
<i>Natural inorganic materials from nature that we can use as an energy source</i>	<i>Reference biophysical or inorganic chemical mechanism/characteristic/property...</i>
<i>The ways the physical environment contribute to our nutritional health</i>	<i>Reference biophysical or inorganic chemical mechanism/characteristic/property...</i>
<i>Gaseous, fluid or non-mineral solid inorganic materials from nature that we can use (excludes water vapour)</i>	<i>Reference biophysical or inorganic chemical mechanism/characteristic/property...</i>
<i>Wind power</i>	<i>Air flows...</i>
<i>Solar power</i>	<i>Energy from sun light..</i>
<i>Using underground heat</i>	<i>Heat in the earth' crust</i>

<i>Diluting wastes</i>	<i>The reduction in concentration of an organic or inorganic substances by mixing in a fresh water ecosystem</i>
<i>Diluting wastes</i>	<i>The reduction in concentration of an organic or inorganic substance by mixing in the atmosphere</i>
<i>Natural processing of wastes</i>	<i>Mediation of waste, toxics and other nuisances, by natural chemical and physical processes...</i>
<i>Natural protection</i>	<i>Mediation of environmental conditions by abiotic structures or processes...</i>
<i>Physical barriers to landslides</i>	<i>Mediation of solid flows by natural abiotic structures..</i>
<i>Physical barriers to flows</i>	<i>Mediation of liquid flows by natural abiotic structures..</i>
<i>Physical barriers to air movements</i>	<i>Mediation of gaseous flows by natural abiotic structures..</i>
<i>Regulating living conditions by the physical environment</i>	<i>Maintenance of physical, chemical, abiotic conditions...</i>

<i>Things in the physical environment that we can experience actively or passively</i>	<i>Natural, abiotic characteristics of nature that...</i>
<i>Things in the physical environment that we can study or think about</i>	<i>Natural, abiotic characteristics of nature that...</i>
<i>Things in the physical environment that are important as symbols</i>	<i>Natural, abiotic characteristics of nature that...</i>
<i>Things in the physical environment that we think are important to others and future generations</i>	<i>Natural, abiotic characteristics of nature that...</i>

e as V5.1.

Use clause	Example Service
<i>...that can be harvested and used as raw material for the production of food</i>	<i>Standing wheat crop before harvest (Proxy for: ecosystem contribution to growth of harvestable wheat)</i>
<i>...that can be harvested and used as raw material for non-nutritional purposes</i>	<i>Harvestable surplus of annual tree growth</i>
<i>...that can be harvested and used as a source of biomass-based energy</i>	<i>Standing crop of Miscanthus at time of harvest</i>
<i>...that can be harvested and used as raw material for the production of food</i>	<i>Harvestable surplus of seaweed biomass in situ</i>
<i>...that can be harvested and used as raw material for non-nutritional purposes</i>	<i>Harvestable surplus of seaweed biomass in situ</i>
<i>...that can be harvested and used as a source of energy</i>	<i>Harvestable surplus of seaweed biomass in situ</i>

<i>...that can be used as raw material for the production of food</i>	<i>Increase in weight or numbers of cattle herd per year [previously the grass feeding these animals was considered the final service]</i>
<i>...that can be harvested and used as raw material for non-nutritional purposes</i>	<i>Harvestable number and quality of animal skins in herd</i>
<i>...that can provide a source of energy</i>	<i>Volume of dung or number of animals used for traction</i>
<i>...that can be used as raw material for the production of food</i>	<i>Harvestable stock of bivalves</i>
<i>...that can be harvested and used as raw material for non-nutritional purposes</i>	<i>Harvestable pearls produced by oyster beds</i>
<i>...that can provide a source of energy</i>	<i>Biogas from aquaculture waste</i>
<i>...that can be harvested and used for the production of food</i>	<i>Harvestable volume of wild berries or wild mushrooms, Or Benthic macroalgae (e.g. Dulse, Laminaria (Kelp)) and macrophytes (e.g. Salicornia and other saltmarsh plants) harvested in the shallow sublittoral and/or littoral zone</i>

<i>...that can be harvested and used as raw material for non-nutritional purposes</i>	<i>Harvestable volume of reeds Or Macroalgae used for thickening agents, agar and superconductor electrodes</i>
<i>...that can be harvested and used as an energy source</i>	<i>Volume of harvested wood</i>
<i>...that can be used as raw material for the production of food</i>	<i>Harvestable surplus of cod population, or deer population</i>
<i>...that can be harvested and used as raw material for non-nutritional uses</i>	<i>Reindeer skins Or Zooplankton – jellyfish used to produce collagen for various purposes</i>
<i>...that can be used as a source of energy</i>	<i>Seal blubber used by traditional cultures in lamps Or Sand eels (Historical) or Cetaceans</i>
<i>...that can be used to maintain or establish a new population</i>	<i>Seeds or spores that we can harvest</i>

<i>...that can be used to maintain populations or develop new varieties</i>	<i>Population of plant algae or fungi species used to in breeding programmes</i>
<i>...that can be used in gene synthesis</i>	<i>Harvestable share of population of plant species used to extract genes</i>
<i>...that can be used to maintain or establish a new population</i>	<i>Spat for fish and shellfish farms</i>
<i>...that can be used to maintain populations or develop new varieties</i>	<i>Population of animals used in breeding programmes</i>
<i>...that can be used in gene synthesis</i>	<i>Harvestable share of population of a given species used to extract genes</i>

<p><i>...that mitigates its harmful effects and reduces the costs of disposal by other means</i></p>	<p><i>Bio-remediation of industrial wastes by disposal on agricultural land</i> <i>Or</i> <i>Bacteria such as Marionobacter that can break the oil down into simple monomers</i></p>
<p><i>...that mitigates its harmful effects and reduces the costs of disposal by other means</i></p>	<p><i>Dust filtration by urban trees</i> <i>Or</i> <i>Macrophytes, for example salt marsh grass, can trap particles in their roots, sequestering wastes/toxicants in the sediment (Govers et al. 2014)</i></p>
<p><i>...that mitigates its harmful or stressful effect, or the cost of the nuisance</i></p>	<p><i>Shelter belts that filter particulates that carry odours</i> <i>Or</i> <i>Birds, epifauna, infauna and bacterial communities contribute to this service by removing material such as rotting algal mats, which is in the littoral zone or offshore but could potentially wash up on shore and produce olfactory and visual impacts</i></p>

<p><i>...that mitigates its harmful or stressful effect, or the cost of the nuisance</i></p>	<p><i>Shelter belts along motorways</i></p>
<p><i>...that mitigates its harmful or stressful effect, or the cost of the nuisance</i></p>	<p><i>Shelter belts around industrial structures</i></p>
<p><i>...that mitigates or prevents potential damage to human use of the environment or human health and safety</i></p>	<p><i>The capacity of vegetation to prevent or reduce the incidence of soil erosion</i> <i>Or</i> <i>Macroalgae, microphytobenthos, macrophytes and biogenic reef structures (epifauna and infauna) all contribute through sediment stabilisation</i></p>
<p><i>...that mitigates or prevents potential damage to human use of the environment or human health and safety</i></p>	<p><i>The capacity of forest cover to prevent or mitigate the extent and force of snow avalanche</i></p>

<p><i>...that assists people in managing and using hydrological systems, and mitigates or prevents potential damage to human use, health or safety</i></p>	<p><i>The capacity of vegetation to retain water and release it slowly, Or The capacity of mangroves to mitigate the effects of tsunamis Or Localised coastal influences on the hydrological cycle by phytoplankton producing Dimethylsulphide (DMS) and localised flow changes due to algal and higher plant structures. Macroalgae beds, such as a kelp forest, macrophytes and biogenic reefs (epifauna and infauna) contribute to attenuation of wave energy and flood prevention</i></p>
<p><i>...that mitigates or prevents potential damage to human use of the environment or human health and safety</i></p>	<p><i>Wind breaks</i></p>
<p><i>...that mitigates or prevents potential damage to human use of the environment or human health and safety</i></p>	<p><i>The capacity of ecosystems to reduce the frequency, spread or magnitudes of fires. (e.g. wetland area between forests, or fire belt in woodland containing species of low combustibility)</i></p>
<p><i>...that maintains or increases the abundance and/or diversity of other species that people use or enjoy</i></p>	<p><i>Providing a habitat for native pollinators Or In the context of societal efforts for the restoration of, for example, seagrass beds , it can be considered final since</i></p>

<p><i>...of plants and other organisms that are important to people in use and non-use terms</i></p>	<p><i>Acorn dispersal by Eurasian Jays</i></p>
<p><i>...that people use or enjoy</i></p>	<p><i>Important nursery habitats include estuaries, seagrass, kelp forest, wetlands, soft sediment, hard bottom, shell bottom and water column habitats. Floating seaweed clumps (macroalgae) form rafts under which juvenile fish aggregate e.g. in the North Sea in pelagic habitats</i></p>
<p><i>...that prevent or reduce the output of food, material or energy from ecosystems, or their cultural importance, by consumption of biomass or competition</i></p>	<p><i>Providing a habitat for native pest control agents Or In the Black Sea, the recovery of fish populations and an alien invader, the Beroe comb jelly, (both of whom predate nuisance alien comb jellies, Finenko et al.2009) may have been the most important contributing factors for the control of the Mnemiopsis leidyi alien comb jelly, which caused an ecosystem shift in the late 80s.</i></p>
<p><i>...that otherwise could prevent or reduce the output of food, material or energy from ecosystems, or their cultural importance, by hindering or damaging the ecological functioning of useful species</i></p>	<p><i>Presence of native disease control agents such as microbial antagonists for the control of postharvest diseases</i></p>

<i>...that maintain fertility or conditions necessary for human use</i>	<i>Inorganic nutrient release in cultivated fields</i>
<i>...that maintains their characteristics necessary for human use</i>	<i>Decomposition of plant residue; N-fixation by legumes</i>
<i>...that enable human use or health</i>	<i>Use of buffer strips along water courses to remove nutrients in runoff</i>
<i>...that enable human use or health</i>	Fish communities that regulate the resilience and resistance of coral reefs to eutrophication
<i>....that impact on global climate or oceans</i>	<i>Sequestration of carbon in tropical peatlands</i>

<p><i>...that improves living conditions for people</i></p>	<p><i>Evaporative cooling provided by urban trees</i></p>
<p><i>.... that are engaged with, used or enjoyed in ways that require physical and cognitive effort</i></p>	<p><i>Ecological qualities of woodland that make it attractive to hiker; private gardens</i> <i>Or</i> <i>Opportunities for diving, swimming</i></p>
<p><i>.... that are viewed/observed by people or enjoyed in other passive ways by virtue of sounds and smells etc.</i></p>	<p><i>Mix of species in a woodland of interest to birdwatchers</i> <i>Or</i> <i>Whales, birds, seals and reptiles can be enjoyed by wildlife watchers</i></p>
<p><i>...that are the subject matter for insitu research</i></p>	<p><i>Site of special scientific interest, Natura 2000 site</i></p>

<i>...that are the subject matter for insitu teaching or skill development</i>	<i>Site used for voluntary conservation activities</i>
<i>...that contribute to cultural heritage or historical knowledge</i>	<i>Sherwood Forest</i>
<i>... that are appreciated for their inherent beauty</i>	<i>Area of Outstanding Natural Beauty; panorama site</i>
<i>...that are recognised by people for their cultural, historical or iconic character and which are used as emblems or signifiers of some kind</i>	<i>Bald Eagle</i>
<i>.....that are deemed to have sacred or religious significance for people.</i>	<i>Totemic species, such as the turtle</i>
<i>.. that provide material or subject matter that can be communicated to others via different media for amusement or enjoyment</i>	<i>Archive records or collections</i>
<i>.....which people seek to preserve because of their non-utilitarian qualities</i>	<i>Areas designated as wilderness</i>

<i>....which people seek to preserve for future generations for whatever reason</i>	<i>Endangered species or habitat</i>
<i>... that provide a source of drinking water</i>	<i>Volume and characteristics of water from a natural springs</i>
<i>... that provide water for that can be used as a material or for cooling</i>	<i>Temperature and volume of water that can be used for cooling or irrigation</i>
<i>...that can be converted to electrical or mechanical energy</i>	<i>Hydraulic potential (Head)</i>
<i>...that can be converted to electrical or mechanical energy</i>	<i>Tidal velocity</i>
<i>... that provide a source of drinking water</i>	<i>Aquifer volume and characteristics</i>
<i>... that provide water for that can be used as a material or for cooling</i>	<i>Characteristics and volume of water that can be used for washing purposes</i>
<i>... that provide water at temperatures that are useful</i>	<i>Hot water and steam vents</i>

<i>...that can be used for nutrition</i>	<i>Salt</i>
<i>...that can be used for material purposes</i>	<i>Pigments</i>
<i>...that can be used for as an energy source</i>	<i>Uranium</i>
<i>...that can be used for nutrition</i>	<i>Sunlight</i>
<i>...that can be used for material purposes</i>	<i>Ozone; or mineraloids (e.g. Opal)</i>
<i>.... that can be used as an energy source</i>	<i>Wind power</i>
<i>.... that can be used as an energy source</i>	<i>Solar power</i>
<i>.... that can be used as an energy source</i>	<i>Hot springs</i>

<i>...that mitigates its harmful effects and reduces the costs of disposal by other means</i>	<i>Use of freshwater/marine systems as a pollution sink</i>
<i>...that mitigates its harmful effects and reduces the costs of disposal by other means</i>	<i>Use of atmosphere as a pollution sink</i>
<i>..the can protect people</i>	<i>Dissolved silica in runoff</i>
<i>.... That can reduce or mitigate a nuisance to people</i>	<i>Screening effect of topography</i>
<i>... that can protect people</i>	<i>Sand bar providing coastal protection</i>
<i>... that can protect people</i>	<i>Natural levees providing flood protection</i>
<i>... that can protect people</i>	<i>Topographic control of wind velocity</i>
<i>... that affect peoples well-being or comfort</i>	<i>Land/sea breezes</i>

<i>...enable active or passive physical and experiential interactions</i>	Caves
<i>...enable intellectual activities</i>	Rock faces for climbing
<i>...have symbolic or spiritual importance</i>	Iconic mountain peaks
<i>... that we think are important to others and future generations</i>	<i>Distinctive geological formation or geomorphological feature.</i>



Example Goods and Benefits	Literature examples for individual services
<i>Harvested crop; Grain in farmer's store; flour, bread</i>	
<i>Processed timber (Volume of harvested wood)</i>	
<i>Energy production</i>	
<i>Vitamin supplement</i>	
<i>Seaweed as an insulating material</i>	
<i>Seaweed as a source of energy</i>	

<i>Meat produced at abattoir, eggs, milk sold on farm or in shops</i>	
<i>Hide products</i>	
<i>Cooking fuel or Haulage</i>	Energy from manure: Yirode et al., 2009, Nonmarket co-benefits and economic feasibility of on-farm biogas energy production. Energy policy, 37(3), pp.1170-1179.
<i>Seafood (e.g. mussels)</i>	
<i>Pearls used for adornment</i>	
<i>Energy production</i>	
<i>Berries as food or for the production of jam</i>	Wild food in Europe as an ecosystem survive, both food from wild plants and animals. Schulp et al., 2014, Wild food in Europe: A synthesis of knowledge and data of terrestrial wild food as an ecosystem service. http://www.sciencedirect.com/science/article/pii/S0921800914001980

<i>Roofing material</i>	
<i>Fuel wood</i>	Makungwa et al., 2013, Fuelwood Supply: A Missed Essential Component in a Food Security Equation. http://pubs.sciepub.com/jfs/1/2/6/index.html
<i>Cod liver oil, Venison joint</i>	Deer populations: Knoche and Lupi, 2007, Valuing deer hunting ecosystem services from farm landscapes. http://www.sciencedirect.com/science/article/pii/S0921800907004168
<i>Hide products</i>	
<i>Fuel source</i>	
<i>Wild plant seed for commercial sale</i>	

<p><i>Plant, algae or fungi species with novel characteristics that increase yields or reduce costs by resisting diseases or pests</i></p>	<p>Ford-Lloyd, B.V., Schmidt, M., Armstrong, S.J., Barazani, O., Engels, J., Hadas, R., Hammer, K., Kell, S.P., Kang, D., Khoshbakht, K. and Li, Y., 2011. Crop wild relatives—undervalued, underutilized and under threat?. <i>BioScience</i>, 61 (7), pp.559-565.</p>
<p><i>Creation of artificial gene products</i></p>	
<p><i>Reduced costs of production</i></p>	
<p><i>Animals with novel characteristics that increase yields or reduce costs by resisting diseases or pests</i></p>	
<p><i>Creation of a novel micro-organism to help produce a pharmaceutical product</i></p>	

<i>Sustainable disposal of wastes</i>	
<i>Reduction in respiratory disease</i>	
<i>Reduction in nuisance effect of smells from animal lots</i>	

<p><i>Low noise environment</i></p>	<p>Noise attenuation by trees in urban settings: Fang et al., 2003, Investigation of the noise reduction provided by tree belts. https://www.researchgate.net/publication/222574735_Investigation_of_the_noise_reduction_provided_by_tree_belts</p>
<p><i>Visual amenity</i></p>	
<p><i>Reduction of damage (and associated costs) of sediment input to water courses</i></p>	<p>Reducing water-induced erosion: Frank et al., 2014, Making use of the ecosystem services concept in regional planning - trade-offs from reducing water erosion. http://link.springer.com/article/10.1007/s10980-014-9992-3/fulltext.html</p>
<p><i>Reduction in cost to human lives and physical damage to infrastructure</i></p>	

<p><i>Mitigation of damage as a result of reduced in magnitude and frequency of flood/storm events</i></p>	<p>Regulation of water flows: McCartney et al., 2013, Evaluating the Flow Regulating Functions of Natural Ecosystems in the Zambezi River basin. https://cgspace.cgiar.org/handle/10568/39933</p>
<p><i>Reduction in scale or frequency of damage to crops</i></p>	<p>Hedgerows offering wind breaks in agroecosystems: Burel, 1996, Hedgerows and Their Role in Agricultural Landscapes. http://www.tandfonline.com/doi/abs/10.1080/07352689.1996.10393185</p>
<p><i>Reduction in fire damage costs</i></p>	<p>fuelbreaks: Ruiz-Mirazo, 2011, Two-year evaluation of fuelbreaks grazed by livestock in the wildfire prevention programme in Analusia (Spain).</p>
<p><i>Contribution to yield of fruit crops</i></p>	<p>Seed dispersal in agricultural ecosystems: Benvenuti, 2007, Weed seed movement and dispersal strategies in the agricultural environment. http://onlinelibrary.wiley.com/doi/10.1111/j.1445-6664.2007.00249.x/full, pollinators in agricultural</p>

<p><i>Tree regeneration in parkland</i></p>	<p>Hougner, C., Colding, J. and Söderqvist, T., 2006. Economic valuation of a seed dispersal service in the Stockholm National Urban Park, Sweden. <i>Ecological Economics</i>, 59(3), pp.364-374.</p>
<p><i>Sustainable populations of useful or iconic species that contribute to a service in another ecosystem.</i></p>	<p>Liquete, C., Cid, N., Lanzanova, D., Grizzetti, B. and Reynaud, A., 2016. Perspectives on the link between ecosystem services and biodiversity: The assessment of the nursery function. <i>Ecological Indicators</i>, 63, pp.249-257.</p>
<p><i>Reduction in pest damage to cultivated crop</i></p>	<p>Natural pest control in agricultural land: Steingroever et al., 2012, <i>Designing agricultural landscapes for natural pest control: a transdisciplinary approach in the Hoeksche Waard</i>. http://link.springer.com/article/10.1007%2Fs10980-010-9489-7</p>
<p><i>Reduction in disease damage due to harvested fruit or vegetables</i></p>	<p>Droby, S., 2005, March. Improving quality and safety of fresh fruits and vegetables after harvest by the use of biocontrol agents and natural materials. In <i>International Symposium on Natural Preservatives in Food Systems</i> 709 (pp. 45-52).</p>

<i>Maintenance of soil quality and hence capability of soil for human use.</i>	
<i>Maintenance of soil quality; legumes used to increase/maintain N-levels in soil</i>	
<i>Reduced damage costs nutrient runoff from agroecosystems</i>	water purification mapped and assessed as ecosystem service by MAES et al., 2012, PERR Report No 4. http://www.peer.eu/fileadmin/user_upload/publications/PEER_report_4_phase_2.pdf , Finlay et al., 2012, Human influences on nitrogen removal in lakes.
<i>Health of coral reef and its benefits to people in terms of buffering wave action etc.</i>	Duarte, C.M., 2009. Coastal eutrophication research: a new awareness. <i>Hydrobiologia</i> , 629(1), pp.263-269.
<i>Climate regulation resulting in avoided damage costs Or Mitigation of impacts of ocean acidification</i>	Tranvik et al., 2009, Lakes and reservoirs as regulators of carbon cycling and climate. http://aslo.org/lo/toc/vol_54/issue_6_part_2/2298.pdf ; Storage of carbon in forests: Liski et al., 2006, Carbon accumulation in Finland's forests 1922 - 2004: estimate obtained by combination of forest inventory data with modelling of biomass, litter and soil. http://www.afs-journal.org/articles/forest/pdf/2006/07/f6070.pdf

<p><i>Increased thermal comfort in cities</i></p>	<p>Mitigating heat island effects in cities with urban forests: Rosenzweig et al., 2006, MITIGATING NEW YORK CITY'S HEAT ISLAND WITH URBAN FORESTRY, LIVING ROOFS, AND LIGHT SURFACES. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.543.4848&rep=rep1&type=pdf</p>
<p><i>Recreation, fitness; de-stressing or mental health; nature-based recreation</i></p>	
<p><i>Recreation, fitness; de-stressing or mental health; eco-tourism</i></p>	<p>Species diversity: Lindemann-Matthias et al., 2010, The influence of plant diversity on people's perception and aesthetic appreciation of grassland vegetation. http://www.sciencedirect.com/science/article/pii/S0006320709004406</p>
<p><i>Knowledge about the environment and nature</i></p>	

<i>Skills or knowledge about environmental management</i>	
<i>Tourism, local identify</i>	
<i>Artistic inspiration</i>	
<i>Social cohesion, cultural icon</i>	
<i>Mental well-being</i>	
<i>Nature films</i>	
<i>Mental/Moral well-being</i>	

<i>Moral well-being</i>	
<i>Potable water in public supply system</i>	
<i>Reduced energy costs; glass house cultivation</i>	
<i>HEP</i>	
<i>Tidal power</i>	
<i>Potable water in public supply system; mineral water</i>	
<i>Reduced material costs</i>	
<i>Reduces energy costs</i>	

<i>Dietary value</i>	
<i>Decoration</i>	
<i>Energy production</i>	
<i>Vitamin D</i>	
<i>Health benefit; gems</i>	
<i>Renewable energy source</i>	
<i>Renewable energy source</i>	
<i>Renewable energy source</i>	

<i>Reduction of disposal costs, disposal of wastes</i>	
<i>Reduction of disposal costs, disposal of wastes</i>	
<i>Biogeochemical effects of reduced dissolved silica in estuaries causing shifts in phytoplankton species composition</i>	Humborg, C., Conley, D.J., Rahm, L., Wulff, F., Cociasu, A. and Ittekkot, V., 2000. Silicon retention in river basins: far-reaching effects on biogeochemistry and aquatic food webs in coastal marine environments. <i>AMBIO: A Journal of the Human Environment</i> , 29(1), pp.45-50.
<i>Visual quality</i>	
<i>Reduction in damage costs</i>	
<i>Reduction in damage costs</i>	
<i>Reduction in damage costs</i>	
<i>Human comfort</i>	

<i>Ecotourism</i>	
<i>Recreation</i>	
<i>Identity</i>	
<i>Cultural meaning</i>	

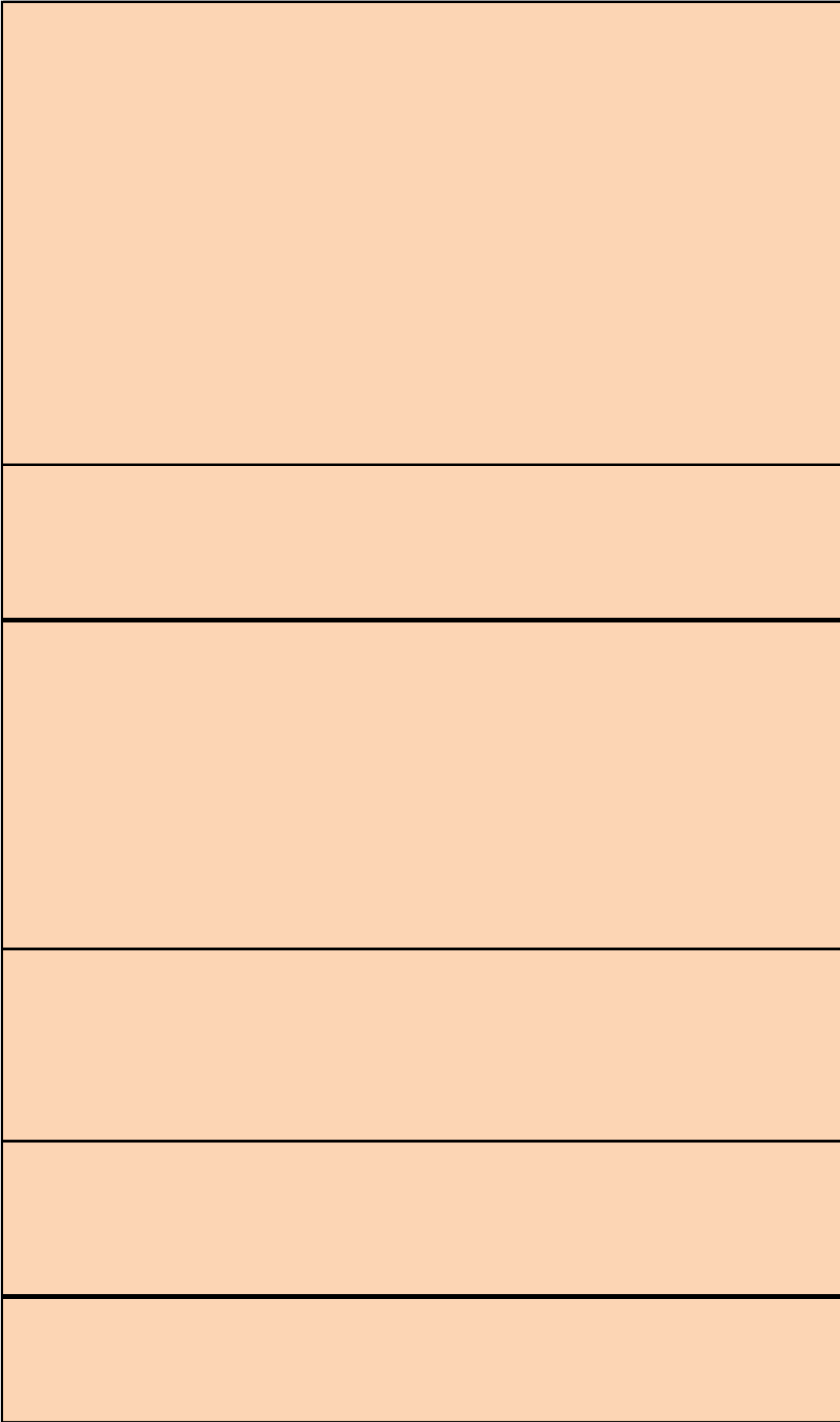


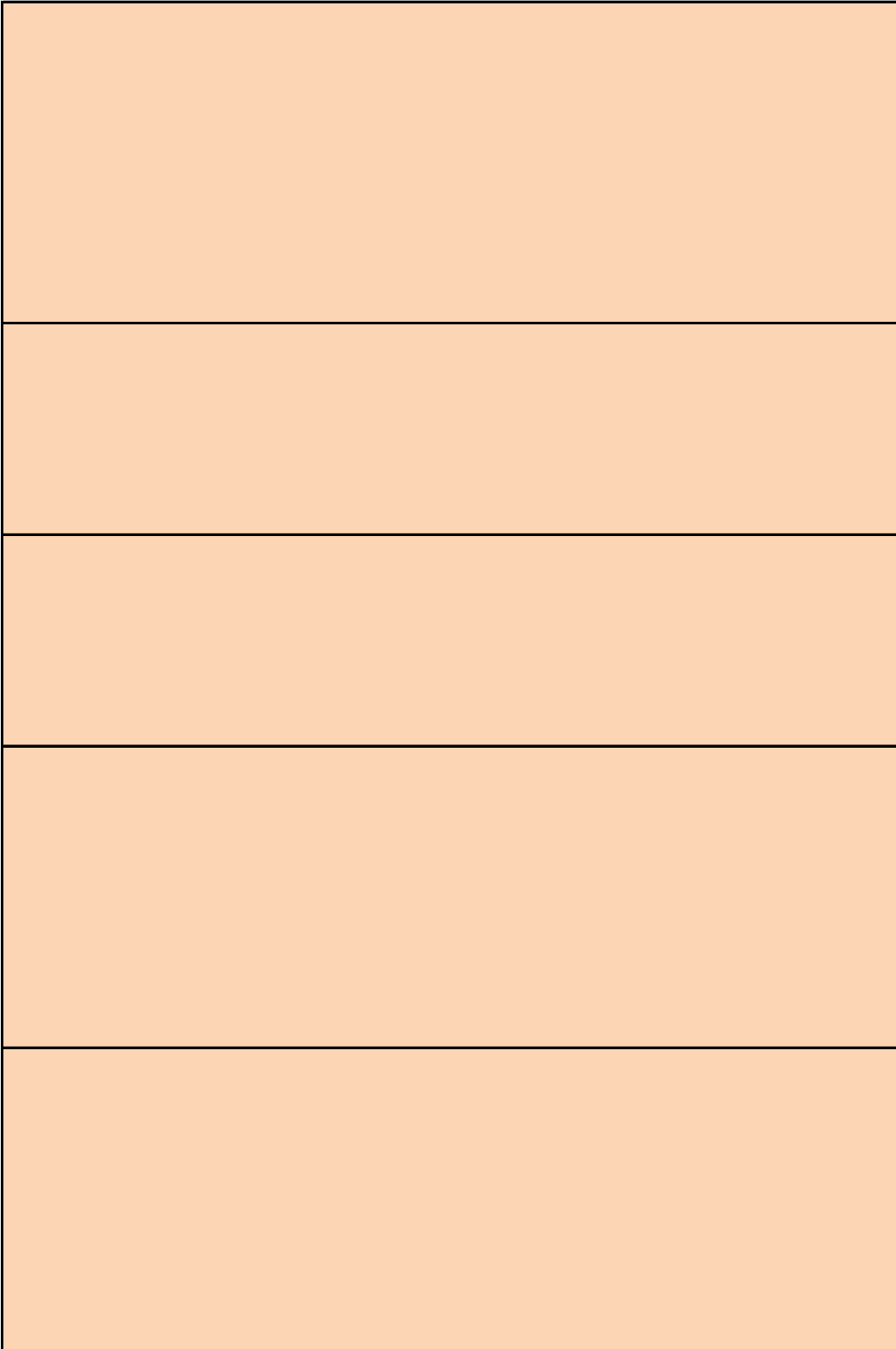
Literature examples for multiple ecosystem services

Maes et al., 2016, Mapping and Assessment of Ecosystems and their Services: This report assesses a variety of ecosystem services across the different sections, such as crop production, water provision, air quality regulation and recreation.

~~https://www.researchgate.net/profile/Jochim_Maes2/publication/~~
forest provisioning services: Kalaba et al., 2013, Contribution of forest provisioning ecosystem services to rural livelihoods in the Mimbo woodlands of Zambia.
<http://link.springer.com/article/10.1007/s11111-013-0189-5>

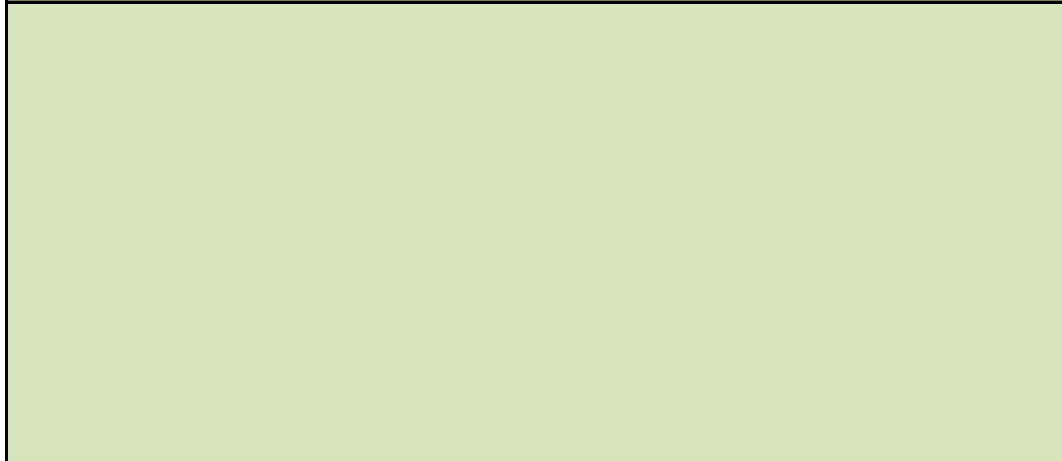
Energy from manure: Yirode et al., 2009, Nonmarket co-benefits and economic feasibility of on-farm biogas energy production

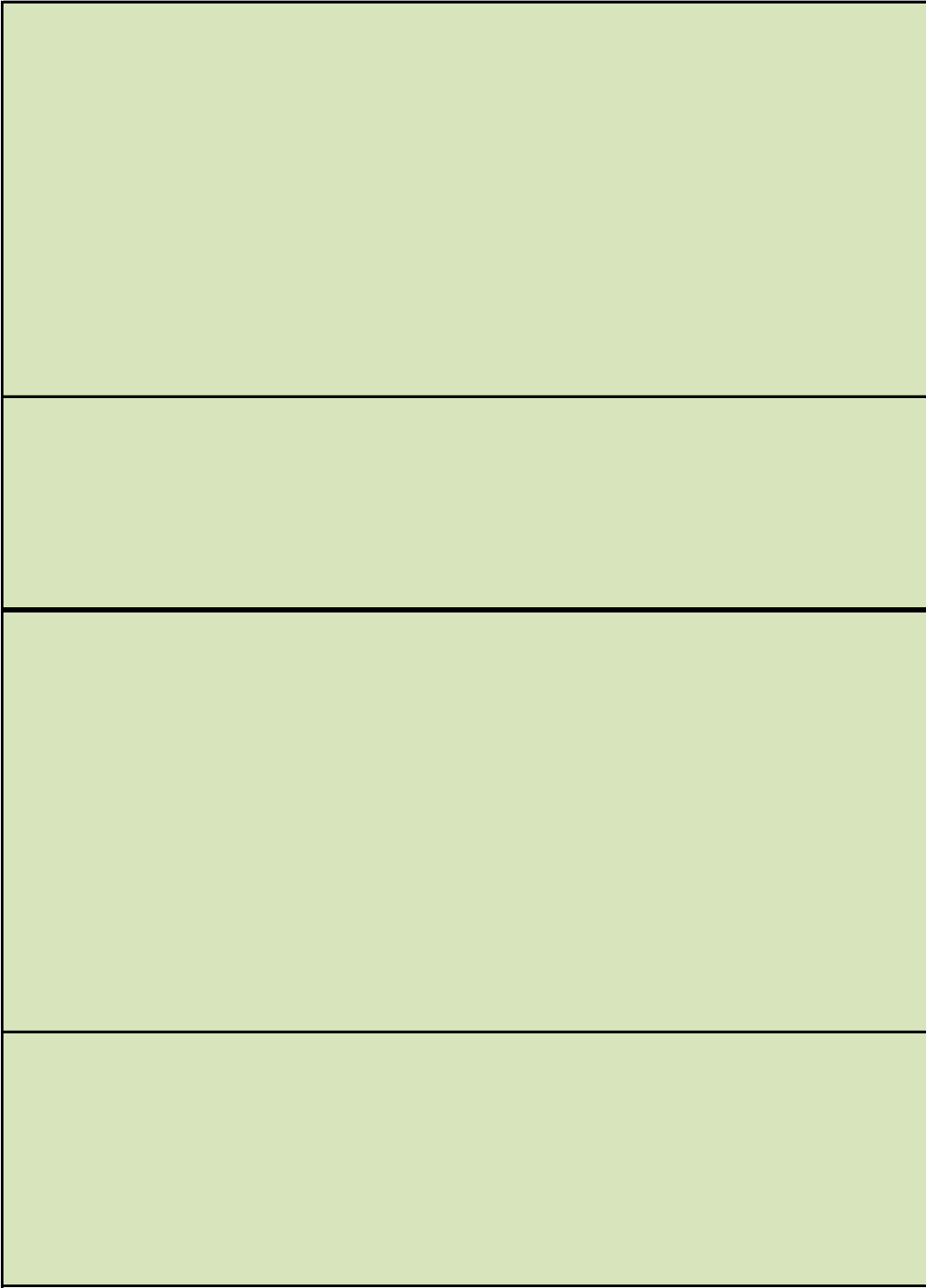


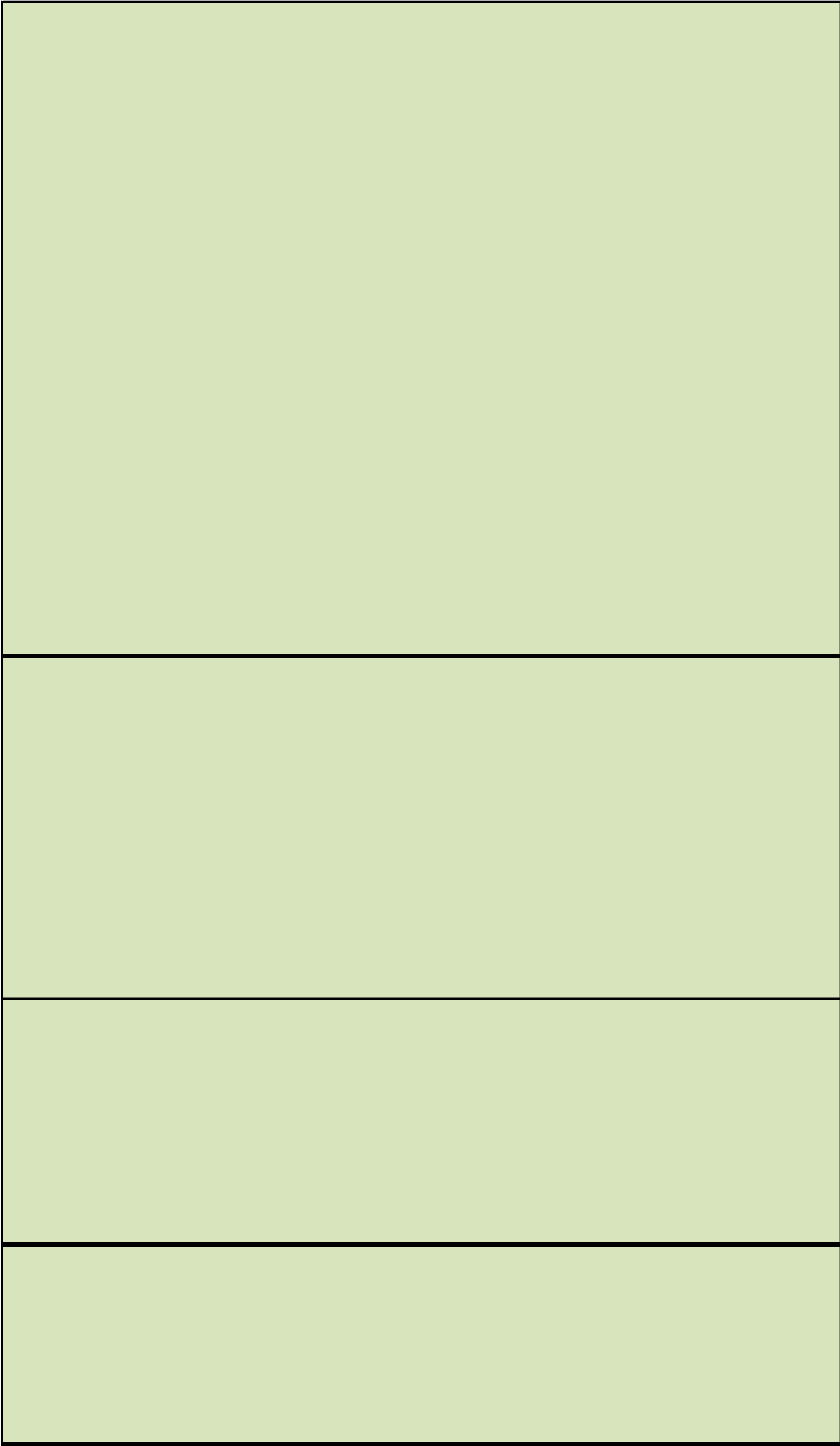




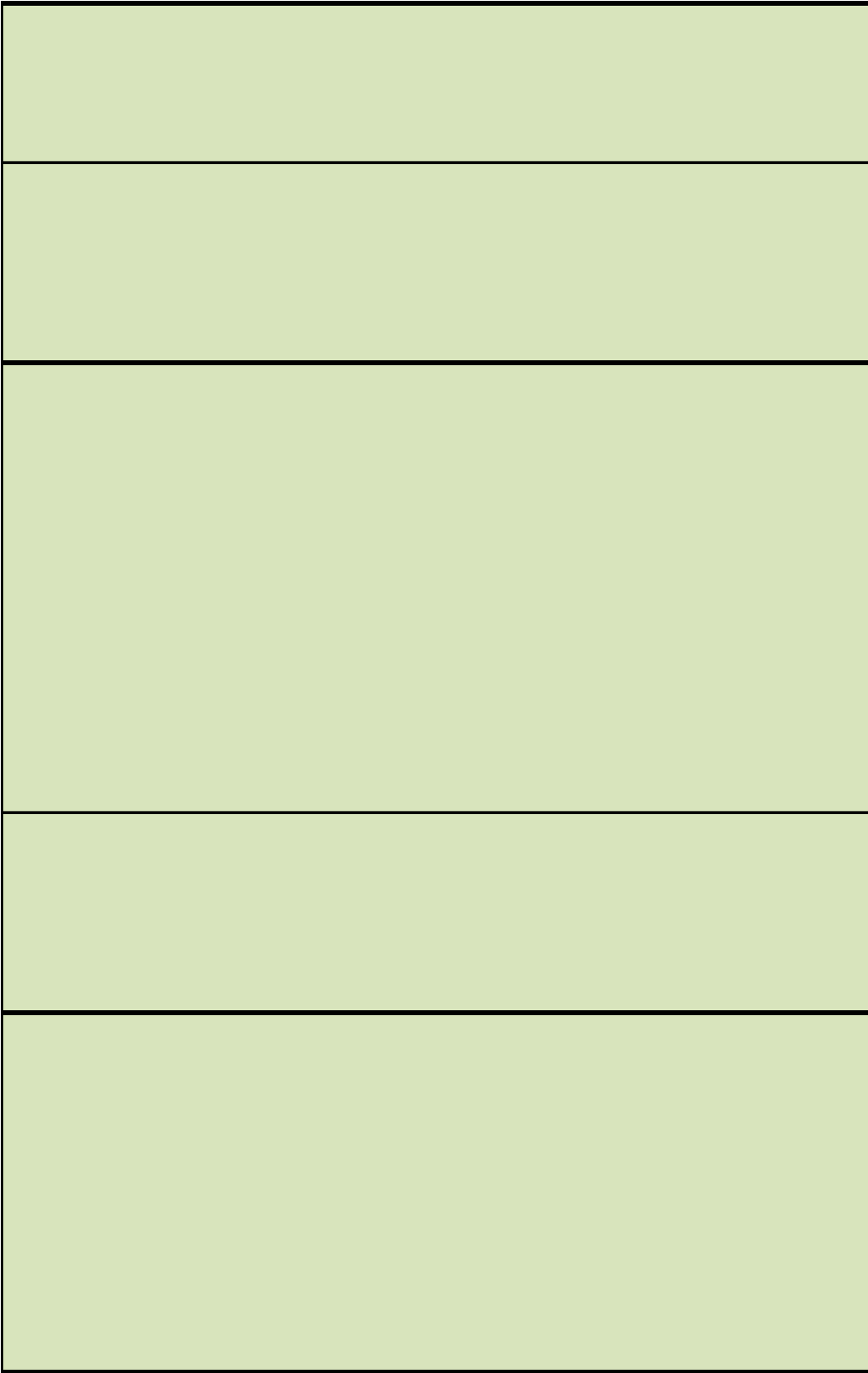
Hinga, K.R. and Batchellor, A., 2005. Waste processing and detoxification. Millennium Ecosystem Assessment Series, Ecosystems and Human Well-being: Current State and Trends Vol, 1.



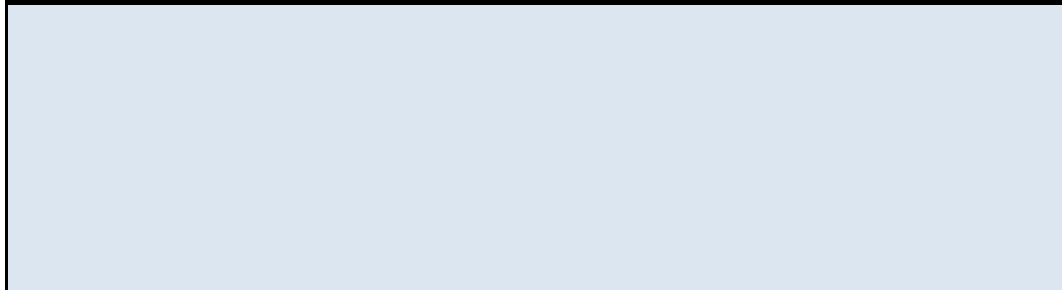
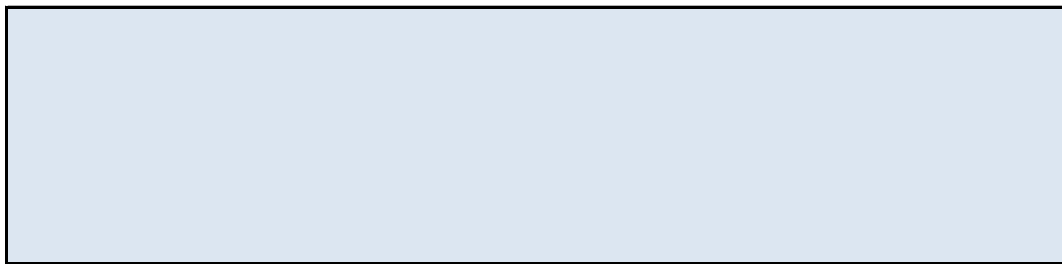






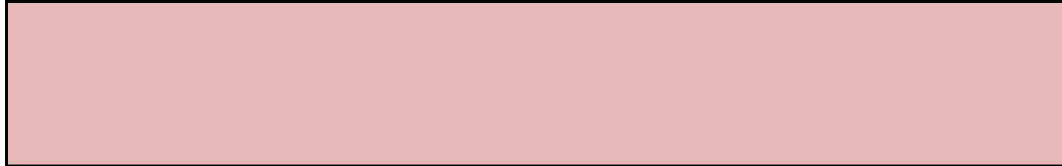






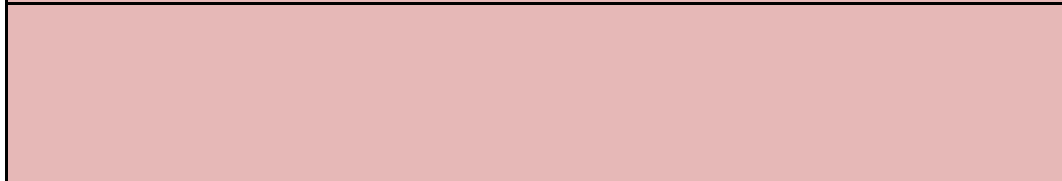
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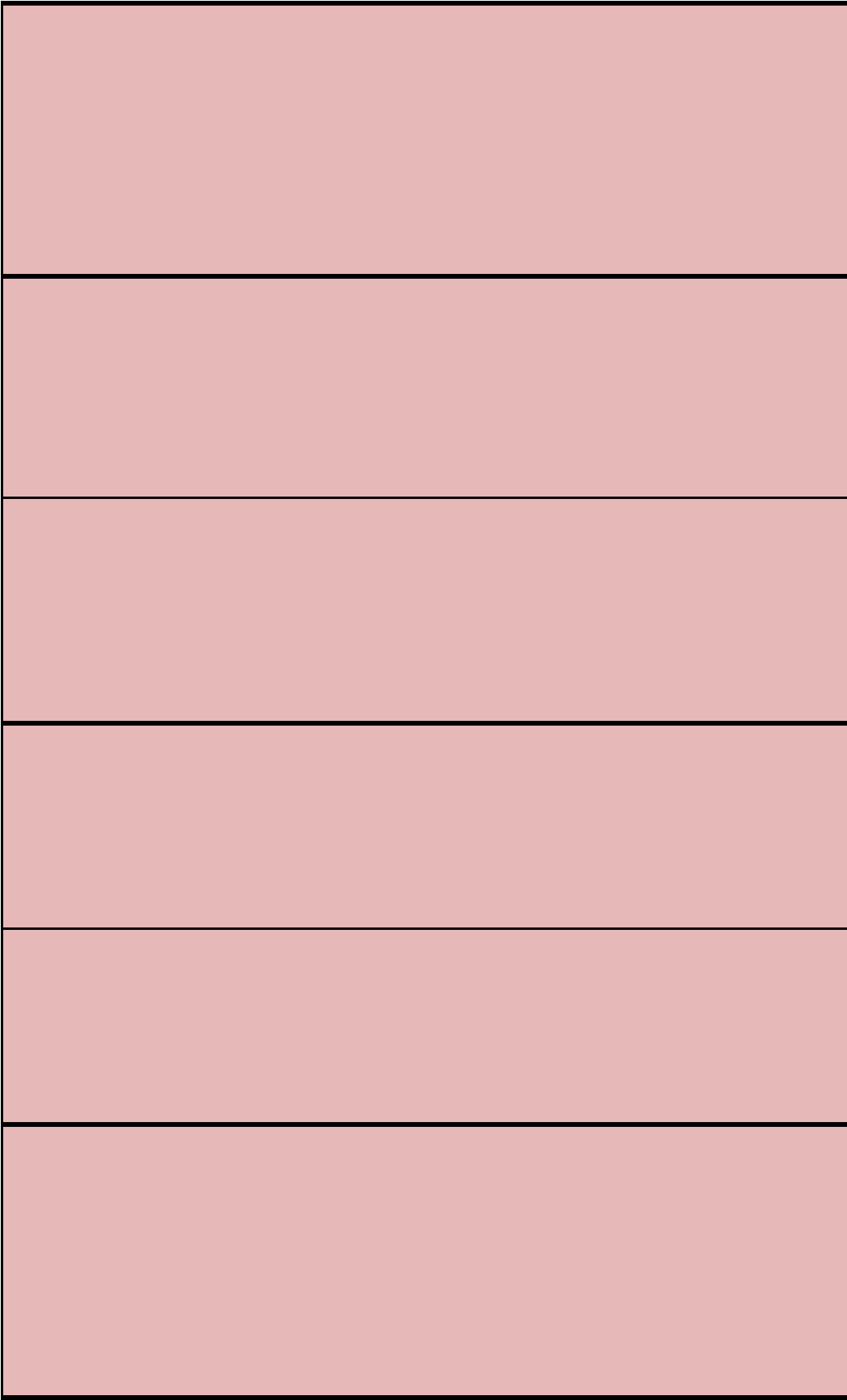
UNEP, 2005, Freshwater ecosystem services.
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<http://www.unep.org/maweb/documents/document.312.aspx.pdf>





Marine CICES (Relevance)	IPBES Code	IPBES Name
0	12	Food and feed
0	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
0	11	Energy
1	12	Food and feed
1	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
1	11	Energy

0	12	Food and feed
0	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
0	11	Energy
1	12	Food and feed
1	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
1	11	Energy
1	12	Food and feed

1	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
1	11	Energy
1	12	Food and feed
1	13, 14	Materials and assistance, Medicinal, biochemical and genetic resources
1	11	Energy
1	1, 13, 14	Habitat creation and maintenance, Materials and assistance, Medicinal,

1	14	Medicinal, biochemical and genetic resources
1	14	Medicinal, biochemical and genetic resources
1	1, 13, 14	Habitat creation and maintenance, Materials and assistance, Medicinal, biochemical and genetic resources
1	14	Medicinal, biochemical and genetic resources
1	14	Medicinal, biochemical and genetic resources

1	-	Not assigned
1	8, 10	Formation, protection and decontamination of soils and sediments, Regulation of organisms detrimental to humans
1	3	Regulation of air quality
1	3	Regulation of air quality

0	9	Regulation of hazards and extreme events
1	9	Regulation of hazards and extreme events
1	8	Formation, protection and decontamination of soils and sediments
1	9	Regulation of hazards and extreme events

1	6	Regulation of freshwater quantity, location and timing
0	9	Regulation of hazards and extreme events
0	13	Materials and assistance
1	2	Pollination and dispersal of seeds and other propagules

1	2	Pollination and dispersal of seeds and other propagules
1	1	Habitat creation and maintenance
1	10	Regulation of organisms detrimental to humans
1	10	Regulation of organisms detrimental to humans

0	8	Formation, protection and decontamination of soils and sediments
1	8	Formation, protection and decontamination of soils and sediments
0	7	Regulation of freshwater and coastal water quality
1	7	Regulation of freshwater and coastal water quality
1	3	Regulation of air quality

1	4	Regulation of climate
1	-	Not assigned
1	6, 16	Regulation of freshwater quantity, location and timing, Physical and psychological experiences
1	6, 16	Regulation of freshwater quantity, location and timing, Physical and psychological experiences
1	6, 15	Regulation of freshwater quantity, location and timing, Learning and inspiration

1	6, 15	Regulation of freshwater quantity, location and timing, Learning and inspiration
1	6, 17	Regulation of freshwater quantity, location and timing, Supporting identities
1	6, 15, 16	Regulation of freshwater quantity, location and timing, Learning and inspiration
1	6, 17	Regulation of freshwater quantity, location and timing, Supporting identities
1	6, 17	Regulation of freshwater quantity, location and timing, Supporting identities
1	6, 13, 17	Regulation of freshwater quantity, location and timing, Materials and assistance
1	6, 18	Regulation of freshwater quantity, location and timing, Maintenance of options

MA	TEEB
Food	Food
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Food	Food
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources

Food	Food
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Food	Food
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Food	Food

Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Food	Food
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Fibre, Timber, Ornamental, Biochemical	Raw materials, medicinal resources
Genetic materials	Genetic materials

Genetic materials	Genetic materials
Genetic materials	Genetic materials
Genetic materials	Genetic materials
Genetic materials	Genetic materials
Genetic materials	Genetic materials

No equivalent	No equivalent
Water purification and water treatment, air quality regulation	Waste treatment (water purification), air quality regulation
Water purification and water treatment, air quality regulation	Waste treatment (water purification), air quality regulation
Water purification and water treatment, air quality regulation	Waste treatment (water purification), air quality regulation

Water purification and water treatment, air quality regulation?	Water purification and water treatment, air quality regulation?
Water purification and water treatment, air quality regulation?	Water purification and water treatment, air quality regulation?
Erosion regulation	Erosion prevention
Erosion regulation	Erosion prevention

Water regulation	Regulation of water flows, regulation of extreme events
Natural hazard regulation	Regulation of water flows, regulation of extreme events
Natural hazard regulation?	Regulation of water flows, regulation of extreme events?
Pollination	Pollination

No equivalent	Biological control
No equivalent	Biological control
Pest regulation	Biological control
Disease regulation	Biological control

Soil formation (supporting service)	Maintenance of soil fertility
Soil formation (supporting service)	Maintenance of soil fertility
Water regulation	Water
Water regulation	Water
Atmospheric regulation	Climate regulation

Atmospheric regulation	Climate regulation
No equivalent	No equivalent
Recreation and ecotourism	Recreation and ecotourism
Recreation and ecotourism	Recreation and ecotourism
Knowledge systems and educational values, cultural diversity, aesthetic values	Information and cognitive development

Knowledge systems and educational values, cultural diversity, aesthetic values	Information and cognitive development
Knowledge systems and educational values, cultural diversity, aesthetic values	Inspiration for culture, art and design, aesthetic information
Knowledge systems and educational values, cultural diversity, aesthetic values	Inspiration for culture, art and design, aesthetic information
Spiritual and religious values	Inspiration for culture, art and design, aesthetic information
Spiritual and religious values	Inspiration for culture, art and design, aesthetic information
Spiritual and religious values	Inspiration for culture, art and design, aesthetic information
No equivalent	No equivalent

Section	Division	Group	Class	Code	Class type	V4.3 Equivalent	Code(4.3)
Provisioning (Biotic)	Biomass	Cultivated terrestrial plants for nutrition, materials or energy	Cultivated terrestrial plants (including fungi, algae) grown for nutritional purposes	1.1.1.1	Crops by amount, type (e.g. cereals, root crops, soft fruit, etc.)	Cultivated crops	1.1.1.1
Provisioning (Biotic)	Biomass	Cultivated terrestrial plants for nutrition, materials or energy	Fibres and other materials from cultivated plants, fungi, algae and bacteria for direct use or processing (excluding genetic materials)	1.1.1.2	Material by amount, type, use, media (land, soil, freshwater, marine)	Fibres and other materials from plants, algae and animals for direct use or processing	1.2.1.1
Provisioning (Biotic)	Biomass	Cultivated terrestrial plants for nutrition, materials or energy	Cultivated plants (including fungi, algae) grown as a source of energy	1.1.1.3	By amount, type, source	Plant-based resources	1.3.1.1
Provisioning (Biotic)	Biomass	Cultivated aquatic plants for nutrition, materials or energy	Plants cultivated by in-situ aquaculture grown for nutritional purposes	1.1.2.1	Plants, algae by amount, type	Plants and algae from in-situ aquaculture	1.1.1.5
Provisioning (Biotic)	Biomass	Cultivated aquatic plants for nutrition, materials or energy	Fibres and other materials from in-situ aquaculture for direct use or processing (excluding genetic materials)	1.1.2.2	Plants, algae by amount, type	Plants and algae from in-situ aquaculture	1.1.1.5
Provisioning (Biotic)	Biomass	Cultivated aquatic plants for nutrition, materials or energy	Plants cultivated by in-situ aquaculture grown as an energy source	1.1.2.3	Plants, algae by amount, type	Plants and algae from in-situ aquaculture	1.1.1.5
Provisioning (Biotic)	Biomass	Reared animals for nutrition, materials or energy	Animals reared for nutritional purposes	1.1.3.1	Animals, products by amount, type (e.g. beef, dairy)	Reared animals and their outputs	1.1.1.2
Provisioning (Biotic)	Biomass	Reared animals for nutrition, materials or energy	Fibres and other materials from reared animals for direct use or processing (excluding genetic materials)	1.1.3.2	Material by amount, type, use, media (land, soil, freshwater, marine)	Materials from plants, algae and animals for agricultural use	1.2.1.2
Provisioning (Biotic)	Biomass	Reared animals for nutrition, materials or energy	Animals reared to provide energy (including mechanical)	1.1.3.3	By amount, type, source	Animal-based resources & Animal-based mechanical energy	1.3.1.2 & 1.3.2.1
Provisioning (Biotic)	Biomass	Reared aquatic animals for nutrition, materials or energy	Animals reared by in-situ aquaculture for nutritional purposes	1.1.4.1	Animals by amount, type	Animals from in-situ aquaculture	1.1.1.6
Provisioning (Biotic)	Biomass	Reared aquatic animals for nutrition, materials or energy	Fibres and other materials from animals grown by in-situ aquaculture for direct use or processing (excluding genetic materials)	1.1.4.2	Animals by amount, type	Animals from in-situ aquaculture	1.1.1.6
Provisioning (Biotic)	Biomass	Reared aquatic animals for nutrition, materials or energy	Animals reared by in-situ aquaculture as an energy source	1.1.4.3	Animals by amount, type	Animals from in-situ aquaculture	1.1.1.6
Provisioning (Biotic)	Biomass	Wild plants (terrestrial and aquatic) for nutrition, materials or energy	Wild plants (terrestrial and aquatic, including fungi, algae) used for nutrition	1.1.5.1	Plants, algae by amount, type	Wild plants, algae and their outputs	1.1.1.3
Provisioning (Biotic)	Biomass	Wild plants (terrestrial and aquatic) for nutrition, materials or energy	Fibres and other materials from wild plants for direct use or processing (excluding genetic materials)	1.1.5.2	Plants, algae by amount, type	Wild plants, algae and their outputs	1.1.1.3
Provisioning (Biotic)	Biomass	Wild plants (terrestrial and aquatic) for nutrition, materials or energy	Wild plants (terrestrial and aquatic, including fungi, algae) used as a source of energy	1.1.5.3	Material by type/source	Not recognised in V4.3	N/A
Provisioning (Biotic)	Biomass	Wild animals (terrestrial and aquatic) for nutrition, materials or energy	Wild animals (terrestrial and aquatic) used for nutritional purposes	1.1.6.1	Animals by amount, type	Wild animals and their outputs	1.1.1.4
Provisioning (Biotic)	Biomass	Wild animals (terrestrial and aquatic) for nutrition, materials or energy	Fibres and other materials from wild animals for direct use or processing (excluding genetic materials)	1.1.6.2	Material by type/source	Not recognised in V4.3	N/A
Provisioning (Biotic)	Biomass	Wild animals (terrestrial and aquatic) for nutrition, materials or energy	Wild animals (terrestrial and aquatic) used as a source of energy	1.1.6.3	By amount, type, source	Not recognised in V4.3	N/A
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from plants, algae or fungi	Seeds, spores and other plant materials collected for maintaining or establishing a population	1.2.1.1	By species or varieties	Not recognised in V4.3	N/A
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from plants, algae or fungi	Higher and lower plants (whole organisms) used to breed new strains or varieties	1.2.1.2	By species or varieties	Genetic materials from all biota	1.2.1.3
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from plants, algae or fungi	Individual genes extracted from higher and lower plants for the design and construction of new biological entities	1.2.1.3	Material by type	Genetic materials from all biota	1.2.1.3
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from animals	Animal material collected for the purposes of maintaining or establishing a population	1.2.2.1	By species or varieties	Not recognised in V4.3	N/A
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from animals	Wild animals (whole organisms) used to breed new strains or varieties	1.2.2.2	By species or varieties	Genetic materials from all biota	1.2.1.3
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from organisms	Individual genes extracted from organisms for the design and construction of new biological entities	1.2.2.3	Material by type	Genetic materials from all biota	1.2.1.3
Provisioning (Biotic)	Other types of provisioning service from biotic sources	Other	Other	1.3.X.X	Use nested codes to allocate other provisioning services from living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Surface water for drinking	4.2.1.1	By amount, type, source	Surface water for drinking	1.1.2.1
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Surface water used as a material (non-drinking purposes)	4.2.1.2	By amount & source	Surface water for non-drinking purposes	1.2.2.1
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Freshwater surface water used as an energy source	4.2.1.3	By amount, type, source	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Coastal and marine water used as energy source	4.2.1.4	By amount, type, source	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground (and subsurface) water for drinking	4.2.2.1	By amount, type, source	Ground water for drinking	1.1.2.2
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground water (and subsurface) used as a material (non-drinking purposes)	4.2.2.2	By amount & source	Ground water as source of energy	1.2.2.2
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground water (and subsurface) used as an energy source	4.2.2.3	By amount & source	Ground water for non-drinking purposes	N/A
Provisioning (Abiotic)	Water	Other aqueous ecosystem outputs	Other	4.2.X.X	Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of wastes or toxic substances of anthropogenic origin by living processes	Bio-remediation by micro-organisms, algae, plants, and animals	2.1.1.1	By type of living system or by waste or subsistence type	Bio-remediation by micro-organisms, algae, plants, and animals	2.1.1.1

Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of wastes or toxic substances of anthropogenic origin by living processes	Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	2.1.1.2	By type of living system, or by water or substance type	Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals And Filtration/sequestration/storage/accumulation by ecosystems	2.1.1.2 & 2.1.2.1
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin	Smell reduction	2.1.2.1	By type of living system	Mediation of smell/noise/visual impacts	2.1.2.3
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin	Noise attenuation	2.1.2.2	By type of living system	Mediation of smell/noise/visual impacts	2.1.2.3
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin	Visual screening	2.1.2.3	By type of living system	Mediation of smell/noise/visual impacts	2.1.2.3
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Control of erosion rates	2.2.1.1	By reduction in risk, area protected	Stabilisation and control of erosion rates	2.2.1.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Buffering and attenuation of mass movement	2.2.1.2	By reduction in risk, area protected	Buffering and attenuation of mass flows	2.2.1.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Hydrological cycle and water flow regulation (Including flood control, and coastal protection)	2.2.1.3	By depth/volumes	Hydrological cycle and water flow maintenance And Flood protection	2.2.2.1 & 2.2.2.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Wind protection	2.2.1.4	By reduction in risk, area protected	Storm protection	2.2.3.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Fire protection	2.2.1.5	By reduction in risk, area protected	Not recognised in V4.3	N/A
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection	Pollination (or 'gamete' dispersal in a marine context)	2.2.2.1	By amount and pollinator	Pollination and seed dispersal	2.3.1.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection	Seed dispersal	2.2.2.2	By amount and dispersal agent	Pollination and seed dispersal	2.3.1.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection	Maintaining nursery populations and habitats (Including gene pool protection)	2.2.2.3	By amount and source	Maintaining nursery populations and habitats	2.3.1.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Pest and disease control	Pest control (including invasive species)	2.2.3.1	By reduction in incidence, risk, area protected by type of living system	Pest control	2.3.2.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Pest and disease control	Disease control	2.2.3.2	By reduction in incidence, risk, area protected by type of living system	Disease control	2.3.2.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of soil quality	Weathering processes and their effect on soil quality	2.2.4.1	By amount/concentration and source	Weathering processes	2.3.3.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of soil quality	Decomposition and fixing processes and their effect on soil quality	2.2.4.2	By amount/concentration and source	Decomposition and fixing processes	2.3.3.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Water conditions	Regulation of the chemical condition of freshwaters by living processes	2.2.5.1	By type of living system	Chemical condition of freshwaters	2.3.4.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Water conditions	Regulation of the chemical condition of salt waters by living processes	2.2.5.2	By type of living system	Chemical condition of salt waters	2.3.4.2
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Atmospheric composition and conditions	Regulation of chemical composition of atmosphere and oceans	2.2.6.1	By contribution of type of living system to amount, concentration or climatic parameter	Global climate regulation by reduction of greenhouse gas concentrations	2.3.5.1
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Atmospheric composition and conditions	Regulation of temperature and humidity, including ventilation and transpiration	2.2.6.2	By contribution of type of living system to amount, concentration or climatic parameter	Micro and regional climate regulation & Ventilation and transpiration	2.3.5.2 & 2.2.3.2
Regulation & Maintenance (Biotic)	Other types of regulation and maintenance service by living processes	Other	Other	2.3.X.X	Use nested codes to allocate other regulating and maintenance services from living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Physical and experiential interactions with natural environment	Characteristics of living systems that enable activities promoting health, recuperation or enjoyment through active or immersive interactions	3.1.1.1	By type of living system or environmental setting	Experiential use of plants, animals and land-/seascapes in different environmental settings	3.1.1.1
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Physical and experiential interactions with natural environment	Characteristics of living systems that enable activities promoting health, recuperation or enjoyment through passive or observational interactions	3.1.1.2	By type of living system or environmental setting	Physical use of land-/seascapes in different environmental settings	3.1.1.2
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Intellectual and representative interactions with natural environment	Characteristics of living systems that enable scientific investigation or the creation of traditional ecological knowledge	3.1.2.1	By type of living system or environmental setting	Scientific	3.1.2.1
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Intellectual and representative interactions with natural environment	Characteristics of living systems that enable education and training	3.1.2.2	By type of living system or environmental setting	Educational	3.1.2.2
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Intellectual and representative interactions with natural environment	Characteristics of living systems that are resonant in terms of culture or heritage	3.1.2.3	By type of living system or environmental setting	Heritage, cultural	3.1.2.3
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Intellectual and representative interactions with natural environment	Characteristics of living systems that enable aesthetic experiences	3.1.2.4	By type of living system or environmental setting	Aesthetic	3.1.2.5
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with natural environment	Elements of living systems that have symbolic meaning	3.2.1.1	By type of living system or environmental setting	Symbolic	3.2.1.1
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with natural environment	Elements of living systems that have sacred or religious meaning	3.2.1.2	By type of living system or environmental setting	Sacred and/or religious	3.2.1.2
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with natural environment	Elements of living systems used for entertainment or representation	3.2.1.3	By type of living system or environmental setting	Entertainment	3.1.2.4
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Other biotic characteristics that have a non-use value	Characteristics or features of living systems that have an existence value	3.2.2.1	By type of living system or environmental setting	Existence	3.2.2.1
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Other biotic characteristics that have a non-use value	Characteristics or features of living systems that have an option or bequest value	3.2.2.2	By type of living system or environmental setting	Bequest	3.2.2.2
Cultural (Biotic)	Other characteristics of living systems that have cultural significance	Other	Other	3.3.X.X	Use nested codes to allocate other cultural services from living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A

Section	Division	Group	Class	Code	Class type	V4.3 Equivalent	Code(4.3)
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Surface water for drinking	4.2.1.1	By amount, type, source	Surface water for drinking	1.1.2.1
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Surface water used as a material (non-drinking purposes)	4.2.1.2	By amount & source	Surface water for non-drinking purposes	1.2.2.1
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Freshwater surface water used as an energy source	4.2.1.3	By amount, type, source	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy	Coastal and marine water used as energy source	4.2.1.4	By amount, type, source	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground (and subsurface) water for drinking	4.2.2.1	By amount, type, source	Ground water for drinking	1.1.2.2
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground water (and subsurface) used as a material (non-drinking purposes)	4.2.2.2	By amount & source	Ground water as source of energy	1.2.2.2
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy	Ground water (and subsurface) used as an energy source	4.2.2.3	By amount & source	Ground water for non-drinking purposes	N/A
Provisioning (Abiotic)	Water	Other aqueous ecosystem outputs	Other	4.2.X.X	Use nested codes to allocate other provisioning services from non-living systems to appropriate	Not recognised in V4.3	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Mineral substances used for nutrition, materials or energy	Mineral substances used for nutritional purposes	4.3.1.1	Amount by type	Minerals	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Mineral substances used for nutrition, materials or energy	Mineral substances used for material purposes	4.3.1.2	Amount by type	Solid	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Mineral substances used for nutrition, materials or energy	Mineral substances used for as an energy source	4.3.1.3	Amount by type	N/A	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy	Non-mineral substances or ecosystem properties used for nutritional purposes	4.3.2.1	Amount by type	Non-mineral	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy	Non-mineral substances used for materials	4.3.2.2	Amount by type	Gas	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy	Wind energy	4.3.2.3	Amount by type	Wind	N/A

Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy	Solar energy	4.3.2.4	Amount by type	Solar	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy	Geothermal	4.3.2.5	Amount by type	Geo-thermal	N/A
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Other mineral or non-mineral substances or ecosystem properties used for nutrition, materials or energy	Other	4.3.2.6	Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of waste, toxics and other nuisances by non-living processes	Dilution by freshwater and marine ecosystems	5.1.1.1	Amount by type	Dilution by atmosphere, freshwater and marine ecosystems	2.1.2.2
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of waste, toxics and other nuisances by non-living processes	Dilution by atmosphere	5.1.1.2	Amount by type	Dilution by atmosphere, freshwater and marine ecosystems	2.1.2.2
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of waste, toxics and other nuisances by non-living processes	Mediation by other chemical or physical means (e.g. via Filtration, sequestration, storage or accumulation)	5.1.1.3	Amount by type	Mediation of waste, toxics and other nuisances, by natural chemical and physical processes	N/A
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin	Mediation of nuisances by abiotic structures or processes	5.1.2.1	Amount by type	Not recognised in V4.3	N/A
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Mass flows	5.2.1.1	Amount by type	Mediation of flows by natural abiotic structures	N/A
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Liquid flows	5.2.1.2	Amount by type	Not recognised in V4.3	N/A
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Gaseous flows	5.2.1.3	Amount by type	Not recognised in V4.3	N/A
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Maintenance of physical, chemical, abiotic conditions	Maintenance and regulation by inorganic natural chemical and physical processes	5.2.2.1	Amount by type	Maintenance of physical, chemical, abiotic conditions	N/A
Regulation & Maintenance (Abiotic)	Other type of regulation and maintenance service by abiotic processes	Other	Other	5.3.X.X	Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A
Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting	Physical and experiential interactions with natural abiotic components of the environment	Natural, abiotic characteristics of nature that enable active or passive physical and experiential interactions	6.1.1.1	Amount by type	Not recognised in V4.3	N/A

Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting	Intellectual and representative interactions with abiotic components of the natural environment	Natural, abiotic characteristics of nature that enable intellectual interactions	6.1.2.1	Amount by type	Not recognised in V4.3	N/A
Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with the abiotic components of the natural environment	Natural, abiotic characteristics of nature that enable spiritual, symbolic and other interactions	6.2.1.1	Amount by type	Not recognised in V4.3	N/A
Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting	Other abiotic characteristics that have a non-use value	Natural, abiotic characteristics or features of nature that have either an existence, option or bequest value	6.2.2.1	Amount by type	Not recognised in V4.3	N/A
Cultural (Abiotic)	Other abiotic characteristics of nature that have cultural significance	Other	Other	6.3.X.X	Use nested codes to allocate other provisioning services from non-living systems to appropriate Groups and Classes	Not recognised in V4.3	N/A