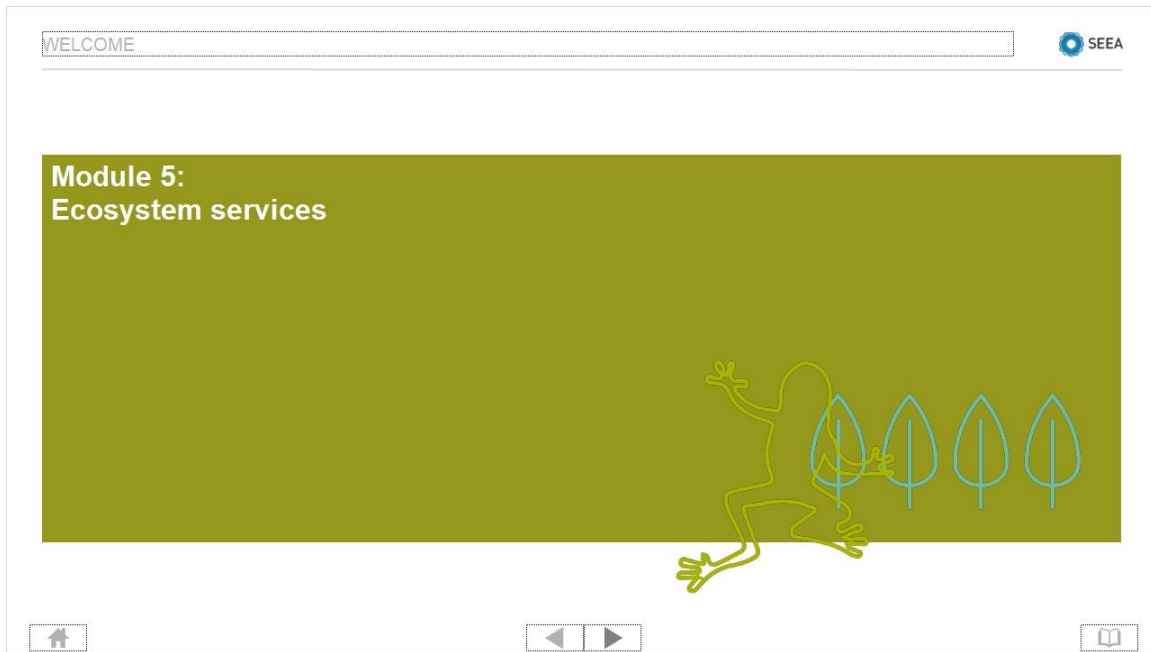


## 1. Module 1 - Introduction


### 1.1 Welcome



Notes:

## 1.2 Module units

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### Module units

The Ecosystem Services Module will take you through four units, as listed below. We recommend completing these units in order.

**Unit 1:  
Ecosystem Services Account**

- What is it?
- Why do we need it?
- What does it look like?
- Expertise and data required.

**Unit 2:  
Compilers**




- Main Ecosystem Services accounting concepts and the basics for compiling service supply accounts.

**Unit 3:  
Data sources**

- Data sources
- Examples


**Unit 4:  
Review**

- Quiz
- Summary



## 1.3 Module objectives

MODULE 5: ECOSYSTEM SERVICES, UNIT 1: ECOSYSTEM SERVICES ACCOUNT

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### Module objectives

After completing this SEEA – Accounting for Flows of Ecosystem Services module, you will be able to:




Understand why accounting for ecosystem services is important.

Understand the basics of the "ecosystem services cascade" and its components.

Contextualize the treatment of service supplies in the SEEA, including basic concepts and the structure of the accounts that include services.

Follow the steps to compile a "service supply account".

Understand the data options and sources for accounting for ecosystem services.



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## 1.4 What is Accounting for Flows of Ecosystem Services?

### What is accounting for flows of ecosystem services?

Accounting for flows of ecosystem services is a way to provide detailed data on physical and monetary flows of “final” ecosystem services from ecosystems to beneficiaries.

We can apply valuation techniques to the flow of these ecosystem services to derive monetary measures; but in this module we restrict ourselves to accounting for ecosystem services in physical terms. In addition to final ecosystem services, there are intermediate ecosystem services i.e. flows within or between ecosystems such as a spawning ground provided by a mangrove forest for fisheries.

Final ecosystem services are directly used by (or affect) people.



## 1.5 Importance of Accounting for Flows of Ecosystem Services

### Importance of accounting for flows of ecosystem services

Creating ecosystem services accounts is important because the flows of ecosystem services plays a vital role in the environment and the economy.

Ecosystem services accounts can be created for the following purposes:

- To inform policies that affect ecosystems' contributions to human well-being
- To assess trade-offs between development and conservation
- To link to standard economic production measures in SNA
- To link to other **SEEA EEA** accounts (condition, services use, monetary asset valuation)
- To assess trade-offs between the use of different ecosystem services within one basket of ecosystem services
- To inform land use planning
- As indicators:
  - Flows of individual services (physical and monetary)
  - Indices of aggregated services by ecosystem type



## 1.6 Accounting for Flows of Ecosystem Services Representation

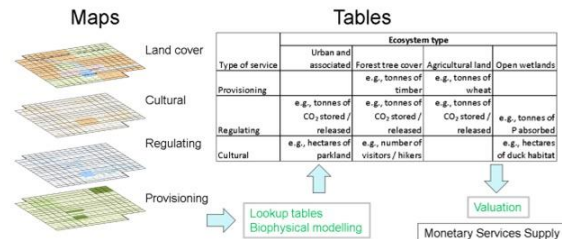
### Accounting for flows of ecosystem services

What does a services supply account look like?

Various types of ecosystem services flows can be represented using maps and tables that contain spatially-detailed information from field studies, and biophysical modelling. Some services can be estimated using reference values from lookup tables.

In a complete account, for each ecosystem type (e.g., urban, forest tree cover, agriculture, open wetlands), it is specified what type of services they provide (e.g., provisioning, regulating, cultural).

Take a look at the table and see how the information is integrated when creating such accounts.



## 1.7 Accounting for Flows of Ecosystem Services Representation

### Accounting for flows of ecosystem services representation

Example (services supply in physical units)

This is a real-life example based on the first part (physical supply and condition accounts) of an ecosystem accounting report for the Limburg province of the Netherlands (Remme et al. 2014).

Click on the highlighted figures to learn more about the ecosystem types.

Ecosystem service		Ecosystem Type									Provincial total
		Units	Urban	Pasture	Cropland	Forest	Heath	Peat	Surface Water	Other nature	
Provisioning	Hunting	kg meat	-	9,100	14,732	8,196	678	70	-	1,513	34,193
	Drinking water extraction	10 <sup>3</sup> m <sup>3</sup> water	4,071	7,026	11,227	3,117	214	-	478	862	26,995
	Crop production	10 <sup>3</sup> kg produce	-	-	1,868	-	-	-	-	-	1,868
	Fodder production	10 <sup>3</sup> kg dry matter	-	533	251	-	-	-	-	-	784
	Air quality regulation	10 <sup>3</sup> kg PM <sub>10</sub>	272	404	737	700	45	7	40	69	2,254
Regulation	Carbon sequestration	10 <sup>3</sup> kg carbon	675	8,019	273	50,064	393	149	-	1,056	61,429
	Recreational cycling	10 <sup>3</sup> trips	2,690	1,863	2,611	1,565	30	3	139	220	9,121

## Explanation 1 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 1: ECOSYSTEM SERVICES ACCOUNT

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SEEA

### Accounting for flows of ecosystem services representation





**Example (services supply in physical units)**

This is a real-life example based on the first part (physical supply and condition accounts) of an ecosystem accounting report for the Limburg province of the Netherlands (Remme et al. 2014).

**Click on the highlighted figures to learn more about the ecosystem types.**

Ecosystem service	Units	Ecosystem Type								Provincial total
		Urban	Pasture	Cropland	Forest	Heath	Peat	Surface Water	Other nature	
Hunting	kg meat	-	9,100	14,732	8,100	678	70	-	1,513	34,193
Drinking water extraction	10 <sup>3</sup> m <sup>3</sup> water	4,071	7,026	11,227	3,117	214	-	478	862	26,995
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Fodder production	10 <sup>3</sup> kg dry matter	-	533	251	-	-	-	-	-	784
Air quality regulation	10 <sup>3</sup> kg PM <sub>10</sub>	272	404	737	700	45	7	40	69	2,254
Carbon sequestration	10 <sup>6</sup> kg carbon	875	8,019	273	50,664	393	149	-	1,056	61,429
Recreational cycling	10 <sup>3</sup> trips	2,690	1,019	11	1,565	30	3	139	220	6,121

Each ecosystem type provides multiple services, and that these services may be represented in different units. Note that the cropland, forest and heathland are providing a majority of the services measured.



## 1.8 Module units

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### Module units

The Ecosystem Services Module will take you through four units, as listed below. We recommend completing these units in order.

**Unit 1:  
Ecosystem Services Account**

- What is it?
- Why do we need it?
- What does it look like?
- Expertise and data required.

**Unit 2:  
Compilers**





- Main Ecosystem Services accounting concepts and the basics for compiling service supply accounts.

**Unit 3:  
Data providers**

- Data sources
- Examples.

**Unit 4:  
Review**

- Quiz
- Summary





## 1.9 Unit 2

### Flows of ecosystem services– compilers

In this unit, we'll learn the concepts of accounting for flows of ecosystem services and the basics for compiling the services supply accounts.

But first, why should we concern ourselves with services supply accounts? Well, ecosystems provide **services** that are essential to the economy and human activities.

[Click here](#) to see some examples of these services.

Further, services supply accounts help us understand if the ecosystems are being converted and/or degraded by answering questions like:

- Which ones are most important to conserve?
- How can they be managed optimally to maintain services?

In addition, these accounts can be linked with national planning and accounting to ensure ecosystems are taken into account in the decision-making process.



### Explanation 1 (Slide Layer)

### Flows of ecosystem services– compilers

In this unit, we'll learn the concepts of accounting for flows of ecosystem services and the basics for compiling the services supply accounts.

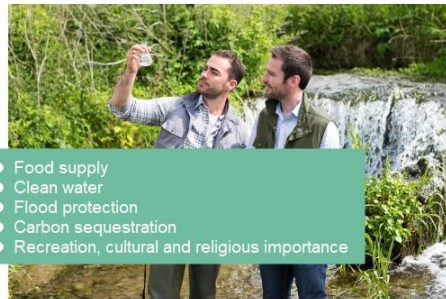
But first, why should we concern ourselves with services supply accounts? Well, ecosystems provide **services** that are essential to the economy and human activities.

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Further, services supply accounts help us understand if the ecosystems are being converted and/or degraded by answering questions like:

- Which ones are most important to conserve?
- How can they be managed optimally to maintain services?

In addition, these accounts can be linked with national planning and accounting to ensure ecosystems are taken into account in the decision-making process.



## 1.10 The Ecosystem Services Cascade

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SEEA


### The ecosystem services cascade





People depend on ecosystems for food, clean water, flood protection, and much more. We generally think of ecosystems as separate from their services and the value we place on them. It's nice to have a forest near our home and to enjoy the wildlife. However, the forest is also important for flood protection, water purification, wild game, pollution regulation, carbon sequestration, wind regulation, etc.

Thus, the **ecosystem services cascade** is designed to analyze each ecosystem type in a way that enables us to understand, measure, and research their services.

After all, ecosystem services are how ecosystems contribute to benefits for people.

**Let's move on and learn more about the ecosystem services cascade.**





## 1.11 The Ecosystem Services Cascade

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### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the **biophysical structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).


**To see the other components, keep clicking on the fields until you close the circle.**

Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)



## Function (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).




To see the other components, keep clicking on the fields until you close the circle.

**Biophysical structure or process**  
(e.g. woodland habitat or net primary productivity)

→


**Function**  
(e.g. slow passage of water, or biomass)

**Support ecosystem function**  
(i.e. growth of biomass), which generates ecosystem services.



## Service (Slide Layer)

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### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).

To see the other components, keep clicking on the fields until you close the circle.

**Biophysical structure or process**  
(e.g. woodland habitat or net primary productivity)




→

**Function**  
(e.g. slow passage of water, or biomass)

→

**Service**  
(e.g. flood protection, or harvestable products)

**Services provided by the ecosystem, when used (and when we apply capital and labor)**





## Benefit (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).

To see the other components, keep clicking on the fields until you close the circle.

When the services are used, they generate benefits.

```
graph LR; A["Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)"] --> B["Function  
(e.g. slow passage of water, or biomass)"]; B --> C["Service  
(e.g. flood protection, or harvestable products)"]; C --> D["Benefit  
(e.g. contribution to aspects of well-being such as health and safety)"];
```

Navigation icons: Home, Previous, Next, and a small book icon.

## Value (Slide Layer)

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SEEA

### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).

To see the other components, keep clicking on the fields until you close the circle.

The benefits generated can be valued.

```
graph LR; A["Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)"] --> B["Function  
(e.g. slow passage of water, or biomass)"]; B --> C["Service  
(e.g. flood protection, or harvestable products)"]; C --> D["Benefit  
(e.g. contribution to aspects of well-being such as health and safety)"]; D --> E["Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)"];
```

Navigation icons: Home, Previous, Next, and a small book icon.

## Pressures (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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SEEA

### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).

To see the other components, keep clicking on the fields until you close the circle.

The use of these services for generating benefits, in turn, puts **pressure** on biophysical structures and processes (e.g., by degradation or conversion).

```
graph LR; Pressures[Pressures] --> Biophysical[Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)]; Biophysical --> Function[Function  
(e.g. slow passage of water, or biomass)]; Function --> Service[Service  
(e.g. flood protection, or harvestable products)]; Service --> Benefit[Benefit  
(e.g. contribution to aspects of well-being such as health and safety)]; Benefit --> Value[Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)]; Value --> Pressures;
```

Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)

Function  
(e.g. slow passage of water, or biomass)

Service  
(e.g. flood protection, or harvestable products)

Benefit  
(e.g. contribution to aspects of well-being such as health and safety)

Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)

Pressures

## Kommentar ausblenden (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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SEEA

### The ecosystem services cascade

There are several components that the ecosystem services cascade addresses. The first component encompasses the biophysical **structures** (e.g., forests and wetlands) and **processes** (e.g., photosynthesis and competition).

To see the other components, keep clicking on the fields until you close the circle.

```
graph LR; Pressures[Pressures] --> Biophysical[Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)]; Biophysical --> Function[Function  
(e.g. slow passage of water, or biomass)]; Function --> Service[Service  
(e.g. flood protection, or harvestable products)]; Service --> Benefit[Benefit  
(e.g. contribution to aspects of well-being such as health and safety)]; Benefit --> Value[Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)]; Value --> Pressures;
```

Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)

Function  
(e.g. slow passage of water, or biomass)

Service  
(e.g. flood protection, or harvestable products)

Benefit  
(e.g. contribution to aspects of well-being such as health and safety)

Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)

Pressures

## 1.12 The Ecosystem Services Cascade

### The ecosystem services cascade

Great! You have closed the ecosystem services cascade.

The components of the cascade are also often studied individually. For example, ecologists focus on processes and functions. Ecological economists will use the ecological information to study the services provided by ecosystems. Economists and sociologists are more interested in the benefits and values we assign to the services. The cascade model is a format in which these sciences can converge.

One last point, the ecosystem services cascade also helps us separate out measurements and work with experts in different areas of science and policy.



Source: Adapted from Haines-Young and Potschin, 2010.

## 1.13 Ecosystem Services

### Ecosystem services

We pointed out earlier that ecosystem services are defined as contribution ecosystems provide to benefits for people. Ecosystem services are not to be equated with benefits, as is done in some other studies, as the generation of benefits usually requires also capital and labour.

So, how should we measure the ecosystem's contribution?


We need to calculate all the contributions from ecosystems, for example: **the crops = contributions of nature, equipment, inputs, labour, energy, etc.** As part of its contributions, nature provides biomass growth, nutrients, water, flood control, and pollination. Without these, there would be no crops.

In the services supply account, we **measure the physical services** (e.g., the addition to biomass of the crop) as this is our goal in this module.



## 1.14 Ecosystem Services Types

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### Ecosystem services types

According to the Common International Classification of Ecosystem Services (CICES) there are three main types of ecosystem services. Each needs to be treated differently.  
They are:


- provisioning services
- regulating services
- cultural services

Click on each type of services to learn more.



### Explanation 1 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS





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### Ecosystem services types

According to the Common International Classification of Ecosystem Services (CICES) there are three main types of ecosystem services. Each needs to be treated differently.  
They are:

- provisioning services
- regulating services
- cultural services


Click on each type of services to learn more.



Provisioning services are the goods that can be harvested, or extracted, from ecosystems.  
Example: providing fish for fisheries, or providing wood for timber harvest

## Explanation 2 (Slide Layer)

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### Ecosystem services types

According to the Common International Classification of Ecosystem Services (CICES) there are three main types of ecosystem services. Each needs to be treated differently.  
They are:

- provisioning services
- regulating services
- cultural services


Regulating services are the regulation of climate, hydrological, ecological, and soil processes.  
Examples: pollination, carbon sequestration, flood control.

Click on each type of services to learn more.



## Explanation 3 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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### Ecosystem services types

According to the Common International Classification of Ecosystem Services (CICES) there are three main types of ecosystem services. Each needs to be treated differently.  
They are:

- provisioning services
- regulating services
- cultural services

Cultural services are the nonmaterial benefits provided by ecosystems.  
Example: recreation, tourism, providing a setting for cultural or religious practices.

Click on each type of services to learn more.





## 1.15 Ecosystem Services - Maps

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SEEA

### Ecosystem services – maps

Different ecosystems generate different services. Therefore, it is important to include spatial detail and a good classification of ecosystem types.

Click on each ecosystem type in the map below to learn about their services.

Forest

Intensive cropland

Extensive pasture

Show recreation and tourism area

### Explanation 1 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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SEEA

### Ecosystem services – maps

Different ecosystems generate different services. Therefore, it is important to include spatial detail and a good classification of ecosystem types.

Click on each ecosystem type in the map below to learn about their services.

Forest

Intensive cropland


Extensive pasture

Wood production, hydrological function, carbon sequestration

Show recreation and tourism area

## Explanation 2 (Slide Layer)

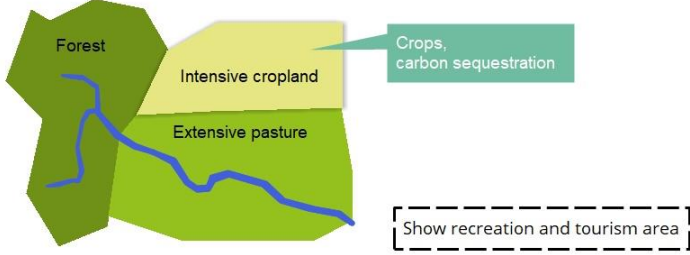
MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS





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### Ecosystem services – maps

Different ecosystems generate different services. Therefore, it is important to include spatial detail and a good classification of ecosystem types.


Click on each ecosystem type in the map below to learn about their services.





## Explanation 3 (Slide Layer)

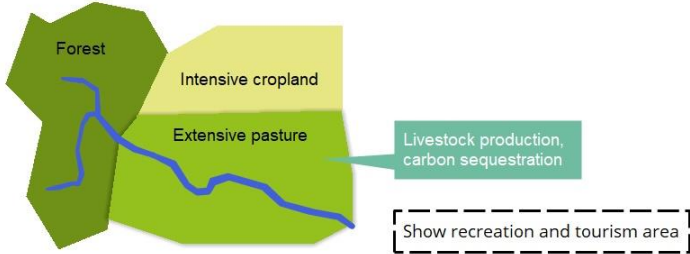
MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS





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### Ecosystem services – maps

Different ecosystems generate different services. Therefore, it is important to include spatial detail and a good classification of ecosystem types.

Click on each ecosystem type in the map below to learn about their services.





## Explanation 4 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

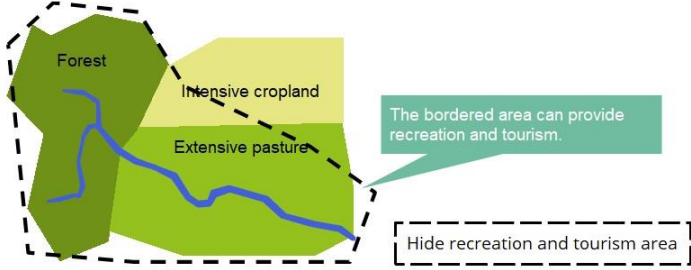
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SEEA

### Ecosystem services – maps

Different ecosystems generate different services. Therefore, it is important to include spatial detail and a good classification of ecosystem types.

Click on each ecosystem type in the map below to learn about their services.





## 1.16 Ecosystem Services - Final Services

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### Ecosystem services – final services

The **SEEA EEA** focuses on 'final' services from ecosystems, which is the point before human involvement transforms the services to benefits. Such as: adding biomass then harvesting, or farming fish before capturing.

It's important to note that the ecosystem processes and functions are not final services (e.g., reproduction, predation, food web, nutrient cycle, etc.)

The **biodiversity** itself is also not a 'final' service. It is an aspect of ecosystem condition and recorded in the biodiversity account. We can use individual species and these species can depend on others. However, the diversity of these species is usually considered an ecosystem condition.





## 1.17 Ecosystem Services - Classifications

### Ecosystem services – classifications

Ecosystem services can be classified based on different classification systems. The three most commonly used classifications for ecosystem accounting are:

- **Common International Classification of Ecosystem Services (CICES)**
  - Developed by the European Environment Agency
  - ‘Multi-purpose classification’ of potential final ecosystem services for accounting and assessment. Hierarchical, developed on basis of MA ESS categories.
- **Final Ecosystem Goods and Services Classification System (FEGS-CS)**
  - Developed by the US Environmental Protection Agency
  - Classification system focused on final ecosystem goods and services (FEGS) for measuring stocks. Explicitly links ecosystem services to an environmental type and a defined beneficiary.
- **National Ecosystem Services Classification System (NESCS)**
  - Developed by the US Environmental Protection Agency
  - Classifies the flows of final ecosystem services from environmental types to economic uses and users.



## 1.18 Ecosystem Services - Classifications

### Ecosystem services – measures

There are different methods for measuring ecosystem services.

We can measure the services directly through surveys or field studies (e.g., socio-economic survey on recreational use, field survey of available fish)

Or, we can use biophysical modelling with:

- **Lookup tables:** Take values from another location
- **Statistical approaches:** Estimate based on known explanatory variables
- **Geostatistical interpolation:** Estimate from known locations nearby
- **Process-based modelling:** use of models such as Invest, Aries, or SWAT, to model individual services based on a range of spatially explicit data sources

In the next few slides, we will go through an exercise to compile the services supply account.



## 1.19 Services Supply Account Exercise

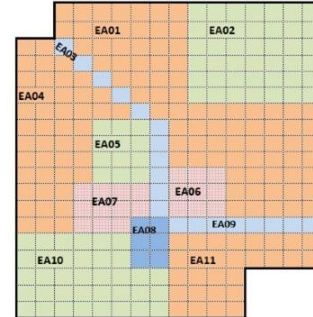
### Services supply account exercise

Let's go further into compiling a **services supply account** by using the services supply data as shown in the table below. The table contains information about the different ecosystem types in each Ecosystem Accounting Area (EAA). A map of the various ecosystem assets is shown to the right.

The main goal of this exercise is to calculate missing services, calculate totals, and discuss the results as highlighted in yellow.

Services Supply Database

		(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
	Extent (ha)	tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3				20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0				5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
<b>Total</b>	<b>1,800.0</b>					



## 1.20 Services Supply Account Exercise

### Services supply account exercise

The first step is to calculate the missing services values (i.e., crop, recreation, and water) for the different ecosystem assets (EAs) 4, 5, 9, 10 and 11.

The unknown services values are calculated by using the values for the EAs of the **same ecosystem type (ET)**. Before doing the maths, check the examples below.

**Click on the highlighted boxes to see two calculations examples.**

Services Supply Database

		(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
	Extent (ha)	tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
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EA04 = Herbaceous crops	281.3				20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0				5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
<b>Total</b>	<b>1,800.0</b>					



## Example 1 (Slide Layer)

### Services supply account exercise

The first step is to calculate the missing services values (i.e., crop, recreation, and water) for the different ecosystem assets (EAs) 4, 5, 9, 10 and 11.

The unknown services values are calculated by using the values for the EAs of the same ecosystem type (ET). Before doing the maths, check the examples below.

Click on the highlighted boxes to see two calculations examples.

Services Supply Database

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m3/year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3	10,518.8			20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0				5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

For example: Crop for EA04

EA01 is of the same type (i.e., herbaceous crops), thus  
 $(\text{EA01 Services value} / \text{EA01 Extent}) * \text{EA04 Extent} =$   
 $(18,700 \text{ tonnes/yr} / 500 \text{ ha}) * 281.3 \text{ ha} =$   
 $= 10,518.8 \text{ tonnes/yr}$

## Example 2 (Slide Layer)

### Services supply account exercise

The first step is to calculate the missing services values (i.e., crop, recreation, and water) for the different ecosystem assets (EAs) 4, 5, 9, 10 and 11.

The unknown services values are calculated by using the values for the EAs of the same ecosystem type (ET). Before doing the maths, check the examples below.

Click on the highlighted boxes to see two calculations examples.

Services Supply Database

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m3/year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3				20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

For example: Recreation for EA09

EA03 is of the same type (i.e., inland water bodies), thus  
 $(\text{EA03 Services value} / \text{EA03 Extent}) * \text{EA09 Extent} =$   
 $(1,600 \text{ trips/yr} / 68.8 \text{ ha}) * 50 \text{ ha} =$   
 $= 1,163.6 \text{ trips/yr}$

## 1.21 Services Supply Account Exercise

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (lookup table) (S – Carbon Sequestration) for each EA (01 – 11).

You need to multiply the **extent (ha)** of each EA with its **sequestration (tonnes/ha/yr)** value.

Click on a highlighted box to see a calculation example.

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m3/year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3	10,518.8			20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

### Example 1 (Slide Layer)

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (lookup table) (S – Carbon Sequestration) for each EA (01 – 11).

You need to multiply the **extent (ha)** of each EA with its **sequestration (tonnes/ha/yr)** value.

Click on a highlighted box to see a calculation example.

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m3/year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3	10,518.8			20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

For example: Carbon sequestration for EA01 =  
Extent (ha) \* Sequestration value (tonnes/ha/yr) =  
500 ha \* 20 tonnes/ha/yr =  
10,000 tonnes/yr

## 1.22 Services Supply Account Exercise

(Drag and Drop, 10 points, 1 attempt permitted)

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### Services supply account exercise

The second step is to calculate the carbon values from the services supply database (lookup table) (S – Carbon Sequestration) for each EA (01 – 11).  
You need to multiply the extent (ha) of each EA with its sequestration (tonnes/ha/yr) value.

**Do the math and drag the correct figures towards the orange blanks under (S) Carbon Sequestration, then hit "OK" to check your answers.**

Services Supply Database

	Extent (ha)	(C) Crop tonnes/year	(R) Recreation trips/year	(W) Water m3/year	(S) Carbon Sequestration tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3	10,518.8			20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

7,875  
344  
5,625  
2,250

OK

Drag Item	Drop Target
Picture 2	Rectangle 1
Picture 3	Rectangle 2
Picture 4	Rectangle 3
Picture 5	Rectangle 4

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

Feedback when correct:

You're doing great so far.

Keep going and move on to the totals in the next slides.

For EA02:

Extent (ha) \* Sequestration value (tonnes/ha/yr) =

= 262.5 ha \* 30 tonnes/ha/yr =

= 7,875 tonnes/yr

**Feedback when incorrect:**

Then keep going and move on to the

totals in the next slides.

For EA02:

Extent (ha) \* Sequestration value (tonnes/ha/yr) =

= 262.5 ha \* 30 tonnes/ha/yr =

= 7,875 tonnes/yr

## Correct (Slide Layer)

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (look in table)

(S – Carbon Sequestration) for each EA (01 – 11).

You need to multiply the **extent (ha)** of each EA with its **sequestration (tonnes/ha/yr)**.

**Do the math and drag the correct figures towards the orange blanks under (S) Carbon Sequestration, then hit "OK" to check your answers.**

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	
EA04 = Herbaceous crops	281.3	10,518.8			20	
EA05 = Tree covered areas	75.0				30	
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

**Well done!**

You're doing great so far.

Keep going and move on to the totals in the next slides.

For EA02:

$$\begin{aligned} \text{Extent (ha)} * \text{Sequestration value (tonnes/ha/yr)} &= \\ = 262.5 \text{ ha} * 30 \text{ tonnes/ha/yr} &= \\ = 7,875 \text{ tonnes/yr} \end{aligned}$$

Continue

## Incorrect (Slide Layer)

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (look in table)

(S – Carbon Sequestration) for each EA (01 – 11).

You need to multiply the **extent (ha)** of each EA with its **sequestration (tonnes/ha/yr)**.

**Do the math and drag the correct figures towards the orange blanks under (S) Carbon Sequestration, then hit "OK" to check your answers.**

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8			20	5,625
EA05 = Tree covered areas	75.0				30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	
EA08 = Shrubs, regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	
EA09 = Inland water bodies	50.0		1,163.6		5	
EA10 = Tree covered areas	225.0				30	
EA11 = Herbaceous crops	175.0				20	
Total	1,800.0					

**Not quite right. Take a look at the solution.**

Then keep going and move on to the totals in the next slides.

For EA02:

$$\begin{aligned} \text{Extent (ha)} * \text{Sequestration value (tonnes/ha/yr)} &= \\ = 262.5 \text{ ha} * 30 \text{ tonnes/ha/yr} &= \\ = 7,875 \text{ tonnes/yr} \end{aligned}$$

Continue



## 1.23 Services Supply Account Exercise

### Services supply account exercise

Now, the final step is to calculate the totals for each service (i.e., crop, recreation, water, and carbon sequestration).

Note: The total is the sum of all values in the column for each service.

Click on the highlighted box to see a calculation example.

Services Supply Database

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0					

### Example 1 (Slide Layer)

### Services supply account exercise

Now, the final step is to calculate the totals for each service (i.e., crop, recreation, water, and carbon sequestration).

Note: The total is the sum of all values in the column for each service.

Click on the highlighted box to see a calculation example.

For example: **Total services for carbon** =  
Sum of all values in the column =  
10,000 + 7,875 + 344 + 5,625 + 2,250 + 0 + 1,500 + 250 + 6,750 +  
3,500 = **38,094 tonnes/yr**

Services Supply Database

	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EU						
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0					38,094

## 1.24 Services Supply Account Exercise

(Drag and Drop, 10 points, 1 attempt permitted)

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SEEA

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (lookup table) (S – Carbon Sequestration) for each EU (01 – 11). You need to multiply the **extent (ha)** of each EU with its **sequestration (tonnes/ha/yr)** value.

**Do the math, fill the blanks of the totals and check your answers.**

Services Supply Database

EU	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>2</sup> /year	tonnes /ha/year	tonnes /year
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0					38,094

36,463.8

13,134.2

39,028.0

OK

Drag Item	Drop Target
Picture 2	Rectangle 1
Picture 3	Rectangle 2
Picture 4	Rectangle 3

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted


Feedback when correct:

Feedback when incorrect:

Take a look at the solution.

## Correct (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 2: COMPILERS

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### Services supply account exercise

The second step is to calculate the carbon values from the services supply database (look in table) (S – Carbon Sequestration) for each EU (01 – 11). You need to multiply the extent (ha) of each EU with its sequestration (tonnes/ha/yr) value.

**Do the math, fill the blanks of the totals and check your answers.**

Services Supply Database

EU	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0					38,094

That's correct!

Continue

## Incorrect (Slide Layer)

### Services supply account exercise

The second step is to calculate the **carbon** values from the services supply database (look in table) (S – Carbon Sequestration) for each EU (01 – 11). You need to multiply the **extent (ha)** of each EU with its **sequestration (tonnes/ha/yr)** value.

Do the math, fill the blanks of the totals and check your answers.

Services Supply Database

EU	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0	36,463.8	13,134.2	39,028.0		38,094

Not quite right.

Take a look at the solution.

Continue

## 1.25 Services Supply Account Exercise

### Services supply account exercise

So far, you've successfully learned how to use a **services supply database** to calculate values, and to compile data and information for other ecosystem services. Using the completed table, can you answer the following questions?

Fill in the EA numbers (e.g., "EA09") and check your answers once you're done!

Services Supply Database

EU	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration	
		tonnes/year	trips/year	m <sup>3</sup> /year	tonnes /ha/year	tonnes /year
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20	10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30	7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5	344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20	5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30	2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0	0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0	0
EA08 = Shrubs..regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40	1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5	250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30	6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20	3,500
Total	1,800.0	36,463.8	13,134.2	39,028.0		38,094

Which EA generates the most ...  
... services for Crop?

... services for Recreation?

... services for Water?

... services for Carbon Sequestration?

OK



## Correct (Slide Layer)

### Services supply account exercise

So far, you've successfully learned how to use a **services supply database** to calculate values, and to compile data and information for other ecosystem services. Using the completed table, can you answer the following questions?

Fill in the EA numbers (e.g., "EA09") and check your answers once you're done!

Services Supply Database					
	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration
		tonnes/year	trips/year	m <sup>2</sup> /year	tonnes /ha/year tonnes /year
EU					
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20 10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30 7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5 344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20 5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30 2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0 0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0 0
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40 1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5 250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30 6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20 3,500
Total	1,800.0	36,463.8	13,134.2	39,028.0	20 38,094

Which EA generates the most ...  
... services for Crop?

... services for Recreation?

... services for Water?

... services for Carbon Sequestration?

Very good!

## Incorrect (Slide Layer)

### Services supply account exercise

So far, you've successfully learned how to use a **services supply database** to calculate values, and to compile data and information for other ecosystem services. Using the completed table, can you answer the following questions?

Fill in the EA numbers (e.g., "EA09") and check your answers once you're done!

Services Supply Database					
	Extent (ha)	(C) Crop	(R) Recreation	(W) Water	(S) Carbon Sequestration
		tonnes/year	trips/year	m <sup>2</sup> /year	tonnes /ha/year tonnes /year
EU					
EA01 = Herbaceous crops	500.0	18,700.0	500.0	600.0	20 10,000
EA02 = Tree covered areas	262.5	0.0	1,500.0	500.0	30 7,875
EA03 = Inland water bodies	68.8	0.0	1,600.0	15,000.0	5 344
EA04 = Herbaceous crops	281.3	10,518.8	281.3	337.5	20 5,625
EA05 = Tree covered areas	75.0	0.0	428.6	142.9	30 2,250
EA06 = Artificial surfaces (urban)	56.3	0.0	500.0	500.0	0 0
EA07 = Artificial surfaces (urban)	68.8	0.0	700.0	400.0	0 0
EA08 = Shrubs...regularly flooded (wetland)	37.5	700.0	5,000.0	10,000.0	40 1,500
EA09 = Inland water bodies	50.0	0.0	1,163.6	10,909.1	5 250
EA10 = Tree covered areas	225.0	0.0	1,285.7	428.6	30 6,750
EA11 = Herbaceous crops	175.0	6,545.0	175.0	210.0	20 3,500
Total	1,800.0	36,463.8	13,134.2	39,028.0	20 38,094

Which EA generates the most ...  
... services for Crop?

... services for Recreation?

... services for Water?

... services for Carbon Sequestration?

Not quite right.



## 1.26 Module units

MODULE 5: ECOSYSTEM SERVICES

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SEEA

### Module units

The Ecosystem Services Module will take you through four units, as listed below. We recommend completing these units in order.

**Unit 1:  
Ecosystem Services Account**

- What is it?
- Why do we need it?
- What does it look like?
- Expertise and data required.

**Unit 2:  
Compilers**

- Main Ecosystem Services accounting concepts and the basics for compiling service supply accounts.

**Unit 3:  
Data providers**

- Data sources
- Examples.

**Unit 4:  
Review**

- Quiz
- Summary

## 1.27 Unit 3


MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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SEEA

### Data sources

In this unit, we will explore different data sources and methods used for compiling services supply accounts. We'll do this alongside some relevant examples from different countries who have used services supply accounting.



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## 1.28 Data of Interest

### Data of interest

**Services Supply Account:** You should be aware that a full services supply account is more complex than the simplified exercise that you practiced earlier.

The full services supply account will have to take into account:

- More services (48 "final" services in **CICES**)
- More types of data (tonnes, risks, visitors, air quality, cultural significance, etc.)
- Less frequently measured data that require models to estimate figures
- High variability among ecosystem types and region (e.g., salt marsh carbon = 650 to 1750 t CO<sub>2</sub>/ha/year)

It can be good to not include all ecosystem services, but you should consider those high priority services to figure out whether you need measurements or estimates.



## 1.29 Ecosystem Services Accounting Example

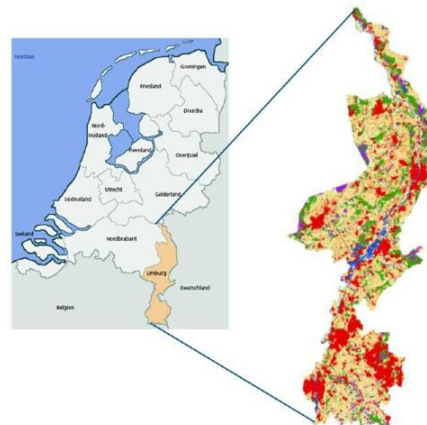
### Ecosystem services accounting example

#### Netherlands Example

The ecosystem service account study was developed for the Limburg province in the Netherlands. It analysed seven ecosystem services. The study area is 2,200 km<sup>2</sup>, and there are 1.1 million inhabitants.

Did you know that this was the one of the first studies to apply SEEA EEA concepts and classifications?

Click on the map to check out two different ecosystem services.



Source: Remme et al., 2014



## Maps (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Ecosystem services accounting example

#### Netherlands Example

The ecosystem service account study was developed for the Limburg province in the Netherlands. It analysed seven ecosystem services. The study area is 2,200 km<sup>2</sup>, and there are 1.1 million inhabitants.

Did you know that this was the one of the first studies to apply SEEA EEA concepts and classifications?

Click on the map to check out two different ecosystem services.



Source: Remme et al., 2014

## 1.30 Ecosystem Services Accounting Example

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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SEEA

### Ecosystem services accounting example

#### Netherlands Example

The Limburg study had integrated data from many sources, such as:

- Statistics on hunting
- Water extraction
- Crop and fodder yield (productivity)
- Pollution deposition by land cover type
- Lookup tables on carbon sequestration
- Databases of bicycling paths and trip lengths.

To the right, you can see the ecosystem services in **physical units**.

Click on the highlighted units box to learn about an interesting fact about this study.

Ecosystem service	Units	Land cover type								Provincial total	
		Urban	Pasture	Cropland	Forest	Heath	Peat	Surface Water	Other nature		
Provisioning											
Hunting	kg meat	-	9,180	14,752	8,100	678	70		1,513	34,193	
Drinking water extraction	10 <sup>3</sup> m <sup>3</sup> water	4,071	7,026	11,227	3,117	214	-	478	862	26,995	
Crop production	10 <sup>3</sup> kg produce	-	-	1,868	-	-	-	-	-	1,868	
Fodder production	10 <sup>3</sup> kg dry matter		533	251						784	
Regulation											
Air quality regulation	10 <sup>3</sup> kg PM <sub>10</sub>	272	404	712	700	45	7	40	69	2,254	
Carbon sequestration	10 <sup>3</sup> kg carbon	875	8,019	273	30,664	393	149	-	1,056	61,429	
Cultural	Recreational cycling	10 <sup>3</sup> trips	2,690	1,863	2,611	1,565	30	3	139	220	9,121

## Explanation 1 (Slide Layer)

### Ecosystem services accounting example

#### Netherlands Example

The Limburg study had integrated data from many sources, such as:

- Statistics on hunting
- Water extraction
- Crop and fodder yield (productivity)
- Pollution deposition by land cover type
- Lookup tables on carbon sequestration
- Databases of bicycling paths and trip lengths.

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		Land cover type									Provincial total
Ecosystem service	Units	Urban	Pasture	Cropland	Forest	Heath	Peat	Surface Water	Other nature		
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	Drinking water extraction	10 <sup>3</sup> m <sup>3</sup> water	4,071	7,026	11,227	3,117	214	-	478	26,995	
	Crop production	10 <sup>3</sup> kg produce	-	-	1,868	-	-	-	-	1,868	
	Fodder production	10 <sup>3</sup> kg dry matter	-	533	251	-	-	-	-	784	
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	Carbon sequestration	10 <sup>3</sup> kg carbon	875	8,019	273	30,684	393	149	-	1,056	
Cultural	Recreational cycling	10 <sup>3</sup> trips	2,690	1,863	2,611	1,565	30	3	139	220	

Note that these units of measures are very different. This means that you cannot add or compare between services. To overcome this issue, you can create an index, like in the SEEA EEA Condition Account example.

## 1.31 Ecosystem Services Accounting Example

### Ecosystem services example

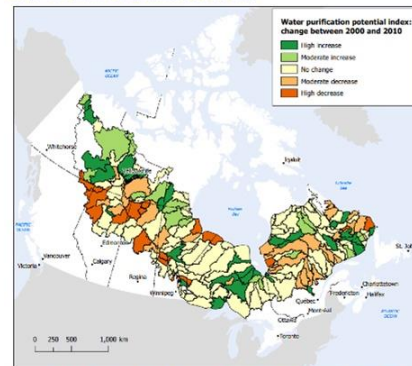
#### Canada example

A study was conducted in Canada to estimate the change in water purification potential by drainage area for the boreal forest between 2000 and 2010. They used a modelling approach based on "condition" data to estimate the generation of the ecosystem services.

Here are some of the indices that were used:

- Percent of forest cover
- Percent of agricultural land
- Percent of riparian forest
- Percent of wetlands
- Percent of anthropogenic disturbance
- Percent of burn area
- Edge & linear density (fragmentation)
- Human footprint
- Slope
- Nitrogen & sulphur exceedance (from atmospheric deposition)

Water purification potential index by watershed, 2000 to 2010 change



Notes: (1) Results from the forest land use study are preliminary. The variability observed in the index values was not increased against independent datasets on water quality. The selected indices and weights, data sources and scoring scheme are found in Tables 1 and 2 (Appendix C).  
(2) Source: Environment Canada and Natural Resources Canada, 2013, spatial analysis.

Source: Statistics Canada, 2013, Human Activity and the Environment  
To zoom in, please click the image.



## 1.32 Ecosystem Services Accounting Example

### Ecosystem services example

#### Canada example

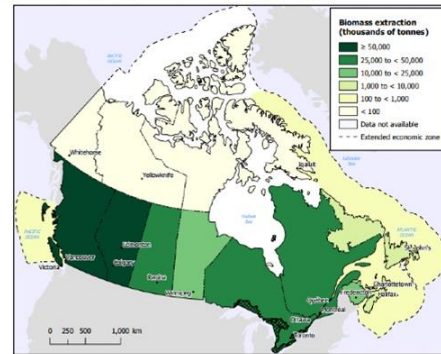
As shown in the map, the net biomass extraction for human use from terrestrial and aquatic ecosystems was estimated in thousands of tonnes.

The different ecosystem services were:

- Agricultural crops
- Livestock and poultry
- Milk, maple products and honey
- Forestry
- Fisheries (inland and marine)

It is important to note that in this study, many biomass-related services were added into one indicator.

Biomass extraction for human use from Canada's terrestrial and aquatic ecosystems, 2010



Source: Statistics Canada, 2013, Human Activity and the Environment  
To zoom in, please click the image.

## 1.33 Ecosystem Services Accounting Example

### Ecosystem services example

#### Canada example

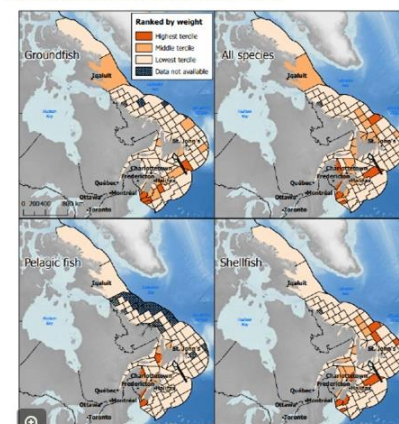
In addition, the study estimated the weight of commercial fish landings by marine statistical area on both the east and west coasts. These statistical areas were defined by Fisheries and Oceans Canada.

The study included groundfish, pelagic fish, shellfish, and all species.

It is worth mentioning that this was one of the first estimates of commercial fish catch by marine statistical area.

The map shows that different areas of the ocean are generating different levels of provisioning services for fish catches.

Weight of commercial landings, Atlantic coast, by statistical area 2006 to 2010



Source: Statistics Canada, 2013, Human Activity and the Environment



## 1.34 Service Flow Measures

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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SEEA

### Service flow measures

There are different ecosystem services to be considered.  
Each of these services requires that certain service flows be measured.

Click on each ecosystem service category to learn more about the flow measurements.

The diagram consists of a central yellow circle labeled 'SERVICES'. Surrounding it are three olive-green circles: 'Provisioning services' at the top, 'Regulating services' at the bottom left, and 'Cultural services' at the bottom right. All circles are connected by a dotted line forming a triangle around the center.

### Explanation 1 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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SEEA

### Service flow measures

There are different ecosystem services to be considered.  
Each of these services requires that certain service flows be measured.

Click on each ecosystem service category to learn more about the flow measurements.

Service	Flow measure
Timber services	Timber increment
Crops	Crop production
Livestock	Livestock production
Water provision	Annual freshwater supply

The diagram is identical to the one in the previous slide, showing a central 'SERVICES' hub connected to 'Provisioning services', 'Regulating services', and 'Cultural services'.

## Explanation 2 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

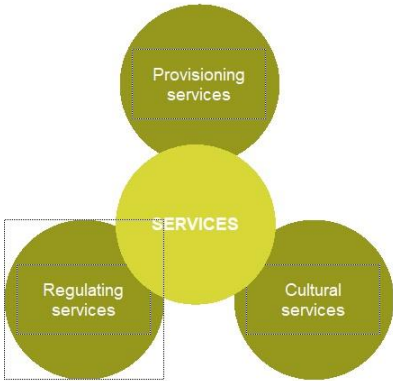
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SEEA

### Service flow measures

There are different ecosystem services to be considered.  
Each of these services requires that certain service flows be measured.

Service	Flow measure
Water quantity regulation	Total amount of water used Total amount of pollutants removed annually
Climate regulation	Annual carbon fixation
Storm protection	Total number of storms mitigated
Air quality regulation	Total amount of pollutants removed via dry deposition on leaves
Erosion control	Total amount of soil retained
Pollination	Increased yield of crops due to pollination
Soil quality regulation	Increased yields of crops attributable to soil quality





## Explanation 3 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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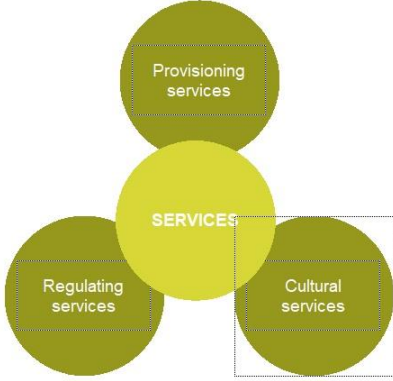
SEEA





### Service flow measures

There are different ecosystem services to be considered.  
Each of these services requires that certain service flows be measured.

Click on each ecosystem service category to learn more about the flow measurements.


Service	Flow measure
Recreation	Number of visitors





## 1.35 Data Options and Sources

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.

Details on data sources follow below:


- Socio-economic statistics
- Environmental statistics
- Ecosystem valuation databases
- Specific studies and models
- Special surveys and case studies

Click on each source to learn more.



### Explanation1 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.





Details on data sources follow below:

- Socio-economic statistics
- Environmental statistics
- Ecosystem valuation databases
- Specific studies and models
- Special surveys and case studies

Click on each source to learn more.


#### Socio-economic statistics

- Agricultural statistics: crop, livestock production
- Energy statistics: biomass for fuel
- Fisheries statistics: catch, stock
- Forestry statistics: timber stock, harvest
- Park surveys: visitors, use
- Water statistics: withdrawals, consumption
- Natural disasters: incidence of floods, erosion, storms
- Soil inventories: erosion potential
- Health statistics: regulation of biotic environment



## Explanation 2 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.





Details on data sources follow below:

- Socio-economic statistics
- Environmental statistics
- Ecosystem valuation databases
- Specific studies and models
- Special surveys and case studies

Click on each source to learn more.


#### Environmental statistics

- Significant species' ranges and habitats
- Land covers that provide information about carbon sequestration, air filtration
- Hydrology & weather data: flow rates, variability that can help provide flood risk data
- Topography, land cover, soil and weather data, which can be used to estimate erosion and landslide risk
- Carbon storage and sequestration (see carbon accounts)



## Explanation 3 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.





Details on data sources follow below:

- Socio-economic statistics
- Environmental statistics
- Ecosystem valuation databases
- Specific studies and models
- Special surveys and case studies

Click on each source to learn more.


#### Ecosystem valuation databases

- Based on codifying scientific studies
- Include data for many countries, ecosystem type, physical services measures, such as:
  - Environmental Valuation Reference Inventory ([www.evri.ca](http://www.evri.ca))
  - TEEB Ecosystem Service Valuation Database (ESVD)
  - Gulf of Mexico Ecosystem Services Valuation Database ([www.gecoserv.org](http://www.gecoserv.org))



## Explanation 4 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.

Details on data sources follow below:





- **Socio-economic statistics**
- **Environmental statistics**
- **Ecosystem valuation databases**
- **Specific studies and models**
- **Special surveys and case studies**

Click on each source to learn more.

#### Specific studies and models


- These may not be included in valuation databases
- Specific studies:
  - National or regional ecosystem assessments (Millennium Ecosystem Assessment, UK National Ecosystem Assessment)
  - Small-area studies (e.g., one park, one region)
  - TEEB studies and country studies (multiple ecosystems and services)
- Decision-support models:
  - There are landscape-scale and site-scale models that can help estimate service flows (AIRES, InVEST, LUCI, etc.)

**AIRES** = Artificial Intelligence for Ecosystem Services  
**InVEST** = Integrated Valuation of Ecosystem Services and Trade-offs  
**LUCI** = Land Use and Capability Indicator



## Explanation 5 (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES

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### Data options and sources

We addressed the sources of data earlier. But for the next few slides, we will elaborate on the significant data sources that will be of use when starting ecosystem services accounts.





Details on data sources follow below:

- **Socio-economic statistics**
- **Environmental statistics**
- **Ecosystem valuation databases**
- **Specific studies and models**
- **Special surveys and case studies**

Click on each source to learn more.

#### Special surveys and case studies

- High-priority data gaps may also be addressed by collecting new data
  - Small-area studies (e.g., one park, one region)
  - Ecological field studies to determine “production functions”
  - Socio-economic surveys to determine the use of services (e.g., water, food, recreation)
  - Case-studies for specific locations or social groups (e.g., dependence on low-income residents)
- If possible, add questions to existing surveys, for example:
  - Households use of water, source of food, incidence of hazards (flooding, erosion, drought, disease), source of biomass for fuel.





## 1.36 Last page

MODULE 5: ECOSYSTEM SERVICES, UNIT 3: DATA SOURCES


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SEEA

### Last page

Great! You have now completed Units 1, 2, and 3.

Let's move on to the **quiz** section to review the accounting for flows of ecosystem services knowledge you've learned in this module.





## 1.37 Module units

MODULE 5: ECOSYSTEM SERVICES




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SEEA

### Module units

The Ecosystem Services Module will take you through four units, as listed below. We recommend completing these units in order.

<b>Unit 1: Ecosystem Services Account</b> <ul style="list-style-type: none"><li>• What is it?</li><li>• Why do we need it?</li><li>• What does it look like?</li><li>• Expertise and data required.</li></ul>	<b>Unit 2: Compilers</b> <ul style="list-style-type: none"><li>• Main Ecosystem Services accounting concepts and the basics for compiling service supply accounts.</li></ul>	<b>Unit 3: Data sources</b> <ul style="list-style-type: none"><li>• Data sources</li><li>• Examples.</li></ul>	<b>Unit 4: Review</b> <ul style="list-style-type: none"><li>• Quiz</li><li>• Summary</li></ul>
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## 1.38 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 1

Can you match the services category with its description?

**Drag the categories to their appropriate grey fields an hit "OK"!**

Regulating Services

Cultural Services

Provisioning Services

are the regulation of climate, hydrological, ecological and soil processes. Example: pollination, carbon sequestration, flood control.

are the nonmaterial benefits provided by ecosystems. Example: recreation, tourism, providing a setting for cultural or religious practices.

are goods that can be harvested from, or extracted from ecosystems. Example: providing fish for fisheries, or providing wood for timber harvest

OK

Drag Item	Drop Target
Regulating Services	Rectangle 1
Cultural Services	Rectangle 2
Provisioning Services	Rectangle 3

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

**Feedback when correct:**

Very good.

**Feedback when incorrect:**

Have a look at the solution.

**That's correct! (Slide Layer)**

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 1

Can you match the services category with its description?

**Drag the categories to their appropriate grey fields an hit "OK"!**

	are the regulation of climate, hydrological, ecological and soil processes. Example: pollination, carbon sequestration, flood control.
	are the nonmaterial benefits provided by ecosystems. Example: recreation, tourism, providing a setting for cultural or religious practices.
	are goods that can be harvested from, or extracted from ecosystems. Example: providing fish for fisheries, or providing wood for timber harvest

Regul

**That's correct!**

Very good.

Continue

## Not quite right. (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 1

Can you match the services category with its description?

Drag the categories to their appropriate grey fields an hit "OK"!

Regulating Services	are the regulation of climate, hydrological, ecological and soil processes. Example: pollination, carbon sequestration, flood control.
Cultural Services	are the nonmaterial benefits provided by ecosystems. Example: recreation, tourism, providing a setting for cultural or religious practices.
Provisioning Services	are goods that can be harvested from, or extracted from ecosystems. Example: providing fish for fisheries, or providing wood for timber harvest

Regul

Not quite right.

Have a look at the solution.

Continue

## 1.39 Drag and Drop

(Drag and Drop, 10 points, 1 attempt permitted)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 2

Can you match the ecosystem type to the service it supplies?

Drag the ecosystem types to their appropriate grey fields an hit "OK"!

Flood control		Wetlands, mountain forests, upper catchment areas
Food security, Crops		Agricultural land
Biomass for energy		Forested areas, agricultural land
Recreation		Forests, wetlands, beaches
Carbon sequestration		Forested areas, mangroves, grasslands

OK

Home

Navigation

Book

Drag Item	Drop Target
Wetlands, mountain forests, upper catchment areas	Rectangle 1
Agricultural land	Rectangle 2
Forested areas, agricultural land	Rectangle 3
Forests, wetlands, beaches	Rectangle 10
Forested areas, mangroves, grasslands	Rectangle 12

Drag and drop properties
Snap dropped items to drop target (Stack random)
Delay item drop states until interaction is submitted

**Feedback when correct:**

Very good.

**Feedback when incorrect:**

Have a look at the solution.



## That's correct! (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 2

Can you match the ecosystem type to the service it supplies?

Drag the ecosystem types to their appropriate grey fields and hit "OK"!

Flood control		Wetlands, mountain forests, upper catchment areas
Food security, Crops		Ag
Biomass for energy		Fo
Recreation		Fores
Carbon sequestration		Fo

**That's correct!**

Very good.

Continue

## Not quite right. (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 2

Can you match the ecosystem type to the service it supplies?

Drag the ecosystem types to their appropriate grey fields and hit "OK"!

Flood control	Wetlands, mountain forests, upper catchment areas
Food security, Crops	Agricultural land
Biomass for energy	Forested areas, agricultural land
Recreation	Forests, wetlands, beaches
Carbon sequestration	Forested areas, mangroves, grasslands

**Not quite right.**

Have a look at the solution.

Continue

## 1.40 Pick Many

(Pick Many, 10 points, 1 attempt permitted)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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SEEA

### Quiz 3

Which of the following flow measures are used to quantify regulating services?

**Check all the answers you think are correct!**

☐ Annual carbon fixation





☐ Total amount of soil retained

☐ Total amounts of pollutants removed annually

☐ Increased yield of crops due to pollination

☐ Total amount of water used

OK



Correct	Choice
X	Annual carbon fixation
X	Total amount of soil retained
X	Total amounts of pollutants removed annually
X	Increased yield of crops due to pollination
X	Total amount of water used

### Feedback when correct:


All answers are correct.

### Feedback when incorrect:

All answers would have been correct.

## Very good! (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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### Quiz 3

Which of the following flow measures are used to quantify regulating services?

**Check all the answers you think are correct!**

- ☐ Annual carbon fixation
- ☐ Total amount of soil retained
- ☐ Total amounts of pollutants removed annually
- ☐ Increased yield of crops due to pollination
- ☐ Total amount of water used


**Very good!**

All answers are correct.

Continue

## Not quite right. (Slide Layer)

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: QUIZ

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### Quiz 3

Which of the following flow measures are used to quantify regulating services?

**Check all the answers you think are correct!**

- ☒ Annual carbon fixation
- ☒ Total amount of soil retained
- ☒ Total amounts of pollutants removed annually
- ☒ Increased yield of crops due to pollination
- ☒ Total amount of water used

**Not quite right.**

All answers would have been correct.

Continue

## 1.41 Untitled Slide

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: SUMMARY

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SEEA

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### Summary

Now that you've reached the end of this module, you're prepared to:

- Understand why accounting for flows of ecosystem services is important.
- Navigate how accounting for flows of ecosystem services is considered in the SEEA.
- Understand the basics of ecosystem services and follow the steps for compiling a "services supply account".
- Identify national and global data sources for accounting for flows of ecosystem services.

**Further Information:**

System of Environmental Economic Accounting – Experimental Ecosystem Accounting (**SEEA-EEA**) 2012.  
System of Environmental Economic Accounting – Central Framework (**SEEA-CF**) 2012.  
"Linkages between ecosystem service accounts and ecosystems asset accounts" (2014) by Lars Hein.  
"Biophysical Modelling and Analysis of Ecosystem Services in an Ecosystem Accounting Context" (2014) by Lars Hein



## 1.42 Untitled Slide

MODULE 5: ECOSYSTEM SERVICES, UNIT 4: REFERENCES

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SEEA

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### References

- Common International Classification of Ecosystem Services (CICES), 2013. [www.cices.eu](http://www.cices.eu)
- European Commission, Organisation for Economic Co-operation and Development, United Nations and World Bank 2013, SEEA Experimental Ecosystem Accounting, [http://unstats.un.org/unsd/envaccounting/seeaRev/eea\\_final\\_en.pdf](http://unstats.un.org/unsd/envaccounting/seeaRev/eea_final_en.pdf)
- Maes, J., Paracchini, M.L. and Zulian, G., 2011. A European assessment of the provision of ecosystem services: Towards an atlas of ecosystem services. Luxembourg: European Commission Joint Research Centre-Institute for Environment and Sustainability.
- Malouin, C., Doyle, M. and Liss, K., 2013. Toward an Ecosystem Potential Index for Canada (EPIC): A Boreal Case Study. ResearchGate.net.
- Nottingham School of Geography, nd, Nature's services in decision making. <http://nottingham.ac.uk/geography/research/impact/natures-services.aspx>
- Remme, Roy P., Matthias Schröter, and Lars Hein. Developing spatial biophysical accounting for multiple ecosystem services. Ecosystem Services 10 (2014): 6-18.
- Statistics Canada, 2013. Human Activity and the Environment: Measuring Ecosystem Goods and Services 2013. 16-201-XWE. Ottawa: Government of Canada.

